ENVIRONMENTAL RESOURCE INVENTORY

ERI

NOVEMBER 2012

For the Township of:

FRANKLIN

Gloucester County, New Jersey

by:

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

with:

Franklin Township Environmental Commission

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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.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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Acknowledgments

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and

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Franklin Township Committee:

Joseph C. Petsch (Mayor), David Deegan, Patrick M. Dougherty, Vito Genna, and Marge Pfrommer (Deputy Mayor).

The impetus for the creation of this document, and its guidance and review, came from the Franklin Township Environmental Commission.

Franklin Township Environmental Commission:

Joseph Arsenault (Vice Chair), Nora Craig, Kevin Kelton, Suzanne McCarthy (Chair), Jay Mounier, Sara Thurston, Peter Petowich, Howie Atkinson Jr. (Alternate #1), Roger Duerr (Alternate #2), Vito Genna (1st Liaison), Joe Petsch (2nd Liaison), and Carolyn Toy (Secretary).

Special thanks are due to Michael Hogan for the use of his photos throughout the ERI. Thanks are also due to Gretchen McLain for her help on the list of historic properties.

Executive Summary

Franklin Township is a municipality of nearly 17,000 people and covers nearly 57 square miles (36,141 acres). Franklin Township contains a diversity of landscapes, land uses, and plant and animal life. The eastern portion of the township is within the Pinelands, while the western portion contains the headwaters of the Maurice River, a Wild and Scenic River as recognized by the National Park Service.

Franklin Township lies in the Outer Coastal Plain and contains mostly sandy soils.

Iona Lake

There are about 67 miles of streams running through Franklin Township, 30 of which are headwater streams. There are also 350 acres of lakes and ponds, including Franklinville Lake, Iona Lake, Malaga Lake, Timothy Lake, Idle Acres Lake, McCarthys Lakes (in Piney Hollow Natural Area), and Cedar Lake.

The western portion of Franklin Township lies within the Maurice River Watershed, while the eastern portion is within the Green Egg Harbor Watershed. Franklin Township lies within 15 subwatersheds which ultimately drain to either of these larger watersheds.

The largest type of land cover in Franklin Township is forest, which covers about 37 percent of the township. This is followed by developed land (22 percent) and agriculture (21 percent).

There are 15 species of rare wildlife found in Franklin Township, including the threatened barred owl and Cooper's hawk and the endangered red-shouldered hawk.

Most residents of Franklin Township rely upon drinking water wells and septic systems.

The 900-acre White Oak Fish and Wildlife Management Area is located partially within Franklin Township. Other nature preserves include the Unexpected Wildlife Refuge and The Nature Conservancy Tract along Still Run.

Understanding and protecting the township's environmental resources is critically important in protecting the health and vitality of the township. Detailed documentation of these resources will aid Franklin Township's citizens in balancing the pressures of growth with conservation while maintaining and shaping the community's unique identity and preserving its rich historic fabric and exceptional natural environment.

Mute Swan

CHAPTER 1

Introduction

The purpose of an Environmental Resource Inventory (ERI) 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.

Sources

Several documents and reports were utilized in preparing the *Environmental Resource Inventory (ERI) for Franklin Township*. These reports and references are listed at the end of this document. This document is an update of the *Environmental Resource Inventory for Franklin Township* produced in February 2002 by the Franklin Township Environmental Commission.

Agriculture near Central Avenue

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 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 Delaware Valley Regional Planning Commission (DVRPC). Information from these sources specific to Franklin 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.

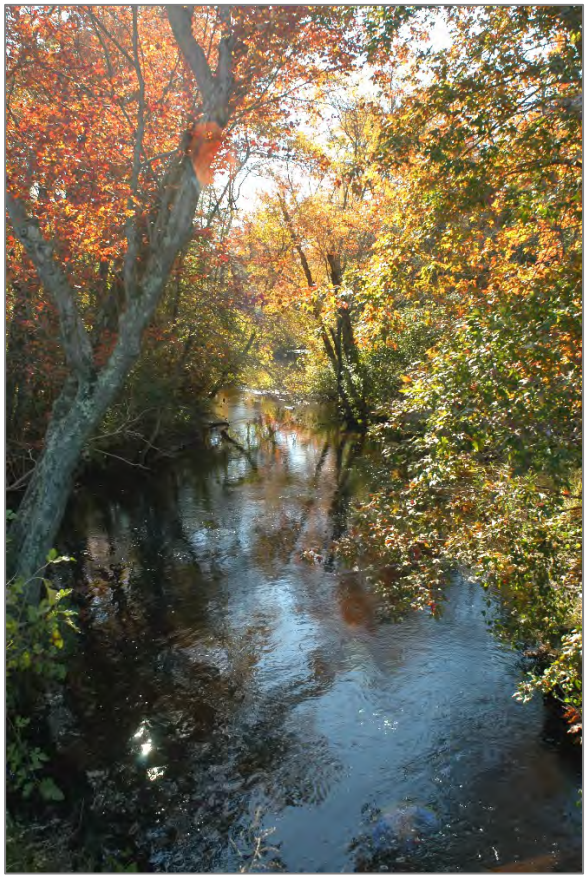
Dirt Road near Piney Hollow Natural Area

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 in the future and to determine the types of investigations that still need to be conducted.

CHAPTER 2

Brief History

Long before European settlement, various peoples occupied the land that would become Franklin Township. Archeological evidence suggests humans arrived in what is now New Jersey over 15,000 years ago. The generally accepted belief of North American migration is that prehistoric humans entered North America by way of Asia over the Bering land bridge and eastward across the northern tier of the continent.



Still Run

Prehistoric archeological artifacts were recovered in Franklin Township prior to the construction of Route 55. At twenty archeological sites in both Franklin and Elk Townships, archeologists uncovered many cultural remains that ranged from the Paleo-Indian period (15,000 to 7,000 BC) to the Late Woodland Period (500 to 1000 AD). Artifacts at some sites possibly indicated Native occupation that occurred concurrent with European occupation. These prehistoric sites and artifacts are further described in the **Historic Resources** section.

By the time of European arrivals, the Algonquin-speaking Native Americans in the region called themselves the Lenni Lenape and the region they lived in was called Lenapehoking. The Lenni Lenape occupied the area within present-day New Jersey, the southeast section of New York, northern areas of Delaware and the eastern part of Pennsylvania. In Algonquin, Lenni Lenape means “true men” or “original people.” Societies were grouped into clans determined by matrilineal descent. The Unami division of the Lenape occupied southern New Jersey and spoke their own dialect within the Algonquin linguistics group.

The Lenni Lenape valued this region for its rich soils and abundance of fish and game. Agriculture provided a substantial portion of their diet. The regional creeks were extensively utilized by the Lenni Lenape for transportation. Semi-permanent village settlements were often located along stream banks for ease of transportation and fishing. Lenape

groups farmed, maintained orchards, fished and hunted, shifting settlements only when resources were depleted, a practice called “agricultural shifting”.

The Europeans called them “Delaware Indians” because they inhabited the Delaware Valley, which itself was named in honor of the Governor of Virginia, Sir Thomas West, and Third Lord de la Warr, the governor of the first British colony at Jamestown, Virginia.

Freshwater Clams in Still Run

A prominent archeological site in Franklin Township is located near the present Janvier School, along Indian Branch. In 1916, arrowheads, pottery and remnants of campsites were found there. Another site is located along the present Route 55 corridor. Native American artifacts that have been unearthed are generally located along river corridors and in upland areas at watershed divides. The location of these artifacts indicates that Native Americans camped in areas where they could exploit the resources associated with the merger of two ecosystems, and the wildlife associated with river corridors.

As the colonial era began, the transition to European dominance changed land usage and resource distribution practices throughout the region. Acquiring private property in exchange for money and goods was a European custom that colonists introduced through treaties and land purchases with Native groups. In 1664 the concept of private property was unilaterally imposed throughout New Jersey when King Charles II of England seized control of the region from the Dutch and French, taking over much of America’s eastern seaboard as well. The British quickly sought to occupy the land and secure its control. Between 1664 and 1700 Lenape populations in New Jersey declined as groups in the area suffered from exposure to diseases like smallpox, measles and tuberculosis, imposed limitations on their movement, and sporadic violent conflicts. In the centuries since, a series of compulsory displacements by colonial powers brought most Lenape groups to settle in Oklahoma. Among the Lenape who survived in Pennsylvania and New Jersey, those who practiced their heritage did so covertly to avoid peril.

Europeans first began to leave their mark on the countryside around Franklin Township in the late 1600s. These early settlers were of Dutch, Swedish and English descent. The earliest European settlements were located on waterways such as Little Ease Run, Scotland Run and Still Run and relied heavily on the forested timber. The first industries in Franklin were lumber production and agriculture, both of which directly relied on the land and its resources. As lumber production cleared forested areas of the Township, agriculture became an easier

endeavor and it became the dominant land use. Certain sections of the Township were better suited to agriculture than others and these areas remained in use as farmland. Cleared areas where soils were not conducive to crop production reverted to forest.

Areas along stream corridors, where hydropower could be exploited, became attractive as industrial centers. Porchtown, Malaga and Franklinville are all settlements that developed around the waterpower derived through mills located on the plentiful streams of the Maurice River system. Created by the mill dams that sprang up in town centers in the 1800s, the Township's lakes are a testament to Franklin's early industrial legacy. After the establishment of these centers, rail lines were built to service the commercial needs of the manufacturing facilities. By 1834 two rail lines were in operation through Franklin Township, both of which were operated by the West Jersey Railroad. The first line ran from points north, along the current track through Franklinville and Malaga. The second line ran from Newfield to Mays Landing and points east.

Zion Methodist Church

Franklin Township was incorporated in 1820 out of portions of Woolwich and Greenwich. At the time of its incorporation it was fifteen miles long and over six miles wide, an area of 72,000 acres - roughly twice its present size. The meeting to establish the municipality was held at Cakes Tavern, which is now the Franklinville Inn. Parts of present-day Glassboro, Clayton, Newfield and Elk were included in the original Franklin Township. Over time the Township has lost area to the incorporation of these new municipalities. The most recent was the creation of Newfield Borough in 1924, when the state legislature approved the establishment of the new municipality. Popular myth asserts that the name "Franklin" was applied to the township as an honor to Benjamin Franklin, the colonial figure from neighboring Philadelphia, yet no evidence exists to substantiate this claim.

The earliest settlements in Franklin include Forest Grove, Janvier and Iona. Over time, several smaller centers existed for a time in Franklin, most of which are now recognizable only by their crossroads and cluster of houses. These included Downstown in southern Franklin Township, which had a store, a blacksmith shop and perhaps forty inhabitants. Chewville, which was located in the southeast of the township, contained a church, a sawmill, a cemetery and ten homes.

Forest Grove

Forest Grove got its start in the lumber production business. In a 1903 article taken from *Valley Ventura*, and quoted in *The Sentinel* 175th Anniversary Edition in 1995, it was written that "the country for miles around was covered with a fine growth of timbers," the cutting of which "kept quite an army of men employed." The vitality of the town was lost when the timber was cut over and converted to farmland. At its peak Forest Grove contained a blacksmith, post office, general store, Methodist church and a school.

Franklinville

Franklinville, originally known as Little Ease, was formed in the late 1700s on a 1,000-acre tract of land owned by William Fisher. Sometime before 1800 he built a sawmill on Little Ease Run. It is said that the town received its name when a man injured by a horse kept asking for "a little ease." The town contained, in addition to the mills, a tavern, a blacksmith shop, a shoe shop, a railroad station, a Methodist church, an inn, and a Presbyterian church.

Iona

Iona is located about 2 miles south of Franklinville. It was founded by Moses Crane, and known for a while as Cranetown. Crane operated a sawmill until 1830 when he abandoned it. The town got a train station in 1860 and in 1883 it consisted of 75 residents, a sawmill, a general store and town hall.

Janvier

Janvier was formed in the late 1800s near the present–day Janvier School. It was first known as New Denmark because of the large percentage of Danish immigrants inhabiting the area. New Denmark received its own post office in 1874, but it was changed to Janvier five years later in 1879. The change was made presumably to honor the Janvier family—or one particular member of it, Mary Fries Janvier—which owned a great deal of land in the area.

Malaga

Malaga was formed about 1814 when Christian L. Stanger purchased several thousand acres of land from Daniel H. Miller. A year prior to the purchase, Stanger had constructed a sawmill on Scotland Run. The production of lumber at the sawmill gave rise to Malaga Glass Works, as well as other enterprises in the newly formed town, such as the blacksmith shop, a tavern, and a hotel. Further up, on the east

Malaga Lake Park

side of the newly formed lake the Richman Brothers constructed a flour mill that was in operation for some time. The old site of the mill was north of where Old Delsea Drive (now Malaga Park Drive) branches off from Delsea Drive.

A gristmill was built in Malaga in 1830 by John Rosenbaum. The mill was intended to be for his private use only. As word spread of the new mill in Malaga, Rosenbaum was inundated by requests that he offer his services to the community. He expanded his operation and began commercial service soon after. Malaga received its name from the glass-workers of the Spanish city of Malaga, as well as from the planting of Malaga grapes in the surrounding land.

During 1840 the workers of the Malaga Glass Manufacturing Company, makers of window glass, went on strike and the company employed Belgians to do the work. These workers left Malaga the following year when most of the former employees returned. The glass industry was carried on sporadically, gradually declined, and in 1902 finally ceased altogether.

Porchtown

John Porch settled what was to be called Porchtown in 1780 with the purchase of 2,500 acres of land. In time a gristmill and a sawmill were built on Still Run, forming Iona Lake. Other services in the town, as of 1883, included a blacksmith shop, a shoe shop, and the Porchtown Methodist Church, built in 1828. The population of Porchtown in 1883 was about 70.

Ziontown

An interesting part of Franklin Township's history was the creation of Ziontown. This was one of a number of Jewish settlements in southern New Jersey that were established beginning in the 1880s prompted by anti-Semitism and hostility against Russian Jews following the assassination of Tsar Alexander II.

In 1891, 1,137 acres were acquired in the vicinity of Tuckahoe Road and Dutch Mill Road to develop Ziontown. A shirt factory was built and designed to be the commercial center of the settlement. Although designed as an industrial settlement, the community was no doubt inspired by the successful Jewish agricultural settlements in southern New Jersey like Alliance, Norma, Carmel, Odessa, and Rosenhayn. Ziontown attracted Jewish immigrants who spoke little or no English, and who were fleeing the oppression in Europe.

Ziontown was one of the more short-lived of the Jewish settlements due to lack of support from Jewish aid organizations. As tensions grew in Ziontown because of low wages and poor working conditions, the workers revolted and tried to take over the factory. The sheriff was called in to quiet the unrest. Four of the aggressors were indicted. That incident ended the existence of Ziontown. In total the factory operated for 18 months. By 1913, the land had been sold to incoming farmers.

Twentieth Century

Farming continued to be a main industry in Franklin Township throughout the twentieth century. In addition to the Jewish settlements in South Jersey, other immigrant communities settled in the area, including Italians from the farming regions of Italy who emigrated in large numbers at the beginning of the century. Vegetable farming was dominant until the end of the century when nursery farming began to proliferate.

The area's lakes attracted many to spend their summers in small communities adjacent to Franklinville, Ione, Idle Acres and Wilson Lakes. Housing was modest and on small lots due to the seasonal use of the dwellings. Later, many of the houses were modified and eventually all of these communities within Franklin Township became permanent year-round residences.

Residential Development at Iona Lake

Suburban Development

With the advent of the automobile in the early 1900s, the industrial and commercial centers were connected by the construction of Routes 40 and 47 and, more recently, the construction of Highway 55. To this day Malaga and Franklinville continue to be the Township's major commercial areas.

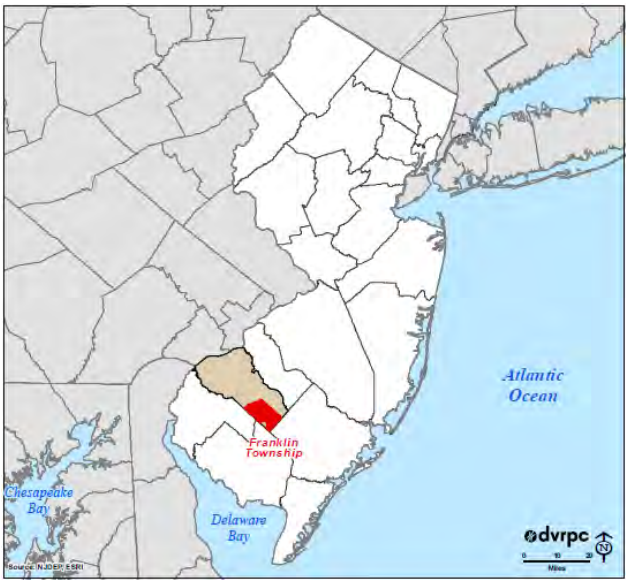
Residential development increased from the 1970s into the twenty-first century, with some larger housing projects being created, especially in the northern corner of Franklin Township in the Star Cross area. However, lack of public water and sewer infrastructure has restrained development compared to adjacent municipalities. Most residential construction has consisted of individually-built single-family houses on large parcels with deep wooded lots.

Today, Franklin is home to a wide array of people from diverse ethnic and social backgrounds, with a variety of occupations reflecting the service and light manufacturing economies of today. Automobile transportation corridors provide the framework for land uses. Many residents commute throughout the tri-state region for employment and for other basic services. This has made the township something of a bedroom community for the more urbanized portions of southern New Jersey. Nonetheless, Franklin Township still supports a significant farming and rural residential community with large areas of forested land.

CHAPTER 3

Location, Size, and Land Use

Figure 1: Location of Franklin Township



Franklin Township is an incorporated township located in southeastern Gloucester County, New Jersey. The U.S. Census Bureau estimates that Franklin Township had a population of 16,820 people in 2010, a nine percent increase from its 2000 population of 15,466. The area is primarily rural, although the township is close to the Philadelphia-Camden urbanized area. Franklin Township occupies 56.47 square miles straddling the Pinelands to the east and farmland to the west. Franklin's 36,141 acres are bordered by four Gloucester County municipalities (Elk, Clayton, Monroe and Newfield) and three other counties (Salem, Cumberland and Atlantic). See **Map 1: Places in Franklin Township** and **Map 2: Aerial Photo (2010)**.

There are a number of individual communities/neighborhoods within Franklin Township, each with its own identity. These include Fries Mill, Star Cross, Janvier, Franklinville, Iona, Porchtown, Plainville, Malaga, Blue Bell, and Forest Grove.

The majority of land in Franklin Township is classified as forest (37.2% or 13,401 acres). This is followed by urban land (22.4% or 8,093 acres). As of 2007, agriculture is the third most common type of land use in Franklin Township, comprising 20.9% (or 7,561 acres) of the township, followed by wetlands, which make up 17.4% (or 6,292 acres) of the township.

Table 1: Franklin Township General Land Cover (2007) shows Franklin 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, which is obtained every five years but requires at least 3 years of scientific analysis to determine detailed land cover. NJDEP's categorization separates wooded wetlands from upland forest areas and includes the former in the wetlands category.

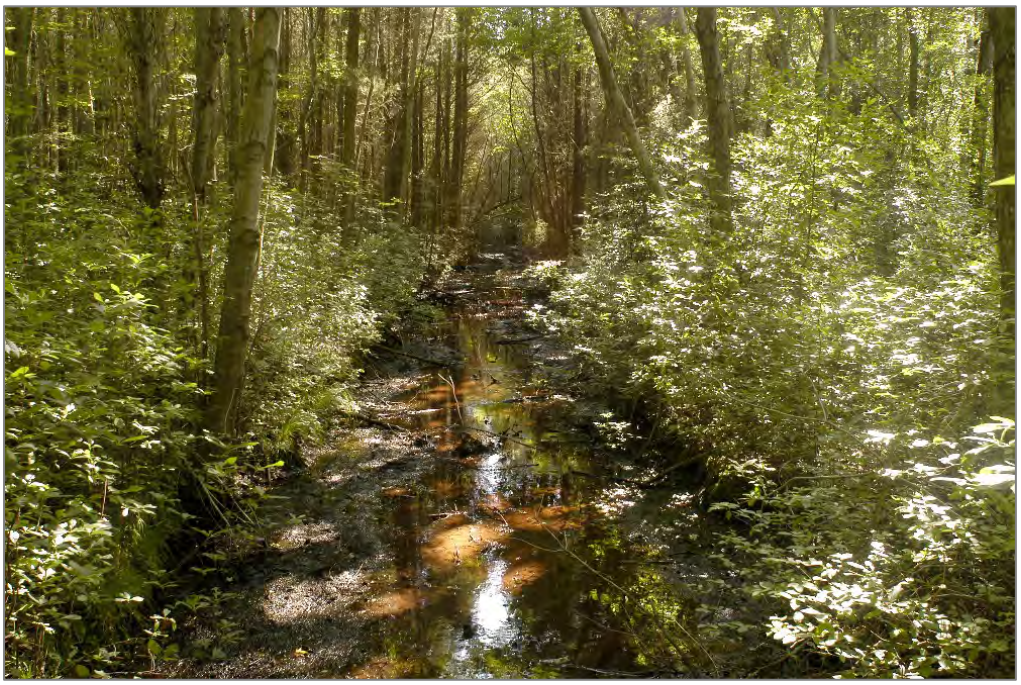
Table 2: Franklin Township Detailed Land Use (2005) is from DVRPC and is based on visual interpretation of 2005 aerial photos. See **Map 3: NJDEP Land**

Cover (2007). For more detailed NJDEP vegetative cover, see **Map 17: Natural Vegetation (2007)**.

Table 1: Franklin Township General Land Cover (2007)

General Land Classes	Area (Acres)	Percent
Agriculture	7,561.82	21.0%
Barren Land	314.45	0.9%
Forest	13,401.35	37.2%
Urban	8,093.61	22.4%
Water	392.11	1.1%
Wetlands	6,292.16	17.5%
Total	**36,053.50**	**100.0%**

Source: NJDEP, 2007



Stands of Atlantic White Cedar along a Stream Corridor

Table 2: Franklin Township Detailed Land Use (2005)

Type	Area (Acres)	Percentage
Agriculture	8,295.64	23.0%
Commercial	457.40	1.3%
Community Services	101.70	0.3%
Manufacturing: Light Industrial	24.46	0.1%
Mining	37.09	0.1%
Parking: Commercial	35.95	0.1%
Parking: Community Services	15.14	0.0%
Parking: Light Manufacturing	0.96	0.0%
Parking: Multi-Family	1.13	0.0%
Parking: Recreation	4.24	0.0%
Recreation	370.07	1.0%
Residential: Mobile Home	34.37	0.1%
Residential: Multi-Family	2.57	0.0%
Residential: Single-Family Detached	5,995.75	16.6%
Transportation	225.64	0.6%
Utility	637.75	1.8%
Vacant	692.40	1.9%
Water	429.32	1.2%
Wooded	18,674.29	51.8%
Total	**36,035.84**	**100.0%**

Source: DVRPC, 2005

Approximately 17% of the township is used for residential dwelling units. The most common residential dwelling is a single-family home located on a lot of at least one acre. There are also small areas of higher density residential units located in the villages of Malaga and Franklinville where smaller lots exist. There is very little area dedicated to multi-unit dwellings and mobile homes, which are primarily limited to the Route 47 corridor.

Commercial uses are limited to just one percent of the township's land. Most areas are primarily used for sale of products and services. Included are central business areas in Franklinville and Malaga, commercial strips and shopping centers, isolated commercial uses, and office buildings. Commercial areas include a number of retail and wholesale land uses often occurring in mixed cultural settings, such as the intersection of Routes 47 and 40 in Malaga and the intersection of Coles Mill Road and Delsea Drive in Franklinville.

Less than one percent of Franklin Township is dedicated to manufacturing, of both light and heavy industry. Light industry includes product assembly, product transfer, warehouse and trucking operations. Heavy industries are limited in the township to metal plating and sand and gravel mining. Each of these uses are scattered throughout the township, primarily but not exclusively along major transportation corridors.

Transportation and utilities occupy over two percent of land in Franklin Township. Many of the township's road miles are maintained by agencies such as the State Department of Transportation (NJ DOT) or the County Road Department. State highways include Routes 40, 47 and 55. County roads such as Routes 555, 557, 610, and 538 are primarily maintained by the Gloucester County Department of Public Works.

Horticulture near Piney Hollow Road

Agricultural land covers about one-fourth of Franklin Township. It remains the mainstay of the local economy and has played a large part in the development of Franklin Township. Farmland is integral to the landscape fabric, binding together various uses throughout the township. The majority of land dedicated to farming is associated with food production and nursery crops. Food production occurs in open plowed fields that change crops each season. Row crops such as vegetables, salad greens, grains, and animal fodder occupy most township agricultural land. The township does, however, have some land dedicated to more permanent or longer rotation crops such as fruit trees. The orchards are primarily apples and peaches. To a lesser degree, livestock farming is also practiced. Most land dedicated to animal husbandry is associated with cattle, horses and sheep. Nursery crops such as landscape trees and shrubs and Christmas tree farms occupy the remaining agricultural land in the township. Nursery crops are part of a growing trend in southern New Jersey to supply the home development market with high quality stock.

Between 2002 and 2007, over 900 acres of previously undeveloped land were developed in Franklin Township according to NJDEP land cover data. About 500 acres of forest land and over 300 acres of agricultural land were developed, along with over 50 acres of barren land (which may have been under development in 2002) and over 20 acres of wetlands. See **Table 3: Land**

Developed between 2002 and 2007 and **Map 4: Developed Land, 2002 to 2007**.

Table 3: Land Developed between 2002 and 2007

Land Class in 2002	Land Class in 2007	Area (Acres)
Agriculture	Developed	324.83
Barren Land	Developed	52.62
Forest	Developed	497.75
Wetlands	Developed	26.56
Total Developed, 2002-2007		**901.77**

Source: NJDEP, 2002, 2007

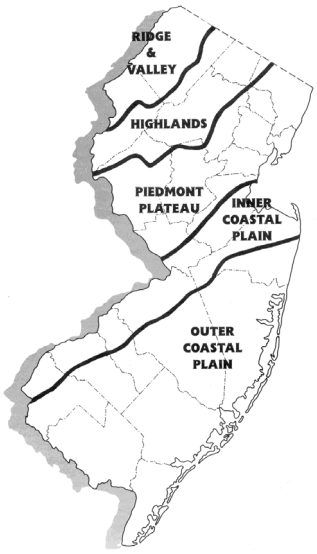
Library and Community Center

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. Franklin Township is located in the Outer Coastal Plain Region.

Figure 2: The Physiographic Regions of New Jersey



Source: NJDEP

The Atlantic Coastal Plain landscape extends from Massachusetts to Texas and is divided into Inner and Outer sections. 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 interbedded sand and clay. Deposits originating in the breakdown of Appalachian and Catskill sedimentary, metamorphic, and igneous rocks are inter-bedded with layers formed by oceanic (marine) deposition, which occurred as the ocean shoreline advanced and receded over geologic time.

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.

In the general vicinity of the dividing line between the two parts of the Coastal Plain is a belt of low hills, which runs northeast and southwest through the southern half of New Jersey. These hills, called the questa, are the youngest of

the Cretaceous formations and are largely made up of sand and marl formations. The Inner Coastal Plain lies to the west of the questa and the Outer Coastal Plain lies to the east. Franklin Township is located in the Outer Coastal Plain just a few miles from the physiographic border.

Earthquakes

On average, earthquakes are very infrequent and very small in New Jersey. There have been no reported deaths caused by an earthquake in the state. However, Cumberland and Union counties are the only two counties in New Jersey not to have been at the epicenter of an earthquake in recorded state history.

In New Jersey, earthquakes usually occur when pressure that has slowly accumulated within the Earth's crust is suddenly released along a fault. The energy from this movement travels as seismic waves along the ground surface and within the crust. The arrival of this released energy is experienced as an earthquake by those on the ground surface.

On November 15, 1939, a 3.4 magnitude earthquake struck in Franklin Township near Malaga. This disturbance was reported from Trenton to Baltimore, Maryland, and from Cape May to Philadelphia. About 16,000 square kilometers were affected. Small objects were reported to have overturned at Deepwater, Salem County, but little or no damage was noted.

On August 23, 2011, a 5.8 magnitude earthquake with an epicenter in Virginia was felt in Franklin Township. This event caused minor damage to structures and concrete.

Topography and Surface Landscapes

Topography relates to the surface terrain and features of an area. The vast majority of Franklin Township is very flat. Ridges and high points delineate the boundaries of watersheds, seen in **Map 11: Watersheds**.

Franklin Township occupies a relatively flat upland straddling the watershed divide between the upper reaches of the Maurice River and Great Egg Harbor Rivers. The surrounding area is characterized by long, flat sand and gravel terraces cascading downslope to river valleys bordering Still Run, Little Ease Run, Scotland Run, and Blackwater Branch, all in the Maurice River watershed, and to Marsh Lake Branch and Whitehall Branch of the Great Egg Harbor River. The topography is a gentle, rolling terrain that supports large wet forested areas in the valleys and large contiguous oak forest on the uplands. Streams are narrow incised corridors on the Maurice tributaries and wide broad corridors in the Great Egg Harbor drainage.

Unexpected Wildlife Refuge

The highest elevation within the Township is approximately 150' MSL[1] at the Maurice River / Great Egg Harbor River watershed-divide. This point occurs near the crossroad village of Star Cross. The lowest elevation is found at the Township's southern boundary, located within the Still Run corridor downstream of the Little Ease and Still Run junction. The elevation at this location is approximately 75' MSL.

Soils

Soil is the foundation for all land uses and it is the critical substrate for life for plants and many organisms dependent on soil for some part of their life cycle. 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

The most common type of soil in Franklin Township is sandy loam. Several soil series appear more frequently in Franklin Township than others and are briefly described as follows. Franklin soils consist of 17 series types and 46 variations within those series (excluding water) as identified by the United States Department of Agriculture's Natural Resources Conservation Service (NRCS). All soil types in the township are listed in **Table 4: Franklin Township Soils** and shown in **Map 7: Soils**.

Aura: The most common soil type in Franklin Township is the Aura soil series, which makes up nearly one-third of the township. This soil occupies the broad drainage divides, or uplands, between major stream tributaries. This soil is derived directly from the Bridgeton Formation. The soil textures are coarse to medium sandy loam with varying gravel contents. These are well-drained soils

[1] MSL is an abbreviation for an elevation above Mean Sea Level, based on the 1983 datum. Mean Sea Level is an arithmetic average of all of the tides.

that are always associated with higher ground. Variants include loam, clay loam, and sandy loam.

Aura-Sassafras Complex: This association is a complex mix of inter-bedded Aura and Sassafras soils. Both series are well-drained and are associated with the Bridgeton Formation.

Downer: The second most common soil type in the township is the Downer soil series, which makes up about 20 percent of the township. The Downer series is a well-drained upland soil characteristically derived from Aeolian (wind-carried) and colluvial (down slope) erosion of other upland sediments. This soil series is topographically lower than Aura or Sassafras, and in Franklin Township is probably derived from these drainage divide soils. The Downer profile is typically a fine sand or sandy loam. Relief is normally gentle to slightly rolling.

Manahawkin Muck: Manahawkin Muck covers about ten percent of Franklin Township. This soil is made of organic sediments in the larger stream valleys of Franklin Township's lowest elevations. Always associated with water, these are streamside peat and leaf accumulations, which can also occur in isolated depressions. Water is always present and occasionally submerges the soils during periods of heavy rain or groundwater discharge. These soils are also known as "Muck", "Muck shallow," or "Fresh water marsh."

Sassafras: Sassafras soils make up about eight percent of Franklin Township. This well-drained sandy soil is typically found down-slope of Aura gravel and is considered a colluvial deposit of the same. This soil is formed from Bridgeton Formation deposits, and the texture and particle composition reflect this origin. This soil contains fine sand and loam with a fair quantity of quartz and quartzite pebbles.

Atsion: Atsion sand covers about seven percent of Franklin Township. This soil is a fine sand deposit associated with wetlands on the western edge of the Cohansey Formation. The seasonal high water table is at the surface during most winter and spring months. Atsion sand is hydric (water-bearing) sand on southern coastal plain outcrops.

Table 4: Franklin Township Soils

	Description	Area (Acres)	% of Franklin	Ag. Quality*	Hydric?
AtsA	Atsion sand, 0 to 2 percent slopes	321.57	0.89%	U-1	Y
AtsAr	Atsion sand, 0 to 2 percent slopes, rarely flooded	2,125.55	5.90%	U-1	Y
AucB	Aura loamy sand, 0 to 5 percent slopes	1,663.09	4.61%	P-1	N
AugA	Aura sandy loam, 0 to 2 percent slopes	86.32	0.24%	P-1	Y

	Description	Area (Acres)	% of Franklin	Ag. Quality*	Hydric?
AugB	Aura sandy loam, 2 to 5 percent slopes	9,589.08	26.60%	P-1	N
AugC	Aura sandy loam, 5 to 10 percent slopes	74.72	0.21%	S-1	N
AvsB	Aura-Sassafras loamy sands, 0 to 5 percent slopes	92.75	0.26%	P-1	N
AvsC	Aura-Sassafras loamy sands, 5 to 10 percent slopes	55.80	0.15%	S-1	N
AvtB	Aura-Sassafras sandy loams, 2 to 5 percent slopes	1,021.47	2.83%	P-1	N
AvtC	Aura-Sassafras sandy loams, 5 to 10 percent slopes	214.63	0.60%	S-1	N
AvtC2	Aura-Sassafras sandy loams, 5 to 10 percent slopes, eroded	61.53	0.17%	S-1	N
AvuB	Aura-Urban land complex, 0 to 5 percent slopes	507.14	1.41%	N/A	N
BEXAS	Berryland and Mullica soils, 0 to 2 percent slopes, occasionally flooded	279.52	0.78%	U-1	N
BerAr	Berryland sand, 0 to 2 percent slopes, rarely flooded	34.17	0.09%	U-1	Y
DocB	Downer loamy sand, 0 to 5 percent slopes	3,960.52	10.99%	S-1	Y
DocC	Downer loamy sand, 5 to 10 percent slopes	0.38	0.00%	S-1	N
DoeA	Downer sandy loam, 0 to 2 percent slopes	2,135.97	5.92%	P-1	Y
DoeB	Downer sandy loam, 2 to 5 percent slopes	580.05	1.61%	P-1	N
DouB	Downer-Urban land complex, 0 to 5 percent slopes	184.00	0.51%	N/A	N
EveB	Evesboro sand, 0 to 5 percent slopes	90.44	0.25%	N/A	Y
EveC	Evesboro sand, 5 to 10 percent slopes	971.38	2.69%	N/A	N
EvuB	Evesboro-Urban land complex, 0 to 5 percent slopes	23.04	0.06%	N/A	N
FapA	Fallsington loam, 0 to 2 percent slopes	85.32	0.24%	S-1	Y
FamA	Fallsington sandy loam, 0 to 2 percent slopes	780.60	2.17%	S-1	Y

	Description	Area (Acres)	% of Franklin	Ag. Quality*	Hydric?
FmhAt	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	13.38	0.04%	N/A	Y
HbmB	Hammonton loamy sand, 0 to 5 percent slopes	1,506.48	4.18%	S-1	Y
HbrB	Hammonton-Urban land complex, 0 to 5 percent slopes	36.63	0.10%	N/A	N
LakB	Lakehurst sand, 0 to 5 percent slopes	24.23	0.07%	N/A	Y
LasB	Lakewood sand, 0 to 5 percent slopes	44.40	0.12%	N/A	Y
LatvB	Lakewood-Quakerbridge complex, 0 to 5 percent slopes	597.15	1.66%	N/A	N
MakAt	Manahawkin muck, 0 to 2 percent slopes, frequently flooded	3,351.57	9.30%	U-1	Y
MumA	Mullica sandy loam, 0 to 2 percent slopes	1.60	0.00%	S-1	Y
PHG	Pits, sand and gravel	83.60	0.23%	N/A	N
SabB	Sassafras loamy sand, 0 to 5 percent slopes	929.14	2.58%	S-1	N
SabC	Sassafras loamy sand, 5 to 10 percent slopes	5.30	0.01%	S-1	N
SacA	Sassafras sandy loam, 0 to 2 percent slopes	1,483.33	4.11%	P-1	Y
SacB	Sassafras sandy loam, 2 to 5 percent slopes	291.69	0.81%	P-1	Y
SacC	Sassafras sandy loam, 5 to 10 percent slopes	150.53	0.42%	S-1	N
SapB	Sassafras-Urban land complex, 0 to 5 percent slopes	39.63	0.11%	N/A	N
UddcB	Udorthents, dredged coarse materials, 0 to 8 percent slopes	21.10	0.06%	N/A	N
UR	Urban land	279.85	0.78%	N/A	N
WATER	Water	353.05	0.98%	N/A	N
WoeA	Woodstown sandy loam, 0 to 2 percent slopes	192.92	0.54%	P-1	Y
WoeB	Woodstown sandy loam, 2 to 5 percent slopes	343.34	0.95%	P-1	Y
WokA	Woodstown-Glassboro complex, 0 to 2 percent slopes	1,341.69	3.72%	P-1	Y

	Description	Area (Acres)	% of Franklin	Ag. Quality*	Hydric?
WooB	Woodstown-Urban land complex, 0 to 5 percent slopes	21.58	0.06%	N/A	N
Total		**36,051.25**	**100.00%**		**18,215.09 (50.53%)**

Source: USDA NRCS, 2004

*Explanation of 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.

