

ENVIRONMENTAL RESOURCE INVENTORY

ERI

AUGUST 2013

For the Township of:

BORDENTOWN

Burlington County, New Jersey



by:



with:

The Environmental
Commission of
Bordentown Township



The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals, and the public with a common vision of making a great region even greater. Shaping the way we live, work, and play, DVRPC builds consensus on improving transportation,

promoting smart growth, protecting the environment, and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.



The symbol in our logo is adapted from the official DVRPC seal and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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Bordentown Township Committee

Mayor Jim Cann, Deputy Mayor Jill Popko, Stephen Benowitz, Karl Feltes, John Moynihan.

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Bordentown Township Environmental Commission

Chair Roger Plew, Vice-Chair Sid Morginstin, Secretary Marilee Ryan, Livia Popko.

Special thanks are due to Mary Alessio Leck, member of Friends of the Marsh and Emeritus Professor of Biology at Rider University.

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Executive Summary

Bordentown Township is a municipality of 11,367 people and covers over nine square miles (5,957 acres). The area was first settled in the late 1600s.

Bordentown Township lies in the Inner Coastal Plain, an area of fertile agricultural soils.



Seth Hand Memorial Park

Source: DVRPC

There are about 28 miles of streams running through Bordentown Township, about 10 miles of which are headwater streams. There are also 105 acres of lakes and ponds, including the 21-acre Crystal Lake.

There are portions of four watersheds, each containing one subwatershed within Bordentown Township. In 2010, all of these subwatersheds were impaired for one or more designated uses. The most common causes of impairment were excess total phosphorus and total suspended solids.

In terms of acres, slightly less than half of the township is developed land, followed by wetlands, forest, water, agriculture, and barren land.

There are a number of threatened and endangered species that may be found in Bordentown Township, including the bald eagle, grasshopper sparrow, bobolink, and Northern harrier.

Bordentown's public drinking water supply is drawn from the Potomac-Raritan-Magothy aquifer system through wells located just north of the township in Hamilton Township.

There are a number of archaeological sites listed or eligible for listing on the State and National Registers of Historic Places, including the Abbott Farm Historic District.

The Abbott Marshlands, located in the northwest corner of the township, is one of the most significant natural areas in the state and contains many rare plants and animals.

Introduction

The purpose of an Environmental Resource Inventory is to identify and describe the natural resources of a community. A community's natural resources—its soil, water, air, forests, fields, and waterways—are fundamental to its character. The protection and wise use of those resources is essential to the public health, safety, and welfare of current and future residents.

The Environmental Resource Inventory provides the basis for the development of methods and steps to preserve, conserve, and utilize those resources, although it does not include specific recommendations to those ends. It is, instead, a compendium of all the existing information that can be found about a township's natural resources, presented in a form that is useful to a broad audience. The Inventory reflects a particular moment in time, and should be updated as new data becomes available.

In the past, Bordentown Township's natural resources made the township an agricultural community. In addition, its position along the Delaware River and the growth of the transportation network that crosses Bordentown made the area an important industrial and commercial center in the 19th and 20th centuries. Today, as residential development in this part of Burlington County increases, the character of Bordentown Township is also undergoing change. Documentation of its resources has become a necessity, especially if it is to support residents of the future. Bordentown's remaining wetlands and tidal marshes, which provide significant habitat for endangered and threatened plants and animals, will be vital to the continued health of the community and the enjoyment of its citizenry.

Sources

This document is an update of the *Environmental Resource Inventory (ERI) for the Township of Bordentown (2004)* prepared by the Delaware Valley Regional Planning Commission (DVRPC). This version includes new, updated, and expanded data and information on the built and natural environment of the township.

The maps and data relating to natural resources are mainly derived from the New Jersey Department of Environmental Protection's (NJDEP's) Geographic Information System (GIS) mapping, the Landscape Project produced by the Endangered and Nongame Species Program of the NJDEP Division of Fish and Wildlife, reports by the United States Geologic Service (USGS) and New Jersey Geologic Service, and data and maps compiled by the DVRPC. Information from these sources specific to Bordentown Township has been included whenever it was available. Information from other reports

about specific sites has also been incorporated, along with data provided by the township and county. The ERI has been reviewed and revised by members of the Environmental Commission and other municipal officials.

Descriptive introductions to some topics have been included in the ERI to give readers background on various complex topics. The hope is that this information will also assist the Environmental Commission and other township officials in obtaining additional data from state sources and determining the types of investigations that still need to be conducted.



Crosswicks Creek

Source: DVRPC

Brief History

Long before European settlement, various Native American peoples occupied the lands near the Delaware River, including parts of Bordentown Township. By the time of European arrivals, these Native Americans called themselves the Lenni Lenape. Later, they were called the “Delaware” by Europeans. The Lenni Lenape inhabited much of southern New Jersey and their settlements were usually located along stream banks. They fished and hunted, and there is some evidence that certain wild plant communities were managed. The Lenni Lenape valued the area for its abundance of fish and game, and they utilized the regional creeks extensively for transportation. By 1801, well over a century after the arrival of the first settlers, the Lenni Lenape had sold virtually all of their land to the settlers and moved from the area.

The first European settlers in Burlington County were the Dutch, who populated Burlington Island in 1624. A fort and civil center was established on the Island along with a number of dwellings and a tavern. As early as 1638, Swedish settlers also ventured into the Delaware Valley and purchased land from the Indians to build small settlements along the Delaware River. In 1644, King Charles II of England took control of much of America’s eastern seaboard, and he deeded most of present-day New Jersey to his brother, the Duke of York, who split it into East and West. The British quickly sought to occupy the land and secure its control. West Jersey was settled mostly by English Quakers. Throughout the 17th century, sections of New Jersey were acquired from the Lenni Lenape tribe.

Burlington County was officially founded on May 17, 1694. By that time, it was a well-established region, with industries in the county that included a tannery, sawmills, pottery-making facilities, and brickyards. Initially, the Bordentown area was called Farnsworth’s Landing, named after Thomas Farnsworth, one of the original settlers of the area. Thomas Farnsworth, an English Quaker, first settled between Crosswicks Creek and Blacks Creek in 1682, where the Delaware River meets Crosswicks Creek. He relocated from the downstream community of Burlington, New Jersey. At the time of Farnsworth’s arrival there were over 20 farms already located along Blacks Creek. Thirty-six years later, in 1717, Joseph Borden arrived in the well-established Farnsworth’s Landing. He very quickly acquired the majority of the land where Bordentown City is located today.

Bordentown Township and the City of Bordentown have a rich cultural history. During the course of the Revolutionary War, English troops often occupied the area. Moreover, the Bordentown region was home to many notable figures. Francis Hopkinson, a signer of the Declaration of Independence; Thomas Paine, a famous American journalist and writer; Clara Barton, founder of the first free public school in Bordentown who later founded the

Red Cross; and Joseph Bonaparte, the eldest brother of Napoleon and the ex-king of Naples and Spain; all resided in the City of Bordentown. According to a bicentennial history of Bordentown, *Bordentown 1682-1976*, "Bordentown, aside from being an active waterfront community, was a fashionable and aristocratic resort town to which many of Philadelphia's finest families traveled."

Throughout Bordentown's history, gristmills and brick making were important to the local economy. One particular mill, Dunns Mill, had a history spanning nearly 200 years, beginning in 1708 when Francis Davenport built the mill on Blacks Creek. Ownership of the mill changed hands numerous times, and both Samuel Farnsworth and Joseph Borden owned the mill at various points before it was purchased by Martin Luther Dunn in 1875. The mill burned down in 1901 and was never rebuilt, but the land the mill occupied remained in the Dunn family until 1982. Today, all that remains is the foundation of the mill on Blacks Creek off of Dunns Mill Road. Several remains of the clay pits used for brick making can also still be seen in the township, most notably along Rising Sun Road and along Dunns Mill Road.



A Pond at the Site of a Former Clay Pit near Dunns Mill Road

Source: DVRPC

Located between Philadelphia and New York, the township was historically a major transportation center. A stagecoach, the Bordentown and New York Stage, carried passengers and the mail from Bordentown to a point just outside of New York between 1740 and the early 1790s. During the 1780s, a riverboat operated between Philadelphia and Bordentown. In 1831, the Camden and Amboy steam-powered railroad made its debut in Bordentown, and the Delaware-Raritan Canal opened in 1834. The Pennsylvania Railroad leased the railroad and the canal in 1871 and immediately began to close the canal, which by 1932 was completely closed. The railroad continued for another thirty

years, ending its passenger service in 1963, although it continued to be used for freight. Forty years later, New Jersey Transit restored passenger service on the line, which is now called the River LINE and links Trenton and Camden. During the late 19th century, trolley lines were created between Trenton, Bordentown, and Camden. A trolley strike in 1923 led to the start of bus service, which eventually replaced trolley service completely in 1932.



Camden & Amboy Railroad

Source: Matt Luyber

In 1849, the Borough of Bordentown was established within the Township of Chesterfield. It was formed from areas of Chesterfield and Mansfield townships and took its name from Joseph Borden (1687-1765), one of the original settlers of the Bordentown region. The Township of Bordentown was established in 1852. Its boundaries included the areas of what is known today as Bordentown Township, the City of Bordentown, and Fieldsboro Borough. Bordentown City separated from the township in 1867, and Fieldsboro Borough separated from the township in 1894. In 1931, Bordentown Township expanded north by annexing the piece of land bounded by Crosswicks Creek, Grovesville Road, and Hogback Road.

There were nearly 6,000 residents living in the Bordentown region during the 1870s. This large population was mainly due to the railroad and a Civil War-era boom.

In 1940, Bordentown Township was a rural community with a population of just 1,095, while the City of Bordentown had a population of 4,223. The suburbanization of the 1950s led to population increases in both the township and the city. In 1960, however, the population of Bordentown Township surpassed the population of the City of Bordentown. Since this time, the population of the township has steadily increased while the population of the city has steadily decreased. According to the 2010 census, Bordentown Township had a population of 11,367, significantly greater than its 2000 population of 8,380, while the City of Bordentown had a population of 3,924, less than its 2000 population of 3,969.

In 1962, the township built a sanitary sewage collection and treatment system, now managed by the Bordentown Sewerage Authority. A full-time Bordentown Township police force was established in 1972. In 1953, Bordentown Township, along with the City of Bordentown, built their first joint elementary school. Prior to 1953, Bordentown Township had a sending agreement with the City of Bordentown. Additionally, in 1965, the first regional high school was constructed, and in 1982 a regional school district was formed.

After World War II, highways were built and the trucking industry began to replace railroad transport of both goods and people. Bordentown Township was primarily rural until the early 1950s. However, the construction of the New Jersey Turnpike and Interstate 295, which began in the 1950s and 1960s, brought major changes to Bordentown. Numerous housing developments began to be constructed on land previously used for farming.

Today, Interstate 295 and the New Jersey State Turnpike intersect Bordentown Township. By automobile, it takes approximately 45 minutes to get to Philadelphia and one-and-a-half hours to arrive in New York City. Bordentown Township is home to a wide array of people with a diverse set of occupations reflecting today's 21st century service and light manufacturing economies. Bordentown Township has become a community with a substantial mix of industrial, commercial, and residential uses.

Bordentown's landscape continues to be dominated by the water that was so much a part of its early history—its Delaware riverfront, its three major stream corridors, and the acres of wetlands and marshes surrounding them. Recently, Bordentown Township has taken steps to recognize the importance of creating permanent open space and protecting land from development. During the early 1980s, the township invested in two parks, each costing about \$1 million. Additionally, in 1999, there was a referendum asking Bordentown Township residents if they were in favor of preserving open space, including farmland, and preserving natural and scenic resources. The residents voted in favor of preservation, and a \$0.03 tax per \$100 property valuation dedicated to creating and maintaining open space in Bordentown Township was established. It is estimated that this tax brings in \$150,000 annually.

Location, Size, and Land Use

Bordentown Township is an incorporated township located at the northern tip of Burlington County, New Jersey. Five municipalities border the township within Burlington County: Chesterfield Township to the east/southeast, the Borough of Fieldsboro and the City of Bordentown to the west, Mansfield Township to the south, and Florence Township to the southwest. It is also bounded by Hamilton Township, in Mercer County, to the north. The northern boundary of Bordentown Township is the Crosswicks Creek, which forms the dividing line between Mercer and Burlington counties. See [Map 1: Places in Bordentown Township](#) and [Map 2: Aerial Photo \(2010\)](#).

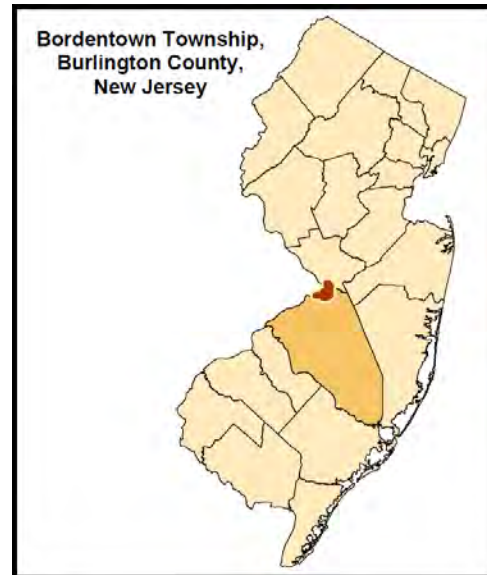


Figure 1: Bordentown Township

Source: DVRPC

Bordentown Township occupies a total area of 9.31 square miles, or 5,957 acres. The U.S. Census Bureau estimates that Bordentown Township had a population of 11,367 in 2010, which was a 36 percent increase from its 2000 population of 8,380 people.

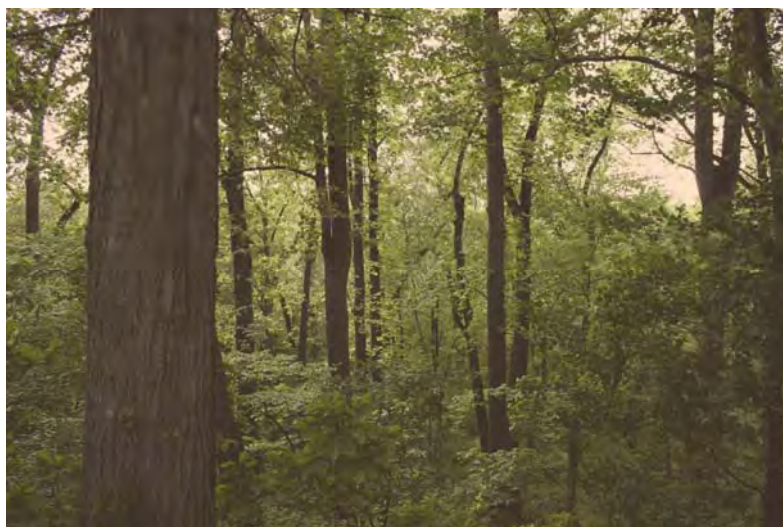
Bordentown Township also includes Newbold Island, a 400-acre island in the Delaware River. Newbold Island has riparian habitat, and a pair of mating bald eagles has been sighted there. Newbold Island is privately owned and is not protected open space. However, people may boat on the Delaware around the island. Public Service Electric and Gas Company (PSE&G) owns the southern half of the island and has proposed several projects for that land, including a controversial nuclear power plant in the 1970s. After an Environmental Impact Statement and several public hearings revealed increasing population density near the site, concern about health effects, and widespread opposition by residents, the proposal was withdrawn by PSE&G. Conectiv proposed building a 550-megawatt power station on the same site, but it was never built. The northern half of the island is privately owned and contains a privately owned and operated heliport.

Bordentown Township is connected by highways and local roads, which the majority of residents use to commute. The township is also served by the River LINE light rail

connecting Camden and Trenton, which provides public transportation access to Philadelphia and the river communities of New Jersey. See the **Transportation** section for more detailed information.

Table 1: Bordentown General Land Cover (2007)

shows Bordentown Township’s land cover grouped into general categories. The categories are based on data from the New Jersey Department of Environmental Protection’s (NJDEP’s) 2007 color infrared digital imagery. NJDEP’s categorization separates wooded wetlands from upland forest areas and includes the former in the wetlands category. These land uses are shown on **Map 3: NJDEP Land Cover (2007)**.



Woodland near Georgetown Road

Source: Olivia Whelan

According to the NJDEP 2007 data, almost half of Bordentown Township is considered “urban” or developed land (43 percent). This is followed by wetlands, at about 22 percent. Forested land covers over 16 percent of the township, water covers nearly eight percent, agriculture covers about seven percent, and barren land covers almost four percent. Barren land is land where vegetation covers less than 15 percent of the area or areas covered by bare rock, sand or clay, quarries, strip mines, gravel pits, and transitional areas, such as construction sites. For more detailed NJDEP vegetative cover, see **Map 15: Natural Vegetation (2007)** and **Table 21: Bordentown Natural Vegetation (2007)**.

Table 1: Bordentown General Land Cover (2007)

General Land Classes	Area (Acres)	Percent
Agriculture	436.02	7.32%
Barren Land	220.53	3.70%
Forest	962.09	16.15%
Urban	2,536.50	42.58%
Water	463.16	7.78%
Wetlands	1,338.36	22.47%
Total	5,956.67	100.00%

Source: NJDEP, 2007

Table 2: Bordentown Land Use (2010) is from DVRPC and is based on analysis of 2010 aerial photography. One difference from the NDJEP data set is that wetlands are not

delineated but are instead included in the forested or vacant land category. See [Map 4: DVRPC Land Use \(2010\)](#).

As seen in [Table 2](#), the largest single type of land use in Bordentown is wooded habitat, which covers 30 percent, or about 1,808 acres of the township. This includes wooded wetlands, which are not specifically identified by DVRPC. Nearly 18 percent of the township's area is single-family detached homes. Vacant land covers nearly 13 percent of the township, which includes non-wooded wetlands areas.

Table 2: Bordentown Land Use (2010)

Type	Area (Acres)	Percentage
Agricultural	475.26	7.98%
Commercial	316.14	5.31%
Community Services	133.72	2.26%
Manufacturing: Heavy Industrial	11.35	0.19%
Manufacturing: Light Industrial	45.33	0.76%
Military	2.56	0.04%
Parking: Commercial	79.66	1.34%
Parking: Community Services	14.33	0.24%
Parking: Heavy Manufacturing	0.23	0.00%
Parking: Light Manufacturing	4.42	0.07%
Parking: Military	1.19	0.02%
Parking: Multi-Family	21.52	0.36%
Parking: Recreation	2.55	0.04%
Recreation	122.02	2.05%
Residential: Mobile Home	3.05	0.05%
Residential: Multi-Family	165.81	2.78%
Residential: Single-Family Detached	1,045.32	17.55%
Transportation	343.23	5.76%
Utility	174.64	2.93%
Vacant	745.56	12.52%
Water	440.82	7.40%
Wooded	1,807.97	30.35%
Total	5,956.70	100.00%

Source: DVRPC, 2010

Natural Resources

Physiography

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by five main physiographic provinces (see **Figure 2: The Physiographic Regions of New Jersey**). The rocky terrain of the Appalachian Province is at one extreme, and the sands of the coast are at the other.

The Atlantic Coastal Plain landscape extends from Massachusetts to Texas and is divided into Inner and Outer sections. Bordentown Township is located entirely in the Inner Coastal Plain. The Coastal Plain generally consists of unconsolidated sands, silts, and clays. As these sediments are prone to erosion, the Coastal Plain is generally characterized by regions of low topographic relief. In New Jersey, the Inner Coastal Plain is made up of alternating layers of sand and clay. Deposits originating in the breakdown of Appalachian and Catskill sedimentary, metamorphic, and igneous rocks lie between or alternate with layers formed by oceanic (marine) deposition, which occurred as the ocean shoreline advanced and receded over geologic time. Geologists use the term “interbedding” to describe beds of rock that lie between or alternate with another type of rock.

The Inner Plain layers date from the Cretaceous Period, 135 to 65 million years ago. Generally, soils of the Inner Coastal Plain are quite fertile. The Outer Coastal Plain was formed more recently than the Inner Coastal Plain. It was laid down by the ocean and developed during the mid-to-late part of the Cenozoic Era, 65 million years ago to the present. Outer Coastal Plain soils are sandier and less fertile than those of the Inner Plain and do not hold water as well.

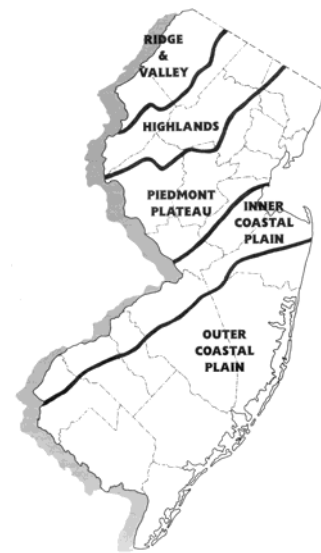


Figure 2: The Physiographic Regions of New Jersey

Source: NJDEP

Topography and Surface Landscapes

Topography relates to the surface terrain and features of an area. Ridges and high points delineate the boundaries of watersheds, seen in [Map 9: Watersheds](#).

At the confluence of the Delaware River and Crosswicks Creek, the Bordentown landscape is dominated by wetlands bordered on the east by cliffs looking out over the Crosswicks and the Abbott Marshlands. To the south, the Blacks Creek and Crystal Creek stream corridors are heavily wooded, with steep slopes along the banks, giving way to a gently rising landscape. The landscape along the Delaware River southwest of Fieldsboro is mostly inaccessible and largely undeveloped. The landscape on Bordentown's eastern side supports gently rolling farmland, reflective of the agricultural area in Chesterfield Township.

The upland area is characterized by rich soils that once supported extensive beech-oak forests. Along the stream valleys, especially along Crosswicks Creek, are extensive freshwater tidal marshes and wet forests. The streams are relatively flat, as in all of southern New Jersey, with muddy and/or sandy bottoms. Smaller streams flowing to the larger channels form connecting networks of wetland marsh.

The highest elevation in the township is approximately 107 feet above mean sea level, located at a point near the northeast quadrant of the 295 interchange with Route 130 close to Blacks Creek and the border with Bordentown City. The lowest elevations measure about 10 feet above mean sea level and are found where the Crosswicks and Blacks Creeks meet the Delaware River and at Crystal Lake.

Due to its topography and hydrology, about 22 percent of Bordentown Township's land is characterized as being in a floodplain. However, as shown on [Map 11: Floodplains \(1990\)](#), much of the floodplain is limited to the rivers, tributaries, and wetlands where there is significantly less development and agriculture. The entire topography of Bordentown Township is shown in [Map 5: Elevation](#).



Northern Community Park

Source: DVRPC

Steep Slopes

Slope is measured as the percent of vertical rise to horizontal distance. The majority of Bordentown Township has slopes of less than ten percent, although the township is crossed by upland ridges with slopes of up to 69 percent. Bordentown Township's steep slopes are depicted on [Map 6: Steep Slopes](#). The steepest slopes in the township are located to the south of Blacks Creek between I-295 and the NJ Turnpike. There is another ridge of steep slopes east of the rail bed of the River Line, which continues upland of Crosswicks Creek. Most of the steep slopes in the township are still well-vegetated, as seen on [Map 15: Natural Vegetation](#), but some development has occurred on the edge of some of the very steep slopes.

In general, development of areas with steep slopes is inadvisable because it is likely to result in soil instability, erosion, sedimentation of streams, increased stormwater runoff, and increased flooding. These effects are responsible for habitat destruction, water pollution, and potential damage to property. Erosion on steep slopes is especially prevalent where excessive tree removal has taken place.

Soils

Soil is the foundation for all land uses. A region's soil defines what vegetation is possible, therefore influencing agricultural uses. Soil properties also affect the location of wells and septic facilities, often determining development potential in certain areas. Soil is a natural resource that cannot be replenished on the human time scale.

Soil Series

Most soils in Bordentown Township are of a sandy loam nature, characterized as well-drained and nutrient-rich. The township's soils consist of 21 series types and 58 variations within those series (excluding water), as identified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

These are listed in [Table 3: Bordentown Township Soils](#) and shown on [Map 7: Soils](#). Several soil series appear more frequently in Bordentown Township than others and are briefly described as follows according to the NRCS soil database.

Keyport Series

The most dominant soil type in Bordentown Township is the Keyport soil series, which covers 16 percent of the township. These soils tend to be moderately or well drained, consisting of a moderate to fine texture, and formed on clay beds. Often, they gently slope and are found in high positions. However, they can slope as much as 25 percent. Keyport soils have a high available water capacity and drain slowly. Water does not saturate the soil. When dry, the soil cracks widely and crusts, reducing seed germination. It has moderate natural fertility, but it is not ideal for agriculture. This soil will support hardwood

forest and limited types of crops. It is not a good soil for vegetables or fruits; however, it is a suitable soil for small grains, corn, soybeans, hay, and pastures.

Freehold Series

The second most common soil type in Bordentown Township, covering nearly 12 percent of the township, is the Freehold series. These soils, formed from sandy marine deposits, are mostly gently sloping and are well drained. Around stream beds, these soils may be steeply sloping. Freehold soils occur in close association with Collington, Colts Neck, Marlton, Westphalia, Woodstown, and Dragston soils. Freehold soils are easily worked for agricultural production and have low to moderate natural fertility. Different variations of these soils will support upland forests of oak and poplar and provide high quality wildlife habitat. These soils are well suited to many different vegetable crops and can support various seasonal crops because the variations of soils warm at different times of the year

Urban Land Series

Nearly 11 percent of Bordentown Township soils are classified as "Urban Land." The Urban Land series consists of cut and filled land that is mostly developed. The land is used for residential, commercial, industrial, or highway purposes. Typically, 70 percent of the original soil horizon has been destroyed in these areas. There are moderate limitations for woodland or wildlife and severe limitations for crops. Urban land is very impermeable and low in fertility where the original soil is removed. However, where the original soil is moved from one area to another area, the soil has moderate but slow permeability, due to compaction of the soil during construction.

Sassafras Series

Sassafras soils are the fourth most frequently occurring soil in Bordentown, making up about 10 percent of the township. Slopes can range from nearly level to very steep. These soils can support vegetation consisting of mixed oaks and scattered pines. They are considered farmland of statewide importance and have clay in their subsoil. Sassafras soils are easy to work, have a low natural fertility, and respond to fertilization.

Woodstown

Variations of the Woodstown series make up over six percent of all acres in Bordentown Township. Historically, these soils have supported oak, beech, poplar, and pitch pine forests. This series is closely associated with Aura, Downer, Freehold, and other soils, except that Woodstown is not well drained. These soils occur on terraces along large streams and in beds of gravel. Cultivation is hampered by wetness.

Udorthents

Over six percent of Bordentown Township soils are in the Udorthents series. This series consists of somewhat poorly drained to very poorly drained soils that have been altered mainly by filling. This type of soil is located mainly in low areas, such as depressions, drainage ways, and tidal marshes. On-site investigation is needed to determine the

suitability of this unit for any use. The western half of Newbold Island is made up of Udorthents soil, as is the mouth of Crystal Creek and other small areas in the township.

Adelphia

About five percent of soils in Bordentown Township are in the Adelphia series, which have a fluctuating water table and are moderately well drained. Their natural fertility is moderate, and applied fertilizers do not leach readily. They have very little slope and support native vegetation consisting of hardwood forest species. Various crops are suitable for this type of soil, including small grains, fruits, vegetables, sod, and nursery stock. These high value crops require better drainage, which these soils provide.

Holmdel

The Holmdel soil series covers less than five percent of Bordentown Township. Soils in the Holmdel series have a moderately high seasonal water table and drain moderately well. Holmdel series soils have moderate to moderately high natural fertility. They respond well to added fertilizers. Most areas with these soil types have been cleared for crops. Small grains, fruits, and vegetables are all capable of growing in these soils. Often, these soils receive both surface runoff and lateral ground water from higher soils.

Soil Characteristics

Hydric Soils

Thirty-seven percent of Bordentown Township's soils are hydric soils, as shown in **Table 3: Soils in Bordentown Township**. Hydric soils, as defined by the NRCS, are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (oxygen-free) conditions below their surfaces. These soils have unique soil properties and are an important element of wetland areas. If a soil is classified as "hydric," land use may be restricted due to the relationship of hydric soils to the definition of wetlands and to laws regarding wetland preservation. Soils that have limitations, such as a high water table or flooding, can qualify as prime and statewide when the limitations are overcome by measures such as drainage or flood control.

Table 3: Bordentown Soils

Soil Type	Description	Area (Acres)	% of Bordentown Twp	Ag. Quality*	Hydric?
AdmA	Adelphia fine sandy loam, 0 to 2 percent slopes	122.92	2.06	P-1	Yes
AdmB	Adelphia fine sandy loam, 2 to 5 percent slopes	24.19	0.41	P-1	No
AdmkA	Adelphia fine sandy loam, clayey substratum, 0 to 2 percent slopes	77.86	1.31	P-1	Yes
AdmkB	Adelphia fine sandy loam, clayey substratum, 2 to 5 percent slopes	31.74	0.53	P-1	No
AdmmA	Adelphia high glauconite variant fine sandy loam, 0 to 2 percent slopes	33.92	0.57	P-1	Yes
AdmmB	Adelphia high glauconite variant fine sandy loam, 2 to 5 percent slopes	9.51	0.16	P-1	No
CoeAs	Colemantown loam, 0 to 2 percent slopes, occasionally flooded	21.30	0.36	NA	Yes
ComA	Collington fine sandy loam, 0 to 2 percent slopes	43.99	0.74	P-1	No
ComB	Collington fine sandy loam, 2 to 5 percent slopes	114.20	1.92	P-1	No
ComC	Collington fine sandy loam, 5 to 10 percent slopes	37.34	0.63	S-1	No
DoaA	Donlonton fine sandy loam, 0 to 2 percent slopes	57.54	0.97	P-1	Yes
DobA	Donlonton loam, 0 to 2 percent slopes	107.56	1.81	P-1	Yes
FankA	Fallsington fine sandy loam, clayey substratum, 0 to 2 percent slopes	79.34	1.33	S-1	Yes
FmhAt	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	238.19	4.00	NA	Yes
FrfB	Freehold loamy sand, 0 to 5 percent slopes	40.43	0.68	P-1	Yes
FrfC	Freehold loamy sand, 5 to 10 percent slopes	12.40	0.21	S-1	No
FrmA	Freehold fine sandy loam, 0 to 2 percent slopes	12.68	0.21	P-1	No
FrmB	Freehold fine sandy loam, 2 to 5 percent slopes	254.73	4.28	P-1	No
FrmC	Freehold fine sandy loam, 5 to 10 percent slopes	18.33	0.31	S-1	No
FrmD	Freehold fine sandy loam, 10 to 15 percent slopes	31.95	0.54	NA	No
FrmE	Freehold fine sandy loam, 15 to 25 percent slopes	54.89	0.92	NA	No

Soil Type	Description	Area (Acres)	% of Bordentown Twp	Ag. Quality*	Hydric?
FrmkB	Freehold fine sandy loam, clayey substratum, 2 to 5 percent slopes	256.69	4.31	P-1	No
GabB	Galestown sand, 0 to 5 percent slopes	6.23	0.10	U-1	No
HodA	Holmdel fine sandy loam, 0 to 2 percent slopes	43.06	0.72	P-1	Yes
HodB	Holmdel fine sandy loam, 2 to 5 percent slopes	10.58	0.18	P-1	No
HodkA	Holmdel fine sandy loam, clayey substratum, 0 to 2 percent slopes	136.29	2.29	P-1	Yes
HodkB	Holmdel fine sandy loam, clayey substratum, 2 to 5 percent slopes	80.68	1.35	P-1	No
KenB	Keyport fine sandy loam, 2 to 5 percent slopes	219.35	3.68	P-1	No
KeoA	Keyport loam, 0 to 2 percent slopes	125.37	2.10	P-1	Yes
KeoB	Keyport loam, 2 to 5 percent slopes	157.68	2.65	P-1	Yes
KeoC	Keyport loam, 5 to 10 percent slopes	185.80	3.12	S-1	No
KeoD	Keyport loam, 10 to 15 percent slopes	158.94	2.67	NA	No
KeoE	Keyport loam, 15 to 25 percent slopes	106.49	1.79	NA	No
KrbA	Kresson loamy sand, 0 to 5 percent slopes	16.95	0.28	S-1	Yes
MamnAv	Mannington-Nanticoke complex, 0 to 1 percent slopes, very frequently flooded	242.56	4.07	U-1	Yes
MbaAt	Marsh, fresh water, 0 to 2 percent slopes, frequently flooded	10.78	0.18	NA	No
PHG	Pits, sand and gravel	21.46	0.36	NA	No
PHM	Pits, clay	103.71	1.74	NA	No
PefB	Pemberton sand, 0 to 5 percent slopes	50.28	0.84	S-1	No
SaeA	Sassafras fine sandy loam, 0 to 2 percent slopes	109.97	1.85	P-1	No
SaeB	Sassafras fine sandy loam, 2 to 5 percent slopes	208.09	3.49	P-1	No
SaeC	Sassafras fine sandy loam, 5 to 10 percent slopes	33.60	0.56	S-1	No
SaekA	Sassafras fine sandy loam, clayey substratum, 0 to 2 percent slopes	43.69	0.73	P-1	No

Soil Type	Description	Area (Acres)	% of Bordentown Twp	Ag. Quality*	Hydric?
SaekB	Sassafras fine sandy loam, clayey substratum, 2 to 5 percent slopes	192.11	3.23	P-1	No
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	41.73	0.70	S-1	Yes
ShskA	Shrewsbury fine sandy loam, clayey substratum, 0 to 2 percent slopes	36.87	0.62	S-1	Yes
ThfB	Tinton sand, 0 to 5 percent slopes	130.48	2.19	S-1	No
ThfC	Tinton sand, 5 to 10 percent slopes	16.01	0.27	S-1	No
ThftB	Tinton sand, thick surface, 0 to 5 percent slopes	12.28	0.21	S-1	No
URCLAB	Urban land, clayey substratum, 0 to 8 percent slopes	238.29	4.00	NA	No
URSAAB	Urban land, sandy, 0 to 8 percent slopes	378.34	6.35	NA	No
URSACB	Urban land, sandy over clayey, 0 to 8 percent slopes	25.99	0.44	NA	No
UddcB	Udorthents, dredged coarse materials, 0 to 8 percent slopes	52.01	0.87	NA	No
UddfB	Udorthents, dredged fine material, 0 to 8 percent slopes	300.31	5.04	NA	No
UdrB	Udorthents, refuse substratum, 0 to 8 percent slopes	30.93	0.52	NA	No
WATER	Water	367.39	6.17	NA	Yes
WofA	Woodstown fine sandy loam, 0 to 2 percent slopes	88.20	1.48	P-1	Yes
WofB	Woodstown fine sandy loam, 2 to 5 percent slopes	1.78	0.03	P-1	No
WofkA	Woodstown fine sandy loam, clayey substratum, 0 to 2 percent slopes	156.05	2.62	P-1	Yes
WofkB	Woodstown fine sandy loam, clayey substratum, 2 to 5 percent slopes	134.63	2.26	P-1	No
Total		5,956.68	100		36.79%

Source: NRCS, 2008

*** Agricultural Quality Designations**

P-1	Prime Farmland
S-1	Statewide Importance
U-1	Unique Importance
N/A	Soil not rated for agricultural use by NRCS, but may be suitable or currently used for such use.



AGWAY Site

Source: DVRPC

Certain soil characteristics can severely restrict the use of sites for construction and development. **Table 4: Soil Limitations for Development** records the soils and their possible limitations for building foundations and septic systems. As indicated in the table, the township has some soils that are severely limited for development, although these soils are mostly located in riparian areas and on Newbold Island. Septic systems require soils that have a low water table (five feet or more from the surface) and high permeability to allow for proper drainage of wastewater. Soils with high water tables (five feet or less from the surface) create a potential for erosion, wet basements, and low permeability, often allowing wastewater to collect near the surface. Because the suitability of a soil for a septic disposal field is very site-specific and relies on many factors, including but not limited to the soil type, there is not an accurate source of soil information regarding this subject. The best way to determine soil suitability for a septic system is to request a site survey by a professional.

Table 4: Soil Limitations for Development

Soil Series	Soil Types	Acreage	Land Use Implications*		
			Building without Basement	Building with Basement	Septic Systems
Keyport	KenB, KeoA, KeoB, KeoC, KeoD, KeoE	953.63	B	B	C
Freehold	FrFB, FrFC, FrmA, FrmB, FrmC, FrmD, FrmE, FrmKB	682.10	A	A	A
Urban Land	URCLAB, URSAAB, URSACB	642.62	A	A	A
Sassafras	SaeA, SaeB, SaeC, SaekA, SaekB	587.46	A	A	A
Woodstown	WofA, WofB, WofkA, WofkB	380.66	B	A	A
Udorthents	UddcB, UddfB, UdrB	383.25	C	C	C
Water	WATER	367.39	N/A	N/A	N/A
Adelphia	AdmA, AdmB, AdmkA, AdmkB, AdmmA, AdmmBB	300.13	B	A	B
Holmdel	HodA, HodB, HodkA, HodkB	270.62	B	A	B
Mannington-Nanticoke	MamAv	242.56	C	C	C
Fluvaquents	FmhAt	238.19	C	C	C
Collington	ComA, ComB, ComC	195.53	A	A	A
Donlonton	DoaA, DobA	165.10	B	B	C
Tinton	ThfB, ThfC, ThftB	158.77	A	A	A
Pits	PHG, PHM	125.17	A	A	A
Shrewsbury	ShsA, ShskA	78.61	C	C	C
Fallsington	FankA	79.34	C	C	C

Soil Series	Soil Types	Acreage	Land Use Implications*		
			Building without Basement	Building with Basement	Septic Systems
Pemberton	PefB	50.28	B	A	B
Colemantown	CoeAs	21.30	C	B	C
Kresson	KrbA	16.95	C	B	C
Galestown	GabB	6.23	A	A	A

Source: USDA NRCS, 2008

*Key to Land Use Implications	
A = Not Limited	Little or no limitation(s) or easily corrected by use of normal equipment and design techniques.
B = Somewhat Limited	Presence of some limitations which normally can be overcome by careful design and management at somewhat greater cost.
C = Very Limited	Limitations that normally cannot be overcome without exceptional, complex, or costly measures.
NA = Not Rated	Soil series/type not rated for designated use.

Soil Quality Classification

Bordentown's soils have high agricultural value. Nearly half of the soils in Bordentown Township are considered Prime Farmlands (P-1). Prime Farmlands are lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They can sustain high yields of crops when managed with correct farming methods. Prime Farmlands are not excessively erodible or saturated with water for long periods of time and do not flood frequently. However, many areas that are designated as containing Prime Farmlands have been developed and may no longer be suited for farming.

Farmlands of Statewide Importance (S-1) occupy over 11 percent of the township. These soils are close in quality to Prime Farmland and can sustain high yields of crops when correctly managed with favorable conditions. About four percent of Bordentown contains Farmland of Unique Importance (U-1), located in riparian areas and along Newbold Island. In order for lands to be classified as Unique Farmland, the land must also be used for a specific high-value food or fiber, and have an adequate moisture supply for that crop. For example, rice, cranberries, citrus, tree nuts, and fruits are often grown on Farmland of Unique Importance. Fiber crops are plants grown for use as paper, rope, and cloth. Rice, cotton, bamboo, and reeds are common fiber crops.

Approximately 35 percent of Bordentown Township's soils have not been rated for agricultural use by the NRCS and are therefore labeled "N/A." These soils are not appropriate for agricultural use and may be best suited for other uses, or they may not yet

have been assessed for quality by NRCS. NRCS created all of the Soil Quality Classifications in 1990, although several new subtypes of soils were created in 2005, which are not yet rated for agricultural use. Soils not rated by the NRCS are not necessarily limited for agricultural use.

See **Table 5: Agricultural Values for Bordentown Soils** for the acreage of each of these classes of farmland. See also **Map 8: Agricultural Quality of Soils** for a visual depiction.

Table 5: Agricultural Values for Bordentown Soils

Designation	Type/Farm Classification	Area (Acres)	% of municipality
P-1	All areas are prime farmland	2,895.48	48.6%
S-1	Farmland of statewide importance	671.4	11.27%
U-1	Farmland of unique importance	248.8	4.17%
N/A	Not prime farmland	2,117.39	35.45%
	Total	5,956.67	100.00%

Source: USDA NRCS, 2008

Climate

Geographically situated approximately halfway between the Equator and the North Pole, New Jersey's climate is extremely variable. The state's temperate, continental climate is influenced by hot, cold, dry, and humid airstreams that create highly variable local weather conditions. From May through September, New Jersey is dominated by moist, tropical air originating in the Gulf of Mexico and carried by prevailing winds from the southwest. In winter, winds generally prevail from the northwest, bringing cold, polar air masses from subarctic Canada.

Although New Jersey is one of the smallest states in the country, it has five distinct climate regions. The state's climate varies across these five regions: North, Central, Southwest, Pine Barrens, and Coastal. Distinct variations between these climate regions is due to a combination of factors, including geology, distance from the Atlantic Ocean, and prevailing atmospheric flow patterns.

Bordentown Township is located on the edge of the Central, Southwest, and Pine Barrens climate zones. The following are the descriptions of all three climate zones.

The *Central* climate zone stretches from New York Harbor to the great bend of the Delaware River near Trenton. This region

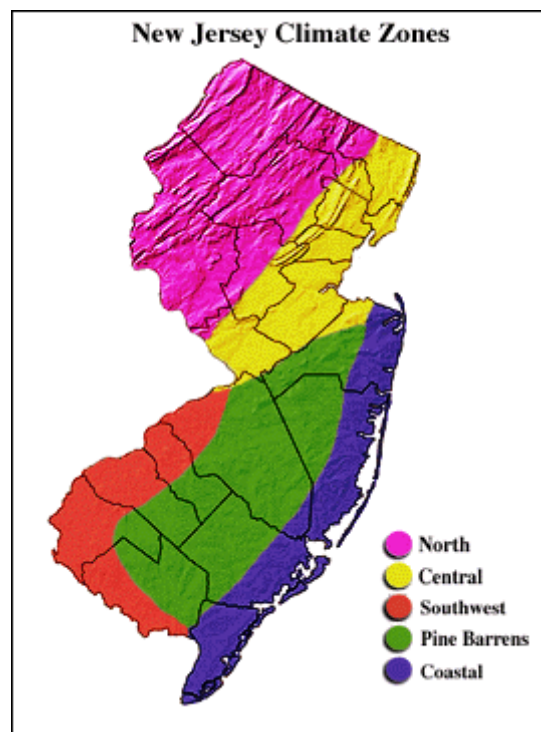


Figure 3: New Jersey Climate Zones

Source: Office of the N.J. State Climatologist

contains many urban areas, such as Trenton, whose paved surfaces and buildings affect local temperatures by retaining more heat. This causes nighttime temperatures to generally be warmer than surrounding rural areas, a phenomenon known as the “heat island effect.”

The *Southwest* has the highest average daily temperatures in the state and, without sandy soils, tends to have higher nighttime minimum temperatures than in the neighboring Pine Barrens. This region receives less precipitation than the Northern and Central regions of the state since it is farther away from the Great Lakes-St. Lawrence storm track. It is also far enough inland to avoid the heavier rains from some coastal storms, and so the Southwest Region receives less precipitation than the Coastal Region.

Unlike the Southwest zone to the west, which is characterized by moist, agriculturally productive soils and the maritime effects of the Delaware Bay, the *Pine Barrens* zone is characterized by sandy soils that retain less moisture. The sandy soils of the Pine Barrens are very porous, allowing precipitation to rapidly infiltrate the ground, leaving the surface dry. The dry, sandy soils release solar radiation absorbed during the day back to space at night at a greater rate, causing a wider range between daily maximum and minimum temperatures than in the Southwest climate zone. These drier conditions also make the Pine Barrens region more prone to forest fires.

The National Climate Data Center (NCDC) operates over 4,000 stations in the United States, none of which are located directly in Bordentown Township. The closest station is in Trenton, N.J., approximately six miles to the northwest of Bordentown Township and within the Central climate zone. Based on NCDC data available through the Office of the NJ State Climatologist at Rutgers University, the mean annual temperature in the Bordentown Township area is 54 degrees Fahrenheit. January is the coldest month with a mean temperature of 32.2 degrees, and July is the hottest month with a mean temperature of 76.3 degrees. The mean annual precipitation is 41.4 inches. August is the rainiest month with a mean precipitation of 4.7 inches, and October and November are the driest months with an average of just 2.9 inches. The average monthly snowfall is greatest in February, which has a historic mean of 7.5 inches.

Severe storm events, including thunderstorms, tropical storms, blizzards, ice storms, hail storms, and tornadoes occur in Burlington County with varying frequency. Tornadoes are infrequent. Only about five generally weak tornadoes occur in New Jersey each year. Most areas in the state experience about 25 to 30 thunderstorms a year.

Growing Seasons

Bordentown Township is located within U.S. Department of Agriculture (USDA) Plant Hardiness Zone 7A, where annual minimum temperatures are typically between 0°F and 5°F. Hardiness zones are based on average annual minimum temperatures and indicate which plant species are able to survive the winter in each area. New Jersey has a hardiness zone range from 6A, being the coolest, to 7B being the warmest for average minimum temperatures. In New Jersey, all of Salem County, adjacent portions of

Cumberland County and Gloucester County, and areas along the Atlantic Coast are designated as Zone 7.

Bordentown Township's agricultural growing season is approximately six months, or 180 days, from mid-April through mid-October. The growing season is generally defined as the period between the last spring frost and the first autumn frost. However, the harvest of grain crops typically continues throughout November, and winter crops such as broccoli, cauliflower, and cabbage are grown until the first hard freeze, usually in early January.

The frost-free growing season in Bordentown Township is about 60 days longer than in northern New Jersey, where frosts generally end in May and begin in October.



Veterans Memorial Park, Joe Lawrence Recreational Facility
Source: DVRPC

Surface Water Resources

The land in Bordentown Township drains to the Crosswicks Creek, Blacks Creek, Crystal Creek, and several smaller tributaries, and ultimately to the Delaware River.

Watersheds

A watershed is an ecological unit consisting of all the land that drains to a particular waterway, such as a river, stream, lake, or wetland. The high points in the terrain, such as hills and ridges, define the boundaries of a watershed. Large watersheds are made up of a succession of smaller ones, down to the catchment area of a local site. So, for example, the Delaware River watershed is made up of many smaller watersheds, such as the Crosswicks Creek watershed, which itself consists of smaller subwatersheds.

Each watershed and subwatershed corresponds to a hydrological unit code, or HUC, as delineated by the United States Geological Survey (USGS). A HUC 11 watershed

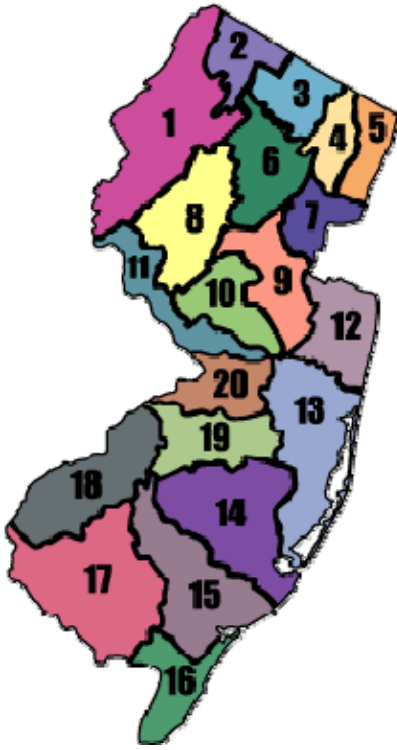


Figure 4: Watershed Management Areas in New Jersey

Source: NJDEP

(identified by an 11-digit code) contains a number of HUC 14 subwatersheds (each identified by a 14-digit code). New Jersey has 152 HUC 11 watersheds and over 900 HUC 14 subwatersheds. Bordentown Township lies entirely within four HUC 11 watershed divisions of the Delaware River watershed: Crosswicks Creek (Below Doctors Creek), Crosswicks Creek (Doctors Creek-Ellisdale tributary), Crafts Creek, and Blacks Creek. These HUC 11 watersheds contain four HUC 14 subwatersheds within Bordentown (one subwatershed per watershed), shown in **Table 6: Watersheds and Subwatersheds in Bordentown**. There are more HUC 14 watersheds that drain to the HUC 11 watersheds, but only the ones within Bordentown Township are listed in the table. See also **Map 9: Watersheds** and **Map 10: Surface Water, Wetlands, and Vernal Pools**.

Watershed Management Area 20: Assiscunk, Crosswicks, and Doctors Creek

NJDEP manages natural resources on a watershed basis. The state has been divided into 20 Watershed Management Areas (WMAs). Bordentown Township is entirely within WMA 20: Assiscunk, Crosswicks, and Doctors. This includes the Crosswicks Creek, Blacks Creek, Crafts Creek, Doctors Creek, Duck Creek, and the Upper Delaware River to Assiscunk Creek.

Crosswicks Creek is the largest of the creeks in WMA 20. It extends for a total length of 25 miles, and its watershed covers 146 square miles. The Crosswicks Creek drains to the Delaware River at Bordentown, running through the Abbott Marshlands. Its tributaries include Jumble Gut Run, Mile Hollow Run, Thorntown Creek, Doctors Creek, North Run, Jumping Brook, and Lahaway Creek.

Crosswicks Creek is bordered by wetlands for most of its length. Crosswicks Creek forms the northern border of Bordentown Township and runs through the ecologically significant Abbott Marshlands. This freshwater tidal marsh is one of the premier wildlife areas in the state of New Jersey.

Table 6: Watersheds and Subwatersheds in Bordentown Township

Watershed (HUC 11 ID)	Subwatershed (HUC 14 ID)	Total Acres of Subwatershed	Acres within Bordentown Township
Crosswicks Ck (below Doctors Creek) (02040201070)	Crosswicks Ck (below Doctors Creek) (02040201070020)	5,514.44	2,011.77
Crosswicks Ck (Doctors Ck to New Egypt) (02040201050)	Crosswicks Ck (Doctors Ck-Ellisdale trib) (02040201050070)	4,141.95	113.51
Blacks Creek (02040201080)	Blacks Creek (below Bacons Run) (02040201080030)	3,012.38	1,713.79
Crafts Creek (02040201090)	LDRV tribs (Assiscunk Ck to Blacks Ck) (02040201090030)	4,885.91	2,116.80
Total		17,554.68	5,955.86

Source: NJDEP, 2010

Streams

Waterways are classified by their stream order, which is a hierarchy used to differentiate smaller streams from larger ones. First through third order streams are considered headwater streams and constitute the vast majority of streams worldwide. Fourth through sixth order streams are considered medium streams, while larger order streams are considered rivers.