Soil Quality Classification

The soils of Franklin Township are rich in agricultural value and over 90 percent meet the state standards for important farmland. See **Table 5: Agricultural Values for Franklin Township Soils** for the acreage of each of these classes of farmland. See also **Map 8: Agricultural Quality of Soils** for a visual depiction.

Prime Farmland Soils

Approximately 52 percent (18,821.69 acres) of all soils in Franklin Township are classified as Prime Farmland (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. Prime Farmland is located across the township on upland areas.

The NRCS outlines specific criteria for Prime Farmland classification. For example, according to Prime and Unique Farmlands federal regulation, soil horizons (layers) within a depth of 40 inches must have a pH between 4.5 and 8.4 (mildly acidic to mildly basic). In addition, the soils must have an average temperature above 32 degrees Fahrenheit at a depth of 20 inches. The USDA outlines additional Prime Farmland requirements for mean summer soil temperature, erodibility factor, water table depth, permeability rate, and more. Land classified as Prime Farmland does not have to be farmed but does have to be potentially available for such use. Thus, water and urban land does not qualify as Prime Farmland.

Soils of Statewide Importance

About 22 percent (7,826.57 acres) of soils in Franklin Township are classified as soils of Statewide Importance (S-1). These soils are close in quality to Prime Farmland and can sustain high yields of crops when correctly managed under favorable conditions. Criteria for establishing Soils of Statewide Importance are determined by state agencies.

Soils of Unique Importance

About 17 percent (6,112.38 acres) of soils in Franklin Township are soils considered to be of unique importance (U-1). The USDA outlines specific Unique Farmland criteria that support particular food or fiber crops, including temperature, humidity, air drainage, elevation, aspect, or proximity to market. 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. Soils of Unique Importance are mostly associated with wetlands areas and riparian corridors in Franklin Township.

Soils Not Rated

Approximately nine percent of Franklin Township 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. Soils that are not rated are not necessarily limited for agricultural use.

Table 5: Agricultural Values for Franklin Township Soils

Designation	Type/Farm Classification	Area (Acres)	% of Township
P-1	All areas are prime farmland	18,821.69	52.21%
S-1	Farmland of statewide importance	7,826.57	21.71%
U-1	Farmland of unique importance	6,112.38	16.95%
N/A	Not prime farmland	3,290.61	9.13%
Total		**36,051.25**	**100.00%**

Source: USDA NRCS, 2004

Hydric Soils

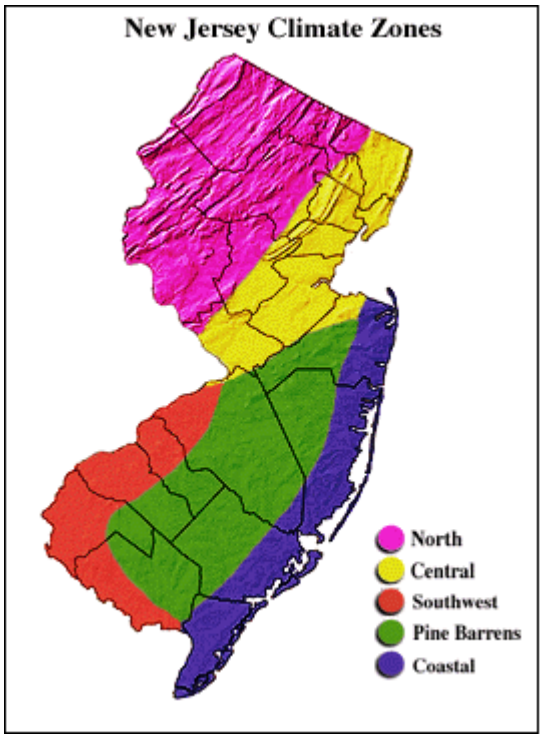
More than half of Franklin Township’s soils are considered hydric soils. Hydric soils, as defined by the NRCS, are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to

develop anaerobic (oxygen-free) conditions in their subsurface. 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.

Climate

Geographically situated approximately halfway between the Equator and the North Pole, New Jersey’s climate is extremely variable. The state’s temperate 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.

Figure 3: The Climate Zones of New Jersey



Source: NJDEP

Although New Jersey is one of the smallest states in the country, it has five distinct climate regions, as shown in **Figure 3**. 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.

Franklin Township is located within the Pine Barrens climate zone. The Pine Barrens climate zone is much larger than the official boundary of the Pinelands. 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 and leave the surface dry and with fewer nutrients. In addition to reducing soil fertility, the drier sandy soils reflect solar radiation absorbed during the day back to space at night at a greater rate, which causes a wider range between the daily maximum and minimum temperatures than in the Southwest climate zone. Finally, these drier conditions also make the Pine Barrens region more prone to forest fires.

The National Climatic Data Center (NCDC) operates over 4,000 stations in the United States, none of which are located directly in Franklin Township. The closest station is in Millville, approximately nine miles to the south of Franklin Township. Data from this station is available for the years 1971 through 2000.

Based on data collected at this station; the mean annual temperature in Franklin Township is 54.4 degrees Fahrenheit. January is the coldest month with a mean temperature of 32.7 degrees, and July is the hottest month with a mean temperature of 76.3 degrees. The highest recorded temperature was 102 degrees Fahrenheit recorded July 3, 1966. The lowest recorded temperature was -10 degrees Fahrenheit recorded January 22, 1961.

Snowfall on Fields near Dutch Mill Road

The mean annual precipitation is 43.2 inches. March is the rainiest month with a mean precipitation of 4.38 inches, and October is the driest month with an average of just 3.04 inches. The greatest amount of precipitation recorded for a single day was 9.06 inches recorded on August 20, 1997.

Growing Seasons

Franklin 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 are helpful in indicating which plant species are able to survive the winter in each area.

Franklin 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 Franklin Township is about 60 days longer than in northern New Jersey, where frosts generally end in May and begin in October.

Surface Water Resources

Water is one of the township's most valuable natural resources. The surface water of Franklin Township includes streams, ponds, and a number of picturesque lakes. Surface waters are those that are exposed to the atmosphere, as opposed to groundwater resources.

Watersheds

A watershed is 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, and smaller ones are made up of the smallest area – down to the catchment area of a local site. Watersheds are natural ecological units, where soil, water, air, plants, and animals interact in a complex relationship.

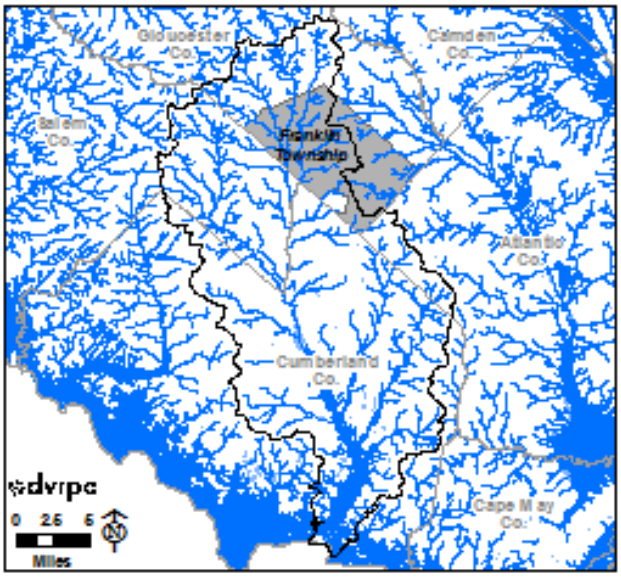
Little Ease Run

Each watershed has been designated by the United States Geological Survey (USGS) with a hydrological unit code, or HUC. A HUC-11 watershed (identified by an 11-digit code) contains a number of HUC-14 subwatersheds (each identified by a 14-digit code). The State of New Jersey has 152 HUC-11 watersheds and over 900 HUC-14 subwatersheds. A complete list of all subwatersheds and their acreages in Franklin Township is shown in **Table 6: Watersheds and Subwatersheds in Franklin Township**. Streams in Franklin Township drain to one of two major watersheds: the Maurice River and the Great Egg Harbor River. Within Franklin Township, the general dividing line of the watersheds is the boundary of the Pinelands, with land in the Pinelands area of the township falling within the Great Egg Harbor River watershed.

Maurice River Watershed

Nearly two-thirds (23,037 acres) of land in Franklin Township drain to the Maurice River watershed (pronounced “Morris”). The Maurice River empties into the Delaware Bay at its mouth in Cumberland County. In Franklin Township, land that drains to the Still Run, Little Ease Run, and Scotland Run subwatersheds eventually drains into the Maurice River. The entire Maurice River watershed encompasses 385 square miles, making it one of the largest watersheds in New Jersey. The length of the Maurice River from its northernmost headwaters to its mouth at the Delaware Bay is 58 miles. The lower lengths of both the Maurice and Great Egg Harbor rivers have been designated by the U.S. National Park Service as national Scenic and Recreational Rivers, because of their “outstandingly remarkable” features, relative lack of development, and importance to the nation’s cultural and natural heritage.

Figure 4: Maurice River Watershed



Source: DVRPC

The Maurice River is a notably pristine Atlantic Coastal river which serves as a critical link between the Pinelands National Reserve and the Delaware Estuary, regional habitats which are both nationally and internationally significant. State and local governments, as well as conservation organizations, own significant acreage along the river for preservation and conservation purposes. The Maurice River and its several tributaries—including the Menantico and Muskee Creeks and the Manumuskin River—were added to the National Wild and Scenic River System in 1993. The National Wild and Scenic Rivers System was created by an Act of Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act seeks to safeguard the special character of these rivers, while also recognizing the potential for their appropriate use and development.

Aligned with the Atlantic Flyway, the clean waters and adjacent habitats of the Maurice River provide rest and food for migrating shorebirds, songbirds, waterfowl, raptors, rails and fish. Along its banks, New Jersey's largest stand of wild rice attracts thousands of wintering waterfowl to the area each year. The mouth of the river is a critical staging area for migratory shorebirds. The immense variety of habitats throughout the watershed support such rare, endangered and threatened species as osprey, bald eagle, southern gray treefrog, shortnose sturgeon, striped bass, joint vetch and swamp pink. More specifically, the

Maurice River watershed hosts 53 percent of the animal species that New Jersey has recognized as endangered, excluding marine mammals.

Harboring cultures as well as plants and wildlife, the Maurice River corridor is an area rich in historical significance. The river not only shaped the lifestyle and livelihood of the region's inhabitants in the past, it continues to support the region's economy and the current lifestyles of many of today's residents. Early industries depended on river water channeled into swiftly flowing mill races. Many other inhabitants worked in maritime occupations. The region's entire glass making industry emerged because of, and still depends upon, sandy deposits throughout the watershed. More recently, the Maurice River supports such industries as commercial crabbing, eeling, net fishing and oystering; activities which are dependent upon the river’s ecological integrity. Pleasure boating, canoeing, and fishing are just a few of the recreational activities currently pursued on the river.

There are three major tributaries to the Maurice River that pass through the township: Still Run, Little Ease Run and Scotland Run. **Still Run** originates in Elk Township to the northwest of Franklin Township. There are a number of smaller tributaries to Still Run west of the main branch, notably the Elephant Swamp-Reed Branch, which crosses the township and joins Still Run immediately downstream of Idle Acres Lake.

Little Ease Run is a smaller but important corridor originating east of Glassboro in the Clayton-Glassboro Fish and Wildlife Management Area. The only major tributary to this stream is Beaverdam Branch. Little Ease Run joins Still Run below Iona Lake.

Scotland Run originates in the vicinity of Cross Keys, Washington Township. Notable tributaries joining Scotland Run at Malaga Lake are the Indian Branch and Malaga Branch. Other named tributaries to Scotland Run include Fries Branch, Hell Branch, and Jericho Branch, which all join Scotland Run between Wilson Lake and Timothy Lake. Timothy Lake is shown on maps but is currently drained due to a dam failure.

Scotland Run

Still Run and Scotland Run join together at Willow Grove Lake south of Franklin Township to form the Maurice River. Further south, the

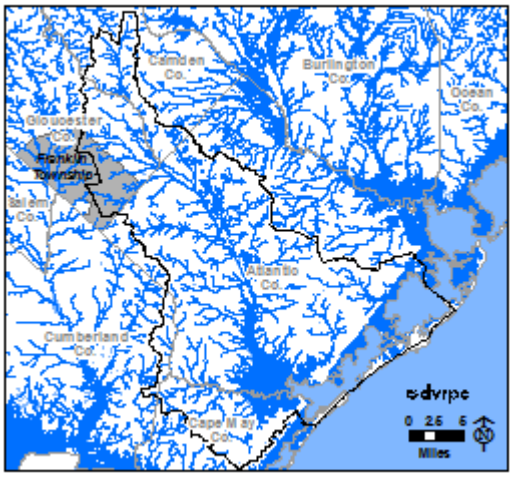
Maurice River is designated as a Wild and Scenic River below Union Lake in Millville. The Maurice River empties into Delaware Bay below Port Norris.

Great Egg Harbor River Watershed

Over one-third (13,016 acres) of Franklin Township is located within the Great Egg Harbor River watershed. The Great Egg Harbor River watershed drains a total area of 205 square miles in Camden, Atlantic, and Gloucester counties and the river is one of the longest in New Jersey at 59 miles in total length. It empties into the Atlantic Ocean at Great Egg Harbor Bay. Its drainage area in Franklin Township includes several small tributaries to the Hospitality Branch, one of the larger tributaries of the Great Egg Harbor River.

Figure 5: Great Egg Harbor River Watershed

Like the Maurice River, the Great Egg Harbor River is designated a Wild and Scenic River in its lower reaches. The Franklin Township portion is composed of a number of headwater streams: Whitehall Branch, Faraway Branch, and White Oak Branch on the northeastern side of the township all flow to the larger Hospitality Branch in neighboring Monroe Township. The Marsh Lake/Main Lake Branches on the southeastern side also join Hospitality Branch but at a lower point below Collings Lake in Monroe Township. These tributaries drain the Pinelands side of Franklin Township.



Source: DVRPC

Table 6: Watersheds and Subwatersheds in Franklin Township

Watershed System (HUC 8)	Watershed (HUC 11)	Subwatershed (HUC 14)	HUC 14	Acres in Franklin
Maurice River (02040206)	Still Run / Little Ease Run (02040206120)	Little Ease Run (below Academy Rd)	02040206120020	2,301.09
		Reed Branch (Still Run)	02040206120040	1,393.73
		Still Run (Willow Grove Lake – Silver Lake Rd)	02040206120050	2,906.82
	Scotland Run (02040206130)	Scotland Run (above Fries Mill / Wilson Lake)	02040206130010	79.21
		Scotland Run (Delsea Drive to Fries Mill / Wilson Lake)	02040206130020	4,521.57
		Indian Branch (Scotland Run)	02040206130030	4,231.77
		Scotland Run (below Delsea Drive)	02040206130040	3,926.23
	Maurice River (above Sherman Ave Bridge) (02040206140)	Maurice River (Blackwater Branch to/incl Willow Grove Lake)	02040206140010	109.33
		Burnt Mill Branch / Hudson Branch	02040206140020	1,930.82
		Blackwater Branch (above/incl Pine Branch)	02040206140040	1,636.74
Great Egg Harbor River (02040302)	Great Egg Harbor R (Lake Lenape to Hospitality Branch) (02040302040)	Hospitality Branch (above Whitehall Rd)	02040302040010	319.28
		Hospitality Br (Rt 538 to Whitehall Rd)	02040302040020	1,685.35
		Hospitality Br (Piney Hollow Rd to Rt 538)	02040302040030	1,430.79
		White Oak Branch (Hospitality Branch)	02040302040040	2,524.83
		Collings Lakes trib / Marsh Lake / Main Lake Branch (Hospitality Branch)	02040302040050	7,055.95
Total				**36,053.50**

Source: NJDEP, 2008

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 67 stream miles flowing through Franklin Township. Approximately 30 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 6: 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 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.

Nearly all of Franklin's streams are first through third order except for Still Run, which is a fourth order stream below its union with Reed Branch.

Table 7: Stream Classification in Franklin Township

Stream Order	Length (miles)
1	30.78
2	16.11
3	18.07
4	2.16
Total	**67.12**

Source: NJDEP, 2008

Table 8: Named Streams in Franklin Township

Blackwater Branch	Malaga Branch
Burnt Mill Branch	Main Lake Branch
Ellwell Branch	Marsh Lake Branch
Faraway Branch	Middle Branch
Fries Branch	New Squankum Branch
Hayes Branch	Reed Branch
Hell Branch	Scotland Branch
Hospitality Branch	Scotland Run
Indian Branch	Still Run
Jericho Branch	White Oak Branch
Little Ease Run	Whitehall Branch
Long Branch	

Source: NJDEP, 2008

Lakes and Ponds

There are several sizable lakes in Franklin Township as well as other small unnamed ponds and water impoundments. In total, there are over 350 total acres of lakes and ponds in Franklin Township. The eight largest lakes, ranging from 10 to 103 acres, are all artificial water bodies. These are permanent waters which were created by damming rivers and streams, primarily for the purpose of establishing the power source for mills. Although the mills are gone, the lakes and dams remain. In Franklin Township, the lakes are scenic and recreational assets, and residential development has been developed next to them. Major lakes within the Township include Franklinville Lake, Iona Lake, Malaga Lake, Timothy Lake, Idle Acres Lake, McCarthys Lakes, and Cedar Lake. McCarthys Lakes in the Piney Hollow Natural Area were formerly cranberry bogs.

Franklinville Lake

There are also 46 small lakes and ponds that are 10 acres

or less in size scattered throughout Franklin Township. Many of these smaller impoundments are classified as artificial waterbodies by NJDEP. Artificial ponds are also formed by damming and were often created for use in irrigation, flood control, cranberry bog agriculture, or recreation.

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 & 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.

Wetlands at Unexpected Wildlife Refuge

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. See **Sources of Information**.

The location and vegetative cover are important parameters for classifying wetlands. Most wetlands in Franklin Township are found associated with the

streams and headwater areas of the Maurice and Great Egg Harbor Rivers. This type of wetland system is referred to as palustrine, as compared to riverine (river-associated) or lacustrine (lake-associated) wetlands. The word "palustrine" comes from the Latin palustria or pauda, meaning "swamps". In Franklin Township these palustrine wetlands are primarily forested, although some areas are recovering woodlands and some are open shrubby thickets.

There are a total of about 6,300 acres of wetlands within Franklin Township, or about 17 percent of the total area of the township. Wetlands are depicted on **Map 9: Wetlands, Dams, and Vernal Pools**. A detailed view of all types of natural vegetation, including different types of wetlands, is shown on **Map 17: Natural Vegetation (2007)**. The vast majority of these are wooded wetlands, which cover about 5,540 acres. Over half of these are deciduous wooded wetlands, and the remainder is coniferous and mixed forest wetlands.

In addition to wooded wetlands, Franklin Township also contains scrub/shrub, herbaceous, and modified wetlands. There are about 300 acres of scrub/shrub and herbaceous wetlands, which include low-growing emergent vegetation.

In addition to natural wetlands, Franklin also includes 450 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. Modified wetland areas do, however, show obvious signs of soil saturation and exist in areas shown to have hydric soils on U.S. Soil Conservation Service soil surveys.

Franklin Township’s modified wetlands fall into the following categories: 218 acres of agricultural wetlands, 145 acres of wetlands used as right-of-ways, 81 acres of disturbed wetlands, 5 acres of former agricultural wetlands, and 9 acres of wetlands found in maintained green space, lawns, or recreation area.

Additional information on the natural wetland habitats in Franklin Township is found in the **Biological Resources** section, under “Wetlands”.

Agricultural Wetlands

Agricultural wetlands occupy 218 acres (three percent) of Franklin Township. Agricultural wetlands are modified former wetlands that are under cultivation yet still exhibit evidence of soil saturation in aerial infrared photo surveys. See **Map 9: Wetlands, Dams, and Vernal Pools**.

Some agricultural wetlands were drained by a technique called “tile drainage.” Tile drainage was a common method of removing excess water from farm fields that exhibited one or more of the following characteristics: (1) small areas of isolated wetlands, (2) very flat land that ponded in wet weather, (3) soils were slow to warm in the spring because of a relatively high water table, or (4) soils had a very high clay content and, therefore, drained slowly. Tile drainage was

very labor intensive, as it involved installing subsurface drainage pipes throughout a field at a depth of three to six feet. Tile drains were used sparingly – only where there were extremely wet spots. Therefore, the existence of tile drainage strongly indicates a natural wetland hydrology.

Figure 7: Tile Drain Installation

Source: Chicago Wilderness Magazine files

As long as agricultural wetland areas remain in agricultural use, they are exempt from New Jersey's Freshwater Wetlands Rules (N.J.A.C. 7:7A). However, if an agricultural area is removed from agricultural production for more than five years, any wetlands located within that area lose their exempt status. Also, according to N.J.A.C. 7:7A-2.8(b)2, "the exemptions apply only as long as the area is used for the exempted activity." Therefore, if the area is used for anything other than farming, the exemption no longer applies.

In addition, if hydric soils are present, certain activities on drained farmland may be regulated by the state of New Jersey. While the Freshwater Wetlands Protection Rules set forth several specific farming, ranching, and silviculture exemptions, those exemptions are subject to another limitation:

> If an area with hydric soils has been drained for farming purposes through the use of drainage structures such as tiles or ditches, the Department shall presume that the area has wetlands hydrology for the purpose of identifying a freshwater wetland under N.J.A.C. 7:7A-2.3. To rebut this presumption of wetlands hydrology, all drainage structures shall be removed or completely disabled and the area shall be left undisturbed for at least one normal rainfall year, after which the presence or absence of wetlands hydrology shall be determined through use of technical criteria, field indicators, and other information, in accordance with the 1989 Federal manual. [7:7A-2.8(b)5]

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. See **Appendix A: Federal and State Conservation Programs for Farmers.**

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; these are called facultative breeders.

Vernal Pool near Malaga Lake Drive

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 (N.J.A.C. 7:7A). 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 in its official map. The South Jersey Land and Water Trust provides training sessions every March to teach volunteers how to identify, survey, and certify vernal pools. Information is available at their website: http://www.sjlandwater.org/ongoing/vernalpools.htm.

The state has identified 72 potential vernal pools in addition to four certified vernal pool habitats in Franklin Township, which are listed in **Appendix B: Vernal Pools in Franklin Township** and shown on **Map 9: Wetlands, Dams, and Vernal Pools**. These vernal pools are fairly evenly distributed throughout the township. Surveys of the potential vernal pools are needed to determine if the pool 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.

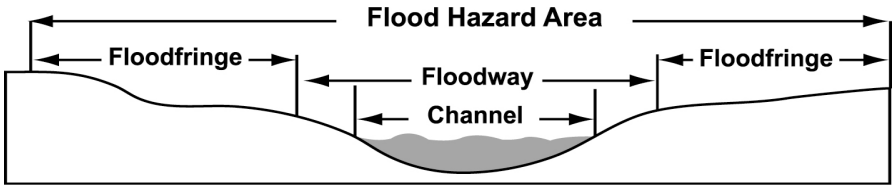
Floodplains

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).

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. This type of flood is called the “flood hazard area design flood” and it is the flood regulated by NJDEP.

Little Ease Run

Figure 8: Parts of a Flood Hazard Area



Source: NJDEP

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 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.

Still Run

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. Additional information on floodplain activities is available from NJDEP and from its web site under “Land use.”

New Jersey’s flood hazard area maps are not available in digital form. Consequently, it is only possible to approximate the spatial extent of the flood hazard area in Franklin Township by using the Federal Emergency Management Agency’s (FEMA’s) 100-year floodplain maps. FEMA’s maps show that almost 2,385 acres, or 6.6 percent, of Franklin Township’s land is within the 100-year floodplain area, and an additional 274 acres are within the 500-year floodplain area. Nearly all of Franklin Township’s floodplain areas are located along the tributaries of the Maurice River and around Malaga Lake. See **Map 10:**

Floodplains (2010) and **Table 9** below. There may be additional areas of the township that are prone to flooding, but which are not identified by FEMA as being within the floodplain

Table 9: Floodplains in Franklin Township

Flood Plain	Zone	Area (Acres)	% of Franklin
100 Year Flood Plain	A/AE	2,385.16	6.6%
500 Year Flood Plain	X500	273.93	0.7%
Total		**2,659.09**	7.3%
Total Franklin Township Area		**36,053.50**	**100.0%**

Source: FEMA, 2010

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.

Idle Acres Lake

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.

Within Franklin Township, all the streams within the Pinelands boundary are categorized as Pinelands water (PL), and the non-Pinelands streams are categorized as nontrout freshwater (FW2-NT).

According to NJDEP rules, PL waters are to be maintained in their natural state and changes are allowed only toward natural water quality. 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.

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.

Beginning in 2002, the NJDEP combined the 305(b) Report and the 303(d) List into a single report, according to the EPA's guidance. The biennial Integrated Water Quality Monitoring and Assessment Report evaluates the state's waters on their support of designated uses, rating them either "fully supporting" or "not supporting."

In 2006, NJDEP began reporting water quality data on a HUC-14 subwatershed basis, and so the assessments of portions of rivers and streams are reported by the subwatershed 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 Franklin Township support trout or shellfish harvesting, these designated uses are not applicable.

Table 10: Integrated Water Quality Monitoring and Assessment Report, 2010 lists the 15 subwatersheds within which Franklin Township is located. Two of these watersheds [Scotland Run (Delsea Drive to Fries Mill / Wilson Lake) and White Oak Branch (Hospitality Branch)] are designated as "fully supporting" aquatic life, and have insufficient information for all other uses. The remaining 13 subwatersheds are designated as "not supporting" at least one of the six designated uses (not including the not applicable uses of trout and shellfish). However, for two of these subwatersheds [Scotland Run (above Fries Mill) and Scotland Run (below Delsea Drive)], fish consumption is the only designated use that is not supported. Impairment due to fish consumption does not qualify a subwatershed for the 303(d) list of impaired waters. The other 11 subwatersheds with a non-supported use are listed in **Table 11: New Jersey's 303(d) List of Impaired Waters with Priority Ranking, 2010** along with the parameter causing the impairment.

Of the impaired subwatersheds, pH was a cause of impairment in seven subwatersheds, and heavy metals such as mercury and arsenic in three subwatersheds. Three subwatersheds were impaired due to unknown causes.

The **pH**, or acidity, of waters is very important as it affects most chemical and biological reactions. A low pH number indicates a high acidity. Acidity is determined by a number of complex interactions and is affected by an area's geology. With increased acidity, water is more able to carry and dissolve substances. Acidity impairments may be due to pH levels that are too high or too low, depending on the natural level for the particular habitat. So, for example, Pinelands waters, which are naturally more acidic, may be considered impaired if their acidity level is too low. This may be due to runoff that brings more basic (non-acidic) substances into the system. Conversely, waters that are more neutral or more basic in character may be impaired by acid rain from atmospheric pollutants or other sources. As shown in **Table 12: AMNET Water Quality Data**, the subwatersheds that were impaired due to pH had pH levels ranging from 3.98 to 6.4.

Mercury and arsenic are considered heavy, or toxic, metals. Trace amounts of some of these elements are essential to maintain the metabolism of the human body, although consuming them in larger doses can be toxic or poisonous.

Heavy metals bioaccumulate, meaning they accumulate in the body and 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.

Table 10: Integrated Water Quality Monitoring and Assessment Report, 2010

Subwatershed Name	Subwatershed ID	AMNET ID		ASMN ID		Designated Uses					
						Aquatic Life - General	Recreation	Drinking Water Supply	Ag. Water Supply	Industrial Water Supply	Fish Consump-tion
Little Ease Run (below Academy Rd.)	02040206120020	AN0727	AN0728	01411458	01411457	NS	NS	FS	FS	FS	II
Reed Branch (Still Run)	02040206120040	AN0731				NS	II	II	II	II	II
Still Run (Willow Grove Lake – Silver Lake Rd.)	02040206120050	AN0730	AN0732	01411453	01411452	NS	FS	FS	FS	FS	II
Scotland Run (above Fries Mill / Wilson Lake)	02040206130010	AN0721				FS	II	II	II	II	NS
Scotland Run (Delsea Drive to Fries Mill / Wilson Lake)	02040206130020	AN0722	AN0723			FS	II	II	II	II	II
Indian Branch (Scotland Run)	02040206130030	AN0724		01411466		NS	NS	FS	FS	FS	II
Scotland Run (below Delsea Drive)	02040206130040	AN0725				II	II	II	II	II	NS
Maurice River (Blackwater Branch to/incl Willow Grove Lake)	02040206140010	AN0733				NS	NS	NS	FS	FS	NS
Burnt Mill Branch / Hudson Branch	02040206140020	AN0734	AN0735			NS	NS	NS	II	FS	II
Blackwater Branch (above/incl Pine Br)	02040206140040	AN0738				FS	NS	NS	FS	FS	NS
Hospitality Branch (above Whitehall Rd)	02040302040010	AN0627		01411035		NS	NS	FS	FS	N/A	II
Hospitality Branch (Rt 538 to Whitehall Rd) (Whitehall Branch)	02040302040020	AN0628		01411050		NS	FS	FS	FS	N/A	II
Hospitality Branch (Piney Hollow Rd to Rt 538) (Faraway Branch)	02040302040030	AN0629				NS	FS	FS	FS	N/A	II
White Oak Branch (Hospitality Branch)	02040302040040	AN0630				FS	II	II	II	N/A	II
Collings Lakes trib / Marsh Lake / Main Lake Branch (Hospitality Branch)	02040302040050	AN0631	AN0632			NS	II	II	II	N/A	NS

Source: NJDEP, 2010

Key to Table 10

Abbreviation	Meaning
NS	Not Supporting
FS	Fully Supporting
II	Insufficient Information

The subwatersheds in Franklin Township that do not attain one or more designated uses are each impaired due to one or more parameters for each use, as shown in **Table 11** below. The most common cause for impairment was due to acidity (pH). Priority ranking is required by Section 303(d) of the Federal Clean Water Act and its purpose is to focus available resources in the most efficient and productive way, taking into account environmental, social, and political factors. Subwatersheds with a high (H) priority ranking are those for which the NJDEP expects to complete a TMDL within the next two years. The NJDEP expects to complete TMDLs for subwatersheds ranked as a medium (M) priority in the near future, but not within two years. Subwatersheds with a low (L) priority are those for which TMDLs will likely not be completed in the near future. Franklin Township does not have any subwatersheds with a high ranking for TMDLs.

Table 11: New Jersey's 303(d) List of Impaired Waters with Priority Ranking, 2010

Subwatershed Name	Subwatershed ID (HUC 14#)	Parameter	Ranking
Little Ease Run (below Academy Rd)	02040206120020	pH	M
Reed Branch (Still Run)	02040206120040	Cause unknown	M
Still Run (Willow Grove Lake – Silver Lake Rd)	02040206120050	Cause unknown	M
Indian Branch (Scotland Run)	02040206130030	pH	M
Maurice River (Blackwater Branch to/incl Willow Grove Lake)	02040206140010	Arsenic	L
		Cause unknown	M
Burnt Mill Branch / Hudson Branch	02040206140020	Arsenic	L
		pH	M
Blackwater Branch (above/incl Pine Br)	02040206140040	Mercury in water column	L

Subwatershed Name	Subwatershed ID (HUC 14#)	Parameter	Ranking
Hospitality Branch (above Whitehall Rd)	02040302040010	pH	M
Hospitality Branch (Rt 538 to Whitehall Rd) (Whitehall Branch)	02040302040020	pH	M
Hospitality Branch (Piney Hollow Rd to Rt 538) (Faraway Branch)	02040302040030	pH	M
Collings Lakes trib / Marsh Lake / Main Lake Branch (Hospitality Branch)	02040302040050	pH	M

Source: NJDEP, 2010

Total Maximum Daily Loads (TMDLs)

For impaired waterways with a high-priority ranking for remediation, the state is required by the EPA to establish a TMDL. A TMDL quantifies the amount of a pollutant that a water body can assimilate (its loading capacity) without violating water quality standards. The purpose of a TMDL is to initiate a management approach or restoration plan based on identifying the sources of a pollutant and determining the percentage reductions of the pollutant that must be achieved by each source. These sources can be point sources, such as sewage treatment plants, or nonpoint sources, such as stormwater runoff.

Although Franklin contains portions of 11 subwatersheds with impaired water quality, only three of these have a TMDL. A TMDL for E. coli was approved or established for Indian Branch (Scotland Run) (02040206130030). A TMDL for mercury in fish tissue was approved or established for Maurice River (Blackwater Branch to/including Willow Grove Lake) (02040206140010) and for Collings Lakes tributary / Marsh Lake / Main Lake Branch (Hospitality Branch) (02040302040050).

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 Biological Monitoring Network (AMNET) and the Ambient Stream Monitoring Network (ASMN) 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.

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. These organisms fulfill an important role in the aquatic food web throughout the state's rivers and streams. Moreover, their limited mobility causes significant changes in the local environment to register in their communities, making benthic macroinvertebrates suitable indicators of localized water quality conditions. They are holistic indicators of overall water quality, yielding information that is difficult or impossible to capture through chemical monitoring.

The most commonly used organisms for biological water impairment assessments include: mayfly nymphs, caddisfly larvae, aquatic beetles, midges (chironomids), freshwater isopods, black fly larvae, and leeches. Mayfly nymphs, stonefly nymphs, caddisfly larvae and aquatic beetles are usually indicative of good water quality because of their sensitivities to various kinds of pollutants. Midges, freshwater isopods, black fly larvae, and leeches occupy a variety of aquatic habitats and are highly tolerant of poor water quality. In compromised environments more sensitive species may not be found.

The ASMN is a cooperative network between USGS and NJDEP that samples surface water quality at 112 stations in the state, 5 of which are located within Franklin Township. These stations monitor stream flow as well as temperature, dissolved oxygen (DO), pH, carbon dioxide, nitrogen, ammonia, phosphorus, arsenic, and many other parameters.

Each subwatershed contains at least one AMNET station that monitors water quality. Only some subwatersheds also contain an ASMN station. **Table 10: Integrated Water Quality Monitoring and Assessment Report, 2010** lists the AMNET and ASMN stations for each of the 15 subwatersheds of Franklin Township. These stations are also shown on **Map 12: Surface Water Quality**. **Table 12: AMNET Water Quality Data** shows the results of the most recent water quality monitoring for all 15 subwatersheds of Franklin Township.

Knowing the actual condition of streams and steam banks, and planning for their improvement, requires more frequent surveying and monitoring than the state can provide. The state primarily monitors main channels in non-tidal 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.

Table 12: AMNET Water Quality Data

HUC 14	Subwatershed Name	AMNET Station	Round 3 Data							
			Collection Date	Index Name	Rating	Habitat Analysis	Water Temp. (°C)	Conduc-tivity* (umhos)	Dissolved Oxygen (mg/L)	pH
02040206120	Little Ease Run (below Academy Rd)	AN0727	4/10/2007	CPMI	12 (Good)	143 (Suboptimal)	6.32	86	9.69	5.01
		AN0728	5/2/2007	CPMI	20 (Good)	154 (Suboptimal)	16.64	90	7.32	5.38
02040206120	Reed Branch (Still Run)	AN0730	4/10/2007	CPMI	6 (Fair)	157 (Suboptimal)	7.58	145	11.03	6.33
02040206120	Still Run (Willow Grove Lk – Silver Lake Rd)	AN0731	5/31/2007	CPMI	10 (Fair)	163 (Suboptimal)	23.68	104	7.57	5.95
		AN0732	5/2/2007	CPMI	8 (Fair)	136 (Suboptimal)	17.99	100	8.98	5.94
02040206130	Scotland Run (above Fries Mill / Wilson Lake)	AN0721	4/10/2007	PMI	56.13 (Good)	148 (Suboptimal)	7.89	89	10.92	5.71
02040206130	Scotland Run (Delsea Drive to Fries Mill / Wilson Lake)	AN0722	4/10/2007	PMI	24.76 (Poor)	141 (Suboptimal)	7.79	96	11.68	6.43
		AN0723	5/1/2007	PMI	55.04 (Fair)	173 (Optimal)	15.51	75	5.82	4.73

HUC 14	Subwatershed Name	AMNET Station	Round 3 Data							
			Collection Date	Index Name	Rating	Habitat Analysis	Water Temp. (°C)	Conduc-tivity* (umhos)	Dissolved Oxygen (mg/L)	pH
02040206130	Indian Branch (Scotland Run)	AN0724	5/1/2007	PMI	52.25 (Fair)	155 (Suboptimal)	13.05	60	5.4	3.98
02040206130	Scotland Run (below Delsea Drive)	AN0725	5/1/2007	PMI	42.33 (Fair)	161 (Optimal)	17.82	72	7.94	5.19
02040206140	Maurice River (Blackwater Br to/incl Willow Grove Lk)	AN0733	5/1/2007	CPMI	10 (Fair)	151 (Suboptimal)	12.12	99	5.86	5.65
02040206140	Burnt Mill Branch / Hudson Branch	AN0734	5/8/2007	PMI	54.72 (Fair)	153 (Suboptimal)	12.03	149	9.83	5.93
		AN0735	5/8/2007	CPMI	20 (Good)	139 (Suboptimal)	14.81	190	8.08	6.03
02040206140	Blackwater Branch (above/incl Pine Br)	AN0738	5/8/2007	PMI	36.41 (Fair)	145 (Suboptimal)	12.87	174	4.92	6.27
02040302040	Hospitality Branch (above Whitehall Rd)	AN0627	11/3/2005	PMI	46.03 (Fair)	152 (Suboptimal)	10.14	66	5.63	6.1
02040302040	Hospitality Br (Rt 538 to Whitehall Rd) (Whitehall Branch)	AN0628	11/9/2005	PMI	19.83 (Poor)	141 (Suboptimal)	12.8	64	7.7	6.4

HUC 14	Subwatershed Name	AMNET Station	Round 3 Data							
			Collection Date	Index Name	Rating	Habitat Analysis	Water Temp. (°C)	Conduc-tivity* (umhos)	Dissolved Oxygen (mg/L)	pH
02040302040	Hospitality Br (Piney Hollow Rd to Rt 538) (Faraway Branch)	AN0629	11/9/2005	PMI	60.02 (Good)	167 (Optimal)	12.8	47	6.8	4.6
02040302040	White Oak Branch (Hospitality Branch)	AN0630	4/17/2006	PMI	60.9 (Good)	179 (Optimal)	13.0	73	3.3	3.9
02040302040	Collings Lakes trib / Marsh Lake / Main Lake Branch (Hospitality Branch)	AN0631	11/9/2005	PMI	21.23 (Poor)	170 (Optimal)	13.5	74	8.2	5.6
		AN0632	11/9/2005	PMI	43.03 (Fair)	161 (Optimal)	13.6	53	5	5.4

Conductivity is the ability of water to transmit an electrical current. Ions from salts, nutrients, and metals provide the conveyance for the electrical current. Conductivity is an indirect measure of the dissolved solids in water.

Source: NJDEP, 2010

Pinelands Macroinvertebrate Index (PMI) (for Pinelands waters)		
Assessment	**Score Range**	**Regulatory Threshold**
Excellent	63-100	Full Attainment
Good	<63-56	Full Attainment
Fair	<56-34	Non-Attainment(PL) Full Attainment(FW2)
Poor	<34	Non-Attainment

Coastal Plain Macroinvertebrate Index (CPMI) (for Coastal Plain non-Pinelands waters)		
Assessment	**Score Range**	**Regulatory Threshold**
Excellent	22-30	Full Attainment
Good	20-12	Full Attainment
Fair	10-6	Non-Attainment
Poor	<6	Non-Attainment

Habitat Assessment (for all waterways)	
Assessment	**Score Range**
Optimal	160-200
Sub-optimal	110-159
Marginal	60-109
Poor	<60

Other 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 can pose health risks 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.

The consumption advisories for general freshwater fishing and for water bodies in Franklin Township are listed in the table below. Within Franklin Township, those additional fish consumption advisories for seven species of fish in two waterbodies supersede the general advisories. Maurice River is included here because its main headwaters travel through Franklin Township. Wilson Lake feeds Scotland Run, which also passes through the township. More details on safe preparation and consumption of fish are found at the advisory website: www.state.nj.us/dep/dsr/njmainfish.htm

Table 13: Fish Consumption Advisories, 2010

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
Smallmouth Bass		One Meal Per Month
Largemouth Bass		
Chained Pickerel		
Yellow Bullhead	No Restrictions	
Brown Bullhead		
Sunfish		One Meal Per Week
Wilson Lake		
Chain Pickerel	One Meal Per Month	Do Not Eat
Pumpkinseed Sunfish		
Largemouth Bass		
Yellow Perch,		
Maurice River		
Channel Catfish	One Meal Per Month	Do Not Eat
White Catfish		
Largemouth Bass	One Meal Per Week	
White Perch		One Meal Per Month

Source: NJDEP, 2010

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 only required states to regulate point sources, New Jersey also regulates nonpoint sources through authority of the NJPDES rules. See **Nonpoint Sources of Pollution**.

Fish Nests at Timothy Lake

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 six NJPDES permits for point source pollution that were issued to individual facilities in Franklin Township. These are listed in **Table 14: NJPDES Permits for Point Source Pollution** and shown on **Map 12: Surface Water Quality**. Of the six permits, two discharge to groundwater (code GW), two discharge to stormwater (code RF), and one is a petroleum hydrocarbon remediation (code B4B).

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. Environmental commissioners and town clerks receive notice from NJDEP when anyone applies for a permit to discharge to surface water under the New Jersey Pollution Discharge Elimination System (NJPDES). The commissions should examine the application and evaluate the proposal – the need for the permit, the location of the discharge and the potential negative impacts. They can then communicate their findings to NJDEP, the applicant and the town.

Table 14: NJPDES Permits for Point Source Pollution

NJPDES Permit Number	PI Number	Facility Name	Municipality	Discharge Category	
				Code	Description
NJ0146200	214447	Community Commons	Franklin Twp.	GW	Discharge to groundwater
NJG0173614	468184	DAS Automotive	Franklin Twp.	B4B	Petroleum hydrocarbon remediation
NJ0066605	46914	Delsea Middle School WWTP	Franklin Twp.	GW	Discharge to groundwater
NJ0067652	46363	Mary F Janvier Elementary School	Franklin Twp.	GW	Discharge to groundwater
NJG0120944.001A	48694	Miles Concrete Company	Franklin Twp.	RF	Stormwater Discharge
NJG0120944.002A	48694	Miles Concrete Company	Franklin Twp.	RF	Stormwater Discharge

Source: NJDEP, 2010

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. 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 of water and the level of pollutants in the runoff from rain. Increased runoff causes erosion and sediment buildup in streams, carries nutrients from fertilizers and washes toxics, 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.

NJDEP's new Stormwater Management Rules focus on reducing and controlling nonpoint sources of water pollution. The Municipal Stormwater Regulation Program was developed in response to the U. S. Environmental Protection Agency's (USEPA) Phase II rules published in December 1999. The Department issued final stormwater rules on February 2, 2004 and 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 with populations less than 10,000; the Public Complex Stormwater General Permit (Public Complex Permit); and the Highway Agency Stormwater General Permit (Highway Permit).

Franklin Township is a Tier A municipality. There is a Highway Permit for the Gloucester County Highway Department that applies to Franklin Township County roads.

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). Under the 2004 NJPDES permit, a town must meet certain specific requirements in planning, ordinance adoption, education, management of township facilities, and investigation of parts of the stormwater system.

In Gloucester County, all municipalities have been aided in complying with the new Rule by a program sponsored by the County Freeholders and managed through the Gloucester County Improvement Authority. This has included development of a stormwater management plan and ordinance and mapping of all stormwater outfall (discharge) pipes.. The County also sponsored the South Jersey Land & Water Trust, a nonprofit organization, to conduct the annual education event and to assist with labeling storm drain inlets.

Stormwater Management Statewide Basic Requirements

Tier A Towns (Franklin Township)

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: NJDEP

Impervious Coverage

The volume of stormwater runoff that is carried to a stream impacts the stream channel condition. Increased volume usually results from increased impervious surface within a subwatershed. As an area becomes developed, more stormwater is directed to the streams from neighborhood storm drains, residential and commercial stormwater facilities, and road drainage. In general, scientists have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to increased stormwater runoff, enlargement of stream channels, increased stream bank erosion, lower dry weather flows, higher stream temperatures, lower water quality, and declines in aquatic wildlife

diversity. When impervious cover reaches 25 percent to 30 percent, streams can become severely degraded.

Franklin Township supports a very low percentage of impervious coverage. With such low rates of impervious surfaces, precipitation is able to infiltrate into the ground and recharge aquifers, and streams are not inundated with polluted stormwater flows.

Stream Buffers

The stream buffer is the region immediately beyond the banks of a stream that serves to limit the entrance of sediment, pollutants, and nutrients into the stream itself. Stream buffers are quite effective at filtering substances washing off the land. The vegetation of the buffer traps sediment and can actually utilize (uptake) a percentage of the nutrients flowing from lawns and farm fields. When forested, a stream buffer promotes bank stability and serves as a major control of water temperature. The buffer region also serves as a green corridor ─ a greenway ─ for wildlife to move between larger forested habitat areas. Residents can utilize these greenways for recreation with the addition of trails, bikeways, and access points to water for fishing and canoe/kayak launching.

The importance of a healthy, intact buffer zone (also referred to as a “riparian corridor”) – especially for headwater streams – has been well-documented scientifically over the past 20 years. However, there is less agreement and much continuing research on the appropriate minimum width of a buffer. In the literature on this issue, a recommended minimum buffer width of 100 feet is most common, with differing activities permitted in each of three zones within the buffer. Buffers of up to 300 feet are recommended for wildlife corridors and potential passive recreational use, such as walking trails.

Marsh Lake Branch

Most stream corridors in Franklin Township are bordered by healthy, wooded riparian buffers, as shown in **Map 17: Natural Vegetation (2007)**. The streams are primarily bordered by wooded wetlands, with some areas of herbaceous wetlands and upland forest. However, it is often the case that the lakes in Franklin Township are bordered either by housing that

is located too close to the lake edges, or by lawns that are often mowed to the lake edges.

The New Jersey Freshwater Wetlands Protection Act incorporates buffer requirements into its wetland protection regulations. The width of the “transition zone” extending beyond a wetland is determined by the value of the wetland, based on its current use and on the documented presence/absence of threatened or endangered species. Municipalities may not establish buffers on wetlands that exceed those required by the state statute. However, the municipality can make certain that those limits are accurate through its review of the wetlands delineation process, and it can also monitor use of the land within the transition area and take action against encroachments.

Restoration of stream buffers on agricultural lands is supported by various programs, such as the Conservation Reserve Program (CRP), administered by the US Department of Agriculture’s Farm Service Agency (FSA) and the New Jersey Department of Agriculture. This program compensates farming landowners for the loss of land being converted to a buffer or other habitat. It also funds or directly creates new buffers where they are absent. Programs such as the Environmental Quality Incentive Program (EQIP), administered by the Natural Resources Conservation Service (NRCS) of USDA, encourage the “due care” management of agricultural lands, involving the proper levels of fertilizer and pesticide applications to farmland. It funds up to 75 percent of the costs of eligible conservation practices. These are all programs in which individual landowners volunteer to take part.

Protecting riparian areas from development and enhancing or maintaining healthy vegetation in the stream corridor can help improve water quality, reduce flooding, and encourage biodiversity. Environmental commissions can encourage the preservation of existing vegetation and replanting of native vegetation along bare stream banks. Use of native vegetation in landscaping minimizes the need for pesticide and fertilizer use, and requires less frequent watering and mowing.

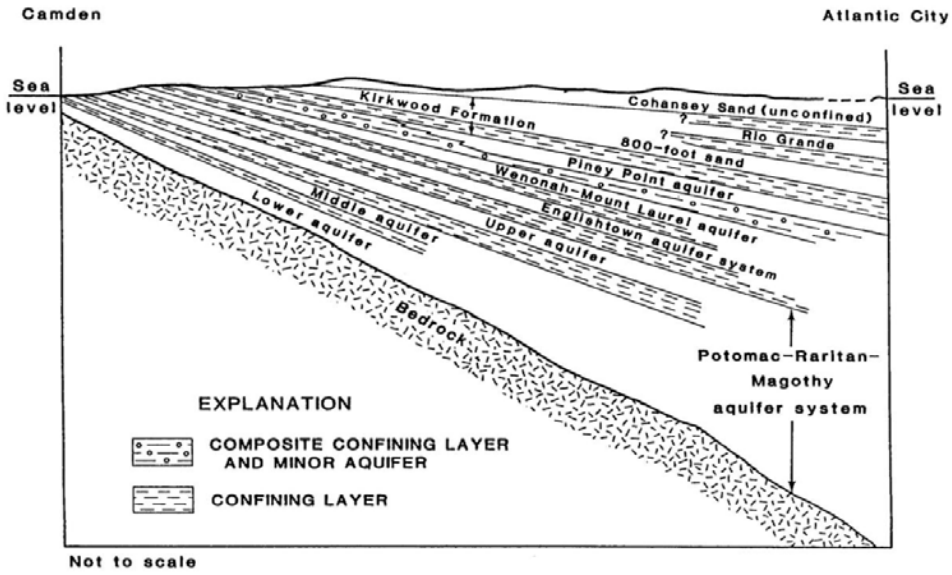
Pitcher Plant

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.

A cross section across southern New Jersey from west to east (see **Figure 9: Aquifers of Southern New Jersey along a line from Camden to Atlantic City)** would show that the aquifers are not horizontal, but 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 deepest strata emerge on the surface near the Delaware River. Where each individual layer emerges is called its “outcrop” area.

Figure 9: Aquifers of Southern New Jersey along a line from Camden to Atlantic City



Source: US Geological Service

The Potomac–Raritan–Magothy (PRM) formation is the deepest and most abundant 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.

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. The surface geology of Franklin Township is shown on **Map 13: Surface Geology**. Franklin Township is situated

over formations of unconsolidated sand and gravel known as the Bridgeton, the Kirkwood and the Cohansey formations. Together, these last two form the regionally important Kirkwood-Cohansey Aquifer. There are no extensive clay beds, rock barriers or other impediments or protection to this groundwater.

Red-Bellied Turtle

Franklin's land is composed of an outcropping of the Tertiary Cohansey Formation, punctuated with overlying patches of Bridgeton Gravel. The Cohansey rests on a bed of Kirkwood Formation, which is a continuous strata of layered sand, clay and gravel. These layers are unconsolidated deposits of coarse to fine quartz sand embedded with discontinuous bands of white illite clay. The deposits came from shallow water marine sedimentation that occurred in the Miocene Period, approximately 19 million years ago. The overlying Bridgeton Gravel is composed of medium to large pebbles in a fine sand-silt matrix. This sediment was deposited by glacial outwash during warming periods in the early to mid-Pleistocene, and is less than 1 million years old. More recent peri-glacial changes and deformations have caused the rolling landscape and erosion conditions present today.

Altogether, the Kirkwood-Cohansey Formation underlies about 3,000 square miles of southern New Jersey on the Coastal Plain. It is the foundation geology for the internationally recognized Pinelands ecosystem. The Kirkwood-Cohansey layer under Franklin is approximately 290 feet at its deepest point. Bridgeton Gravel caps approximately 57 percent of the outcrop and can be up to 50 feet deep.

The Kirkwood-Cohansey aquifers are normally described together because their separation is based on small microfossils in otherwise similar porous sand. This is a nationally important water reserve and provides the potential for the eastern US's largest source of unpolluted and potable water. It is important because it is large (about 13 trillion gallons), serves a substantial population, and may be a regional source in times of national emergency. The combined water resources of the Kirkwood and Cohansey formations provide all the potable water to the southeastern portion of Gloucester County's residents and many other communities in adjoining counties.

The vast Kirkwood-Cohansey aquifer system is recharged solely by infiltration of rainwater through the upland porous sandy soils. There are no continuous barriers to rainwater, or other water that reaches the soil surface from infiltrating into the Franklin Township water table. The groundwater provides the base flow

for streams and supports the wildlife and vegetation associated with wetlands. For these reasons, groundwater is both an extremely important township resource and one that is vulnerable to surface impacts.

Aquifers

Within Franklin Township, the Kirkwood-Cohansey outcrops throughout the entire municipality and all residents are dependent on it as the source of supply for their private drinking water wells. The shallow and unconfined Cohansey sand aquifer is extremely vulnerable to contamination. The aquifer also faces issues with base flow reduction in streams which draw most of their total annual flow from ground water. The Kirkwood-Cohansey aquifer is estimated to be in deficit due to the lack of surface water storage and because ground water use exceeds the estimated ground water supply, which is determined to be about 54 million gallons per day (MGD).

Groundwater Recharge

Recharge of groundwater is an important issue in southern New Jersey because of the dependence on aquifers for drinking supply and for agricultural use. The amount of rainwater that actually enters an aquifer is a function of many factors, including the nature and structure of the aquifer itself. The amount of precipitation that infiltrates the soil and reaches the saturated zone to become groundwater – the recharge of the aquifer – is also dependent on climatic conditions, the nature of the soil, and the vegetation of an area.

In general, lands immediately adjacent to the creeks' floodplains, marshes, and wetlands of the township exhibit less groundwater recharge. In addition, large amounts of paving and impervious cover on high recharge lands will have the most detrimental impact, although these areas are also usually the places most suitable for building because they are well-drained. Conversely, these are also regions where the dilution of substances from septic systems, such as nitrates, may require a larger land area because the soils are usually more "porous." For example, minimum average lot sizes of two to four acres are often needed for proper nitrate dilution from septic systems in areas having 10 or more inches per year of groundwater recharge, depending on the soils.

Within a watershed, there are areas which infiltrate and those which discharge. On Franklin's landscape, all uplands are recharge areas. The capability for recharge, however, is a function of a few factors, such as depth to seasonal high water table, soil texture and composition. Sandy surface soils are a better recharge site then silty sands, but all of Franklin Township's soils are porous enough to allow for excellent recharge. The highest topographic sites in the township provide the best recharge potentials. These areas have the greatest depths to seasonal high ground water and thus have the greatest storage of infiltrating rainwater. Areas of upland forest around Plainville, Star Cross, Malaga

and Janvier are the best sites for rainwater infiltration into Franklin's portion of the Cohansey Aquifer. See **Map 14: Groundwater Recharge** for a depiction of recharge areas in Franklin Township.

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 less than 25 people and 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 15 service connections for at least 60 days per year. According to the EPA, public water supply wells serve 90 percent of the people of the United States with drinking water. Public water supply wells are further defined 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 at least 25 year-round residents. Public community water supply wells may serve municipalities, subdivisions, nursing homes, or other areas or institutions.

There are nine active public community water supply wells serving Franklin Township. They are listed in **Table 15: Public Community Water Supply Wells** below and shown on **Map 15: Public Water Supply Wells**. All wells tap the Kirkwood-Cohansey aquifer system.

Table 15: Public Community Water Supply Wells

PWSID	Well ID	Original Owner	Address of Well	Depth of Well (ft.)
NJ0805433	0578754	Holly Green Campground	Monroeville Rd	85
NJ0805001	0191569	Iona Trailer Park	Rte 47 & Belle Ave	70
	0191572	Iona Trailer Park	Rte 47 & Belle Ave	122
	0191575	Iona Trailer Park	Delsea Dr (Rte 47) & Belle Ave	0
	0715717	Iona Trailer Park	Rte 47	50
NJ0805002	0191570	Malaga Mobile Home Park	Rte 47 & Rte 40	135
	0191571	Malaga Mobile Home Park	Rte 47 & Rte 40	135
NJ0805003	0000280	Malaga Villa Apartments	Rte 47 (Delsea Drive)	150
	0269542	Malaga Villa Apartments	Rte 47 (Delsea Drive)	150

Source: NJDEP, 2007

Private Drinking Wells

Private wells supplying potable water are not routinely monitored like public community water systems (public water) and public non-community wells. However, beginning in 2002, the state of New Jersey, under the Private Well Testing Act, required that well water be tested for contaminants when properties are sold or leased. In addition, each county or local health department enforces the state requirements for testing of all newly installed wells.

As required by federal and state regulations, public water supply wells in the state are monitored by NJDEP on a regular basis. The monitoring schedules for the public community water supply wells Franklin Township are shown in **Appendix H: Monitoring Schedules for Public Community Water Supply Wells**.

Sampling requirements for a water system may change at any time for several reasons, including analytical results, 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).

Public non-community wells are another part of a public water system. There are two types of public non-community water systems: transient and non-transient. The name refers to the type of populations that utilize them and their frequency of use. A transient non-community water system serves at least 25 people each day, but this population changes each day. These systems are at places such as rest stops, gas stations, and restaurants. A non-transient non-community water system serves at least 25 of the same people daily at a minimum of six months per year at places like schools, factories, and office parks.

There are 54 public non-community wells in Franklin Township. They are listed in **Table 16: Public Non-Community Water Supply Wells Serving Franklin Township** below and shown on **Map 15: Public Water Supply Wells**.

Table 16: Public Non-Community Water Supply Wells Serving Franklin Township

Well ID	Well Permit	System Name	Depth of Well (ft.)
0805352	31-27934	Airmax Heating & Air Conditioning	140
0805315		Bell Tavern	110
0805404		Bob Brooks Auction	110
0805348	31-28727	Bright Promise Nursery	79
0805392	31-56834	Camp Sacajawea	97
0805419	31-24198	Church of the Nativity	70
0805371	31-34226	Clayton Amer. Legion POS	90

Well ID	Well Permit	System Name	Depth of Well (ft.)
0805333	31-26128	Cumberland Farms 7644	80
0805427	31-28485	Delsea Middle School	130
0805397	31-55956	Forest Grove Volunteer Fire Co.	100
0805435	31-31239	Franklin Savings Bank	140
0805312	31-17540	Franklin Skating Center	130
0805440	31-42011	Franklin Twp. BOE	120
0805382	31-15784	Franklin Twp. Recreation	131
0805342	31-53158	Franklinville Adult Training	90
0805319		Franklinville Inn	110
0805381	31-13039	Franklinville Volunteer Fire Co.	96
0805407	31-58145	Gaetano's Indoor Soccer	100
0805438	31-25289	Girl Scouts So. Jersey Pines	140
0805332	31-45900	Gleason's Place	113
0805406		Here’s the Scoop	110
0805433	31-20254	Holly Green Campground	85
0805313		Iona Deli	110
0805318		Joseph's Orig Cap N Cat	110
0805353		La Pizza	110
0805304	31-24323	Lake Road School	100
0805308	31-05162	Main Road School	98
0805389	31-31684	Malaga Methodist Church	120
0805341	31-23387	Malaga Pentecostal ASSE	100
0805426	31-28400	Mary F. Janvier School	140
0805344	31-35693	Maryville INC.	110
0805335		Mike's Coles Mill Tavern	110
0805444		New Life in Christ Ministry	110
0805324	31-50364	Nicks Pizzeria and Steak	110
0805359	31-34138	Pegasus Restaurant	104
0805431		Purple Penguin	110
0805303	31-38784	Reutter School	100
0805383	31-40435	Roman Catholic Church	110
0805384		South Star Diner	110

Well ID	Well Permit	System Name	Depth of Well (ft.)
0805317		Star Cross Tavern	110
0805429		Steve's Deli	110
0805430		Suburban Cable	110
0805430		Suburban Cable	110
0805367		Truth Baptist Church	110
0805388	31-15482	Twp of Franklin	80
0805336	31-58430	VFW Post 2071	110
0805327		Walt's Grocery	110
0805405	31-40297	WAWA Store #399	93
0805351	31-20767	WAWA Store #444	100
0805414		WAWA Store #462	110
0805399	31-57140	WAWA Store #486	90
0805355		Wayside Motel	110
0805400		Wayside Motel	110
0805443		Wrights Liquor Store	110

Source: NJDEP, 2009

Wellhead Protection Areas

Delineating a Well Head Protection Area (WHPA)

A WHPA consists of three tiers, each based on the time of travel to the well:
Tier 1 = two years
Tier 2 = five years
Tier 3 = twelve years

Calculation of the tier boundaries is based on findings of how long specific contaminants can survive in groundwater, how much time would be required for specific remedies to be undertaken, and on the likelihood of natural dilution over distance.

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.

Once WHPAs are delineated, potential pollution sources may be managed by landowners or municipalities, in relation to the tier locations. Protection of land and restrictions on activities within wellhead zones (relating to uses that generate contaminants, and to the storage, disposal, or

handling of hazardous materials) are important for maintaining the quality of water within those zones.

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 in Franklin Township are shown on **Map 15: Public Water Supply Wells**.

Groundwater Contamination

All homes for sale with private wells for drinking water must have their well water tested. The New Jersey Private Well Testing Act (PWTA), which became effective in 2002, is a consumer information law that requires sellers (or buyers) of property with wells in NJ to test the untreated ground water for a variety of water quality parameters, including 32 of human health concern, and to review the test results prior to closing of title. Landlords are also required to test their well water once every five years and to provide each tenant with a copy of the test results. A laboratory certified by the New Jersey Department of Environmental Protection (NJDEP) must sample and analyze the water in accordance with state law.

The Gloucester County law requires specific testing of new wells for a variety of contaminants and chemical parameters. Testing includes a standard parameter test (total coliform bacteria, pH, iron, manganese, lead, mercury, nitrate, Volatile Organic Compounds, and gross alpha analysis).

Piney Hollow Natural Area

Map 16: Groundwater Risk (1996-2011) shows some of the results from County testing and other sources, recorded between 1996 and 2011 for Franklin Township. The map represents only the areas of risk that the Gloucester County Health Department was able to provide, due in part to privacy issues. Radionuclides are present in many wells throughout the township, although this parameter is not shown on the map.

Criteria Pollutants

Ground level ozone (O_3) 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 (NOx) are a group of highly reactive gases which 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 (SO_2) 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

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.

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%. The industrial sector reduced its toxic air emissions by 70% during this time period. Stricter emissions standards in the auto industry have made cars 90% “cleaner” since 1970. Cars also pollute less because refineries are required to produce cleaner fuels; leaded gasoline was completely banned in 1996.

Air Quality Monitoring

NJDEP’s Bureau of Air Monitoring maintains a network of over 40 continuous monitoring stations across the state. These stations are located across New Jersey, although many 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 an ambient monitoring station located approximately eight miles (12.5 kilometers) to the north of Franklin Township at the Ancora Hospital in Winslow Township in Camden County. In 2009 (the most recent year of available annual data), the Ancora monitoring station monitored four parameters: carbon monoxide, ozone, sulfur dioxide and acid deposition. These were all monitored at the “urban” scale, representative of 10 to 100 kilometers, which would include all of Franklin Township. However, because of ongoing equipment issues, acid deposition samples taken in 2009 were not able to be analyzed.

The other continuous monitoring station closest to Franklin Township is located in Millville, Cumberland County, approximately nine miles (13 kilometers) to the south. However, this station monitors at the “neighborhood” scale (1 to 10 kilometers), which would not be representative of Franklin Township.

Carbon Monoxide

Carbon monoxide is formed by the burning of fuels, including gasoline, oil, wood, coal, and other fuel sources. It is toxic to humans in high quantities, and hundreds of people die from indoor carbon monoxide poisoning each year according to the Centers for Disease Control. Atmospherically, carbon monoxide levels are elevated in urban areas due primarily to automobile exhaust.

There are currently two national primary, or health-based, standards for carbon monoxide. There is a one-hour concentration of 35 parts per million (ppm), and an eight-hour average concentration of nine ppm. These levels are not to be exceeded more than once in any calendar year. There are no national secondary (public welfare-based) standards for CO at this time. New Jersey state standards for CO are based on different units (milligrams per cubic meter as opposed to parts per million), and these state standards are not to be exceeded more than once in any 12-month period. The state has set secondary (public welfare-based) standards for CO at the same level as the primary standards. None of the monitoring sites exceeded any CO standard during 2009.

Table 17: Carbon Monoxide One- and Eight-Hour Averages, 2009

Monitoring Site	Maximum 1-Hour Average	2nd Highest 1-Hour Average	Maximum 8-Hour Average	2nd Highest 8-Hour Average
Ancora State Hospital	0.900	0.800	0.400	0.400
Statewide	*0.036*	*0.031*	*0.003*	*0.001*

Source: NJDEP, 2009

Ozone

The ozone (O_3) layer in the upper atmosphere protects the earth from the sun's harmful electromagnetic radiation. However, ground level ozone is an atmospheric pollutant that is linked to respiratory illness, heat attack, and other ill health effects. Ozone is formed by the reaction of sunlight on air containing hydrocarbons and nitrogen oxides.

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, 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. However, in 2008 New Jersey tightened the one-hour concentration standard for secondary effects to 0.075 ppm maximum daily eight-hour average. The available data represents the first complete year AQI values for ozone and is based on this new standard. Ozone was monitored at 14 stations throughout the state in 2009.

Table 18: Ozone One-Hour Averages, 2009

Monitoring Site	1-hour Max ppm	2nd Highest 1-hour Max ppm	4th Highest 1-hour Average 2004-2006 ppm	# of Days with 1-hour Averages above 0.12ppm
Ancora State Hospital	0.081	0.080	0.101	0
Statewide	*0.109*	*0.100*	---	*0*

Source: NJDEP, 2009

Table 19: Ozone Eight-Hour Averages, 2009

Monitoring Site	1st Highest	2nd Highest	3rd Highest	4th Highest
Ancora State Hospital	0.075	0.074	0.073	0.071
Statewide	*0.085*	*0.083*	*0.080*	*0.080*

Source: NJDEP, 2009

Sulfur Dioxide

Sulfur dioxide (SO_2) results from the combustion of fossil fuels like coal and petroleum. The largest source of sulfur dioxide in the atmosphere is power plants, followed by other industrial facilities. At high levels, sulfur dioxide has significant health impacts for humans, including respiratory disease, reproductive disorders, and a range of other illnesses and effects.

Since the implementation of regulations requiring the use of low sulfur fuels in New Jersey, SO_2 concentrations have improved significantly. The last time the national SO_2 standards were exceeded in New Jersey was in 1980. There are three NAAQS for SO_2. The first is an annual average health standard of 0.03 parts per million (ppm), based on a calendar year average of continuously monitored levels. The second is a 24-hour average primary standard of 0.14 ppm which is not to be exceeded more than once a year. The third is a secondary standard of 0.5 ppm based on a three-hour average concentration not to be exceeded more than once per year. New Jersey has also set state air quality standards for SO_2. They are similar to the federal standards but are expressed in micrograms per cubic meter (µg/m3) instead of ppm. New Jersey's standards are also based on rolling averages rather than calendar year averages. So, for example, the state's primary 12-month standard is based on any twelve month average, while the federal standard is based solely on the calendar year average. The state also has secondary 12-month, 24-hour, and 3-hour average standards.

Table 20: Sulfur Dioxide 3-Hour and Annual Averages, 2009

Monitoring Site	3-Hour Average Maximum	3-Hour Average 2nd Highest	12-Month Average Maximum	Calendar Year Average
Ancora State Hospital	0.026	0.024	0.001	0.000
Statewide	*0.036*	*0.031*	*0.003*	*0.001*

Source: NJDEP, 2009

Table 21: Sulfur Dioxide 24-Hour and Daily Averages, 2009

Monitoring Site	24-Hour Average Maximum	24-Hour Average 2nd Highest	Daily Average Maximum	Daily Average 2nd Highest
Ancora State Hospital	0.018	0.010	0.015	0.007
Statewide	*0.018*	*0.015*	*0.017*	*0.010*

Source: NJDEP, 2009

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 10: Air Quality Index (AQI)** below. The higher the AQI value, the greater the level of air pollution and associated health concerns.

Figure 10: Air Quality Index (AQI)

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

Source: NJDEP, 2005

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. Gloucester and Camden counties make up Region 8: Southern Delaware Valley. In 2009, Region 8 reported 284 good (green) and 79 moderate (yellow) days, two days which were unhealthy for sensitive groups (orange), and zero unhealthy (red) and hazardous (maroon) days.

Greenhouse Gas Inventory

A research team from Stockton University conducted a municipal greenhouse gas inventory for Franklin Township in 2011. The results from this study were used to calculate an index of current emissions as follows:

Table 22: Greenhouse Gas Inventory for Franklin Township

Source	Energy (MMBtu)	Emissions (tons eCO2)
Residential Energy	1,014,824	163,781
Commercial Energy	422,032	71,904
Transportation	1,799,638	154,305
Solid Waste		3,869
Total	**3,236,494**	**393,859**

Source: Katie-Anne Conway, 2011

Overall, the transportation sector comprised 40 percent of all greenhouse gas emissions, similar to the statewide average of 43 percent. However, due to the low levels of commercial development in the township, the commercial sector comprised just 18 percent of all greenhouse gas emission, far less than the statewide average of 34 percent. The residential sector in Franklin Township comprised 42 percent of emissions, more than the statewide average of 23 percent.

The per capita greenhouse gas emissions for Franklin Township were 24 tons per year, less than the national average of 27 tons but more than the statewide average of 18.6 tons.

CHAPTER 5

Biological Resources

Franklin Township contains an abundance of natural vegetation and habitat for a wide range of animal species. The current plant and animal associations found in the township are dependent on both the underlying ecological conditions and the impact of human settlement.

Natural Vegetation

A region's vegetation is dependent upon many factors, the most important of which are climate and soils. Franklin Township's climate is cool and temperate, and is characterized by moderate temperatures, precipitation, and wind, with an average annual temperature of 54 degrees Fahrenheit. The average annual precipitation is 43 inches and is fairly well distributed throughout the year. Many of Franklin Township's soils are poorly drained soils that exhibit ponding and sustain wetland plants. However, Franklin Township also has a great deal of moderately well-drained soils that support a diversity of trees and crops. See the **Soils** section for a detailed description of Franklin Township's soils.

Franklin 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. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the U.S. Geologic Survey. See **Map 17: Natural Vegetation (2007)**.