There are approximately 28 stream miles flowing across Bordentown Township. As shown below in **Table 7: Stream Classification in Bordentown**, most stream miles in Bordentown are first order and fifth order streams. Over 10 miles of these are first order (or headwater) streams, meaning they are the initial sections of stream channels with no contributing tributaries. The headwaters are where a stream is “born” and actually begins to flow.



Figure 5: Stream Order Classification

Source: T. A. Endreny, 2003

Headwaters are of particular importance because they tend to contain a diversity of aquatic species and their condition affects downstream water quality. Because of their small size, they are highly susceptible to impairment by human activities on the land. First and second order streams are narrow and often shallow, and they are characterized by relatively small base flows. This makes them

subject to greater temperature fluctuations, especially when forested buffers on their banks are removed. They are also easily over silted by sediment-laden runoff, and their water quality can be rapidly degraded. In addition, first order streams are greatly affected by changes in the local water table because they are fed by groundwater sources. Headwaters are important sites for the aquatic life that is at the base of the food chain and often serve as spawning or nursery areas for fish.

Higher order streams are influenced progressively less by surrounding land. Higher order streams are broader and usually have larger volumes of water than smaller order streams. These physical changes in the stream are accompanied by shifting biological communities populated by organisms adapted to the unique hydrology and ecology of these streams.

Within Bordentown Township, the lengths of Mile Hollow Run and Jumble Gut Run are first order, as are a number of tributaries to Sucker Run, Blacks Creek, Crosswicks Creek, and Crystal Creek. Thornton Creek, a portion of Sucker Run, and other tributaries are second order streams. Most of Crystal Creek and another portion of Sucker Run are third order streams. Blacks Creek is a fourth order stream, and much of Crosswicks Creek is fifth order. The Delaware River does not have a defined stream order (indicated by the stream order “99”).

Table 7: Stream Classification in Bordentown Township

Stream Order	Length (miles)
1	10.57
2	3.36
3	1.33
4	3.51
5	6.44
6	0.86
99 (Delaware River)	1.80
Total	27.86

Source: NJDEP, 1998

Tidal flows bring Delaware River water into the Crosswicks Creek, Mile Hollow Run, Blacks Creek, and Crystal Creek twice a day. These and other streams are listed below in **Table 8: Named Streams in Bordentown**. Tidal flows both help and hinder maintenance of good water quality in affected streams. The flood (incoming) tide carries leaves and nutrients that are beneficial to aquatic organisms, but it also limits the regular flushing out of silt and pollutant-laden waters coming from upstream. Silt deposition within a stream tends to increase during flood tides, although deposition is also a function of stream shape, the presence of specific flow barriers, and the quantity of silt (the load) being carried by the stream. Disposition of sediment in the Abbott Marshlands compensates for sea level rise and protects inland communities from increased water levels and inundation. See **Map 10: Surface Water, Wetlands, and Vernal Pools**.

Table 8: Named Streams in Bordentown

Blacks Creek
Crosswicks Creek
Crystal Creek
Delaware River
Doctors Creek
Jumble Gut Run
Mile Hollow Run
Sucker Run
Thornton Creek

Source: NJDEP, 2002



Thornton Creek Park

Source: DVRPC

Lakes and Ponds

There are 105.4 acres of lakes and ponds in Bordentown Township, including one named lake and other small unnamed ponds and water impoundments. Crystal Lake, covering 20.8 acres in size, is located on the border of Bordentown Township and Mansfield Township. Crystal Lake was formed by the damming of Crystal Creek. Crystal Lake Park, located to the south of the lake in Mansfield Township, is a 370-acre Burlington County park that offers hiking, biking, and equestrian trails.

Wetlands

Wetlands support unique communities that serve as natural water filters and as incubators for many beneficial species. The term “wetland” is applied to areas where water meets the soil surface and supports a particular biological community. The source of water for a wetland can be an estuary, river, stream, lake edge, or groundwater that rises close to the land surface. Under normal circumstances, wetlands are those areas that support a prevalence of defined wetland plants on a wetland soil. The U.S. Fish and Wildlife Service designates all large vascular plants as wetland (hydric), non-wetland (non-hydric), or in-between (facultative). Wetland soils, also known as hydric soils, are areas where the land is saturated for at least seven consecutive days during the growing season. Wetlands are classified as either tidal (coastal) or nontidal (interior). Tidal wetlands can be either saline or freshwater. There are also special wetlands categories to denote saturated areas that have been altered by human activities.

Marshes are wetlands that are frequently or continually inundated with water and are characterized by emergent soft-stemmed vegetation adapted to saturated soil conditions. They are invaluable natural resources because they store floodwaters, improve water quality, control erosion, provide wildlife habitat, offer recreational opportunities, and provide other environmental services. Freshwater tidal marshes are marshes influenced by the motion of the tides. Freshwater tidal marshes occur in estuaries where freshwater flows from rivers and streams is influenced by ocean tides, and yet, typically, there is little mixing with salt water. The freshwater tidal marsh complex is considered a rare ecological community in the state.

New Jersey protects freshwater wetlands under the New Jersey Freshwater Wetlands Protection Act Rules: N.J.A.C. A 7:7A. The law also protects transition areas, or “buffers,” around freshwater wetlands. The New Jersey freshwater wetlands maps provide guidance on where wetlands are found in New Jersey, but they are not the final word. Only an official determination from DEP, called a “letter of interpretation” (LOI), can legally determine for sure if there are freshwater wetlands on a property. An LOI verifies the presence, absence, and boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited and usually require a permit. Additional information on wetlands rules and permits is available through NJDEP.

Wetlands cover 1,338 acres within the township (22 percent of the township), the largest category of which is deciduous wooded wetlands (878 acres). Freshwater tidal marshes cover 209 acres. In addition to natural wetlands, Bordentown Township also includes 144 acres of modified or disturbed wetlands. Modified wetlands are former wetland areas that have been altered by human activities and no longer support typical wetland vegetation, or are not vegetated at all. All categories of wetlands are shown in **Table 21: Bordentown Natural Vegetation**. See also **Map 15: Natural Vegetation**.

In the freshwater tidal marshes, wild rice (*Zizania aquatica*) is perhaps the most distinctive native plant in these regions. This annual grass can grow to be nine feet tall and is an important food source for migratory birds such as red-winged blackbirds and grackles. It is often found near spatterdock and pickerelweed. Other plants found in the tidal marsh include broad-leaved cattail, water hemp, jewelweed, arrow arum, bur marigold, smooth

beggar-ticks, nodding beggar-ticks, and sneezeweed. *Phragmites*, an invasive plant, is found in disturbed areas of the Abbott Marshlands, such as on Duck Island and along pipeline rights-of-way, as well as along the marsh's edges. Also known as the common reed, *Phragmites* colonizes easily and pushes into wetland areas from adjacent dry land areas. It spreads through an underground root system that is difficult to eradicate. In addition to its tendency to aggressively spread, *Phragmites* often becomes a dominant monoculture and is therefore considered an invasive species. Purple loosestrife is another invasive species known to be present in Bordentown Township.

Agricultural Wetlands

Agricultural wetlands occupy 100 acres of Bordentown Township, shown in [Map 10: Surface Water, Wetlands, and Vernal Pools](#). Agricultural wetlands are modified former wetlands that are under cultivation yet still exhibit evidence of soil saturation in aerial infrared photo surveys.

The Natural Resources Conservation Service sponsors the Wetlands Reserve Program, a voluntary program that offers landowners a chance to receive payments for restoring and protecting wetlands, including agricultural wetlands, on their property. Restoring agricultural wetlands would require removing them from agricultural use and restoring them to their natural state. This program provides technical and financial assistance to eligible landowners who can enroll eligible lands through permanent easements, 30-year easements, or restoration cost-share agreements.

Vernal Pools

Vernal pools are bodies of water that appear following snowmelt and during spring rains, but disappear or are dry during the rest of the year. They are highly important sites for certain rare species of amphibians. Particular types of frogs and salamanders will only breed in vernal ponds (obligate breeders), which provide their offspring with a measure of protection because the pond's impermanence prevents the residence of predators of the eggs and young, especially fish. Other species may use vernal pools but are not limited to them for breeding. They are called facultative breeders.

Vernal pools are so intermittent that their existence as wetlands has frequently not been recognized. Consequently, many of them have disappeared from the landscape, or have been substantially damaged. This, in turn, is a principal cause of the decline of their obligate amphibian species.

The New Jersey Division of Fish and Wildlife has been conducting a Vernal Pool Survey project since 2001 to identify, map, and certify vernal ponds throughout the state. A certified vernal pool is one that occurs in a confined basin without a permanently flowing outlet, has habitat documented for one obligate or two facultative herptile (reptile and amphibian) species, maintains ponded water for at least two continuous months between March and September, and is free of fish populations throughout the year.

Once a vernal pond is certified, regulations require that a 75-foot buffer be maintained around the pond. NJDEP's division of Land Use Regulation oversees this designation and restricts development around vernal ponds by denying construction permits. Local municipalities can provide additional protection by negotiating conservation easements on the land surrounding the pond or by instituting restrictive zoning, such as passing a stream corridor protection overlay ordinance that specifically includes the vernal pools. A township can also include the pools on its official map.

The state has identified nine potential vernal pools in Bordentown Township, which are listed below in **Table 9: Vernal Pools in Bordentown** and shown on **Map 10: Surface Water, Wetlands, and Vernal Pools**. These vernal pools are located mostly in the northern part of the township and in the southwestern part of the township near streams and wetlands. Few potential vernal pools have been identified in the central part of the township, where urban development is the primary land use. Surveys of each pond are needed to determine if the pond is still in existence as a natural habitat, and if it is, what species are present. Once surveyed, the New Jersey Division of Fish and Wildlife will review the data and those pools that meet the criteria will be certified.

Table 9: Vernal Pools in Bordentown

Id#	USGS Quad Name	X Coordinate	Y Coordinate	Old Id
10517	Columbus NJ	524144.3	4440984	1761
8479	Trenton East NJ-PA	523022.1	4441823	1273
8484	Trenton East NJ-PA	523139.8	4441977	1274
8488	Trenton East NJ-PA	522961.2	4442027	1275
8469	Trenton East NJ-PA	522640.4	4442211	1272
8492	Trenton East NJ-PA	524334.4	4443181	1276
8496	Trenton East NJ-PA	525674.6	4445331	1277
8515	Trenton East NJ-PA	525887.6	4445830	1281
8500	Trenton East NJ-PA	526337.7	4446019	1278

Source: NJDEP, 2001

Floodplains

Areas naturally subject to flooding are called floodplains, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal stream channel. The 100-year floodplain is defined as the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood that has a one percent chance of occurring in any given year).

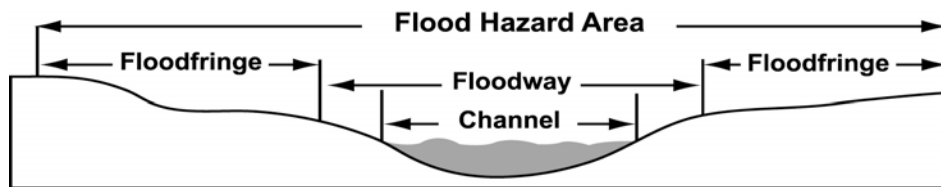


Figure 6: Parts of a Flood Hazard Area

Source: NJDEP

Although the terms “flood hazard area” and “100-year floodplain” refer to similar concepts, NJDEP defines them in slightly different ways. New Jersey’s regulations define the flood hazard area as the area inundated by a flood resulting from the 100-year discharge increased by 25 percent.

Floodplains require protection in order to prevent loss to residents, especially within the boundaries of the floodway. Equally important is the preservation of the environmentally sensitive aquatic communities that exist in floodplains. These plant and invertebrate communities are often the first link in the food chain of the aquatic ecosystem. In addition, floodplains serve the function of removing and mitigating various pollutants through the uptake by their vegetation of excess chemical loads in the water and by the filtering of sediments generally. All efforts to keep development out of floodplains will help to preserve the flood-carrying capacity of streams and their water quality.

In New Jersey and throughout the country, building in areas subject to flooding is regulated to protect lives, property, and the environment. New Jersey regulates construction in the flood hazard area under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq., and its implementing rules at N.J.A.C. 7:13. Activities that are proposed to occur in a flood hazard area will require issuance of a flood hazard area permit or a letter of non-applicability from the NJDEP.

New Jersey’s flood hazard area maps are not available in digital form. Consequently, it is possible to approximate the spatial extent of the flood hazard area in Bordentown Township only by using the Federal Emergency Management Agency’s (FEMA’s) floodplain maps. The most recent FEMA floodplain mapping for Bordentown Township is the FEMA Q3 Flood Data, effective 1990. The Q3 Flood Data shows that 1,259 acres, or 21 percent, of Bordentown Township’s land is within the 100-year floodplain area, and an additional 56 acres are within the 500-year floodplain area. Nearly all of Bordentown Township’s floodplain areas are located along the Delaware River, major creeks and streams, and smaller tributaries. See [Map 11: Floodplains \(1990\)](#) and [Table 10: Floodplains in Bordentown](#) below.

Table 10: Floodplains in Bordentown

Floodplain	Area (Acres)	% of Township
100 Year Floodplain	1,258.69	21.13%
500 Year Floodplain	56.01	0.94%
Total Floodplain	1,314.69	22.07%
Total Township Area	5,956.67	100%

Source: FEMA, 1990



A View of Newbold Island

Source: DVRPC

Surface Water Quality

Water quality standards are established by federal and state governments to ensure that water is suitable for its intended use. The ultimate objective of the federal Clean Water Act (P.L. 95-217) is to restore and maintain the chemical, physical, and biological integrity of the nation’s waters. Standards are intended to restore the quality of the nation’s waters to provide for the protection and propagation of fish, shellfish, and wildlife and to provide for recreation in and out of the water, wherever attainable.

All waterbodies in New Jersey are classified by NJDEP as either freshwater (FW), pinelands water (PL), saline estuarine water (SE), or saline coastal water (SC). Freshwater is further broken down into freshwater that originates and is wholly within

federal or state parks, forests, or fish and wildlife lands (FW1) and all other freshwater (FW2). The water quality for each of these groups must be able to support designated uses that are assigned to each waterbody classification (see Surface Water Quality Standards N.J.A.C. 7:9B-1.12). In addition to being classified as FW1 and FW2, fresh waterbodies are classified as trout producing (TP), trout maintaining (TM), or nontrout waters (NT). Each of these classifications may also be subject to different water quality standards.

All waterbodies in Bordentown are FW2-NT, meaning they are fresh water streams that neither produce nor maintain trout.

According to NJDEP rules, FW2-NT waters must provide for (1) the maintenance, migration, and propagation of the natural and established biota; (2) primary and secondary contact recreation (i.e., swimming and fishing); (3) industrial and agricultural water supply; (4) public potable water supply after conventional filtration and disinfection; and (5) any other reasonable uses.

The determination of whether or not water quality is sufficient to meet a body of water's designated use(s) is based on an analysis of certain surface water quality parameters, including fecal coliform, dissolved oxygen, pH, phosphorous, and toxic substances. NJDEP also evaluates water quality by examining the health of aquatic macroinvertebrate life in a stream.



Northern Community Park

Source: DVRPC

New Jersey's Integrated Water Quality Monitoring and Assessment Report

The Federal Clean Water Act mandates that states submit biennial reports to the U.S. Environmental Protection Agency (EPA) that describe the quality of their waters. States must submit two reports: the first is the Water Quality Inventory Report, or 305(b) Report,

which documents the status of principal waters in terms of overall water quality and support of designated uses; the second is the 303(d) List, which lists the water bodies that are not attaining water-quality standards. States must also prioritize the impaired water bodies on the 303(d) List for Total Maximum Daily Load (TMDL) analyses and identify those high-priority water bodies for which they anticipate establishing TMDLs in the next two years.

In 2006, NJDEP began reporting water quality data on a HUC-14 subwatershed basis. So, the assessments of rivers and streams are reported by the subwatersheds they fall within. Subwatersheds (assessment units) are assessed on their attainment of eight different designated uses, although not all uses are applicable to all subwatersheds. The designated uses are as follows:

- ▶ Aquatic life (general)
- ▶ Aquatic life (trout)
- ▶ Recreation
- ▶ Drinking water supply
- ▶ Industrial water supply
- ▶ Agricultural water supply
- ▶ Shellfish harvesting
- ▶ Fish consumption

As none of the waters in Bordentown Township support trout or shellfish, these designated uses are not applicable. As shown in the table below, all four subwatersheds, in which Bordentown Township is partially located, are impaired for at least one designated use. The NJDEP determined that sites located in tidal waters would no longer be assessed and listed due to new water quality testing standards. For aquatic life, the most general and encompassing parameter of water quality, three subwatersheds are impaired and one has insufficient information.

See [Map 12: Water Quality \(2010\)](#) and [Table 11: Integrated Water Quality Monitoring and Assessment Report, 2010](#).

Table 11: Integrated Water Quality Monitoring and Assessment Report, 2010

Subwatershed Name (HUC 14 ID)	Aquatic Life (General)	Primary Contact Rec.	Public Water Supply	Agricultural Water Supply	Industrial Water Supply	Fish Consumption	Sources of Impairment
Crosswicks Creek (Below Doctors Creek) (02040201070020)	Not Supporting: Phosphorus (Total), Total Suspended Solids (TSS), Turbidity	Insufficient Information	Not Supporting: Arsenic	Fully Supporting	Fully Supporting	Not Supporting: Polychlorinated biphenyls	<ul style="list-style-type: none"> •Industrial Point Source Discharge •Municipal Point Source Discharges •Agriculture •Urban Runoff/Storm Sewers •Atmospheric Depositon - Toxics
Crosswicks Ck (Doctors Ck-Ellisdale trib) (02040201050070)	Not Supporting: Phosphorus (Total), Total Suspended Solids (TSS), Turbidity	Not Supporting: Escherichia coli	Not Supporting: Arsenic, Mercury in Water Column	Fully Supporting	Not Supporting: Total Suspended Solids (TSS)	Not Supporting: Mercury in Fish Tissue, Mercury in Water Column, Polychlorinated biphenyls	<ul style="list-style-type: none"> •Package Plant or Other Permitted Small Flow Discharges •Agriculture •Urban Runoff/Storm Sewers •Atmospheric Depositon -Toxics •Natural Sources
Lower Delaware River tribs (Assiscunk Ck to Blacks Ck) (02040201090030)	Insufficient Information	Insufficient Information	Insufficient Information	Insufficient Information	Insufficient Information	Not Supporting: Mercury in Fish Tissue, PCB in Fish Tissue	
Blacks Creek (below Bacon's Run) (02040201080030)	Not Supporting: Phosphorus (Total), Total Suspended Solids (TSS)	Not Supporting: Escherichia coli	Fully Supporting	Fully Supporting	Fully Supporting	Not Supporting: Polychlorinated biphenyls	<ul style="list-style-type: none"> •Municipal Point Source Discharges •Transfer of Water from an Outside Watershed •Agriculture •Urban Runoff/Storm Sewers •Atmospheric Depositon -Toxics

Source: NJDEP, 2012

The four subwatersheds in Bordentown Township that do not attain one or more designated uses are each impaired due to one or more parameters for that use, as shown in **Table 11: Integrated Water Quality Monitoring and Assessment Report, 2010**. The causes of impairment include phosphorus (total), total suspended solids, turbidity, mercury, arsenic, polychlorinated biphenyls (PCBs), and E. coli. Brief descriptions of these contaminants follow.

Phosphorus exists naturally at low levels within the environment, although excess phosphorus can lead to harmful algae blooms. As the excess algae dies and its decomposition uses up the oxygen, “dead zones” can develop where no aquatic life can survive. Typical causes of phosphorus pollution include overfertilization of lawns and agricultural areas; runoff from impervious surfaces such as parking lots, lawns, rooftops, and roadways; discharge from waste-water treatment plants; and overflow from septic systems. Soil erosion is a major contributor of phosphorus to streams, and streambank erosion occurring during floods can transport high quantities of phosphorous into the water system.

Total suspended solids (TSS) refer to solid materials, both organic and inorganic, that are suspended in water. High concentrations of TSS make water warmer by absorbing sunlight, while also blocking sunlight from reaching aquatic plants, decreasing photosynthesis, and reducing oxygen in the water, which then kills aquatic animal life. These materials enter waterbodies through stormwater runoff, streambank erosion, industrial wastes, wastewater discharges, improperly managed construction sites, and other sources.

Turbidity relates to how clear water appears. High turbidity makes water appear cloudy or opaque. Materials that cause water to be turbid include clay, silt, finely divided inorganic and organic matter, algae, soluble colored organic compounds, and plankton and other microscopic organisms. Excess turbidity can affect light penetration and productivity, recreational values, and habitat quality, and it can cause lakes to fill in faster.

Mercury and arsenic are considered heavy, or toxic, metals. Heavy metals bioaccumulate, meaning they accumulate in the body because they are not easily broken down. The consumption of heavy metals can cause kidney and liver failure, bone defects, stomach and intestinal irritation, fetal deformities, acute or chronic damage to the nervous system, and various cancers. Heavy metals usually enter the water system through industrial processes, such as the manufacture of electronics, paint, batteries, metal, or lamps.

Polychlorinated biphenyls (PCBs) are considered a highly toxic persistent organic pollutant (POPs) and have been outlawed worldwide. POPs have long half-lives, bioaccumulate in the fatty tissue of animals, and move up through the food chain. PCBs are byproducts of industrial processes used to make electrical, heat transfer, and hydraulic equipment; paints, plastics, and rubber products; pigments, dyes, and bleached paper; herbicides and pesticides; and many other industrial applications. Exposure to PCBs causes cancer and damages the immune, reproductive, nervous, and endocrine systems.

E. coli (*Escherichia coli*) bacteria inhabit the intestinal tract of humans and other warm-blooded animals and enter waterways through human and animal waste. Levels of E. coli in water may increase after periods of flooding when stormwater runoff may carry manure or animal waste from agricultural production into streams. E. coli itself is not necessarily a health hazard but serves as an indicator of the presence of sewage or animal waste, which may contain other more harmful microbes that are not as easily monitored.

Water-Quality Monitoring Networks

New Jersey's *Integrated Report* is based on the water quality assessments of a number of different monitoring networks. The Ambient Stream Monitoring Network (ASMN) and the Ambient Biological Monitoring Network (AMNET) are the two primary sources of surface water monitoring data. Beyond the information included in the *Integrated Report*, additional water quality data gathered from these monitoring stations is available through the USGS and the NJDEP.

The ASMN is a cooperative network between USGS and NJDEP that samples surface water quality at 112 stations in the state, four of which are located within Bordentown Township. These stations monitor stream flow as well as temperature, dissolved oxygen (DO), pH, carbon dioxide, nitrogen, ammonia, phosphorus, arsenic, and many other parameters. Monitoring sites are listed below in **Table 12: Ambient Stream Quality Monitoring Sites in Bordentown**.

AMNET is another water quality monitoring system that the *Integrated Report* is based on. AMNET, administered solely by NJDEP, consists of over 800 stream sites in the state and provides long-term biological data. The program routinely samples and evaluates the benthic macroinvertebrate population at each site as a biological indicator of water quality. Benthic macroinvertebrates are bottom-dwelling aquatic insects, worms, mollusks, and crustaceans that are large enough to be seen by the naked eye. There are three AMNET monitoring sites in Bordentown Township. Beyond the information included in the *Integrated Report*, additional water quality data gathered from these monitoring stations is available through the USGS and the NJDEP. NJDEP data include reports about what organisms, such as fish, protozoa, and others, are found at the monitoring site. USGS measures water quality and volume during the water year, which runs from October 1 to September 30 of the following year. These monitoring reports include water and air temperatures, nutrient loads, flow volume, and several other parameters.

Table 12: Ambient Stream Quality Monitoring Sites in Bordentown

Station Name	AMNET	ASMN
Blacks Ck Rt 130	AN0134	
Blacks Creek at Fieldsboro NJ		01464532
Crosswicks Ck Main St	AN0126	
Crosswicks Ck Point Breeze NJ	AN0131	
Crosswicks Creek at White Horse NJ		0146452360
Crosswicks at Groveville Rd in Groveville NJ		01464504
Doctors C at Rt 130 at Yardville NJ		01464522

Source: NJDEP, 2008

Knowing the actual condition of streams and stream banks, and planning for their improvement, requires more frequent surveying and monitoring than the state can provide. As described earlier, the state does not monitor all sites continuously or for all parameters. The state primarily monitors main channels in nontidal areas, and only does biological assessments through AMNET on a five-year cycle. A community may benefit from additional stream surveys by local organizations, along with regular monitoring of water quality on all local waterways.

Other Monitoring

New Jersey Watershed Ambassadors Program

The New Jersey Watershed Ambassadors Program is an AmeriCorps Program hosted by the NJDEP Water Monitoring and Standards Program. The goal of this program is to raise awareness of water quality issues in the state through monitoring and education. This program is organized by Watershed Management Area (WMA), with ambassadors assigned to each WMA. Bordentown Township is located within WMA 20: Assiscunk, Crosswicks, Doctors. The local host agency for WMA 20 is the Mercer County Soil Conservation District. The Watershed Ambassadors Program has conducted biological and visual assessments of streams and lakes in the area, including some recent visual assessments in Bordentown Township and the City of Bordentown along Thornton Creek. The data from these visual assessments are shown in **Table 13: Thornton Creek Visual Assessments**.

Table 13: Thornton Creek Visual Assessments

Side ID	WATHOR 1	WATHOR 2	WATHOR 3
Waterbody	Thornton Creek	Thornton Creek	Thornton Creek
Site Location	Elizabeth Street, City of Bordentown	Joseph Lawrence Park, Bordentown Township	Hogback Road, Bordentown Township
Date of Observation	12/3/12	12/3/12	12/13/12
Average Stream Width (feet)	12.16	2.5	8.16
Habitat Score (Overall)	126	112	137
Epifaunal Substrate/Available Cover	19	15	18
Pool Substrate Characterization	13	10	18
Pool Variability	16	3	17
Sediment Deposition	14	18	15
Channel Flow Status	8	8	10
Channel Alteration	12	6	11
Channel Sinuosity	9	3	10
Bank Stability	3 (left), 3 (right)	9 (left), 9 (right)	6 (left), 2 (right)
Bank Vegetative Protection	9 (left), 7 (right)	7 (left), 7 (right)	7 (left), 6 (right)
Riparian Vegetative Zone Width	8 (left), 5 (right)	8 (left), 9 (right)	8 (left), 9 (right)

Source: AmeriCorps NJ Watershed Ambassador Program, 2013

Fish Consumption Monitoring

Certain fish may contain toxic chemicals, such as PCBs, dioxins, or mercury, which accumulate in bottom sediments and aquatic life, including fish tissue. Chemical contaminants, such as dioxin and PCBs, are classified by the U.S. Environmental Protection Agency as probable cancer-causing substances in humans. Elevated levels of mercury pose a health risk to the human nervous system. Infants, children, pregnant women, nursing mothers, and women of childbearing age are considered to be at higher risk from contaminants in fish than other members of the general public. Since 1982, NJDEP has been catching fish at numerous sampling stations throughout the state and testing for contaminant levels. It then adopts advisories to guide residents on safe

consumption practices. More details on preparation and consumption of fish are found at the advisory website: www.state.nj.us/dep/dsr/njmainfish.htm.

The consumption advisories for fish caught in general freshwater are listed in **Table 14: Fish Consumption Advisories, 2012** below. In addition to the statewide general advisories, there are additional fish consumption advisories for the tidal Delaware River and tributaries, Crosswicks Creek, and Crystal Lake.

Table 14: Fish Consumption Advisories, 2012

Species	General Population	High-Risk Individuals
	Eat No More Than:	Eat No More Than:
General Freshwater Advisories		
Trout (Brown, Brook, Rainbow)	One meal per week	One meal per week
Largemouth Bass		One meal per month
Smallmouth Bass		
Chain Pickerel		
Yellow Bullhead	No restrictions	One meal per month
Brown Bullhead		
Sunfish		
Lower Delaware River (Tidal Section)		
Trenton, NJ to Delaware/Pennsylvania border, including all tributaries to head of tide		
Hybrid Striped Bass	No restrictions	One meal per week
Largemouth Bass	One meal per month	Do not eat
American Eel	One meal per year	Do not eat
Channel Catfish		
Striped Bass	Four meals per year	
White Perch		
White Catfish	One meal per month	
Crosswicks Creek at Bordentown (Mercer Co.)		
Largemouth Bass	No restrictions	One meal per week
White Catfish		
Crystal Lake at Fieldsboro (Burlington Co.)		
Largemouth Bass	No restrictions	One meal per month
Black Crappie		One meal per week
Brown Bullhead		No restrictions

Source: NJDEP, 2012

Causes of Water Quality Impairments

Point Sources of Pollution

Point sources of pollution, which come from a single source or “point,” such as an industrial pipe discharge, are regulated by NJDEP through the New Jersey Pollution Discharge Elimination System (NJPDES). New Jersey created NJPDES in response to the Federal Clean Water Act of 1972, which mandated that each state develop water quality standards and regulate the amount of pollution entering water bodies. The act classified all water pollution into one of two categories: “point source” pollution coming from a single source, such as an industrial pipe; and “nonpoint source” pollution, which comes from many diffuse sources. Although the Federal Clean Water Act required states to only regulate point sources, New Jersey also regulates nonpoint sources through authority of the NJPDES rules. See [Nonpoint Sources of Pollution](#).

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program. Under NJPDES, any facility discharging over 2,000 gallons per day (gpd) of wastewater directly into surface water or ground water (generally through a septic system) must apply for and obtain a permit for discharging. Rather than creating individually tailored permits for each and every facility, the Division of Water Quality uses scientific standards to create and issue general permits for different categories of dischargers. NJDEP enforces the terms of the NJPDES permit by visiting discharging facilities and requiring facilities to periodically conduct and submit water quality, biological and toxicological analyses, and thermal impact and cooling water assessments.

There are nine active NJPDES permits issued to facilities in Bordentown Township. These are shown in [Table 15: NJPDES Permits for Point Source Pollution](#). All nine permits are for stormwater discharges.

Although the NJPDES program has made much progress in regulating point source discharges, a great number of minor discharges have been allowed without regard to their cumulative impact on surface water quality. The mayor and governing body of the municipality where the facility will be located receive notice from NJDEP when anyone applies for a permit to discharge to surface water under the New Jersey Pollution Discharge Elimination System (NJPDES). Copies of the public notice should then be forwarded to the Environmental Commission. The municipality should examine the application and evaluate the proposal—the need for the permit, the location of the discharge and the potential negative impacts. They should communicate their findings to NJDEP, the applicant, and the town.

Table 15: NJPDES Permits for Point Source Pollution

NJPDES Permit Number	PI Number	Facility Name	Street Address	Effective Start Date	Expiration Date	Discharge Category
NJG0176036	513719	Adesta and Transco Staging Area	RT 206	03/01/12	02/28/17	5G3: Construction Activity Stormwater
NJG0204340	577020	Bordentown Waterfront Community	US 130	04/30/12	02/28/17	5G3: Construction Activity Stormwater (GP)
NJG0204455	577289	Bordentown Waterfront Community	US 130	05/03/12	02/28/17	5G3: Construction Activity Stormwater (GP)
NJG0204765	577691	Bordentown Waterfront Community	US 130	05/09/12	02/28/17	5G3: Construction Activity Stormwater (GP)
NJG0129801	49399	Loves Travel Stop 404	2008 State Highway 206 S	06/01/07	05/31/12	5G2: Basic Industrial Stormwater GP - NJ0088315
NJG0178497	521097	New Jersey Turnpike Widening Project	1053 U.S. Route 206	03/01/12	02/28/17	5G3: Construction Activity Stormwater
NJG0193691	560237	NJTTF - Joseph Lawrence Park	Bordentown	03/01/12	02/28/17	5G3: Construction Activity Stormwater
NJG0110639	47864	Parklands Reclamation Landfill	1070 Rt 206	06/01/07	05/31/12	5G2: Basic Industrial Stormwater GP - NJ0088315
NJG0057631	46139	Petro Stopping Center #18	402 Rising Sun Rd	06/01/07	05/31/12	5G2: Basic Industrial Stormwater GP - NJ0088315

Source: NJDEP, 2012

Nonpoint Sources of Pollution

Since the adoption of the federal Clean Water Act and the implementation of the NJPDES program in subsequent years, water pollution from point sources has decreased dramatically. However, as development has continued to spread throughout New Jersey, nonpoint source pollution has increased substantially in recent decades. Nonpoint source pollution, which is carried by stormwater runoff, has the largest effect on the water quality and channel health of streams in Bordentown Township. According to US EPA, about half the pollution in New Jersey's surface water comes from nonpoint sources. Development dramatically increases nonpoint source pollution by increasing the volume and velocity of water and the level of pollutants in the runoff. Increased runoff causes erosion and sediment buildup in streams and washes nutrients, toxins, bacterial contamination, road salt, motor oils and litter into streams.

The sources of polluted stormwater runoff are also the most difficult to identify and remediate because they are diffuse, widespread, and cumulative. Most nonpoint source pollution in Bordentown derives from stormwater runoff from paved surfaces such as streets, commercial and industrial areas, residential sites (with and without detention basins), and agricultural fields lacking adequate vegetative buffers. The waterways in Bordentown are affected by stormwater runoff both from within the township and upstream municipalities.

NJDEP's new Stormwater Management Rules focus on reducing and controlling nonpoint sources of water pollution. The NJDEP established four NJPDES general permits: the Tier A Municipal Stormwater General Permit (Tier A Permit) for more populous municipalities; the Tier B Municipal Stormwater General Permit (Tier B Permit) for rural communities; the Public Complex Stormwater General Permit (Public Complex Permit); and the Highway Agency Stormwater General Permit (Highway Permit). Bordentown Township is a Tier A municipality.

The NJPDES Stormwater program lays out guidance and requirements for management of and education about stormwater at the local level. Municipalities were required to obtain the NJPDES general permit for the stormwater system and its discharges within their borders, which are considered to be owned and "operated" by the municipality. The general permits address stormwater quality issues related to new development, redevelopment, and existing development by requiring regulated entities to implement Statewide Basic Requirements (SBRs).

Stormwater Management Statewide Basic Requirements

1. Control post-construction stormwater management in new development and redevelopment through:
 - Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.
 - Adoption and implementation of a stormwater control ordinance in accordance with N.J.A.C. 7:8. This ordinance requires retention on site of 100% of preconstruction recharge and use of low-impact design in stormwater facilities, among other features.
 - Ensuring compliance with Residential Site Improvement Standards for stormwater management. The RSIS has been revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.
 - Ensuring long-term operation and maintenance of Best Management Practices on municipal property.
 - Requiring that new storm drain inlets meet new design standards.
2. Conduct local public education:
 - Distribute educational information (about stormwater requirements, nonpoint source pollution, and stewardship) annually to residents and businesses and conduct a yearly "event" (such as a booth with these messages at a community day).
 - Have all municipal storm drain inlets labeled with some type of "don't dump" message.
 - Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives and regarding proper identification, handling, and disposal of wastes, including pet waste and litter
 - Adopt specific ordinances to control waste disposal and other nonpoint sources.
3. Control improper disposal of waste through improved yard waste collection and through adoption of ordinances (pet waste, litter, improper dumping, and wildlife feeding).
4. Control solids and floatables through increased street sweeping, retrofitting storm drain inlets during road repairs, and instituting programs for stormwater facility management, for roadside erosion control, and for outfall pipe scouring/erosion.
5. Improve maintenance yard operations, specifically for de-icing material storage, fueling operations, vehicle maintenance, and housekeeping operations.
6. Increase employee training about all of the above.

Source: N.J.A.C. 7:8

Groundwater

The geology of the New Jersey Coastal Plain can be visualized as a tilted layer cake, with its “layers,” or strata, formed of gravels, sands, silts, and clays. The saturated gravel and sand layers, with their large pore spaces, are the aquifers from which water is drawn. The silt and clay layers, which impede the movement of water, are called confining beds.

The Potomac–Raritan–Magothy (PRM) formation is the deepest and largest aquifer. Other smaller aquifers on top of the PRM are the Englishtown and the Wenonah–Mount Laurel. The Kirkwood–Cohansey is a large formation that begins at the divide between the inner and outer coastal plain. It is composed of two thick layers—the Kirkwood (lower) and the Cohansey (upper)—that overlie the older formations.

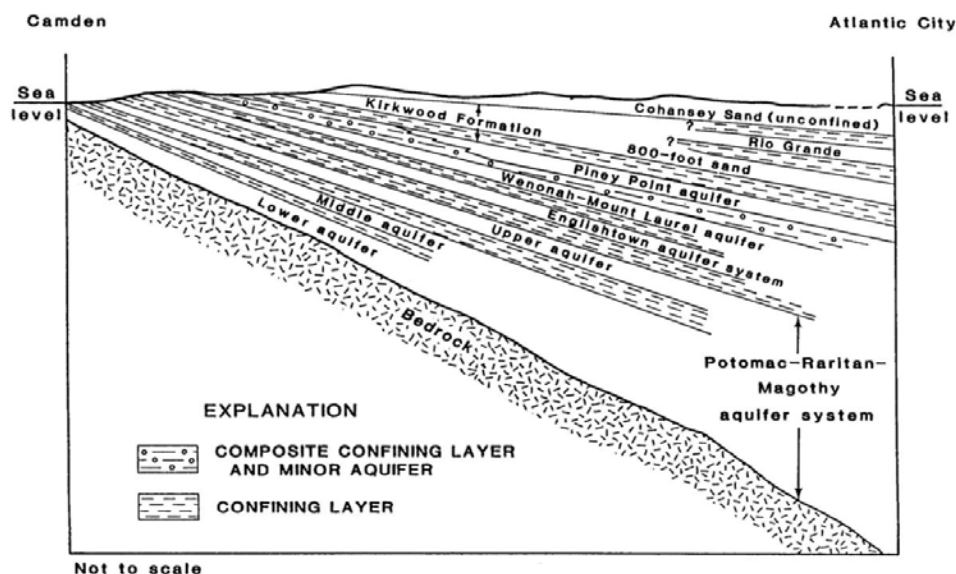


Figure 7: Aquifers of Southern New Jersey
Source: USGS

A cross section across southern New Jersey from west to east (see [Figure 7](#)) would show that the aquifers are not horizontal, but instead are tilted toward the southeast, getting deeper as they cross the state toward the Atlantic Ocean. Because of this tilting, each aquifer emerges on the land surface in a sequential manner. The oldest strata emerge on the surface near the Delaware River.

An outcrop is the area where the aquifer emerges on the land surface. Preventing contamination of the land in outcrop areas is extremely important in order to maintain a safe drinking supply. Confining units may also outcrop. Also known as an aquitard, a confining unit is an impenetrable layer of fine, compact clay that divides one aquifer from another. [Map 13: Geologic Outcrops](#) shows the outcropping geologic formations in and around Bordentown Township. The Englishtown aquifer outcrops in the southeastern corner of the township. The Merchantville–Woodbury confining unit outcrops in a diagonal band across much of Bordentown Township. The Potomac and Magothy formations outcrop along the western edge as well as the northern section of the township and Newbold Island.

Aquifers

Bordentown Township's public water supply is drawn from the Potomac-Raritan-Magothy aquifer system (PRM) through wells located just north of the township, in Hamilton Township.

Potomac-Raritan-Magothy Aquifer System (PRM)

The Potomac-Raritan-Magothy (PRM) is a deep geological formation underlying Bordentown Township. This multiple aquifer is actually a large series of formations that have been combined and described as a single unit because the individual formations—the Potomac group and the Raritan and Magothy formations—are lithologically indistinguishable from one another over large areas of the Coastal Plain. That is, they are composed of materials of like kind and size laid down by both an advancing and retreating sea across southern New Jersey, and by deposits of material that came from the breakdown and erosion of the Appalachian and Catskill Mountains beginning in the Cretaceous Period.

In the Delaware Valley, three aquifers have been distinguished within the PRM system, designated as lower, middle, and upper, and divided by two confining units or layers between the three water-bearing strata. The aquifers themselves are largely made up of sands and gravels, locally inter bedded with silt and clay. The lower aquifer sits on the bedrock surface. Confining beds between the aquifers are composed primarily of very fine-grained silt and clay sediments, which are less permeable and thus reduce the movement of water between the aquifers. They also help to slow the entry of any contaminants on the surface down into the groundwater.

The PRM is the primary source of drinking water for New Jersey residents from Burlington to Salem counties, as well as communities in Delaware. Because of such high usage, PRM aquifer water levels have declined in recent decades.

Water Supply Wells

Wells that provide drinking water may be either private or public water supply wells. Private water supply wells are those that serve fewer than 25 people; these are not regulated by the EPA or DEP. On the other hand, public water supply wells—which may be publically or privately owned—are those that serve at least 25 people, or serve 15 service connections for at least 60 days per year. Public water supply wells are classified as being either “community” or “non-community.” A public community water supply well serves 15 or more service connections used by year-round residents, or serves at least 25 year-round residents. Public community water supply wells may serve municipalities, subdivisions, nursing homes, or other areas or institutions.

The Bordentown Water Department has four active public community water supply wells serving Bordentown Township and City, located just to the north of the township in Hamilton Township. They are listed in **Table 16: Public Community Water Supply Wells**

below and shown on [Map 14: Public Water Supply Wells](#). In addition to serving Bordentown, the Bordentown Water Department sells its water to the Fieldsboro Water Department. Information on the susceptibility ratings, monitoring schedules, and annual drinking water quality report (also known as the Consumer Confidence Report) are found in [Appendix E: Drinking Water](#).

Table 16: Public Community Water Supply Wells

Well Permit	Well ID	System Name	Depth of Bottom of Well (feet)	Primary Aquifer
2805150	WSWL0000065857	Bordentown Water Dept	121	Middle PRM
2805409	WSWL0000065868	Bordentown Water Dept	138	Middle PRM
2808769	WSWL0000065940	Bordentown Water Dept	121	Middle PRM
2834305	WSWL0000066082	Bordentown Water Dept	102	Middle PRM

Source: NJDEP, 2009

Public non-community wells are another part of a public water system. A public non-community water supply well is a public water supply well used by individuals other than year-round residents for at least 60 days of the year. There is one public non-community well in Bordentown Township on Route 206 that serves the Maier's Bakery Thrift Store, listed in [Table 17: Public Non-Community Water Supply Wells](#) below and shown on [Map 14: Public Water Supply Wells](#). Although this business has been closed for some time, the well has an active registration with the NJDEP.

Table 17: Public Non-Community Water Supply Wells

Well ID	System Name	Depth of Bottom of Well
0304305	Maier's Bakery Thrift Store	180

Source: NJDEP, 2012

As required by federal and state regulations, public water supply wells (both community and non-community) in the state are monitored by NJDEP on a regular basis.

Sampling requirements for a water system may change at any time for several reasons, including analytical results or changes in population and/or inventory. It is generally the responsibility of the public water system and its licensed operator to make sure proper monitoring is performed for the entire distribution system and each point of entry for all parameters. Sampling requirements may be confirmed by referring to the Code of Federal Regulations (40 CFR 141) and the New Jersey Safe Drinking Water Act Regulations (N.J.A.C. 7:10).

Wellhead Protection Areas

As part of its 1991 Well Head Protection Program Plan, the New Jersey Department of Environmental Protection has delineated Wellhead Protection Areas (WHPAs) around all community wells. A WHPA is the area from which a well draws its water within a specified time frame (tiers). Pollutants spilled directly on or near the wellhead will enter the water source within that time frame. Once delineated, these areas become a priority for efforts to prevent and clean up groundwater contamination. Other components of the Wellhead Protection Plan include implementing best management practices to protect groundwater, land use planning, and education to promote public awareness of groundwater resources.

The radius of the WHPA depends on a number of factors related to the well and the underlying hydrogeology. The thicker and more porous the aquifer and the slower the pumping rate of the well, the smaller the radius is of the WHPA. The WHPAs for the Bordentown Water Department wells in Hamilton Township, shown on [Map 14: Public Water Supply Wells](#), extend into the northern portion of Bordentown Township onto land that is mostly, but not entirely, protected wetlands.

Air Quality

Air quality is one of the most difficult environmental resources to measure because its sources are diffuse and regional in nature. Common sources of air pollution include industry, cars, trucks, buses, fires, and dust. For example, the burning of coal in Ohio, Michigan, and Western Pennsylvania to generate electricity sends pollutants such as sulfur, nitrogen, and particulate matter all the way to the East Coast. Locally produced sources of air pollution include daily roadway traffic and industrial facilities.



Northern Community Park

Source: Sean Varga

Increasing public awareness regarding air pollution led to the passage of a number of state and federal laws, including the original Clean Air Act of 1963 and a much stronger Clean Air Act of 1970 (CAA). In 1990, the CAA was amended and expanded by Congress to include a market approach to reducing air pollution by allowing certain companies to buy and sell emission “allowances,” or “credits.” The 1990 CAA also required transportation projects receiving federal funding to be in conformity with state air quality goals. The 1990 CAA also revised the way that air toxins are regulated, increasing the number of regulated toxic air pollutants from seven to 187.

In 1970, the US Environmental Protection Agency (EPA) was formed to enforce the Clean Air Act (CAA). In New Jersey, the EPA allowed NJDEP to enforce the CAA because the state agency developed more stringent air standards and created a State Implementation Plan (see NJAC 7:27). The CAA identified six criteria pollutants—ozone, particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and lead—that are destructive to human health and the built and natural environment (see explanation of Criteria Pollutants on right). The EPA sets National Ambient Air Quality Standards (NAAQS) for these pollutants based on human health effects, as well as environmental and property damage.

Between 1970 and 2007, total emissions of the six criteria air pollutants decreased by more than 50 percent. The industrial sector reduced its toxic air emissions by 70 percent during this time period. Stricter emissions standards in the auto industry have made cars 90 percent “cleaner” since 1970. Cars also pollute less because refineries are required to produce cleaner fuels; leaded gasoline was completely banned in 1996.



First ground-mounted solar panels

Source: Bill Ryan

Criteria Pollutants

Ground-level ozone (O₃) is formed when volatile organic compounds (VOC) and nitrogen oxides react with sunlight and heat. It is produced more in the summer months and is the primary constituent of smog. Ground-level ozone is a pulmonary irritant, which, even in low levels, can be dangerous to sensitive populations such as people with asthma or emphysema and the elderly. It can also affect plant growth and is responsible for hundreds of millions of dollars in lost crop production.

Particulate matter (PM), or particle pollution, is made up of dust, ash, smoke, and other small particles formed from the burning or crushing of materials such as wood, rocks, and oil. When ingested, particulate matter can lodge deep in the lungs and can contribute to serious respiratory illnesses such as asthma or lung disease. Particulate matter also creates haze, reduces visibility, and covers buildings in dirty soot.

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon fuel is not burned completely. It is a component of motor vehicle exhaust; therefore, higher levels of CO generally occur in areas with heavy traffic congestion. The highest levels of CO typically occur during the colder months when air pollution becomes trapped near the ground beneath a layer of rising warm air.

Nitrogen oxides (NO_x) are a group of highly reactive gases that contain nitrogen and oxygen in varying amounts. Motor vehicles, electric utilities, and homes and businesses that burn fuels emit nitrogen oxides; they can also be found naturally. Nitrogen oxides are primary components in ground-level ozone (smog), acid precipitation, and other toxic chemicals. Acid precipitation can cause lung ailments in humans, property damage, harm to aquatic life, and other environmental and human health problems.

Sulfur dioxide (SO₂) is released into the atmosphere when fuel containing sulfur, such as coal and oil, is burned, and when gasoline is refined from oil. Sulfur dioxide dissolves in water vapor to form acid precipitation.

Lead (Pb) is a pollutant that was historically released by cars and trucks burning leaded fuel, but metals processing plants and trash incinerators are the major source of emissions today. Lead tends to be a localized air pollutant, found in urban or high-traffic areas, and is deposited in soil and water, harming fish and wildlife.

Air Quality Monitoring

NJDEP's Bureau of Air Monitoring maintains a network of over 40 continuous monitoring stations across the state. Most of the monitoring stations are clustered in the New York metropolitan area. Each station monitors at least one of 23 different parameters, including many air pollutants as well as wind speed, wind direction, solar radiation, or other parameters. Several of these parameters—carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, smoke shade, particulate matter, and various meteorological data—are measured continuously and data is available instantaneously. As enabled by the CAA, the EPA has set National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, and lead. There are two kinds of NAAQS: the primary standard is based on human health effects, while the secondary standard is based on environmental and property damage.

There is a continuous monitoring station located approximately 15 miles to the southeast of Bordentown Township in Colliers Mills, NJ, Ocean County. In 2011, the Colliers Mills monitoring station monitored ozone (O₃) at the "urban" scale, representative of an area including Bordentown Township.

The amount of ozone has decreased greatly in New Jersey since the 1980s, and one-hour concentrations have not exceeded 0.200 parts per million (ppm) since 1988. For ground-level ozone (O₃), there are two NAAQ standards: (1) a one-hour concentration of 0.12 ppm, and (2) an eight-hour average concentration of 0.08 ppm. For the national standards, these are the same for both primary and secondary effects. New Jersey, however, has tightened

the one-hour concentration standard for secondary effects to 0.08 ppm. Ozone was monitored at 15 stations throughout the state in 2011. The Colliers Mills station did not exceed the one-hour standard, although it did exceed the eight-hour standard on 11 days in 2011, as shown in **Table 18: Ozone One-Hour Data** and **Table 19: Ozone Eight-Hour Data** below.

Table 18: Ozone One-Hour Data, 2011

Monitoring Site	1-hr Max ppm	2nd Highest 1-hr Max ppm	4th Highest 1-hour Average 2007-2009	# of days with 1-hour Averages above 0.12 ppm
Colliers Mills	0.114	0.107	0.109	0

Source: NJDEP, 2011

Table 19: Ozone Eight-Hour Data, 2011

Monitoring Site	1st Highest	2nd Highest	3rd Highest	4th Highest	Avg. of 4th Highest 8-hour Averages 2008-2010	# of days with 8-hour above 0.08 ppm
Colliers Mills	0.101	0.094	0.089	0.085	0.081	11

Source: NJDEP, 2011

Air Quality Index

The Air Quality Index (AQI) is an index for reporting air quality on a daily basis. The EPA created the AQI to indicate a region's air quality by measuring levels of five of the six criteria pollutants (excluding lead). The AQI is focused on the potential human health hazards experienced by breathing unhealthy air. Scores for the AQI range from 0 to 500 and are divided into six color-coded categories, as shown in **Figure 8: Air Quality Index (AQI) for Region 5, 2011** below. The higher the AQI value, the greater the level of air pollution and associated health concerns.