Marsh Lake Branch

Plants are the basis for all of earth's life, supporting all animals with oxygen, food and shelter. Algae, mosses, liverworts and other lower organisms (bacteria, fungi) form a food chain link that ultimately affects the entire

local ecosystem. These small and diminutive plants are common in all Franklin Township environments. The non-vascular plants are the first link in the ecological web. The many species that form this web of life are not well documented, nor is information on the microscopic animals that feed upon them.

The most obvious natural plant communities are based on large, visible (macrophytic) vascular plants. These are found growing within the township in plant communities such as forests, marshes and old fields. Typically, deciduous broad leaf and needle leaf evergreen trees with trunk base measurements greater than four inches diameter at breast height (DBH) form a closed canopy in our forests. Marshes are open wetlands dominated by herbs and shrubs without a distinct forest canopy. Old fields are natural recovering landscapes that have been cleared in the recent past by fire or deforestation and now have a renewed vegetative cover dominated by warm season grasses, composites and other perennial herbs.

White Fringed Orchid

Vegetation is controlled by a variety of factors. Most important is the local climate, which directly affects soil moisture and soil development. Franklin Township's climate is a cool temperate type associated with a coastal permanently humid-warm summer condition. The climate is favorable enough to allow the southeastern coastal plain forest to dominate the landscape. The entire township is located on New Jersey’s Outer Coastal Plain where mineral soils of silica sand are the basic substrate. Two distinct soil textures exist based on the presence or absence of over-wash gravels of the Bridgeton Formation. Areas under this mantle tend to have silt and silt-sand soils with considerable amounts of rounded quartz and other igneous rock fragments. Those areas without the Bridgeton cap are sandier, with conditions more typical of true Pine Barren environments. Both soil textures have the ability to support deciduous-dominated canopies with coniferous (needle-leaf) associates. Local forests differ from each other depending on which particular species are dominant. This can be quite distinct and is dependent on the specifics of the underlying soil.

Upland Forest

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. Most upland forests have been cleared and converted to farms or homes. Franklin Township still has some large areas of upland forest, primarily in its Pinelands region. The remaining upland forests outside the Pinelands are largely remnants along stream corridors, or are small patchy woodlands associated with large farms and areas with less desirable soils. The only non-Pinelands large upland forest remaining, located along Pennsylvania Avenue, received development approvals prior to the current economic downturn.

Approximately 37 percent (13,400 acres) of Franklin Township is considered upland forest. Forested land includes some rural residential home sites as well as undeveloped land. Most of the larger continuous parcels with undeveloped forest are on the eastern edge of the Township in the Piney Hollow and Blue Bell areas.

Wooded Trail at the Harris Tract

The upland forests found on the Bridgeton Formation, such as those on the western edge of the Township, tend to be dominated by a wide array of regionally distributed oaks such as white, black, chestnut, scarlet, and southern red, together with mocker nut, sweet pignut and sand hickories. Short-needle pine is more prevalent in this type of forest than other types of pines, but pitch pine and Virginia pine are present along field edges and in patches within the forest canopy. Higher soil moisture, together with a lower wildfire history, allow for these less fire-tolerant plant communities dominated by oak-hickory-short-needle pine to survive. Upland forest on the Bridgeton Formation is normally stratified with an understory composed of scattered small trees and large shrubs such as sassafras, dogwood, hawthorn and shadbush, as well as sapling canopy trees. The forest floor occasionally is covered with a dense huckleberry and mountain laurel thicket, but most forests have thick leaf litter and widely scattered colonies of black huckleberry, low bush blueberry, and mountain laurel. Herbaceous plants associated with upland forest include panic grasses, upland sedges and yellow foxgloves.

The upland forests found in the Cohansey Formation of the eastern portion of the township are more dominated by coniferous rather than deciduous forests. The

Cohansey Formation soils are made of more coarse sand than the Bridgeton Formation areas, and thus drain quicker and dry faster. This lack of soil moisture is reflected in the vegetation, which is dominated by xeric or arid plants tolerant of drought conditions and fire. Pitch pine is associated with disturbance and is indicative of abandoned farm fields and forest fire. Where fire has been eliminated or reduced, fire and drought-tolerant oaks dominate. Post, white, black, scrub and blackjack oaks are common on the Cohansey Sand. The subcanopy is weakly stratified in this forest. Most species found as subcanopy plants are saplings of canopy trees. The forest floor under a more open pine canopy tends to have more light reaching the forest floor. This produces a dense thicket of black huckleberry, scrub oak, dangleberry and other blueberry family plants. Herbaceous plants are not common, but do include upland sedge, panic grasses and frost-weed.

Grasslands and Old Fields

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.

The “old field” vegetation type is found on uplands and is typically dominated by warm season grasses such as little blue stem, Indian grass, and broom sedge. Old fields are areas that once were cultivated, but have since been abandoned. After abandonment, perennial herb and grasses succeed to become the dominant species for approximately three to 20 years. This habitat is visible throughout the Township, especially along wood edges, roadsides, and in other landscapes where mowing is infrequent and woody plants are not yet the dominant vegetation.

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.

Wet forests established on soil with high water tables are wetlands. State and federal definitions tie wetlands to specific soil chemistry and the presence of water. Franklin's wetland forests are confined to headwater seep areas, stream corridors and isolated depressions. Wetland forests are either covered with deciduous trees or evergreen trees or have a combination of both.

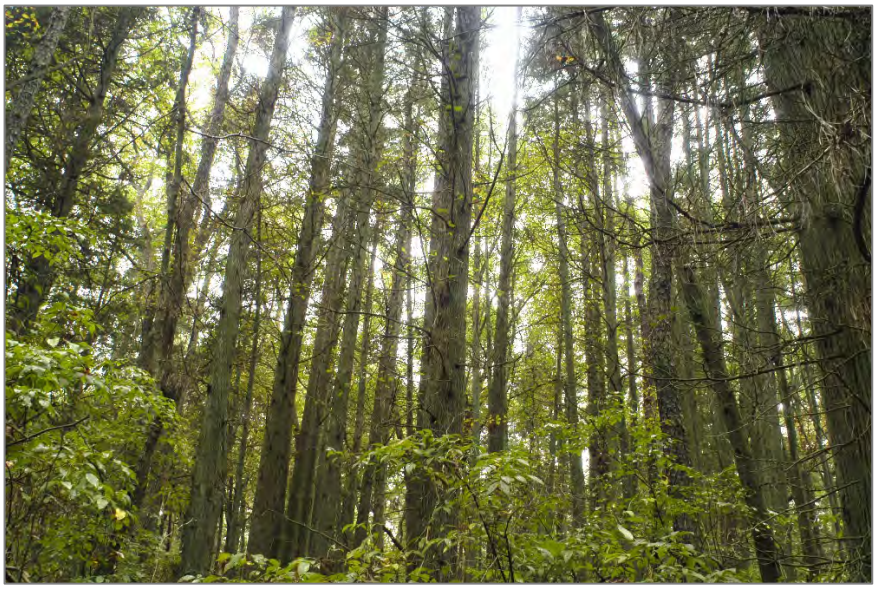
Franklin's wet forests are primarily red maple-dominated and most include associated trees such as black and sweet gums, sweet bay magnolia, and birches. Pitch pine is an important wetland tree, either as a co-dominant within red maple swamps or as the important species on pitch pine lowlands. Atlantic white cedar, an economically important tree, is found throughout the township. This tree forms dense stands and is a regionally important plant community in itself. Most white cedar however, is scattered as individual trees within the wetland forests. Under this forest canopy, shrubs and saplings form dense thickets. Shrubs are the dominant plants where wetlands are recovering from past impacts.

Wetlands at Piney Hollow Natural Area

Needle-leaf evergreen trees dominate some of the Township's wetland forests. Pitch pine and Atlantic white cedar are Franklin Township's only native needle-leaf evergreen trees. Pitch pine and Atlantic white cedar are also characteristic wetland plants associated with New Jersey's Coastal Plain wetlands. Pitch pine dominates lowland areas, like those found around the Whitehall Branch of the Great Egg Harbor River. The pitch pine lowland plant community exists where fire or extensive logging has impacted seasonally saturated sand. Pitch pine is a singular dominant tree in this forest, with few associates. The understory is characteristically very dense, covered with a shrub thicket composed of scrub oak, blueberries and other heath-family plant species.

A distinctive type of wooded wetlands found in Franklin Township are Atlantic white cedar wetlands, which cover over 300 acres in the easternmost part of the township along the Faraway Branch, White Oak Branch, and Marsh Lake Branch and their tributaries. These areas are depicted on **Map 21: Conservation Areas**. Cedar swamps, like those visible south of Coles Mill Road within the Great Egg Harbor drainage, or those east of Route 47 just south of the Township Municipal building, are dominated by this single species. This forest type, however, is found in wetlands with saturated or standing water. Atlantic white cedar wetlands are an important cultural and ecological component of the landscape of the New

Jersey Pinelands, although one which has declined significantly. Atlantic white cedar wetlands were once widely distributed across the state, but declined due to lack of proper management, loss of wetland habitat, theft and illegal harvesting, wildfire, deer browsing, a rise in sea level, and other natural and man-made factors. These types of wetlands provide essential storage areas for rainwater and stormwater runoff. They also provide essential habitat for a diversity of plants and animals, including numerous threatened and endangered species.



Atlantic White Cedar

Open wetlands support non-woody vegetation. As with upland old fields, perennial wetland herbs form similar successional wetland plant communities. These wetland meadows do not cover many acres within Franklin, but their presence is evident along the wetter road shoulders and lake edges that abound in Franklin Township. Malaga Lake, McCarthys Lakes, and the many other open bodies of water support some extent of this herbaceous vegetation.

Emergent and submerged communities are found in the stream corridors and lakes within the Township. These areas support plants that require the persistent presence of standing water. Light is also a limiting factor to this plant community and they are found only within the shallower parts of open, perennial lakes and streams. Yellow spatterdock, white water lily, pickerelweed, arrow arum, water loosestrife and other obvious emergent water plants are limited to marshes, lakes, ponds and streams that are not shaded by a forest canopy. Plants such as pondweeds, bladderworts and other submerged plants are also totally dependent upon the permanent presence of standing water. Healthy populations of all these plants exist in all of the Township lakes, especially those found within the Maurice River drainage basin.

Table 23: Franklin Township Natural Vegetation (2007)

Vegetation Type	Area (Acres)	Percentage of Township
Brush/Shrubland	706.77	1.9%
Brush/Shrubland - Oldfield	284.16	0.79%
Upland Forest - Coniferous	1,483.07	4.1%
Upland Forest - Deciduous	7,453.83	20.7%
Upland Forest - Mixed (Coniferous Dominated)	1,105.89	3.1%
Upland Forest - Mixed (Deciduous Dominated)	2,364.67	6.6%
Water	392.11	1.1%
Wetlands - Herbaceous	60.29	0.2%
Wetlands - Modified	454.06	1.3%
Wetlands - Phragmites Dominated	2.74	0.0%
Wetlands - Scrub/Shrub	229.58	0.6%
Wetlands - Wooded - Atlantic White Cedar	318.73	0.9%
Wetlands - Wooded - Coniferous	761.97	2.1%
Wetlands - Wooded - Deciduous	2,941.13	8.2%
Wetlands - Wooded Mixed (Coniferous Dominated)	619.16	1.7%
Wetlands - Wooded Mixed (Deciduous Dominated)	904.51	2.5%
Total	**20,082.66**	**55.7%**

Source: NJDEP, 2007

Pinelands National Reserve

Nearly 35% percent of Franklin Township, or 12,812.25 acres, is within the 1.1 million-acre Pinelands National Reserve. This area encompasses nearly 22 percent of the State of New Jersey and is rich in cultural, ecological, and agricultural history. The boundary of the Pinelands includes all or part of 56 municipalities in seven counties. The Pinelands is the largest body of open space on the mid-Atlantic seaboard between Richmond and Boston. Most land in the Pinelands overlays the vast Kirkwood-Cohansey aquifer. The Pinelands is home to 700,000 people, 43 endangered or threatened animal species, and an unknown number of rare plant species.

The Pinelands was approved as a National Reserve on January 16, 1981. In 1983, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) named it a Biosphere Reserve, an area meant to demonstrate a balanced relationship between humans and the biosphere. The Pinelands was

named an International Biosphere Reserve in 1988 and is considered to have one of the first and best widespread ecosystem management plans in the country. The goals of a UNESCO Reserve are to conserve the life within the reserve, to provide a site for scientific research and monitoring, and to promote sustainable development in communities of surrounding regions.

Wild Blueberries

In addition to the valuable and unique environmental features of the Pinelands, the over one million acres also includes historic and prehistoric sites, hamlets, subdivisions, towns, and active farmland. New Jersey is the second largest producer of blueberries and the fourth largest producer of cranberries in the country, and all this production occurs in the Pinelands.

The New Jersey Pinelands Commission's Comprehensive Management Plan (CMP), adopted in 1980 and approved by Congress in 1981 is a plan to balance protection with development. To ensure the effectiveness of the plan, county and municipal master plans and land use ordinances must be brought into conformance with the CMP. The CMP divides the Pinelands region into nine different management areas based on land use capability. Each area has different goals, objectives, development intensities, and permitted uses. In order to develop in the Pinelands, an application must be submitted to the Pinelands Commission. Development applications are reviewed to ensure conformance with the Pinelands CMP. After this review, the Pinelands Commission issues a Certificate of Filing, and this enables the applicant to apply for state and local permits and approvals. If the development does not meet the land use and environmental standards of the CMP, then the applicant may attempt to obtain a Waiver of Strict Compliance, which involves additional review. The development review process by the Pinelands Commission is aimed at fostering environmentally sensitive development in order to protect one of the most unique ecosystems in the world.

Landscape Project Priority Habitats

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish & Wildlife, documents the value of

various types of habitats within New Jersey. It categorizes these habitats into one of five rankings according to their importance (five being the highest). Habitat in Franklin Township has been ranked between one and four by the Landscape Project. In Landscape Project version 3.1, the state has been divided into six ecological regions. Franklin Township is located in the Delaware Bay, Pinelands, and Piedmont regions.

Approximately 69% (24,698.39 acres) of Franklin Township has been identified as important habitat by the Landscape Project. In addition, about two percent (742.98 acres) of the township has been identified as bald eagle foraging area. See **Map 18: Landscape Project Priority Habitat (2012)**.

Osprey

Table 24: Landscape Project Habitats (2012)

Rank	Area (Acres)	% of Township Land
1	11,914.55	33.05%
2	2,675.79	7.42%
3	8,036.07	22.29%
4	2,071.99	5.75%
Total Landscape Project	**24,698.39**	**68.51%**
Total Franklin	**36,051.25**	**100.00%**

Source: NJDEP, 2012

Delaware Bay

Land in Franklin Township south of Route 40 is located in the “Delaware Bay” region of the Landscape Project. Species of special concern found in this region of Franklin Township include the wood thrush and great blue heron. The state threatened Northern pine snake, barred owl, and Cooper’s hawk have also been documented.

Piedmont Plains

Land to the west of Route 55 in Franklin Township is located in the “Piedmont Plains” region of the Landscape Project. This part of Franklin Township provides habitat for the great blue heron, a species of special concern. In addition, the state endangered bald eagle was sighted in 2011 foraging as well as nesting in this part of Franklin Township.

Pinelands

Most of Franklin Township is located in the “Pinelands” region of the Landscape Project, located north of Route 40 and east of Route 55. The worm eating warbler, wood thrush, northern parula warbler, and great blue heron, all species of special concern. This area also provides habitat for the state threatened Northern pine snake, barred owl, and Cooper’s hawk. A breeding sighting of the state endangered red-shouldered hawk was reported in 2000. This area of Franklin Township also provides foraging, wintering, and nesting habitat for the state endangered bald eagle.

Animal Communities

Together with climate and soils, animals shape the plant communities. The local resident and normal seasonal migrant animal assemblage is commonly called the area’s "fauna". Composed of all living organisms, the Township’s fauna consists of populations of invertebrates (insects, arachnids, crustaceans, mollusks) and vertebrates (mammals, birds, amphibians, reptiles, fishes).

Most visible in this animal assemblage are the vertebrates. Mammals, birds, and fish along with reptiles and amphibians, a group commonly referred to as herptiles, are the most visible members of the township’s fauna. Specific land uses and the regional setting provide habitats for many species that have wide geographic distributions. Some mammals, such as white tailed deer, raccoon and opossum, are generalists and occupy many different vegetation types during different seasons of the year. Other mammals, such as beaver, muskrat and river otter, are almost exclusively restricted to open water habitats associated with the wetland corridors feeding the Great Egg Harbor and Maurice Rivers.

Beaver Lodge at Piney Hollow Natural Area

Although no comprehensive inventory of the different animal species within Gloucester County or Franklin 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 animals of Franklin Township. These are included in **Appendix D: Vertebrate Animals Known or Probable in Franklin Township**.

Invertebrates

Invertebrates make up the bulk of the animal community mass even though their presence is not always evident. Insects (beetle, bugs, moths, butterflies, ants, termites, bees and wasps, etc.), arachnids (spiders, ticks and mites), crustaceans (crayfish, microscopic copepods) and mollusks (mussels, clams, snails and slugs) exist in every habitat. 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.

Macroinvertebrates are invertebrates that are visible to the naked eye but smaller than 50 millimeters. 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**.

Invertebrate population totals are extremely variable and difficult to assess, as are the species associations. To date, there are no complete assays of invertebrates for the township, County or State. There are nine endangered invertebrate species (two beetle species, four butterfly species, and three mussel species) and eight threatened invertebrate species (three butterfly species and five mussel species) in New Jersey. Of those species on the New Jersey

Endangered and Threatened List, one – the dwarf wedge mussel – is listed as endangered under the federal Endangered Species Act.

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. Although elusive, there are a number of reptile and amphibian species that have been recorded in Franklin Township. A wide range of bird species are found in the township, including many breeding species.

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 Franklin Township include the opossum, masked shrew, short-tailed shrew, Eastern mole, big brown bat, little brown bat, Eastern cottontail, Eastern chipmunk, gray squirrel, red squirrel, white-footed mouse, meadow vole, muskrat, pine vole, coyote, red fox, gray fox, raccoon, long-tailed weasel, mink, striped skunk, river otter, beaver and white-tailed deer. There are no threatened or endangered mammals listed for Franklin Township.

White-tailed deer are a common species in New Jersey, and their conflict with humans in suburban and rural areas is an increasing concern. Officially, their state-wide population status is considered “decreasing” due to the combined impacts of habitat loss, crop damage, and vehicle collisions. However, many areas in the state are experiencing great increases in deer populations as herds are forced to find new habitat. Managing deer populations is difficult as herds have the ability to double, or even triple, their numbers within a single year. Although highly dependent upon the ecological carrying capacity of the land, a healthy deer concentration is estimated to be 20 deer per

White-tailed Deer at Piney Hollow Natural Area

square mile or less.

Deer thrive in fragmented “edge” conditions and altered areas since these habitats support the new plant growth and mixed vegetation that deer prefer. New Jersey’s agricultural and suburban landscapes are prime examples of these habitats, and they provide deer with food year-round. An over-population of deer will decimate plant communities through over-grazing, which destroys the growth of seedlings and young trees. This loss of habitat then causes the health of deer to decline, making them more susceptible to disease and malnutrition. Habitat loss through over-grazing also threatens the entire ecosystem since other animals depend upon the same plants for survival.

The Community-Based Deer Management Permit program in New Jersey allows alternative and traditional techniques to control deer populations in the state. Traditional and controlled hunting as well as bait and shoot tactics are lethal ways to sustain deer numbers. Minimizing the amount of edge habitat also controls numbers and is best achieved by preserving large, contiguous tracts of land. Another strategy is modifying habitat by planting deer-repellant plants such as lavender, shadbush, ornamental sage, yarrow, and plants with thorns. More costly deer management strategies can also be utilized, such as installing reflectors and reducing speed limits on roads, employing traps for relocations, and administering fertility control measures.

Birds

New Jersey has between 350 and 500 species of birds, which is an exceptional number given the state’s small size. New Jersey is an important location for migratory birds heading south for the winter. Not only is the state an important “rest stop” for birds migrating to warmer climates in Central and South America, but also the New Jersey Atlantic Coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Blue-gray Gnatcatcher

Birds are one of the easiest groups of vertebrates to see. Their constant movement and audible calls allow for easy observation. Specific assemblages are associated with different vegetation types found in the township. Old fields and edge habitats characteristically support field sparrows, Carolina wrens, brown-headed cowbirds, mockingbirds and other species

capable of nesting on or close to the ground. Forest species include birds with upland preferences (such as the ovenbird, Northern flicker, white-breasted nuthatch, and wild turkey) and those usually found in wetland forests (prothonotary warbler, hooded warbler, barred owl.) There are also species without distinct preferences, capable of using any wooded environment (for example, white-eyed vireo, great horned owl, Cooper's hawk).

Franklin Township is home to a great abundance and variety of birds. See **Appendix D: Vertebrate Animals Known or Probable in Franklin Township**.

A common bird found in Franklin Township is the Canada goose. The State of New Jersey has a "resident" Canada goose population of approximately 100,000 birds that no longer migrate to more southern locales, and that number may double in the next 5 to 10 years. While geese are a pleasant component of the urban/suburban environment, providing enjoyable wildlife opportunities for the public, they can also cause property and environmental damage. Goose droppings that wash into lakes during storm events can elevate coliform bacteria to unhealthy levels, closing lakes to swimming. Goose droppings limit human use of grassy areas in parks, and because geese can be quite aggressive during the nesting season, they can also injure humans.

Removing geese or preventing them from residing in park areas is a difficult task. Because geese move freely, the most effective management solutions are best conducted at the community level. Canada geese are protected by the Migratory Bird Treaty Act. Therefore, a management program may require the US Department of Agriculture's approval and permits. A new federal rule signed into law in December 2005 eases hunting restrictions and allows county and municipal officials to coordinate with state fish and wildlife departments to destroy birds and/or eggs that pose a threat to public health and safety. Management techniques include planting shrubby vegetation around streams, lakes, and ponds to block waterfowl access, discouraging humans from feeding geese, and removing geese eggs and replacing with decoys.

Rare birds in Franklin Township include the Cooper's hawk, barred owl, Northern parula warbler, red-shouldered hawk, wood thrush, and worm-eating warbler.

Reptiles and Amphibians

Reptiles, like mammals, are a diverse vertebrate grouping. Individual species are found in many habitats or restricted to upland or wetland environments. Box turtles, garter snakes and Eastern fence lizards are examples of upland-restricted species. Red-bellied turtle, snapping turtle and Northern water snakes are examples of species requiring aquatic environments. Most amphibians are

tied in some portion of their life cycle to wetlands. All frogs, salamanders and many toads are dependent on aquatic environments for most of their life cycles[2].

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 in particular tend to be very sensitive to environmental changes, offering a visible warning to humans that significant changes are occurring.

Fowler's Toad

New Jersey is home to approximately 80 reptile and amphibian species. There are just three types of lizards found in the state. The rare herpetological species found in Franklin Township include the carpenter frog, Eastern box turtle, Eastern king snake, Fowler's toad, Northern pine snake, Pine Barrens treefrog, gray treefrog, spring peeper, and spotted turtle.

See **Appendix D: Vertebrate Animals Known or Probable in Franklin Township** for a complete list of reptiles and amphibians that may be found in the township.

Fish

When European settlers arrived in present-day Gloucester 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 waterbodies and conducts research and management surveys.

[2] The wood frog, Fowler's & spade-foot toads and red-backed salamanders are only dependent on open water for breeding.

There are over thirty species of fish that are likely to be found in Franklin Township's many streams and lakes. See **Appendix D: Vertebrate Animals Known or Probable in Franklin Township**. Many fish found in Franklin are adapted to low pH of the Pine Barrens waters. Chain pickerel, largemouth bass, yellow perch, brown catfish, madtom catfish, American eel, creek chubsucker, tessellated Johnny darter, swamp darter, mud minnow, pirate perch, blue gill, pumpkinseed, iron colored shiner, and the Pine Barren sunfish (black banded, blue-spotted, banded and mud) are common in lakes and streams.

Endangered Vertebrates

According to the Natural Heritage Database and the Landscape Project, many species of rare wildlife have been documented in Franklin Township over the course of the past 100 years. Brief descriptions of those species listed on the Natural Heritage Database for Franklin Township, provided by the New Jersey Fish and Wildlife Service, are outlined in **Appendix E: Rare Plants and Animals**. Additionally, there are 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.

The Natural Heritage Database of the NJDEP lists 15 species of rare wildlife found in Franklin Township. Eight of these are birds, four are reptiles and three are amphibians. These species are listed on the New Jersey threatened and endangered species list as either endangered, threatened, or a species of special concern within New Jersey. However, none of these species are included on the federal list. These animals are listed in **Appendix D: Vertebrate Animals Known or Probable in Franklin Township**.

Conservation Areas

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. Those threatened and endangered plants and animals identified in Franklin Township by the Natural Heritage Database are listed in **Appendix C-2: Rare Plants Found in Franklin Township** and in **Appendix D-17: Rare Wildlife**. Those species are then described individually in **Appendix E: Rare Plants and Animals**. Threatened and endangered plants found in Franklin Township include floatingheart, short-beaked bald-rush, humped bladderwort and purple bladderwort. 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.

Wood Frog

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).

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.

There are four different NHP sites in Gloucester County, two of which are located in Franklin Township: Marsh Lake is a large intermittent wetland with habitat for rare plants, including one globally imperiled plant (B5), and Little Ease is a wooded stream corridor with a power line traversing the site. It supports wetland habitat for rare plant species including one globally rare plant species (B3). These areas are shown on **Map 21**.

Wildlife Management Area

The New Jersey Wildlife Management Area (WMA) system is administered by the NJDEP Division of Fish & Wildlife's Bureau of Land Management. The WMA program preserves fish and wildlife habitats across the state and provides recreational opportunities. Hunting and fishing are allowed in many but not all of the WMAs. Statewide, there are 121 WMAs covering over 328,000 acres. WMA land is entirely owned by the State of New Jersey.

The White Oak Branch Wildlife Management Area occupies 2,676.51 acres in Franklin and Monroe Townships, Gloucester County. Its location is shown on

Map 21. It is open daily from 5:00 a.m. to 9:00 p.m. One of the most truly natural areas in the region, White Oak Branch Wildlife Management Area consists of mixed forest, swamp areas, and small streams. Wildlife can be viewed along the sandy roads and trails. The forest is within the fringe of the Pinelands National Reserve. It has more oaks than pitch pine throughout most of the uplands, while the lowlands along White Oak branch and Faraway Branch are dominated by red maple and white cedar swamp.

Important Bird Area

The Pine Barrens Macrosite Important Bird Area (IBA) is a an area of over 400,000 acres that has been identified by the New Jersey Audubon Society as important habitat for threatened and endangered bird species. The portion of the IBA macrosite within Franklin Township is shown on **Map 21: Conservation Areas**. This macrosite provides critical habitat for the bald eagle, red-shouldered hawk, Northern harrier, barred owl, red-headed woodpecker, Cooper's hawk, grasshopper sparrow, savannah sparrow, and broad-winged hawk. This macrosite has significant congregations of waterfowl and an exceptional single species concentration of the yellow-throated warbler.

This macrosite encompasses mostly oak-pine forests in the Southern portion of New Jersey. It is characterized by oak-pine forests, as well as more typical coastal habitats including non-tidal wetlands, open water and riparian areas. This site also supports extensive hardwood swamps and early successional habitats including the typical Pine Barrens scrub-shrub community and grasslands.

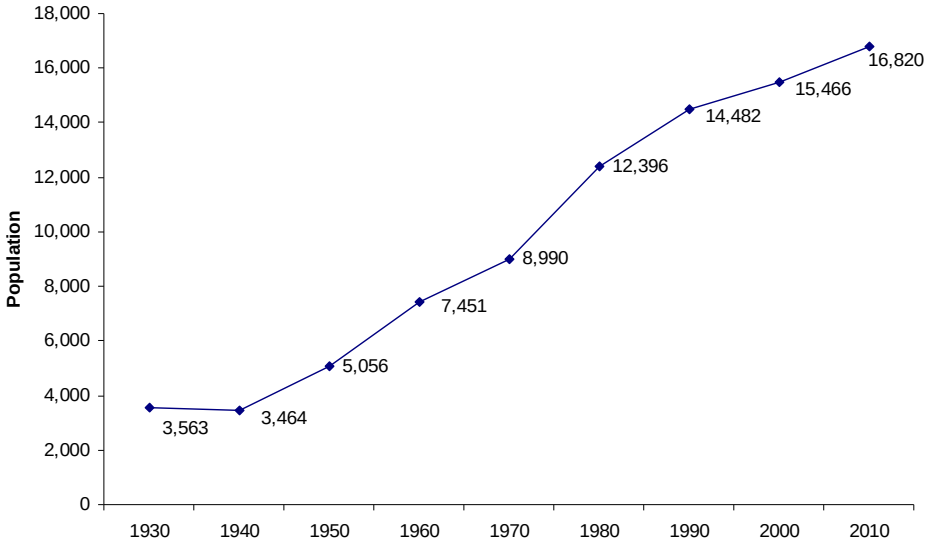
CHAPTER 6

The Built Environment

Population and Housing

In 2010, the US Census recorded that Franklin Township had a population of 16,820 people, a nine percent increase from its 2000 population of 15,466.

Figure 11: The Population of Franklin Township, 1930 - 2010



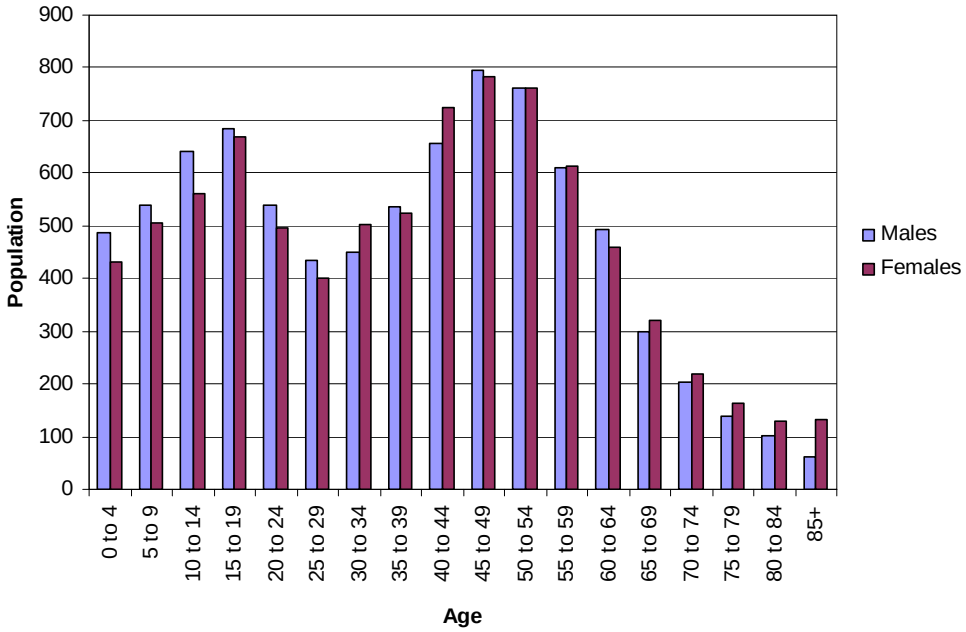
Source: US Census Bureau, 1930-2010

The township's median age is 40, similar to the national average of 37. The percentage of residents of Franklin Township aged 65 and over was about 10 percent in 2010, slightly less than the national average of 13 percent. Approximately 21 percent of Franklin Township 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.

Based on the 2010 US Census, Franklin Township's population is primarily composed of the following ethnic groups, with 88.44 percent of the population

identifying themselves as white, 7.18 percent identifying themselves as black or African American, 3.9 percent identifying themselves as Hispanic or Latino and 1.27 percent identifying themselves as Asian.

Figure 12: Franklin Population by Age and Gender (2010)



Source: US Census Bureau, 2010

According to US Census data from 2010, Franklin Township had 6,104 housing units. Of the 5,849 occupied housing units, about 89.6 percent (5,239 units) were owner-occupied, higher than the national average of 65.1 percent. The amount of rental properties is about 10.4 percent (610 units), lower than the national average of 34.9 percent.

Most of Franklin Township's population lives in single-family dwellings, scattered on large individual lots fronting major county or township roads. Residential areas are dispersed over the rural residential landscape, with minor population densities within the villages of Franklinville, Malaga, Star Cross, Iona and Porchtown.

Transportation

Franklin Township is located in a relatively accessible part of Gloucester County. It is approximately 30 miles from Philadelphia and 35 miles from Wilmington, Delaware. The major transportation corridors for Franklin Township include the state and county highway systems, which were developed for local commerce as

well as for reaching New Jersey's popular seashore resort communities. Within the township, local roads follow the paths of early roads that connected farming and small industry centers. The township has one functioning rail line used for bulk freight delivery.

Transportation to and from Franklin Township is highly accessible via Routes 55, 40, and 47.

Route 55 provides convenient, nonstop transportation for passenger and truck traffic. This limited access highway has two interchanges (Little Mill Road and Rt. 40/Malaga) within the township and two additional interchanges (one north and one south) just beyond the township's borders. This highway provides easy access to locations to the south, such as neighboring Vineland and Millville, as well as to the distant shore communities. Points north on this highway include regionally important areas such as the county seat in Woodbury, and the Camden/Philadelphia area with its interconnected federal interstate highway systems. Route 55 and its right of way occupy approximately 375 acres of Township space.

Route 40, or Harding Highway, is a highway that was developed in the early-20th century and is oriented east to west. As with other highways of that period that were built with industrial and commercial development in mind, it connects with other state two-lane highways to the south and west as far as California. It begins in the east at Atlantic City and travels directly across the center of the township. Route 40 provides Franklin Township with the longest highway commercial frontage available to township residents.

Route 47, or Delsea Drive, is the north-south complement to Route 40 and was built in the same period as a major route to the seashore. It connects the Delaware River side of the State with the Atlantic Ocean border at Wildwood and has been called Delsea Drive since its creation. This road passes through Franklinville and Malaga, two of the township's most important commercial and residential villages/nodes.

Delsea Drive near Route 538

A number of county routes cross through the township and connect Franklin Township to neighboring townships. In addition to providing access to nearby commercial centers, these roads connect smaller

residential streets within the township. County roads within the township include Routes 538, 555, 557, 604, 610, 612, 613, 615, 655, and 657. These provide access and connections within the township and county and are remnants of past agrarian land uses that connected farming nodes that were once the centers of activity. The majority of the smaller, local roads are a mixture of old rural lanes and newer subdivision thoroughfares. Together these secondary roads, including the County roads, occupy approximately 1,280 acres of Township land.

NJ Transit has two bus routes that service Franklin Township. Bus routes 313 and 315 travel along Route 47 in Franklin Township and connect Philadelphia, Cape May, and Wildwood. Bus route 408 also travels along Route 47 and connects Millville and Philadelphia.

The one railroad presently crosses through the township on a path roughly parallel with Route 47. The railroad is called the West Jersey Shore Line. It once carried agricultural and manufactured products from this region to points north and there was also passenger service at one time. Today, it carries industrial and commercial goods, on a regular but infrequent schedule, from the northern end of the county to points south and east in Cumberland and Cape May Counties.

The Historic Franklinville Railroad Station

Historic Resources

Franklin Township has no sites that are listed on the National and State Registers of Historic Places. However, there are several structures of historical importance that remain in Franklin today, such as the Porchtown Methodist Church and the Franklinville Inn. There are also three notable archeological sites in Franklin Township, as well as the rail corridor of the Millville and Glassboro Railroad Historic District. A list of several historic resources located in Franklin Township can be found in **Appendix F: Historical Resources of Franklin Township**. These Franklin Township buildings were documented in the Gloucester County Cultural Resource Survey conducted in 1986 and published in 1987, which was updated by the Franklin Environmental Commission in 2012. The Survey includes many but not all of the historic structures in Franklin Township.

Table 25: Historic Sites Recognized by the State Historic Preservation Office

Name	State ID#	Register
Prehistoric Site (28-Gl-171)	2921	DOE: 3/10/1986 SHPO Opinion: 11/12/1985
Prehistoric Site (28-Gl-170)	1379	DOE: 3/10/1986 SHPO Opinion: 11/12/1985
Prehistoric Site (28-Gl-164)	3883	SHPO Opinion: 8/23/1985
Millville and Glassboro Railroad Historic District	4153	SHPO Opinion: 1/4/2002

DOE: A Determination of Eligibility (DOE) is issued by the Keeper of the National Register, National Park Service, Department of Interior. It is a formal certification that a property is eligible for registration.

SHPO Opinion: This is an opinion of eligibility issued by the State Historic Preservation Officer (SHPO). It is in response to a federally funded activity that will have an effect on historic properties not listed on the National Register.

Source: NJDEP, 2010

The Franklinville Inn

The three prehistoric sites in Franklin Township were identified during an archeological data recovery effort required prior to the construction for Route 55. The archeologists R. Alan Mounier and John W. Martin uncovered 20 archeological sites in both Franklin and Elk Townships, six of which were deemed to be eligible for listing on the National Register. Half of these eligible sites were in Franklin Township and half were in Elk Township. The cultural artifacts uncovered at these sites ranged from Paleo-Indian (15,000 to 7,000 BC) to Late Woodland (500 to 1000 AD), and some artifacts possibly indicated an occupation that occurred following European occupation. These

sites were all scattered around the banks of Still Run and Little Ease Run in the general area where Route 55 is now located.

The artifacts at these sites suggested that they were ephemeral supply camps that supported larger settlements elsewhere. The archeologists uncovered fire broken rocks, flake tools, ceramics, projectile points, knives, bifaces, hearths, and pits. The cultural remains lacked the density and variety that would have indicated a major base camp. The location of the sites would have favored the collection of tubers, greens, berries, and nuts. Deer hunting would also have been possible here.

New Jersey municipalities are permitted to identify, designate, and regulate their own historic resources through the adoption of historic preservation ordinances (which are recognized as zoning laws under the New Jersey Municipal Land Use law). Responsibility to maintain the character of the historic properties within the Township is carried out by the Planning Board and Zoning Board as outlined by the Township Codes. As official bodies of the Township, the Boards are responsible for conducting research on and nominating significant buildings and sites to the State and National Registers of Historic Places.

There are also federal incentives for individuals, organizations, or firms that own historic properties and are interested in historic preservation. Interested parties can take advantage of the Rehabilitation Investment Tax Credit, a federal tax incentive to encourage the preservation and reuse of older income-producing properties, including offices, apartment buildings and retail stores.

Cultural Resources and Open Space

Parks, Recreation and Preserved Open Space/Farmland

Franklin Township has ample open space and recreation land dedicated for parks, ball fields, fair grounds and cemeteries. Township open spaces include open land around the Township schools and buildings as well as two recreational properties used exclusively for active team-oriented games. The Pennsylvania Avenue recreation fields are dedicated for baseball, softball, football and roller hockey. The Dutch Mill Road parcel is used exclusively for soccer.

Township parkland dedicated to passive recreation includes most of the existing open spaces. Activities such as swimming, boating, fishing, hiking and nature watching are important for many township residents. These activities can be enjoyed at one of the lakes (Franklinville, Iona, Malaga) or in the natural areas (Malaga Lake Park and the Piney Hollow Natural Area) Additional open land exists in the White Oak Fish and Wildlife Management Area, an area of over 900 acres situated around the headwaters of the White Oak Branch of the Great Egg Harbor River. Private open space for passive use exists within two preserves:

Unexpected Wildlife Refuge and The Nature Conservancy tract along Still Run south of Route 40.

The Beach at Franklinville Lake

Private open space in the form of recreation land, preserved farmland, and land within the Pinelands with severed Pineland Development Credits (PDCs) also exist within Franklin Township. Timothy Lake, located north of Delsea Drive, is used for private camping and fishing. Camp Sacajawea South (Camp SACY) is a Girl Scouts camp ground located near Cedar Lake. Golfing is available at the White Oak Country Club. This facility, preserved by the New Jersey Green Acres Program, is located north of the intersection between Dutch Mill and Union Road in the Piney Hollow section of the township. Hunting is permitted in the township, and many private acres outside of established safety zones are used for this purpose. Preserved farmland is scattered throughout the Township's farming landscape, whereas the Pinelands Development Credit (PDC)-preserved land is concentrated in the Piney Hollow section of the Township.

Township Utilities and Services

Drinking Water

Public water is available for only a few residents. Generally, no public water services are available within Franklin Township. Most water for residences and commercial properties is provided by private wells. The exceptions are four public community water systems that serve residents of Holly Green Campground, Iona Trailer Park, Malaga Mobile Home Park, and Malaga Villa Apartments.

Most wells serve one user, yet systems exist which provide water to multiple dwellings. Most wells are drilled into the underlying Kirkwood-Cohansey Aquifer but the Wenonah-Mt. Laurel and Potomac-Raritan-Magothy Aquifers are also available for exploitation.

Additional information on water supply wells is available in the **Water Supply Wells** section. See also **Map 15: Public Water Supply Wells** and **Appendix H: Monitoring Schedules for Public Community Water Supply Wells**.

Sewer Service

Public sewer service is not available for residents of Franklin Township. Franklin's rural location and distance from the Delaware River does not allow for easy extensions from neighboring townships with regional sewer connections. Residences and commercial ventures rely on individual septic systems to treat wastewater.

Trash and Recycling

Franklin Township provides curbside trash and recycling pick up. Trash and mixed recycling are collected once a week. Bulk items such as furniture and appliances are removed by appointment by township employees. Aluminum, iron, tin, glass, paper, cardboard and plastics are collected at the curb. The Township also provides a space at its Coles Mill Road yard to dispose of limbs, trees and other forms of bulk organic debris. Commercial and industrial clients provide their own collection and disposal services through private trash haulers.

Hazardous materials, such as paints, oil, asbestos, gasoline, pesticides, and fertilizer, can also be disposed of at the Gloucester County Solid Waste Complex in South Harrison Township.

Education

Franklin Township has three elementary schools to serve township students. The Mary Janvier Elementary School serves kindergarten through second grade. The Caroline Reutter and the Main Road Schools educate third through sixth grades. The Delsea Middle School and Delsea Regional High School, located adjacent to each other, serve Franklin and Elk Township students in grades seven through twelve. The Franklin Township Board of Education provides supervision for the elementary schools serving kindergarten to sixth grades, while a separate school board maintains the middle and high schools of the Delsea Regional School District.

Beginning in the 2008-09 school year, Newfield Borough contracted with the Delsea Regional District to send its new 7th grade students to the Delsea Regional Middle School. Eventually all Newfield middle and high school students will attend Delsea Regional School District.

CHAPTER 7

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 30 active known contaminated sites within Franklin Township as of March 2012. These are active sites with confirmed contamination of the soil, groundwater, and/or surface water. These sites include a landfill, automotive services, gas stations, industrial sites, and other locations.

Additionally, there are 45 closed sites and one pending site in the township as of March 2012. 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. See **Table 27: Pending Known Contaminated Sites in Franklin Township** and **Appendix G-1: Closed Sites with Remediated Contamination**. Some sites in this table have more than one remedial level due to multiple cases. Non-residential sites are shown on **Map 22: Known Contaminated Sites (2009)**.

Table 26: Known Contaminated Sites in Franklin Township

Site ID	PI Number	PI Name	Address
429295	538400	88 Old Dutch Mill Road	88 Old Dutch Mill Rd
64518	G000015944	Accutherm Incorporated	1600 Delsea Dr
74296	G000038457	Blue Bell Estates Ground Water Contamination	Whitehall Rd & Salem Ave
44878	011352	D A S Automotive	Harding Hwy
94405	133134	Delsea Drive & Hall Avenue Ground Water Contamination	Delsea Dr & Hall Ave
21081	014966	FMC Corp ACG	N Delsea Dr
63992	G000006730	Franklin Burn 2	652 Lincoln Ave
64033	G000008573	Franklin Burn 7	Marshall Mill Rd
63992	G000006728	Franklin Burn Sites	652 Lincoln Ave
63991	G000006728	Franklin Burn Sites	Marshall Mill Rd
64025	G000006728	Franklin Burn Sites	Marshall Mill Rd
64026	G000006728	Franklin Burn Sites	Marshall Mill Rd
64033	G000006728	Franklin Burn Sites	Marshall Mill Rd
63778	G000004437	Franklin Township Sanitary Landfill	Pennsylvania Ave
64303	G000010623	Franklin Township Sanitary Landfill (Williamstown Road Dump)	Willette Ave
8028	000725	Franklinville Gulf	1986 Delsea Dr
434906	546300	Janvier Road Ground Water Contamination	Janvier Rd
50417	012971	K&G Axcel	2623 Delsea Dr
226712	295910	Kayaalp Property	Tuckahoe Rd & W Malaga Rd
8027	023046	Malaga Car Wash And Service	Delsea Dr & Marshall Mill Rd
56988	008192	McCandless Petroleum Inc	465 Delsea Dr
18858	G000036747	Motiva Enterprises LLC Tank Truck Spill	2234 Harding Hwy
74297	G000038458	Nicholas Drive Ground Water Contamination	Nicholas Dr

Site ID	PI Number	PI Name	Address
95068	133966	NJ DOT Route 47 Sites 1 to 6	Delsea Dr
8023	000616	Our Lady of Mercy Academy	1001 Main Rd
13982	G000001908	Pioneer Metal Finishing Incorporated	2034 Coles Mill Rd
46852	010414	SICO Direct 6/835	2547 Delsea Dr
372619	461610	TAC Hauling LLC	2962 Delsea Dr
8004	010089	US Gas	3344 Tuckahoe Rd
43199	004909	Walts Gas & Grocery	4344 Tuckahoe Rd

Source: NJDEP, 2012

Table 27: Pending Known Contaminated Sites in Franklin Township

Site ID	PI Number	PI Name	Address
65830	G000032293	741 Washington Avenue	741 Washington Avenue

Source: NJDEP, 2012

There are 8 hazardous waste sites in Gloucester County that are listed on the National Priority List (NPL), more commonly referred to as Superfund sites. These sites pose a major human health hazard and are in need of federal funds for cleanup. Within Franklin Township, the Franklin Burn site is listed on the NPL.

The **Franklin Burn Site** consists of seven separate parcels of land (referred to as subsites) located within an area about one square mile in size. At the subsites, fires were set to burn away the plastic coatings from insulated wire and other electrical components for the recovery and sale of copper. The burning operations resulted in the generation of ash piles containing hazardous substances. Site burning activities are reported to have ceased in 1988 and have remained inactive since that time. The ash piles were found to contain high levels of metals. Some ash piles also contained low levels of one or more of the following: pesticides, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-dioxins (dioxins), polychlorinated dibenzofurans (furans), and organics. Testing by the EPA in 1992 indicated that the groundwater in the vicinity of some subsites might contain low concentrations of some metals. Through the Superfund program, soil and ash removal activities were completed by 1997. Over 10,000 tons of debris, ash, and contaminated soil were removed from the sites. The EPA determined that residual contamination levels do not pose an unacceptable risk and, therefore, no further cleanup is required.

Two other high profile known contaminated sites are FMC Corporation and Pioneer Metals.

FMC Corporation ACG (PI 014966), also known as AG Chemical Company or Crop Production Services, was used for the manufacturing, packaging, and storing of agricultural chemicals and products, including insecticides, pesticides, and herbicides. The soil and groundwater of the site are contaminated with pesticides, including chlordane, DDE, DDT, dieldrin, endosulfan sulfate, endrin, and heptachlor epoxide. Since groundwater quality data indicates exceedance of contaminants above the Primary Drinking Water Standards, and the designated uses of the underlying aquifer include potable use, the Classification Exception Area (CEA) established for the site is also a Well Restriction Area (WRA). With the exception of monitoring wells installed into the first water bearing zone, any proposed well to be installed within the CEA/WRA boundary shall be double cased to an approximate depth in order to prevent any vertical contaminant migration pathways. This depth is either into a confining layer or 50 feet below the vertical extent of the CEA. This site is part of the Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

Pioneer Metal Company (PI G000001908), also known as Pioneer Metal Finishing Incorporated, was a facility used for metal plating and finishing. As of 2004, the NJDEP has issued conditional approval to Pioneer to implement an amended Remedial Investigation Work Plan. This plan proposes additional soil/sediment samples, surface water sampling, redeveloping existing wells, installing and sampling of two additional wells at the site. A proposed schedule of events was proposed by Malcolm Pirnie Engineering for May 2004 through July 2009. However, a Notice of Violation dated March 8, 2007 was sent to Pioneer Metals regarding Remedial Investigation Work Plan Deficiencies.

Kiddie Kollege

In July 28, 2006 a day care center, Kiddie Kollege, was closed due to elevated levels of mercury on the premises. The center, located at 162 Station Avenue, was located in a former factory previously occupied by Acutherm, a thermometer manufacturer. After the plant ceased operation in 1992, its owner was unable to comply with the New Jersey Department of Environmental Protection's (NJDEP) directive to clean all discharges of mercury from the site. Subsequently, a 1996 report by the Environmental Protection Agency (EPA) exempted the property from Superfund status, disqualifying it from eligibility for federal cleanup. At that time, the EPA report identified two areas of the building where mercury vapors were found in excess of standards, and described visible mercury droplets. The report also noted 500 to 1,000 thermometers and a 55-gallon drum with unknown contents had been left behind, but concluded the following: "Based on air monitoring, soil sampling and wipe sample analysis and the condition and security of the building and surrounding property, the site does not present an immediate threat to human health or the environment."

The property was acquired by a local real estate broker in 2001, who subsequently applied for permits for renovations, zoning permits, and a certificate of occupancy. The building was leased to Kiddie Kollege, a day care facility that

opened in 2004. On April 11, 2006, the NJDEP inspected the property, which they had believed to be empty, and discovered that the day care center was operating in the building. On July 28, 2006, tests conducted by the state environmental department showed elevated levels of mercury vapor, and droplets of mercury in the basement and between the floor joists. Following its closure, a Remedial Action Report concluded that mercury infused virtually every part of the building and was detected in 98 out of 100 material and wipe samples tested. Also, exposure levels at the property exceeded Federal Occupational Health and Safety exposure limits. However, the New Jersey Department of Health and Senior Services (DHSS) conducted an investigation of elemental mercury exposure in the students and determined that, while some youth did have elevated mercury levels in their bodies, no mercury levels were within a range known to be toxic.

Mercury is a naturally occurring element that was present in its elemental form at this property. It appears as a heavy, bright silver liquid and vaporizes at room temperature. Beads of liquid mercury can separate into many smaller beads, flow into cracks and spread throughout an area without being visible. Generally, long-term exposure to mercury vapor can affect the nervous system. Higher exposures are more likely to cause symptoms than lower exposures.

The judge in a class action lawsuit ruled in 2011 that funds must be provided by the State, County, and Municipality for ongoing neuropsychological testing and medical monitoring for the 100 children who experienced exposure to mercury at Kiddie Kollege. The owner made an out-of-court settlement, and litigation is ongoing.

Additionally, on January 11, 2011 Governor Jon Corzine signed S-2261/A-3529, a new law requiring DHSS to adopt regulations establishing evaluation and assessment procedures for determining the safety of child care centers and schools. The bills will also amend the "Industrial Site Recovery Act" to require DHSS to establish procedures for evaluating and assessing the current and maximum contaminant levels of buildings being considered for use as child care centers or schools.

The contaminated building in Franklin Township was removed and the site was remediated in 2011, under NJDEP supervision.

Underground Storage Tanks

As of December 2011, there are six active and compliant sites in Franklin Township with regulated underground storage tanks that contain hazardous substances, pursuant to N.J.A.C. 7:14B et seq. They are listed in **Table 28: Active and Compliant Underground Storage Tanks**. A hazardous material may be motor fuel, petroleum products, toxic pollutants, or other hazardous wastes or substances. If there is a known release to soil and/or groundwater, a site will also be listed on **Table 26: Known Contaminated Sites in Franklin**

Township. There may also be private residences in Franklin 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 28: Active and Compliant Underground Storage Tanks

Facility ID	Facility Name	Street Address	Expiration Date
11350	Delsea Regional HS District	242 Fries Mill Rd	12/31/2012
725	Franklinville Gulf	Rt 47 1986 Delsea Dr	12/31/2012
31933	Malaga Riggins	461 Delsea Dr	12/31/2012
26750	USA Gas	Rtes 40 & 47	12/31/2012
10089	US Gas	3344 Tuckahoe Rd	12/31/2012
33861	Wawa Food Market #486	450 Delsea Dr	12/31/2012

Source: NJDEP, 2011

There are five sites in Franklin Township where there is active remediation of underground storage tanks, shown in the table below.

Table 29: Underground Storage Tanks with Active Remediation

PI Number	PI Name	Street Address	Bureau
725	Franklinville Gulf	Rt 47 1986 Delsea Dr	BUST
4909	Walts Gas & Grocery	4344 Tuckahoe Rd	BUST
10414	SICO Direct 6/835	2547 Delsea Dr	BUST
12971	K&G Axcel	2623 S Delsea Dr	BUST
461610	TAC Hauling LLC	2962 Delsea Dr	INS

Source: NJDEP, 2011

Historic Pesticides

New Jersey is one of the first states in the nation to address issues related to toxic pesticide residuals, such as dichloro-diphenyl-trichloroethane (DDT), arsenic, and lead that remain in the soil from past agricultural operations. In 1996, NJDEP convened a task force to study the extent of the historic pesticide problem in New Jersey and to develop strategies for protecting human health.

The task force's findings were issued in an April 1999 report (see **Sources of Information**). While the task force examined 18 agricultural sites throughout New Jersey, it is estimated that five percent of the state's land area is impacted by residues from agricultural pesticides.

The primary human health concern of residual contamination is the ingestion of contaminated soil. Therefore, small children who may ingest soil are at the greatest health risk. This issue may affect residents of homes and subdivisions built on former cropland and orchards. Homeowners can take precautions such as maintaining grass coverage and washing hands and toys after playing in exposed soil. Where documented, developers must now address this problem by testing and removing the existing topsoil and bringing in clean topsoil before construction commences.

There have been instances of contaminated soils in Franklin Township that have required remediation or buffering before development on or adjacent to the land could go forward.

Erosion

Soil erosion is one of the most important, yet least understood, environmental problems. Geologic, or "background," erosion occurs at approximately the same rate as soil formation, leading to neither a net loss nor a net gain of soil. Background erosion is an important process; erosion from rock is carried and deposited by wind and water. In areas with vegetative cover, the rock mixes with decomposed vegetation and creates more nutrient-rich soil.

Erosion caused by human activity has greatly increased the amount, and the rate, of soils lost (accelerated erosion). Unfortunately, human activity cannot significantly contribute to soil formation, a process that takes place over thousands of years. Human-caused erosion is a serious environmental problem across the world. In the United States, the most significant impacts are the loss of prime-agricultural soils (on-site erosion), pollution of stream and rivers (off-site erosion), and increased flooding due to stream siltation.

The immediate environmental impact of on-site erosion is unproductive farmland. Topsoil, which is the most quickly eroded soil, also contains the majority of the nutrients and soil biota required for plant life. In addition, once topsoil is eroded, the water-holding capacity of soil decreases. This further impacts plant life and increases flooding. The agricultural industry compensates for the loss of soil fertility with the use of chemical fertilizers. However, these fertilizers can wash directly into streams and rivers, causing water pollution downstream before they can be used by plants.

As Franklin Township has a significant percentage of prime farmland, soil conservation and erosion prevention measures are important considerations for the protection of the agricultural capability of the township. Erosion affects not

only the productive quality of the soil, but also the health of local streams and wetlands.

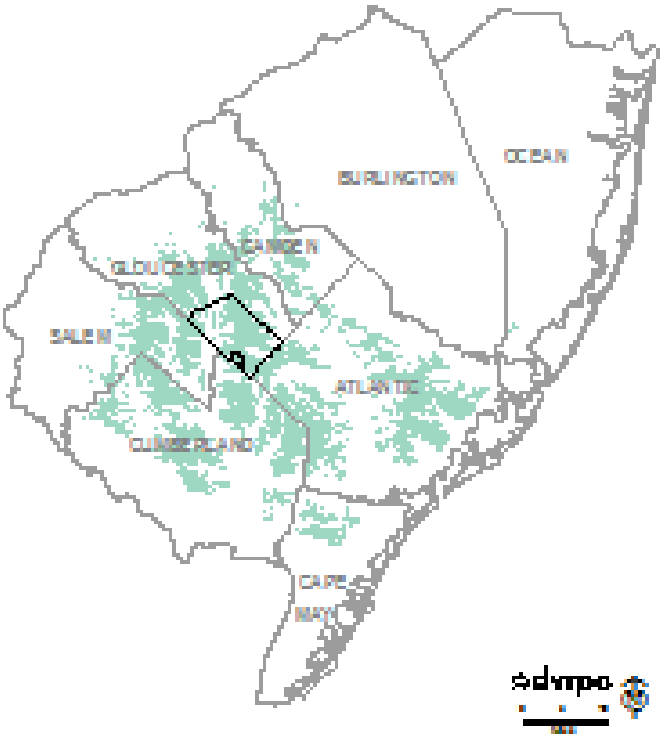
Construction on or near steep slopes greatly increases the incidence of soil erosion. The loss of tree cover and plant material on steep slopes is especially damaging. Where steep slopes adjoin streams, erosion may contaminate the water and endanger wildlife habitat. In road building, there are numerous means for managing roadside erosion during and after construction, ranging from the highly technical (polyester and steel) to the simple (compost and tree plantings). Most state departments of transportation have best management practices to alleviate and manage roadside erosion, to protect the environment, and ensure the future safety of the road itself.

The New Jersey Department of Agriculture (NJDA) houses the State Soil Conservation Committee (SSCC), which is responsible for the conservation and management of New Jersey's soils. The SSCC administers the natural resources conservation program, which supports the work of 16 local Soil Conservation Districts and the New Jersey Conservation Partnership (NJCP), another diverse group of federal and state regulatory and advocacy organizations. The NJCP and individual soil conservation districts offer a wide range of voluntary conservation, technical assistance, and education programs that focus on agricultural conservation planning assistance, cost-sharing programs, application of organic materials, water supply and management, soil erosion and sediment control, stormwater discharge, and soil surveys. More information about NRCS programs is available in **Appendix A: Federal and State Conservation Programs for Farmers**.

Gravel Mining

The geologic properties of Franklin Township have made it attractive to the gravel mining industry due to the Bridgeton Formation that outcrops throughout the township, as shown in **Figure 13** and **Map 13: Surface Geology**. The Bridgeton Formation is a late Miocene age deposit placed on New Jersey's southwest coastal plain as a fluvial plain by an ancient river. The formation is a mix of sand, silt, clay and gravel derived from sandstone, shale, gneiss and other rocks north of New Jersey. The deposit is above, or "superior to," and thus

Figure 13: Bridgeton Formation



Source: DVRPC

younger than the Cohansey Formation. The resulting surface is a richer substrate than the surface created from the Cohansey. The Bridgeton Formation is a choice source of gravel because of its ideal mixture of textures. This same feature makes the soils created from the Bridgeton Formation especially good farmland.

Most of the township is covered by this fine-textured gravel deposit. More than 75% of the uplands are on Bridgeton outcrops. This has attracted the mining industry. Franklin's landscape contains small excavations as well as active removal on Fries Mill Road and Coles Mill Road. Most of the old defunct sites were not ecologically restored, resulting in a landscape of pits and slopes that is difficult to redevelop into other uses. Township land mined today is required by statute to restore the slopes and vegetation within two years of cessation. However, there are no regulations preventing new gravel pits from being established outside the Pinelands areas of the township. Many abandoned mines such as those located off Victoria Avenue and Tuckahoe Road have been used illegally by off-road vehicle riders and have attracted illegal dumping as well.

Radionuclides

A radionuclide is an atom with an unstable nucleus. Over time such atoms undergo radioactive decay and emit potentially harmful ionizing radiation. According to the EPA, most drinking water sources have very low levels of these naturally occurring radioactive contaminants, although man-made contamination can also occur. Some people who drink water containing radionuclides in excess over many years may have an increased risk of getting cancer (especially bone and sinus cancer). In extreme cases, toxic effects to the kidneys have also been reported. In general, the health risks are apparently fairly low, but the Private Well Testing Act lists it as a substance that must be tested for in Gloucester County water.

During routine testing between 1988 and 1996, the New Jersey Department of Environmental Protection and the U.S. Geological Survey discovered elevated levels of naturally occurring radionuclides—particularly radium-226 and radium-228—in shallow groundwater in Southern New Jersey. In some cases, the level of radium found in the tested wells was higher than the U.S. Environmental Protection Agency's Maximum Contaminant Level for radium, which is 5 pCi/L (picocuries per liter).

According to the U.S. Geological Survey, there are four factors that predispose wells to higher concentrations of total radium: 1) If wells are over outcrops of the Bridgeton Formation, 2) If they are in or near agricultural areas, 3) If they have acidic groundwater (i.e., the pH is less than 5), and 4) If they have nitrate concentrations of more than 5 milligrams per liter. There are areas of Franklin Township and the surrounding region that fit this description, especially the first and second factors.

Because of the correlation between high gross alpha-particle activity and radium, the New Jersey Department of Environmental Protection recommends that public supply utilities and homeowners whose wells draw from the Kirkwood-Cohansey aquifer test their water for gross alpha-particle activity, which is less expensive than testing for total radium concentration.

CHAPTER 8

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CHAPTER 9

Appendices

APPENDIX A

Federal and State Conservation Programs for Farmers

Several financial and economic incentive programs, and technical assistance, are available to help farmers plan and use conservation practices on their farms. The United States Department of Agriculture Natural Resources Conservation Service (NRCS) has a Farm Service Agency office in Woodstown, Salem County that serves Gloucester County. NRCS staff members are available to work with farmers to help identify their conservation goals and then craft appropriate conservation plans to meet those goals.

Numerous programs provide financial incentives to help farmers voluntarily engage in these practices. Financial incentives can include rental payments to farmers for reserved land, easement payments, and cost sharing – up to 100% for some programs – to develop and follow conservation plans.

Federal Programs

The **Conservation Reserve Program (CRP)** is offered by NRCS and administered by the Farm Service Agency. It provides technical and financial aid and gives farmers assistance in complying with federal, state, and tribal environmental laws. The program encourages farmers to convert highly erodible or environmentally sensitive cropland to vegetative cover, such as native grasses, filter strips or riparian buffers. In exchange, farmers receive rental payments for enrolled land as well as financial assistance for implementing and maintaining conservation practices. www.nrcs.usda.gov/programs/crp/.

The State of New Jersey partnered with the USDA to help farmers protect water quality by establishing a $100 million **Conservation Reserve Enhancement Program (CREP)**, which is the New Jersey version of the federal program**.** Under a joint agreement between the USDA and State of New Jersey, $100 million in funding has been provided for New Jersey farmers to install stream buffers in order to reduce the flow of nonpoint source pollution into the state's waterways. Types of buffers to be installed include trees, shrubs, vegetative filter strips, contour grass strips, and grass waterways. Under the program, a landowner installs and maintains approved practices through a 10- or 15-year rental contract agreement. A landowner entering the state Farmland Preservation Program or Green Acres Program also may opt for a permanent easement under

the Conservation Reserve Enhancement Program. This would provide additional payment for permanent maintenance of approved conservation practices. The program will pay landowners annual rental and incentive payments for participating in the program, as well as 100 percent of the cost to establish approved practices. Additional information can be found at<www.fsa.usda.gov> or contact the local Farm Services Agency (FSA) Office or Soil and Water Conservation District Office. www.fsa.usda.gov

Another program targeted for wetlands preservation is called the **Wetlands Reserve Program (WRP)**. WRP is a voluntary resource conservation program that provides landowners with the opportunity to receive financial incentive to restore, protect, and enhance wetlands in exchange for returning marginal land from agriculture. WRP is made possible by a reauthorization in the Food, Conservation and Energy Act of 2008, known as the Farm Bill. The program has three enrollment options: permanent easement, 30-year easement, or restoration cost-share agreement, which has a minimum 10-year commitment. Applications are accepted on a continuous basis and may be obtained and filed at any time. www.nrcs.usda.gov/programs/farmbill/2002/

The **Grassland Reserve Program (GRP)** is another conservation program that emphasizes protection of grasslands, pasturelands, and rangelands without prohibiting grazing. Participants voluntarily put limitations on the future use of their land while retaining the ability and right to conduct grazing practices, produce hay, mow or harvest for seed production, conduct fire rehabilitation, and construct firebreaks and fences. There are four enrollment options: permanent easement; 30-year easement; rental agreement, which is available in 10-, 15-, 20-, or 30-year contracts; and restoration agreement. Participants are compensated in different ways according to the enrollment option. www.nrcs.usda.gov/programs/GRP/

The **Wildlife Habitat Incentives Program (WHIP)** is another USDA voluntary program that targets landowners who want to preserve and protect fish and wildlife habitat on nonfederal lands. WHIP applicants develop a plan of operations that outlines conservation practices and implementation schedules. The NJ State Conservationist, in conjunction with the State Technical Committee, identifies and prioritizes plans that complement the goals and objectives of relevant fish and wildlife conservation initiatives at the state, regional and national levels. If selected, a plan forms the basis of a cost-share agreement, lasting between 1 to 10 years. NRCS will pay for up to 75 percent of costs of implementing conservation practices that protect fish and wildlife habitat. For beginning farmers, socially disadvantaged or limited resource producers, NRCS will pay for up to 90 percent of costs. In New Jersey, a state plan has been developed that targets a number of priority habitat areas: pollinator habitat, grasslands habitat, disturbance-dependent habitat, bog turtle priority species habitat, wetland habitat and Delaware Bay priority habitat. www.nj.nrcs.usda.gov/programs/whip/

The **Environmental Quality Incentives Program (EQIP)** is also a part of the reauthorized Farm Bill of 2008. EQIP is a voluntary program that focuses on conservation that promotes both agricultural production and environmental quality. The program itself offers technical and financial assistance with installation and implementation of structural and management practices on agricultural land. EQIP features a minimum contract term compared to other programs, lasting a maximum of 10 years. Landowners are eligible for incentive and cost-share payments of up to 75 percent and sometimes up to 90 percent, while still engaging in livestock or agricultural production activities. www.nrcs.usda.gov/programs/eqip

The **Conservation Stewardship Program (CSP)** is a voluntary program administered by the NRCS that replaces the Conservation Security Program. This program is intended to promote conservation and improvement of soil, water, air, energy, plant and animal life, etc. on tribal and private working lands. Working lands refer to a variety of land types, including cropland, grassland, prairie land, improved pasture, and range land. In some cases, forested lands would also be included in this category. CSP is available in 50 states, as well as the Caribbean and Pacific Basin areas, and provides equal access to funding. www.nrcs.usda.gov/programs/new_csp/csp.html

The **Farm and Ranch Lands Protection Program (FRPP)** is a voluntary land conservation program that assists farmers in keeping their lands for agricultural purposes. FRPP provides matching funds to those provided by state, tribal, local government, or nongovernment organizations, offering farm and ranch protection programs designed to purchase conservation easements. The FRPP is managed by the NRCS. Conservation easements are purchased by the state, tribal, or local entity. A participating landowner agrees not to convert their land to nonagricultural uses, and to develop a conservation plan for any highly erodible lands. Landowners do, however, maintain all of their rights to utilize their land for agricultural purposes. www.nrcs.usda.gov/programs/frpp/

The federal Environmental Protection Agency (EPA) offers the **Strategic Agricultural Initiative**, an outreach program designed to demonstrate and facilitate the adoption of agricultural management practices that will enable growers to transition away from the use of high-risk pesticides. Funds are provided to projects that develop agricultural management practices that offer risk reductions to human health and the environment. www.epa.gov/region02

The EPA also offers the **Source Reduction Assistance Program**, which prioritizes water conservation and the minimization of chemicals of concern, such as pesticides, endocrine disruptors, and fertilizers. www.epa.gov

The U.S. Fish and Wildlife offers technical and financial assistance to private landowners through the **Partners for Fish and Wildlife** Program. The owners restore wetlands, streams and river conditions, as well as other important fish and wildlife habitat, for federal trust species. www.fws.gov/partners/

State Programs

The **Landowner Incentive Program (LIP)** is a preservation program for private landowners who wish to protect and conserve rare wildlife habitat and species. LIP is funded by the U.S. Fish and Wildlife Service and is administered by NJDEP's Division of Fish and Wildlife Endangered Nongame Species Program. Participating landowners receive both technical and financial assistance through this competitive grant program. Generally, a five-year minimum commitment is required and longer terms are preferred. A 25 percent cost-share is required of the landowner. www.state.nj.us/dep/fgw/ensp/lip_prog.htm

The **State Agricultural Development Committee (SADC) in New Jersey** has made soil and water conservation grants available as part of the Farmland Preservation Program. The grants gives landowners up to 50 percent of the funds required for approved soil and water conservation projects. Farms are only eligible if they are already enrolled in a permanent or eight-year easement program. Soil projects can include measures to prevent or control erosion, control pollution on agricultural land, and improve water management for agricultural purposes. Projects must be completed within three years of SADC funding approval. However, under special circumstances, the grant may be renewed for an additional year. www.state.nj.us/agriculture/sadc/sadc.htm

NJDEP's 319(h) Non-point Source Pollution Control Pass-through Grant Program provides financial assistance to reduce non-point source pollution through riparian buffers, manufactured treatment devices, and other methods. Applicant must be a government entity or a non-profit organization, but can partner with farmers. www.state.nj.us/dep/watershedmgt/319grant.htm

Vernal Pools in Franklin Township

ID #	OLD ID	STATUS	X UTM	Y UTM	X Degrees	Y Degrees
15358	4060	**Confirmed**	492938.7500	4382180.4999	-75.0822	39.5893
15348	4054	**Confirmed**	495261.5625	4381395.4999	-75.0552	39.5823
32116		**Confirmed**	497306.1968	4387216.7235	-75.0314	39.6347
32106		**Confirmed**	501311.8827	4384349.6243	-74.9847	39.6089
32107		**Confirmed**	502455.9649	4384504.4666	-74.9714	39.6103
32110		**Confirmed**	502860.9443	4384279.5336	-74.9667	39.6083
32121		**Confirmed**	505653.9997	4380467.2110	-74.9342	39.5739
32122		**Confirmed**	505868.7895	4380375.2561	-74.9317	39.5731
15986	4514	Potential	490889.2500	4385593.4999	-75.1061	39.6201
605	13186	Potential	490909.8904	4385567.2776	-75.1059	39.6198
15987	4515	Potential	491044.0312	4385490.4999	-75.1043	39.6191
15333	4043	Potential	491569.7812	4387663.9999	-75.0982	39.6387
15332	4042	Potential	491577.3437	4387533.4999	-75.0982	39.6375
15336	4046	Potential	491855.6250	4386944.4999	-75.0949	39.6322
15325	4039	Potential	492043.7812	4387875.4999	-75.0927	39.6406
15331	4041	Potential	492370.6562	4387349.9999	-75.0889	39.6359
15989	4517	Potential	492627.3750	4385165.9999	-75.0859	39.6162
15988	4516	Potential	493497.9375	4383116.9999	-75.0757	39.5978
32117		Potential	494728.6449	4382378.0552	-75.0614	39.5911
32118		Potential	494776.8452	4382409.0857	-75.0608	39.5914
32120		Potential	494799.9561	4382440.1570	-75.0606	39.5917
15334	4044	Potential	495003.5312	4385630.4999	-75.0582	39.6204
15347	4053	Potential	495096.1250	4381812.4999	-75.0571	39.5860
32119		Potential	495133.5662	4381791.8023	-75.0567	39.5858
602	13185	Potential	495137.5427	4385326.2005	-75.0566	39.6177