The daily score is based on the highest individual pollutant score reported. For example, if ozone scored 150 and particulate matter scored 100, the daily AQI would be 150, which is considered "Unhealthy for Sensitive Groups." The index is also used to measure overall air quality by counting the number of days per year when the AQI of each metropolitan region exceeds 100. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level the EPA has set to protect public health.

New Jersey is divided into nine regions, which report their respective AQI. Burlington County is in Region 5: Central Delaware Valley. The monitoring stations for Region 5 are located in Ewing and Rider University. In 2011, the most recent year of annual data, Region 5 reported 320 good (green) and 38 moderate (yellow) days, 7 days that were unhealthy for sensitive groups (orange), and 0 unhealthy, very unhealthy, or hazardous

(red, purple, maroon) days.

Numerical Air Quality Index (AQI) Rating	Descriptive Rating: Levels of Health Concern	AQI Color Code	Region 5 Days, 2011
0 to 50	Good	Green	320
51 to 100	Moderate	Yellow	38
101 to 150	Unhealthy for Sensitive Groups	Orange	7
151 to 200	Unhealthy	Red	0
201 to 300	Very Unhealthy	Purple	0
301 to 500	Hazardous	Maroon	0

Figure 8: Air Quality Index (AQI) for Region 5, 2011

Source: DVRPC, 2012

Local Point Sources of Air Quality Pollution

Under the CAA, the EPA limits the amount of other air pollutants and toxins that are emitted by point sources, such as chemical plants, industrial factories, power plants, and steel mills. The NJDEP Air Quality Permitting Program issues permits for stationary sources of air pollution, such as power plants, oil refineries, dry cleaners, food processing centers, and manufacturing plants, and regulates and monitors their emissions. There are 27 active air quality permits in Bordentown Township, listed below in **Table 20: Facilities with Active Air Quality Permits.**

Table 20: Facilities with Active Air Quality Permits

Facility Name	Address	PI Number
APCO Petroleum Corp-APCO Bordentown	2000 Rt 206	A467
Badshah Oil Corp	1077 Rt 206	A9756
Bob Maguire Chevrolet (closed)	237 Rt 130	46308
Bordentown Armory	1048 US HWY 206	45611
Bordentown Gas Inc Service Station	231 Rt 206	A4780
Bordentown Fuel Service Area	Chesterfield Rd	H4502
Bordentown Twp DPW	262 Crosswicks Rd	A3765
Bordentown Twp Middle School	50 Dunns Mill Rd	46172
Bordentown Twp Regional High School	318 Ward Ave	46151
Delta Gas	676 Rt 206	A4821
Hertz Corp	1037 Rt 206	H8761
Juvenile Medium Security Facility	W Burlington St	45197
Laurel Run Corp-Laurel Run Apts.	Rt 206	45173
Laurel Run STP	Georgetown Rd	46267
Mershon Concrete LLC	5251 Rt 130	45417
Mile Hollow Pump Station	Stanton Ave	46331
NJDOT Bordentown Maintenance Facility	Dunns Mill Rd & Rt 130	H4531
Nu Wave Cleaners	310 Ward Ave	L8586
NWL Transformers Inc	312 Rising Sun Rd	45070
Parklands Recycling & Disposal Facility	1070 Rt 206	46099
P&C Cleaner	626 Rt 206	L4560
Shahi Valero Service Station	51 Rt 130 N	A4503
Tri State Petro-Tri State Yardville	42 Rt 130S	A4607
Turnpike Amoco Service Station	1080 Rt 206	A4665
Verizon NJ Bordentown Co#53414	195 Crosswicks Rd	45548
WM of Central Jersey Inc	1070 Rt 206	45231

Source: NJDEP, 2012

Biological Resources

When a community protects wildlife and habitat, it is also protecting biodiversity, which is important for the health and productivity of the ecosystem and its inhabitants, including humans. Biodiversity refers to the variety of genetic material within a species population, the variety of species (plants, animals, microorganisms) within a community, and the variety of natural communities within a given region. Biodiversity facilitates adaptation and evolution, improving a species' chance of survival as the environment changes. A diversity of plant and animal species is also necessary to maintain healthy human environments, working landscapes, and productive ecosystems. Lower organisms, many not well known, contribute to nutrient cycling, decomposition of organic matter, soil rehabilitation, pest and disease regulation, pollination, and water filtering. Once biodiversity declines, it is extremely difficult for an ecosystem to recover or replace species.

Bordentown contains various ecosystems, from the Abbott Marshlands to Newbold Island to the many riparian corridors along its streams. Wooded wetlands are the most abundant type of ecosystem in Bordentown, followed by deciduous upland forests and tidal marshes. Areas of upland forest are located adjacent to wooded wetlands and on much of Newbold Island.

Natural Vegetation

A region's vegetation is dependent upon many factors, the most important of which are climate and soils. Bordentown's climate is temperate, and it is characterized by moderate temperatures, precipitation, and wind, with an average annual temperature of 54 degrees Fahrenheit. The average annual precipitation is 41.4 inches and is fairly well distributed throughout the year. The majority of Bordentown Township's soils are poorly drained soils that exhibit ponding and sustain wetland plants. However, Bordentown also has a large amount of moderately well-drained soils that support a diversity of trees and crops. See the [Soils](#) section for a detailed description of Bordentown Township's soils.

Bordentown Township's natural vegetation types, along with human-influenced types of land cover, have been tabulated and mapped by NJDEP's 2007 land cover analysis and are shown below in [Table 21: Bordentown Natural Vegetation](#). See [Map 15: Natural Vegetation \(2007\)](#).

Table 21: Bordentown Natural Vegetation

Vegetation Type	Area (Acres)	Percentage of Township
Brush/Shrubland-Oldfield	109.18	1.8%
Brush/Shrubland	180.11	3.0%
Tidal Marshes-Freshwater	208.57	3.5%
Tidal Waters	392.00	6.6%
Upland Forest-Coniferous	2.83	<1.0%
Upland Forest-Deciduous	642.86	10.8%
Upland Forest-Mixed (Coniferous Dominated)	6.59	<1.0%
Upland Forest-Mixed (Deciduous Dominated)	20.51	<1.0%
Water	71.20	1.2%
Wetlands-Coastal (Phragmites Dominated)	11.86	<1.0%
Wetlands-Herbaceous	19.75	<1.0%
Wetlands-Modified	144.10	2.4%
Wetlands-Phragmites Dominated	5.04	<1.0%
Wetlands-Scrub/Shrub	71.30	1.2%
Wetlands-Wooded-Deciduous	877.74	14.7%
Total Natural Vegetation Cover	2,763.61	46.4%
Total Bordentown Land	5,956.67	100.0%

Source: NJDEP, 2007

Wetlands

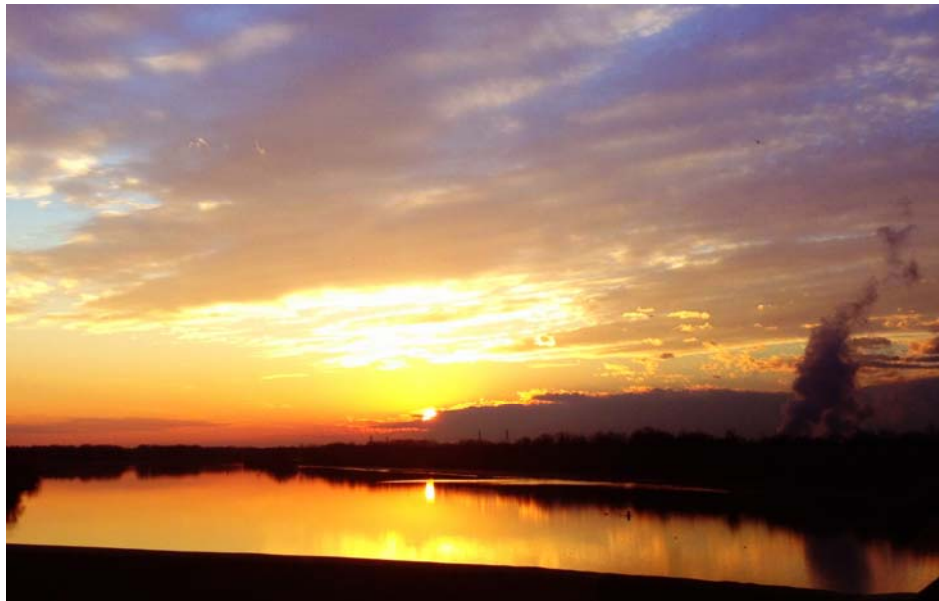
Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivity far greater than that found on dry land. Wetlands play a vital role in maintaining water quality by naturally filtering surface and ground waters. The ecological importance of wetlands, however, has not always been appreciated. For over three centuries, people drained, dredged, filled, and leveled wetlands to make room for development and agriculture. Although the pace of wetland destruction has slowed markedly in the past three decades, human activities have destroyed approximately 115 million of the original 221 million acres of wetlands in the United States since the beginning of European settlement.

Scattered throughout Bordentown Township are deciduous wooded wetlands (sometimes referred to as wetland forests or, more typically, hardwood swamps). Virtually all of the wetlands in the township are found in association with streams and their tributaries. Deciduous wooded wetlands occupy nearly 900 acres (nearly 15 percent) of Bordentown Township and support mixed hardwoods that flourish in lowlands. The trees in Bordentown's deciduous wooded wetlands may include American sycamore, river birch,

white ash, swamp white oak, green ash, and sweetgum. Deciduous wooded wetlands provide important habitat for a wide variety of mammals, birds, reptiles, and amphibians.

Closely associated with deciduous wooded wetlands are scrub/shrub wetlands, occupying over 70 acres of Bordentown Township. These wetlands are generally composed of young, medium-height, primarily deciduous woody plants. Scrub/shrub wetlands are usually in early successional stages and will later become shrub-dominated wetlands or those dominated by canopy species. The trees in Bordentown Township's scrub/shrub wetlands may include red maple, ash, and sweetgum, and they are dominated by shrub species such as silky dogwood, buttonbush, winterberry, swamp rose, elderberry, Southern arrowhead, and hazel alder.

Other types of wetlands found in Bordentown Township include herbaceous wetlands, also known as emergent wetlands. These herbaceous wetlands generally occur as freshwater tidal marshes along the main channel of Crosswicks Creek, the largest and most significant of which is the Abbott Marshlands. Nontidal emergent wetlands are also found in Bordentown along Jumble Gut Run, Mile Hollow Run, Thornton Creek, the upper portion of Blacks Creek, Laurel Run, and Spring Hill Brook. Herbaceous wetland plants in Bordentown may include rice cutgrass, reed canary grass, pond lily, tearthumb, arrow-leafed tearthumb, broadleaf cattail, and the common reed (*Phragmites*). Herbaceous wetlands may be dominated by *Phragmites*, a reed that colonizes easily and pushes into wetland areas from adjacent dry land areas, spreading through an underground root system that is difficult to eradicate. In addition to its tendency to aggressively spread, *Phragmites* often becomes a dominant monoculture and is therefore considered an invasive species.



Sunset over the Delaware River

Source: M. Gonzalez

Modified wetlands are areas that have been altered by human activities and do not support natural wetland vegetation, but show signs of soil saturation on aerial infrared

surveys. Modified wetlands encompass agricultural wetlands, former agricultural wetlands, disturbed wetlands, and wetlands that occur in maintained green spaces, such as open lawns, golf courses, and stormwater swales. Bordentown Township has several large tracts of modified wetlands covering over 140 acres of the township.

Wetlands are protected through enforcement of the buffer requirements of the New Jersey Freshwater Wetlands Protection Act.

Upland Forests

Upland areas are those locations without water at or near the soil surface. Upland forests are located on drainage divides, terraces, and slopes where water is not the controlling factor and where drainage is sufficient so that soils do not become saturated for extended periods of time. Nearly all old growth forests in New Jersey were harvested for lumber during colonial times.

Over 11 percent of Bordentown Township consists of upland forests. Most of Bordentown's original upland forests were cleared and converted to farms during the 18th and early 19th centuries. While some second-growth forests have returned, other areas have been converted to residential or commercial development. The remaining upland forests tend to be located near stream corridors or are patchy woodlands on less desirable soils associated with large farms.

The composition of upland forests in the township is largely one of mixed oaks (white, black, red, chestnut, and scarlet oak) joined by beech, pignut, and mockernut hickories, black walnut, tulip tree, and red maple. Beech/oak forest is found predominantly around the lower third of Blacks Creek, beginning at the Delaware River and heading east until Route 206. Past this point, the forest becomes a mixed oak forest. Additionally, hickories are found in abundance at the northeastern corner of the township, on Crosswicks Creek.

Dogtoothed violets and skunk cabbage are common along Blacks Creek and parts of Crosswicks Creek. The understory is dominated by flowering dogwood, black cherry, ironwood, and sassafras. Vines are common, including Virginia creeper, wild grapes, Japanese honeysuckle, and poison ivy. Spicebush, arrowwood, and black haw are common shrubs in moister locations.

Rhododendrons form a unique part of the Bordentown landscape. They are in abundance in parts of Bordentown because of the very specific conditions they require. When located in the New Jersey Inner Coastal Plain, rhododendrons must be situated on north-facing slopes with Keyport soils. Bordentown Township has these conditions primarily along Blacks Creek, between Route 130 and Burlington Street, and also near Route 206. Rhododendrons, reaching 20 feet in height, have been spotted in these areas.

Grasslands and Agricultural Lands

NJDEP defines grassland habitat as brushland, shrubland, or old fields that were cleared or disturbed at one time and then abandoned. Following abandonment, old fields are overgrown by perennial herbs and grasses. These pioneer plants remain the dominant species for 3 to 20 years. Later, woody plants take over. This habitat is visible, especially along wood edges, roadsides, and in landscapes where mowing is infrequent and where woody plants are not yet the dominant vegetation.

In Bordentown, 180 acres or approximately 3 percent of the township is brush or shrubland. An additional 109 acres or 1.8 percent of the township is classed as old fields. The majority of old fields and brushland/shrubland within the township is located on the western half of Newbold Island.

Landscape Project Priority Habitats

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish and Wildlife, documents the value of various types of habitats within New Jersey. It ranks these habitats out of five classifications based on their importance (five being the highest). The NJDEP divides New Jersey into six habitat regions based on ecological similarities. Bordentown Township is located completely within the Piedmont Plains habitat region.



Blacks Creek

Source: M. Gonzalez

Nearly half of the area of Bordentown Township is ranked as priority habitat by the Landscape Project. This includes waterways within the township boundaries. Newbold Island and the riparian areas of the Delaware River, Crosswicks Creek, Crystal Creek, and Blacks Creek are all ranked as high priority habitat. These areas are listed below in **Table 22: Landscape Project Priority Habitat**. It is important to preserve all levels of habitat in order to maintain the diversity of species that still exists in the township. Many areas along the Delaware River and Crosswicks Creek provide habitat for the bald eagle, a state endangered species. There is also habitat in the Delaware River and Crosswicks Creek for the shortnose sturgeon, a state and federal endangered species, as well as the great blue heron, a species of special concern. Newbold Island also provides habitat for the state threatened wood turtle and the state endangered Northern harrier. Non-riparian areas of Bordentown also provide habitat for the state threatened wood turtle, bobolink, grasshopper sparrow, and three species of special concern: Eastern meadowlark, Cooper's hawk, and great blue heron. See **Map 16: Landscape Project Priority Habitat (2012)**.

Table 22: Landscape Project Priority Habitat

Rank	Area (Acres)	% of Township Land
1	776.60	13.04%
2	378.84	6.36%
3	243.69	4.09%
4	1,076.22	18.07%
5	370.35	6.22%
Total Landscape Project Habitat	2,845.71	47.77%
Total Bordentown Township Land	5,956.67	100.00%

Source: NJDEP, 2012

Animal Communities

Although no comprehensive inventory of the different animal species within Bordentown Township exists, there are records of sightings, biological studies of range, and assessments of endangered and threatened species status. Using federal, state, and other scientific sources, it is possible to identify and describe known and possible animal communities of Bordentown Township. These are included in **Appendix B: Animals in Bordentown Township**.

Invertebrates

Invertebrates are the basis of a healthy environment and are part of every food chain—either as food for amphibians and fish, or as a part of nutrient cycling systems that create and maintain fertile soils. Invertebrates consist of insects (beetles, butterflies, moths, dragonflies, ants, termites, bees, wasps, flies, and others), arachnids (spiders, ticks, and mites), crustaceans (crayfish and microscopic copepods), mollusks (mussels, clams, snails, and slugs), and worms.

Macroinvertebrates are invertebrates that are visible to the naked eye but smaller than two inches. Benthic (bottom-dwelling) macroinvertebrate communities provide a basis for ecological monitoring and are relatively simple to collect from shallow stream bottoms. These communities consist largely of the juvenile stages of many insects, such as dragonflies and mayflies, as well as mollusks, crustaceans, and worms. Monitoring for diverse assemblages of macroinvertebrates reveals the effect of pollutants over a longer period of time, as compared to chemical monitoring, which measures water quality at one moment in time. The Ambient Biomonitoring Network (AMNET) surveys streams for macroinvertebrate communities, which indicate certain levels of water quality, discussed in the section on **Surface Water Quality**.

The Eastern pondmussel and the tidewater mucket, both threatened species in the state, are both found in the waters of Bordentown Township.

A list of butterflies found in the Abbott Marshlands is found in **Appendix C: Abbott Marshlands**.



Praying Mantis

Source: *Olivia Whelan*

Vertebrates

Vertebrates are less numerous than invertebrates, but their larger size makes them much more visible, and thus better studied and recorded. Fish species are fairly well documented, as are mammals. Lists of animals that may be found in Bordentown are found in **Appendix B: Animals in Bordentown Township** and **Appendix C: Abbott Marshlands**.

Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are 90 mammal species in New Jersey, of which nine are listed as endangered and none are listed as threatened by the state. Some common mammals found in Bordentown include the opossum, Eastern mole, little brown bat, Eastern cottontail, Eastern chipmunk, gray squirrel, white-footed mouse, meadow vole, muskrat, red fox, raccoon, long-tailed weasel, mink, striped skunk, beaver, river otter, and white-tailed deer. There are no rare mammals located in Bordentown Township.

Birds

New Jersey has about 400 species of birds, which is an exceptional number given the state's small size. New Jersey is an important "rest stop" for birds migrating to and from climates in Central and South America. The New Jersey Atlantic Coast and the Delaware Bay are crucial elements of the Eastern Flyway (established migratory air route) in North America.

Bordentown Township is home to a variety of birds. Some birds that are very numerous or are common and frequently seen include the great blue heron, mallard, turkey vulture, American robin, gray catbird, Canada goose, and house sparrow. The rare bobolink, grasshopper sparrow, Eastern meadowlark, Cooper's hawk, Northern harrier, and bald eagle are also all found in Bordentown. A complete list of birds found in Bordentown Township is found in [Appendix B: Animals in Bordentown Township](#).

Important Bird and Birding Areas

The Important Bird Area (IBA) is a global effort by the Audubon Society to identify and conserve areas that are vital to birds and other species. The New Jersey Audubon Society has an expanded initiative called the Important Bird and Birding Area (IBBA) Program, which identifies areas that provide essential habitat for sustaining bird populations (Bird Areas), as well as areas that provide exceptional opportunities for bird watching (Birding Areas). The New Jersey IBBA Program has identified 122 sites within the state.

Two sites, Crystal Lake and the Abbott Marshlands, are located partially within Bordentown Township.

Crystal Lake is a large freshwater lake buffered from dense urban areas by cultivated fields, deciduous forest, scrub-shrubland, and nontidal wetlands. The Crystal Lake IBA stretches northward between Newbold Island and Dunns Mill Road and eastward between Route 130 and Route 206. The surrounding residential, agricultural, and industrial development impair water quality, stream flow, and groundwater supplies that feed the lake. There are several large development projects proposed for nearby agricultural parcels. New Jersey state-endangered bald eagles breed at Crystal Lake and occasionally winter in the area. Other breeding birds observed at Crystal Lake include great blue herons, red-bellied woodpeckers, downy woodpeckers, hairy woodpeckers, northern bobwhites, Baltimore orioles, and Northern flickers. One of the few forested areas in the region, this site provides spring and fall migrants with resting and roosting habitat before

they continue their migration. Several areas around Crystal Lake have been developed into suburban neighborhoods, reducing the amount and quality of habitat.

The **Abbott Marshlands** (identified by the Audubon Society as the Hamilton-Trenton Marsh IBA) is the only IBA in Mercer County. Covering about 2,800 acres, the site supports state-endangered pied-billed grebes and bald eagles. Cliff swallows, listed as a state species of special concern, occur here in impressive numbers. Breeding forested wetland species include the wood duck, mallard, prothonotary warblers, and fish crows. Hundreds of gadwalls, American wigeons, Northern shovelers, Northern pintails, green-winged teals, and ring-necked ducks winter at the marsh and often move through the area during spring migration. Migratory songbirds also depend on the resources of this urban oasis during spring and fall migration. Nearly half of the bird species sighted at the marsh—100 of 230 species—nest in the marsh.

Reptiles and Amphibians

Reptiles and amphibians can be quite elusive when surveys attempt to document them. Some reptiles and amphibians, called herpetological species, are rare because they depend on vernal ponds, as discussed in the **Surface Waters Resources** section. Amphibians tend to be very sensitive to environmental changes, offering a visible warning to humans that significant changes are occurring.

New Jersey is home to approximately 80 reptile and amphibian species. Some common herpetological species that have been documented in Bordentown Township include the red-backed salamander, bullfrog, green frog, spring peeper, Southern leopard frog, Eastern painted turtle, snapping turtle, stinkpot turtle, Northern fence lizard, garter snake, Northern water snake, rough green snake, Southern ringneck snake, and Eastern ribbon snake. See **Appendix B: Animals in Bordentown Township** for a complete list of reptiles and amphibians that may be found in the township.

Fish

When European settlers arrived in present-day Burlington County, they encountered Lenape Indians, who regularly fished along the inland streams and gathered shellfish in the Delaware River. Shad fishing was an important industry along the Delaware River until the early twentieth century. Due to the unintended consequences of overfishing, urban development, industrial advancement, and mechanized agriculture, the amount and diversity of aquatic life has decreased dramatically throughout most of New Jersey.

The New Jersey Division of Fish and Wildlife, under the Bureau of Freshwater Fisheries, monitors and actively aids the propagation, protection, and management of the state's freshwater fisheries. The bureau raises several million fish for stocking in suitable water bodies and conducts research and management surveys.

There are over 50 species of fish that are likely to be found in Bordentown Township's many streams and lakes, including the shortnose sturgeon, which is an endangered

species both in the state and the nation. See [Appendix B: Animals in Bordentown Township](#).

Rare Wildlife

The Natural Heritage Database of the NJDEP lists nine species of rare wildlife found in Bordentown Township. Of these nine species, seven are birds, one is a reptile, one is an invertebrate, and none are mammals or amphibians. These wildlife species are listed as either endangered, threatened, or a species of special concern in New Jersey. One species, the shortnose sturgeon, is also listed as federally endangered. The rare animals are listed in [Appendix B: Animals in Bordentown Township](#). Additionally, there may be other rare species sighted by township residents but not yet verified by the Endangered and Nongame Species Program. They are, therefore, not included in this list.

Natural Heritage Database and Natural Heritage Priority Sites

The New Jersey Natural Heritage Program identifies the state's most significant natural areas through a comprehensive and continuously updated inventory of rare plant and animal species and representative ecological communities. The Natural Heritage Database compiles information on the distribution, biology, status, and preservation needs of these species and communities. The Natural Heritage Database provides the foundation for the designation of Natural Heritage Priority (NHP) sites. NHP sites are exemplary natural communities within the state that provide critically important habitat for rare plant and animal species. Preserving these areas should be a top priority in efforts to conserve biological diversity in New Jersey. Biodiversity rankings of NHP sites range from B1 (outstanding significance for biodiversity) to B5 (general biodiversity interest). In Bordentown Township, the [Abbott Marshlands](#) (referred to as the Trenton Marsh) is an NHP site.

Designation as an NHP site does not carry any specific requirements or restrictions on the land. Rather, the designation is made because of a site's high biological diversity value. Owners of NHP sites are encouraged to become informed stewards of the property and to consider working with the local community, nonprofit groups, or the state to preserve the land permanently.

Information on particular sites may also be provided by the Nature Conservancy or by the NJDEP Endangered and Nongame Species Program, and especially through the latter agency's Landscape Project.

Abbott Marshlands

The Abbott Marshlands (also known as Hamilton-Trenton-Bordentown Marsh) is one of New Jersey's most significant natural areas. This is despite being intersected by two major interstates and a railroad line, and containing uses like a former landfill, sewage

treatment plant, and a power generating plant. A popular destination for bird watching, hiking, fishing, canoeing, and photography, the Abbott Marshlands is the northernmost tidal freshwater wetland on the Delaware River. The Abbott Marshlands, located on the eastern side of the Delaware River, is situated among the urbanized areas of Trenton, Hamilton Township, and Bordentown Township. The marsh is bordered by a dense infrastructure network that includes the River LINE, Interstates 295 and 195, and other roadways and associated development. The entire marsh is 3,030 acres and contains 1,250 acres of wetlands and adjacent uplands in public ownership. The Abbott Marshlands is identified by the Natural Heritage Database as the Trenton Marsh NHP Site, and by the Audubon Society as the Hamilton-Trenton Marsh IBA.

The **Trenton Marsh NHP Site**, covering 1,250 acres, is a freshwater tidal marsh natural community and is home to several state endangered plant and animal species. Those threatened and endangered plants and animals identified in Bordentown Township by the Natural Heritage Database are listed in **Appendix A: Plant Species in Bordentown Township, Rare Plant Species** and in **Appendix B: Animals in Bordentown Township, Rare Wildlife**. Rare plants found in Bordentown include the pawpaw, pale Indian plantain, occluded bindweed, and many others. Natural Heritage Grid Maps show the general locations of rare plant species and ecological communities, without providing the sensitive detailed information that could place these resources at risk for vandalism or illegal collection. These maps are available to Environmental Commissions and for research projects but are otherwise not public.



Northern Community Park
Source: DVRPC

The marsh is made up of several habitats, including tidal and nontidal wetlands, shrub forest wetlands, constructed wetlands, deciduous woodland, and upland forests with second-growth oak woods. There are lakes including Spring Lake, Rowan Lake, and Sturgeon Pond in the north. The Delaware & Raritan (D & R) Canal greenway also passes through the marsh.

These diverse habitats support over 1,200 species of plant and animal life. Over 900 plant species have been identified in the marsh, including 30 species considered endangered, threatened, or rare in the state. Over 200 bird species have been recorded, including, the osprey, great blue heron, least bittern, Virginia rail, and cliff swallow.

The wetlands area of the marsh is defined by the tidal waters of the Delaware River and the Crosswicks, Watson, and Duck creeks. Plants found here include New York ironweed, wild rice, arrow arum, bur marigold, yellow pond lily, and water smartweed. Phytoplankton—tiny microscopic photosynthetic cells—inhabits these waters as well. Phytoplankton is the foundation of the food web and supports other fish found in the Hamilton-Trenton Marsh, such as the killifish, Johnny darter, alewife, shad, yellow perch, and the short-nosed sturgeon. These fish

populations, in turn, support fish-eating birds such as mergansers, cormorants, osprey, egrets, and herons. The river otter has recently reestablished the Hamilton-Trenton Marsh as its home.

To the southeast of the marsh, uplands overlook Crosswicks Creek from a bluff. Oaks and red maples are the dominant trees. Dense thickets of mountain laurel and great rhododendron are found here as well. Pitch pines and Eastern hemlocks also occur along the bluffs. A variety of birds, especially migratory species, inhabit the upland forests. Titmice and Carolina chickadees are commonly found in the mountain laurel-rhododendron thickets.

Second-growth forests are found to the northeast of the marsh along the bluffs near Spring Lake, as well as on the islands off of Spring Lake and the Hamilton Water Treatment Plant. These are former agricultural fields or places that have been altered by human activities, where the second growth of oaks, tulip trees, black gums, and other hardwood trees has occurred. Song sparrows and Carolina chickadees reside in the second-growth forests.

Wetlands are fragile ecosystems susceptible to pollution, development, and nonnative species. Although they are regulated under the New Jersey Freshwater Wetlands Protection Act, this law does not guarantee protection. Under current regulations, wetlands can still be disturbed, drained, or filled. Commercial and residential development threatens the Hamilton-Trenton Marsh. Effluent from the Hamilton Township sewage treatment plant and a coal-fired power plant on Duck Island contribute to pollution problems as well. Recreational overuse from activities such as off-road vehicles and unauthorized digging for archaeological artifacts destroy habitats. The marsh is disturbed by construction and maintenance activities along roadways, as well as the railroad and a former landfill. Habitat diversity has been reduced due to nonnative flora, such as the common reed (*Phragmites australis*), Japanese bamboo (*Polygonum cuspidatum*), reed canary grass (*Phalaris arundinacea*), and Japanese stilt grass (*Microstegium vimineum*). Other nonnative flora, such as mile-a-minute weed (*Persicaria perfoliata*), have been identified at the marsh but are not yet widespread. Along the Delaware River and Crosswicks Creek, lesser celandine (*Ranunculus ficaria*) has become an invasive species of concern.

A *Cooperative Stewardship Plan* for the marsh was completed in 2010 by the Friends for the Marsh organization, a project of the D & R Greenway Land Trust. The plan serves as a vision and guide for the marsh, and seeks to balance natural conservation with enhancing educational and recreational opportunities within the marsh. The marsh is a significant environmental resource because it reduces flood damage and provides water filtration, groundwater recharge, and wildlife habitat. There are prehistoric Native American archaeological sites around the marsh that are part of the Abbott Farm National Historic Landmark. Six goals are identified, with strategies and action items identified for each: Protection and Preservation, Stewardship, Education, Recreation, Marsh Identity and Interpretation, and Coordinated Management and Organization. Friends for the Marsh organizes canoe trips, field trips, and a history education weekend for the public. Several community parks are part of Abbott Marshlands, including the Northern Community Park and Bordentown Bluffs. Northern Community Park has some athletic facilities and

recreational trails. Bordentown Bluffs has a large scenic overlook and several hiking and dog-walking trails accessible from the adjacent neighborhood. The Stanton Lane entrance to Bordentown Bluffs was recently re-opened and provides trail access to the D & R Canal State Park. This area provides opportunities to see many birds and native plants. Swimming and wading are prohibited due to dangerous tides.



Northern Community Park

Source: DVRPC

The Tidal Delaware Water Trail is another way to explore the Abbott Marshlands. This 56-mile boating trail, planned by the Pennsylvania Environmental Council, identifies recreational boating access points, amenities, and points of interest along the Delaware River. Several historical and environmental points of interest along the trail feature the Abbott Marshlands and Abbott Farm National Historic Landmark.

For a complete list of species found in the marsh, see [Appendix C: Abbott Marshlands](#).

The Built Environment

Population and Housing

In 2010, the U.S. Census estimated that Bordentown Township had a population of 11,367 people, up a dramatic 36 percent from its 2000 population of 8,380, due to a number of recent large-scale residential developments in the township. See **Figure 9: The Population of Bordentown Township**, below.

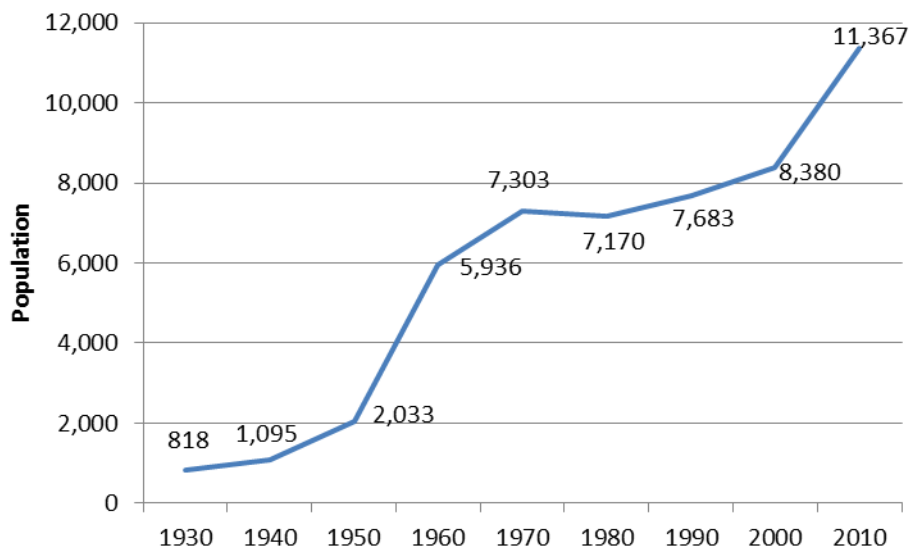


Figure 9: The Population of Bordentown Township, 1930–2010

Source: U.S. Census Bureau, 2010

The township's median age is 38.1, slightly more than the national average of 35. The percentage of residents of Bordentown Township aged 65 and over was 10.6 percent in 2010, slightly less than the national average of 12 percent. Approximately 23.2 percent of Bordentown Township's residents are children between the ages of 5 and 18. This represents the age group that is most likely to generate demand for public schools, community facilities, and recreational opportunities. See **Figure 10** below for a complete breakdown of Bordentown's population by age and gender.

Based on the 2010 U.S. Census, Bordentown Township's population has racial diversity, with 74.4 percent of the population identifying themselves as white, 10.7 percent black or African American, 10.6 percent Asian, two percent as two or more races, and less than one percent each of other races. Hispanics or Latinos (of any race) make up about six percent of the population of Bordentown Township.

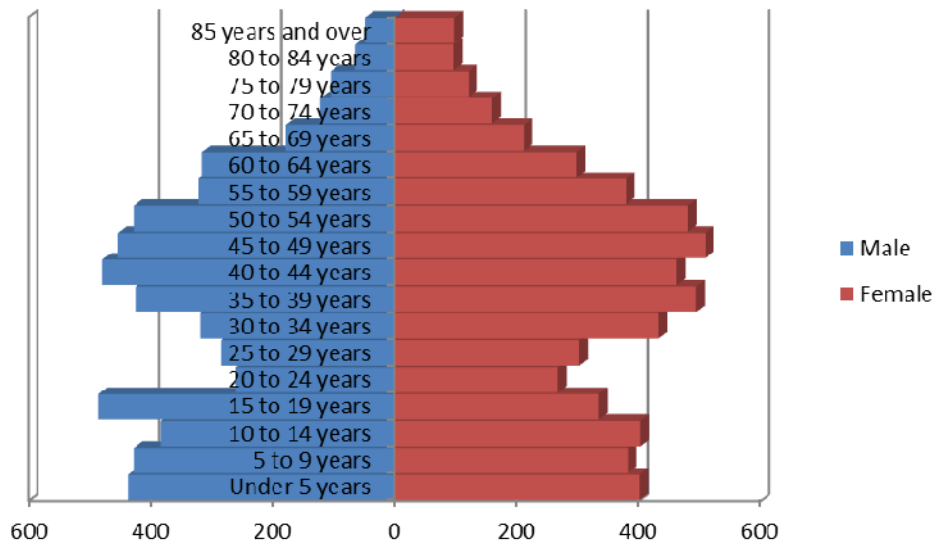


Figure 10: Bordentown Township Population by Age and Gender (2010)

Source: U.S. Census Bureau, 2010

According to U.S. Census data from 2010, Bordentown Township had 4,173 occupied housing units, of which about 78.8 percent (3,289 units) were owner-occupied, higher than the national average of 66 percent.

Transportation

Bordentown Township is located in a highly accessible part of Burlington County. It is approximately 31 miles from Philadelphia and less than 10 miles from Trenton. The township is crossed by Interstate 295 and the NJ Turnpike (I-95). Interstate 195 is located just to the north of the township in Hamilton Township. U.S. Routes 130 and 206 intersect in the township.

A number of smaller roads in the township connect Fieldsboro and the City of Bordentown to outlying areas. There are a number of newer roads in the township built as part of residential subdivisions.

Accessibility to highways and other major roads is integral to the lives of Bordentown Township residents, as approximately 94.2 percent of the township's employed population

commutes to work by automobile, according to the 2010 US Census. The mean travel time to work for Bordentown Township residents is 26.7 minutes, slightly lower than the New Jersey average of 28 minutes and slightly higher than the national average of 24 minutes. Just 1.8 percent of Bordentown Township residents rely on public transportation for their commute, while 4.0 percent of residents use other means of transportation.

In addition to roadways, Bordentown Township also benefits from the passenger light-rail service, the River LINE. The River LINE was historically known as the Camden and Amboy Railroad and was reopened by New Jersey Transit (NJT) in the winter of 2004 after a 42-year hiatus in passenger service. Freight service operated on the line during the last four decades, and now operates only at night. The new light-rail line connects Trenton and Camden with a total of 20 stops in between. The service provides links to other NJT buses and trains, and to Amtrak and SEPTA in Trenton and to PATCO in Camden. The Bordentown station is located in Bordentown City, at Park Street and Prince Street. A new River LINE station is proposed to be built in Bordentown Township as part of the Bordentown Waterfront Community development currently under construction.

The Delaware River Heritage Trail is a planned 60-mile loop trail from Trenton to Palmyra in New Jersey and Morrisville to Philadelphia's Tacony neighborhood in Pennsylvania. The extent of the trail in and around Bordentown Township is shown on [Map 19: Parks and Open Space \(2011\)](#). The Delaware River Greenway Partnership and a coalition of government and non-profit partners in both New Jersey and Pennsylvania are working to complete this trail.

Historic Resources

Bordentown Township hosts several properties and districts on the National and State Registers of Historic Places, listed below in [Table 23: Historic Sites of Bordentown Township](#) and shown on [Map 17: Historic Resources](#). The **Abbott Farm Historic District**, on the National and State Registers, is an archaeological site of very early Native American settlements. The **Camden and Amboy Railroad Historic District** is also on the National and State Registers and follows the current right of way of the River LINE. The **Delaware and Raritan Canal Historic District** spans 100 yards to either side of the canal and is also on the National and State Registers. The **New Jersey Manual Training and Industrial School for Colored Youth**, a historic site, is a campus of buildings near the Delaware River between Bordentown City and Fieldsboro. This school, also known as the Bordentown School, was closed in 1955 after *Brown v. Board of Education* prohibited segregated schools. The campus was then used by the E.R. Johnstone Training and Research Center, a home for developmentally disabled people. In 1996, the Johnstone Campus was turned over to the New Jersey Juvenile Justice Commission.

Bordentown also contains several prehistoric sites given opinions of eligibility by the SHPO (State Historic Preservation Officer), which are shown on the archaeological site grid to prevent unauthorized excavations. They are referred to as the **Blacks Creek, Mile Hollow**, and **Thornton Creek** prehistoric sites. The **Hilltop House**, located on the Camden and Amboy Railroad near Newbold Island, was given a SHPO opinion in 1997.

These properties and historic districts all meet the New Jersey and National Register criteria for significance in American history, archaeology, architecture, engineering, or culture and possess integrity of location, design, setting, materials, workmanship, feeling, and association. Other sites may have the potential to be listed as local, state, or national landmarks but have not been nominated by local citizens or identified by SHPO for such a designation.

Table 23: Historic Sites of Bordentown Township

Name	Location	State ID#	Register
State and National Registers of Historic Places			
Abbott Farm Historic District		1654	NR: 12/8/1976 SR: 8/16/1979
Camden and Amboy Railroad Historic District	Camden and Amboy Railroad ROW	2969	SHPO opinion: 6/26/1975
The Delaware and Raritan Canal Historic District	Entire Canal bed and all lands 100 yards to either side	1600	NR: 5/11/1973 SR: 11/30/1972
The New Jersey Manual Training and Industrial School for Colored Youth	Roughly bounded by Burlington Road, the Delaware River, and I-295	2973	NR: 1/5/1998 SR: 10/23/1997
Eligible Sites for State and National Registers of Historic Places			
Blacks Creek Prehistoric Archaeological District		749	DOE: 11/29/1977 SHPO Opinion: 12/19/1975
Thornton Creek Site		3868	SHPO Opinion: 5/2/2001
The Hilltop House	Fourth Street	2971	SHPO Opinion: 2/29/1997
Mile Hollow Prehistoric Site		2972	SHPO Opinion: 5/29/1987
Hogback Road Site		4359	SHPO Opinion: 2/27/2001

Source: NJ State Historic Preservation Office, 2012

Although located primarily in Hamilton Township, the **Abbott Farm Historic District** extends into the northwestern corner of the Township. Named after the famed 19th century archaeologist Charles Conrad Abbott, this site is the largest known Middle Woodland village site in the coastal Mid-Atlantic and New England region. The Woodland time period is considered an important cultural development stage for prehistoric Native Americans, when pottery making and the cultivation of crops began. Use of the area began about 13,000 years ago, and this archaeological site has been at the center of a controversy over the antiquity of human presence in the Americas. It is illegal to dig and remove archaeological artifacts from the area. The site's proximity to the Abbott Marshlands, the

northernmost tidal Delaware marsh, and its archaeological and cultural importance make environmental protection and historic preservation important priorities.

In 2008, the Planning Division of Mercer County organized an interpretive planning process for the Abbott Farm Historic District involving the County, an interpretive planning firm, and an archaeological and historical research firm. This interpretive plan aims to create a cohesive interpretive program and to increase public understanding of and participation in this historic and environmental resource.

The **Crossroads of the American Revolution National Heritage Area** is another historic and environmental resource in Bordentown. This National Heritage Area was established in 2006 by the National Parks in order to help communities preserve historic resources and local identity, improve inter-governmental relationships, and preserve historic resources. The Crossroads of the American Revolution National Heritage Area encompasses a 2,155-square mile area in New Jersey.

Another historic site in Bordentown is **Point Breeze**, Joseph Bonaparte's estate. Joseph Bonaparte, the former king of Spain and elder brother of Napoleon, moved to the United States after he and his brother were banished from France in 1816. Joseph Bonaparte built a mansion and landscaped much of his 1,880-acre estate in Bordentown. Although the original house burned down in 1820, another house was rebuilt in its place, and Bonaparte lived there until returning to Europe in the 1840s. The estate was auctioned by Joseph Bonaparte's grandson, and eventually the British consul built an Italianate villa where the houses stood. Although Point Breeze is privately owned and is not protected open space, it has nonetheless enriched the area's cultural history. Bonaparte and subsequent residents exposed New Yorkers and Philadelphians to European tastes, and some furniture and art from Point Breeze now belong to the Philadelphia Museum of Art.

Bordentown has several organizations that educate the public about historic resources and preserve and rehabilitate historic sites. The Bordentown Historical Society, established in 1930, offers online exhibits and special events focused on local history, such as holiday house tours and socials. Other community organizations offer walking tours of downtown Bordentown and other places of interest.

Cultural Resources and Open Space

Parks, Recreation, and Preserved Open Space/Farmland

Bordentown Township has four major public parks with over 685 acres of recreational land and facilities, parkland, natural resource protection, and farmland shown on **Map 19: Parks and Open Space**. Bordentown's parks include Northern Community Park, Joseph H. Lawrence Park, Bossert Park, Terry Field, Laurel Park, and Constitution Park. Northern Community Park and Joseph H. Lawrence Park are the largest parks, and both feature athletic fields, picnicking areas, playgrounds, parking, and some natural areas. Northern Community Park has recently undergone a series of improvements, including new trees

and lighting. Public school facilities at Bordentown Regional High School and Peter Muschal School are also used by residents for recreation.

While Bordentown Township provides fields and facilities for recreation, field rentals are overseen by the Public Works Department. Athletic programs for all ages are also run independently of the town by community organizations.



Site of Bordentown Waterfront Community

Source: DVRPC

The state owns 238 acres of land, primarily located along the banks of the Crosswicks Creek and Blacks Creek. Bordentown Township has one 78-acre preserved farm located to the east of the NJ Turnpike. Bordentown Township has protected significant amounts of open space along the Crosswicks Creek, although a large area west of Route 206 remains unprotected. Bordentown's other major stream corridor, Blacks Creek, in the southern part of the township, also remains largely unprotected. To remedy this, the Bordentown Township Open Space Advisory Committee submitted "A Proposal for the Blacks Creek Greenway" to the township in December 2003. This plan documents the Blacks Creek corridor's natural resources, including forested ridge and valley formations, unique marshland, many large old beeches, tulip trees and oaks, and native stands of rhododendrons. The plan also emphasizes the area's cultural resources, including historic mills dating from the early 18th century and scenic views from the ridgelines.

The Blacks Creek Greenway Plan recommends the creation of additional community parks to (1) improve the quality of the township's park and recreation system, making it attractive for residents, visitors, and potential businesses; (2) provide public recreational space in an area of the township that is without public parks; (3) provide diverse active

and recreational opportunities that are currently not available; (4) create opportunities for environmental and historical interpretation of unique sites; (5) allow safe public access to the greenway and its unique natural areas; and (6) ultimately improve the quality of life for township residents.

Township residents can use neighboring Bordentown City's park on the Delaware River, which has a boat ramp, beach, and fishing pier; but Bordentown Township lacks its own riverfront access, despite its own significant frontage along the Delaware River. The proposed Bordentown Waterfront Community, currently under development on the former North American Marine Salvage Company site, would offer waterfront access to the Delaware River. Located on the site of a remediated brownfield, the proposed transit village will include up to 671 apartments and townhouses, stores, restaurants, a public park, pier, and a new River LINE stop.



Northern Community Park

Source: Roger Plew

Township Utilities and Services

Drinking Water

The Bordentown City Water Department supplies public drinking water to residences in the more developed sections of Bordentown Township. Drinking water is drawn from four public supply wells that tap the Potomac-Raritan-Magothy aquifer just north of the township in Hamilton Township (see [Aquifers](#)). Additional information on water supply

wells is available in the [Water Supply Wells](#) section. See also [Map 14: Public Water Supply Wells](#).

Sewer Service

The Bordentown Sewage Authority provides sewer collection service to all developed areas in Bordentown Township and adjacent Bordentown City. The municipal sewer service area is shown in [Map 18: Sewer Service Area \(2012\)](#). Not all areas shown on the map currently have sewer service. The Bordentown Sewer Authority treatment facility on average treats 1.6 million gallons per day (mgd) and has a design capacity of 3 mgd. All sludge is treated on site and the cleaned fluid is discharged.

Trash and Public Works

In Bordentown Township, household trash is picked up once per week except on major holidays. Bulk waste, including furniture and yard waste, is collected once per week. "White goods," which consist of large household appliances (washer/dryers, refrigerators, hot water heaters, etc.) are collected every Wednesday as long as the municipality is notified by 3:00 PM on Tuesday.

Burlington County collects commingled glass, cans, and plastics (numbers 1 and 2 only) as well as mixed paper and cardboard. Residents leave their recycling on the curb by 6:00 AM every other Monday to be collected.

In addition, Bordentown has a fall leaf pickup. During these times, residents are able to rake and pack leaves into bags not to exceed 30 pounds in weight. The Public Works Department prefers that leaves are raked to the curbside gutter for vacuum collection. NJDEP stormwater regulations forbid the placement of leaves within 10 feet of a storm drain. It is also illegal to put leaves in household trash. At other times of the year, leaves and yard waste will be collected on the normally scheduled bulk waste collection day.

The Bordentown Township Public Works Department offers several other services including recycling drop-off, snow plowing, Christmas tree pick-up, and field and facility rentals. The Public Works Department also oversees road maintenance and construction, as well as the permitting for contractors carrying out construction affecting roadways.

In 2013, the Bordentown Township Committee approved a \$2.3 million expansion plan for the Public Works Department. As part of this plan, the Township Committee has agreed to purchase a property adjacent to the Crosswicks Road Public Works facility. The property will add 3.6 acres to the existing facility and will allow the township to accept additional materials such as recyclable electronics, paint, light bulbs, car batteries, and other items that often are dumped illegally at the facility.

Education

The Bordentown Regional School District serves the Township of Bordentown, the City of Bordentown, and the Borough of Fieldsboro. New Hanover Township sends students on a tuition basis to grades 9 to 12. There are a total of five schools in the school district.

There are two elementary schools serving grades kindergarten through third grade: Peter Muschal School, located in Bordentown Township, and Clara Barton Elementary School, located in Bordentown City. The MacFarland Intermediate School, located in Bordentown City, serves fourth and fifth grades. The Bordentown Regional Middle School occupies the former Regional High School site in Bordentown Township and serves sixth through eighth grades. The new Bordentown Regional High School, located in the township, was completed in 2005 and serves ninth through twelfth grades.

Environmental Issues

Known Contaminated Sites

The New Jersey Known Contaminated Sites List includes former factory sites, landfills, locations of current or former leaking underground storage tanks, sites where chemicals or wastes were once routinely discharged, and places where accidents have resulted in spills and pollution. Contamination may have affected soil, groundwater, surface water, or a combination of site conditions. The most dangerous sites, from a human health standpoint, can be listed on the National Priorities List (NPL), under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA is commonly referred to as “Superfund” because sites on the NPL are eligible for federal and state cleanup funds. Other sites may be remediated by state cleanup funds (via the New Jersey Spill Compensation and Control Act). The majority of the sites are remediated by the responsible parties as required pursuant to state and federal regulations. Responsible parties may be current or former owners or users of the site.

There are 15 active Known Contaminated Sites within Bordentown Township, listed in **Table 24: Known Contaminated Sites in Bordentown Township**. These are active sites with confirmed contamination of the soil, groundwater, and/or surface water. Additionally, there is one pending site and 37 (non-homeowner) closed sites in the township. An active site has one or more active cases with confirmed contamination, and may have one or more pending or closed cases. A pending site has one or more cases with confirmed contamination, no active cases, and may include closed cases. Closed sites are those with remediated contamination and have no active or pending cases. Sites are identified by a Program Interest (PI) number. See **Table 25: Pending Known Contaminated Sites in Bordentown Township** and **Appendix D: Closed Known Contaminated Sites**. Some sites in this table have more than one remedial level due to multiple cases. Non-residential sites are shown on **Map 20: Known Contaminated Sites (2012)**. Private homes have been removed from the lists to protect resident privacy.

Updates to this list of Known Contaminated Sites and additional information on each site may be found at the NJDEP Data Miner website.

Table 24: Known Contaminated Sites in Bordentown Township

PI Name	Address	PI Number	Site ID	Remedial Level *
Alstarz Sports Pub LLC	144 Rt 130	300073	229264	C1
Badshah Oil Corp	1077 Rt 206	032332	49239	C1
Bordentown City Sanitary Landfill	Rt 206 & Farnsworth Ave	G000005065	63875	C3
Bordentown Maintenance Yard	Rt 130 & Dunns Mill Rd	012366	11020	B
Bordentown Shell	252 Rt 130	007601	11027	C2
Bordentown Twp Public Works	262 Crosswicks Rd	012162	41593	C2
Circuit Foil USA Inc (AKA Square D Company)	88 Rt 130	007412	14684	D
E R Johnstone Training & Research Center	Burlington St	013933	37622	C1
J&S Automotive & Lawnmower	30 Rt 130	012429	33613	C2
Johns Car Care Center	232 Rt 130	019253	15547	C2
Love's Travel Stop #404	2008 Rt 206	001515	16733	C2
Mosca Thomas B & Pauls Service Ctr	686 Rt 206	015211	11013	C2
NJDOT Route 206 Section 39	Rt 206	130531	92501	C3
Sam Enterprises LLC	598 Rt 206	466003	375998	C1
Southgate Apartments	272 Ward Ave	022851	54044	C2

Source: NJDEP, 2012

*Remedial Level
B: Single Phase Remedial Action, Single Contamination Affecting Only Soils.
C1: No Formal Design, Source Known Potential Groundwater Contamination.
C2: Formal Design, Known Source with Groundwater Contamination.
C3: Multi-Phased Remedial Action, Unknown or Uncontrolled Discharge to Soil or Groundwater
D: Multi-Phased Remedial Action, Multiple Source/Release to Multi-media Including Groundwater

Table 25: Pending Known Contaminated Sites in Bordentown Township

PI Name	Address	Site ID	PI Number
Parklands Reclamation	1070 RT 206	15905	848

Source: NJDEP, 2012

Fourteen hazardous waste sites in Burlington County have been listed on the National Priority List (NPL), more commonly referred to as Superfund site. These sites pose a major human health hazard and are in need of federal funds for cleanup.

There is one NPL site located in Bordentown Township: Square D Company, also known as Copper Foil Corporation, Circuit Foil Corporation, and Yates Industries, Inc. Located at 90 US Highway 130 in Bordentown Township, the site was originally used for copper-foil manufacturing. The site was also used for clay mining in the 1930s before becoming a municipal landfill. The site was also used for a wastewater treatment plant that made use of unlined lagoons and disposal areas, including waste piles, landfills, and sludge drying pads. Due to these activities, the groundwater and soils became contaminated, primarily due to inorganic heavy metals, including chromium, copper, arsenic, zinc, and lead. Most of the contaminated soils were excavated from the site, and the area was filled with clean soil. The groundwater is being pumped and treated by an on-site wastewater treatment system, and then discharged to the Bordentown Sewer Authority. This pump-and-treat system and groundwater monitoring will continue indefinitely to ensure that contaminated groundwater does not migrate off-site.

Technical documents about the site are available for public review at the NJDEP Division of Solid & Hazardous Waste Records Center.

Underground Storage Tanks

There are nine active and compliant sites in Bordentown Township with regulated underground storage tanks that contain hazardous substances, pursuant to N.J.A.C. 7:14B et seq. As of 2012, there are 5,731 underground storage tank facilities and 15,862 underground storage tanks in New Jersey. Tanks and facilities are inspected based on several parameters and according to the NJDEP standard of one inspection every three years. On-site inspections have found a 90 percent compliance rate with release detection and prevention measures, compared to the national compliance rate of 70.9 percent. Information about these facilities and inspections can be found in the EPA Public Record Summary and other reports. The phase-in period of the Site Remediation Reform Act and related amendments to the Brownfield and Contaminated Sites Act ended May 7, 2012. These changes included establishing a professional board for Licensed Site Remediation Professionals (LSRP) and allowing LSRPs to supervise remediation, instead of requiring the New Jersey Department of Environmental Protection to approve all surveys.

Underground storage tanks are listed in **Table 26: Active and Compliant Underground Storage Tanks**. A hazardous material may be motor fuel, petroleum products, toxic pollutants, or other hazardous wastes or substances. Most of Bordentown's active and compliant underground storage tanks are auto body shops, gas stations, and military facilities, located along major township roads. If there is a known release to soil and/or groundwater, a site will also be listed on **Table 24: Known Contaminated Sites in Bordentown Township**. There may also be private residences in Bordentown Township that still have underground storage tanks, used primarily to hold home-heating oil. As these tanks age and rust, they often begin to leak, which becomes a serious threat to the groundwater below them. Those private residences are not publicly listed by NJDEP unless they pose a human health hazard. Underground storage tanks are not required to be removed, although removal may reduce any resulting environmental liabilities.

Table 26: Active and Compliant Underground Storage Tanks

Facility ID	Facility Name	Street Address	Expiration Date
003322	APCO Farnsworth	247 Rt 130 N	3/31/2013
032332	Badshah Oil Corp	1077 Rt 206	3/31/2013
021860	Bordentown Gulf	231 Rt 206 N	3/31/2013
007601	Bordentown Shell	252 Rt 130 & Farnsworth Ave	3/31/2013
007450	Bordentown Stopping Center	402 Rising Sun Rd	3/31/2013
001515	Love's Travel Stop #404	2008 Rt 206 S	3/31/2013
015211	Mosca Thomas B & Paul's Service Center	676 Rt 206 S	3/31/2013
000655	NJ Dept Military & Vet Affairs	Rt 130	3/31/2013
007053	Tri State Yardville	42 Rt 130 & Bordentown Chesterfield Rd	3/31/2013

Source: NJDEP, 2012

There are 13 sites in Bordentown Township where there is active remediation of underground storage tanks, shown in the table below. Five of these sites that are undergoing remediation of former tanks also have active and compliant underground storage tanks. Active remediation means that the hazardous materials are being cleaned up at the site and that inadequate facilities are being removed or repaired according to state and federal guidelines.

Table 27: Underground Storage Tanks with Active Remediation

PI Number	PI Name	Street Address
000654	NJ Dept Military & Vet Affairs	Rt 206
0001515	Love's Travel Stop #404	2008 Rt 206 S
007450	Bordentown Stopping Center	402 Rising Sun Rd
007601	Bordentown Shell	252 Rt 130 & Farnsworth Ave
12429	(formerly J&S Automotive & Lawnmower)	30 Rt 130 & Groveville Rd
013933	E R Johnstone Training & Research Center	Burlington St
015211	Mosca Thomas B & Pauls Service Ctr	676 Rt 206 S
015626	New Jersey State Police Barracks	Rt 130 N
019253	Johns Car Care Center	232 Rt 130
021860	Bordentown Gulf	231 Rt 206 N
032332	Badshah Oil Corp	1077 Rt 206
0466003	Sam Enterprises LLC	598 Rt 206

Source: NJDEP, 2012

Radon

Radon is a radioactive gas that comes from the natural decay of uranium found in nearly all soils. It is invisible, odorless, and tasteless. It moves up through the ground to the air above, and into all types of homes through cracks and other holes in foundations. A build-up of radon-contaminated air within a home can pose a long-term health hazard to residents, specifically for lung cancer. The only method of detection is to conduct a test of the air within a home. Fortunately, radon testing is inexpensive. All radon test results conducted in the state are reported to NJDEP by certified companies, which perform the tests or manufacture the test kits. These results are used to classify municipalities into a three-tier system, which identifies the potential for homes with indoor radiation problems.

NJDEP classifies municipalities into three categories according to the potential for indoor radon problems: high (Tier 1), moderate (Tier 2), and low (Tier 3). Bordentown Township is classified as a Tier 2 municipality, indicating a moderate risk of high radon levels in homes. The average indoor radon level in the United States is about 1.3 picoCuries per liter (pCi/L). At the level of 4 pCi/L, NJDEP recommends a homeowner consider steps to reduce long-term exposure to radon gas. If radon levels are high in a home, NJDEP suggests that the homeowner take the following actions: (1) prevent radon from entering the house by repairing cracks and insulation; and (2) dilute radon concentrations currently in the house by installing a radon extraction system and/or frequently ventilating indoor air.

NJDEP provides information on testing, mitigation, radon's health effects, and additional information on their website at www.njradon.org. Free information packets are available upon request. All companies conducting radon testing and mitigation are certified by NJDEP and are listed on their website.

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APPENDIX A

Plant Species in Bordentown Township

Blacks Creek Vegetation

Common Name	Scientific Name
Box elder	<i>Acer negundo</i>
Red maple	<i>Acer rubrum</i>
Tree-of-heaven	<i>Ailanthus altissima</i>
River birch	<i>Betula nigra</i>
Shagback hickory	<i>Carya ovalis</i>
Flowering dogwood	<i>Cornus florida</i>
Kousa dogwood	<i>Cornus kousa</i>
Dog-toothed Violets	<i>Erythronium americanum</i>
American beech	<i>Fagus grandifolia</i>
Witchhazel	<i>Hamamelis virginiana</i>
Jewelweed	<i>Impatiens capensis</i>
Blue flag iris	<i>Iris versicolor</i>
Small red cedars	<i>Juniperus virginiana</i>
Understory privet	<i>Ligustrum sp.</i>
Spicebush	<i>Lindera benzoin</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Tulip tree	<i>Liriodendron tulipifera</i>
Honeysuckle	<i>Lonicera japonica</i>
Spatterdock	<i>Nuphar advena</i>
Non-native pines	<i>Pinus sp.</i>
White pine	<i>Pinus strobus</i>
Black cherry	<i>Prunus serotina</i>
White oak	<i>Quercus alba</i>
Chestnut oak	<i>Quercus montana</i>

Common Name	Scientific Name
Pin oak	<i>Quercus palustris</i>
Red oak	<i>Quercus rubra</i>
Rosebay rhododendron	<i>Rhododendron maximum</i>
Poison ivy	<i>Rhus radicans</i>
Multiflora rose	<i>Rosa multiflora</i>
Blackberry	<i>Rubus sp.</i>
Sassafras	<i>Sassafras albidum</i>
Greenbriar	<i>Smilax rotundifolia</i>
Skunk cabbage	<i>Symplocarpus foetidus</i>
Blueberry	<i>Vaccinium sp.</i>
Mapleleaf viburnum	<i>Viburnum acerifolium</i>
Arrowwood	<i>Viburnum dentatum</i>
Blackhaw viburnum	<i>Viburnum prunifolium</i>
Vinca	<i>Vinca minor</i>
Fox grape	<i>Vitis sp.</i>
Wild rice	<i>Zizania aquatica</i>

Source: Bordentown Township Open Space Advisory Committee. The Proposal for the Blacks Creek Greenway: An Analysis Area with Recommendations. Dec. 1, 2003

Rare Plant Species

Common Name	Scientific Name	State Status	Regional Status	G Rank	S Rank	Last Observed	Identified?
Vascular Plant							
Pawpaw	<i>Asima triloba</i>	E	LP, HL	G5	S1	1976-05-09	Yes
Estuary burr-marigolia	<i>Bidens bidentoides</i>		HL	G3G4	S2	2011-09-12	Yes
Pale Indian plantain	<i>Cacilia atriplicifolia</i>	E	LP, HL	G3G4	S1	1992-09-11	Yes
Occluded bindweed	<i>Calystegia sepium ssp.erratica</i>	E	LP, HL	G5TNR	SH.1	19189-06-04	Yes
Toothed tick-trefoil	<i>Desmodium cuspidatum var.cuspidatum</i>		HL	G5T5?	S2	1917-08-15	Yes
Few-flower tick-trefoil	<i>Desmodium pauciflorum</i>	E	LP, HL	G5	SH		Yes
Parker's pipewort	<i>Ericaulon parkeri</i>		HL	G3	S2	1917-08-15	Yes
Butternut	<i>Juglans cinera</i>		HL	G5	S3	2011-08-10	Yes
Winged monkey-flower	<i>Mimulus alatus</i>		HL	G5	S3	2011-08-10	Yes
Variable-leaf water-milfoil	<i>Myriophyllum heterophyllum</i>		HL	G5	S2	1917-09	Yes
Spotted-sheath panic grass	<i>Panicum dichotomom var. yadkinense</i>		HL	G5T4Q	SH	1922-06-24	Yes
Awl-leaf arrowhead	<i>Sagittaria subulata</i>		HL	G4	S2	2011-09-12	Yes
Veined skullcap	<i>Scutellaria nervosa</i>		HL	G5	S2	1914-06-26	Yes

Source: NJDEP Natural Heritage Database, 2012

State Code
E- An endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors – a loss of habitat, over-exploitation, predation, competition, or disease. An endangered species requires immediate assistance or extinction will probably follow.
Regional Codes
LP- Indicates taxa or ecological communities listed by the Pinelands commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pinelands species is included in the New Jersey Pinelands Comprehensive Management Plan.
HL- Indicates taxa or ecological communities protected by the Highlands Water Protection and Planning Act within the jurisdiction of the Highlands Preservation Area.
Global (G Rank) and State (S Rank) Element Rank

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2	Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3	Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; the number of occurrences are in the range of 21 to 100.
G4	Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.
T	The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species global rank.
S1	Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements that were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.
S2	Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically, many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.
S3	Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements that are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.
B	Refers to the breeding population of the element in the state.
N	Refers to the non-breeding population of the element in the state.
NR	Species has not yet been ranked.

APPENDIX B

Animals in Bordentown Township

Fish

Common Name	Scientific Name	General Habitat
Alewife	<i>Alosa pseudoharengus</i>	Streams
Bass, largemouth	<i>Micropterus salmoides</i>	Streams
Bass, smallmouth	<i>Micropterus dolomieu</i>	Streams
Bass, striped	<i>Morone saxatilis</i>	Streams
Bluegill	<i>Lepomis macrochirus</i>	Streams
Bowfin	<i>Amia calva</i>	Streams
Bullhead, black	<i>Ameiurus melas</i>	Streams
Bullhead, brown	<i>Ameiurus nebulosus</i>	Streams
Carp, common	<i>Cyprinus carpio</i>	Streams
Carp, grassfin	<i>Ctenopharyngodon idella</i>	Lakes/Ponds
Catfish, channel	<i>Ictalurus punctatus</i>	Streams
Catfish, white	<i>Ameiurus catus</i>	Streams
Chub, creek	<i>Semotilus atromaculatus</i>	Streams
Chubsucker, creek	<i>Erimyzon oblongus</i>	Streams
Crappie, black	<i>Pomoxis nigromaculatus</i>	Streams
Crappie, white	<i>Pomoxis annularis</i>	Streams
Dace, blacknose	<i>Rhinichthys cataractae</i>	Streams
Darter, swamp	<i>Etheostoma fusiforme</i>	Streams
Darter, tessellated	<i>Etheostoma olmstedi</i>	Streams
Eel, American	<i>Anguilla rostrata</i>	Streams/Lakes
Fallfish	<i>Semotilus corporalis</i>	Streams
Gar, longnose	<i>Lepisosteus osseus</i>	Streams
Goldfish	<i>Carassius auratus</i>	Streams
Gerring, blueback	<i>Alosa aestivalis</i>	Streams

Common Name	Scientific Name	General Habitat
Gogchoker	<i>Trinectes maculatus</i>	Streams
Killfish, banded	<i>Fudulus diaphanous</i>	Streams
Lamprey, American brook	<i>Lampetra appendix</i>	Streams
Lamprey, sea	<i>Petromyzon marinus</i>	Streams
Minnow, silvery	<i>Hybognathus regius</i>	Streams
Mudminnow, Eastern	<i>Umbra pygmaea</i>	Streams
Mummichog	<i>Fundulus heteroclitus</i>	Streams
Muskellunge, tiger	<i>Esox masquinogy</i>	Streams
Perch, white	<i>Morone americana</i>	Streams
Perch, yellow	<i>Perca flavescens</i>	Streams
Pickerel, chain	<i>Esox niger</i>	Streams
Pickerel, redbfin	<i>Esox americanus</i>	Streams/Lakes
Pumpkinseed	<i>Lepomis cyanellus</i>	Streams/Lakes
Quillback	<i>Carpoides cyprinus</i>	Streams
Shad, American	<i>Alosa sapidissima</i>	Streams
Shad, gizzard	<i>Dorosoma cepedianum</i>	Streams
Shiner, common	<i>Luxilus cornutus</i>	Streams
Shiner, colden	<i>Notemigonus crysoleucas</i>	Streams
Shiner, satinfin	<i>Cyprinella analostana</i>	Streams
Shiner, spotfin	<i>Cyprinella spiloptera</i>	Streams
Shiner, spottail	<i>Notropis hudsonius</i>	Streams
Shiner, swallowtail	<i>Notropis procne</i>	Streams
Stickleback, fourspine	<i>Apeltes quadracus</i>	Streams
Stickleback, threespine	<i>Gasterosteus aculeatus</i>	Streams
Sturgeon, Atlantic	<i>Acipenser oxyrinhus</i>	Streams
Sturgeon, shortnose	<i>Acipenser brevirostrum</i>	Streams
Sucker, white	<i>Catostomus commersonii</i>	Streams
Sunfish, bluespotted	<i>Enneacanthus gloriosus</i>	Streams/Lakes
Sunfish, green	<i>Lepomis cyanellus</i>	Streams
Sunfish, mud	<i>Acantharchus pomotis</i>	Streams
Sunfish, redbreast	<i>Lepomis auritus</i>	Streams
Tadpole madtom	<i>Noturus gyrinus</i>	Streams
Walleye	<i>Sander vitreum</i>	Streams

Source: Arndt, Rudolf G. "Annotated Checklist and Distribution of New Jersey Freshwater Fishes, with Comments on Abundance." The Bulletin [of the] New Jersey Academy of Science, V. 49, No. 1, Spring, 2004.

Birds

Common Name	Scientific Name	Status*	
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	INC	bw
Downy woodpecker	<i>Picoides pubescens</i>	S	bw
Hairy woodpecker	<i>Picoides villosus</i>	D	bw
Northern bobwhite	<i>Colinus virginianus</i>	RP	bw
Baltimore oriole	<i>Icterus galbula</i>	RP	bm
Northern flicker	<i>Colaptes auratus</i>	RP	bmw
Wood duck	<i>Aix sponsa</i>	RP	bmw
Common nighthawk	<i>Chordeiles minor</i>	SC	bm
American woodcock	<i>Philohela minor</i>	RP	bmw
Blue jay	<i>Cyanocitta cristata</i>	D	bmw
Gray catbird	<i>Dumetella carolinensis</i>	RP	bmw
Scarlet tanager	<i>Piranga olivacea</i>	RP	bm
Pied-billed grebe	<i>Podilymbus podiceps</i>	E	bmw
Cliff swallow	<i>Hirundo pyrrhonota</i>	SC	bm
Mallard	<i>Anas platyrhynchos</i>	INC	bmw
Fish crow	<i>Corvus ossifragus</i>	S	bmw
Gadwall	<i>Anas strepera</i>	S	bmw
American wigeon	<i>Anas americana</i>	S	mw
Northern shoveler	<i>Anas clypeata</i>	S	mw
Northern pintail	<i>Anas acuta</i>	RP	mw
Green-winged teal	<i>Anas crecca</i>	S	bmw
Wild turkey	<i>Meleagris gallopavo</i>	INC	bw
Ring-necked duck	<i>Aythya collaris</i>	S	mw
Ruddy duck	<i>Oxyura jamaicensis</i>	D	bmw
Wood duck	<i>Aix sponsa</i>	RP	bmw
American black duck	<i>Anas rubripes</i>	RP	bmw
Long-tailed duck	<i>Clangula hyemalis</i>	S	mw
Mute swan	<i>Cygnus olor</i>	I	bmw
Snow goose	<i>Chen caerulescens</i>	INC	mw

Common Name	Scientific Name	Status*	
Canada goose	<i>Branta canadensis</i>	INC	bmw
Lesser scaup	<i>Aythya affinis</i>	RP	mw
Common goldeneye	<i>Bucephala clangula</i>	S	mw
Bufflehead	<i>Bucephala albeola</i>	RP	mw
Hooded merganser	<i>Lophodytes cucullatus</i>	S	bmw
Common merganser	<i>Mergus merganser</i>	S	bmw
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	U	mw
Belted kingfisher	<i>Ceryle alcyon</i>	S	bmw
Eastern screech-owl	<i>Otus asio</i>	RP	bw
Great horned owl	<i>Bubo virginianus</i>	S	bw
Long-eared owl	<i>Asio otus</i>	T	bmw
Rock dove	<i>Columba livia</i>	I	bmw
Mourning dove	<i>Zenaida macroura</i>	S	bmw
Rirginia rail	<i>Rallus limocola</i>	RP	bmw
American coot	<i>Fulica americana</i>	U	bmw
Spotted sandpiper	<i>Actitis macularia</i>	SC	bm
Killdeer	<i>Charadrius vociferus</i>	S	bmw
Ring-billed gull	<i>Larus delawarensis</i>	INC	bmw
Great black-backed gull	<i>Larus marinus</i>	D	bmw
Glaucous gull	<i>Larus hyperboreus</i>	D	mw
Iceland gull	<i>Larus glaucooides</i>	D	mw
Herring gull	<i>Larus argentatus</i>	S	bmw
Lesser black-backed gull	<i>Larus fuscus</i>	INC	mw
Bald eagle	<i>Haliaeetus leucocephalus</i>	E	bmw
Northern harrier	<i>Circus cyaneus</i>	E	bmw
Sharp-shinned hawk	<i>Accipiter striatus</i>	SC	bmw
Cooper's hawk	<i>Accipiter Cooperii</i>	T	bmw
Red-shouldered hawk	<i>Buteo lineatus</i>	E	bmw
Red-tailed hawk	<i>Buteo jamaicensis</i>	INC	bmw
Rough-legged hawk	<i>Buteo lagopus</i>	D	mw
American kestrel	<i>Falco sparverius</i>	SC	bmw
Merlin	<i>Falco columbarius</i>	INC	m
Peregrine falcon	<i>Falco peregrinus</i>	E	bmw
Double-crested cormorant	<i>Phalacrocorax auritus</i>	S	bmw

Common Name	Scientific Name	Status*	
Great cormorant	<i>Phalacrocorax carbo</i>	U	mw
Little blue heron	<i>Egretta caerulea</i>	RP	bm
Great blue heron	<i>Ardea herodias</i>	SC	bmw
Great egret	<i>Casmerodius albus</i>	RP	bm
Least bittern	<i>Ixobrychus exilis</i>	SC	bm
American bittern	<i>Botaurus lentiginosus</i>	E	bm
Black vulture	<i>Coragyps atratus</i>	INC	bmw
Eastern wood-peewee	<i>Contopus virens</i>	RP	bm
Great crested flycatcher	<i>Myiarchus crinitus</i>	RP	bm
American crow	<i>Corvus brachyrhynchos</i>	S	bmw
Cedar waxwing	<i>Bombycilla cedrorum</i>	S	bmw
Eastern bluebird	<i>Sialia sialis</i>	INC	bmw
Hermit thrush	<i>Catharus guttatus</i>	D	bmw
Wood thrush	<i>Hylocichla mustelina</i>	RP	bm
American robin	<i>Turdus migratorius</i>	S	bmw
European starling	<i>Sturnus vulgaris</i>	I	bmw
Northern mockingbird	<i>Mimus polyglottos</i>	D	bmw
Brown thrasher	<i>Toxostoma rufum</i>	RP	bmw
Red-breasted nuthatch	<i>Sitta canadensis</i>	S	bmw
White-breasted nuthatch	<i>Sitta carolinensis</i>	INC	bw
Brown creeper	<i>Certhia americana</i>	INC	bmw
Marsh wren	<i>Cistothorus palustris</i>	RP	bmw
Carolina wren	<i>Thryothorus ludovicianus</i>	INC	bw
Winter wren	<i>Troglodytes troglodytes</i>	SC	bmw
Carolina chickadee	<i>Parus carolinensis</i>	S	bw
Black-capped chickadee	<i>Parus atricapillus</i>	S	bmw
Tufted titmouse	<i>Parus bicolor</i>	INC	bw
Ruby-crowned kinglet	<i>Regulus calendula</i>	D	mw
Golden-crowned kinglet	<i>Regulus satrapa</i>	INC	bmw
Horned lark	<i>Eremophila alpestris</i>	SC	bmw
House sparrow	<i>Passer domesticus</i>	I	bmw
American pipit	<i>Anthus rubescens</i>	U	mw
Pine siskin	<i>Carduelis pinus</i>	S	mw
American goldfinch	<i>Carduelis tristis</i>	INC	bmw

Common Name	Scientific Name	Status*	
Purple finch	<i>Carpodacus purpureus</i>	RP	bmw
House finch	<i>Carpodacus mexicanus</i>	S	bmw
Fox sparrow	<i>Passerella iliaca</i>	INC	mw
Song sparrow	<i>Melospiza melodia</i>	D	bmw
Swamp sparrow	<i>Melospiza georgiana</i>	D	bmw
White-throated sparrow	<i>Zonotrichia albicollis</i>	D	bmw
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	D	mw
Dark-eyed junco	<i>Junco hyemalis</i>	S	bmw
Savannah sparrow	<i>Passerculus sandwichensis</i>	T	bmw
American tree sparrow	<i>Spizella arborea</i>	U	mw
Chipping sparrow	<i>Spizella passerina</i>	S	bmw
Field sparrow	<i>Spizella pusilla</i>	RP	bmw
Eastern towhee	<i>Pipilo erythrophthalmus</i>	RP	bmw
Yellow-rumped warbler	<i>Dendroica coronata</i>	INC	bmw
Palm warbler	<i>Dendroica palmarum</i>	INC	m
Black-and-white warbler	<i>Miniotilta varia</i>	RP	bm
Kentucky warbler	<i>Oporornis formosus</i>	SC	bm
Yellow-breasted chat	<i>Icteria virens</i>	SC	bm
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	RP	bm
Northern cardinal	<i>Cardinalis cardinalis</i>	INC	bw
Red-winged blackbird	<i>Agelaius phoeniceus</i>	S	bmw
Common grackle	<i>Quiscalus quiscula</i>	D	bmw
Rusty blackbird	<i>Euphagus carolinus</i>	INC	mw
Brown-headed cowbird	<i>Molothrus ater</i>	S	bmw

Sources: NJ Audubon Society, NJDEP Fish and Wildlife

*Status	
E - Endangered	b - breeding
T - Threatened	pb - possibly breeding
SC - Special Concern	m - migrant
D - Decreasing	
INC - Increasing	w - winters
RP - Regional Priority	a - accidental
S - Stable	* - present during breeding season—no confirmed nesting
U - Undetermined	

I - Introduced	
P - Peripheral	

Reptiles and Amphibians

Common Name	Scientific Name	Status
Salamanders		
Red-backed salamander	<i>Plethodon c. cinereus</i>	S
Frogs and Toads		
Bullfrog	<i>Rana catesbeiana</i>	S
Green frog	<i>Rana clamitans melanota</i>	S
Southern leopard frog	<i>Rana spenocephala</i>	S
Wood frog	<i>Rana sylvatica</i>	S
Spring peeper	<i>Hyla c. crucifer</i>	S
Fowlers toad	<i>Bufo woodhousii fowleri</i>	SC
Turtles		
Common snapping turtle	<i>Chelydra s. serpentina</i>	S
Stinkpot turtle	<i>Sternotherus odoratus</i>	S
Eastern box turtle	<i>Terrapene c. carolina</i>	S
Red-bellied turtle	<i>Pseudemys rubriventris</i>	U
Eastern painted turtle	<i>Chrysemys p. picta</i>	S
Lizard		
Northern fence lizard	<i>Sceloporus undulatus hyacinthinus</i>	S
Snakes		
Northern water snake	<i>Nerodia s. sipedon</i>	S
Garter snake	<i>Thamnophis s. sirtalis</i>	S
Eastern ribbon snake	<i>Thamnophis s. sauritus</i>	S
Southern ringneck snake	<i>Diadophis p. punctatus</i>	S
Northern black racer	<i>Coluber c. constrictor</i>	U
Rough green snake	<i>Opheodrys aestivus</i>	S
Black rat snake	<i>Elaphe o. obsoleta</i>	U

Source: DVRPC, *Environmental Resource Inventory for Bordentown Township*, 2004.

Status	
E - Endangered	S - Stable
T - Threatened	U - Undetermined
D - Decreasing	I - Introduced
SC - Special Concern	

Mammals

Common Name	Scientific Name	Status
Opossum	<i>Didelphis marsupialis</i>	S
Short-tailed shrew	<i>Blarina brevicauda</i>	S
Eastern mole	<i>Scalopus aquaticus</i>	S
Star-nosed mole	<i>Condylura cristata</i>	U
Little brown bat	<i>Myotis lucifugus</i>	S
Eastern pipstrel	<i>Pipistrellus subflavus</i>	U
Eastern cottontail	<i>Sylvilagus floridanus</i>	S
Eastern chipmunk	<i>Tamias striatus</i>	S
Woodchuck	<i>Marmota monax</i>	S
Gray squirrel	<i>Sciurus carolinensis</i>	S
White-footed Mouse	<i>Peromyscus leucopus</i>	S
Jumping mouse	<i>Zapus hudsonius</i>	U
Meadow vole	<i>Microtus pennsylvanicus</i>	S
Muskrat	<i>Ondatra zibethicus</i>	S
Brown rat	<i>Rattus rattus</i>	I
House mouse	<i>Mus musculus</i>	I
Coyote	<i>Canis latrans, var.</i>	INC
Red fox	<i>Vulpes vulpes</i>	S
Raccoon	<i>Procyon lotor</i>	S
Long-tailed weasel	<i>Mustela frenata</i>	S
Striped skunk	<i>Mephitis mephitis</i>	S
River otter	<i>Lutra canadensis</i>	S
Beaver	<i>Castor canadensis</i>	INC
Mink	<i>Mustela vison</i>	S

Common Name	Scientific Name	Status
White-tailed deer	<i>Odocoileus virginianus</i>	D

Source: DVRPC, *Environmental Resource Inventory for Bordentown Township, 2004*

Status	
E - Endangered	S - Stable
T - Threatened	U - Undetermined
D - Decreasing	I - Introduced
INC - Increasing	P - Peripheral

Rare Wildlife

Common Name	Scientific Name	State Status	G Rank	S Rank
Aves				
Bald eagle	<i>Haliaeetus leucocephalus</i>	E	G5	S1B, S2N
Bobolink	<i>Dolichonyx oryzivorus</i>	T	G5	S2B, S3N
Cooper's hawk	<i>Accipiter cooperi</i>	SC	G5	S3B, S4N
Eastern meadowlark	<i>Sturnella magna</i>	SC	G5	S3B, S3N
Grasshopper sparrow	<i>Ammodramus savannarum</i>	T	G5	S2B, S3N
Great blue heron	<i>Ardea Herodias</i>	SC	G5	S3B, S4N
Northern harrier	<i>Circu cyaneus</i>	E	G5	SAB, S3N
Osteichthyes				
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	G3	S1
Reptilia				
Wood turtle	<i>Glytpetmys insculpta</i>	T	G4	S2
Invertebrate Animals				
Eastern pondmussel	<i>Ligumia nasuta</i>	T	G4	S2
Tidewater mucket	<i>Leptodea ochracea</i>	T	G3G4	S2
Pink streak	<i>Faronta rubripennis</i>		G3G4	S3

Source: NJDEP Natural Heritage Database, 2012

State Status	
T	Threatened: A species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
E	Endangered: A species whose prospects for survival within the state are in immediate danger due to one or many factors, such as a loss of habitat, over-exploitation, predation, competition, or disease. An endangered species requires immediate assistance, or extinction will probably follow.
SC	Special Concern: A species that warrants special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.

Global (G Rank) and State (S Rank) Element Rank	
G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2	Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3	Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; the number of occurrences are in the range of 21 to 100.
G4	Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.
S1	Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements that were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.
S2	Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically, many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.
S3	Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements that are widely distributed in the state but with small populations/acres or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.

B	Refers to the breeding population of the element in the state.
N	Refers to the non-breeding population of the element in the state.

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program to map critical habitat for rare animal species. Some of the rare species data in the Landscape Project is in the Natural Heritage Database, while other records were obtained from other sources. Natural Heritage Database response letters will list all species (if any) found during a search of the Landscape Project. However, any reports that are included with the response letter will only reference specific records if they are in the Natural Heritage Database. This office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.



NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

Abbott Marshlands

Water Life

Common Name	Scientific Name	Habitat Within Marsh
Alewife	<i>Alosa pseudoharengus</i>	Wetlands
Asiatic clam	<i>Corbiculidae*</i>	Constructed wetlands
Banded killifish	<i>Fundulus diaphanus</i>	Constructed wetlands
Blue crab	<i>Callinectes sapidus</i>	Constructed wetlands
Bullhead catfish	<i>Ictaluridae*</i>	Constructed wetlands
Carp	<i>Cyprinidae*</i>	Constructed wetlands
Johnny darter	<i>Etheostoma nigrum</i>	Wetlands
Killifish	Order: <i>Cyprinodontiformes</i>	Wetlands
Phytoplankton	Defined by ecological niche rather than phylogenetic or taxonomic classification	Wetlands
River mussel	Order: <i>Unionoidea</i>	Constructed wetlands
Shiner	<i>Cyprinids*</i>	Constructed wetlands
Shad	<i>Clupeidae*</i>	Wetlands
Short-nosed sturgeon	<i>Acipenser brevirostrum</i>	Wetlands
Yellow perch	<i>Perca flavescens</i>	Wetlands
Sea lamprey	<i>Petromyzon marinus</i>	Water
American brook lamprey	<i>Lethenteron appendix</i>	Water
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	Water
Longnose gar	<i>Lepisosteus osseus</i>	Water
Bowfin	<i>Amia calva</i>	Water
American eel	<i>Anguilla rostrata</i>	Water
American shad	<i>Alosa sapidissima</i>	Water
Gizzard shad	<i>Dorosoma cepedianum</i>	Water

Common Name	Scientific Name	Habitat Within Marsh
Blueback herring	<i>Alosa aestivalis</i>	Water
Eastern mudminnow	<i>Umbra pygmaea</i>	Water
Redfin pickerel	<i>Esox americanus</i>	Water
Chain pickerel	<i>Esox niger</i>	Water
Muskellunge	<i>Esox masquinongy</i>	Water
Grass carp	<i>Ctenopharyngodon idella</i>	Water
Spottail shiner	<i>Notropis hudsonius</i>	Water
Common shiner	<i>Luxilus cornutus</i>	Water
Bridle shiner	<i>Notropis bifrenatus</i>	Water
Satinfin shiner	<i>Notropis analostanus</i>	Water
Golden shiner	<i>Notemigonus crysoleucas</i>	Water
Ironcolor shiner	<i>Notropis chalybaeus</i>	Water
Eastern silvery minnow	<i>Hybognathus regius</i>	Water
Cutlips minnow	<i>Exoglossum maxillingua</i>	Water
Fathead minnow	<i>Pimephales promelas</i>	Water
Blacknose dace	<i>Rhinichthys atratulus</i>	Water

*Indicates Family, a taxonomic category ranking used in biological classification that is below an order level and above a genus level, and includes group(s) of species that share a common attribute

Source: Friends for the Marsh, www.marsh-friends.org

Birds

Common Name	Scientific Name	Nesting Recorded
Acadian flycatcher	<i>Empidonax virescens</i>	
American bittern	<i>Botaurus lentiginosus</i>	Yes
American black duck	<i>Anas rubripes</i>	Yes
American coot	<i>Fulica americana</i>	Yes
American crow	<i>Corvus brachyrhynchos</i>	Yes
American goldfinch	<i>Carduelis tristis</i>	Yes
American kestrel	<i>Falco sparverius</i>	Yes
American pipit	<i>Anthus rubescens</i>	
American redstart	<i>Setophaga ruticilla</i>	Yes
American robin	<i>Turdus migratorius</i>	Yes

Common Name	Scientific Name	Nesting Recorded
American tree sparrow	<i>Spizella arborea</i>	
American wigeon	<i>Anas americana</i>	
American woodcock	<i>Scolopax minor</i>	Yes
Bald eagle	<i>Haliaeetus leucocephalus</i>	Yes
Baltimore oriole	<i>Icterus galbula</i>	Yes
Bank swallow	<i>Riparia riparia</i>	Yes
Barn owl	<i>Tyto alba</i>	
Barn swallow	<i>Hirundo rustica</i>	Yes
Barred owl	<i>Strix varia</i>	Yes
Bay-breasted warbler	<i>Dendroica castanea</i>	
Belted kingfisher	<i>Megaceryle alcyon</i>	Yes
Bicknell's thrush	<i>Catharus bicknelli</i>	
Black tern	<i>Chlidonias niger</i>	
Black vulture	<i>Coragyps atratus</i>	
Black-and-white warbler	<i>Mniotilta varia</i>	Yes
Black-bellied plover	<i>Pluvialis squatarola</i>	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Yes
Blackburnian warbler	<i>Dendroica fusca</i>	
Black-capped chickadee	<i>Poecile atricapillus</i>	
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	Yes
Black-necked stilt	<i>Himantopus mexicanus</i>	
Blackpoll warbler	<i>Dendroica striata</i>	
Black-throated blue warbler	<i>Dendroica caerulescens</i>	
Black-throated green warbler	<i>Dendroica virens</i>	
Blue grosbeak	<i>Passerina caerulea</i>	Yes
Blue jay	<i>Cyanocitta cristata</i>	Yes
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	Yes
Blue-headed vireo	<i>Vireo solitarius</i>	
Blue-winged teal	<i>Anas discors</i>	Yes
Blue-winged warbler	<i>Vermivora cyanoptera</i>	Yes
Bobolink	<i>Dolichonyx oryzivorus</i>	
Bonaparte's gull	<i>Chroicocephalus philadelphia</i>	
Brant	<i>Branta bernicla</i>	
Broad-winged hawk	<i>Buteo platypterus</i>	Yes

Common Name	Scientific Name	Nesting Recorded
Brown creeper	<i>Certhia americana</i>	
Brown thrasher	<i>Toxostoma rufum</i>	Yes
Brown-headed cowbird	<i>Molothrus ater</i>	Yes
Bufflehead	<i>Bucephala albeola</i>	
Canada goose	<i>Branta canadensis</i>	Yes
Canada warbler	<i>Wilsonia canadensis</i>	
Canvasback	<i>Aythya valisineria</i>	
Cape May warbler	<i>Dendroica tigrina</i>	
Carolina chickadee	<i>Poecile carolinensis</i>	Yes
Carolina wren	<i>Thryothorus ludovicianus</i>	Yes
Caspian tern	<i>Hydroprogne caspia</i>	
Cattle egret	<i>Bubulcus ibis</i>	
Cedar waxwing	<i>Bombycilla cedrorum</i>	Yes
Cerulean warbler	<i>Dendroica cerulea</i>	
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>	Yes
Chimney swift	<i>Chaetura pelagica</i>	Yes
Chipping sparrow	<i>Spizella passerina</i>	Yes
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	Yes
Common goldeneye	<i>Bucephala clangula</i>	
Common grackle	<i>Quiscalus quiscula</i>	Yes
Common loon	<i>Gavia immer</i>	
Common merganser	<i>Mergus merganser</i>	
Common moorhen	<i>Gallinula chloropus</i>	Yes
Common nighthawk	<i>Chordeiles minor</i>	Yes
Common raven	<i>Corvus corax</i>	
Common redpoll	<i>Carduelis flammea</i>	
Common snipe	<i>Gallinago gallinago</i>	
Common yellowthroat	<i>Geothlypis trichas</i>	Yes
Connecticut warbler	<i>Oporornis agilis</i>	
Cooper's hawk	<i>Accipiter cooperii</i>	Yes
Dark-eyed junco	<i>Junco hyemalis</i>	
Double-crested cormorant	<i>Phalacrocorax auritus</i>	
Downy woodpecker	<i>Picoides pubescens</i>	Yes
Dunlin	<i>Calidris alpina</i>	

Common Name	Scientific Name	Nesting Recorded
Eastern bluebird	<i>Sialia sialis</i>	Yes
Eastern kingbird	<i>Tyrannus tyrannus</i>	Yes
Eastern meadowlark	<i>Sturnella magna</i>	Yes
Eastern phoebe	<i>Sayornis phoebe</i>	Yes
Eastern screech-owl	<i>Megascops asio</i>	Yes
Eastern towhee	<i>Pipilo erythrophthalmus</i>	Yes
Eastern wood-pewee	<i>Contopus virens</i>	Yes
Eurasian wigeon	<i>Anas penelope</i>	
European starling	<i>Sturnus vulgaris</i>	Yes
Evening grosbeak	<i>Hesperiphona vespertina</i>	
Field sparrow	<i>Spizella pusilla</i>	Yes
Fish crow	<i>Corvus ossifragus</i>	Yes
Forster's tern	<i>Sterna forsteri</i>	
Fox sparrow	<i>Passerella iliaca</i>	
Fulvous whistling-duck	<i>Dendrocygna bicolor</i>	
Gadwall	<i>Anas strepera</i>	
Glaucous gull	<i>Larus hyperboreus</i>	
Glossy ibis	<i>Plegadis falcinellus</i>	
Golden eagle	<i>Aquila chrysaetos</i>	
Golden-crowned kinglet	<i>Regulus satrapa</i>	
Golden-winged warbler	<i>Vermivora chrysoptera</i>	
Gray catbird	<i>Dumetella carolinensis</i>	Yes
Gray-cheeked thrush	<i>Catharus minimus</i>	
Great Black-backed gull	<i>Larus marinus</i>	
Great blue heron	<i>Ardea herodias</i>	Yes
Great cormorant	<i>Phalacrocorax carbo</i>	
Great crested flycatcher	<i>Myiarchus crinitus</i>	Yes
Great egret	<i>Ardea alba</i>	
Great horned owl	<i>Bubo virginianus</i>	Yes
Greater scaup	<i>Aythya marila</i>	
Greater yellowlegs	<i>Tringa melanoleuca</i>	
Green heron	<i>Butorides virescens</i>	Yes
Green-winged teal	<i>Anas crecca</i>	
Hairy woodpecker	<i>Picoides villosus</i>	Yes

Common Name	Scientific Name	Nesting Recorded
Hermit thrush	<i>Catharus guttatus</i>	
Herring gull	<i>Larus smithsonianus</i>	
Hooded merganser	<i>Lophodytes cucullatus</i>	
Hooded warbler	<i>Wilsonia citrina</i>	
Horned grebe	<i>Podiceps auritus</i>	
Horned lark	<i>Eremophila alpestris</i>	
House finch	<i>Carpodacus mexicanus</i>	Yes
House sparrow	<i>Passer domesticus</i>	Yes
House wren	<i>Troglodytes aedon</i>	Yes
Iceland gull	<i>Larus glaucoides</i>	
Indigo bunting	<i>Passerina cyanea</i>	Yes
Kentucky warbler	<i>Oporornis formosus</i>	Yes
Killdeer	<i>Charadrius vociferus</i>	
King rail	<i>Rallus elegans</i>	Yes
Laughing gull	<i>Leucophaeus atricilla</i>	
Least bittern	<i>Ixobrychus exilis</i>	Yes
Least flycatcher	<i>Empidonax minimus</i>	
Least sandpiper	<i>Calidris minutilla</i>	
Least tern	<i>Sternula antillarum</i>	
Lesser black-backed gull	<i>Larus fuscus</i>	
Lesser scaup	<i>Aythya affinis</i>	
Lesser yellowlegs	<i>Tringa flavipes</i>	
Lincoln's sparrow	<i>Melospiza lincolnii</i>	
Little blue heron	<i>Egretta caerulea</i>	
Long-eared owl	<i>Asio otus</i>	
Louisiana waterthrush	<i>Seiurus motacilla</i>	
Magnolia warbler	<i>Dendroica magnolia</i>	
Mallard	<i>Anas platyrhynchos</i>	Yes
Marsh wren	<i>Cistothorus palustris</i>	Yes
Merlin	<i>Falco columbarius</i>	
Mississippi kite	<i>Ictinia mississippiensis</i>	
Mourning dove	<i>Zenaida macroura</i>	Yes
Mourning warbler	<i>Oporornis philadelphia</i>	
Mute swan	<i>Cygnus olor</i>	Yes

Common Name	Scientific Name	Nesting Recorded
Nashville warbler	<i>Vermivora ruficapilla</i>	
Northern bobwhite	<i>Colinus virginianus</i>	Yes
Northern cardinal	<i>Cardinalis cardinalis</i>	Yes
Northern flicker	<i>Colaptes auratus</i>	Yes
Northern goshawk	<i>Accipiter gentilis</i>	
Northern harrier	<i>Circus cyaneus</i>	
Northern mockingbird	<i>Mimus polyglottos</i>	Yes
Northern parula	<i>Parula americana</i>	
Northern pintail	<i>Anas acuta</i>	
Northern rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Yes
Northern shoveler	<i>Anas clypeata</i>	
Northern waterthrush	<i>Seiurus noveboracensis</i>	
Olive-sided flycatcher	<i>Contopus cooperi</i>	
Orange-crowned warbler	<i>Vermivora celata</i>	
Orchard oriole	<i>Icterus spurius</i>	Yes
Osprey	<i>Pandion haliaetus</i>	Yes
Ovenbird	<i>Seiurus aurocapilla</i>	Yes
Palm warbler	<i>Dendroica palmarum</i>	
Pectoral sandpiper	<i>Calidris melanotos</i>	
Peregrine falcon	<i>Falco peregrinus</i>	
Philadelphia vireo	<i>Vireo philadelphicus</i>	
Pied-billed grebe	<i>Podilymbus podiceps</i>	Yes
Pileated woodpecker	<i>Dryocopus pileatus</i>	
Pine siskin	<i>Carduelis pinus</i>	
Pine warbler	<i>Dendroica pinus</i>	
Prairie warbler	<i>Dendroica discolor</i>	
Prothonotary warbler	<i>Protonotaria citrea</i>	Yes
Purple finch	<i>Carpodacus purpureus</i>	
Purple gallinule	<i>Porphyrio martinica</i>	
Purple martin	<i>Progne subis</i>	Yes
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	Yes
Red-breasted merganser	<i>Mergus serrator</i>	
Red-breasted guthatch	<i>Sitta canadensis</i>	
Red-eyed vireo	<i>Vireo olivaceus</i>	Yes

Common Name	Scientific Name	Nesting Recorded
Redhead	<i>Aythya americana</i>	
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Yes
Red-necked grebe	<i>Podiceps grisegena</i>	
Red-shouldered hawk	<i>Buteo lineatus</i>	
Red-tailed hawk	<i>Buteo jamaicensis</i>	Yes
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Yes
Ring-billed gull	<i>Larus delawarensis</i>	
Ring-necked duck	<i>Aythya collaris</i>	
Ring-necked pheasant	<i>Phasianus colchicus</i>	Yes
Rock dove/rock pigeon	<i>Columba livia</i>	Yes
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	Yes
Rough-legged hawk	<i>Buteo lagopus</i>	
Ruby-crowned kinglet	<i>Regulus calendula</i>	
Ruby-throated hummingbird	<i>Archilochus colubris</i>	Yes
Ruddy duck	<i>Oxyura jamaicensis</i>	
Rusty blackbird	<i>Euphagus carolinus</i>	
Sandhill crane	<i>Grus canadensis</i>	
Savannah sparrow	<i>Passerculus sandwichensis</i>	
Scarlet tanager	<i>Piranga olivacea</i>	Yes
Semipalmated plover	<i>Charadrius semipalmatus</i>	
Semipalmated sandpiper	<i>Calidris pusilla</i>	
Sharp-shinned hawk	<i>Accipiter striatus</i>	
Short-billed dowitcher	<i>Limnodromus griseus</i>	
Short-eared owl	<i>Asio flammeus</i>	
Snow bunting	<i>Plectrophenax nivalis</i>	
Snow goose	<i>Chen caerulescens</i>	
Snowy egret	<i>Egretta thula</i>	
Solitary sandpiper	<i>Tringa solitaria</i>	
Song sparrow	<i>Melospiza melodia</i>	Yes
Sora	<i>Porzana carolina</i>	Yes
Spotted sandpiper	<i>Actitis macularius</i>	Yes
Stilt sandpiper	<i>Calidris himantopus</i>	
Swainson's thrush	<i>Catharus ustulatus</i>	
Swamp sparrow	<i>Melospiza georgiana</i>	Yes

Common Name	Scientific Name	Nesting Recorded
Tennessee warbler	<i>Vermivora peregrina</i>	
Tree swallow	<i>Tachycineta bicolor</i>	Yes
Tufted titmouse	<i>Baeolophus bicolor</i>	Yes
Tundra swan	<i>Cygnus columbianus</i>	
Turkey vulture	<i>Cathartes aura</i>	
Veery	<i>Catharus fuscescens</i>	Yes
Vesper sparrow	<i>Pooecetes gramineus</i>	
Virginia rail	<i>Rallus limicola</i>	Yes
Warbling vireo	<i>Vireo gilvus</i>	Yes
Western sandpiper	<i>Calidris mauri</i>	
White-breasted nuthatch	<i>Sitta carolinensis</i>	Yes
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	
White-eyed vireo	<i>Vireo griseus</i>	Yes
White-rumped sandpiper	<i>Calidris fuscicollis</i>	
White-throated sparrow	<i>Zonotrichia albicollis</i>	
Wild turkey	<i>Meleagris gallopavo</i>	Yes
Willow flycatcher	<i>Empidonax traillii</i>	Yes
Wilson's warbler	<i>Wilsonia pusilla</i>	
Winter wren	<i>Troglodytes hiemalis</i>	
Wood duck	<i>Aix sponsa</i>	Yes
Wood thrush	<i>Hylocichla mustelina</i>	Yes
Worm-eating warbler	<i>Helmitheros vermivorum</i>	
Yellow warbler	<i>Dendroica aestiva</i>	Yes
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Yes
Yellow-breasted chat	<i>Icteria virens</i>	Yes
Yellow-rumped warbler	<i>Dendroica coronata</i>	
Yellow-throated vireo	<i>Vireo flavifrons</i>	Yes
Yellow-throated warbler	<i>Dendroica dominica</i>	

Source: Leck, CF, and R. Blicharz, Marsh Bird List 2010, www.marsh-friends.org

Amphibians

Common Name	Scientific Name	Habitat Within Marsh
American toad	<i>Bufo americanus</i>	Constructed wetlands
Bullfrog	<i>Rana catesbeiana</i>	Ponds
Fowler's toad	<i>Bufo fowleri</i>	Constructed wetlands
Green frog	<i>Rana clamitans</i>	Ponds
Pickerel frog	<i>Rana palustris</i>	Ponds
New Jersey chorus frog	<i>Pseudacris triseriata kalmi</i>	Ponds
Wood frog	<i>Rana sylvatica</i>	Forest floor, ponds
Northern gray tree frog	<i>Hyla versicolor</i>	Trees
Red-backed salamander	<i>Plethodon cinereus</i>	Ponds

Source: Friends for the Marsh, www.marsh-friends.org

Reptiles

Common Name	Scientific Name	Habitat Within Marsh
Brown snake	<i>Colubridae*</i>	Shrub forest
Eastern painted turtle	<i>Chrysemys picta</i>	Ponds
Map turtle	<i>Graptemys geographica</i>	Ponds, rivers
Red-bellied turtle	<i>Pseudemys rubriventris</i>	Ponds
Red-eared turtle	<i>Trachemys scripta elegans</i>	Ponds
Ribbon snake	<i>Thamnophis sauritus</i>	Constructed wetlands
Snapping turtle	<i>Chelydra serpentina</i>	Constructed wetlands, ponds
*	Indicates Family, a taxonomic category ranking used in biological classification that is below an order level and above a genus level, and includes group(s) of species that share a common attribute	

Source: Friends for the Marsh, www.marsh-friends.org

Mammals

Common Name	Scientific Name
Beaver	<i>Castor canadensis</i>
Big brown bat	<i>Eptesicus fuscus</i>
Little brown bat	<i>Myotis lucifugus</i>
Eastern chipmunk	<i>Tamias striatus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern grey squirrel	<i>Sciurus carolinensis</i>
Long-tailed weasel	<i>Mustela frenata</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Voles (various species)	<i>Microtus</i>
Muskrat	<i>Ondatra zibethicus</i>
Opossum	<i>Didelphis marsupialis</i>
Raccoon	<i>Procyon lotor</i>
Red bat	<i>Lasiurus borealis</i>
Red fox	<i>Vulpes vulpes</i>
River otter	<i>Lontra canadensis</i>
Short-tailed shrew	<i>Blarina brevicauda</i>
White-footed mouse	<i>Peromyscus leucopus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Woodchuck	<i>Marmota monax</i>

Source: Friends for the Marsh, www.marsh-friends.org

Butterflies

Common Name	Scientific Name
Pipevine swallowtail	<i>Battus philenor</i>
Eastern black swallowtail	<i>Papilio polyxenes</i>
Tiger swallowtail	<i>Papilio glaucus</i>
Spicebush swallowtail	<i>Papilio troilus</i>
Cabbage white	<i>Pieris rapae</i>
Falcate orange-tip	<i>Anthocharis midea</i>

Common Name	Scientific Name
Clouded sulphur	<i>Colias philodice</i>
Orange sulphur	<i>Colias eurytheme</i>
American copper	<i>Lycaena phlaeas</i>
Red-banded hairstreak	<i>Calycopis cecrops</i>
White hairstreak	<i>Parrhasius m-album</i>
Other hairstreak spp.	<i>Lycaenidae Theclinae</i>
Eastern-tailed blue	<i>Cupido comyntas</i>
Spring azure	<i>Celastrina ladon</i>
Great spangled fritillary	<i>Speyeria cybele</i>
Question mark	<i>Polygonia interrogationis</i>
Eastern comma	<i>Polygonia comma</i>
Mourning cloak	<i>Nymphalis antiopa</i>
Pearl crescent	<i>Phyciodes tharos</i>
Baltimore	<i>Euphydryas phaeton</i>
American painted lady	<i>Vanessa virginiensis</i>
Painted lady	<i>Vanessa cynthia</i>
Red admiral	<i>Vanessa atalanta</i>
Buckeye	<i>Junonia coenia</i>
Red-spotted purple	<i>Limenitis arthemis</i>
Viceroy	<i>Limenitis archippus</i>
Hackberry species	<i>Asterocampa</i>
American snout	<i>Libytheana carinenta</i>
Appalachian eyed brown	<i>Satyroides appalachia</i>
Little wood satyr	<i>Megisto cymela</i>
Common wood nymph	<i>Cercyonis pegala</i>
Monarch	<i>Danaus plexippus</i>
Harvester	<i>Feniseca tarquinius</i>
Silver-spotted skipper	<i>Epargyreus clarus</i>
Broad-winged skipper	<i>Poanes viator</i>
Many other species of skippers	<i>Hesperiidae</i>
Hand-maid moth	<i>Datana ranaeiceps</i>
Coastal bog metarranthis	<i>Metarranthis pilosaria</i>

Source: Dr. Charles F. Leck

Plants

See the following pages for a list of plants found in the Abbott Marshlands.