ID #	OLD ID	STATUS	X UTM	Y UTM	X Degrees	Y Degrees
15335	4045	Potential	495142.8437	4385304.4999	-75.0566	39.6175
603	12231	Potential	495425.9065	4385019.1000	-75.0533	39.6149
15337	4047	Potential	496059.5000	4385015.9999	-75.0459	39.6149
604	12232	Potential	496152.1150	4385280.3955	-75.0448	39.6173
15338	4048	Potential	496154.7500	4384969.4999	-75.0448	39.6145
15345	4051	Potential	496223.9375	4382680.9999	-75.0440	39.5938
15346	4052	Potential	496238.5000	4382493.4999	-75.0438	39.5922
15349	4055	Potential	496288.8750	4383902.4999	-75.0432	39.6049
15529	4181	Potential	496380.9375	4378653.4999	-75.0421	39.5576
16124	4610	Potential	496499.9375	4389319.4999	-75.0408	39.6537
32115		Potential	497306.3151	4387155.4220	-75.0314	39.6342
606	12233	Potential	499809.2342	4378081.6663	-75.0022	39.5524
15528	4180	Potential	500115.6875	4376966.4999	-74.9987	39.5424
15344	4050	Potential	500161.4375	4381802.4999	-74.9981	39.5859
15339	4049	Potential	500211.6875	4381900.4999	-74.9975	39.5868
16044	4556	Potential	500596.7187	4375164.9999	-74.9931	39.5261
16026	4542	Potential	500693.9375	4379696.4999	-74.9919	39.5670
16017	4537	Potential	500752.8437	4385622.4999	-74.9912	39.6204
16016	4536	Potential	500796.5000	4385678.9999	-74.9907	39.6209
16015	4535	Potential	500877.1875	4385659.4999	-74.9898	39.6207
16013	4533	Potential	501045.1875	4384881.4999	-74.9878	39.6137
16010	4530	Potential	501125.9687	4384255.4999	-74.9869	39.6080
16014	4534	Potential	501247.5937	4384776.9999	-74.9855	39.6127
16043	4555	Potential	501511.5625	4378308.4999	-74.9824	39.5545
16042	4554	Potential	501616.1875	4378694.9999	-74.9812	39.5579
16018	4538	Potential	501659.8437	4384478.9999	-74.9807	39.6101
16045	4557	Potential	502328.4687	4378367.4999	-74.9729	39.5550
16041	4553	Potential	502355.9062	4378657.9999	-74.9726	39.5576
16025	4541	Potential	502738.0625	4382271.9999	-74.9681	39.5902
16024	4540	Potential	502843.9062	4382078.9999	-74.9669	39.5884
16011	4531	Potential	503120.7187	4383265.9999	-74.9637	39.5991
16012	4532	Potential	503216.4687	4383629.9999	-74.9625	39.6024

ID #	OLD ID	STATUS	X UTM	Y UTM	X Degrees	Y Degrees
32114		Potential	503219.2739	4383578.8660	-74.9625	39.6019
16040	4552	Potential	503341.1250	4378057.4999	-74.9611	39.5522
16005	4529	Potential	503524.0625	4383713.9999	-74.9590	39.6032
16019	4539	Potential	503758.9375	4380527.9999	-74.9562	39.5745
16031	4547	Potential	504288.9687	4378610.4999	-74.9501	39.5572
15999	4523	Potential	504465.7187	4382864.9999	-74.9480	39.5955
15998	4522	Potential	504724.4062	4382883.4999	-74.9450	39.5957
16032	4548	Potential	504879.9687	4378984.9999	-74.9432	39.5605
16038	4550	Potential	504958.7500	4379116.4999	-74.9423	39.5617
16030	4546	Potential	504961.2500	4378606.9999	-74.9422	39.5571
16039	4551	Potential	505037.0312	4379041.4999	-74.9414	39.5610
16028	4544	Potential	505374.4687	4378852.4999	-74.9374	39.5593
16029	4545	Potential	505432.6562	4378812.9999	-74.9368	39.5590
15997	4521	Potential	505443.9062	4382852.9999	-74.9366	39.5954
15442	411	Potential	505472.3125	4382477.4999	-74.9363	39.5920
32123		Potential	506059.9108	4380899.2394	-74.9294	39.5778
32113		Potential	506417.6198	4380375.6925	-74.9253	39.5731
32112		Potential	506441.4126	4380591.1067	-74.9250	39.5750
32111		Potential	506441.4645	4380621.8698	-74.9250	39.5753

Source: Center for Remote Sensing and Spatial Analysis (CRSS), 2007

APPENDIX C

Plants Found in Franklin Township

The Flora of Franklin Township: Known and Suspected

THE FLORA OF FRANKLIN TOWNSHIP:
Known or Suspected
By Joseph R. Arsenault 1/12/2012

Total Flora: 602 species and varieties
6 Lycopods
14 Ferns
8 Gymnosperms
411 Dicots
161 Monocots

Names in bold are species on the NJ Threatened and Endangered Species list. The code in parenthesis indicates status (see key at end of list)

LYCOPODIALES: 6

Isoetaceae
- Isoetes: *echinospora*

Lycopodiaceae
- Dendrolycopodium: *obscurum*
- Diphasiastrum: *digitatum*
- Lycopodiella: *appressa*
- Lycopodium :*digitatum*

Selaginellaceae
- Selaginella: *appodes*

FERNS: 14

Aspleniaceae
- Asplenium: *platyneruon*

Blechnaceae
- Woodwardia: *aerolata, virginica*

Dennstaedtiaceae
- Dennstaedtia: *punctaloba*
- Pteridium: *aquillinuum*

Dryopteridaceae
- Dryopteris: *carthusiana*
- Polystichum: *acrostichoides*

Equisetaceae
- Equisetum: *arvense*

Onocleaceae
- Onoclea: *sensibilis*

Ophioglossaceae
- Botrychium: *disectum*
- Ophioglossum: *vulgatum*

Osmundaceae
- Osmunda: *cinnamomea, regalis*

Thelypteridaceae
- Thelypteris: *palustris*

GYMNOSPERMS: 8

Cupressaceae
- Chamaecyparis: *thyoides*
- Juniperus: *virginiana*

Ginkgoaceae
- Ginkgo: *biloba*

Pinaceae
- Picea: *abies*
- Pinus: *echinata, rigida, taeda, virginiana*

ANGIOSPERMS – DICOTYLEDONS: 411

Adoxaceae (formerly under Caprifoliaceae)
- Sambucus: *canadensis*
- Viburnum: *dentatum, nudum* var. *nudum, nudum* var. *crassinoides*

Altingiaceae (formerly in Hamamelidaceae)
- Liquidambar: *styraciflua*

Amaranthaceae
- Amaranthus: *hybridus, retroflexus*
- Froelichia: *gracilis*

Anacardiaceae
- Rhus: *copilina, glabra, hirta*
- Toxicodendron: *radicans, vernix*

Apiaceae
- Daucus: *carrota*
- Oxypolis: *rigidor*
- Sanicula: *marlandica*

Apocynaceae (includes Asclepiadaceae)
- Apocynum: *cannabinum*
- Asclepias: *incarnatum, syricia, tuberosa*
- Vinca: *minor*

Aquifoliaceae
- Ilex (includes Nemopanthus): *glabra, laeviagata, opaca, verticilata, mucronata*

Araliaceae
- Aralia: *nudicalis*

Asteraceae
- Achillea: *millefolium*
- Ambrosia: *artemisiifolia, trifidum*
- Antennaria: *plantagilifolia*
- Artemisia: *annua, vulgaris*
- Baccharis: *hamilifolia*
- Bidens: *bipinnata, cornata, frondosa, polylepis*
- Centaurea: *biebersterinii*
- Chondrilla: *juncea*
- Chrysopsis: *marlandica*
- Cichorium: *intybus*
- Cirsium: *arvense, discolor, horridulum, vulgare*
- Conyza: *canadensis*
- Coreopsis: *lanceotlata,* ***rosea (S3)***
- Doellingeria (formerly under Aster): *umbellata*
- Eclipita: *alba*
- Erechtites: *hieracifolium*
- Erigeron: *annua, philidelphicus, strigosus*
- Eupatorium: *album, dubium, fistulosum, hyssopifolium, pilosum,* ***resinosum (S2),*** *perfoliatum x resinosum*
- Eurybia (formerly under Aster): *compacta, divaricata, spectabilis*
- Euthamia: *graminifolia, caroliniana*
- Galinsoga: *parviflora*
- Helenium: *autumnale*
- Helianthus: *divaricatus, tuberosus*
- Heterotheca: *subaxilaris*
- Hieracium: *floribundum, gronovii, paniculata, pilosella, pratense*
- Hypochaeris: *radicata*
- Ionactis (formerly under Aster): *linariifolius*
- Krigia: *viriginiana*
- Lactuca: *biennis, canadensis, sarriola*
- Leucanthemum (formerly under Chrysanthemum): *vulgare*
- Liatris: *pilosa var. pilosa*
- Matricaria: *discoidea*
- Mikania: *scandens*
- Oclemena (formerly under Aster): *nemoralis*
- Prenanthes: *trifoliata*
- Pseudognaphalium (formerly under Gnaphalium): *obtusifolium. purpureum*
- Rudbeckia: *hirta*
- Sericocarpus (formerly under Aster): *asteroids, linifolius*
- Solidago: *altissima, erecta, fistulosa, juncea, odora, nemoralis, puberula, rugosa var. rugosa, rugosa var. aspera, sempervirens*
- Sonchus: *arvensis, asper, olerceus*
- Symphyotrichum (formerly under Aster): *cordifolium*[1]*, divaricatum, dumosum, novae-angliae, novi-belgii, patens, pilosum, racemosum*
- Taraxacum: *officinalis*
- Tragopogon: *porrifolius*
- Vernonia: *noveborascensis*
- Xanthium: *strumarium*

Balsaminaceae
- Impatiens: *capensis*

[1] Local escape

DICOTS (cont'd.)

Berberidaceae
- Berberis: *thunbergii*

Betulaceae
- Alnus: *serrulata*
- Betula: *nigra, populifolia*

Bignoniaceae
- Campsis: *radicans*
- Catalpa: *speciosa*

Boraginaceae
- Myosotis: *arvense, verna*

Brassicaceae
- Alliaria: *officinalis*
- Arabidopsis: *thaliana*
- Arabis: *lyrata*
- Barbarea: *vulgaris*
- Brassica: *nigra, vulgaris*
- Capsella: *bursa-pastoris*
- Cardamine: *parviflora, hirsuta*
- Draba: *verna*
- Lepidium (includes Cardaria and Coronopus): *virginicum*
- Rorippa: *islandica*
- Sisymbrium: *altissimum*

Cabombaceae
- Brasenia: *schreberi*

Cactaceae
- Opuntia: *humifusa*

Campanulaceae
- Lobelia: *cardinalis, inflata, nuttallii*

Cannabaceae
- Celtis (formerly in Celtidaceae): *occidentalis*
- Humulus: *japonicus*

Caprifoliaceae
- Lonicera: *fragrantissima, tartarica, japonica, mackii*

Caryophyllaceae
- Agrostemma: *githago*
- Cerastium: *vulgatum*
- Dianthus: *ameria*
- Saponaria: *officinalis*
- Scleranthus: *annus*
- Silene (includes Lychnis): *alba*
- Spergula: *arvensis*
- Stellaria: *graminea, longifolia, media*

Celastraceae
- Celastrus: *orbiculatus*
- Euonymus: *alata*

Chenopodiaceae
- Chenopodium: *album, ambrosiodes*

Cistaceae
- Hudsonia: *ericoides*
- Lechea: *minor, muricata, racemulosa*

Clethraceae
- Clethra: *alnifolia*

Convolvulaceae
- Calystegia: *sepium*
- Convolvulus: *arvensis*
- Cuscuta: *compacta, gronovii*
- Ipomoea: *hedercea*

Comaceae
- Cornus: *amomum, florida*

Droseraceae
- Drosera: *filiformis, intermedia, rotundifolia*

Ebenaceae
- Diospyros: *virginiana*

Elaeagnaceae
- Elaeagnus: *umbellata*

Ericaceae
- Chamaedaphne: *calyculata*
- Chimaphila: *maculata*
- Eubotrys: *racemosa*
- Gaultheria: *procumbens*
- Gaylussacia: *baccata, frondosa*
- Kalmia (now includes Leiophyllum): *angustifolia, latifolia*
- Lyonia: *ligustrina, mariana*
- Monotropa: *hypopithys, uniflora*
- Rhododendron: *viscosum*
- Vaccinium: *attrococcum, caesariense, corymbosum, macrocarpon, pallidum*

DICOTS (cont'd.)

Euphorbiaceae
- Acalypha: *rhomboidea, graciliens*
- Euphorbia: *esula*
- Chamaesyce: *maculata*

Fabaceae
- Albizia: *julibrissin*
- Apios: *americanum*
- Baptisia: *tinctorum*
- Cercis: ***canadensis***[2] ***(S1)***
- Chamaecrista (formerly under Cassia): *fasciculata, nictitans*
- Coronilla (See Securigera): *varia*
- Desmodium: *canadensis, canescens, marlandicum, paniculatum*
- Kummerowia*: striata*
- Lathyrus: *japonicus*
- Lespedeza: *capitata, cuneata, fruitescens, hirta, procumbens, virginica*
- Medicago: *sativa*
- Melilotus: *officinalis*
- Robinia: *pseudoacacia*
- Strophostyles: *helova, umbellata*
- Tephrosia: *virginica*
- Trifolium: *campestre, hybridum, pratense, repens*
- Vicia: *grandiflora, sativa, tetrasperma, villosa*
- Wisteria: *sinensis*

Fagaceae
- Castanea: *dentata*
- Fagus: *grandifolia*
- Quercus: *alba, coccinea, falcata, ilicifolia, marlandica, palustris, phellos, prinus, stellata, velutina*

Gentianaceae
- Bartonia: *virginica*

Geraniaceae
- Erodium: *cicutarium,*
- Geranium: *carolinianum*

Haloragaceae
- Myriophyllum: *humile*
- Proserpinaca: *pectinata*

Hamamelidaceae
- Hamamelis: *virginiana*

Hyperiaceae (formerly under Clusiaceae or Guttiferae)
- Hypericum: *mutilum, canadensis, gentianoides, hypericoides, punctatum*
- Triadenum: *virginicum*

Iteaceae
- Itea: *virginica*

Juglandaceae
- Carya: *glabra, pallida, tomentosa, ovalis*
- Juglans: *nigra*

Lamiaceae (formerly Labiatae)
- Glechoma: *hederacea*
- Lamium: *amplexicaule, purpureum*
- Lycopus: *amplectens, uniflorus, virginicus*
- Monarda: *punctata*
- Physostegia: *virginica*
- Prunella: *vulgare*
- Pycnanthemum: *virginianum*
- Trichostema: *dichotomum*

Lauraceae
- Lindera: *benzoin*
- Sassafras: *albidum*

Lentibulariaceae
- Utricularia: *inflata, macrorhiza,* ***purpurea (S3)****, subulata*

Linaceae
- Linum: *medium, virginianum*

Lythraceae
- Decodon: *verticillata*
- Lythrum: *salicaria*

Magnoliaceae
- Liriodendron: *tulipifera*
- Magnolia: v*irginiana*

Malvaceae
- Abutilon: *theophrasti*
- Hibiscus: *palustris*
- Sida: s*pinosa*

[2] Local escape in Franklin Twp. but a T & E species on state list

DICOTS (cont'd.)

Melastomataceae
- Rhexia: *mariana, virginica*

Menyanthaceae
- Nymphoides: ***cordata (S3)***

Molluginaceae
- Mollugo: *verticillata*

Moraceae
- Morus: *alba, rubra*

Myricaceae
- Comptonia: *peregrynia*
- Morella (formerly under Myrica): *pensylvanica*

Myrsinaceae
- Lysimachia (formerly in Primulaceae): *quadrifolia, terrestris*
- Trientalis (formerly in Primulaceae): *borealis*

Nymphaeaceae
- Nuphar*: lutea var. variagatea*
- Nymphaea: *odorata*

Nyssaceae
- Nyssa: *sylvatica*

Onagraceae
- Epilobium: *coloratum*
- Ludwigia: *alterniflora, palustris*
- Oenothera: *biennis, laciniata*

Orobanchaceae (root-parasite herbs lacking chlorophyll and chlorophylose hemi-parasites)
- Agalinis*: purpurea*
- Melampyrum: *linearum*

Oxalidaceae
- Oxalis: *striata, repens*

Paulowniaceae (formerly under Bignoniaceae)
- Paulownia: *tomentosa*

Phytolaccaceae
- Phytolacca: *americana*

Plantaginaceae
- Callitriche: *heterophylla*
- Linaria:*vulgaris*
- Nuttallanthus: c*anadensis*
- Penstemon: *hisuta*
- Plantago: *aristida, major, rugelii, virginica*
- Veronica: *arvense, hederafolia, perrgrina, persica*

Platanaceae
- Platanus: *occidentalis*

Polemoniaceae
- Phlox*: paniculata*

Polygalaceae
- Polygala: *nuttalis,* ***polygama (S2)***

Polygonaceae
- Persicaria (formerly under Polygonum): *hydropiperoides, lapathifolium, caespitosum v. longistylis,*
- Polygonella: *articulata*
- Polygonum: *scandens, sagittatum*
- Rumex: *acetosella, crispus, orbiculatus*

Portulacaceae
- Portulaca: *oleracea*

Ranunculaceae
- Aquilegia: *canadensis*[3]
- Clematis: *terniflora, virginiana*
- Ranunculus: *bulbosus, acris*

Rosaceae
- Agrimonia: *parviflora*
- Amelanchier: *canadensis, obovata, spicata*
- Aronia: *arbutifolia*
- Crataegus: *uniflora, coccinea*
- Fragaria: *virginica*
- Geum: *canadensis*
- Malus: ***angustifolia (S2)****, coronaria*
- Potentilla (includes Duchesnea): *recta, canadense, simplex, indica*
- Prunus: *maritima, serotina*
- Pyrus: *caleryana*
- Rosa: *carolina, multiflora,*
- Rubus: *allegheniensis, flagellaris, hispidus, phoenicolasius*
- Spiraea: *tomentosa*

[3] Local escape

DICOTS (cont'd.)

Rubiaceae
- Cephalanthus: *occidentalis*
- Diodia: *teres*
- Galium: *aparine, trifidum*
- Mitchella: *repens*

Salicaceae
- Populus: *alba, grandidentata*
- Salix: *discolor, nigra*

Santalaceae
- Comandra: *umbellata*
- Phoradendron: *leucarpum*

Sapindaceae
- Acer: *negundo, platanoides, rubrum v. trilobum, saccharinum*

Sarraceniaceae
- Sarracenia: *purpurea*

Scrophulariaceae
- Verbascum: *blattaria, thapsus*

Simaroubaceae
- Ailanthus: *altissima*

Solanaceae
- Datura: *strumarum*
- Physalis: *heterophylla*
- Solanum: *carolinense, dulcamara*

Ulmaceae
- Ulmus: *americana*

Urticaceae
- Boehmeria: *cylindrica*
- Pilea: *pumila*

Verbernaceae
- Verbena: *hastata*

Violaceae
- Viola: *lanceolata, primulifolia, ovata v. pubescens, sororia*

Vitaceae
- Parthenocissus: *parthenocisus*
- Vitis: *aestavalis, lambrusca, vulpina*

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Acoraceae
- Acorus: *calymus*

Agavaceae
- Yucca: *filiformis*

Alismataceae
- Sagittaria: *latifolia, engelmaniana*

Amaryllidaceae
- Allium: *vineale*

Araceae
- Arisaema: *triphyllum*
- Lemna (formerly under Lemnaceae Lemnoideae): *minor*
- Orontium: *aquaticum*
- Peltandra: *virginica*
- Spirodela (formerly under Lemnaceae Lemnoideae): *polyrhiza*
- Symplocarpus: *foetidus*

Asparagaceae
- Asparagus: *officinalis*
- Smilacina (formerly in Ruscaceae): *racemosa*

Colchicaceae
- Uvularia (formerly under Liliaceae; others put it under the Uvulariaceae): *sessilifolia*

Commelinaceae
- Commelina: *communis*
- Tradescantia: *virginiana*

Cyperaceae
- Bulbostylis: *capillaris*
- Carex (incomplete): *albolutescens, atlantic, atlantica v. capillacea, bullata, barrattii, collinsi, folliculata, tonsa, umbellata, pensylvanica, nigromarginata, swanii, complamata, lurida, crinita v. crinita, stricta, scoparia*
- Cyperus: *strigosus, dentatus, erythrorhizos, esculentus, grayii*
- Dulichium: *arundinaceae*
- Eleocharis: *olivacea, obtusa, tenuis*
- Kyllinga: *pumilla*
- Rhychospora: *capitellata,* ***nitens (S2)***
- Schoenoplectus (formerly under Scirpus): *pungens*
- Scirpus: *cyperinus*
- Scleria: *triglomerata*

Dioscoreaceae
- Dioscorea: *villosa*

Eriocaulaceae
- Eriocaulon: *septangulare*

Xanthorrhoeaceae
- Hemerocallis (formerly under Hemerocallidaceae): *fulva*

Hypoxidaceae (formerly in Liliaceae)
- Hypoxis: *hirsuta*

Iridaceae
- Iris: *pseudoacorus, versicolor*
- Sisyrinchium: *angustifolium, atlanticum*

Juncaceae
- Juncus: *dichotomus, effuses, tenuis, canadensis, pelocarpus*
- Luzula: *multiflora*

Liliaceae
- Erythronium: *americanum*
- Lilium: *superbum*
- Medeola: *virginiana*

Melanthiaceae (formerly under Liliaceae)
- Helonias: ***bullata (S3)***
- Xerophyllum: *asphodeloides*

Nartheciaceae (formerly under Liliaceae)
- Aletris: *farinosa*

Orchidaceae
- Cypripedium: *acaule*
- Platanthera: *blepharglottis,* ***ciliaris (S2),*** *clavaellata, lacera*
- Spiranthes: *cernua, lacera v. gracilis*
- Tipularia: ***discolor (S3)***

MONOCOTS (cont'd.)

Poaceae (formerly Graminae)-Incomplete
- Agrostis: *stolinifera*
- Aira: *caryophllea*
- Andropogon: *glomeratus, virginicus*
- Anthoxanthum: *odoratum*
- Aristida: *dichotoma, longespica, oligantha*
- Bromus: *inermus, tinctorum*
- Chasmanthium: *laxum*
- Cinna: *arrundinacea*
- Cynodon: *dactylon*
- Dactylis: *glomerata*
- Danthonia: *compressa, sericea, spicata*
- Deschampsia: *flexuosa*
- Dichanthelium: *acuminatum senso lato, clandestinum, columbianum, commutatum v. ashei, depauperatum, dichotomum, lucidum, mattamuskeetense, meridionale, microsarpon, ovale v. addisonii, sabulorum v. patulum, scoparium, spretum, villosissimum*
- Digitaria: *ischaemum, sanguinalis*
- Echinochloa: *crus-galli, muricata*
- Eleusine: *indica*
- Elymus: *virginicum*
- Eragrostis: *cilianensis, curvula, pectinaea, spectabilis*
- Festuca: *rubrua*
- Glyceria: *obtusa, striata*
- Holcus: *lanatus*
- Leersia: *oryzoides, virginica*
- Microstegium: *vimenium*
- Miscanthus: *sinesis*
- Muhlenbergia: *schreberi*
- Panicum: *anceps, dichotomiflorum, rigidulum v. pubescens, verrucosum, virgatum*
- Paspalum: *laevis, setaceum*
- Phalaris: *arundinacea*
- Phleum: *pratense*
- Phragmites: *australis*
- Piptatherum: *avenacea*
- Poa: *annua, compressa, pratensis, trivialis*
- Saccharum (formerly under Erianthus): *giganteum*
- Schedonorus (formerly under Festuca and Lolium): *perennis, pratense sensu lato*
- Schizachyrium: *scoparium*
- Setaria: *faberia, pumillia*
- Sorghastrum: *nutans*
- Sphenopholis: *nitida*
- Tridens: *flava*
- Tripsacum: *dactyloides*
- Vulpia: *octoflora*

Pontederiaceae
- Pontederia: *cordata*

Potamogetonaceae
- Potamogeton: *diversifolium*

Smilacaceae
- Smilax: *glauca, rotundifolia*

Typhaceae
- Sparganium: *americanum*
- Typha: *latifolia*

Xyridaceae
- Xyris: *diformis*

Key to State Element Rank

S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
S2	Imperiled in NJ because of rarity (6 to 20 occurrences).
S3	Rare in state with 21 to 50 occurrences. Includes elements which are widely distributed but with small populations/acreage, or with restricted distribution but locally abundant.

Rare Plants Found in Franklin Township

Common Name	Scientific Name	Federal Status	State Status	Regional Status	G Rank	S Rank	Last Observed	Identified?
Vascular Plant								
Wand-like three-awn Grass	*Aristida virgata*			HL	G5T4T5	S2	1940-11-17	Y
Eastern Silvery Aster	*Aster concolor*			LP, HL	G5	S2	1940-11-17	Y
Rose-color Coreopsis	*Coreopsis rosea*			LP, HL	G3	S2	1934-08-15	Y
Pine Barren Boneset	*Eupatorium resinosum*		E	LP, HL	G3	S2	1992-08-04	Y
Swamp-pink	*Helonias bullata*	LT	E	LP, HL	G3	S3	1937-05-07	Y
Floatingheart	*Nymphoides cordata*			LP, HL	G5	S3	2004-08-06	Y
Virginia False-gromwell	*Onosmodium virginianum*		E	LP, HL	G4	S1	1941-05-30	Y
American Mistletoe	*Phoradendron leucarpum*			LP, HL	G5	S3	1941-12-07	Y
Slender Horned-rush	*Rhynchospora inundata*			LP, HL	G4?	2	1992-07-10	Y
Short-beaked Bald-rush	*Rhynchospora nitens*			HL	G4?	S2	2008-08-18	Y
Long-beak Bald-rush	*Rhynchospora scirpoides*			HL	G4	S2	2008-08-18	Y
Sand-plain Blue-eyed Grass	*Sisyrinchium fuscatum*			HL	G5?	S2	1941-05-30	Y
Narrow-leaf Bluecurls	*Trichostema setaceum*			HL	G5	S2	1950-09-04	Y
Humped Bladderwort	*Utricularia gibba*			LP, HL	G5	S3	2007-09-11	Y
Purple Bladderwort	*Utricularia purpurea*			LP, HL	G5	S3	2004-08-06	Y

Source: NJDEP Natural Heritage Database, 2011

Federal Status	
LT	Taxa formally listed as threatened.

State Status	
E	Endangered species – 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, disease. An endangered species requires immediate assistance or extinction will probably follow.

Regional Status	
LP	Indicates taxa 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; with the number of occurrences 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 which 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 which 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.

Vertebrate Animals Known or Probable in Franklin Township

Fish

Common Name	Scientific Name	Historical Presence
Freshwater Eels	***Family Anguillidae***	
American eel	*Anguilla rostrata*	Native
Carps & Minnows	***Family Cyprinidae***	
Flathead minnow	*Pimephales promelas*	Introduced
Golden shiner	*Notemigonus crysoleucas*	Native
Ironcolor shiner	*Notropis chalybaeus*	Native
Suckers	***Family Catostomidae***	
Creek chubsucker	*Erimyzon oblongus*	Native
North American Catfishes	***Family Ictaluridae***	
Yellow bullhead	*Ameiurus natalis*	Native
Brown bullhead	*Ameiurus nebulosus*	Native
Channel catfish	*Ictalurus punctatus*	Introduced
Tadpole madtom	*Noturus gyrinus*	Native
Pikes	***Family Esocidae***	
Chain pickerel	*Esox niger*	Native
Mudminnows	***Family Umbridae***	
Eastern mudminnow	*Umbra pygmaea*	Native
Pirate Perches	***Family Aphredoderidae***	
Pirate perch	*Aphredoderus sayanus*	Native
Sunfishes	***Family Centrarchidae***	
Mud sunfish	*Acantharchus pomotis*	Native

Common Name	Scientific Name	Historical Presence
Blackbanded sunfish	*Enneacanthus chaetodon*	Native
Bluespotted sunfish	*Enneacanthus gloriosus*	Native
Banded sunfish	*Enneacanthus obesus*	Native
Pumpkinseed	*Lepomus gibbosus*	Native
Bluegill	*Lepomis macrochirus*	Introduced
Largemouth bass	*Micropterus salmoides*	Introduced
White crappie	*Pomoxis annularis*	Introduced
Black crappie	*Pomoxis nigromaculatus*	Introduced
Perches	***Family Percidae***	
Swamp darter	*Etheostoma fusiforme*	Native
Tessellated darter	*Etheostoma olmstedi*	Native
Yellow perch	*Perca flavescens*	Native

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

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
*** B = Breeding; M = Migrant; W = Winter; R = Year-round resident**				
Double-crested cormorant	Open water	Malaga Lake	Summer visitor; B-Coast & Delaware R.	√
Great blue heron	Open marsh, lake edges	Nesting colony on Scotland Run	B	√
Great egret	Open marsh, lake edges	Occasional visitor	B	
Snowy egret	Open marsh, lake edges		B - Coast & Del. R.	√
Green heron	Open marsh, lake edges	Malaga & Iona Lakes	B	√

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Black-crowned night heron	Open marsh, lake edges	Occasional visitor	B	√
Black vulture	Open fields		R	√
Turkey vulture	Open fields, woodlands		R	√
Snow goose	Open farm fields	Winter migrant in fields	W & M	√
Canada goose	Open water, fields		R	√
Mute swan	Open water	Lakes	R	√
Wood duck	Forested wetlands	Need tree cavities or nest boxes for breeding; rare in winter	R	√
Gadwall	Open water	Winter migrant	W	
American wigeon	Open water	Winter migrant	W	
American black duck	Marsh, lakes		R	√
Mallard	Open water, marshes		R	√
Blue-winged teal	Wetlands	Winter Migrant	B	
Northern shoveler	Open water	Winter migrant	W	
Northern pintail	Open water,	Winter migrant	W	
Green-winged teal	Wetlands	Winter Migrant	W	√
Ring-necked duck	Open water	Winter migrant - Malaga Lake	W	√
Lesser scaup	Open water	Winter migrant	W	
Bufflehead	Open water	Winter migrant	W	
Hooded merganser	Open water	Winter migrant	W	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Common merganser	Open water	Winter migrant	W	
Ruddy duck	Open water	Winter migrant	W	
Osprey	Open water	Lakes and ponds	B	√
Bald eagle	Lakes, waterways, open fields	Nesting in Piney Hollow Natural Area; forages over most lakes	R	√
Northern harrier	Open fields, marshes		R	√
Sharp-shinned hawk	Woodlands	Migrant & Winter most likely	B - Mostly North Jersey	√
Cooper's hawk	Woodlands	Coniferous & mixed forests including wet forests; usually near water	R	√
Red-shouldered hawk	Wet forests - deciduous	Usually near water; endangered	R	√
Broad-winged hawk	Woodlands	Pinelands forests	B	
Red-tailed hawk	Open areas, woodlands, urbanized areas	Most common hawk	R	√
American kestrel	Open fields, farmland	Summer; have declined	R	√
Merlin	Open fields near trees	Uncommon migrant	M & W	√
Peregrine falcon	Near water	Uncommon	R	
Ringed-neck pheasant	Old fields, farms	Released; otherwise uncommon especially in Pinelands	R	√
Wild turkey	Open fields, woodlands	Becoming common	R	√

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Northern bobwhite	Old field, brushy areas, woodlands	Once abundant; has declined	R	√
American coot	Ponds and lakes, marshes		W	√
Killdeer	Open areas, farmland, parking lots	Bare ground	R	√
Greater yellowlegs	Lake edges, mudflats	Summer/fall migrant; uncommon	M	
Lesser yellowlegs	Lake edges, mudflats	Summer/fall migrant, uncommon	M	√
Solitary sandpiper	Lake edges, mudflats, pond edges	Early fall migrant; uncommon	M	
Spotted sandpiper	Lake and pond edges, streams	Uncommon	B	√
Least sandpiper	Lake edges, mudflats	Spring & fall migrant	M	
American woodcock	Wet forests; woodland edges		R	√
Laughing gull	Open water, parking lots	Summer visitor	B - NJ Coast	√
Ring-billed gull	Open water, parking lots	Winter visitor	W	
Herring gull	Open water, dumps, parking lots	Winter visitor	R	√
Great black-backed gull	Open water, mudflats	Winter visitor	R on Coast	
Rock dove	Houses and bridges	Residential areas	R	√
Mourning dove	Suburbs, farmland, woodlands	Common; often on overhead wires	R	√
Black-billed cuckoo	Woodlands, shrub thickets	Prefer large unbroken forests	B	√
Yellow-billed cuckoo	Woodlands, dense thickets	Pinelands	B	√
Barn owl	Farmland	Uncommon	R	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Eastern screech owl	Woodlands	Forest edges; open fields near forests	R	√
Great horned owl	Woodlands	Woods; fields; forest edges	R	√
Barred owl	Wet forests	NJ threatened status	R	√
Saw-whet owl	Mixed deciduous & coniferous woods	Uncommon breeder; sightings in Pinelands	R	√
Common nighthawk	Cities and towns; pastures; open fields	Nest on flat gravel roofs; summer evening sky	B & M	√
Whip-poor-will	Mixed pine and deciduous woods	Heard rather than seen	B	√
Chimney swift	Residential areas	Bridges, house chimneys	B	√
Ruby-throated hummingbird	Woodlands and fields	Woodland edges; feeders	B & M	√
Belted kingfisher	Open water	Rare in winter	R	√
Red-headed woodpecker	Upland forest - Pinelands forest and upland forest on Pennsylvania Ave.	Open, dry, mixed woodlands - NJ threatened species	R	√
Red-bellied woodpecker	Woodlands	Common winter visitor at feeders	R	√
Yellow-bellied sapsucker	Woodlands	More likely as fall migrant but uncommon	M & W	√
Downy woodpecker	Woodlands	Frequently at feeders	R	√
Hairy woodpecker	Woodlands	Mature woods	R	√
Northern flicker	Woodlands	Woods with openings - common	R	√

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Eastern wood peewee	Woodlands	Upland woods	B	√
Willow flycatcher	Old fields, brush, near bogs	Wetland forests	B	
Alder flycatcher	Old fields, brush; near bogs	Wetland forests	B - North Jersey	
Least flycatcher	Woodlands	Mature forest; forest edges	B - North Jersey M	
Acadian flycatcher	Woodlands	Wetland forests	B	
Eastern phoebe	Woodlands; near houses	Nests on man-made structures	B	√
Great crested flycatcher	Woodlands	Upland mature deciduous forests	B & M	√
Eastern kingbird	Fields, farmland; often near water		B	√
Warbling vireo	Open woodlands, near streams & ponds	Seem to avoid Pinelands	B - Mostly North Jersey	
White eyed vireo	Woodlands; edges; brushy areas	Common	B	√
Red-eyed vireo	Woodlands	Fairly common	B	√
Yellow-throated vireo	Woodlands - deciduous or mixed	Forest edges; Prefer large forests; uncommon	B - More Abundant In North Jersey	
Blue jay	Woodland	Common	R	√
American crow	All habitats	Common	R	√
Fish crow	Nearly all habitats	Near water	R	√
Horned Lark	Open grassy fields	Local & scattered; uncommon	R	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Purple martin	Open fields, wetlands	Agricultural & some suburban areas; nests only in man-made boxes	B	√
Tree swallow	Open fields; over water; open woods	Nests in birdhouses and cavities	B	√
Barn swallow	Buildings, bridges	Nests in man-made structures	B	√
Northern rough-winged swallow	Buildings, bridges, streambanks	Locally common; like sand & gravel pits	B	
Bank swallow	Open fields; gravel pits; sand dunes	Locally common; nest in colonies	B	
Carolina chickadee	Woodlands	Common	R	√
Tufted titmouse	Woodlands	Common	R	√
Red-breasted nuthatch	Coniferous woodlands	Largely a winter resident	M	√
White breasted nuthatch	Woodlands; feeders	Common at feeders	R	√
Brown creeper	Woodlands	Pinelands forests; migrants in yards, forest edges	B & M	√
Carolina wren	Edge of woodlands; yards	Common	B	√
House wren	Edge habitat altered by man; yards	Fairly common	B	√
Winter wren	Woodlands	Winter migrant	B - North Jersey	√
Golden-crowned kinglet	Woodlands	Winter migrant	B - North Jersey	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Ruby-crowned kinglet	Edge of woodlands	Fall migrant	M	
Blue-gray gnatcatcher	Woodlands	Nests in deciduous, including those within Pinelands	B	√
Eastern bluebird	Edge of woodlands; fields	Cavity nester; Uses bluebird boxes	R	√
Veery	Woodlands	Most likely seen as migrant	M; B - North & Central Jersey; M	
Hermit thrush	Woodlands	Migrant	M; B - North Jersey & northern Pinelands	√
Gray-cheeked thrush	Woodlands	Migrant	M	
Swainson's thrush	Woodlands	Migrant	M	
Wood thrush	Woodlands	Deciduous upland and wet woods	B	√
American robin	Edge of woodlands, parks, suburbs	May leave in winter if it's severe	R	√
Catbird	Edge of woodlands, brushy areas	Common	B	√
Mockingbird	Suburbs, open areas, parks, yards	Common	B	√
Brown thrasher	All habitats	Brushy areas, forest edges, hedgerows	B	√
European starling	Old fields, developed areas, woodland edges	Very common	R	√
American pipit	Open fields	Uncommon	M	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Cedar waxwing	Upland forest	B - mixed woods; fairly common in Pinelands	R	√
Blue-winged warbler	Woodlands	Forest edges; power line cuts; Pinelands	B	
Golden-winged warbler	Brushy areas	Uncommon	B – North Jersey	
Nashville warbler	Woodlands, gardens	Shrubby woods	M	
Northern parula warbler	Woodlands	Large tracts of wet forests, deciduous or mixed	B & M	√
Yellow warbler	Wet brushy areas	Adjacent to marshes, ponds & streams	B	√
Chestnut-sided warbler	Brushy areas, old fields, orchards	Migrant	B - North NJ	
Magnolia warbler	Woodlands, brushy areas	Coniferous forests	M & Early W	
Black-throated blue warbler	Woodlands	Migrant	B - North NJ	
Yellow-rumped warbler	Woodlands; brushy areas	Winter resident-field edges among shrubs, residential areas	M & W	√
Black-throated green warbler	Woodlands, esp. Coniferous	Mostly migrant	B - North NJ & Eastern Pinelands	√
Blackburnian warbler	Woodlands	Migrant - coniferous forests	B - North NJ; M	
Yellow-throated warbler	Wet woodlands	Moist mixed oak-pine forests; probably migrant	B - Eastern Pinelands & Bayshore Area	
Pine warbler	Woodlands	Open pine or mixed forest	B	√

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Prairie warbler	Old fields, woodland edges	Throughout; Common in Pinelands	B	√
Palm warbler	Weedy fields, marsh edges	Migrant	M, Possibly W	
Bay-breasted warbler	Woodlands	Migrant	M	√
Blackpoll warbler	Woodlands; forest edges	Fall migrant	M	
Black and white warbler	Woodlands	Pineland & mixed upland forests	B	√
American redstart	Woodlands	Deciduous wet forests but more common in fall as migrant	B & M	√
Prothonotary warbler	Woodlands	Wet forests, especially Pinelands	B	√
Worm-eating warbler	Woodlands	Wooded slopes; forested ravines; require large unbroken forest	B	
Ovenbird	Woodlands	Dry deciduous or mixed forests	B	√
Northern waterthrush	Woodlands	Wet woodlands & brushy bogs	B – Pinelands, White Cedar Swamps	
Louisiana waterthrush	Woodlands	Along streams	B - Limited - Western Pinelands	
Kentucky warbler	Woodlands	Wet deciduous forests	B - Patchy	√
Connecticut warbler	Woodlands	Fall migrant	M	
Mourning warbler	Woodlands	Fall migrant	M	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Common yellowthroat	Brushy & marshy areas	Low, wet open areas; forest edges; wet forest understory	B	√
Hooded warbler	Woodlands	Wet deciduous forests, especially with laurel understory; Pinelands, white cedar swamps	B	√
Canada warbler	Woodlands	Migrant	B - North NJ; M	
Yellow-breasted chat	Old fields, open areas	Fallow farm fields, brushy areas, hedgerows, marsh edges	B - Not Common	√
Summer tanager	Woodlands	Mixed pine and deciduous forest; western pinelands	B	
Scarlet tanager	Woodlands	Upland deciduous or mixed forests, forest edges	B	√
Eastern towhee	Brushy areas, woodlands with shrubby understory	Upland areas	B & occasionally W	√
American tree sparrow	Brushy areas		W	
Chipping sparrow	Open woodlands, parks, yards	Also nests in open or mixed pine woods	B	√
Field sparrow	Old fields	Likes some trees present in weedy overgrown fields	B	√
Savannah sparrow	Open fields; meadows, pastures	Farmland, airports, man-made habitats	W & B - North Jersey & Salem Co	
Grasshopper sparrow	Old fields, fallow farm fields, pastures	Likes hedgerows. Uncommon. Threatened species in NJ	B	

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Fox sparrow	Woodlands	Brushy thickets In Woodlands	M & W	√
Song sparrow	Open areas, suburbs, yards	Bushy areas and edges; hedgerows	B	√
Lincoln's sparrow	Grassy patches near brush and trees	Fall migrant	M	
Swamp sparrow	Wetlands	Freshwater marshes; edges of bogs	B & M	
White-throated sparrow	Woodlands; brushy areas	Woodland edges, thickets, hedgerows, feeders; common in winter	W	√
White-crowned sparrow	Brushy areas; pastures	Uncommon	W	√
Dark-eyed junco	Woodlands, open areas, feeders	Common in winter	W	√
Northern cardinal	Woodlands, suburbs, parks, yards	Common in all habitats	B	√
Rose-breasted grosbeak	Woodlands	Open deciduous woods; edges	M & B-North & central Jersey	√
Blue grosbeak	Old fields; woodland edges	Likes brushy areas	B	√
Indigo bunting	Woodland edges; open brushy areas; farmland	Not abundant in much of Pinelands	B	√
Bobolink	Farmland; marshes	Fallow fields; marsh reeds. Uncommon	B - Mostly North Jersey	√
Red-winged blackbird	Wetlands, fields, pastures	Common. Mix in winter flocks	B	√
Eastern meadowlark	Farmland, open fields	Grassy fields, open meadows. Uncommon & local.	B	√

Species	General Habitat	Preferred Habitat/Township Locations/Special Status	Status in South Jersey*	Documented in Franklin 2005 - 2011
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident				
Rusty blackbird	Woodlands, ;swampy thickets	Mix less with other blackbirds. Uncommon winter visitor	W & M	
Common grackle	Open areas	Highly abundant. Mix in winter flocks	B	√
Brown-headed cowbird	Open woodlands	Mix in winter flocks	B	√
Orchard oriole	Scrubby woodlands with some tall trees	Also orchards, parks. Somewhat uncommon. Not in Pinelands center.	B	√
Baltimore oriole	Open woodlands	Deciduous tall trees; edges; parks. Fairly common. Not in Pinelands center.	B	√
Purple finch	Woodlands; brushy areas	Winter visitor	W & B - North Jersey	
House finch	Suburbs; feeders	Nest in conifers; abundant at winter feeders	B	√
Pine siskin	Open woodlands, old fields	Often with goldfinches in small flocks; uncommon	R	√
American goldfinch	Old fields; orchards; hedgerows; suburbs, thistle feeders	Residential areas; common	B	√
House sparrow	Open areas	Common in all habitats	B	√

Source: Walsh, Joan, et al. *Birds of New Jersey;* Personal observation: Joseph Arsenault, Suzanne McCarthy, Jay Mounier, and Franklin Environmental Commission Bird Quest surveys 2005 - 2011.

Reptiles and Amphibians

Species	General Habitat	Township Locations
Reptiles		
Common Snapping Turtle	Ponds and Lakes	Throughout
Stinkpot Turtle	Wetlands	Throughout
Spotted Turtle	Pineland Wetlands	Lower Maurice, Egg Harbor
Eastern Box Turtle	Uplands	Throughout
Red-bellied Turtle	Lakes and Ponds	Throughout
Eastern Painted Turtle	Lakes and Ponds	Throughout
Northern Fence Lizard	Uplands	Throughout
Northern Water Snake	Wetlands	Throughout
Garter Snake	All Habitats	Throughout
Eastern Ribbon Snake	Wetlands	Throughout
Eastern Smooth Earth Snake	Rotted Stumps	Throughout in sandy soil
Eastern Hog-nosed Snake	Pineland Woodlands	East side of Township
Southern Ring neck Snake	Woodlands	Throughout
Northern Pine Snake	Sandy Uplands	Threatened - NJ
Northern Black Racer	Edges	Throughout
Rough Green Snake	Woodlands	Throughout
Black Rat Snake	All Habitats	Throughout
Amphibians		
Red-backed Salamander	Woodlands	Throughout
Eastern Spade-Foot Toad	Sandy Uplands	Eastern side of Township
Fowlers Toad	Uplands	Throughout
Spring Peeper	Wetlands	Throughout
Pine Barrens Tree Frog	Pineland Wetlands	Piney Hollow
Northern Gray Tree Frog	Woodlands	Throughout
Bull Frog	Lakes and Ponds	Throughout
Carpenter Frog	Lakes and Ponds	Throughout
Green Frogs	Wetlands	Throughout
Wood Frog	Woodlands	Throughout

Species	General Habitat	Township Locations
Southern Leopard Frog	Wetlands	Throughout

Source: Franklin Township Environmental Commission, 2012

Mammals

Species	General Habitat	Township Locations
Opossum	All Habitats	Throughout
Short-tailed Shrew	Woodlands	Throughout
Eastern Mole	Uplands	Throughout
Star-nosed Mole	Uplands	Throughout, Occasional
Little Brown Bat	Uplands	Throughout
Eastern Pipistrel	Uplands	Throughout
Eastern Cottontail	All Habitats	Throughout, Common
Eastern Chipmunk	Woodlands	Throughout
Woodchuck	Woodlands and Fields	Throughout
Gray Squirrel	Woodlands	Throughout
Red Squirrel	Pine Woodlands	Throughout
Southern Flying Squirrel	Woodlands	Throughout
Beaver	Wet Forests	Throughout
White-footed Mouse	Woodlands	Throughout
Meadow Vole	Open fields	Throughout
Pine Vole	Woodlands	Throughout
Red-backed Vole	Woodlands	Throughout
Muskrat	Wetlands	Throughout
Brown Rat	Wetlands, homes, farms	Throughout
House Mouse	Homes and villages	Throughout
Red Fox	All habitats	Throughout
Gray Fox	Woodlands, thickets	Throughout
Coyote		
Raccoon	All Habitats	Throughout
Long-tailed Weasel	Wetlands	Throughout
Mink	Wetlands	Throughout

Species	General Habitat	Township Locations
Striped Skunk	Uplands	Throughout
River Otter	Wetlands	Maurice and Egg Harbor
White-tailed Deer	All Habitats	Throughout

Source: Franklin Township Environmental Commission, 2012

Rare Wildlife

Common Name	Scientific Name	State Status	G Rank	S Rank
Bald Eagle Foraging	*Haliaeetus leucocephalus*	E	G4	S1B,S1N
Barred Owl	*Strix varia*	T/T	G5	S2B,S2N
Carpenter Frog	*Rana virgatipes*	SC	G5	S3
Cooper's Hawk	*Accipiter cooperii*	T/T	G5	S2B,S4N
Eastern Box Turtle	*Terrapene carolina carolina*	SC	G5T5	S3
Eastern King Snake	*Lampropeltis g. getula*	SC	G5T5	S3
Fowler's Toad	*Bufo woodhousii fowleri*	SC	G5	S3
Great Blue Heron	*Ardea herodias*	SC/S	G5	S3B,S4N
Northern Parula Warbler	*Parula Americana*	SC/S	G5	S3B
Northern Pine Snake	*Pituophis melanoleucus melanoleucus*	T	G4T4	S2
Pine Barrens Treefrog	*Hyla andersonii*	T	G4	S2
Red-shouldered Hawk	*Buteo lineatus*	E/T	G5	S1B,S2N
Spotted Turtle	*Clemmys guttata*	SC	G5	S3
Wood Thrush	*Hylocichla mustelina*	SC/S	G5	S3B
Worm-eating Warbler	*Helmitheros vermivorus*	SC/S	G5	S3B

NJDEP Natural Heritage Database, 2011

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, disease. An endangered species requires immediate assistance or extinction will probably follow.
INC	Increasing: A species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.
SC	Special Concern: A species that warrant 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.
RP	Regional Priority: A species in regional conservation plans
U	Undetermined: A species about which there is not enough information available to determine the status.
D	Declining: A species that exhibited a continued decline in population numbers over the years.
P	Peripheral: A species whose occurrence in New Jersey is at the extreme edge of its present natural range.
S	Stable: A species whose population is not undergoing any long-term increase/decrease within its natural cycle.
Status for animals separated by a slash (/) indicates a dual status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.	

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 which 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 which 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.
Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).	

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

Rare Plants and Animals

Animals

The **Bald Eagle** *(Haliaeetus leucocephalus)*, an endangered species in New Jersey, was removed from the federal endangered species list in 2007 although it is still listed on the state endangered list. They mostly consume fish, and so often choose to build nests in forested areas near water bodies. Population decline caused by hunting, poisoning, and egg collecting was accelerated after the introduction of the pesticide dichlorodiphenyltrichloroethane (DDT) into the environment during the 1950s. DDT causes the thinning of eggshells, which crack under the weight of the incubating adult bird. Since the ban of DDT in 1972 and with an active state restoration program, bald eagle populations in New Jersey have increased from a single nesting pair in 1970 to 69 nesting pairs in 2008. Within Franklin Township, bald eagle foraging areas have been identified.

USFWS

Photo by Terren J Peterson

The **Barred Owl** *(Strix varia)* is a medium-sized gray-brown owl with white horizontal bars streaking its chest and vertical barring on its belly. The species is round-headed with a whitish/brown face ringed by dark brown trim. Barred owls prefer deep, moist forests, wooded swamps, and woodlands near waterways. Territories range in size between 213 and 903 acres. In New Jersey, the barred owl is a threatened species, which means it may become endangered if conditions begin or continue to deteriorate.

Photo by C. Kenneth Dodd, Jr., USGS

The **Carpenter Frog** *(Rana virgatipes)* is a medium-sized, brownish or olive-grey frog that is identifiable by four distinctive yellowish stripes down its back and its lack of dorsolateral ridges. It grows to be about three inches long and dwells in pools, bogs or slow-running streams that feature wet land masses and plant coverings in which to hide. Areas where sphagnum moss grows are particularly attractive to them. Heard between March and August, the breeding call of this frog resembles the sound of a carpenter hitting a nail. In New Jersey, the carpenter frog is a species of special concern. This status means that there is some evidence of population decline within the species, inherent vulnerability to environmental deterioration, or habitat modification that could result in its becoming a threatened species.

Photo by Larry C. Graff, DNREC

The **Cooper's Hawk** *(Accipiter cooperii)* is a threatened species in New Jersey. This raptor resides in both wetland and upland forests and is present year-round in the state. The Cooper's hawk lives in old-growth forests with closed canopies and moderate to heavy shrub cover. It prefers nesting in dense woods, such as cedar forests and conifer groves. The population of the Cooper's hawk began to decline in the 1950s as development encroached upon its habitat. Like the bald eagle, the Cooper's hawk was affected by the use of DDT. It was placed on the endangered species list for New Jersey in 1974, however it does not have federal endangered species status. Also like the bald eagle, the population of the Cooper's hawk has rebounded greatly after the federal ban on DDT, and its status in New Jersey changed from endangered to threatened in 1999. The loss of large, continuous forest land in the state continues to be a threat to the species.

Photo by Paul J. Fusco - CT DEEP-Wildlife

The **Eastern Box Turtle** *(Terrapene carolina)* is listed as a species of special concern in New Jersey. This small, four-to-six inch turtle can be found all over the state and lives in many different habitats. They are mostly terrestrial and enjoy soaking themselves in water or mud during the summer. Continued residential development has limited suitable habitats and reduced their number over the years. People encountering these turtles often keep them as pets, which prevents them from breeding. As

with all rare species, the collection and possession of Eastern box turtle is prohibited in New Jersey.

Photo by Achim Raschka

Eastern King Snakes *(Lampropeltis g. getula)* are large, three to four feet long, black, shiny, smooth-scaled snakes with white or pale yellow, ring-like bands that cross their backs at regular intervals. They thrive in many habitats including hardwood and pine forests, bottomlands and swamps, hammocks, and tidal wetlands. They have also been known to inhabit farmlands and suburban areas. While they live on land, they prefer areas close to water and are often found under cover objects which they use for protection. Their habitat ranges throughout the southeastern United States. In New Jersey the Eastern king snake is a species of special concern.

USFWS

The **Fowler's Toad** *(Bufo woodhousii fowleri)* is brown, gray, or olive green in color and has black-edged dark spots on its back. Their preferred habitats are in open woodlands, sand prairies, meadows, and beaches. During dry periods and throughout the winter time they often burrow into the ground. The Fowler's toad is a species of special concern in New Jersey.

USFWS

Great Blue Herons are the largest herons in North America. They stand approximately 2 ft. tall and are 38-54" long. Great blue herons inhabit inland areas near water, including rivers, lake edges, marshes, saltwater seacoasts, and swamps. They usually nest in trees or bushes that stand near water. In New Jersey, the great blue heron is a species of special concern.

USFWS

The **Northern Parula Warbler** *(Parula Americana)* is a small gray and white bird with a bright yellow throat. Northern parulas prefer to breed in mature forests or clumps of trees along streams, swamps, and other bottomlands. Because the Northern parula depends upon mature forests, they are sensitive to

deforestation and forest fragmentation. In New Jersey the Northern parula is a species of special concern.

Photo by Scott A. Smith, MDDNR

The **Northern Pine Snake** *(Pituophis melanoleucus melanoleucus)* is a relatively large (48-68") snake that is a threatened species in the state. Pine snakes in New Jersey dwell in dry pine-oak forest types growing on very infertile sandy soils such as Lakehurst or Lakewood sands. Disturbances such as agriculture, forestry, and fire can form the types of openings Northern pine snakes need for nesting and basking. Sandy, infertile soil provides open ground but also allows pine snakes to dig seasonal dens, the only snakes known to do so. Because of its secrecy and tendency to burrow, the Northern pine snake can easily go undetected even in locations where it is known to be common.

Photo by Clay Myers, NJDEP

The **Pine Barrens Treefrog** *(Hyla andersonii)* is a small, vibrant green treefrog that prefers acidic habitats with features such as an open canopy, a dense shrub layer, and heavy ground cover. Preferred soil compositions include sands and muck. Vernal woodland ponds, vegetated bogs, and seepage areas along tributaries serve as breeding areas. Occasionally, disturbed areas such as roadside ditches, vehicle ruts, or pools found along power line corridors may be used as well. Because of large expanses of protected, specialized habitat within the Pinelands National Reserve of southern New Jersey, the state serves as a stronghold for this species, in which it is categorized as threatened.

Photo by Jim Clayton, NYDEC

The **Red-shouldered Hawk** *(Buteo lineatus)* is a large hawk with broad wings and long tails. A threatened species in New Jersey, red-shouldered hawks usually inhabit mature deciduous or mixed deciduous-conifer forests with an open understory, riparian areas and swamps. They prefer to build their nests 20 to 60 feet above the ground in deciduous trees in wet woodland areas. Red-shouldered hawks often make use of dead trees nearby where they can perch and enjoy an unobstructed view to survey the forest floor.

MEIFW

The **Spotted Turtle** *(Clemmys guttata)* is a very small species of turtle that rarely exceeds 4.5” in length. Spotted turtles prefer shallow waters with a soft sedimentary bottom, submergent and emergent vegetation. These can include sedge meadows, boggy ponds, fens, tamarack swamps, sphagnum seepages, and slow, muddy streams. This species also frequently wanders between wetlands across land and may engage in periods of terrestrial inactivity, called aestivation, for weeks at a time. In New Jersey the spotted turtle is a species of special concern.

USFWS

The **Wood Thrush** *(Hylocichla mustelina)* is a small songbird that is a species of special concern in New Jersey. Wood thrush breeding grounds include deciduous and mixed forests with a moderately-dense shrub layer. They favor areas with running water, moist ground and high understory cover. The decline in the population is due to a sensitivity to forest fragmentation.

USFWS

The **Worm-eating Warbler** *(Helmitheros vermivorus)* features a distinctive patterned marking alternating black and buff stripes on its head. The worm-eating warbler nests on the ground in leaf litter, on steep slopes or hillsides, along ravines, and in deciduous or mixed woodlands with dense understories. The worm-eating warbler is a species of special concern in New Jersey.

Plants

Photo by Jeff McMillian, Almost Eden - USDA

The **Floatingheart** (*Nymphoides cordata)* is a small aquatic herb with heart-shaped leaves and long slender stems with slightly scalloped margins. Each stem produces a single leaf or flower. Their delicate white flowers have five petals, and bloom from early July to late August. Clumps of elongate tuberous roots are also carried along the stem, generally near the water's surface. Floatingheart grows in still waters of lakes and streams in most states along the eastern seaboard and gulf coast. This species provides food and shelter for wildlife such as fish.

Photo by Jim Stasz - USDA

Short-beaked bald-rush (*Rhynchospora nitens)* is a small, annual sedge. Several stalks rise from the plant's base, producing clusters of dark grey-brown spikelets that yield flowers and fruits from late July through September. This species is found on wet, sandy to slightly peaty, exposed shores and the bottoms of freshwater ponds. Seeds lie dormant during periods of higher water levels and the plant grows only during intermittent periods of drought when water levels are low. Habitats with fluctuating water levels along the coastal plain allow successful reproduction to take place only once in 4 to 7 years.

Photo by R.A. Howard - Smithsonian Institution

Humped bladderwort (*Utricularia gibba)* is an annual or perennial aquatic herb with stems that skim the silty bottoms of shallow waters. Carnivorous bladders attached to the thread-like leaf segments trap and digest tiny aquatic invertebrates with digestive enzymes and bacteria. When digestion is complete, the plant draws nutrient-rich water into the stem, thereby emptying and preparing the bladder's trap, resetting the trigger hairs. The humped bladderwort's flowers are yellow and irregularly formed, and the fruit is stored as seeds along a central column within a capsule-like pod. This species populates exposed shores, lakes, ponds, marshes, and

fens and can be found along the coasts of the United States and into Central America.

Photo by William S. Justice - Smithsonian Institution

Purple bladderwort (*Utricularia purpurea)* is an aquatic perennial plant. It produces small carnivorous bladders like those of the humped bladderwort, but its flowers are pink and bloom from mid-July to September. The purple bladderwort grows in still waters along the Atlantic Coastal Plain and in the Great Lakes region.

Historic Resources of Franklin Township

Historic Districts

Name	Location	Construction Date
Franklinville Lake Historic District	Eastern shore of Franklinville Lake. Includes all streets to west of Blackwood Ave.	Early 20th century. 25 older structures, some from turn of the century
Franklinville Historic District	Both sides of Delsea Dr from Macarthur Ave south to Wall St and Royal Ave, excluding Douglas and Lakeside Dr, and Rt 538 from Rt 55 to Veterans Way.	19th century. Approx. 110 structures
Malaga Historic District	Bounded by Malaga Lake and Defiance Dr on west, Malaga Branch on north, Delsea Dr on northeast, and Main St and Alrue St on east. The southern boundary runs from Defiance Dr along New St eastward across Rt 47 and across a field to Main St at intersection with Rt 40.	ca. 1850-1890
Pine Grove Camp	South side of Dutch Mill Rd.	est. 1873. Approx. 30 buildings
Porchtown Historic District	Approx. 32 structures along Porchtown Rd and Taylor Rd, from Rt 40, and along Taylor Rd toward Willow Grove Rd.	ca. 1800 thru 1900

Source: Gloucester County Cultural Resource Survey, 1987, as updated by Franklin Township Environmental Commission, 2012.

Other Historic Places

These Franklin Township buildings were documented in the *Gloucester County Cultural Resource Survey* conducted in 1986 and published in 1987, which was updated by the Franklin Environmental Commission in 2012. Missing numbers reflect structures that have been demolished or "modernized" and have lost their historic features. This list includes many but not all of the historic structures in Franklin Township.

Name	Address	Date	Style	Location, on Survey	Survey ID
	1053 A & B Willow Grove Rd	ca. 1900	Queen Anne influence	West side of Willow Grove Rd.	32
	1137 Little Mill Rd	ca.1925	Craftsman	North side of Little Mill Road, east of Broad	37
Pioppi	1185 Piney Hollow Rd	1919	Misc. Victorian		65
	121 New York Ave	ca. 1910	Bungalow, simple vernacular		36
	1215 Dutch Mill Rd	ca. 1860	Misc. vernacular/ bungalow	North side of Dutch Mill Rd west of Main Rd.	53
	1217 West Blvd	ca. 1900	Vernacular	West Blvd west of Lake Ave.	35
	1234 Delsea Dr	ca. 1925	Craftsman		62
	1327 Monroeville Rd	ca. 1915	Bungalow	North side of Rt 604 west of Willow Grove Rd.	24
	133 Taylor Rd	ca. 1900	Bungalow	North side of Taylor Rd, west of Willow Grove Rd.	25
	1371 Dutch Mill Rd	ca. 1900	Vernacular Victorian	North side of Dutch Mill Rd, west of Main Rd.	54
	143 Railroad Ave	ca. 1875	Federal Revival	West of railroad, north of Rt 538.	07
	145 Kendle Ave	ca. 1920	Bungalow	West side of Kendle Ave.	28
	1641 Marshall Mill Rd	ca. 1900	Vernacular, Victorian	1641 Marshall Mill Rd	70

Name	Address	Date	Style	Location, on Survey	Survey ID
Gaskin	1664 Hall Rd	ca. 1875	Bungalow		38
	1684 Monroeville Rd	ca. 1910	Bungalow	South side of Willow Grove Rd.	23
	1753 Delsea Dr	ca. 1910	Misc. Victorian, Bungalow	Leonard Cake Rd and Rt 47.	08/09
	1806 Flora Ave	ca. 1908	Misc.	South side of Flora Ave	68
	1854 Coles Mill Road	ca. 1920	Colonial Revival	Coles Mill Rd, south side east of Blackwoodtown Rd.	16
	1910 Delsea Dr	ca. 1889	Misc. Victorian, simple vernacular	Rt 47 across from Station Rd.	58
	1914 Harding Hwy (Rt 40)	1890	Misc. Victorian	Rt 40 at intersection w/ Madison Ave.	19
	1942 Stanton Ave	ca. 1900	Misc. Victorian	Janvier Rd, south of Grant Ave.	44
	1963 Forest Grove Rd	ca. 1910	Misc. Victorian		67
Parkin	1967 Stanton Ave	ca. 1890	Misc. Victorian		45
	2002 Monroeville Rd	ca. 1850	Early farmhouse, simple vernacular	Rt 604 west of Rt 538.	22
Rosenberg	2016 Delsea Dr	ca. 1860	Delaware Valley vernacular	Rt 47 south of Porchtown Rd.	57
	216 Delsea Dr	ca. 1910	Vernacular	East side of Rt 47, south of Malaga.	33
Zion Methodist Episcopal Church	220 Porchtown Rd	1834	Greek Revival		60

Name	Address	Date	Style	Location, on Survey	Survey ID
	253 Porchtown Rd	ca. 1850	Federal /Greek Revival	East side of Willow Grove Rd, behind Porchtown Church.	26
	2752 Delsea Dr	ca. 1900	American Four Square	Delsea Dr, to the north of Franklinville.	56
	2857 Victoria Ave	ca. 1870	Delaware Valley Vernacular		48
	3058 Main Rd	ca. 1830	Vernacular cottage	Main Rd	11
	3085 Victoria Ave	ca. 1860	Delaware Valley Vernacular	North side of Victoria Ave across from Girl Scout Camp.	63
	3125 Main Rd	ca. 1915	Misc. Victorian		20
	3366 Victoria Ave	ca. 1900	Misc. Vernacular	Piney Hollow at southwest corner of Victoria Ave.	64
	4094 Tuckahoe Road	ca. 1890	Misc. Vernacular		46
	400 Porchtown Rd	ca. 1850	Delaware Valley vernacular	Porchtown	61
	4945 Lake Rd	ca. 1915	Craftsman	Lake Ave between West Blvd and Rt 40.	14
	55 Old Marshall Mill Rd	ca. 1870	Victorian w/ Federal/ Greek influence	Old Marshall Mill Rd, northeast of Old Dutch Mill Rd.	77
	602 Dutch Mill Rd	ca. 1900	Vernacular	South side of Dutch Mill Rd	73
	638 Weymouth Rd	ca. 1850	Federal/ Greek Revival	Weymouth, east of Prospect Ave.	01
	664 Weymouth Rd	ca. 1900	Vernacular	East of Propect Ave	02
	72 Dinshah Dr	ca. 1900	Misc. Victorian	West Blvd, southeast of Malaga.	34

Name	Address	Date	Style	Location, on Survey	Survey ID
	726 Weymouth Rd	ca. 1875	Vernacular, Federal/ Greek Revival	Weymouth, east of Propect Ave.	06
	775 Reed Ave	Ca. 1915	Bungalow	West side of Reed Ave.	31
Drovin	975 Dutch Mill Rd	ca. 1900	Vernacular/ Colonial Revival Influence		49
Eastern Lift Truck Co	993 Fries Mill Rd	ca. 1930	Misc. Victorian		41
Daughters of Mercy Novitiate: Villa Rossello	Catawba Ave	ca. 1900	Greek Revival	Catawba west of south side of Main Rd.	66
Blacksmith Shop	Delsea Dr	ca. 1930	Colonial, simple vernacular	Rt 47, south of Leonard Cake Rd.	03
	Royal Rd	ca. 1890	Vernacular cottage	North side of Royal Rd, east of Willow Grove Rd.	27
Piney Hollow Methodist Church		ca. 1880	Vernacular/ Victorian	Piney Hollow	47
Peterson Farm		ca. 1890	Victorian vernacular	Southwest corner of Main Rd and Lake Rd.	15
		ca. 1910	Bungalow	East side of Reed Ave.	30
Iona Lake Hotel		ca. 1920	Craftsman	Porchtown Rd by Iona Lake.	10

Source: Gloucester County Cultural Resource Survey, 1987, as updated by Franklin Township Environmental Commission, 2012.