Plants of the Hamilton - Trenton - Bordentown Marsh (to June 2010), based on Leck & Leck 2005 with additions ([+]) and non native species noted (*). Rare species are bolded and state status indicated. Arrangement is as follows: alphabetical by family; non seed vascular plants are followed by seed plants; dicots precede monocots. Names follow recent taxonomy and are based on Karl Anderson's 2011 *Checklist of the Plants of New Jersey*. State status is from: Snyder, D. 2010. *Special Plants of New Jersey*. (Rankings: Global (G1-5) - G1 critically imperiled globally to G5 demonstrably secure globally although possibly rare at the periphery of range; State (S1-5) - S1 critically imperiled in New Jersey to S5 demonstrably secure in the state under present conditions; SH - of historical occurrence in New Jersey, but no extant populations known; E - endangered, prospects for survival in New Jersey are low and the species is in immediate danger.) (For annotated list: Leck, MA, CF Leck. 2005, Journal Torrey Botanical Society 132: 323-354.)

Phylum	Family	Binomial	State Status	Common Name	Common Name
LYCOPODIOPHYTA	Isoetaceae	<i>Isoetes riparia</i>	S3	Shore Quillwort	Quillwort, Shore
LYCOPODIOPHYTA	Lycopodiaceae	<i>Huperzia lucidula</i>		Shining Clubmoss	Clubmoss, Shining
LYCOPODIOPHYTA	Lycopodiaceae	<i>Lycopodium obscurum</i>		Rare Clubmoss	Clubmoss, Rare
LYCOPODIOPHYTA	Selaginellaceae	<i>Selaginella apoda</i>		Meadow Spikemoss	Spikemoss, Meadow
EQUISETOPHYTA	Equisetaceae	<i>Equisetum arvense</i>		Field Horsetail	Horsetail, Field
EQUISETOPHYTA	Equisetaceae	<i>Equisetum fluviatile</i>		Water Horsetail	Horsetail, Water
EQUISETOPHYTA	Equisetaceae	<i>Equisetum hyemale</i> var. <i>affine x laevigatum</i>		Scouring Rush Horsetail	Horsetail, Scouring Rush
PTERIDOPHYTA	Aspleniaceae	<i>Asplenium platyneuron</i>		Ebony Spleenwort	Fern, Ebony Spleenwort
PTERIDOPHYTA	Azollaceae	<i>Azolla caroliniana</i> [+]	G5, S2	Carolina Mosquito Fern	Fern, Carolina Mosquitofern
PTERIDOPHYTA	Blechnaceae	<i>Woodwardia areolata</i>		Netted Chainfern	Fern, Netted Chain
PTERIDOPHYTA	Blechnaceae	<i>Woodwardia virginica</i>		Virginia Chainfern	Fern, Virginia Chain
PTERIDOPHYTA	Dennstaedtiaceae	<i>Dennstaedtia punctilobula</i>		Eastern Hay-scented Fern	Fern, Hay-scented, Eastern
PTERIDOPHYTA	Dennstaedtiaceae	<i>Pteridium aquilinum</i>		Western Brackenfern	Fern, Bracken, Western
PTERIDOPHYTA	Dryopteridaceae	<i>Athyrium filix-femina</i>		Ladyfern	Fern, Lady
PTERIDOPHYTA	Dryopteridaceae	<i>Cystopteris tenuis</i>		Upland Brittle Bladderfern	Fern, Upland Brittle Bladder
PTERIDOPHYTA	Dryopteridaceae	<i>Dryopteris carthusiana</i>		Spinulose Wood Fern	Fern, Spinulose Wood
PTERIDOPHYTA	Dryopteridaceae	<i>Dryopteris cristata</i> [+]		Crested Woodfern	Fern, Crested
PTERIDOPHYTA	Dryopteridaceae	<i>Dryopteris intermedia</i>		Intermediate Woodfern	Fern, Intermediate Wood
PTERIDOPHYTA	Dryopteridaceae	<i>Dryopteris marginalis</i>		Marginal Woodfern	Fern, Marginal Wood
PTERIDOPHYTA	Dryopteridaceae	<i>Matteuccia struthiopteris</i>		Ostrich Fern	Fern, Ostrich
PTERIDOPHYTA	Dryopteridaceae	<i>Onoclea sensibilis</i>		Sensitive Fern	Fern, Sensitive
PTERIDOPHYTA	Dryopteridaceae	<i>Polystichum acrostichoides</i>		Christmas Fern	Fern, Christmas
PTERIDOPHYTA	Dryopteridaceae	<i>Woodsia obtusa</i>		Bluntlobe Woodsia	Fern, Bluntlobe Woodsia
PTERIDOPHYTA	Ophioglossaceae	<i>Botrychium dissectum</i>		Cutleaf Grape Fern	Fern, Cutleaf Grape
PTERIDOPHYTA	Ophioglossaceae	<i>Botrychium virginianum</i>		Rattlesnake Fern	Fern, Rattlesnake
PTERIDOPHYTA	Osmundaceae	<i>Osmunda cinnamomea</i>		Cinnamon Fern	Fern, Cinnamon
PTERIDOPHYTA	Osmundaceae	<i>Osmunda claytoniana</i>		Interrupted Fern	Fern, Interrupted
PTERIDOPHYTA	Osmundaceae	<i>Osmunda regalis</i>		Royal Fern	Fern, Royal
PTERIDOPHYTA	Thelypteridaceae	<i>Thelypteris noveboracensis</i>		New York Fern	Fern, New York
PTERIDOPHYTA	Thelypteridaceae	<i>Thelypteris palustris</i>		Eastern Marsh Fern	Fern, Eastern Marsh
PTERIDOPHYTA	Thelypteridaceae	<i>Thelypteris simulata</i> [+]		Bog Fern (Mass. Fern)	Fern, Bog
SEED PLANTS					
PINOPHYTA (Gymnosperms)	Cupressaceae	<i>Chamaecyparis thyoides</i>		Atlantic White Cedar	Cedar, Atlantic White
PINOPHYTA	Cupressaceae	<i>Juniperus virginiana</i>		Eastern Redcedar	Cedar, Eastern Red
PINOPHYTA	Pinaceae	<i>Picea abies</i> *		Norway Spruce	Spruce, Norway
PINOPHYTA	Pinaceae	<i>Pinus rigida</i>		Pitch Pine	Pine, Pitch
PINOPHYTA	Pinaceae	<i>Pinus strobus</i>		White Pine	Pine, White
PINOPHYTA	Pinaceae	<i>Tsuga canadensis</i>		Eastern Hemlock	Hemlock, Eastern
PINOPHYTA	Taxaceae	<i>Taxus</i> spp.		Yew	Yew
MAGNOLIOPHYTA (Flowering Plants)					
MAGNOLIOPSIDA (Dicotyleons)	Acanthaceae	<i>Justicia americana</i>		American Water-willow	Water-willow, American
	Aceraceae	<i>Acer canpestre</i> * [+]		Field Maple	Maple Field
	Aceraceae	<i>Acer negundo</i>		Boxelder	Boxelder
	Aceraceae	<i>Acer palmatum</i> *		Japanese Maple	Maple, Japanese
	Aceraceae	<i>Acer platanoides</i> *		Norway Maple	Maple, Norway
	Aceraceae	<i>Acer pseudoplatanus</i> *		Sycamore Maple	Maple, Sycamore
	Aceraceae	<i>Acer rubrum</i>		Red Maple	Maple, Red

Aceraceae	<i>Acer saccharinum</i>	Silver Maple	Maple, Silver
Aceraceae	<i>Acer saccharum</i>	Sugar Maple	Maple, Sugar
Amaranthaceae	<i>Amaranthus cannabinus</i>	Tidalmarsh Amaranth	Amaranth, Tidalmarsh
Amaranthaceae	<i>Amaranthus retroflexus</i> *	Redroot Amaranth	Amaranth, Redroot
Amaranthaceae	<i>Froelichia gracilis</i> *	Slender Snakecotton	Snakecotton, Slender
Anacardiaceae	<i>Rhus copallina</i>	Winged Sumac	Sumac, Winged
Anacardiaceae	<i>Rhus glabra</i>	Smooth Sumac	Sumac, Smooth
Anacardiaceae	<i>Rhus typhina</i>	Staghorn Sumac	Sumac, Staghorn
Anacardiaceae	<i>Toxicodendron radicans</i>	Poison Ivy	Poison Ivy
Anacardiaceae	<i>Toxicodendron vernix</i> [+]	Poison Sumac	Sumac, Poison
Annonaceae	<i>Asimina trilobata</i> [+]	G5, S1 Pawpaw	Pawpaw
Apiaceae	<i>Chaerophyllum procumbens</i> [+]	Spreading Chervil	Chervil, Spreading
Apiaceae	<i>Cicuta bulbifera</i>	Bulb-bearing Water Hemlock	Water Hemlock, Bulb-bearing
Apiaceae	<i>Cicuta maculata</i>	Spotted Water Hemlock	Water Hemlock, Spotted
Apiaceae	<i>Cryptotaenia canadensis</i>	Honewort	Honewort
Apiaceae	<i>Daucus carota</i> *	Wild Carrot	Carrot, Wild
Apiaceae	<i>Heracleum lanatum</i>	Common Cowparsnip	Parsnip, Common Cow-
Apiaceae	<i>Hydrocotyle sibthorpioides</i> *	Lawn Marshpennywort	Pennywort, Lawn Marsh-
Apiaceae	<i>Osmorhiza claytonii</i>	Clayton's Sweetroot (Sweet Cicely)	Sweetroot, Clayton's
Apiaceae	<i>Osmorhiza longistylis</i>	Longstyle Sweetroot	Sweetroot, Longstyle
Apiaceae	<i>Pastinaca sativa</i> *	Wild Parsnip	Parsnip, Wild
Apiaceae	<i>Ptilimnium capillaceum</i>	Mock Bishopweed	Bishopweed, Mock
Apiaceae	<i>Sanicula odorata</i>	Clustered Blacksnakeroot	Blacksnakeroot, Clustered
Apiaceae	<i>Sium suave</i>	Hemlock Waterparsnip	Waterparsnip, Hemlock
Apocynaceae	<i>Apocynum androsaemifolium</i>	Spreading Dogbane	Dogbane, Spreading
Apocynaceae	<i>Apocynum cannabinum</i>	Indianhemp	Indianhemp
Apocynaceae	<i>Vinca minor</i> *	Common Periwinkle	Periwinkle, common
Aquifoliaceae	<i>Ilex opaca</i>	American Holly	American Holly
Aquifoliaceae	<i>Ilex verticillata</i>	Common Winterberry	Winterberry, Common
Araliaceae	<i>Aralia nudicaulis</i>	Wild Sarsaparilla	Sarsaparilla, Wild
Araliaceae	<i>Hedera helix</i> *	English Ivy	Ivy, English
Aristolochiaceae	<i>Asarum canadense</i>	Wild Ginger	Ginger, Wild
Asclepiadaceae	<i>Asclepias incarnata</i>	Swamp Milkweed	Milkweed, Swamp
Asclepiadaceae	<i>Asclepias syriaca</i>	Common Milkweed	Milkweed, Common
Asclepiadaceae	<i>Cynanchum louiseae</i> [+]	Louise's Swallowwort	Swallowwort, Louise's (Black Swallowwort)
Asteraceae	<i>Achillea millefolium</i> *	Yarrow	Yarrow
Asteraceae	<i>Ageratina altissima</i> (<i>Eupatorium rugosum</i>)	White Snakeroot	Snakeroot, White
Asteraceae	<i>Ageratina aromatica</i> (<i>Eupatorium aromaticum</i>)	S1 Lesser Snakeroot	Snakeroot, Lesser
Asteraceae	<i>Ambrosia artemisiifolia</i>	Annual Ragweed	Ragweed, Annual
Asteraceae	<i>Ambrosia trifida</i>	Great Ragweed	Ragweed, Great
Asteraceae	<i>Antennaria plantaginifolia</i>	Pussytoes, Plantain-leaved	Pussytoes, Plantain-leaved
Asteraceae	<i>Anthemis arvensis</i> *	Corn Chamomile	Chamomile, Corn
Asteraceae	<i>Anthemis cotula</i> *	Stinking Chamomila	Chamomila, Stinking
Asteraceae	<i>Anthemis tinctoria</i> *	Golden Chamomile	Chamomile, Golden
Asteraceae	<i>Arctium minus</i> *	Lesser Burdock	Burdock, Lesser
Asteraceae	<i>Arnoglossum atriplicifolia</i> (<i>Cacalia atriplicifolia</i>)	S1, E Pale Indian Plantain	Indian Plantain, Pale
Asteraceae	<i>Artemisia annua</i> *	Sweet Sagewort	Sagewort, Sweet
Asteraceae	<i>Artemisia vulgaris</i> *	Mugwort	Mugwort

Asteraceae	<i>Baccharis halimifolia</i>	Eastern Baccharis	Baccharis, Eastern
Asteraceae	<i>Bidens bidentoides</i>	S2, E Delmarva Beggarticks	Beggarticks, Delmarva
Asteraceae	<i>Bidens bipinnata</i>	Spanish Needles	Spanish Needles
Asteraceae	<i>Bidens cernua</i>	Nodding Beggarticks	Beggarticks, Nodding
Asteraceae	<i>Bidens connata</i>	Purplestem Beggarticks	Beggarticks, Purplestem
Asteraceae	<i>Bidens coronata</i>	Crowned Beggarticks	Beggarticks, Crowned
Asteraceae	<i>Bidens discoidea</i>	Small Beggarticks	Beggarticks, Small
Asteraceae	<i>Bidens frondosa</i>	Beggarticks	Beggarticks
Asteraceae	<i>Bidens laevis</i>	Smooth Beggarticks	Beggarticks, Smooth
Asteraceae	<i>Bidens polylepis</i> *		
Asteraceae	<i>Bidens tripartida</i> L. (<i>Bidens comosa</i>)	Threelobe Beggarticks	Beggarticks, Threelobe
Asteraceae	<i>Carduus nutans</i> *	Nodding Plumeless Thistle	Thistle, Nodding Plumeless
Asteraceae	<i>Centaurea stoebe</i> (<i>Centaurea maculosa</i>)*	Spotted Knapweed	Knapweed, Spotted
Asteraceae	<i>Cichorium intybus</i> *	Chicory	Chicory
Asteraceae	<i>Cirsium arvense</i> *	Canada Thistle	Thistle, Canada
Asteraceae	<i>Cirsium vulgare</i> *	BullThistle	Thistle, Bull
Asteraceae	<i>Conyza canadensis</i>	Canadian Horseweed	Horseweed, Canadian
Asteraceae	<i>Coreopsis lanceolata</i> *	Lanceleaf Tickseed	Tickseed, Lanceleaf
Asteraceae	<i>Crepis tectorum</i> *	Narrowleaf Hawksbeard	Hawksbeard, Narrowleaf not on Kark
Asteraceae	<i>Eclipta prostrata</i>	False Daisy	Daisy, False
Asteraceae	<i>Erechtites hieraciifolia</i>	American Burnweed	Burnweed, American
Asteraceae	<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Fleabane, Eastern Daisy
Asteraceae	<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	Fleabane, Philadelphia
Asteraceae	<i>Erigeron strigosus</i>	Prairie Fleabane	Fleabane, Prairie
Asteraceae	<i>Eupatoriadelphus dubius</i> (<i>Eupatorium dubium</i> Willd. ex Poir.)	Coastal Plain Joe Pye Weed	Joe Pye Weed, Coastal Plain
Asteraceae	<i>Eupatoriadelphus fistulosus</i> (<i>Eupatorium fistulosum</i>)	Trumpetweed	Trumpetweed
Asteraceae	<i>Eupatoriadelphus maculatus</i> (<i>Eupatorium maculatum</i>)	Spotted Joe Pye Weed	Joe Pye Weed, Spotted
Asteraceae	<i>Eupatorium album</i> var. <i>subvenosum</i>	White Thoroughwort	Thoroughwort, White
Asteraceae	<i>Eupatorium altissimum</i>	S2 Tall Thoroughwort	Thoroughwort, Tall
Asteraceae	<i>Eupatorium hyssopifolium</i>	Hyssopleaf Thoroughwort	Thoroughwort, Hyssopleaf
Asteraceae	<i>Eupatorium leucolepis</i>	White-bracted Boneset	Boneset, White-bracted
Asteraceae	<i>Eupatorium perfoliatum</i>	Common Boneset	Boneset, Common
Asteraceae	<i>Eupatorium purpureum</i>	Sweetscented Joe Pye Weed	Joe Pye Weed, Sweetscented
Asteraceae	<i>Eupatorium rotundifolium</i> .	Roundleaf Boneset	Boneset, Roundleaf
Asteraceae	<i>Eupatorium serotinum</i>	Lateflowering Boneset	Boneset, Lateflowering
Asteraceae	<i>Eurybia divaricata</i> (<i>Aster divaricatus sensu lato</i>)	White Wood Aster	Aster, White Wood
Asteraceae	<i>Euthamia graminifolia</i>	Flat-top Goldenrod	Goldenrod, flat-top
Asteraceae	<i>Galinsoga quadriradiata</i> *	Hairy Galinsoga	Galinsoga, Hairy
Asteraceae	<i>Gnaphalium uliginosum</i>	Marsh Cudweed	Cudweed, Marsh
Asteraceae	<i>Helenium autumnale</i>	Common Sneezeweed	Sneezeweed, Common
Asteraceae	<i>Helianthus annuus</i>	Common Sunflower	Sunflower, Common
Asteraceae	<i>Helianthus decapetalus</i>	Thinleaf Sunflower	Sunflower, Thinleaf
Asteraceae	<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Artichoke, Jerusalem
Asteraceae	<i>Heterotheca subaxillaris</i>	Camphorweed	Camphorweed
Asteraceae	<i>Hieracium caespitosum</i> *	Meadow Hawkweed	Hawkweed, Meadow
Asteraceae	<i>Hieracium gronovii</i>	Hairy Hawkweed	Hawkweed, Hairy
Asteraceae	<i>Hieracium piloselloides</i> *	Tall Hawkweed	Hawkweed, Tall
Asteraceae	<i>Hieracium venosum</i>	Rattlesnakeweed	Rattlesnakeweed
Asteraceae	<i>Hypochaeris radicata</i> *	Cat's-ear	Cat's-ear
Asteraceae	<i>Krigia biflora</i>	Twoflower Dwarf dandelion	Dwarf dandelion, Twoflower
Asteraceae	<i>Krigia virginica</i>	Virginia Dwarf dandelion	Dwarf dandelion, Virginia
Asteraceae	<i>Lactuca biennis</i>	Tall Blue Lettuce	Lettuce, Tall Blue
Asteraceae	<i>Lactuca canadensis</i>	Canada Lettuce	Lettuce, Canada
Asteraceae	<i>Lactuca floridiana</i> [+]	Woodland Lettuce	Lettuce, Woodland
Asteraceae	<i>Lactuca serriola</i> *	Prickly Lettuce	Lettuce, Prickly
Asteraceae	<i>Leucanthemum vulgare</i> (<i>Chrysanthemum leucanthemum</i>)*	Oxeye Daisy	Daisy, Oxeye
Asteraceae	<i>Matricaria perforata</i> *	Scentless Chamomile	Chamomile, Scentless
Asteraceae	<i>Mikania scandens</i>	Climbing Hempvine	Hempvine, Climbing

Asteraceae	<i>Packera aurea</i> (<i>Senecio aureus</i>)	Golden Ragwort	Ragwort, Golden
Asteraceae	<i>Prenanthes trifoliolata</i>	Gall of the Earth	Gall of the Earth
Asteraceae	<i>Pseudognaphalium obtusifolium</i> (<i>Gnaphalium obtusifolium</i>)	Sweet Everlasting	Everlasting, Sweet
Asteraceae	<i>Rudbeckia hirta</i>	Blackeyed Susan	Blackeyed Susan
Asteraceae	<i>Rudbeckia laciniata</i>	Cutleaf Coneflower	Coneflower, Cutleaf
Asteraceae	<i>Senecio vulgaris</i> *	Common Groundsel	Groundsel, Common
Asteraceae	<i>Solidago caesia</i>	Wreath Goldenrod	Goldenrod, Wreath
Asteraceae	<i>Solidago canadensis</i>	Canada Goldenrod	Goldenrod, Canada
Asteraceae	<i>Solidago canadensis</i> var. <i>scabra</i> (<i>S. altissima</i>)	Tall Goldenrod	Goldenrod, Tall
Asteraceae	<i>Solidago gigantea</i> .	Giant Goldenrod	Goldenrod, Giant
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod	Goldenrod, Early
Asteraceae	<i>Solidago rugosa</i>	Wrinkleleaf Goldenrod	Goldenrod, Wrinkleleaf
Asteraceae	<i>Solidago sempervirens</i>	Seaside Goldenrod	Goldenrod, Seaside
Asteraceae	<i>Sonchus asper</i> *	Spiny Sowthistle	Sowthistle, Spiny
Asteraceae	<i>Symphotrichum cordifolium</i> (<i>Aster cordifolius</i>)	Common Blue Wood Aster	Aster, Common Blue Wood
Asteraceae	<i>Symphotrichum puniceum</i> (<i>Aster puniceus</i>)	Purplestem Aster	Aster, Purplestem
Asteraceae	<i>Symphotrichum ericoides</i> (<i>Aster ericoides</i>)	White Heath Aster	Aster, White Heath
Asteraceae	<i>Symphotrichum pilosum</i> (<i>Aster pilosus</i>).	Hairy White Oldfield Aster	Aster, Hairy White Oldfield
Asteraceae	<i>Symphotrichum praealtum</i> (<i>Aster longifolius</i>)	S, E1 Willowleaf Aster	Aster, Willowleaf
Asteraceae	<i>Symphotrichum dumosum</i> (<i>Aster dumosus sensu lato</i>)	Rice Button Aster	Aster, Rice Button
Asteraceae	<i>Symphotrichum lanceolatum</i> (<i>Aster lanceolatus</i> Willd. ssp. <i>simplex</i>)	White Panicle Aster	Aster, White Panicle
Asteraceae	<i>Symphotrichum racemosum</i> (<i>Aster fragilis</i> var. <i>fragilis</i> (including <i>A. racemosus</i> and <i>A. vimineus</i>)	Small White Oldfield Aster	Aster, Small White Oldfield
Asteraceae	<i>Taraxacum laevigatum</i> *	Rock Dandelion	Dandelion, Rock
Asteraceae	<i>Taraxacum officinale</i> *	Common Dandelion	Dandelion, Common
Asteraceae	<i>Tragopogon dubius</i> .*	Yellow Salsify	Salsify, Yellow
Asteraceae	<i>Verbesina alternifolia</i> .	Wingstem	Wingstem
Asteraceae	<i>Vernonia noveboracensis</i>	New York Ironweed	Ironweed, New York
Asteraceae	<i>Xanthium strumarium</i>	Cocklebur	Cocklebur
Balsaminaceae	<i>Impatiens capensis</i>	Jewelweed	Jewelweed
Balsaminaceae	<i>Impatiens pallida</i>	Pale Touch-me-not	Touch-me-not, Pale
Berberidaceae	<i>Berberis thunbergii</i> *	Japanese Barberry	Barberry, Japanese
Berberidaceae	<i>Podophyllum peltatum</i> .	Mayapple	Mayapple
Betulaceae	<i>Alnus glutinosa</i> *	European Alder	Alder, European
Betulaceae	<i>Alnus incana</i>	Speckled Alder	Alder, Speckled
Betulaceae	<i>Alnus serrulata</i> .	Hazel Alder	Alder, Hazel
Betulaceae	<i>Betula lenta</i>	Sweet Birch	Birch, Sweet
Betulaceae	<i>Betula nigra</i>	River Birch	Birch, River
Betulaceae	<i>Betula populifolia</i>	Gray Birch	Birch, Gray
Betulaceae	<i>Carpinus caroliniana</i>	American Hornbeam	Hornbeam, American
Betulaceae	<i>Corylus americana</i>	American Hazelnut	Hazelnut, American
Bignoniaceae	<i>Campsis radicans</i>	Trumpet Creeper	Trumpet Creeper
Bignoniaceae	<i>Catalpa bignonioides</i>	Southern Catalpa	Catalpa, Southern
Bignoniaceae	<i>Paulownia tomentosa</i> *	Princesstree	Princesstree
Boraginaceae	<i>Echium vulgare</i> *	Common Viper's Bugloss	Viper's Bugloss, Common
Boraginaceae	<i>Hackelia virginiana</i>	Virginia Stickseed	Stickseed, Virginia
Boraginaceae	<i>Mertensia virginica</i>	Virginia Bluebells	Bluebells, Virginia
Boraginaceae	<i>Myosotis arvensis</i> *	Field Forget-me-not	Forget-me-not, Field
Boraginaceae	<i>Myosotis laxa</i>	Bay Forget-me-not	Forget-me-not, Bay
Boraginaceae	<i>Myosotis stricta</i> *	Blue Scorpionweed	Scorpionweed, Blue
Brassicaceae	<i>Alliaria petiolata</i> *	Garlic Mustard	Mustard, Garlic
Brassicaceae	<i>Arabidopsis thaliana</i> *	Mouseear Cress	Cress, Mouseear
Brassicaceae	<i>Arabis laevigata</i>	Smooth Rockcress	Rockcress, Smooth

	Brassicaceae	<i>Barbarea verna</i>	Early Yellowrocket	Yellowrocket, Early
	Brassicaceae	<i>Barbarea vulgaris</i> *	Garden Yellowrocket	Yellowrocket, Garden
	Brassicaceae	<i>Brassica nigra</i> *	Black Mustard	Mustard, Black
	Brassicaceae	<i>Camelina microcarpa</i> *	Littlepod False Flax	False Flax, Littlepod
	Brassicaceae	<i>Capsella bursa-pastoris</i> *	Shepherd's Purse	Shepherd's Purse
	Brassicaceae	<i>Cardamine bulbosa</i>	Bulbous Bittercress	Bittercress, Bulbous
	Brassicaceae	<i>Cardamine concatenata</i>	Cutleaf Toothwort	Toothwort, Cutleaf
	Brassicaceae	<i>Cardamine hirsuta</i>	Hairy Bittercress	Bittercress, Hairy
	Brassicaceae	<i>Cardamine impatiens</i> [+]	Narrowleaf Bittercress	Bittercress, Narrowleaf
	Brassicaceae	<i>Diplotaxis tenuifolia</i> *	Perennial Wallrocket	Wallrocket, Perennial
	Brassicaceae	<i>Draba verna (Eriophila verna)</i> *	Spring Draba	Draba, Spring
	Brassicaceae	<i>Hesperis matronalis</i> *	Dame's Rocket	Dame's Rocket
	Brassicaceae	<i>Lepidium virginicum</i>	Virginia Pepperweed	Pepperweed, Virginia
	Brassicaceae	<i>Lunaria annua</i> [+]	Annual Honesty	Honesty, Annual
	Brassicaceae	<i>Nasturtium officinale</i> *	Watercress	Watercress
	Brassicaceae	<i>Rorippa palustris</i>	Bog Yellowcress	Yellowcress, Bog
	Brassicaceae	<i>Sisymbrium altissimum</i> *	Tall Tumblemustard	Tumblemustard, Tall
	Brassicaceae	<i>Sisymbrium officinale</i> *	Hedgemustard	Hedgemustard
	Brassicaceae	<i>Thlaspi arvense</i> *	Field Pennycress	Pennycress, Field
Loganaceae	Buddlejaceae	<i>Buddleja davidii</i>	Orange-eye Butterflybush	Butterflybush, Orange-eye
	Buxaceae	<i>Pachysandra terminalis</i> *	Pachysandra	Pachysandra
	Cabombaceae	<i>Cabomba caroliniana</i>	Carolina Fanwort	Fanwort, Carolina
Fabaceae	Caesalpiaceae	<i>Chamaecrista fasciculata</i>	Partridge Pea	Partridge Pea
Fabaceae	Caesalpiaceae	<i>Chamaecrista nictitans</i>	Sensitive Partridge Pea	Partridge Pea, Sensitive
Fabaceae	Caesalpiaceae	<i>Gleditsia triacanthos</i>	Honeylocust	Honeylocust
Fabaceae	Caesalpiaceae	<i>Senna hebecarpa</i>	American Senna	Senna, American
	Callitricheaceae	<i>Callitriche heterophylla</i>	Twoheaded Water-starwort	Water-starwort, Twoheaded
	Callitricheaceae	<i>Callitriche stagnalis</i> *	Vernal Water-starwort	Water-starwort, Vernal
	Campanulaceae	<i>Campanula aparinoides</i>	Marsh Bellflower	Bellflower, Marsh
	Campanulaceae	<i>Lobelia cardinalis</i>	Cardinal Flower	Cardinal Flower
	Campanulaceae	<i>Lobelia inflata</i>	Indian-tobacco	Indian-tobacco
	Campanulaceae	<i>Lobelia siphilitica</i>	Great Blue Lobelia	Lobelia, Great Blue
	Campanulaceae	<i>Triodanis perfoliata</i>	Venus' Looking-glass	Venus' Looking-glass
	Cannabaceae	<i>Humulus japonicus</i> *	Japanese Hop	Hop, Japanese
	Caprifoliaceae	<i>Lonicera japonica</i> *	Japanese Honeysuckle	Honeysuckle, Japanese
	Caprifoliaceae	<i>Lonicera morrowii</i> *	Morrow's Honeysuckle	Honeysuckle, Morrow's
	Caprifoliaceae	<i>Lonicera sempervirens</i>	Trumpet Honeysuckle	Honeysuckle, Trumpet
	Caprifoliaceae	<i>Lonicera xylosteum</i> *	Fly Honeysuckle	Honeysuckle, Fly
	Caprifoliaceae	<i>Sambucus niger (Sambucus canadensis)</i>	Black Elderberry	Elderberry, Black
	Caprifoliaceae	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	Viburnum, Mapleleaf
	Caprifoliaceae	<i>Viburnum dentatum</i>	Southern Arrowwood	Arrowwood, Southern
	Caprifoliaceae	<i>Viburnum prunifolium</i>	Blackhaw	Blackhaw
	Caryophyllaceae	<i>Arenaria serpyllifolia</i> *	Thymeleaf Sandwort	Sandwort, Thymeleaf
	Caryophyllaceae	<i>Cerastium semidecandrum</i> *	Fivestamen Chickweed	Chickweed, Fivestamen
	Caryophyllaceae	<i>Dianthus armeria</i> *	Deptford Pink	Pink, Deptford
	Caryophyllaceae	<i>Paronychia fastigiata</i>	Smooth Forked Nailwort	Nailwort, Smooth Forked
	Caryophyllaceae	<i>Sagina japonica</i> *	Japanese Pearlwort	Pearlwort, Japanese
	Caryophyllaceae	<i>Sagina procumbens</i>	Birdeye Pearlwort	Pearlwort, Birdeye
	Caryophyllaceae	<i>Saponaria officinalis</i> *	Bouncingbet	Bouncingbet
	Caryophyllaceae	<i>Scleranthus annuus</i> *	German Knotgrass	Knotgrass, German
	Caryophyllaceae	<i>Silene latifolia</i> *	White Campion	Campion, White
	Caryophyllaceae	<i>Silene antirrhina</i>	Sleepy Catchfly	Catchfly, Sleepy

Caryophyllaceae	<i>Silene caroliniana</i>	S3	Sticky Catchfly	Catchfly, Sticky
Caryophyllaceae	<i>Silene noctiflora</i> *		Nightflowering Catchfly	Catchfly, Nightflowering
Caryophyllaceae	<i>Silene stellata</i>		Starry Campion	Campion, Starry
Caryophyllaceae	<i>Spergula arvensis</i> *		Corn Spurrey	Corn Spurrey
Caryophyllaceae	<i>Stellaria longifolia</i>		Longleaf Starwort	Starwort, Longleaf
Caryophyllaceae	<i>Stellaria media</i> *		Common Chickweed	Chickweed, Common
Celastraceae	<i>Celastrus orbiculatus</i> *		Oriental Bittersweet	Bittersweet, Oriental
Celastraceae	<i>Euonymus alatus</i> *		Burningbush	Burningbush
Ceratophyllaceae	<i>Ceratophyllum demersum</i>		Coontail	Coontail
Chenopodiaceae	<i>Atriplex prostrata</i>		Triangle Orache	Orache, Triangle
Chenopodiaceae	<i>Chenopodium album</i> *		Lambsquarters	Lambsquarters
Chenopodiaceae	<i>Chenopodium ambrosioides</i> *		Mexican Tea	Mexican Tea
Chenopodiaceae	<i>Chenopodium pumilio</i>		Clammy Goosefoot	Goosefoot, Clammy
Chenopodiaceae	* <i>Cycloloma atriplicifolium</i>		Winged Pigweed	Pigweed, Winged
Cistaceae	<i>Helianthemum canadense</i> [+]		Longbranch Frostweed	Frostweed, Longbranch
Cistaceae	<i>Lechea mucronata</i>		Hairy Pinweed	Pinweed, Hairy
Clethraceae	<i>Clethra alnifolia</i>		Coastal Sweetpepperbush	Sweetpepperbush, Coastal
Clusiaceae	<i>Hypericum gentianoides</i>		Orangegrass	Orangegrass
Clusiaceae	<i>Hypericum mutilum</i>		Dwarf Saint Johnswort	Saint Johnswort, Dwarf
Clusiaceae	<i>Hypericum perforatum</i> *		Common Saint Johnswort	Saint Johnswort, Common
Clusiaceae	<i>Hypericum punctatum</i>		Spotted Saint Johnswort	Saint Johnswort, Spotted
Clusiaceae	<i>Triadenum virginicum</i>		Virginia Marsh Saint Johnswort	Saint Johnswort, Virginia Marsh
Convolvulaceae	<i>Calystegia sepium sensu lato</i>		Hedge False Bindweed	Bindweed, Hedge False
Convolvulaceae	<i>Convolvulus arvensis</i> *		Field Bindweed	Bindweed, Field
Convolvulaceae	<i>Ipomoea coccinea</i> [+]		Redstar	Redstar
Convolvulaceae	<i>Ipomoea hederacea</i>		Ivyleaf Morning Glory	Morning Glory, Ivyleaf
Convolvulaceae	<i>Ipomoea pandurata</i>		Man of the Earth	Man of the Earth
Cornaceae	<i>Cornus alternifolia</i>		Alternateleaf Dogwood	Dogwood, Alternateleaf
Cornaceae	<i>Cornus amomum</i>		Silky Dogwood	Dogwood, Silky
Cornaceae	<i>Cornus florida</i>		Flowering Dogwood	Dogwood, Flowering
Cornaceae	<i>Cornus racemosa</i>		Gray Dogwood	Dogwood, Gray
Cornaceae	<i>Cornus sericea</i>		Redosier Dogwood	Dogwood, Redosier
Crassulaceae	<i>Sedum acre</i> *		Goldmoss Stonecrop	Stonecrop, Goldmoss
Crassulaceae	<i>Sedum sarmentosum</i> *		Stringy Stonecrop	Stonecrop, Stringy
Crassulaceae	<i>Sedum purpureum</i> (or <i>S. telephium</i>)*			
Cucurbitaceae	<i>Sicyos angulatus</i>		Oneseed Bur Cucumber	Bur Cucumber, Oneseed
Cuscutaceae	<i>Cuscuta compacta</i>		Compact Dodder	Dodder, Compact
Cuscutaceae	<i>Cuscuta gronovii</i>		Scaldweed	Scaldweed
Cuscutaceae	<i>Cuscuta polygonorum</i>	S2	Smartweed Dodder	Dodder, Smartweed
Dipsacaceae	<i>Dipsacus fullonum</i> [+]		Fuller's Teasel	Teasel, Fuller's
Droseraceae	<i>Drosera rotundifolia</i> (seed bank samples only)		Roundleaf Sundew	Sundew, Roundleaf
Ebenaceae	<i>Diospyros virginiana</i>		Persimmon	Persimmon
Elaeagnaceae	<i>Elaeagnus angustifolia</i> * [+]		Russian Olive	Russian Olive
Elaeagnaceae	<i>Elaeagnus umbellata</i> Thunb.*		Autumn Olive	Autumn Olive

Elatinaceae	<i>Elatine americana</i>	S2	American Waterwort	Waterwort, American
Ericaceae	<i>Epigaea repens</i>		Trailing Arbutus	Arbutus, Trailing
Ericaceae	<i>Eubotrys racemosa</i> [+]		Swamp Doghobble (Leucothoe)	Swamp Doghobble (Leucothoe; Fedderbush)
Ericaceae	<i>Kalmia latifolia</i>		Mountain Laurel	Laurel, Mountain
Ericaceae	<i>Lyonia ligustrina</i> [+]		Maleberry	Maleberry
Ericaceae	<i>Rhododendron</i> ((?) <i>canescens</i>) prob. <i>viscosum</i>		Swamp Azalea	Azalea, Swamp
Ericaceae	<i>Rhododendron maximum</i>		Great Laurel	Laurel, Great
Ericaceae	<i>Rhododendron periclymenoides</i>		Pink Azalea	Azalea, Pink
Ericaceae	<i>Vaccinium corymbosum</i>		Highbush Blueberry	Blueberry, Highbush
Ericaceae	<i>Vaccinium pallidum</i>		Blue Ridge Blueberry	Blueberry, Blue Ridge
Ericaceae	<i>Vaccinium stamineum</i>		Deerberry	Deerberry
Euphorbiaceae	<i>Acalypha rhomboidea</i>		Common Threeseed Mercury	Threeseed Mercury, Common
Euphorbiaceae	<i>Acalypha virginica</i>		Virginia Threeseed Mercury	Threeseed Mercury, Virginia
Euphorbiaceae	<i>Chamaesyce maculata</i>		Spotted Sandmat	Sandmat, Spotted
Euphorbiaceae	<i>Chamaesyce vermiculata</i> [+]		Wormseed	Wormseed
Euphorbiaceae	<i>Chamaesyce nutans</i>		Eyebane	Eyebane
Euphorbiaceae	<i>Euphorbia corollata</i>	S2	Flowering Spurge	Spurge, Flowering
Euphorbiaceae	<i>Euphorbia lathyris</i> [+]		Moleplant	Moleplant
Euphorbiaceae	<i>Poinsettia dentata</i>			
Fabaceae	<i>Amorpha fruticosa</i>		Desert False Indigo	False Indigo, Desert
Fabaceae	<i>Amphicarpaea bracteata</i>		American Hogpeanut	Hogpeanut, American
Fabaceae	<i>Apios americana</i>		Groundnut	Groundnut
Fabaceae	<i>Crotalaria sagittalis</i>		Arrowhead Rattlebox	Rattlebox, Arrowhead
Fabaceae	<i>Desmodium canadense</i>		Showy Ticktrefoil	Ticktrefoil, Showy
Fabaceae	<i>Desmodium canescens</i>		Hoary Ticktrefoil	Ticktrefoil, Hoary
Fabaceae	<i>Desmodium glabellum</i>		Dillenius' Ticktrefoil	Ticktrefoil, Dillenius'
Fabaceae	<i>Desmodium paniculatum</i>		Panicledleaf Ticktrefoil	Ticktrefoil, Panicledleaf
Fabaceae	<i>Kummerowia stipulacea</i> *		Korean Clover	Clover, Korean
Fabaceae	<i>Kummerowia striata</i> *		Japanese Clover	Clover, Japanese
Fabaceae	<i>Lathyrus latifolius</i> L.*		Perennial Pea	Pea, Perennial
Fabaceae	<i>Lespedeza capitata</i>		Roundhead Lespedeza	Lespedeza, Roundhead
Fabaceae	<i>Lespedeza cuneata</i> *		Sericea Lespedeza	Lespedeza, Sericea
Fabaceae	<i>Lespedeza frutescens</i> (<i>Lespedeza intermedia</i>)		Shrubby Lespedeza	Lespedeza, Shrubby
Fabaceae	<i>Lespedeza violacea</i>		Violet Lespedeza	Lespedeza, Violet
Fabaceae	<i>Lotus corniculatus</i> *		Bird's-foot Trefoil	Trefoil, Bird's-foot
Fabaceae	<i>Medicago lupulina</i> *		Black Medick	Medick, Black
Fabaceae	<i>Medicago sativa</i> *		Alfalfa	Alfalfa
Fabaceae	<i>Melilotus indica</i> (<i>Melilotus alba</i>) *		White Sweet-clover	Sweet-clover, White
Fabaceae	<i>Melilotus officinalis</i> *		Yellow Sweet-clover	Sweet-clover, Yellow
Fabaceae	<i>Robinia pseudoacacia</i>		Black Locust	Locust, Black
Fabaceae	<i>Securigera varia</i> (<i>Coronilla varia</i>) *		Crown Vetch	Vetch, Crown
Fabaceae	<i>Strophostyles helvola</i>		Trailing Wild Bean	Bean, Trailing Wild
Fabaceae	<i>Trifolium arvense</i> *		Rabbitfoot Clover	Clover, Rabbitfoot
Fabaceae	<i>Trifolium aureum</i> .*		Golden Clover	Clover, Golden
Fabaceae	<i>Trifolium campestre</i> *		Field Clover	Clover, Field
Fabaceae	<i>Trifolium dubium</i> .*		Suckling Clover	Clover, Suckling
Fabaceae	<i>Trifolium hybridum</i> *		Alsike Clover	Clover, Alsike
Fabaceae	<i>Trifolium pratense</i> *		Red Clover	Clover, Red
Fabaceae	<i>Trifolium repens</i> *		White Clover	Clover, White
Fabaceae	<i>Vicia sativa</i> *		Garden Vetch	Vetch, Garden
Fabaceae	<i>Vicia tetrasperma</i> *		Lentil Vetch	Vetch, Lentil
Fabaceae	<i>Wisteria floribunda</i> *		Japanese Wisteria	Wisteria, Japanese
Fagaceae	<i>Castanea dentata</i>		American Chestnut	Chestnut, American
Fagaceae	<i>Fagus grandifolia</i>		American Beech	Beech, American
Fagaceae	<i>Quercus alba</i>		White Oak	Oak, White
Fagaceae	<i>Quercus bicolor</i>		Swamp White Oak	Oak, Swamp White

Fagaceae	<i>Quercus marilandica</i>		Blackjack Oak	Oak, Blackjack
Fagaceae	<i>Quercus michauxii</i>	S3	Basket Oak	Oak, Basket
Fagaceae	<i>Quercus muhlenbergii</i>		Chinkapin Oak	Oak, Chinkapin
Fagaceae	<i>Quercus palustris</i>		Pin Oak	Oak, Pin
Fagaceae	<i>Quercus phellos</i>		Willow Oak	Oak, Willow
Fagaceae	<i>Quercus prinus (Quercus montana)</i>		Chestnut Oak	Oak, Chestnut
Fagaceae	<i>Quercus rubra</i>		Northern Red Oak	Oak, Northern Red
Fagaceae	<i>Quercus stellata</i>		Post Oak	Oak, Post
Fagaceae	<i>Quercus velutina</i>		Black Oak	Oak, Black
Fumariaceae	<i>Corydalis flavula</i>		Yellow Fumewort	Fumewort, Yellow
Fumariaceae	<i>Dicentra cucullaria</i>		Dutchman's Breeches	Breeches, Dutchman's
Gentianaceae	<i>Bartonia paniculata</i>		Twining Screwstem	Screwstem, Twining
Gentianaceae	<i>Bartonia virginica</i>		Yellow Screwstem	Screwstem, Yellow
Geraniaceae	<i>Erodium cicutarium</i>		Redstem Storksbill	Storksbill, Redstem
Geraniaceae	<i>Geranium carolinianum</i>		Carolina Geranium	Geranium, Carolina
Geraniaceae	<i>Geranium maculatum</i>		Spotted Geranium	Geranium, Spotted
Haloragaceae	<i>Myriophyllum heterophyllum</i>	S2	Twoleaf Watermilfoil	Watermilfoil, Twoleaf
Haloragaceae	<i>Myriophyllum spicatum *</i>		Eurasian Watermilfoil	Watermilfoil, Eurasian
Haloragaceae	<i>Proserpinaca palustris</i>		Marsh Mermaidweed	Mermaidweed, Marsh
Hamamelidaceae	<i>Liquidambar styraciflua</i>		Sweetgum	Sweetgum
Hamamelidaceae	<i>Hamamelis virginiana</i>		American Witchhazel	Witchhazel, American
Hippocastanaceae	<i>Aesculus flava</i>		Yellow Buckeye	Buckeye, Yellow
Hippocastanaceae	<i>Aesculus hippocastanum</i>		Horse Chestnut	Chestnut, Horse
Hydrangeaceae	<i>Hydrangea arborescens</i>		Wild Hydrangea	Hydrangea, Wild
Hydrangeaceae	<i>Philadelphus coronarius *</i>		Mock Orange	Orange, Mock
Hydrophyllaceae	<i>Hydrophyllum virginianum</i>		Eastern Waterleaf	Waterleaf, Eastern
Juglandaceae	<i>Carya alba (Carya tomentosa)</i>		Mockernut Hickory	Hickory, Mockernut
Juglandaceae	<i>Carya cordiformis</i>		Bitternut Hickory	Hickory, Bitternut
Juglandaceae	<i>Carya glabra</i>		Pignut Hickory	Hickory, Pignut
Juglandaceae	<i>Carya ovata</i>		Shagbark Hickory	Hickory, Shagbark
Juglandaceae	<i>Juglans nigra</i>		Black Walnut	Walnut, Black
Lamiaceae	<i>Agastache nepetoides</i>	S2	Yellow Giant Hyssop	Hyssop, Yellow Giant
Lamiaceae	<i>Agastache scrophulariifolia</i>	S2	Purple Giant Hyssop	Hyssop, Purple Giant
Lamiaceae	<i>Collinsonia canadensis</i>		Richweed	Richweed
Lamiaceae	<i>Dracocephalum parviflorum</i>		Western False Dragonhead	Dragonhead, Western False
Lamiaceae	<i>Elsholtzia ciliata *</i>		Elsholtzia	Elsholtzia
Lamiaceae	<i>Glechoma hederacea *</i>		Ground Ivy	Ivy, Ground
Lamiaceae	<i>Hedeoma pulegioides</i>		American False Pennyroyal	Pennyroyal, American False
Lamiaceae	<i>Lamium amplexicaule *</i>		Henbit Deadnettle	Deadnettle, Henbit
Lamiaceae	<i>Lamium purpureum *</i>		Purple Deadnettle	Deadnettle, Purple
Lamiaceae	<i>Leonurus cardiaca *</i>		Common Motherwort	Motherwort, Common
Lamiaceae	<i>Lycopus americanus</i>		Water Horehound	Horehound, Water
Lamiaceae	<i>Lycopus europaeus *</i>		Gypsywort	Gypsywort
Lamiaceae	<i>Lycopus rubellus</i>	S2	Taperleaf Water Horehound	Horehound, Taperleaf Water
Lamiaceae	<i>Lycopus virginicus</i>		Virginian Water Horehound	Horehound, Virginia Water
Lamiaceae	<i>Mentha arvensis</i>		Wild Mint	Mint, Wild
Lamiaceae	<i>Monarda fistulosa</i>		Wild Bergamot	Bergamot, Wild
Lamiaceae	<i>Nepeta cataria *</i>		Catnip	Catnip
Lamiaceae	<i>Perilla frutescens *</i>		Beefsteakplant	Beefsteakplant
Lamiaceae	<i>Prunella vulgaris *</i>		Common Selfheal	Selfheal, Common

Lamiaceae	<i>Pycnanthemum tenuifolium</i>		Narrowleaf Mountainmint	Mountainmint, Narrowleaf
Lamiaceae	<i>Pycnanthemum verticillatum</i>		Whorled Mountainmint	Mountainmint, Whorled
Lamiaceae	<i>Pycnanthemum virginianum</i>		Virginia Mountainmint	Mountainmint, Virginia
Lamiaceae	<i>Salvia lyrata</i>		Lyreleaf Sage	Sage, Lyreleaf
Lamiaceae	<i>Scutellaria galericulata (Scutellaria integrifolia)</i>		Hyssop Skullcap	Skullcap, Hyssop
Lamiaceae	<i>Scutellaria lateriflora</i>		Blue Skullcap	Skullcap, Blue
Lamiaceae	<i>Stachys paustris</i>		Marsh Hedge-nettle	Hedge-nettle, Marsh
Lamiaceae	<i>Stachys tenuifolia var hispida</i>		Smooth Hedge-nettle	Hedge-nettle, Smooth
Lamiaceae	<i>Teucrium canadense</i>		Canada Germander	Germander, Canada
Lamiaceae	<i>Trichostema dichotomum</i>		Forked Blue Curls	Blue Curls, Forked
Lauraceae	<i>Lindera benzoin</i>		Spicebush	Spicebush
Lauraceae	<i>Sassafras albidum</i>		Sassafras	Sassafras
Lentibulariaceae	<i>Utricularia gibba</i>	S3	Humped Balderwort	Balderwort, Humped
Lentibulariaceae	<i>Utricularia intermedia</i>	S3	Flatleaf Balderwort	Balderwort, Flatleaf
Lentibulariaceae	<i>Utricularia macrorhiza</i> Leconte (<i>U. vulgaris</i>)		Common Balderwort	Balderwort, Common
Lentibulariaceae	<i>Utricularia radiata</i>		Little Floating Bladderwort	Balderwort, Little Floating
Limnanthaceae	<i>Floerkea proserpinacoides</i>		False Mermaidweed	Mermaidweed, False
Lythraceae	<i>Decodon verticillatus</i> (Swamp Loosestrife	Loosestrife, Swamp
Lythraceae	<i>Lythrum alatum</i>		Winged Loosestrife	Loosestrife, Winged
Lythraceae	<i>Lythrum salicaria</i> *		Purple Loosestrife	Loosestrife, Purple
Magnoliaceae	<i>Liriodendron tulipifera</i>		Tuliptree	Tuliptree
Magnoliaceae	<i>Magnolia tripetala</i>		Umbrella-tree	Umbrella-tree
Magnoliaceae	<i>Magnolia virginiana</i>		Sweetbay	Sweetbay
Malvaceae	<i>Abutilon theophrastii</i> .*		Velvetleaf	Velvetleaf
Malvaceae	<i>Hibiscus moscheutos</i>		Crimson-eyed Rosemallow	Rosemallow, Crimson-eyed
Malvaceae	<i>Hibiscus trionum</i> *		Flower of an Hour	Flower of an Hour
Malvaceae	<i>Malva neglecta</i> .*		Common Mallow	Mallow, Common
Melastomataceae	<i>Rhexia virginica</i>		Virginia Meadowbeauty	Meadowbeauty, Virginia
Menispermaceae	<i>Menispermum canadense</i>		Common Moonseed	Moonseed, Common
Menyanthaceae	<i>Nymphoides cordata</i> [+]	G5, S3	Little Floatingheart	Floatingheart, Little
Fabaceae (Mimosaceae)	<i>Albizia julibrissin</i> *		Mimosa	Mimosa
Molluginaceae	<i>Mollugo verticillata</i> *		Green Carpetweed	Carpetweed, Green
Monotropaceae	<i>Monotropa uniflora</i>		Indian Pipe	Indian Pipe
Moraceae	<i>Broussonetia papyrifera</i> *		Paper Mulberry	Mulberry, Paper
Moraceae	<i>Malcura pomifera</i>		Osage Orange	Osage Orange
Moraceae	<i>Morus alba</i> *		White Mulberry	Mulberry, White
Moraceae	<i>Morus rubra</i>		Red Mulberry	Mulberry, Red
Myricaceae	<i>Comptonia peregrina</i>		Sweet Fern	Sweet Fern
Nelumbonaceae	<i>Nelumbo lutea</i> (herbarium record only)	S1, E	American Lotus	Lotus, American
Nyctaginaceae	<i>Mirabilis nyctaginea</i>		Heartleaf Four O'Clock	Four O'Clock, Heartleaf
Nymphaeaceae	<i>Nuphar lutea</i>		Yellow Pond Lily	Pond Lily, Yellow
Nymphaeaceae	<i>Nymphaea odorata</i>		American White Waterlily	Waterlily, American White
Nyssaceae	<i>Nyssa sylvatica</i>		Blackgum	Blackgum

Oleaceae	<i>Fraxinus americana</i>	White Ash	Ash, White
Oleaceae	<i>Fraxinus pennsylvanica</i>	Green Ash	Ash, Green
Oleaceae	<i>Ligustrum obtusifolium</i> *	Border Privet	Privet, Border
Oleaceae	<i>Ligustrum vulgare</i> *	European Privet	Privet, European
Onagraceae	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Broadleaf Enchanter's Nightshade	Enchanter's Nightshade, Broadleaf
Onagraceae	<i>Epilobium coloratum</i>	Purpleleaf Willowherb	Willowherb, Purpleleaf
Onagraceae	<i>Ludwigia alternifolia</i>	Seedbox	Seedbox
Onagraceae	<i>Ludwigia palustris</i>	Marsh Seedbox	Seedbox, Marsh
Onagraceae	<i>Ludwigia peploides</i>	Floating Primrose-willow	Primrose-willow, Floating
Onagraceae	<i>Oenothera biennis</i>	Common Evening Primrose	Evening Primrose, Common
Onagraceae	<i>Oenothera perennis</i>	Little Evening Primrose	Evening Primrose, Little
Orobanchaceae	<i>Epifagus virginiana</i>	Beechdrops	Beechdrops
Orobanchaceae	<i>Orobanche uniflora</i>	Oneflowered Broomrape	Broomrape, Oneflowered
Oxalidaceae	<i>Oxalis stricta</i>	Common Yellow Woodsorrel	Woodsorrel, Common Yellow
Oxalidaceae	<i>Oxalis violacea</i>	Violet Woodsorrel	Woodsorrel, Violet
Papaveraceae	<i>Chelidonium majus</i> *	Celandine	Celandine
Phytolaccaceae	<i>Phytolacca americana</i>	American Pokeweed	Pokeweed, American
Plantaginaceae	<i>Plantago aristata</i>	Largebracted Plantain	Plantain, Largebracted
Plantaginaceae	<i>Plantago lanceolata</i> *	Narrowleaf Plantain	Plantain, Narrowleaf
Plantaginaceae	<i>Plantago major</i> *	Common Plantain	Plantain, Common
Plantaginaceae	<i>Plantago rugelii</i>	Blackseed Plantain	Plantain, Blackseed
Platanaceae	<i>Platanus occidentalis</i>	American Sycamore	Sycamore, American
Polemoniaceae	<i>Phlox paniculata</i>	Fall Phlox	Phlox, Fall
Polygonaceae	<i>Polygonella articulata</i>	Coastal Jointweed	Jointweed, Coastal
Polygonaceae	<i>Polygonum amphibium</i>	Water Smartweed	Smartweed, Water
Polygonaceae	<i>Polygonum arifolium</i>	Halberdleaf Tearthumb	Tearthumb, Halberdleaf
Polygonaceae	<i>Polygonum aviculare</i> *	Prostrate Knotweed	Knotweed, Prostrate
Polygonaceae	<i>Polygonum caespitosum</i> *	Oriental Lady's Thumb	Lady's Thumb, Oriental
Polygonaceae	<i>Polygonum careyi</i>	Carey's Smartweed	Smartweed, Carey's
Polygonaceae	<i>Polygonum cilinode</i>	Fringed Black Bindweed	Bindweed, Fringed Black
Polygonaceae	<i>Polygonum cuspidatum</i> *	Japanese Knotweed	Knotweed, Japanese
Polygonaceae	<i>Polygonum hydropiper</i> *	Marshpepper Knotweed	Knotweed, Marshpepper
Polygonaceae	<i>Polygonum hydropiperoides</i>	Swamp Smartweed	Smartweed, Swamp
Polygonaceae	<i>Polygonum lapathifolium</i>	Curlytop Smartweed	Smartweed, Curlytop
Polygonaceae	<i>Polygonum orientale</i> *	Prince's Feather	Prince's Feather
Polygonaceae	<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	Smartweed, Pennsylvania
Polygonaceae	<i>Polygonum perfoliatum</i> *	Asiatic Tearthumb	Tearthumb, Asiatic (Mile-a-minute Vine)
Polygonaceae	<i>Polygonum persicaria</i> *	Spotted Ladythumb	Ladythumb, Spotted
Polygonaceae	<i>Polygonum punctatum</i>	Dotted Smartweed	Smartweed, Dotted
Polygonaceae	<i>Polygonum sagittatum</i>	Arrowleaf Tearthumb	Tearthumb, Arrowleaf
Polygonaceae	<i>Polygonum scandens</i>	Climbing False Buckwheat	False Buckwheat, Climbing
Polygonaceae	<i>Polygonum setaceum</i>	S2 Bog Smartweed	Smartweed, Bog
Polygonaceae	<i>Polygonum virginianum</i>	Jumpseed	Jumpseed
Polygonaceae	<i>Rumex acetosella</i> *	Common Sheep Sorrel	Sheep Sorrel, Common
Polygonaceae	<i>Rumex altissimus</i>	Pale Dock	Dock, Pale
Polygonaceae	<i>Rumex crispus</i> *	Curly Dock	Dock, Curly
Polygonaceae	<i>Rumex obtusifolius</i> *	Bitter Dock	Dock, Bitter
Polygonaceae	<i>Rumex triangulivalvis</i>	White Dock	Dock, White
Portulacaceae	<i>Claytonia virginica</i>	Virginia Springbeauty	Springbeauty, Virginia

Portulacaceae	<i>Portulaca oleracea</i>	Purslane	Purslane
Primulaceae	<i>Anagallis arvensis</i> *	Scarlet Pimpernel	Pimpernel, Scarlet
Primulaceae	<i>Lysimachia ciliata</i> .	Fringed Loosestrife	Loosestrife, Fringed
Primulaceae	<i>Lysimachia nummularia</i> *	Creeping Jenny	Creeping Jenny
Primulaceae	<i>Lysimachia quadrifolia</i>	Whorled Yellow Loosestrife	Loosestrife, Whorled Yellow
Primulaceae	<i>Lysimachia terrestris</i>	Earth Loosestrife	Loosestrife, Earth
Primulaceae	<i>Samolus valerandi</i> [+]	Seaside Brookweed	Brookweed, Seaside
Pyrolaceae	<i>Chimaphila maculata</i>	Striped Prince's Pine	Prince's Pine, Striped
Ranunculaceae	<i>Anemone quinquefolia</i>	Wood Anemone	Anemone, Wood
Ranunculaceae	<i>Caltha palustris</i>	Yellow Marsh Marigold	Marsh Marigold, Yellow
Ranunculaceae	<i>Clematis terniflora</i> *	Sweet Autumn Virginibower	Virginibower, Sweet Autumn
Ranunculaceae	<i>Ranunculus abortivus</i>	Littleleaf Buttercup	Buttercup, Littleleaf
Ranunculaceae	<i>Ranunculus bulbosus</i> *	Bulbous Buttercup	Buttercup, Bulbous
Ranunculaceae	<i>Ranunculus ficaria</i> *	Fig Buttercup	Buttercup, Fig
Ranunculaceae	<i>Ranunculus hispidus</i>	Bristly Buttercup	Buttercup, Bristly
Ranunculaceae	<i>Ranunculus longirostris</i> (herb. only)	S2 Longbeak Buttercup	Buttercup, Longbeak
Ranunculaceae	<i>Ranunculus sceleratus</i> *	Cursed Buttercup	Buttercup, Cursed
Ranunculaceae	<i>Thalictrum pubescens</i>	Tall Meadow-rue	Meadow-rue, Tall
Rosaceae	<i>Agrimonia parviflora</i>	Harvestlice	Harvestlice
Rosaceae	<i>Amelanchier arborea</i>	Common Serviceberry	Serviceberry, Common
Rosaceae	<i>Amelanchier canadensis</i> [+]	Canadian Serviceberry	Serviceberry, Canadian
Rosaceae	<i>Crataegus crus-galli sensu lato</i>	Cockspur Hawthorn	Hawthorn, cockspur
Rosaceae	<i>Crataegus intricata sensu lato</i> .	Copenhagen Hawthorn	Hawthorn, Copenhagen
Rosaceae	<i>Duchesnea indica</i> *	Indian Strawberry	Strawberry, Indian
Rosaceae	<i>Fragaria virginiana</i>	Virginia Strawberry	Strawberry, Virginia
Rosaceae	<i>Geum canadense</i>	White Avens	Avens, White
Rosaceae	<i>Geum laciniatum</i>	Rough Avens	Avens, Rough
Rosaceae	<i>Malus pumila</i> *	Apple	Apple
Rosaceae	<i>Photinia melanocarpa</i> (<i>Aronia melanocarpa</i>)	Black Chokeberry	Chokeberry, Black
Rosaceae	<i>Physocarpus opulifolius</i>	Common Ninebark	Ninebark, Common
Rosaceae	<i>Potentilla norvegica</i>	Norwegian Cinquefoil	Cinquefoil, Norwegian
Rosaceae	<i>Potentilla recta</i> *	Sulphur Cinquefoil	Cinquefoil, Sulphur
Rosaceae	<i>Potentilla simplex</i>	Common Cinquefoil	Cinquefoil, common
Rosaceae	<i>Prunus serotina</i>	Black Cherry	Cherry, Black
Rosaceae	<i>Prunus serulata</i> (?)		
Rosaceae	<i>Pyrus communis</i> *	Common Pear	Pear, Common
Rosaceae	<i>Rosa multiflora</i> *	Multiflora Rose	Rose, Multiflora
Rosaceae	<i>Rosa palustris</i>	Swamp Rose	Rose, Swamp
Rosaceae	<i>Rosa spinosissima</i> *	Scotch Rose	Rose, Scotch
Rosaceae	<i>Rosa virginiana</i> [+]	Virginia Rose	Rose, Virginia
Rosaceae	<i>Rubus allegheniensis</i> (= <i>Rubus pensilvanicus</i>)	Allegheny Blackberry	Blackberry, Allegheny
Rosaceae	<i>Rubus flagellaris sensu lato</i>	Northern Dewberry	Dewberry, Northern
Rosaceae	<i>Rubus hispidus sensu lato</i> .	Bristly Dewberry	Dewberry, Bristly
Rosaceae	<i>Rubus laciniatus</i> *	Cutleaf Blackberry	Blackberry, Cutleaf
Rosaceae	<i>Rubus occidentalis</i>	Black Raspberry	Raspberry, Black
Rosaceae	<i>Rubus odoratus</i>	Purpleflowering Raspberry	Raspberry, Purpleflowering
Rosaceae	<i>Rubus phoenicolasius</i> *	Wine Raspberry	Raspberry, Wine
Rosaceae	<i>Spiraea alba</i> var. <i>latifolia</i> (<i>Spiraea latifolia</i>)	White Meadowsweet	Meadowsweet, White
Rosaceae	<i>Spiraea tomentosa</i>	Steeplebush	Steeplebush
Rubiaceae	<i>Cephalanthus occidentalis</i>	Common Buttonbush	Buttonbush, Common
Rubiaceae	<i>Cruciata pedemontana</i>	Piedmont Bedstraw	Bedstraw, Piedmont
Rubiaceae	<i>Diodia teres</i>	Buttonweed	Buttonweed
Rubiaceae	<i>Galium aparine</i>	Stickywilly	Stickywilly
Rubiaceae	<i>Galium obtusum</i>	Bluntleaf Bedstraw	Bedstraw, Bluntleaf
Rubiaceae	<i>Galium palustre</i>	S2 Common Marsh Bedstraw	Bedstraw, Common Marsh
Rubiaceae	<i>Galium tinctorium</i>	Stiff Marsh Bedstraw	Bedstraw, Stiff Marsh

Rubiaceae	<i>Galium triflorum</i>		Threepetal Bedstraw	Bedstraw, Threepetal
Rubiaceae	<i>Houstonia caerulea (Hedyotis caerulea)</i>		Azure Bluet	Bluet, Azure
Rubiaceae	<i>Mitchella repens</i>		Partridge Berry	Partridge Berry
Rutaceae	<i>Phellodendron japonicum *</i>		Japanese Corktree	Corktree, Japanese
Rutaceae	<i>Ptelea trifoliata</i>	S1, E	Common Hoptree	Hoptree, Common
Salicaceae	<i>Populus balsamifera .</i>		Balsam Poplar	Poplar, Balsam
Salicaceae	<i>Populus deltoides</i>		Eastern Cottonwood	Cottonwood, Eastern
Salicaceae	<i>Populus grandidentata</i>		Bigtooth Aspen	Aspen, Bigtooth
Salicaceae	<i>Populus heterophylla</i>	S2	Swamp cottonwood	Cottonwood, Swamp
Salicaceae	<i>Populus nigra *</i>		Lombardy Poplar	Poplar, Lombardy
Salicaceae	<i>Populus tremuloides</i>		Quaking Aspen	Aspen, Quaking
Salicaceae	<i>Salix bebbiana</i>		Bebb Willow	Willow, Bebb
Salicaceae	<i>Salix discolor</i>		Pussy Willow	Willow, Pussy
Salicaceae	<i>Salix eriocephala</i>		Missouri River Willow	Willow, Missouri River
Salicaceae	<i>Salix exigua</i>		Sandbar Willow	Willow, Sandbar
Salicaceae	<i>Salix fragilis *</i>		Crack Willow	Willow, Crack
Salicaceae	<i>Salix humilis (S. tristis?)</i>		Prairie Willow	Willow, Prairie
Salicaceae	<i>Salix hybrid</i>		Hybrid Willow	Willow, Hybrid
Salicaceae	<i>Salix nigra</i>		Black Willow	Willow, Black
Salicaceae	<i>Salix x sepulcralis (Salix babylonica)*</i>		Weeping Willow	Willow, Weeping
Salicaceae	<i>Salix sericea</i>		Silky Willow	Willow, Silky
Sapindaceae	<i>Koelreuteria paniculata *</i>		Goldenrain Tree	Goldenrain Tree
Saururaceae	<i>Saururus cernuus</i>		Lizard's Tail	Lizard's Tail
Saxifragaceae	<i>Heuchera americana</i>		American Alumroot	Alumroot, American
Saxifragaceae	<i>Penthorum sedoides</i>		Ditch Stonecrop	Stonecrop, Ditch
Scrophulariaceae	<i>Agalinus purpurea</i>		Purple False Foxglove	Foxglove, Purple False
Scrophulariaceae	<i>Chelone glabra</i>		White Turtlehead	Turtlehead, White
Scrophulariaceae	<i>Cymbalaria muralis * [+]</i>		Kenilworth Ivy	Ivy, Kenilworth
Scrophulariaceae	<i>Gratiola neglecta</i>		Clammy Hedgehyssop	Hedgehyssop, Clammy
Scrophulariaceae	<i>Linaria vulgaris *</i>		Butter-and-eggs	Butter-and-eggs
Scrophulariaceae	<i>Lindernia dubia</i>		Yellowseed False Pimpernel	False Pimpernel, Yellowseed
Scrophulariaceae	<i>Mazus pumilus *</i>		Japanese Mazus	Mazus, Japanese
Scrophulariaceae	<i>Mimulus alatus</i>	S3	Sharpwing Monkeyflower	Monkeyflower, Sharpwing
Scrophulariaceae	<i>Mimulus ringens</i>		Allegheny Monkeyflower	Monkeyflower, Allegheny
Scrophulariaceae	<i>Nuttallanthus canadensis (Linaria canadensis)</i>		Canada Toadflax	Toadflax, Canada
Scrophulariaceae	<i>Scrophularia lanceolata [+]</i>		Lanceleaf Figwort	Figwort, Lanceleaf
Scrophulariaceae	<i>Scrophularia marilandica</i>		Carpenter's Square	Carpenter's Square
Scrophulariaceae	<i>Verbascum blattaria*</i>		Moth Mullein	Mullein, Moth
Scrophulariaceae	<i>Verbascum lychnitis *</i>		White Mullein	Mullein, White
Scrophulariaceae	<i>Verbascum thapsus *</i>		Common Mullein	Mullein, Common
Scrophulariaceae	<i>Veronica americana</i>		American Speedwell	Speedwell, American
Scrophulariaceae	<i>Veronica anagallis-aquatica</i>		Water Speedwell	Speedwell, Water
Scrophulariaceae	<i>Veronica arvensis *</i>		Corn Speedwell	Speedwell, Corn
Scrophulariaceae	<i>Veronica hederifolia *</i>		Ivyleaf Speedwell	Speedwell, Ivyleaf
Scrophulariaceae	<i>Veronica longifolia *</i>		Longleaf Speedwell	Speedwell, Longleaf
Scrophulariaceae	<i>Veronica peregrina</i>		Neckweed	Neckweed
Scrophulariaceae	<i>Veronica persica</i>		Birdeye Speedwell	Speedwell, Birdeye
Simaroubaceae	<i>Ailanthus altissima *</i>		Tree of Heaven	Tree of Heaven
Solanaceae	<i>Datura stramonium</i>		Jimsonweed	Jimsonweed
Solanaceae	<i>Lycium barbarum *</i>		Matrimony Vine	Matrimony Vine
Solanaceae	<i>Physalis heterophylla</i>		Clammy Groundcherry	Groundcherry, Clammy
Solanaceae	<i>Physalis longifolia (Physalis subglabrata)</i>		Longleaf Goundcherry	Groundcherry, Longleaf

Solanaceae	<i>Solanum carolinense</i>	Carolina Horsenettle	Horsenettle, Carolina	
Solanaceae	<i>Solanum dulcamara</i> *	Climbing Nightshade	Nightshade, Climbing	
Solanaceae	<i>Solanum nigrum</i>	Black Nightshade	Nightshade, Black	
Staphyleaceae	<i>Staphylea trifolia</i>	American Bladdernut	Bladdernut, American	
Tiliaceae	<i>Tilia americana</i>	American Basswood	Basswood, American	
Ulmaceae	<i>Celtis occidentalis</i>	Common Hackberry	Hackberry, Common	
Ulmaceae	<i>Ulmus americana</i>	American Elm	Elm, American	
Ulmaceae	<i>Ulmus glabra</i> *	Wych Elm	Elm, Wych	
Ulmaceae	<i>Ulmus rubra</i>	Slippery Elm	Elm, Slippery	
Urticaceae	<i>Boehmeria cylindrica</i>	Smallspike False Nettle	Nettle, False Smallspike	
Urticaceae	<i>Laportea canadensis</i>	Canadian Woodnettle	Woodnettle, Canadian	
Urticaceae	<i>Pilea pumila</i>	Canadian Clearweed	Clearweed, Canadian	
Urticaceae	<i>Urtica dioica</i> ssp. <i>gracilis</i>	Stinging Nettle	Nettle, Stinging	
Valerianaceae	<i>Valerianella locusta</i> *	Lewiston Cornsalad	Cornsalad, Lewiston	
Verbenaceae	<i>Verbena hastata</i>	Swamp Vervain	Vervain, Swamp	
Verbenaceae	<i>Verbena urticifolia</i>	White Vervain	Vervain, White	
Violaceae	<i>Viola arvensis</i> *	European Field Pansey	Pansy, European Field	
Violaceae	<i>Viola bicolor</i> (<i>Viola rafinesquii</i>)	Field Pansey	Pansy, Field	
Violaceae	<i>Viola lanceolata</i>	Bog White Violet	Violet, Bog White	
Violaceae	<i>Viola primulifolia</i> (mis. <i>macloskeyi</i> ssp. <i>pallens</i>)	Primrose-leaved Violet	Violet, Primrose-leaved	
Violaceae	<i>Viola pubescens</i>	Downy Yellow Violet	Violet, Downy Yellow	
Violaceae	<i>Viola sororia</i>	Common Blue Violet	Violet, Common Blue	
Violaceae	<i>Viola striata</i>	Striped Cream Violet	Violet, Striped Cream	
Vitaceae	<i>Ampelopsis brevipedunculata</i> *	Amur Peppervine	Peppervine, Amur	
Vitaceae	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Creeper, Virginia	
Vitaceae	<i>Vitis aestivalis</i>	Summer Grape	Grape, Summer	
Vitaceae	<i>Vitis labrusca</i>	Fox Grape	Grape, Fox	
Vitaceae	<i>Vitis riparia</i>	Riverbank Grape	Grape, Riverbank	
Vitaceae	<i>Vitis vulpina</i>	Frost Grape	Grape, Frost	
LILIOPSIDA (Monocotyledons)	Acoraceae	<i>Acorus calamus</i>	Sweetflag	Sweetflag
	Agavaceae	<i>Yucca filamentosa</i> (<i>Yucca flaccida</i>)	Adam's Needle	Adam's Needle
	Alismataceae	<i>Alisma subcordatum</i> (<i>Alisma plantago-aquatica</i> var. <i>parviflorum</i>)	Small Water Plantain	Water Plantain, Small
	Alismataceae	<i>Sagittaria graminea</i>	Grassleaf Arrowhead	Arrowhead, Grassleaf
	Alismataceae	<i>Sagittaria latifolia</i> Willd.	Broadleaf Arrowhead	Arrowhead, Broadleaf
	Alismataceae	<i>Sagittaria rigida</i> Pursh.	Sessilefruit Arrowhead	Arrowhead, Sessilefruit
	Alismataceae	<i>Sagittaria subulata</i>	S2 Awl-leaf Arrowhead	Arrowhead Awl-leaf
	Araceae	<i>Arisaema dracontium</i>	Green Dragon	Green Dragon
	Araceae	<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit	Jack-in-the-Pulpit
	Araceae	<i>Orontium aquaticum</i>	Golden Club	Golden Club
	Araceae	<i>Peltandra virginica</i>	Green Arrow Arum	Arrow Arum, Green
	Araceae	<i>Symplocarpus foetidus</i>	Skunk Cabbage	Skunk Cabbage
	Commelinaceae	<i>Commelina communis</i> *	Asiatic Dayflower	Dayflower, Asiatic
	Commelinaceae	<i>Tradescantia ohioensis</i>	S2 Ohio Spiderwort	Spiderwort, Ohio
	Commelinaceae	<i>Tradescantia virginiana</i>	Virginia Spiderwort	Spiderwort, Virginia

Cyperaceae	<i>Bulbosyilis capillaris</i>	Dense Hairsedge	Hairsedge, Dense
Cyperaceae	<i>Carex abscondita</i>	Thicket Sedge	Sedge, Thicket
Cyperaceae	<i>Carex amphibola</i>	Eastern Narrowleaf Sedge	Sedge, Eastern Narrowleaf
Cyperaceae	<i>Carex annectans</i>	Yellowfruit Sedge	Sedge, Yellowfruit
Cyperaceae	<i>Carex argyrantha</i>	Hay Sedge	Sedge, Hay
Cyperaceae	<i>Carex blanda</i>	Eastern Woodland Sedge	Sedge, Eastern Woodland
Cyperaceae	<i>Carex brevior</i>	Shortbeak Sedge	Sedge, Shortbeak
Cyperaceae	<i>Carex canescens</i>	Silvery Sedge	Sedge, Silvery
Cyperaceae	<i>Carex caroliniana</i>	Carolina Sedge	Sedge, Carolina
Cyperaceae	<i>Carex cephalophora</i>	Oval-leaf Sedge	Sedge, Oval-leaf
Cyperaceae	<i>Carex comosa</i>	Longhair Sedge	Sedge, Longhair
Cyperaceae	<i>Carex crinita</i>	Fringed Sedge	Sedge, Fringed
Cyperaceae	<i>Carex cristatella</i>	Crested Sedge	Sedge, Crested
Cyperaceae	<i>Carex davisii</i>	Davis' Sedge	Sedge, Davis'
Cyperaceae	<i>Carex debilis</i>	White Edge Sedge	Sedge, White Edge
Cyperaceae	<i>Carex festucacea</i>	Fescue Sedge	Sedge Fescue
Cyperaceae	<i>Carex frankii</i>	S3 Frank's Sedge	Sedge, Frank's
Cyperaceae	<i>Carex granularis</i>	Limestone Meadow Sedge	Sedge, Limestone Meadow
Cyperaceae	<i>Carex grayi</i>	Gray's Sedge	Sedge, Gray's
Cyperaceae	<i>Carex gynandra</i>	Nodding Sedge	Sedge, Nodding
Cyperaceae	<i>Carex hystericina</i>	Bottlebrush Sedge	Sedge, Bottlebrush
Cyperaceae	<i>Carex interior</i>	Inland Sedge	Sedge, Inland
Cyperaceae	<i>Carex intumescens</i>	Greater Bladder Sedge	Sedge, Greater Bladder
Cyperaceae	<i>Carex lacustris</i>	Hairy Sedge	Sedge, Hairy
Cyperaceae	<i>Carex laevivaginata</i>	Smoothheath Sedge	Sedge, Smoothheath
Cyperaceae	<i>Carex laxiculmis</i>	Spreading Sedge	Sedge, Spreading
Cyperaceae	<i>Carex laxiflora</i> (= <i>Carex laxiculmis</i>)	Broad Looseflower Sedge	Sedge, Broad Looseflower
Cyperaceae	<i>Carex lupulina</i>	Hop Sedge	Sedge, Hop
Cyperaceae	<i>Carex lurida</i>	Sallow Sedge	Sedge, Sallow
Cyperaceae	<i>Carex molesta</i>	Troublesome Sedge	Sedge, Troublesome
Cyperaceae	<i>Carex normalis</i>	Greater Straw Sedge	Sedge, Greater Straw
Cyperaceae	<i>Carex pellita</i>	Wooly Sedge	Sedge, Wooly
Cyperaceae	<i>Carex pensylvanica</i>	Pennsylvania Sedge	Sedge, Pennsylvania
Cyperaceae	<i>Carex projecta</i>	Necklace Sedge	Sedge, Necklace
Cyperaceae	<i>Carex radiata</i>	Eastern Star Sedge	Sedge, Eastern Star
Cyperaceae	<i>Carex rosea</i> S	Rosy Sedge	Sedge, Rosy
Cyperaceae	<i>Carex scoparia</i>	Broom Sedge	Sedge, Broom
Cyperaceae	<i>Carex squarrosa</i>	Squarrose Sedge	Sedge, Squarrose
Cyperaceae	<i>Carex sterilis</i>	S2 Dioecious Sedge	Sedge, Dioecious
Cyperaceae	<i>Carex stipata</i>	Awlfruit Sedge	Sedge, Awlfruit
Cyperaceae	<i>Carex straminea</i>	Eastern Straw Sedge	Sedge, Eastern Straw
Cyperaceae	<i>Carex stricta</i>	Upright Sedge	Sedge, Upright
Cyperaceae	<i>Carex swanii</i>	Swan's Sedge	Sedge, Swan's
Cyperaceae	<i>Carex tribuloides</i>	Blunt Broom Sedge	Sedge, Blunt Broom
Cyperaceae	<i>Carex trichocarpa</i>	Hairyfruit Sedge	Sedge, Hairyfruit
Cyperaceae	<i>Carex trisperma</i>	Threeseed Sedge	Sedge, Threeseed
Cyperaceae	<i>Carex vulpinoidea</i>	Fox Sedge	Sedge, Fox
Cyperaceae	<i>Cyperus bipartitus</i>	Slender Flatsedge	Flatsedge, Slender
Cyperaceae	<i>Cyperus dentatus</i>	Toothed Flatsedge	Flatsedge, Toothed
Cyperaceae	<i>Cyperus diandrus</i>	Umbrella Flatsedge	Flatsedge, Umbrella
Cyperaceae	<i>Cyperus echinatus</i>	Globe Flatsedge	Flatsedge, Globe
Cyperaceae	<i>Cyperus erythrorhizos</i>	Redroot Flatsedge	Flatsedge, Redroot
Cyperaceae	<i>Cyperus esculentus</i>	Chufa Flatsedge	Flatsedge, Chufa
Cyperaceae	<i>Cyperus flavescens</i>	Yellow Flatsedge	Flatsedge, Yellow
Cyperaceae	<i>Cyperus lancastrimensis</i>	Many-flowered Flatsedge	Flatsedge, Many-flowered
Cyperaceae	<i>Cyperus lupulinus</i>	Great Plains Flatsedge	Flatsedge, Great Plains
Cyperaceae	<i>Cyperus microiria</i> *	Asian Flatsedge	Flatsedge, Asian
Cyperaceae	<i>Cyperus odoratus</i>	Fragrant Flatsedge	Flatsedge, Fragrant
Cyperaceae	<i>Cyperus retrofractus</i>	SH, E Reflexed Flatsedge	Flatsedge, Reflexed
Cyperaceae	<i>Cyperus squarrosus</i>	Bearded Flatsedge	Flatsedge, Bearded
Cyperaceae	<i>Cyperus strigosus</i>	Strawcolored Flatsedge	Flatsedge, Strawcolored

Cyperaceae	<i>Dulichium arundinaceum</i>		Threeway Sedge	Sedge, Threeway
Cyperaceae	<i>Eleocharis acicularis</i>		Needle Spikerush	Spikerush, Needle
Cyperaceae	<i>Eleocharis engelmannii</i>		Englemann's Spikerush	Spikerush, Englemann's
Cyperaceae	<i>Eleocharis erythropoda</i>		Bald Spikerush	Spikerush, Bald
Cyperaceae	<i>Eleocharis obtusa</i>		Blunt Spikerush	Spikerush, Blunt
Cyperaceae	<i>Eleocharis palustris</i>		Common Spikerush	Spikerush, Common
Cyperaceae	<i>Eleocharis tenuis</i>		Slender Spikerush	Spikerush, Slender
Cyperaceae	<i>Fimbristylis autumnalis</i>		Slender Fimbristylis	Fimbristylis, Slender
Cyperaceae	<i>Kyllinga gracillima</i> *		Pasture Spikerush	Spikerush, Pasture
Cyperaceae	<i>Rhynchospora capitellata</i>		Brownish Beaksedge	Beaksedge, Brownish
Cyperaceae	<i>Schoenoplectus fluviatilis</i>		River Bulrush	Bulrush, River
Cyperaceae	<i>Schoenoplectus pungens (americanus)</i>		Common Threesquare	Threesquare, Common
Cyperaceae	<i>Schoenoplectus purshianus</i>		Weakstem Bulrush	Bulrush, Weakstem
Cyperaceae	<i>Schoenoplectus smithii</i>	S2	Smith's Bulrush	Bulrush, Smith's
Cyperaceae	<i>Schoenoplectus tabernaemontani</i>		Softstem Bulrush	Bulrush, Softstem
Cyperaceae	<i>Scirpus atrocinctus</i>	S1	Blackgirdle Bulrush	Bulrush, Blackgirdle
Cyperaceae	<i>Scirpus atrovirens</i>		Green Bulrush	Bulrush, Green
Cyperaceae	<i>Scirpus cyperinus</i>		Woolgrass	Woolgrass
Cyperaceae	<i>Scirpus expansus</i>		Woodland Bulrush	Bulrush, Woodland
Cyperaceae	<i>Scirpus georgianus</i>		Georgia Bulrush	Bulrush, Georgia
Cyperaceae	<i>Scirpus hattorianus</i>		Mosquito Bulrush	Bulrush, Mosquito
Cyperaceae	<i>Scirpus polyphyllus</i>		Leafy Bulrush	Bulrush, Leafy
Dioscoriaceae	<i>Dioscorea oppositifolia (Dioscorea batatas)*</i>		Chinese Yam	Yam, Chinese
Dioscoriaceae	<i>Dioscorea villosa</i>		Wild Yam	Yam, Wild
Eriocaulaceae	<i>Eriocaulon parkeri</i> (herbarium only).	S2	Estuary Pipewort	Pipewort, Estuary
Hydrocharitaceae	<i>Egeria densa</i> *		Brazilian Waterweed	Waterweed, Brazilian
Hydrocharitaceae	<i>Elodea nuttallii</i>		Western Waterweed	Waterweed, Western
Hydrocharitaceae	<i>Hydrilla verticillata</i> *		Waterthyme	Waterthyme
Hydrocharitaceae	<i>Vallisneria americana</i>		American Eelgrass	Eelgrass, American
Iridaceae	<i>Iris pseudoacorus</i> *		Paleyellow Iris	Iris, Paleyellow
Iridaceae	<i>Iris versicolor</i>		Harlequin Blueflag	Blueflag, Harlequin
Iridaceae	<i>Sisyrinchium angustifolium</i>		Narrowleaf Blue-eyed Grass	Blue-eyed Grass, Narrowleaf
Juncaceae	<i>Juncus acuminatus</i>		Tapertip Rush	Rush, Tapertip
Juncaceae	<i>Juncus brevicaudatus</i>	S2	Narrowpanicle Rush	Rush, Narrowpanicle
Juncaceae	<i>Juncus bufonius</i>		Toad Rush	Rush, Toad
Juncaceae	<i>Juncus dichotomus</i>		Forked Rush	Rush, Forked
Juncaceae	<i>Juncus effusus</i>		Common Rush	Rush, Common
Juncaceae	<i>Juncus secundus</i>		Lopsided Rush	Rush, Lopsided
Juncaceae	<i>Juncus tenuis</i>		Poverty Rush	Rush, Poverty
Juncaceae	<i>Juncus torreyi</i>	S1	Torrey's Rush	Rush, Torrey's
Juncaceae	<i>Luzula bulbosa</i> [+]		Bulbous Woodrush	Woodrush, Bulbous
Juncaceae	<i>Luzula multiflora</i>		Common Woodrush	Woodrush, Common
Lemnaceae	<i>Lemna minor</i>		Common Duckweed	Duckweed, Common
Lemnaceae	<i>Lemna valdiviana</i>	S1, E	Valdivia Duckweed	Duckweed, Valdivia
Lemnaceae	<i>Spirodela polyrhiza</i>		Greater Duckweed	Duckweed, Greater
Lemnaceae	<i>Wolffia columbiana</i>		Columbian Watermeal	Watermeal, Columbian
Lemnaceae	<i>Wolffia brasiliensis (Wolffia papulifera)</i>		Brazilian Watermeal	Watermeal, Brazilian
Lemnaceae	<i>Wolffiella gladiata</i>	S1	Florida Mudmidget	Mudmidget, Florida
Liliaceae	<i>Allium canadense</i>		Meadow Garlic	Garlic, Meadow
Liliaceae	<i>Allium vineale</i> *		Wild Garlic	Garlic, Wild
Liliaceae	<i>Allium tricoccum</i> [+]		Ramp	Ramp
Liliaceae	<i>Asparagus officinalis</i> *		Asparagus	Asparagus
Liliaceae	<i>Convallaria majalis</i> *		European Lily-of-the-Valley	Lily-of-the-Valley, European
Liliaceae	<i>Erythronium americanum</i>		Dogtooth Violet	Violet, Dogtooth

Liliaceae	<i>Hemerocallis fulva</i> *	Orange Daylily	Daylily, Orange
Liliaceae	<i>Hosta</i> sp. (probably <i>H. ventricosa</i>) *	Plantain-lily	Plantain-lily
Liliaceae	<i>Lilium canadense</i>	Canada Lily	Lily, Canada
Liliaceae	<i>Lilium superbum</i>	Turk's-cap Lily	Lily, Turk's-cap
Liliaceae	<i>Maianthemum canadense</i>	Canada Mayflower	Mayflower, Canada
Liliaceae	<i>Medeola virginiana</i>	Indian Cucumber	Cucumber, Indian
Liliaceae	<i>Narcissis pseudonarcissis</i> *	Daffodil	Daffodil
Liliaceae	<i>Ornithogalum umbellatum</i> *	Star of Bethlehem	Star of Bethlehem
Liliaceae	<i>Polygonatum biflorum</i>	Smooth Solomon Seal	Solomon Seal, Smooth
Liliaceae	<i>Polygonatum biflorum</i> var. <i>commutatum</i>	Smooth Solomon Seal (var.)	Solomon Seal, Smooth (var.)
Liliaceae	<i>Maianthemum racemosum</i> (<i>Smilacina racemosa</i>)	False Lily of the Valley	Lily of the Valley, False
Liliaceae	<i>Uvularia sessilifolia</i>	Sessileleaf Bellwort	Bellwort, Sessileleaf
Najadaceae	<i>Najas flexilis</i>	Nodding Waternymph	Waternymph, Nodding
Orchidaceae	<i>Cypripedium acaule</i>	Moccasin Flower	Moccasin Flower
Orchidaceae	<i>Epipactis helleborine</i> *	Broadleaf Hellaborine	Hellaborine, Broadleaf
Orchidaceae	<i>Platanthera lacera</i>	Green Fringed Orchid	Orchid, Green Fringed
Orchidaceae	<i>Spiranthes cernua</i>	Nodding Lady's Tresses	Lady's Tresses, Nodding
Orchidaceae	<i>Tipularia discolor</i> [+]	G4/G5, S3 Cranefly Orchid	Orchid, Cranefly
Poaceae	<i>Agrostis capillaris</i> *	Colonial Bentgrass	Bentgrass, Colonial
Poaceae	<i>Agrostis gigantea</i> *	Redtop	Redtop
Poaceae	<i>Agrostis hyemalis</i>	Winter Bentgrass	Bentgrass, Winter
Poaceae	<i>Agrostis perennans</i>	Upland Bentgrass	Bentgrass, Upland
Poaceae	<i>Agrostis stolonifera</i> *	Creeping Bentgrass	Bentgrass, Creeping
Poaceae	<i>Alopecurus pratensis</i> *	Meadow Foxtail	Foxtail, Meadow
Poaceae	<i>Andropogon gerardii</i>	Big Bluestem	Bluestem, Big
Poaceae	<i>Andropogon ternarius</i>	S2 Splitbeard Bluestem	Bluestem, Splitbeard
Poaceae	<i>Andropogon virginicus</i>	Broomsedge	Broomsedge
Poaceae	<i>Anthoxanthum odoratum</i> *	Sweet Vernalgrass	Vernalgrass, Sweet
Poaceae	<i>Aristida dichotoma</i>	Threeawn	Threeawn
Poaceae	<i>Aristida oligantha</i>	Prairie Threeawn	Threeawn, Prairie
Poaceae	<i>Aristida purpurascens</i>	Arrowfeather Threeawn	Threeawn, Arrowfeather
Poaceae	<i>Arthraxon hispidus</i> *	Small Carpgrass	Carpgrass, Small
Poaceae	<i>Bromus arvensis</i> (<i>Bromus japonicus</i>)*	Field Brome	Brome, Field
Poaceae	<i>Bromus ciliatus</i>	Fringed Brome	Brome, Fringed
Poaceae	<i>Bromus inermis</i> *	Smooth Brome	Brome, Smooth
Poaceae	<i>Bromus racemosus</i> *	Bald Brome	Brome, Bald
Poaceae	<i>Bromus sterilis</i> .*	Barren Brome	Brome, Barren
Poaceae	<i>Bromus tectorum</i> *	Cheatgrass	Cheatgrass
Poaceae	<i>Calamagrostis canadensis</i>	Bluejoint	Bluejoint
Poaceae	<i>Cenchrus tribuloides</i> *	Sandbur	Sandbur
Poaceae	<i>Cinna arundinacea</i>	Sweet Woodreed	Woodreed, Sweet
Poaceae	<i>Dactylis glomerata</i> *	Orchardgrass	Orchardgrass
Poaceae	<i>Danthonia spicata</i>	Poverty Oatgrass	Oatgrass, Poverty
Poaceae	<i>Deschampsia flexuosa</i> .	Wavy Hairgrass	Hairgrass, Wavy
Poaceae	<i>Dichanthelium acuminatum</i> var. <i>acuminatum</i> (<i>Panicum acuminatum</i>)	Tapered Rosette Grass	Rosette Grass, Tapered
Poaceae	<i>Dichanthelium clandestinum</i> (<i>Panicum clandestinum</i>)	Deertongue Grass	Deertongue Grass
Poaceae	<i>Dichanthelium commutatum</i> (<i>Panicum commutatum</i>)	Variable Panicgrass	Panicgrass, Variable
Poaceae	<i>Dichanthelium latifolium</i> (<i>Panicum latifolium</i>)	Broadleaf Rosette Grass	Rosette Grass, Broadleaf
Poaceae	<i>Dichanthelium sabulorum</i> var. <i>thinium</i> (<i>Panicum collumbianum</i>)	Hemlock Rosette Grass	Rosette Grass, Hemlock
Poaceae	<i>Digitaria cognata</i> (<i>Leptoloma cognatum</i>)	Tall Witchgrass	Witchgrass, Tall
Poaceae	<i>Digitaria filiformis</i>	Slender Crabgrass	Crabgrass, Slender
Poaceae	<i>Digitaria ischaemum</i>	Smooth Crabgrass	Crabgrass, Smooth
Poaceae	<i>Digitaria sanguinalis</i> *	Hairy Crabgrass	Crabgrass, Hairy
Poaceae	<i>Echinochloa crusgalli</i> *	Barnyardgrass	Barnyardgrass
Poaceae	<i>Echinochloa muricata</i>	Rough Barnyardgrass	Barnyardgrass, Rough

Poaceae	<i>Echinochloa walteri</i>	Coast Cockspur Grass	Cockspur Grass, Coast
Poaceae	<i>Eleusine indica</i> *	Indian Goosegrass	Goosegrass, Indian
Poaceae	<i>Elymus hystrix</i>	Eastern Bottlebrush Grass	Bottlebrush Grass, Eastern
Poaceae	<i>Elymus repens (Elytrigia repens)</i> *	Quackgrass	Quackgrass
Poaceae	<i>Elymus villosus</i>	Hairy Wildrye	Wildrye, Hairy
Poaceae	<i>Elymus virginicus</i>	Virginia Wildrye	Wildrye, Virginia
Poaceae	<i>Eragrostis hypnoides</i>	Teal Lovegrass	Lovegrass, Teal
Poaceae	<i>Eragrostis capillaris</i>	Lace Grass	Lace Grass
Poaceae	<i>Eragrostis cilianensis</i> *	Stinkgrass	Stinkgrass
Poaceae	<i>Eragrostis curvula</i> *	Weeping Lovegrass	Lovegrass, Weeping
Poaceae	<i>Eragrostis minor</i>	Little Lovegrass	Lovegrass, Little
Poaceae	<i>Eragrostis pectinacea</i>	Tufted Lovegrass	Lovegrass, Tufted
Poaceae	<i>Eragrostis pilosa</i> *	Indian Love-grass	Love-grass, Indian
Poaceae	<i>Eragrostis spectabilis</i>	Purple Love-grass	Love-grass, Purple
Poaceae	<i>Festuca ovina</i>	Sheep Fescue	Fescue, Sheep
Poaceae	<i>Festuca rubra</i>	Red Fescue	Fescue, Red
Poaceae	<i>Festuca subverticillata (Festuca obtusa)</i>	Nodding Fescue	Fescue, Nodding
Poaceae	<i>Glyceria canadensis</i>	Rattlesnake Mannagrass	Mannagrass, Rattlesnake
Poaceae	<i>Glyceria melicaria</i>	Melic Mannagrass	Mannagrass, Melic
Poaceae	<i>Glyceria obtusa</i>	Atlantic Mannagrass	Mannagrass, Atlantic
Poaceae	<i>Glyceria septentrionalis</i>	Floating Mannagrass	Mannagrass, Floating
Poaceae	<i>Glyceria striata</i>	Fowl Mannagrass	Mannagrass, Fowl
Poaceae	<i>Holcus lanatus</i> *	Common Velvetgrass	Velvetgrass, Common
Poaceae	<i>Hordeum jubatum (Critesion jubatum)</i>	Foxtail Barley	Barley, Foxtail
Poaceae	<i>Leersia oryzoides</i>	Rice Cutgrass	Cutgrass, Rice
Poaceae	<i>Leersia virginica</i>	Whitegrass	Whitegrass
Poaceae	<i>Lolium perenne</i> *	Perennial Ryegrass	Ryegrass, Perennial
Poaceae	<i>Lolium perenne</i> spp. <i>multiflorum (Lolium multiflorum)</i> *	Italian Ryegrass	Ryegrass, Italian
Poaceae	<i>Melica mutica</i>	Twoflower Melicgrass	Melicgrass, Twoflower
Poaceae	<i>Microstegium vimineum</i> *	Korean Browntop	Browntop, Korean
Poaceae	<i>Miscanthus sinensis</i> *	Silvergrass	Silvergrass
Poaceae	<i>Muhlenbergia schreberi</i>	Nimblewill	Nimblewill
Poaceae	<i>Panicum anceps</i>	Beaked Panicgrass	Panicgrass, Beaked
Poaceae	<i>Panicum capillare</i>	Witchgrass	Witchgrass
Poaceae	<i>Panicum dichotomiflorum</i>	Fall Panicgrass	Panicgrass, Fall
Poaceae	<i>Panicum dichotomum</i>	Panicgrass	Panicgrass
Poaceae	<i>Panicum rigidulum</i> var. <i>elongatum (Panicum stipidatum)</i>	Redtop Panicgrass	Panicgrass, Redtop
Poaceae	<i>Panicum verrucosum</i>	Warty Panicgrass	Panicgrass, Warty
Poaceae	<i>Panicum virgatum</i>	Switchgrass	Switchgrass
Poaceae	<i>Paspalum laeve</i>	Field Paspalum	Paspalum, Field
Poaceae	<i>Paspalum setaceum</i> var. <i>muhlenbergii</i>	Thin Paspalum	Paspalum, Thin
Poaceae	<i>Phalaris arundinacea</i>	Reed Canarygrass	Canarygrass, Reed
Poaceae	<i>Phleum pratense</i> *	Timothy	Timothy
Poaceae	<i>Phragmites australis</i>	Common Reed	Reed, Common
Poaceae	<i>Poa annua</i> *	Annual Bluegrass	Bluegrass, Annual
Poaceae	<i>Poa compressa</i> *	Canada Bluegrass	Bluegrass, Canada
Poaceae	<i>Poa palustris</i>	Fowl Bluegrass	Bluegrass, Fowl
Poaceae	<i>Poa pratensis</i> . *	Kentucky Bluegrass	Bluegrass, Kentucky
Poaceae	<i>Poa trivialis</i> *	Rough Bluegrass	Bluegrass, Rough
Poaceae	<i>Pseudosasa japonica</i> * [+]	Arrow Bamboo	Bamboo, Arrow
Poaceae	<i>Schedonorus phoenix (Festuca elatior)</i> *	Tall Fescue	Fescue, Tall
Poaceae	<i>Schedonorus pratensis (Festuca pratensis)</i>	Meadow Fescue	Fescue, Meadow
Poaceae	<i>Schizachyrium scoparium</i>	Little Bluestem	Bluestem, Little
Poaceae	<i>Setaria faberi</i> *	Japanese Bristlegrass	Bristlegrass, Japanese
Poaceae	<i>Setaria pumila</i> *	Yellow Foxtail	Foxtail, Yellow
Poaceae	<i>Setaria viridis</i>	Green Bristlegrass	Bristlegrass, Green
Poaceae	<i>Sorghastrum nutans</i>	Indiangrass	Indiangrass
Poaceae	<i>Spartina pectinata</i> (herbarium only).	Prairie Cordgrass	Cordgrass, Prairie
Poaceae	<i>Torreyochloa pallida</i>	Pale False Mannagrass	Mannagrass, Pale False

Poaceae	<i>Tridens flavus</i>		Purpletop Tridens	Purpletop
Poaceae	<i>Vulpia myuros</i> var. <i>myuros</i> *		Rat-tail Fescue	Fescue, Rat-tail
Poaceae	<i>Zizania aquatica</i> var. <i>aquatica</i>		Annual Wildrice	Wildrice, Annual
Pontederiaceae	<i>Heteranthera multiflora</i>	S3	Bouquet Mudplantain	Mudplantain, Bouquet
Pontederiaceae	<i>Heteranthera reniformis</i>		Kidneyleaf Mudplantain	Mudplantain, Kidneyleaf
Pontederiaceae	<i>Pontederia cordata</i>		Pickerelweed	Pickerelweed
Potamogetonaceae	<i>Potamogeton crispus</i> *		Curly Pondweed	Pondweed, Curly
Potamogetonaceae	<i>Potamogeton diversifolius</i>		Waterthread Pondweed	Pondweed, Waterthread
Potamogetonaceae	<i>Potamogeton epihydrus</i>		Ribbonleaf Pondweed	Pondweed Ribbonleaf
Potamogetonaceae	<i>Stuckenia pectinata</i> (<i>Potamogeton pectinatus</i>)		Sago Pondweed	Pondweed, Sago
Potamogetonaceae	<i>Potamogeton pusillus</i>		Small Pondweed	Pondweed, Small
Smilacaceae	<i>Smilax herbacea</i> [+]		Smooth Carrionflower	Carrionflower, Smooth
Smilacaceae	<i>Smilax pseudochina</i>		Bamboo Vine	Bamboo Vine
Smilacaceae	<i>Smilax pulverulenta</i>		Hairy Carrionflower	Carrionflower, Hairy
Smilacaceae	<i>Smilax rotundifolia</i>		Roundleaf Greentbrier	Greenbrier, Roundleaf
Sparganiaceae	<i>Sparganium americanum</i>		American Bur-reed	Bur-reed, American
Sparganiaceae	<i>Sparganium eurycarpum</i>		Broadfruit Bur-reed	Bur-reed, Broadfruit
Typhaceae	<i>Typha angustifolia</i>		Narrowleaf Cattail	Cattail, Narrowleaf
Typhaceae	<i>Typha latifolia</i>		Broadleaf Cattail	Cattail, Broadleaf
Typhaceae	<i>Typha x glauca</i>		Hybrid Cattail	Cattail, Hybrid
Zannichelliaceae	<i>Zannichellia palustris</i>		Horned Pondweed	Pondweed, Horned

APPENDIX D

Closed Known Contaminated Sites

PI Name	Address	PI Number	Site ID (MasterFile)
1053 Route 206	1053 Rt 206	485214	388451
13 Liberty Avenue	13 Liberty Ave	G000010917	77059
14 Butts Avenue	14 Butts Ave	G000032485	65854
15 Homestead Avenue	15 Homestead Ave	G000024500	77992
171 Route 130	171 Rt 130	333101	259978
1826 Jacksonville-Jobstown Road	1826 Jacksonville Jobstown Rd	464496	374825
244 Route 130	244 Rt 130	G000033161	65974
APCO Farnsworth	Rt 130 & Farnsworth Ave	3322	45644
Auto Body by Duie	53 Rt 130	158184	201054
Bank of Mid-Jersey	243 Rt 130	22842	54041
Bills Auto Service	1077 Rt 206	23516	49239
Bob Maguire Chevrolet Inc	840 Rt 206	10809	11016
Bordentown Feed Facility	122 Rt 130	11207	183464
Bordentown Gulf	231 Rt 206	21860	15546
Bordentown Regional High School	318 Ward Ave	156237	93475
Bordentown Junior High School (formerly Bordentown Regional High School)	50-52 Dunns Mill Rd	11234	14109
Bordentown Stopping Center	402 Rising Sun Rd	7450	26465
Burlington Bordentown Road	Burlington Bordentown Rd	493284	394267
C&H Transportation Co	266 Crosswicks Rd	13211	50503
Department of Parks & Property	213 Crosswicks St	11977	11038
Fedor Motors Inc	Rt 206 & 68	6016	43529

PI Name	Address	PI Number	Site ID (MasterFile)
Hough Petroleum Corp	230 Rt 130	168703	127462
Laurel Run Gardens Apartments	1026 Rt 206	21522	11028
Laurel Run Sewage Treatment Plant	Georgetown Rd	12163	47105
Mile Hollow Pump Station	Stanton Ave	12161	47104
Monroe Investment LLC	Crosswicks St	167236	126717
New Valley Apartments	100 Lucas Dr	18703	52192
NJ Dept Military & Vet Affairs	1048 Rt 206	654	15540
NJ Dept Military & Vet Affairs	Rt 130	655	15514
NWL Transformers	312 Rising Sun Rd	9409	14126
Park Apartments	601 Park St	22897	54074
PSE&G Co	Rt 130 & Dunns Mill Rd	16972	11032
Rydal Apartments	272 Ward Ave	22857	54046
The Auto Exchange	1070 Rt 206	25453	15905
Valero (formerly Tri State Yardville)	42 Rt 130 S	7053	15508
Universal Chemicals & Metals Corporation	2047 Rt 130	3455	45662

Source: NJDEP, 2012

Drinking Water

The Bordentown Water Department (PWSID # 0303001) is a public community water system consisting of four wells that draw from the middle Potomac-Raritan-Magothy aquifer system. Both the City and Township of Bordentown are served by the Bordentown Water Department.

Susceptibility Ratings for Source Water

The table below illustrates the susceptibility ratings for the seven contaminant categories (and radon) for the source water drawn by the four wells of the Bordentown Water Department. These ratings are from the NJDEP Source Water Assessment Program (SWAP).

The wells are rated high (H), medium (M), or low (L) for each contaminant category. If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. The number in parentheses indicates the number of wells in the Bordentown Water Department that are rated as such in each category.

Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radio-nuclides	Radon	Disinfection Byproduct Precursors
M (4)	H (4)	L (4)	H (4)	H (1), M (3)	H (2), M (2)	M (4)	H (3), M (1)

Source: NJDEP, 2004

Annual Drinking Water Quality Report

The EPA and FDA regulate drinking water quality, for tap water and bottled water, respectively. The Safe Drinking Water Act established monitoring procedures and quality standards. Bordentown's drinking water system received a monitoring waiver for synthetic organic chemicals. Monitoring schedules for various contaminants vary due to minimal concentration fluxes and natural environmental occurrence. Some values are running annual averages of quarterly samples, while other reported values are the highest quarterly running annual average of samples taken. Some contaminants' Maximum Contaminant Levels have not been established for community water systems yet.

The Bordentown Water Department's 2011 Drinking Water Quality Results found that there are no violations of the Safe Drinking Water Act. The Water Department tested water for the following types of contaminants: disinfectants and disinfectant byproducts, radioactive contaminants, inorganic contaminants, chlorine residual, and microbiological contaminants. For specific contaminants, the Water Quality Results show contaminant unit, Maximum Containment Level Goal Maximum Contaminant Level, Bordentown's result, range or sample date, and whether or not there was a violation, and the potential health effects from exposure to elevated contaminant levels.

Bordentown Water Department Drinking Water Quality Results, 2011

Public Water Supply Identification Number: NJ0303001

Contaminant (Unit of measurement)	Violation (Y/N)	Level Detected	Range or Sample Date	MCLG	MCL	Likely Source of Contamination
Disinfection Byproducts						
TTHMs [Total Trihalomethanes] (ppb)	No	4.71 (b)	2.16 – 8.80	NA	80	By-product of drinking water disinfection
HAAs [Haloacetic Acids] (ppb)	No	1.85 (b)	1.02 – 1.94	NA	60	
Radioactive Contaminants						
Alpha emitters (pCi/L)	No	9.30 (a)	7.95 – 13.36	0	15	Erosion of natural deposits
Combined radium (pCi/L)	No	3.36 (a)	1.28 – 4.51	0	5	
Uranium (pCi/L)	No	0.02 (a)	ND – 0.076	0	30	

Inorganic Contaminants						
Barium (ppm)	No	0.0262	8/8/11 d	2	2	Discharge of drilling wastes; erosion of natural deposits
Copper (ppm)	No	0.1107 (90th percentile)	0 sites exceeded the AL (c, d)	AL = 1.3	AL = 1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (ppb)	No	0.0013 (90th percentile)	0 sites exceeded the AL (c, d)	0	AL = 15	Corrosion of household plumbing systems; erosion of natural deposits
Nitrate (as Nitrogen) (ppm)	No	0.7	9/26/11	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nickel (ppb)	No	22.3	8/8/11 (c, d)	N/A	None	Erosion of natural deposits
Selenium (ppb)	No	3.3	8/8/11 (d)	50	50	Discharge from petroleum and metal refineries, erosion of natural deposits, discharge from mines.
Chlorine Residual						
Chlorine (ppm)	No	0.53 (ave.) (average)	0.51 - 0.57	MRDLG = 4	MRDL = 4	Water additive used to control microbes
Total Coliform						
Total Coliform (# of positive samples)	No	1 out of 245	1	0	1	Naturally present in the environment

Source: Bordentown Water Department, 2009

Footnotes

(a) The reported value is a “rolling annual average” of the quarterly samples taken, rounded down per NJDEP standards.

(b) The reported value is an average of samples taken quarterly.

(c) Copper, lead, and nickel MCLs have not yet been established for community water systems. Currently, only Action Levels (AL) of 1.3 ppm for copper and 15 ppb for lead apply. AL is the concentration of a substance that, if exceeded, triggers the need for additional required treatment. Monitoring only of nickel is required.

(d) The state allows monitoring for some contaminants every three years, since the concentrations do not change frequently. The latest sample dates are shown for these contaminants.

Monitoring Schedule – Bordentown Water Department

Monitoring Schedule for BORDENTOWN WATER DEPARTM (NJ0303001)

Routine Total Coliform Bacteria Schedules

Schedule Start Date	Schedule End Date	Required Months to Sample In	Sampling Requirements
01/01/1991	Continuous	1/1--12/31	15 Routine Sample(s)/Month

Contaminant Group Schedules

Sample Point ID	Analyte Group	Schedule Start Date	Schedule End Date	Required Months to Sample In	Required Year to Sample In	Sampling Requirements
	TOTAL THM-HAA5	01/01/2004	Continuous		2012	Disinfection Byproducts (Stage 1) 1 MAX RESIDENCE TIME SAMPLE(S)/QTR COLLECTED 1/1-12/31 (SAMPLE POINT ID: DBPMAX)
DS	IRON-MANGANESE	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Year
DS	LEAD AND COPPER	01/01/2005	Continuous	6/1--9/30	2013	30 Sample(s)/Every 3 years
TP001003	INORGANICS	01/01/2002	Continuous	1/1-12/31	2014	1 Sample(s)/Every 3 years
TP001003	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/Quarter
TP001003	SECONDARY	01/01/2002	Continuous	1/1-12/31	2014	1 Sample(s)/Every 3 years
TP001003	VOCS FEDERAL	01/01/2013	Continuous	1/1--3/31	2013	1 Sample(s)/Year
TP001003	VOCS STATE	01/01/2013	Continuous	1/1--3/31	2013	1 Sample(s)/Year

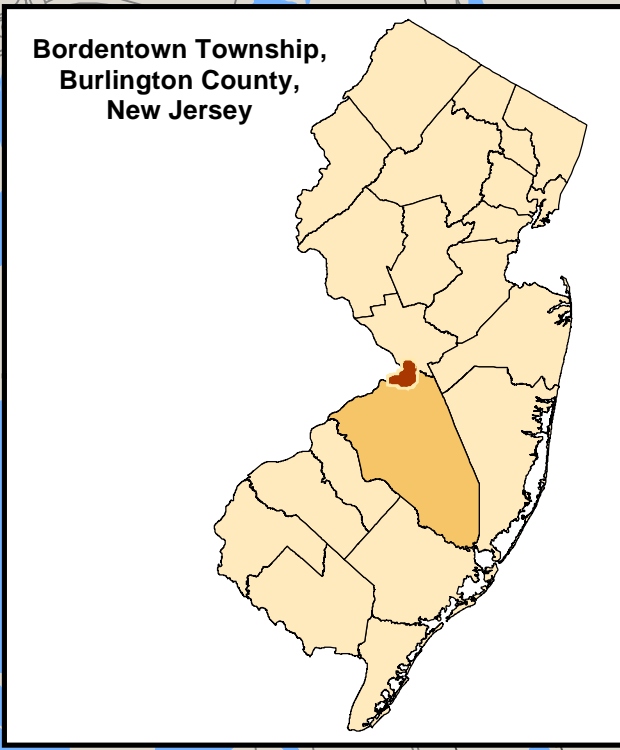
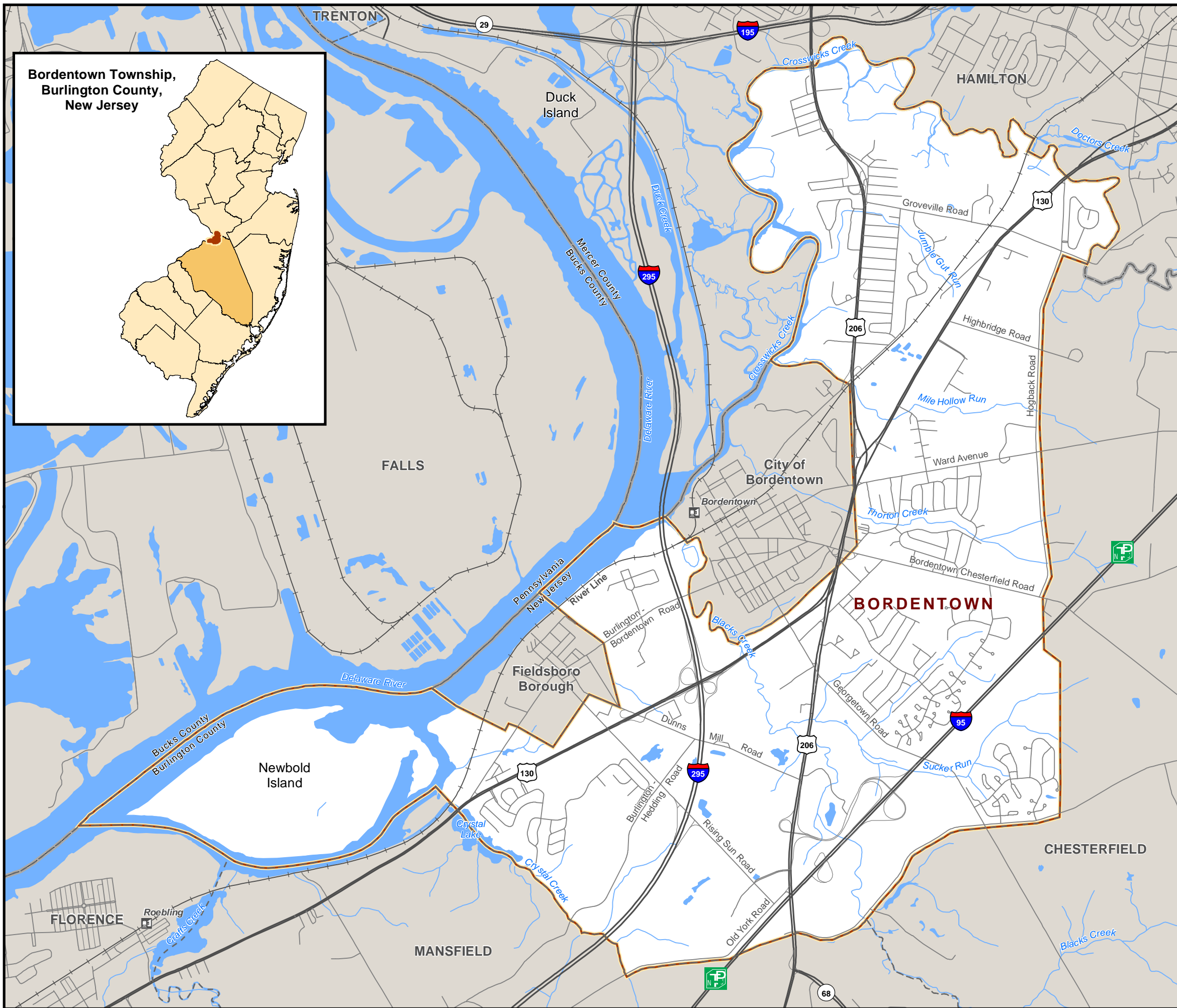
Individual Contaminant Schedules

Sample Point ID	Analyte Name	Schedule Start Date	Schedule End Date	Required Months to Sample In	Required Year to Sample In	Sampling Requirements
TP001003	NITRATE	01/01/2003	Continuous	1/1-12/31	2012	1 Routine Sample(s)/Year

Printed: Tue Sep 04 15:53:41 EDT 2012








Maps

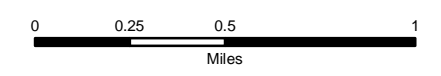
- Map 1: Places in Bordentown Township
- Map 2: Aerial Photo (2010)
- Map 3: NJDEP Land Cover (2007)
- Map 4: DVRPC Land Use (2010)
- Map 5: Elevation
- Map 6: Steep Slopes
- Map 7: Soils
- Map 8: Agricultural Quality of Soils
- Map 9: Watersheds
- Map 10: Surface Water, Wetlands, and Vernal Pools
- Map 11: Floodplains (1990)
- Map 12: Water Quality (2010)
- Map 13: Geologic Outcrops
- Map 14: Public Water Supply Wells
- Map 15: Natural Vegetation (2007)
- Map 16: Landscape Project Priority Habitats (2012)
- Map 17: Historic Resources
- Map 18: Sewer Service Area (2012)
- Map 19: Parks and Open Space (2011)
- Map 20: Known Contaminated Sites (2012)



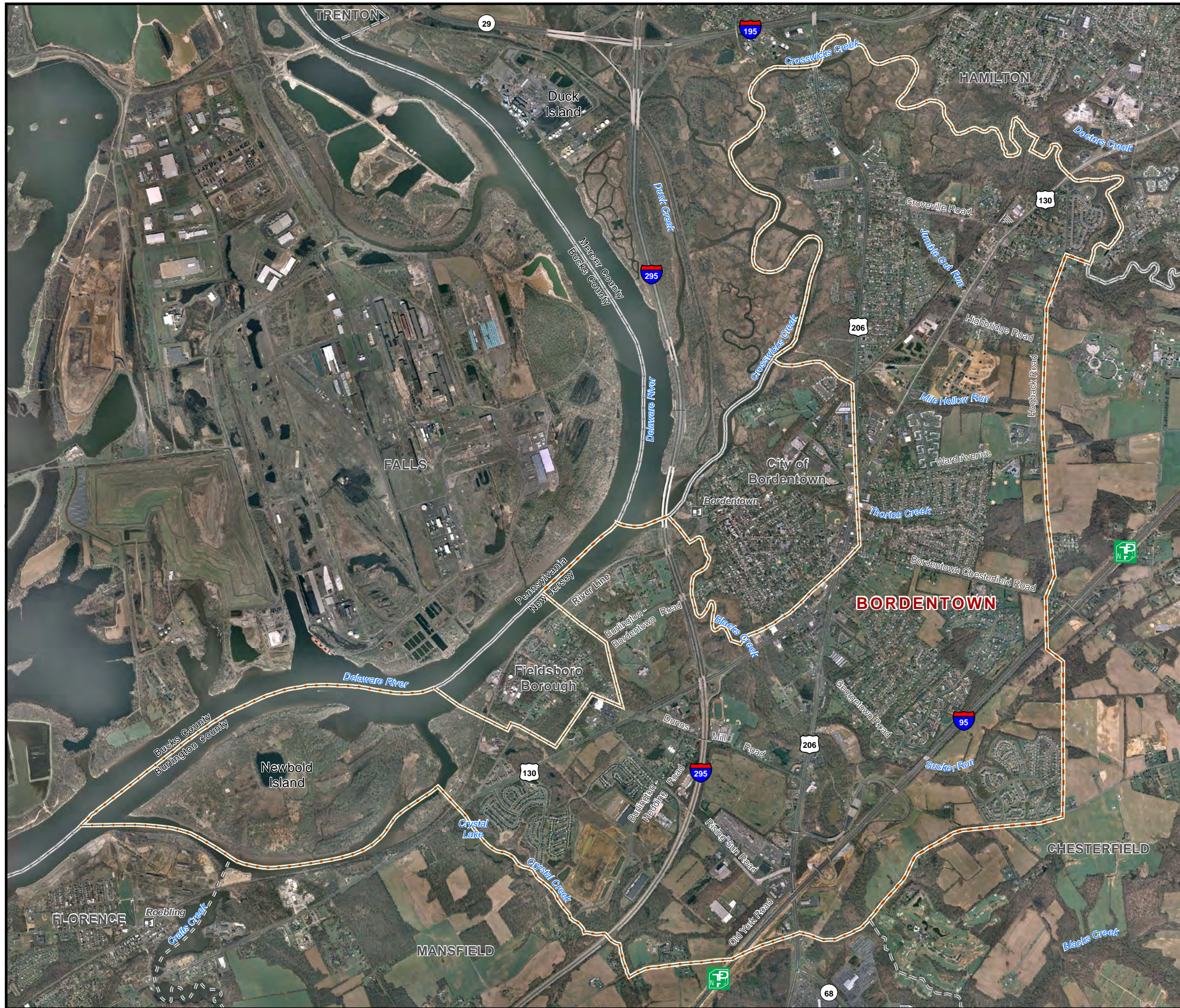
Bordentown Township

Map 1: Places in Bordentown Township

-  Township Boundary
-  County Boundary
-  Municipal Boundary
-  Surface Water
-  Stream
-  Rail
-  Rail Station





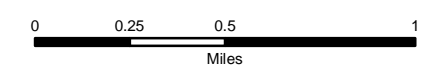
Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



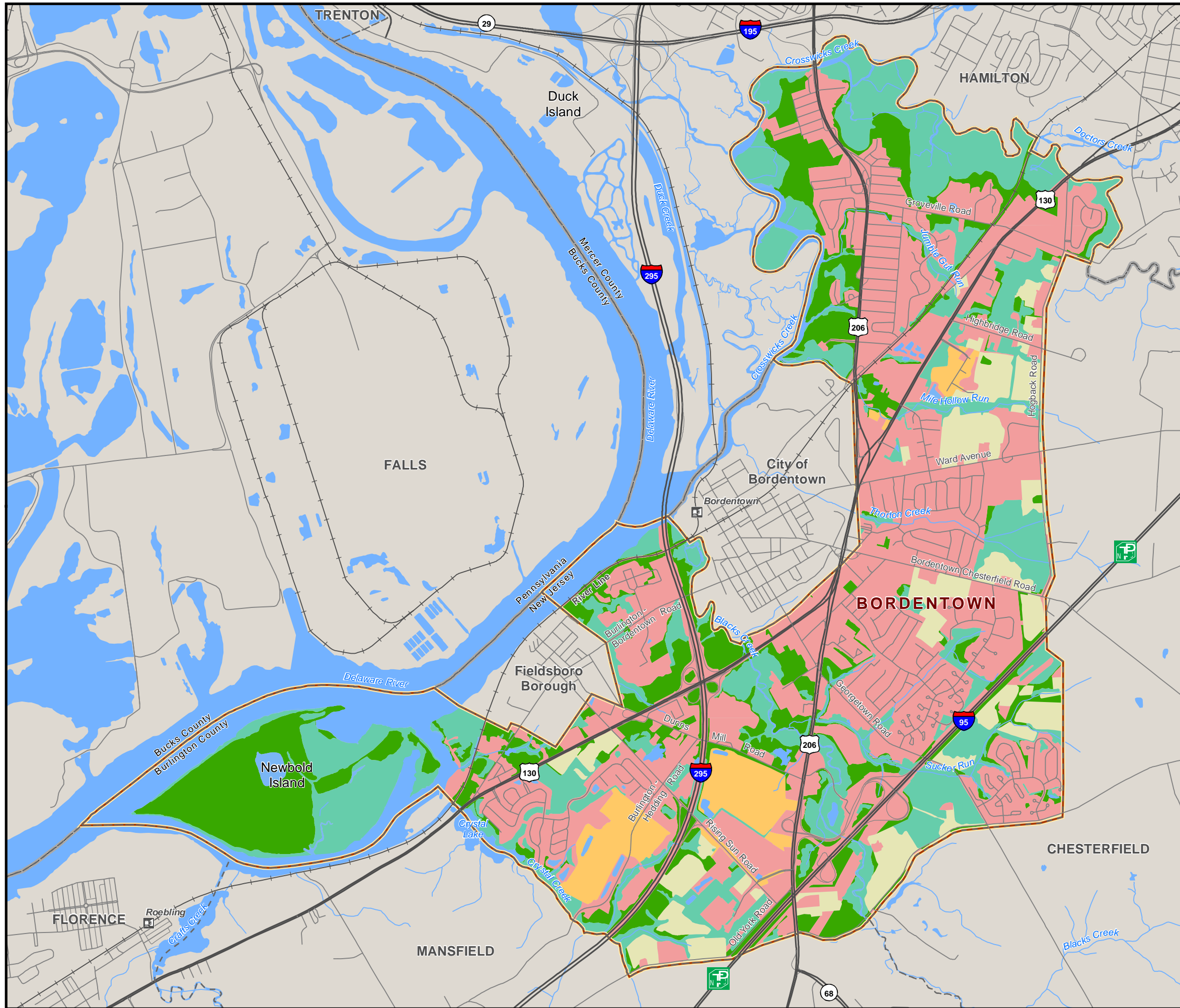
Bordentown Township

Map 2: Aerial Photo (2010)

-  Municipal Boundary
-  Township Boundary



Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

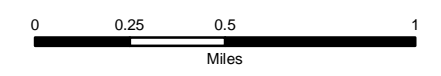


Bordentown Township

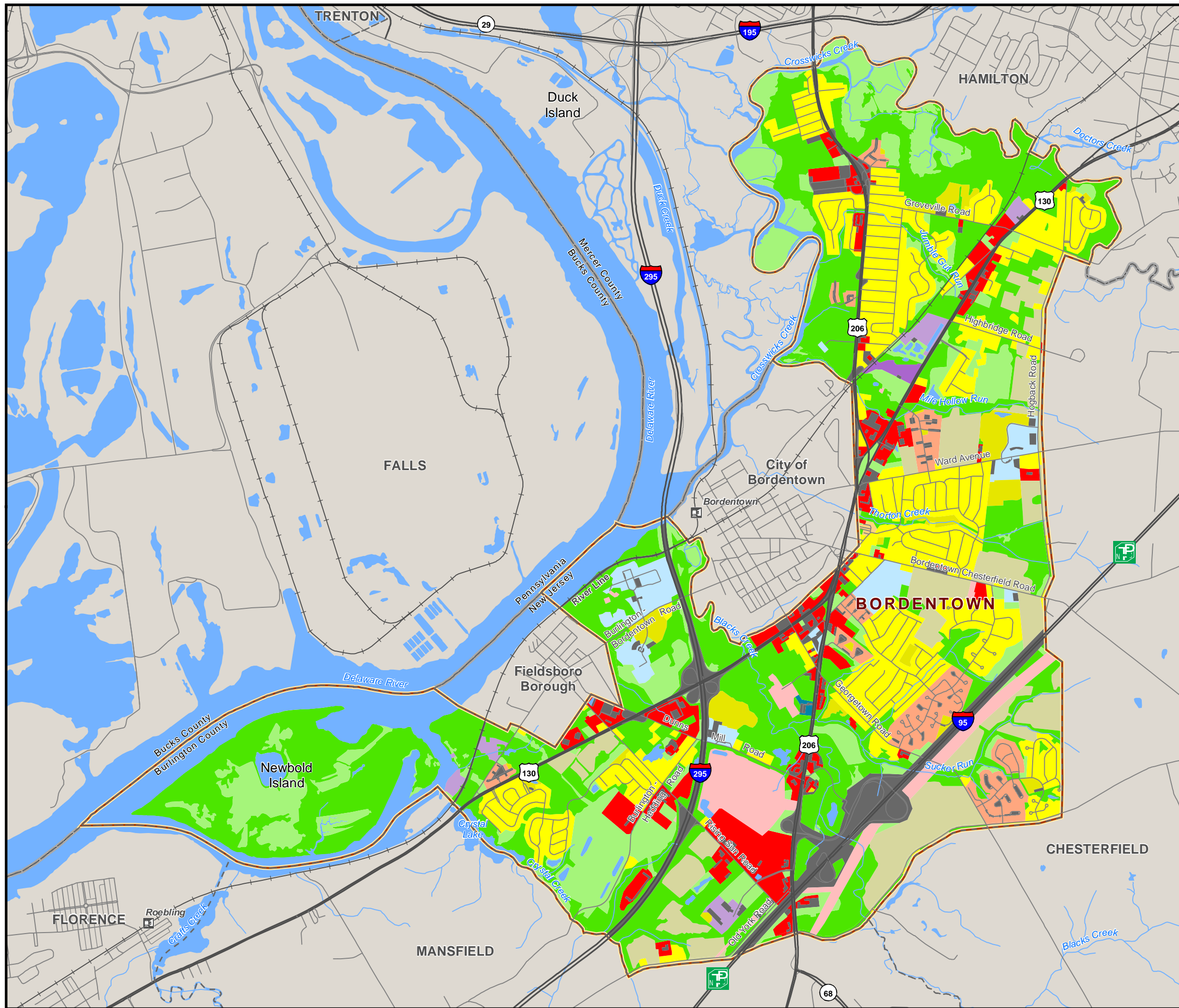
Map 3: NJDEP Land Cover (2007)

Acres are listed in Table 1.

- Surface Water
- Stream
- NJDEP Land Cover (2007)**
 - Agriculture
 - Barren Land
 - Forest
 - Developed
 - Water
 - Wetlands



Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

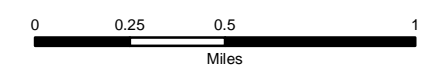


Bordentown Township

Map 4: DVRPC Land Use (2010)

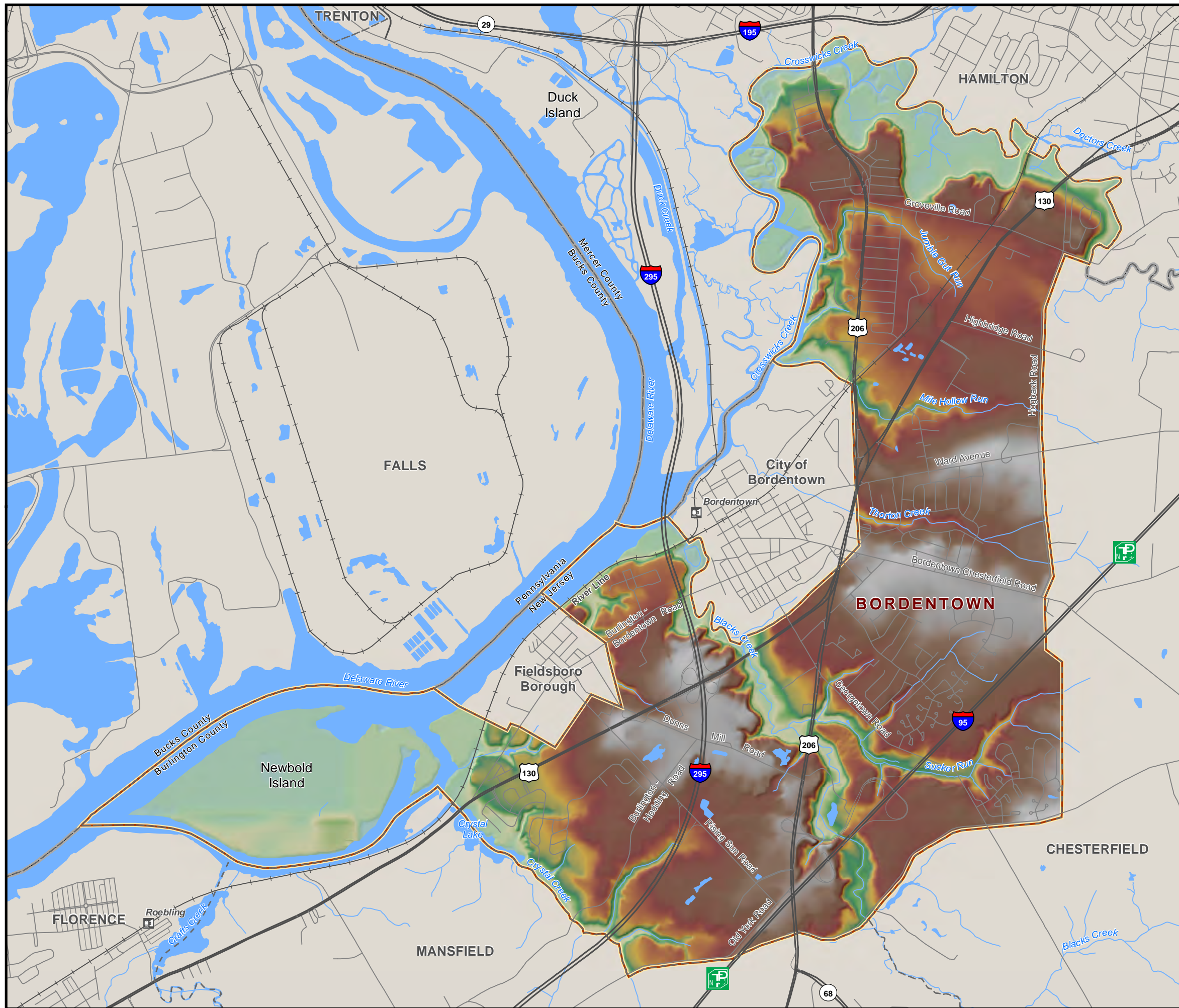
Acres are listed in Table 2.

- Single Family
- Multi-Family
- Mobile Home
- Light Manufacturing
- Heavy Manufacturing
- Utility
- Commercial
- Community
- Parking and Transportation
- Military
- Recreation
- Agriculture
- Wooded
- Vacant
- Water



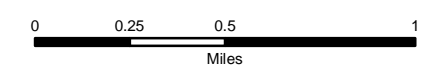
Source : NJDEP, NJDOT, DVRPC, TANA.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

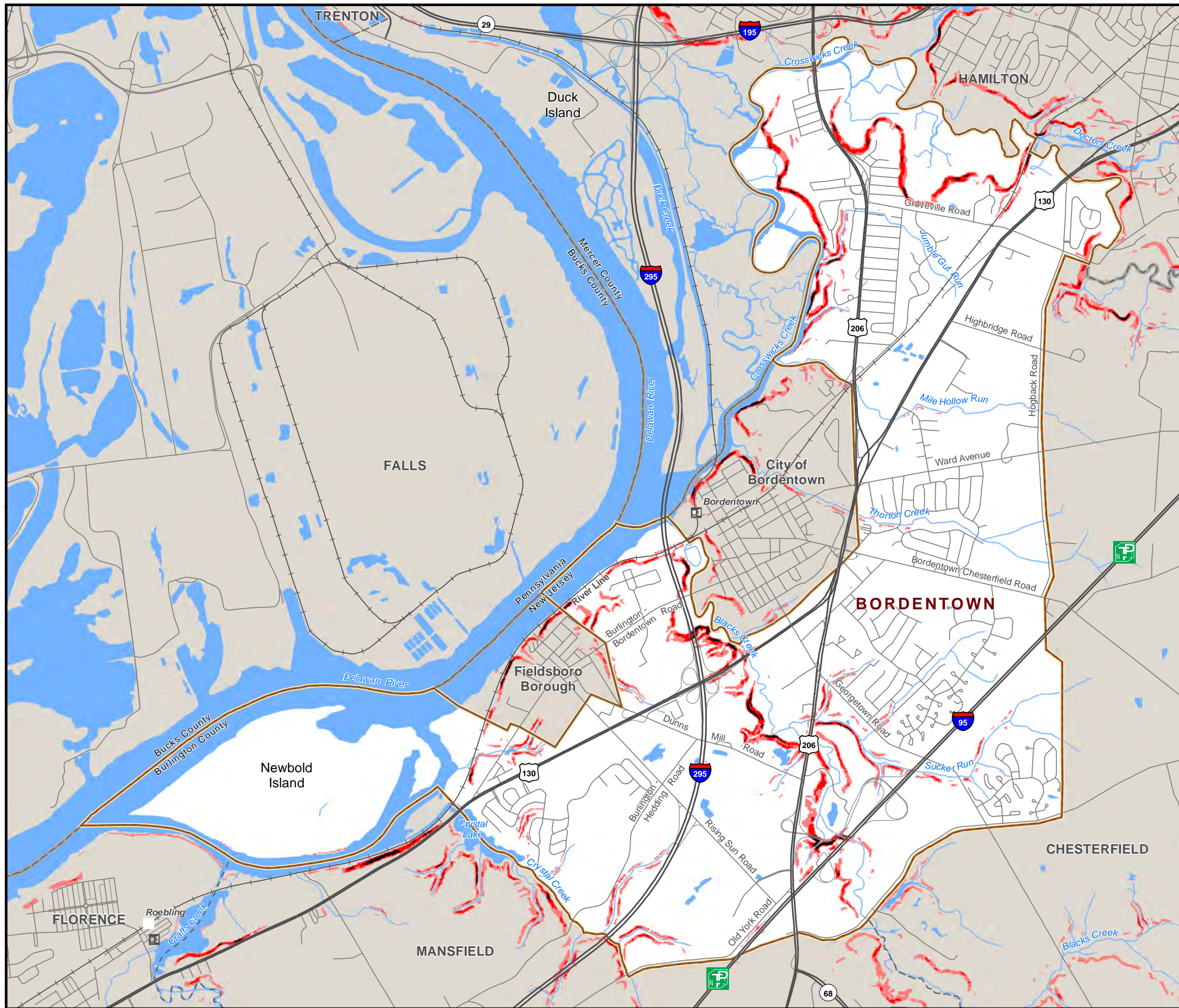


Bordentown Township

Map 5: Elevation

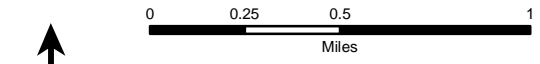
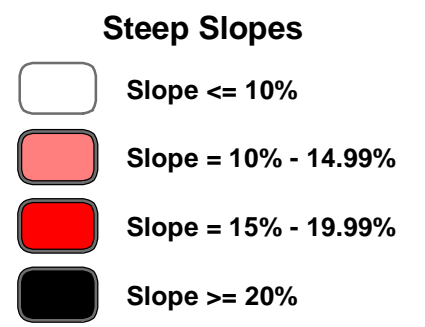


Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

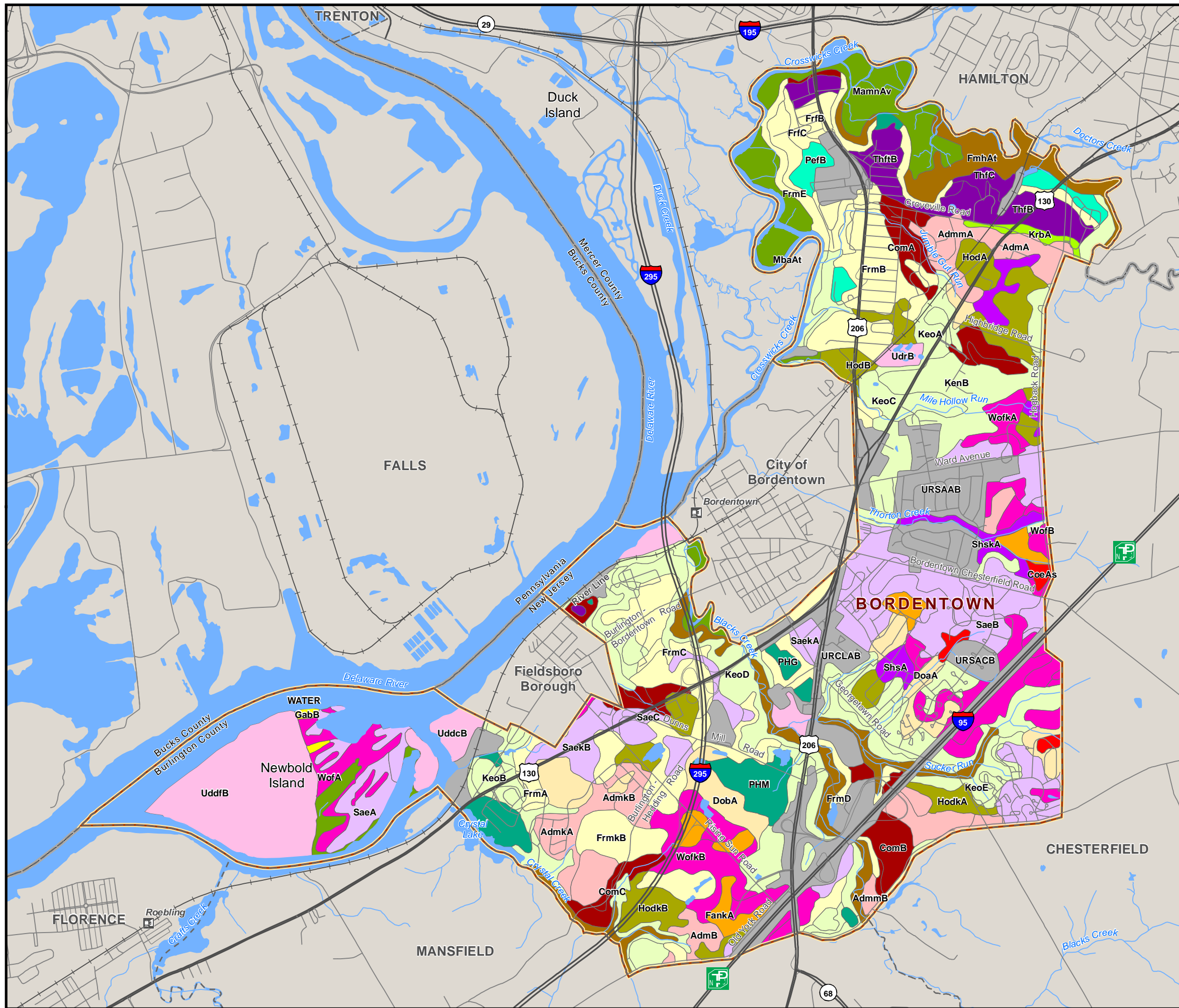


Bordentown Township

Map 6: Steep Slopes



Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

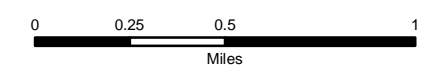


Bordentown Township

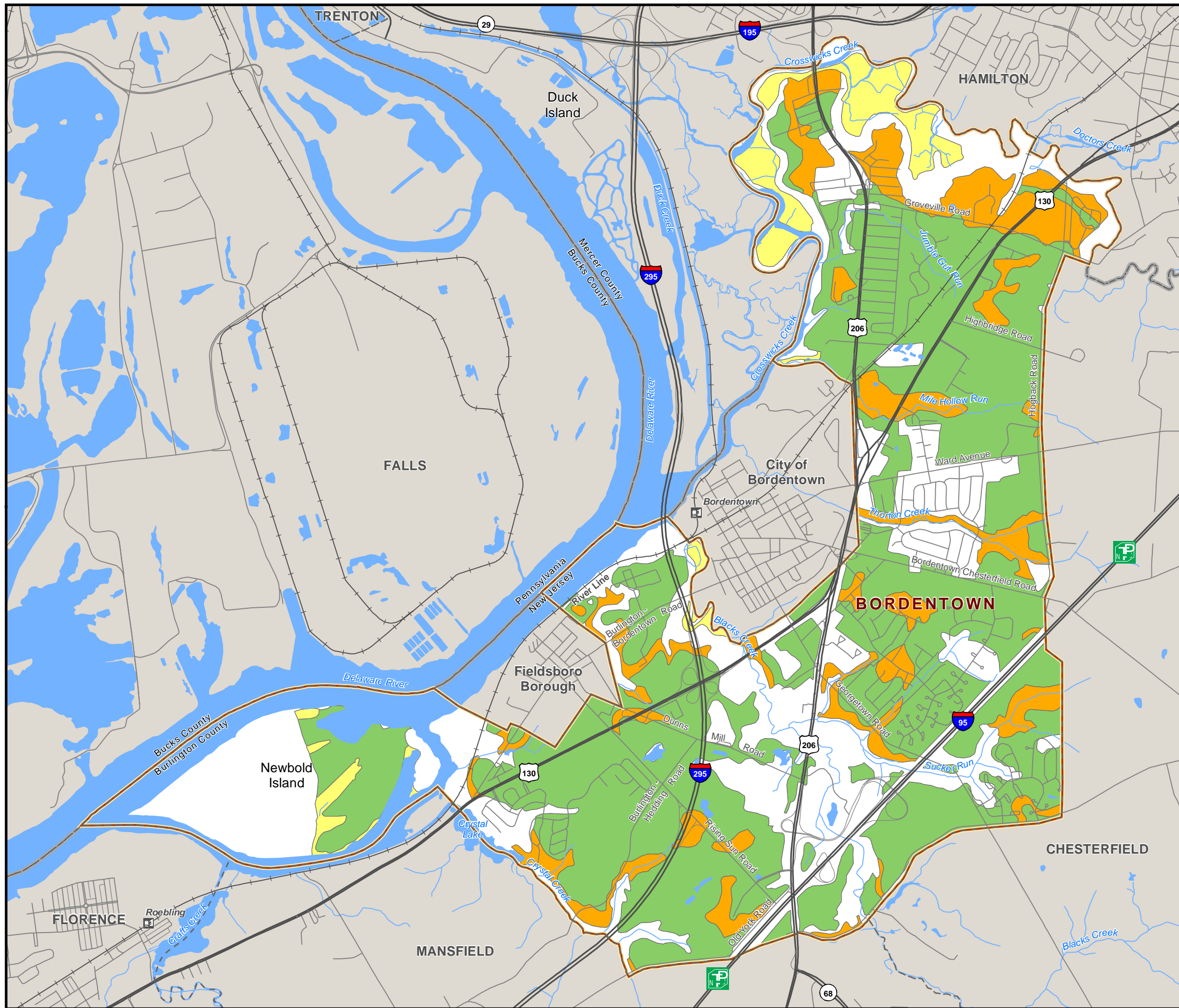
Map 7: Soils

Acres are listed in Table 3.

- | | | | |
|--|-------------|--|----------------------|
| | Adelphia | | Mannington-Nanticoke |
| | Colemantown | | Marsh |
| | Collington | | Pemberton |
| | Donlonton | | Pits |
| | Fallsington | | Sassafras |
| | Fluvaquents | | Shrewsbury |
| | Freehold | | Tinton |
| | Galestown | | Udorthents |
| | Holmdel | | Urban |
| | Keyport | | Water |
| | Kresson | | Woodstown |







Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

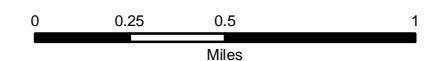


Bordentown Township

Map 8: Agricultural Quality of Soils

Acres are listed in Table 5.

-  P-1 -Prime Farmland
-  S-1 -Farmland of Statewide Importance
-  U-1 -Farmland of Unique Importance
-  NA -Not Rated for Agricultural Use

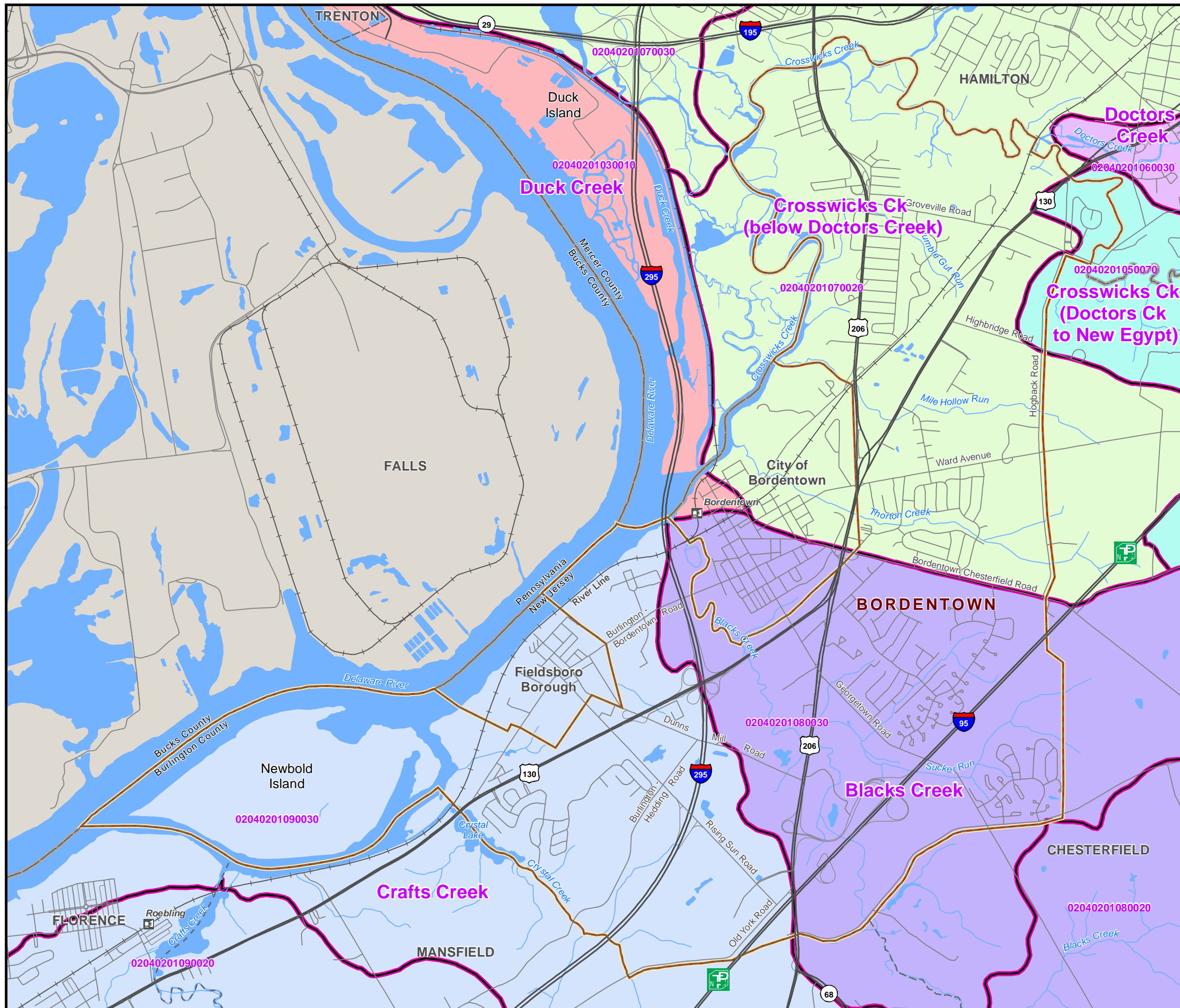










Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

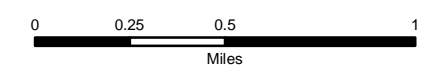
Bordentown Township

Map 9: Watersheds

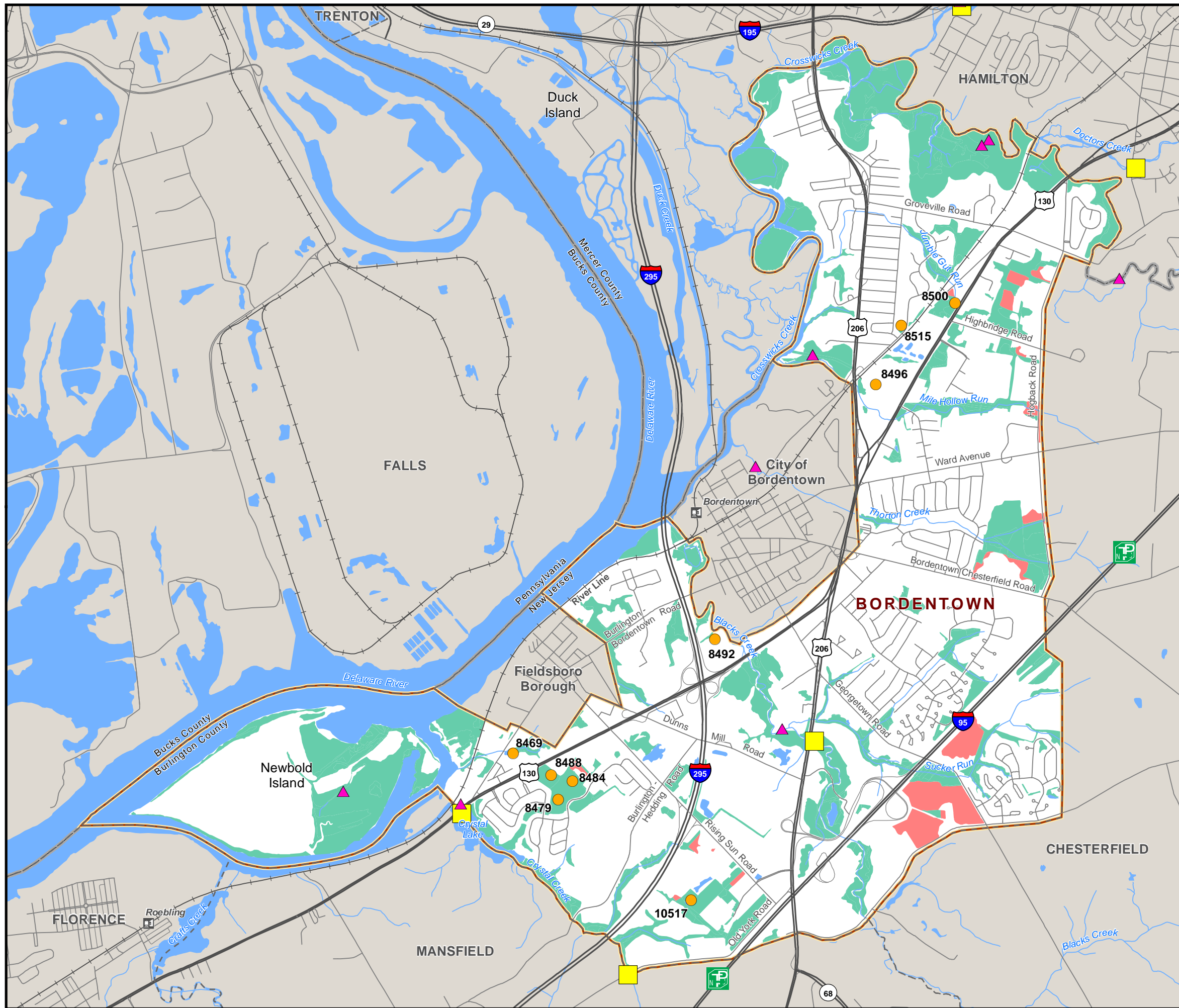
Acres listed in Table 6.



-  HUC 14 Subwatershed
-  HUC 11 Watershed
-  02040201060, Doctors Creek
-  02040201070, Crosswicks Ck (below Doctors Creek)
-  02040201080, Blacks Creek
-  02040201030, Duck Creek
-  02040201090, Crafts Creek
-  02040201050, Crosswicks Ck (Doctors Ck to New Egypt)







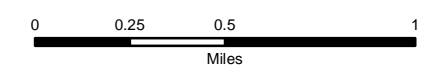
Source : NJDEP, NJDOT, DVRPC, TANA.
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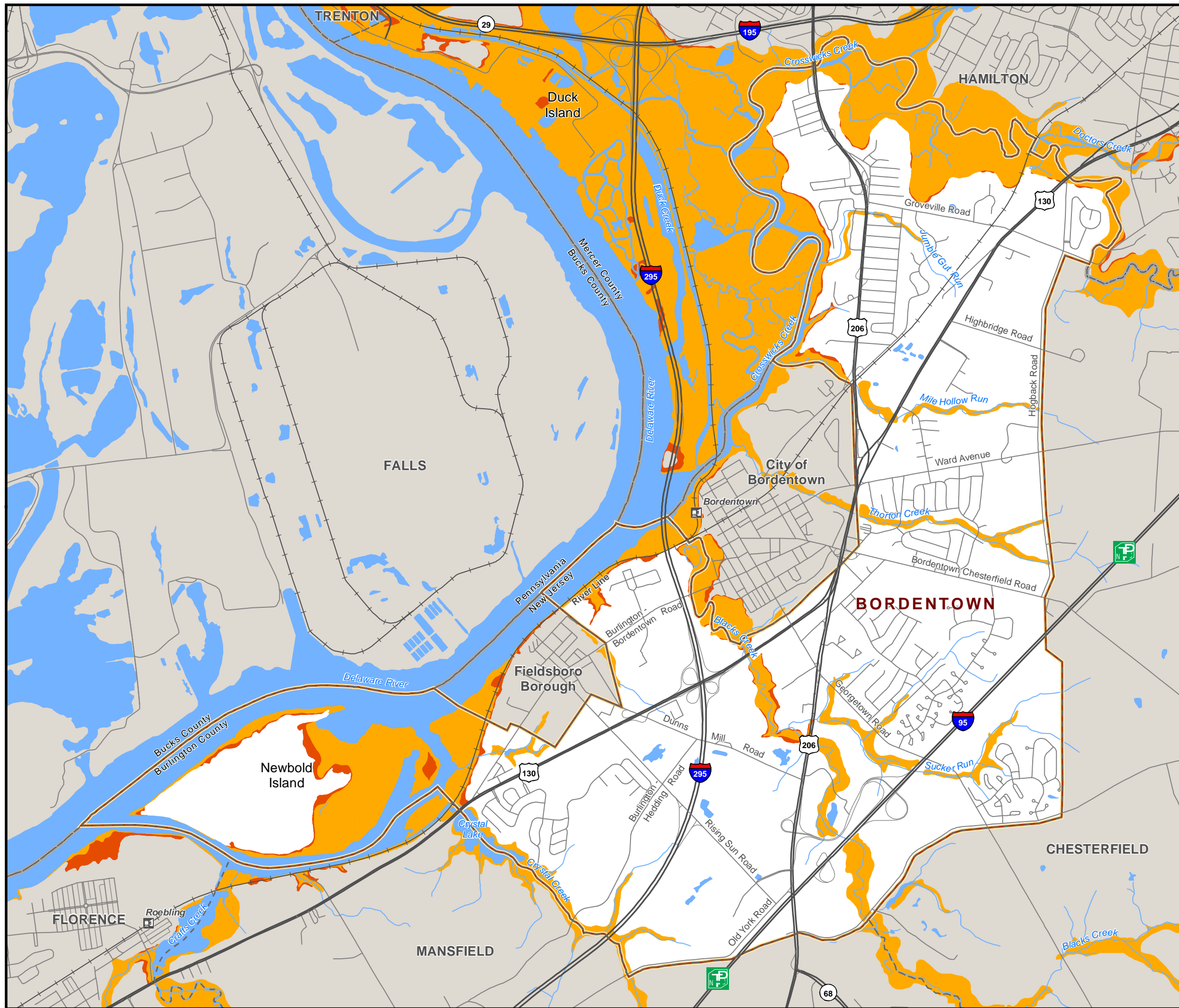
Bordentown Township

**Map 10:
Surface Water, Wetlands,
and Vernal Pools**

-  Head of Tide
-  Dam
-  Potential Vernal Pool
-  Agricultural Wetlands
-  Wetlands
-  Surface Water
-  Stream



Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



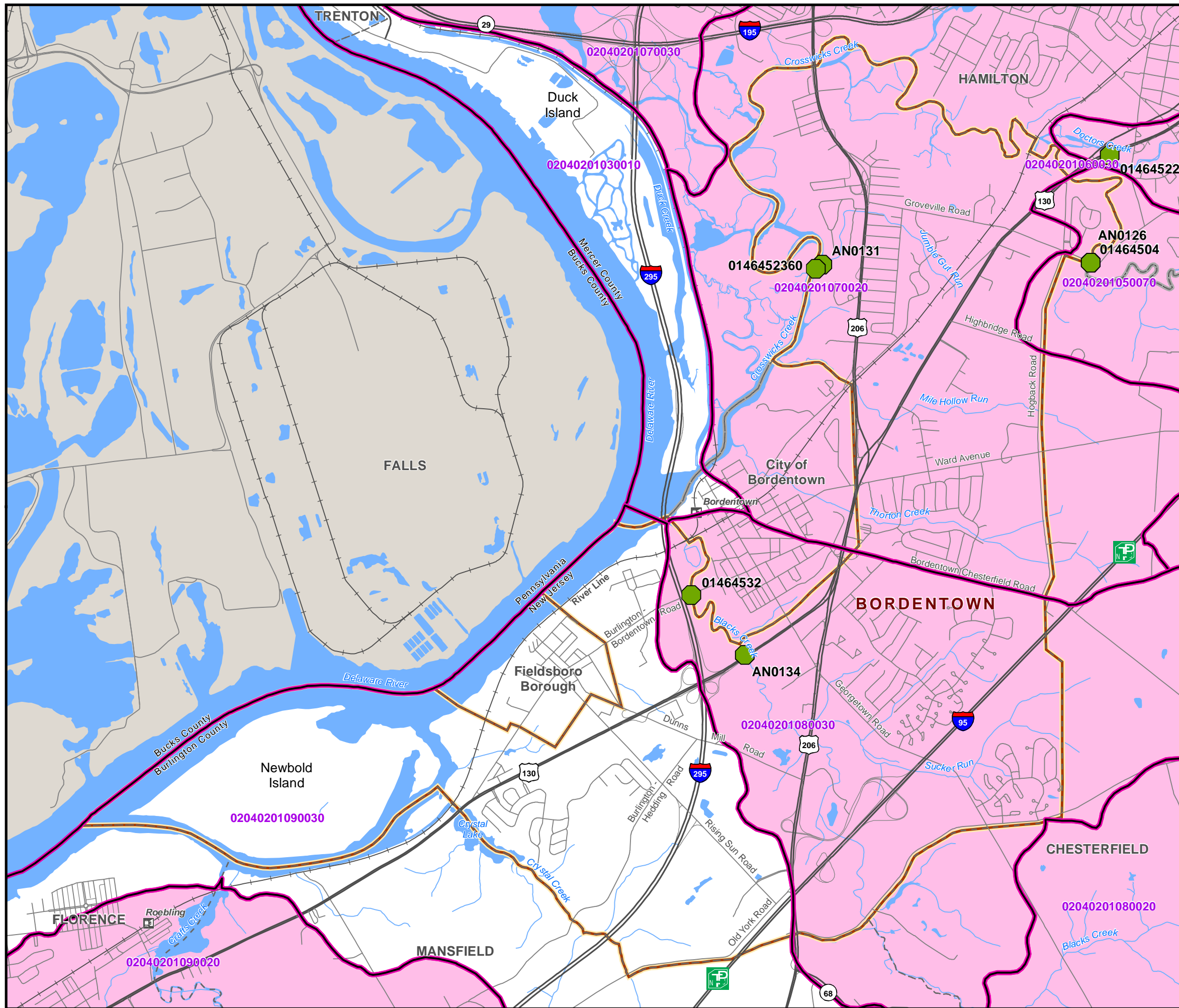
Bordentown Township

Map 11: Floodplains (1990)

Acres are listed in Table 10.







Source : DVRPC, FEMA, NJDEP, NJDOT, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.





Bordentown Township

Map 12: Water Quality (2010)

Subwatershed assessments are listed in Table 11.
Station information is listed in Table 12.

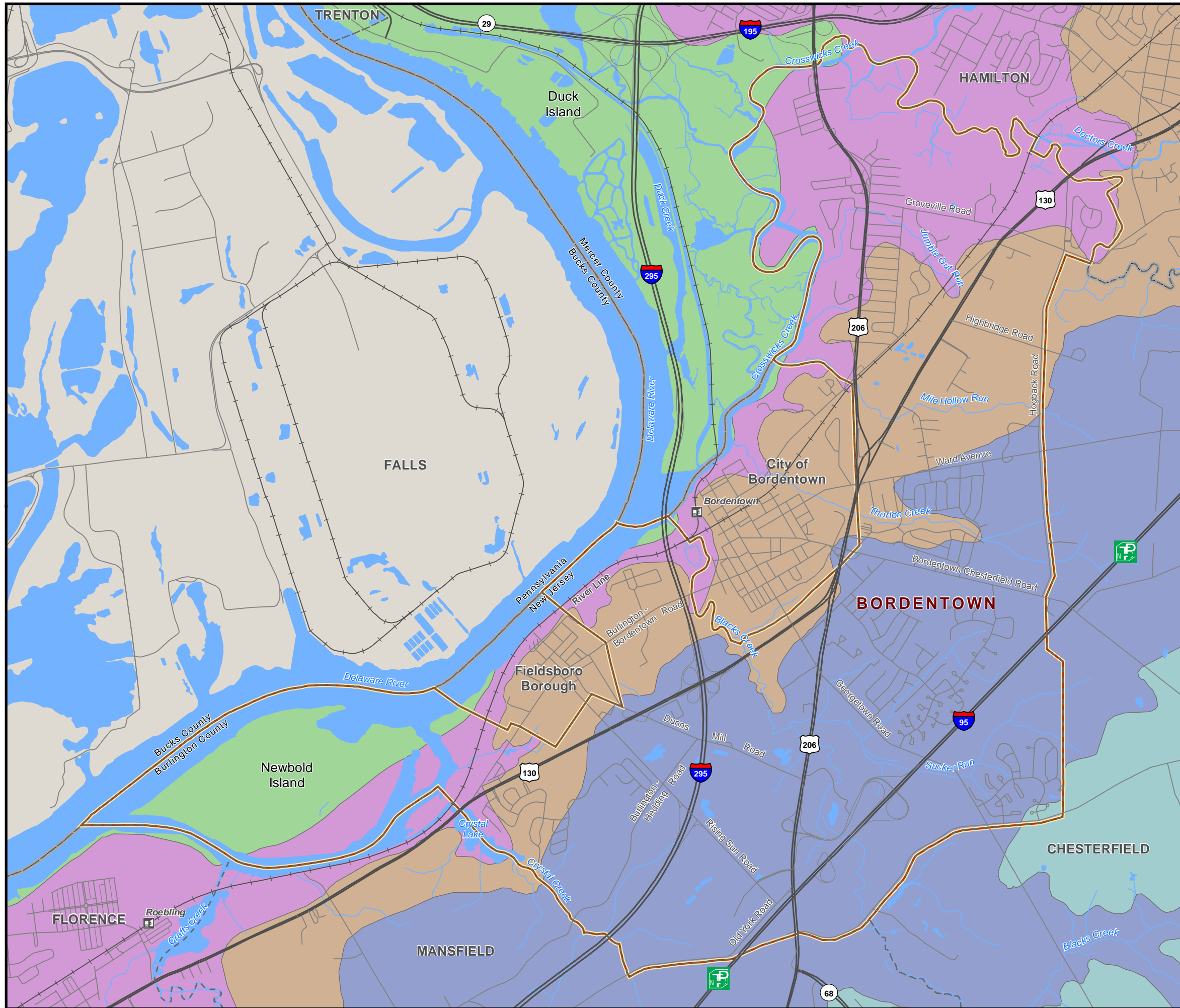
-  Water Quality Monitoring Station
 -  HUC 14 Subwatershed
- Integrated Water Quality Report**
- General Aquatic
-  Insufficient Information
 -  Not Supporting

0 0.25 0.5 1
Miles






dvrpc
REGIONAL
PLANNING COMMISSION

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.





Bordentown Township

Map 13: Geologic Outcrops

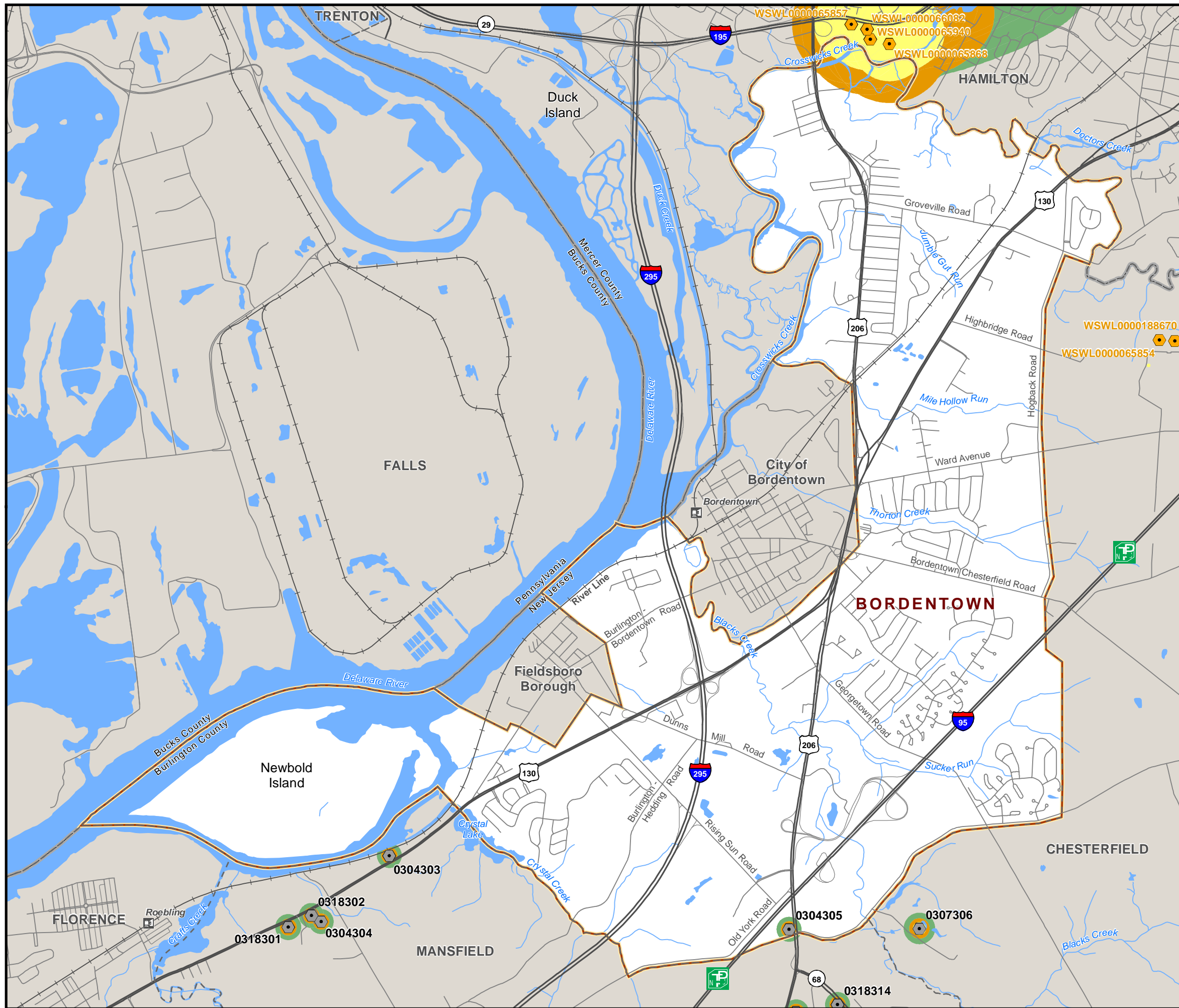
- Outcrop Formations**
-  Potomac Formation
 -  Magothy Formation
 -  Merchantville Formation
 -  Woodbury Formation
 -  Englishtown Formation

0 0.25 0.5 1
Miles

DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION



Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



Bordentown Township




Map 14: Public Water Supply Wells

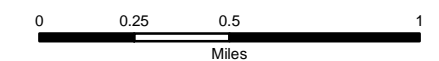
Wells are listed in Table 16.

-  Public Non-Community Well
-  Public Community Well

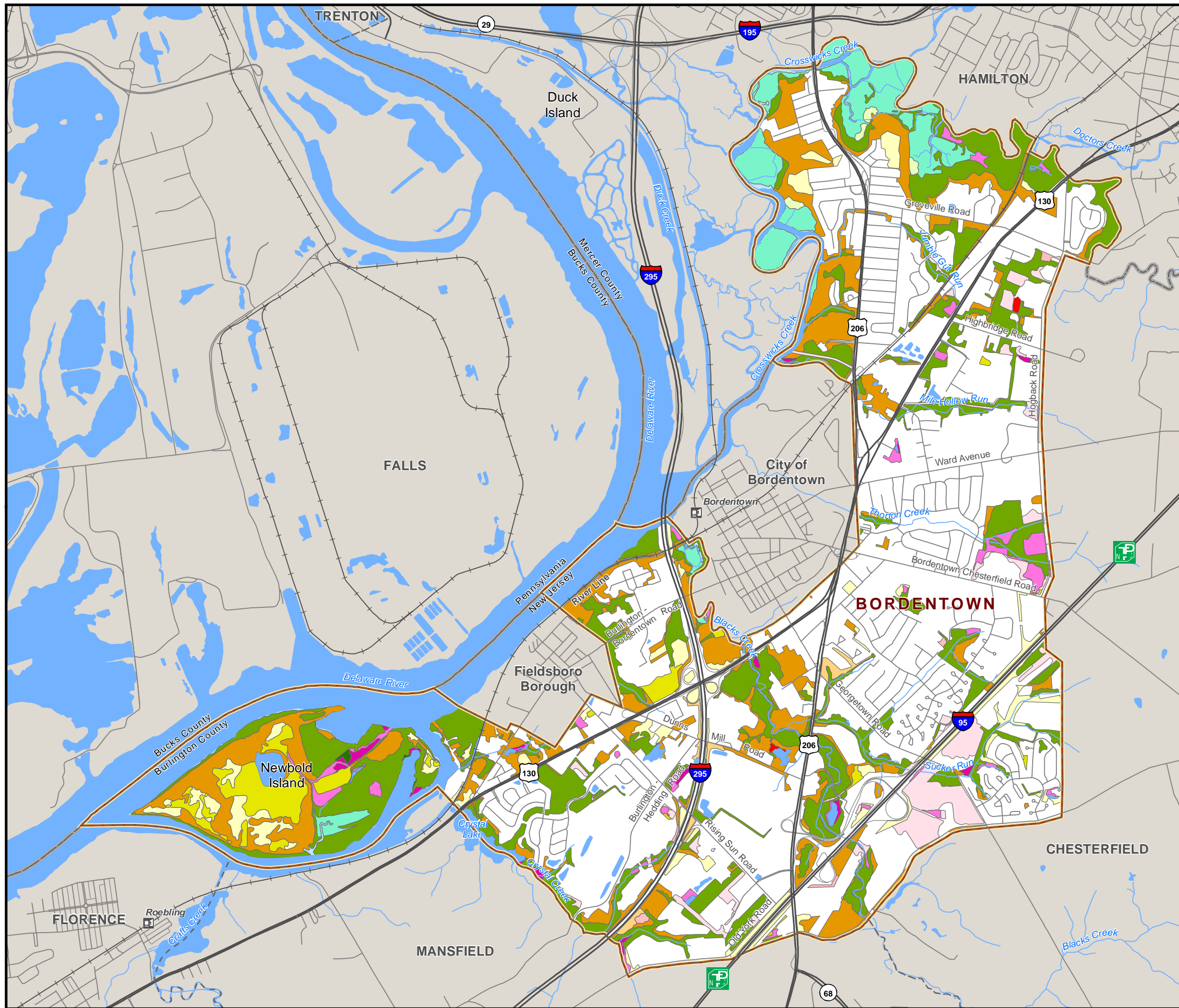
Public Community (2008)
Public Non-Community (2004)

Wellhead Protection Areas

-  2-year time of travel
-  5-year time of travel
-  12-year time of travel



Source : NJDEP, NJDOT, NJGS, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

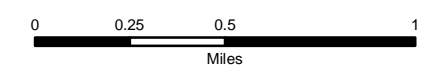


Bordentown Township

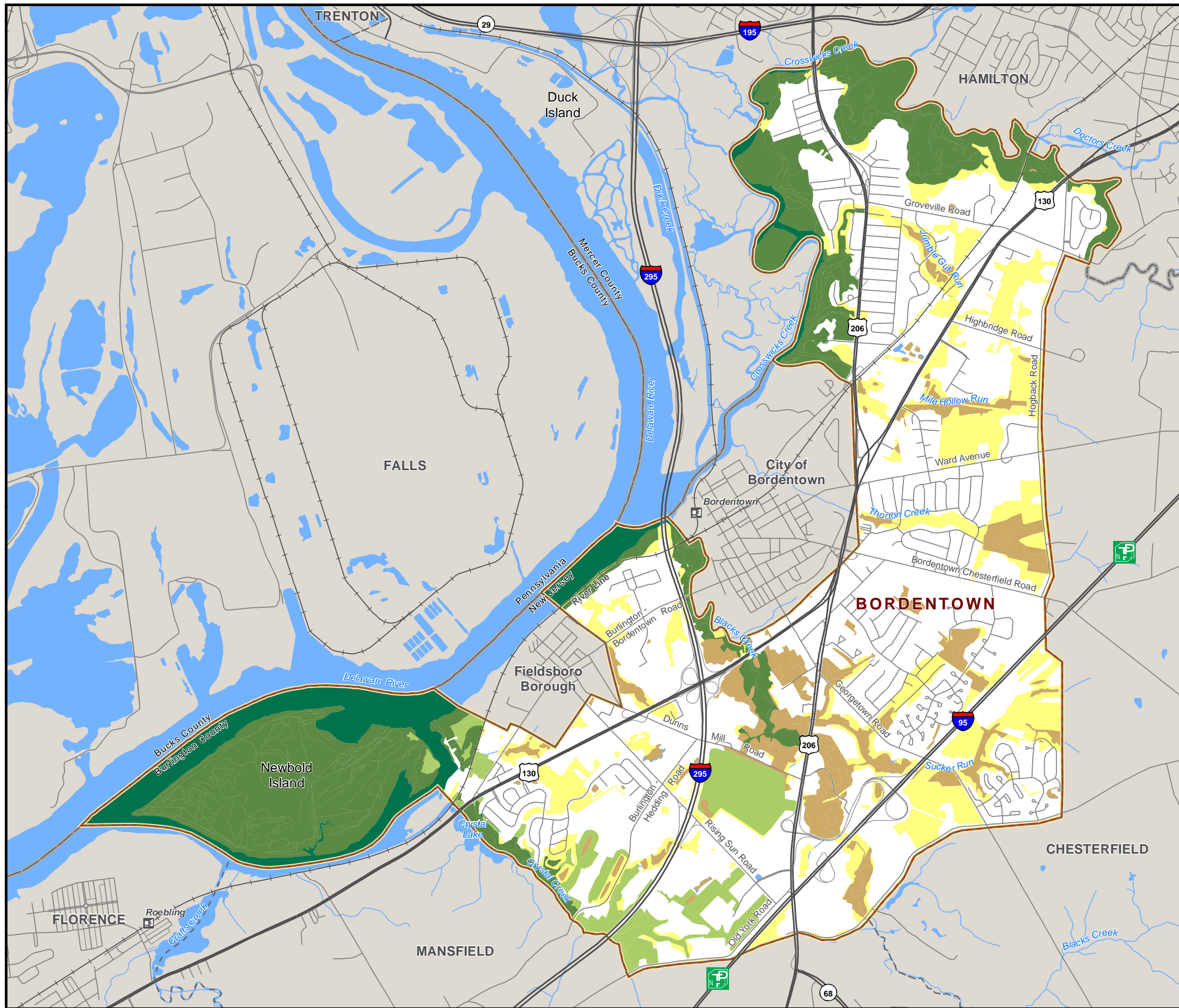
Map 15: Natural Vegetation (2007)

Acres are listed in Table 21.

-  Brush/Shrubland
-  Brush/Shrubland - Oldfield
-  Upland Forest - Coniferous
-  Upland Forest - Mixed (Con. Dom.)
-  Upland Forest - Deciduous
-  Upland Forest - Mixed (Decid. Dom.)
-  Water
-  Tidal Waters
-  Tidal Marshes - Freshwater
-  Wetlands - Modified
-  Wetlands - Scrub/Shrub
-  Wetlands - Herbaceous
-  Wetlands - Wooded - Deciduous
-  Wetlands - Coastal (Phragmites Dominated)
-  Wetlands - Phragmites Dominated



Source : NJDEP, NJDOT, DVRPC, TANA.
 This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



Bordentown Township

Map 16: Landscape Project Priority Habitat (2012)

Acres are listed in Table 22.

Ranking

- Rank 1 - Habitat specific requirements
- Rank 2 - Special Concern
- Rank 3 - State Threatened
- Rank 4 - State Endangered
- Rank 5 - Federal Listed

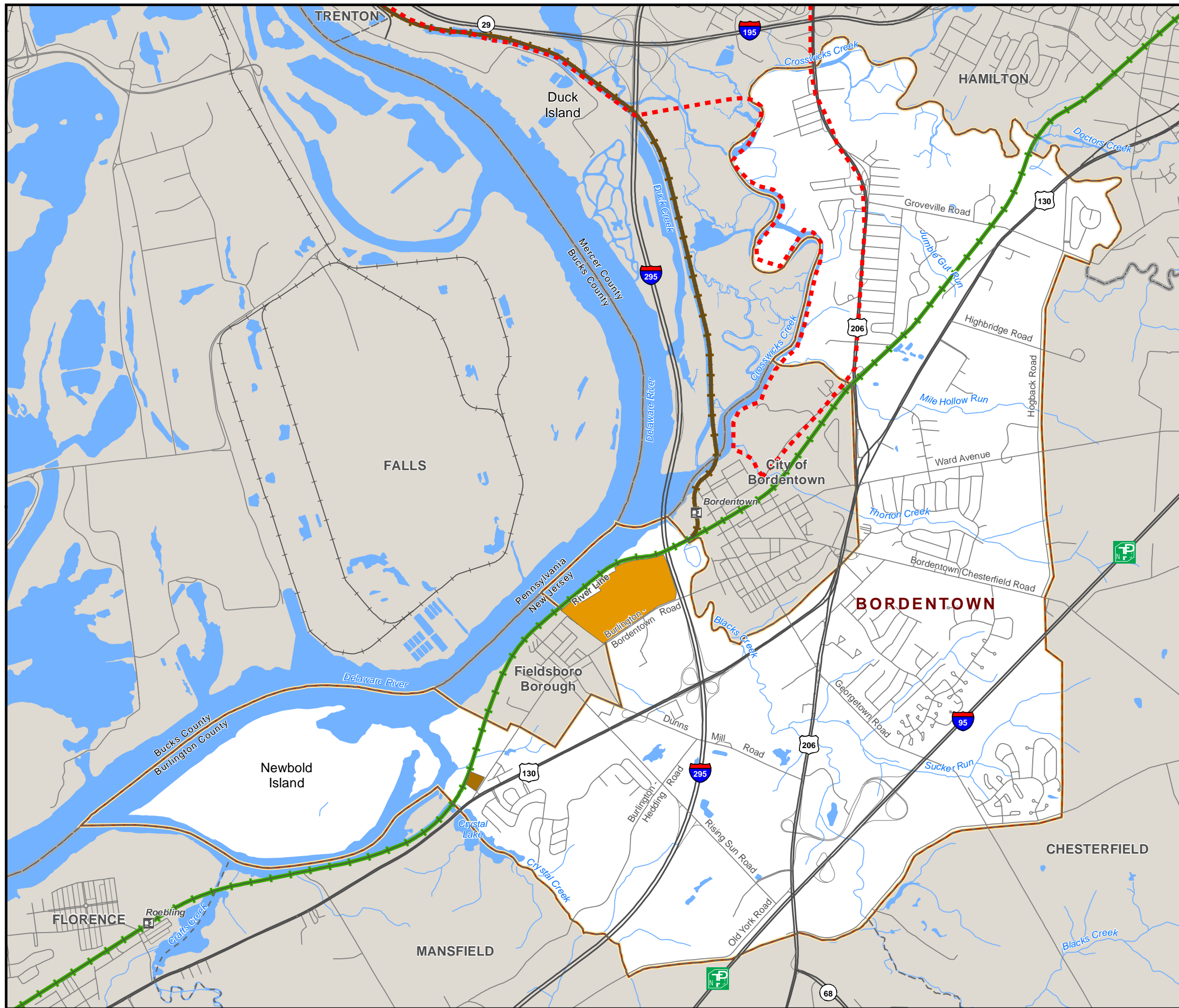







Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

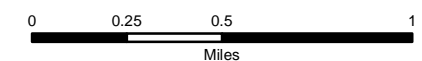
Bordentown Township

Map 17: Historic Resources

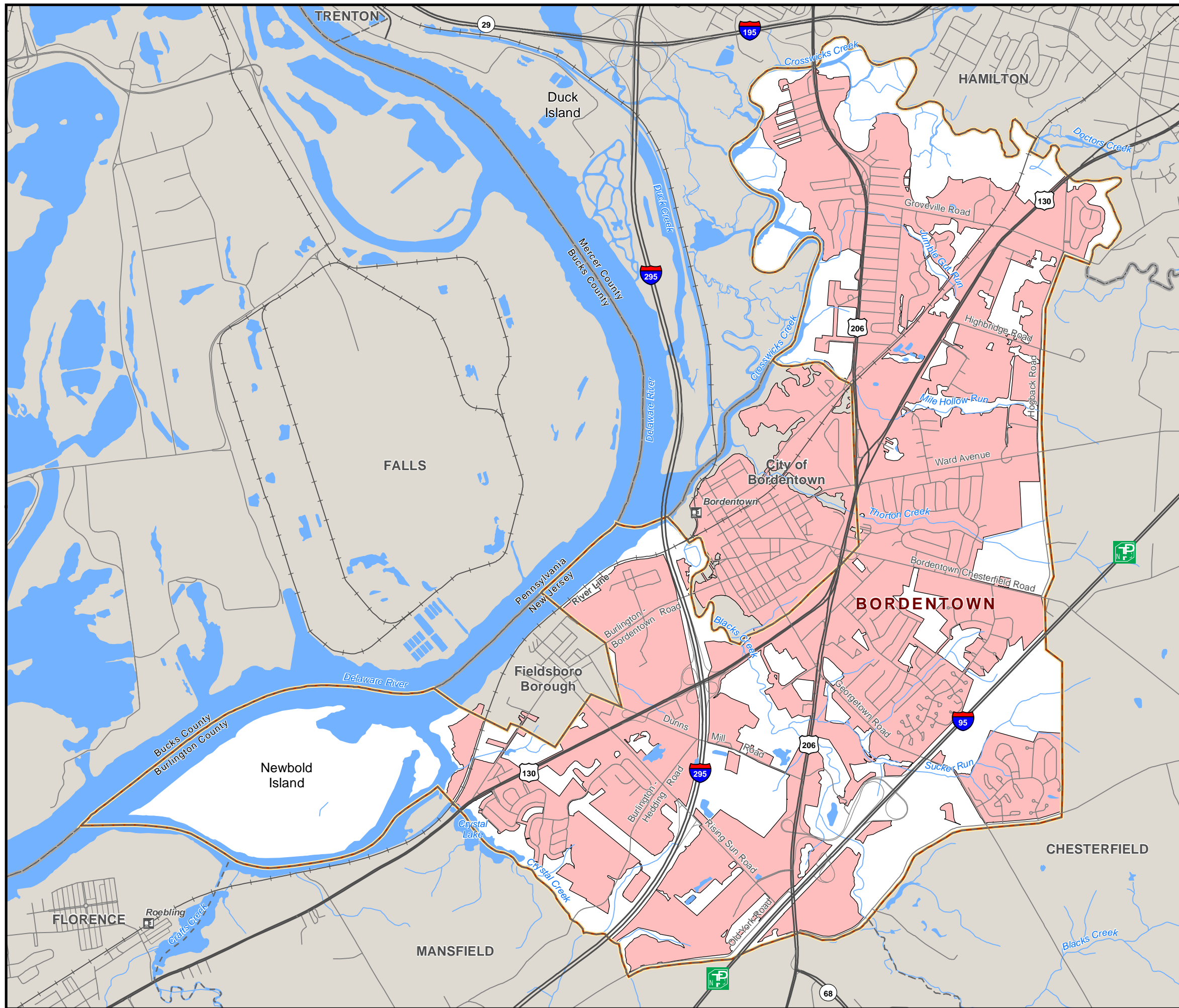
Sites are listed in Table 23.



-  Abbott Farm Historic District
-  Hilltop House
-  New Jersey Manual Training and Industrial School for Colored Youth
-  Delaware and Raritan Canal Historic District
-  Camden and Amboy Railroad Historic District



Source : NJDEP, NJDOT, DVRPC, TANA.
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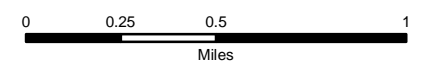


Bordentown Township

Map 18: Sewer Service Area (2012)

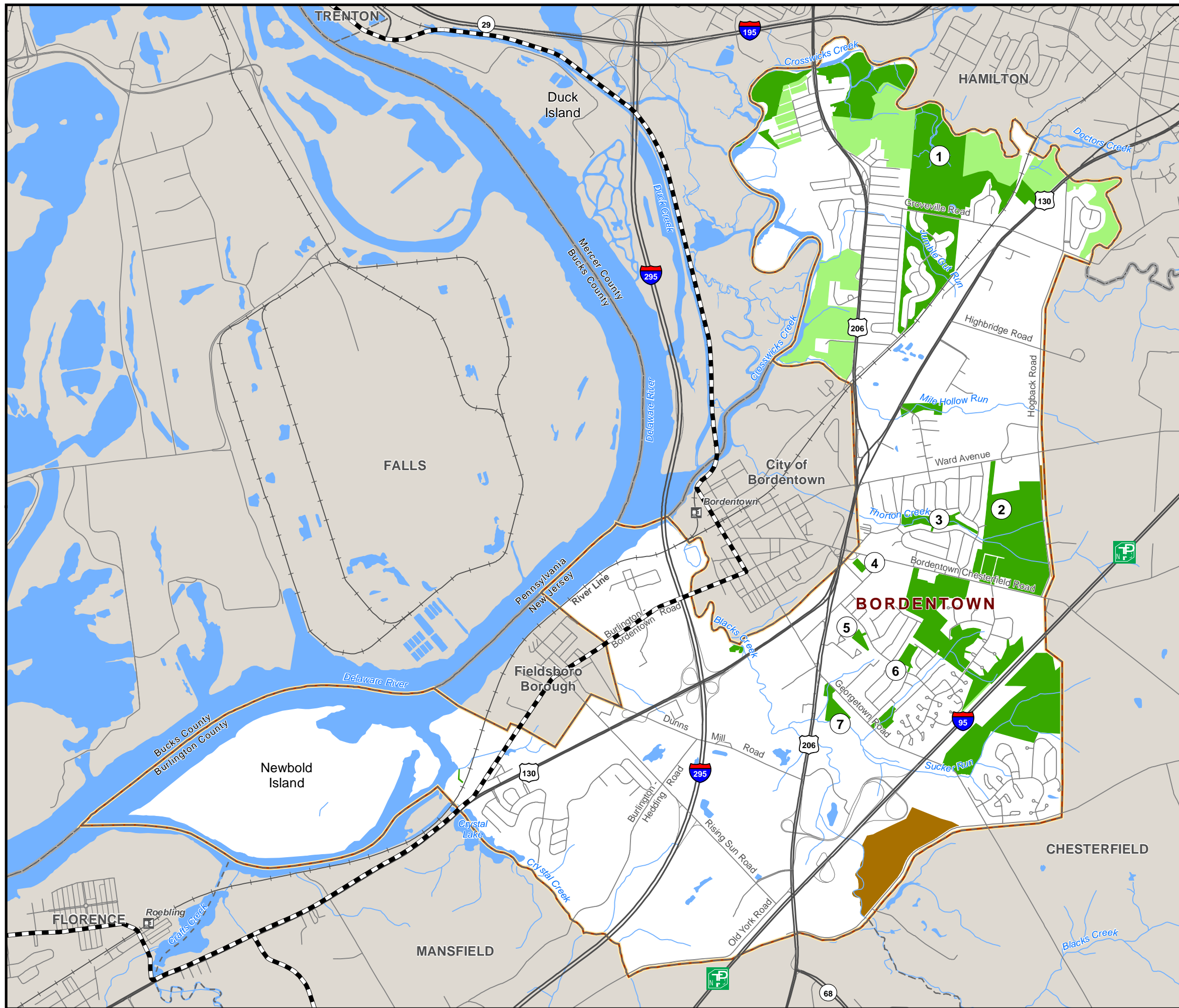
Approved Sewer Service Area

Blacks Creek WWTP



Source : NJDEP, NJDOT, DVRPC, TANA.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



Bordentown Township

Map 19: Parks and Open Space (2011)

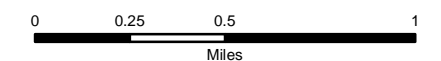
Delaware River Heritage Trail

Protected Open Space

- Municipal
- Preserved Farmland
- State

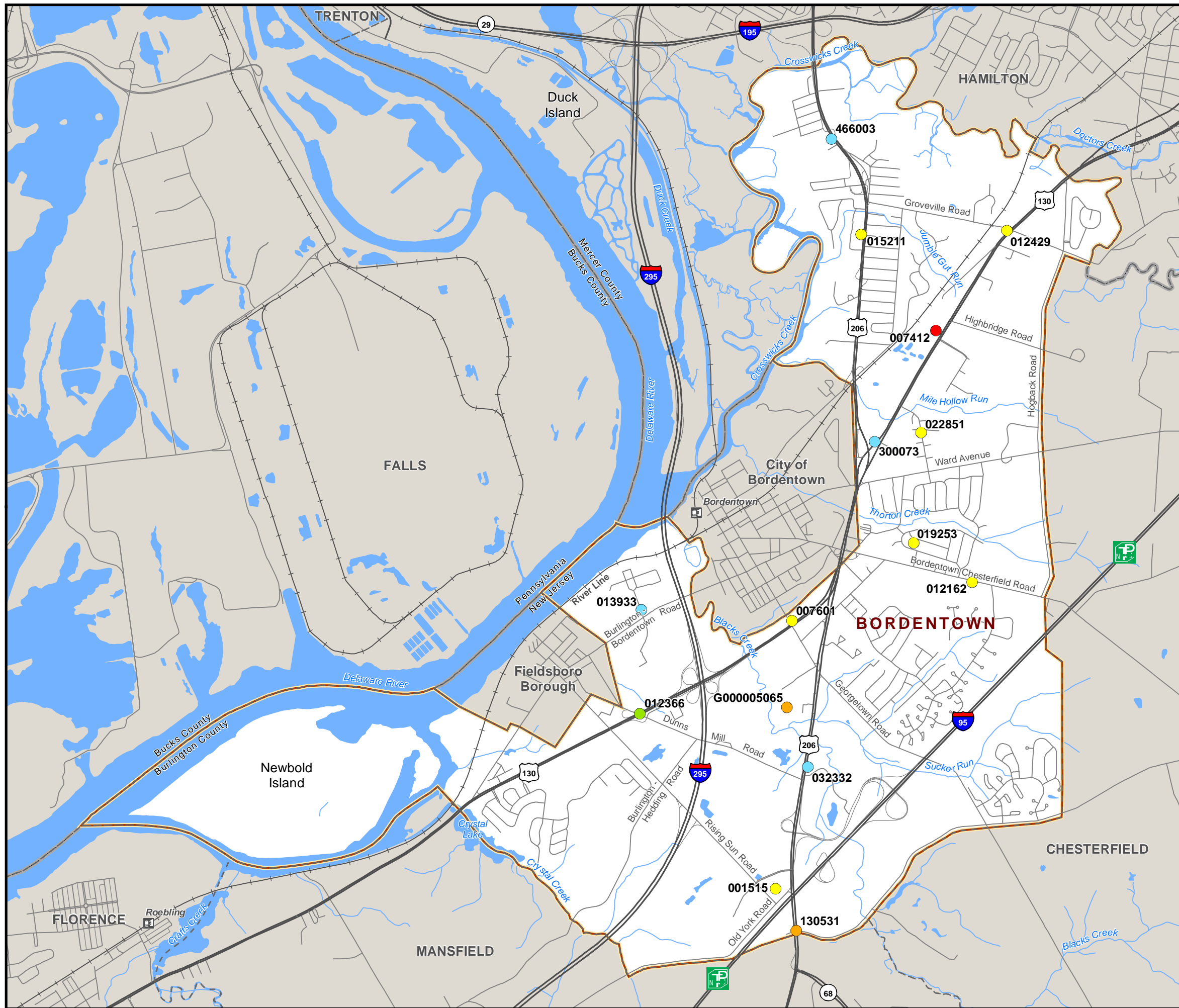
Parks

1. Northern Community Park
2. Joseph H. Lawrence Park
3. Charles Bossert Park
4. Seth C. Hand Memorial Park
5. Constitution Park
6. Terry Field
7. Laurel Park



Source : NJDEP, NJDOT, DVRPC, TANA.

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Bordentown Township

Map 20: Known Contaminated Sites (2012)

Sites are identified by Program Interest (PI) number and are listed in Table 24.

Remedial Level

- **B: Single Phase Remedial Action, Single Contamination Affecting Only Soils**
- **C1: No Formal Design, Source Known Potential Groundwater Contamination**
- **C2: Formal Design, Known Source with Groundwater Contamination**
- **C3: Multi-Phased Remedial Action, Unknown or Uncontrolled Discharge to Soil or Groundwater**
- **D: Multi-Phased Remedial Action, Multiple Source/Release to Multi-media Including Groundwater**



Source : NJDEP, NJDOT, DVRPC, TANA.
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Publication Title: Environmental Resource Inventory for the Township of Bordentown

Publication Number: 13062

Date Published: August 2013

Geographic Area Covered: Bordentown Township, Burlington County, New Jersey

Key Words

Agriculture, air quality, aquifers, biodiversity, biological resources, Bordentown Township, built environment, Burlington County, climate, conservation, Crosswicks Creek, Delaware River, development, endangered species, environmental issues, environmental resource inventory, floodplains, forests, grasslands, groundwater, habitat, land preservation, Landscape Project, master planning, natural resources, New Jersey, open space, population, soils, steep slopes, topography, U.S. Census, vernal pools, water quality, watersheds, wetlands.

Abstract

This publication documents the natural and community resources of Bordentown Township, Burlington County, New Jersey. The natural resource information includes descriptions, tables, and maps of: land use; soils; drinking water, aquifers, and wells; surface waters, including watersheds, streams, lakes, wetlands, and floodplains; impacts on water resources and surface water quality; impervious coverage; vegetation, including wetlands, forests, and grasslands; animal communities; threatened and endangered species; Natural Heritage Priority Sites; Landscape Project Priority Habitats; and known contaminated sites. Community resources that are briefly described include population, transportation, township utilities and services, historic sites and buildings, and protected open space. A short history of the community is also included.

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