APPENDIX G

Known Contaminated Sites in Franklin Township

Closed Sites with Remediated Contamination

Site ID	PI Number	PI Name	Street Address	Homeowner?
394398	493445	X Catawba Avenue	Catawba Ave	Yes
222855	291070	X Certain Avenue	Certain Ave	Yes
225544	294382	X Certain Avenue	Certain Ave	Yes
166973	219528	X Coles Mill Road	Coles Mill Rd	Yes
257825	330259	X Coles Mill Road	Coles Mill Rd	Yes
87661	G000061334	X Delsea Drive	Delsea Dr	Yes
196090	257382	X Grant Avenue	Grant Ave	Yes
93145	131227	X Macarthur Avenue	Macarthur Ave	Yes
372631	461628	X N Blue Bell Road	N Blue Bell Rd	Yes
118358	155959	X New Street	New St	Yes
393294	492028	X Station Avenue	Station Ave	Yes
451778	568209	X Whitehall Road	Whitehall Rd	Yes
167860	235692	Patriot Homes	Coles Mill Rd & Swedesboro Rd	Yes
391206	489090	1566 Flora Road	1566 Flora Rd	No
189224	248632	2588 Delsea Drive	2588 Delsea Dr	No
72499	G000025152	303C Dutch Mill Road	303 Dutch Mill Rd	No
72252	G000023952	311 Federal Street	311 Federal St	No

Site ID	PI Number	PI Name	Street Address	Homeowner?
393843	492710	3111 Williamstown Road	3111 Williamstown Rd	No
401302	502166	862 Salem Avenue	862 Salem Ave	No
71327	G000012004	Ashton Hosiery Company Incorporated	Rt 555	No
8007	11321	Coastal 0913 2804	1420 Harding Hwy	No
53028	20763	Crown Glass Company Inc	261 Main Rd	No
75674	G000044935	CS Glass Incorporated	487 Delsea Dr	No
43494	5870	Cumberland Farms 2912	Harding Hwy & Delsea Dr	No
8002	11350	Delsea Regional HS Dist	242 Fries Mill Rd	No
48477	19280	Department of Public Works	Broad St	No
64027	G000008471	Franklin Burn 5	Marshall Mill Rd	No
64031	G000008569	Franklin Burn 6	Marshall Mill Rd	No
73239	G000031836	Franklin Methodist Church	1636 Coles Mill Rd	No
70976	G000004421	Franklin Township Landfill	Lake Rd	No
63778	G000004437	Franklin Township Sanitary Landfill	Pennsylvania Ave	No
64303	G000010623	Franklin Township Sanitary Landfill	Willette Ave	No
65560	G000030566	JM Computers Services Incorporated	2099 Main Rd	No
226712	295910	Kayaalp Property	Tuckahoe Rd & W Malaga Rd	No
72945	G000028924	Mays Landing Transportation	1586 Harding Hwy	No
31946	G000013832	NER Data Products Incorporated	1080 Grant Ave	No

Site ID	PI Number	PI Name	Street Address	Homeowner?
60019	G000008482	NER Data Products Incorporated	412 Delsea Dr	No
22466	13704	Publication Distribution Service	1571 N Main Rd	No
75438	G000043940	Riggins Transport MVA	Rt 55	No
54683	24185	Seaboard Warehouses Inc	177 Malaga Park Dr	No
54587	23989	South Jersey Airstream	Delsea Dr & Leonard Cake Rd	No
181355	22681	St Marys R C Church	256 Dutch Mill Rd	No
70960	G000002916	Tablicaps Incorporated	Blackwoodtown Rd	No
372619	461610	TAC Hauling LLC	2962 Delsea Dr	No
46007	5888	Wawa Food Market #444	Delsea Dr & Iona Lake Rd	No

Source: NJDEP, 2012

APPENDIX H

Monitoring Schedules for Public Community Water Supply Wells

Monitoring Schedule for HOLLY GREEN CAMPGROUND (NJ0805433)

Routine Total Coliform Bacteria Schedules

Schedule Start Date	Schedule End Date	Required Months to Sample In	Sampling Requirements
08/01/2010	Continuous	1/1--12/31	2 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
DS	LEAD AND COPPER	01/01/2006	Continuous	6/1--9/30	2011	5 Sample(s)/Every 3 years
WL001001	INORGANICS	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
WL001001	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/6 year period
WL001001	SECONDARY	01/01/2005	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
WL001001	VOCS FEDERAL	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
WL001001	VOCS STATE	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years

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
WL001001	NITRATE	01/01/2007	Continuous	4/1--6/30	2011	1 Routine Sample(s)/Year

Printed: Wed Aug 31 12:48:51 EDT 2011

Monitoring Schedule for IONA TRAILER PARK (NJ0805001)

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	1 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		2011	Disinfection Byproducts (Stage 1) 1 MAX RESIDENCE TIME SAMPLE(S) COLLECTED ANNUALLY BETWEEN 7/1--9/30 (SAMPLE POINT ID: DBPMAX)
DS	LEAD AND COPPER	01/01/2004	Continuous	6/1--9/30	2012	5 Sample(s)/Every 3 years
TP001002	INORGANICS	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/6 year period
TP001002	SECONDARY	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	VOCS FEDERAL	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	VOCS STATE	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years

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
TP001002	NITRATE	01/01/2003	Continuous	1/1-12/31	2011	1 Routine Sample(s)/Year

Printed: Wed Aug 31 12:55:51 EDT 2011

Monitoring Schedule for MALAGA MOBILE HOME PARK (NJ0805002)

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	1 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		2011	Disinfection Byproducts (Stage 1) 1 MAX RESIDENCE TIME SAMPLE(S) COLLECTED ANNUALLY BETWEEN 7/1--9/30 (SAMPLE POINT ID: DBPMAX)
DS	LEAD AND COPPER	01/01/2007	Continuous	6/1--9/30	2012	5 Sample(s)/Every 3 years
TP001002	INORGANICS	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/6 year period
TP001002	SECONDARY	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	VOCS FEDERAL	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001002	VOCS STATE	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years

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
TP001002	NITRATE	01/01/2003	Continuous	1/1-12/31	2011	1 Routine Sample(s)/Year

Printed: Wed Aug 31 12:57:55 EDT 2011

Monitoring Schedule for MALAGA VILLA APARTMENTS (NJ0805003)

Routine Total Coliform Bacteria Schedules

Schedule Start Date	Schedule End Date	Required Months to Sample In	Sampling Requirements
08/01/2005	Continuous	1/1--12/31	1 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
DS	LEAD AND COPPER	01/01/2007	Continuous	6/1--9/30	2011	5 Sample(s)/Year
TP001003	INORGANICS	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001003	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/6 year period
TP001003	SECONDARY	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001003	VOCS FEDERAL	01/01/2012	Continuous	7/1--9/30	2011	1 Sample(s)/Year
TP001003	VOCS STATE	01/01/2012	Continuous	7/1--9/30	2011	1 Sample(s)/Year

Individual Contaminant Schedules

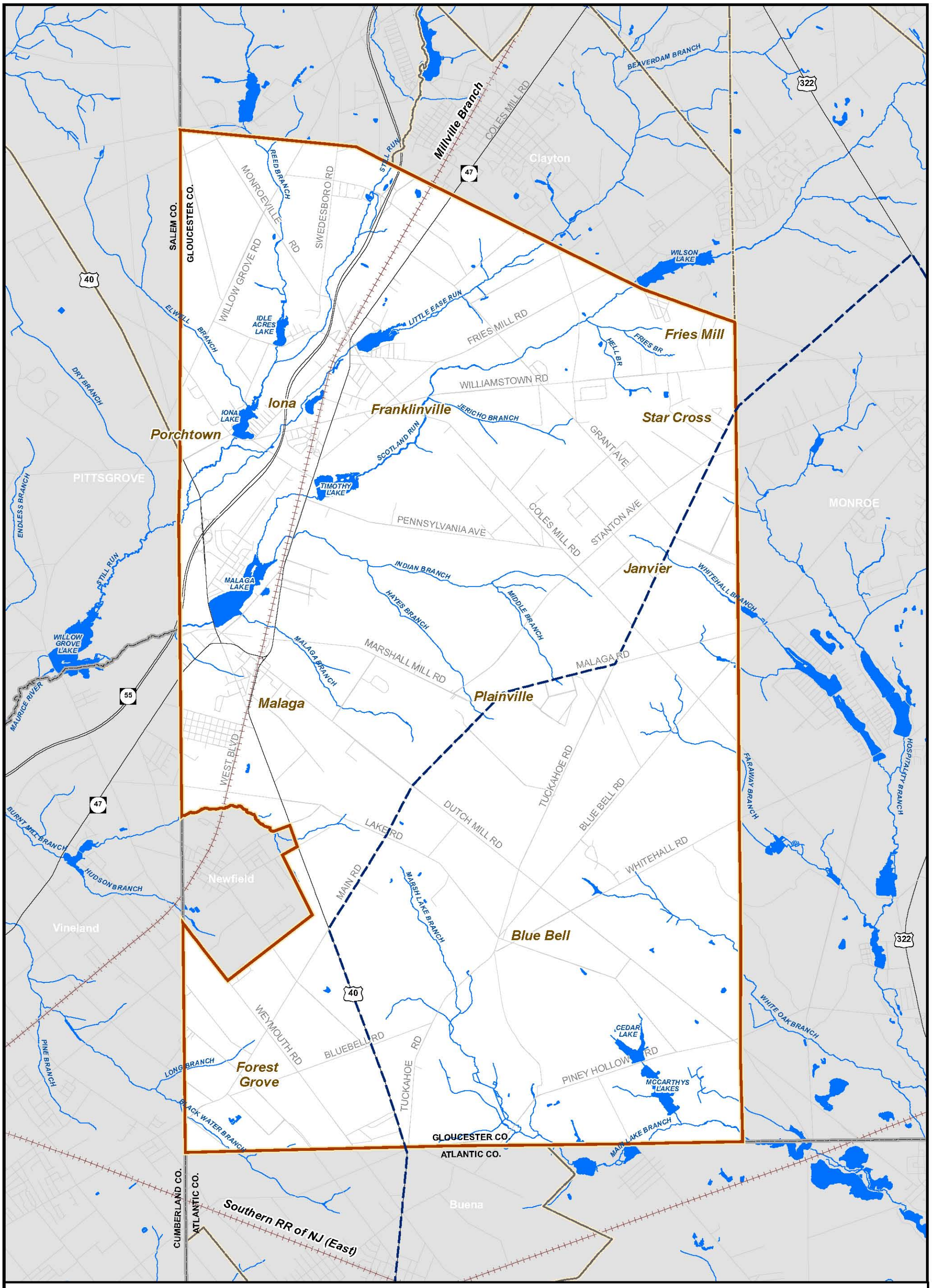
Sample Point ID	Analyte Name	Schedule Start Date	Schedule End Date	Required Months to Sample In	Required Year to Sample In	Sampling Requirements
TP001003	NITRATE	04/01/2010	Continuous	10/1--12/31	2011	1 Routine Sample(s)/Year

Printed: Wed Aug 31 12:58:36 EDT 2011

APPENDIX I

Maps

- **Map 1: Places in Franklin Township**
- **Map 2: Aerial Photo (2010)**
- **Map 3: NJDEP Land Cover (2007)**
- **Map 4: Developed Land, 2002 to 2007**
- **Map 5: DVRPC Land Use (2005)**
- **Map 6: Elevation**
- **Map 7: Soils**
- **Map 8: Agricultural Quality of Soils**
- **Map 9: Wetlands, Dams, and Vernal Pools**
- **Map 10: Floodplains (2010)**
- **Map 11: Watersheds**
- **Map 12: Surface Water Quality (2010)**
- **Map 13: Surface Geology**
- **Map 14: Groundwater Recharge**
- **Map 15: Public Water Supply Wells**
- **Map 16: Groundwater Risk (1996-2011)**
- **Map 17: Natural Vegetation (2007)**
- **Map 18: Landscape Project Priority Habitats (2012)**
- **Map 19: Historic Resources**
- **Map 20: Existing Open Space**
- **Map 21: Conservation Areas**
- **Map 22: Known Contaminated Sites (2009)**



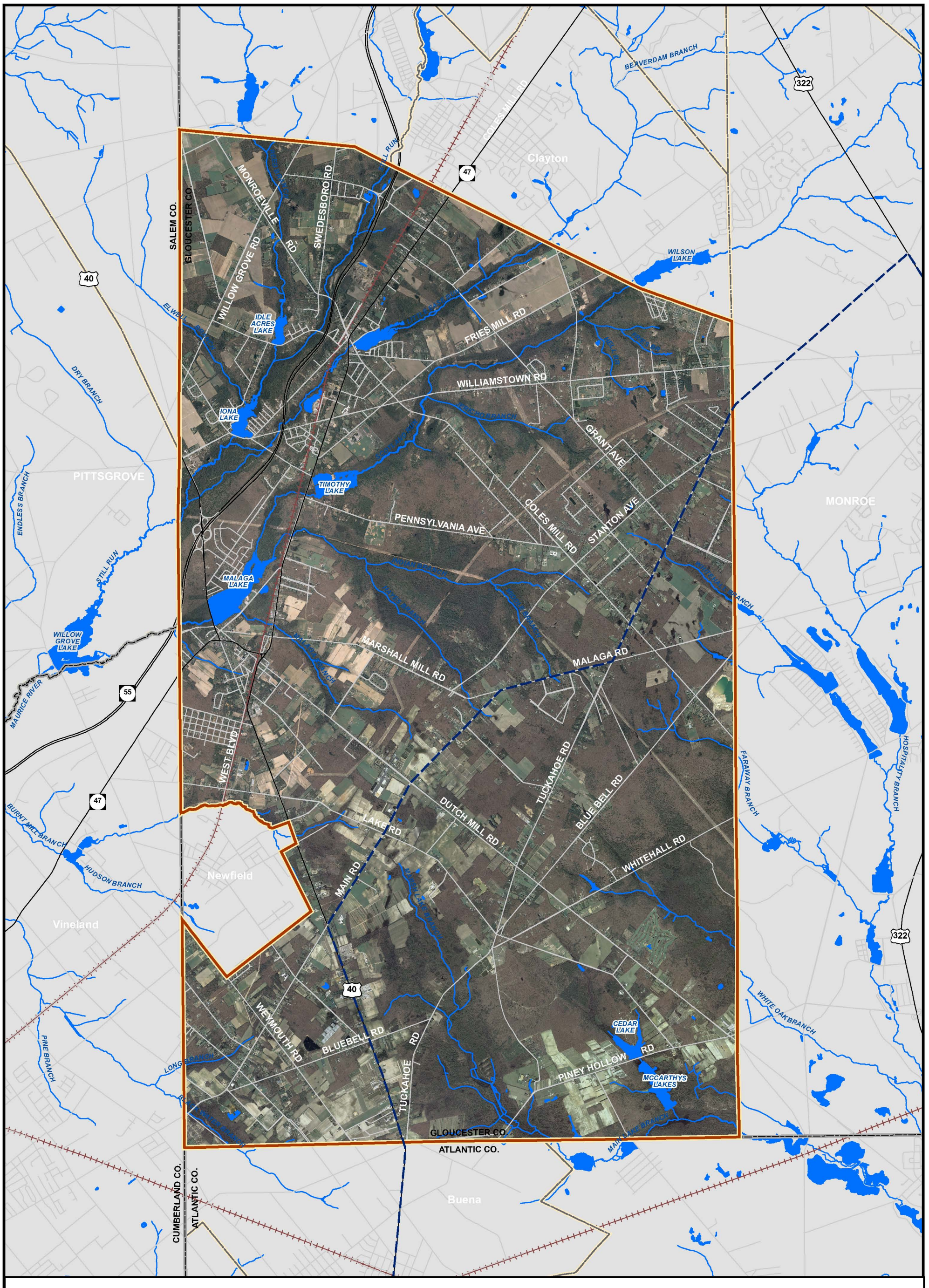
Source : NJDEP,NJDOT,DVRPC, FEMA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

0 1 2
Miles

Map 1: Places in Franklin Township

Pinelands Boundary
Franklin
Municipality
Stream
County
Railroad

dvrpc



Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

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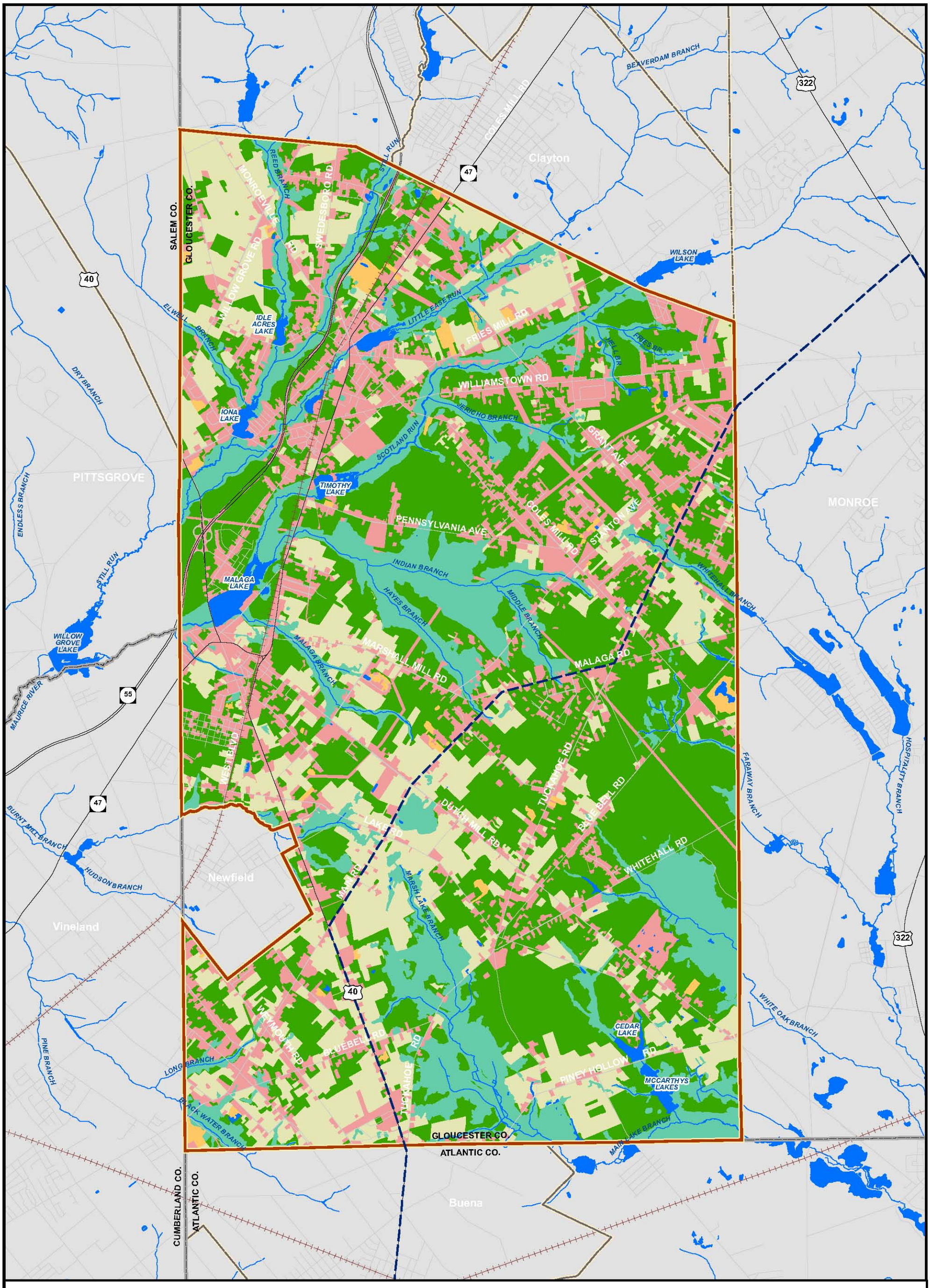
Map 2: Aerial Photo (2010)

Pinelands Boundary

dvrpc



Map 3: NJDEP Land Cover (2007)

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

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- Agriculture
- Barren Land
- Forest
- Developed
- Water
- Wetlands
- Pinelands Boundary

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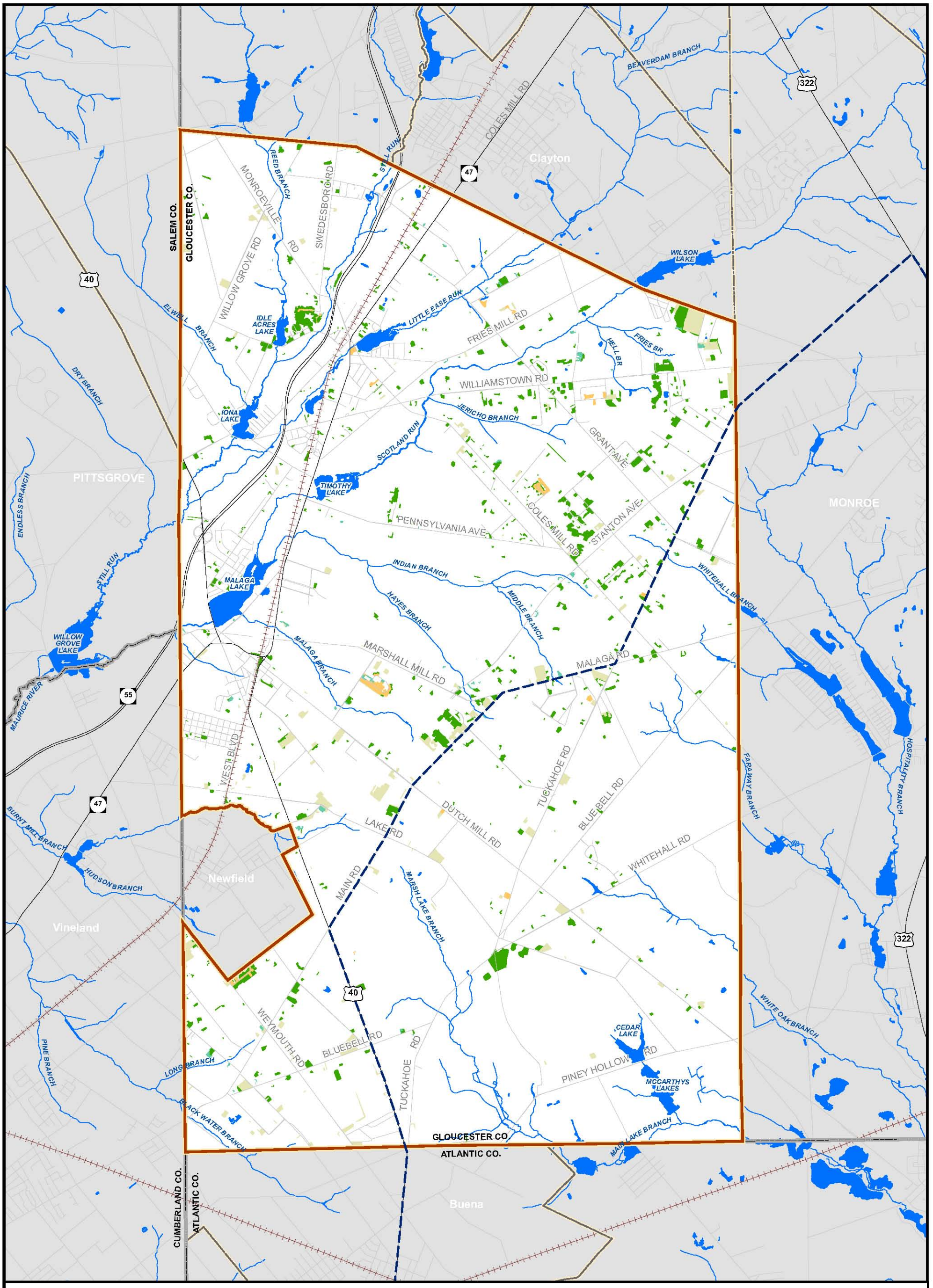

Source : NJDEP,NJDOT,DVRPC, FEMA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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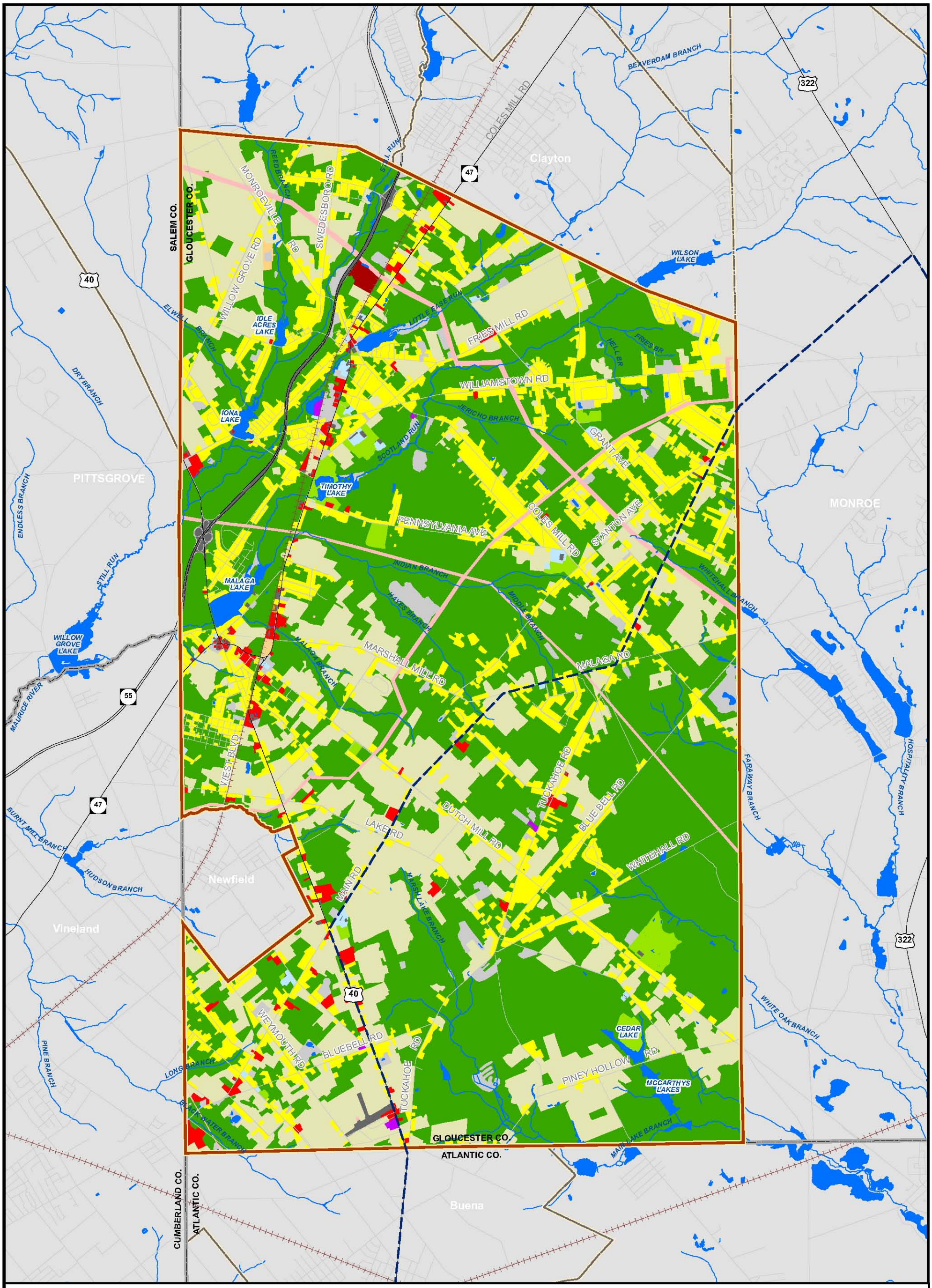
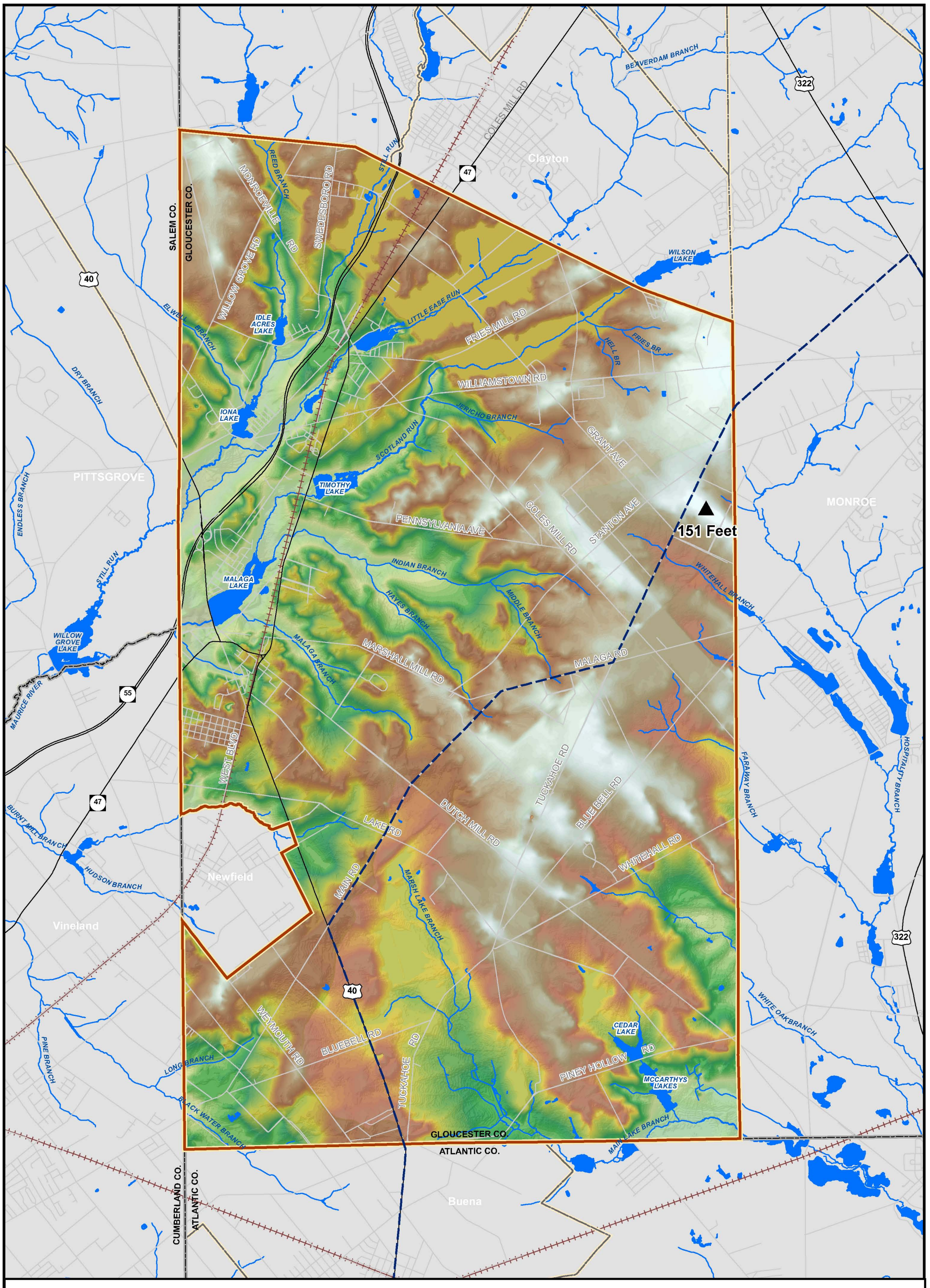
Land Type in 2002 of Currently Developed Land

- Agriculture
- Barren Land
- Forest
- Wetlands
- Pinelands Boundary

Map 4: Developed Land, 2002 to 2007

dvrpc


Clayton
PITTSGROVE
Newfield
Vineland
Buena
MONROE
SALEM CO.
GLOUCESTER CO.
CUMBERLAND CO.
ATLANTIC CO.
ATLANTIC CO.
GLOUCESTER CO.
COLES MILL RD
BEAVERDAM BRANCH
STILL RUN
REED BRANCH
MONROEVILLE RD
SWEDESBORO RD
WILLOW GROVE RD
ELWELL BRANCH
IDLE ACRES LAKE
LITTLE EASE RUN
FRIES MILL RD
WILSON LAKE
HELL BR
FRIES BR
WILLIAMSTOWN RD
JERICHO BRANCH
SCOTLAND RUN
GRANT AVE
IONA LAKE
TIMOTHY LAKE
PENNSYLVANIA AVE
STANTON AVE
INDIAN BRANCH
MALAGA LAKE
HAYES BRANCH
MIDDLE BRANCH
WHITEHALL BRANCH
MARSHALL MILL RD
MALAGA BRANCH
MALAGA RD
WILLOW GROVE LAKE
MAURICE RIVER
WEST BLVD
TUCKAHOE RD
DUTCH MILL RD
BLUE BELL RD
LAKE RD
WHITEHALL RD
FARAWAY BRANCH
HOSPITALITY BRANCH
MAIN RD
MARSH LAKE BRANCH
BURNT MILL BRANCH
HUDSON BRANCH
ENDLESS BRANCH
STILL RUN
PINE BRANCH
LONG BRANCH
BLACK WATER BRANCH
WEYMOUTH RD
BLUEBELL RD
TUCKAHOE RD
CEDAR LAKE
PINEY HOLLOW RD
MCCARTHYS LAKES
WHITE OAK BRANCH
MAIN LAKE BRANCH
DRY BRANCH
40
47
55
322
Source : NJDEP,NJDOT,DVRPC, FEMA.
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.
0
1
2
Miles
Pinelands Boundary
Agriculture
Commercial
Community
Light Manufacturing
Mining
Mobile Home
Multi Family
Transportation/Parking
Recreation
Single Family
Utility
Vacant
Water
Wooded
Map 5: DVRPC Land Use (2005)
dvrpc



Source : NJDEP,NJDOT,DVRPC, FEMA. 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.

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Value (Feet above sea level)

High : 151

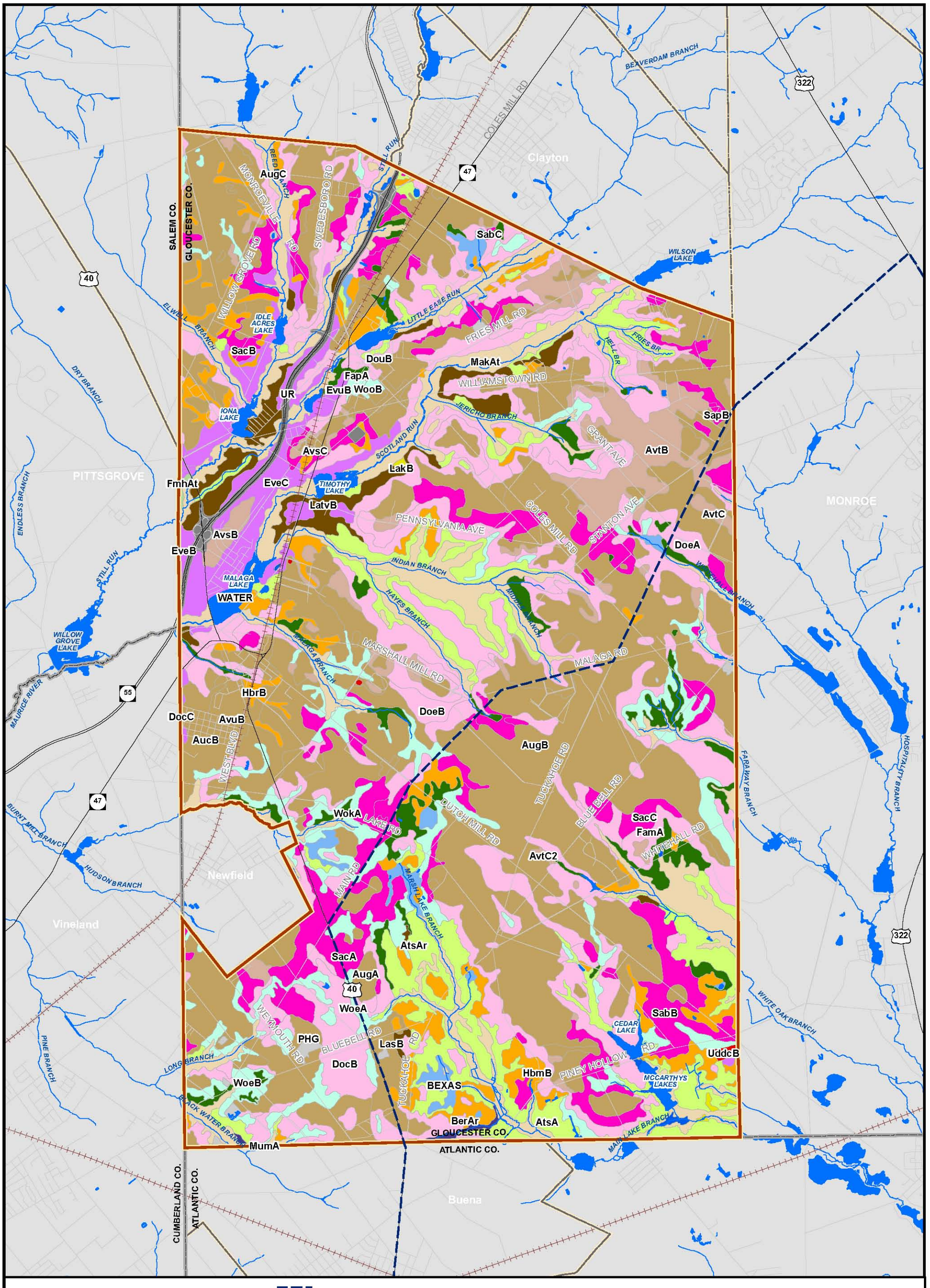
Low : 75

▲ High Elevation

Pinelands Boundary

Map 6: Elevation

dvrpc



Source : NJDEP,NJDOT,DVRPC, FEMA. 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.

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Miles

Pinelands Boundary

Soils

- Atsion
- Aura
- Aura-Sassafras
- Berryland and Mullica
- Berryland
- Downer
- Evesboro
- Fallsington
- Fluvaquents
- Hammonton
- Lakehurst
- Lakewood
- Manahawkin
- Mullica
- Pits, sand and gravel
- Sassafras
- Udorthents
- Urban land
- Water
- Woodstown

Map 7: Soils

dvrpc

Map 8: Agricultural Quality of Soils

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Not Rated for Agricultural Use
- Pinelands Boundary

dvrpc

Map 9: Wetlands, Dams, and Vernal Pools

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

- Dam
- Vernal Pool Location
- Potential Vernal Pool
- Agricultural Wetlands
- Wetlands
- Pinelands Boundary

dvrpc

Map 10: Floodplains (2010)

Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain
- Pinelands Boundary

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

dvrpc

Map 11: Watersheds

Still Run/
Little Ease Run

Scotland Run

Great Egg Harbor

Maurice River

02040206150010
02040206120030
02040206120010
02040206120040
02040206150020
02040206120020
02040206130010
02040206120050
02040302030050
02040206130020
02040206140030
02040302040010
02040206130030
02040206140010
02040302040020
02040206130040
02040206140020
02040302040030
02040206140050
02040302040040
02040206140040
02040302040050
02040206140060
02040206140070
02040206180020
02040302040070

Clayton
MONROE
Newfield
Vineland
Buena
PITTSGROVE

SALEM CO.
GLOUCESTER CO.
GLOUCESTER CO.
ATLANTIC CO.
CUMBERLAND CO.
ATLANTIC CO.

BEAVERDAM BRANCH
STILL RUN
COLES MILL RD
MONROEVILLE RD
REED BRANCH
SWEDESBORO RD
WILLOW GROVE RD
ELWELL BRANCH
DRY BRANCH
IDLE ACRES LAKE
IONA LAKE
WILSON LAKE
LITTLE EASE RUN
FRIES MILL RD
HELL BR
FRIES BR
WILLIAMSTOWN RD
JERICHO BRANCH
SCOTLAND RUN
GRANT AVE
TIMOTHY LAKE
ENDLESS BRANCH
PENNSYLVANIA AVE
INDIAN BRANCH
HAYES BRANCH
MIDDLE BRANCH
MALAGA LAKE
MALAGA BRANCH
MARSHALL MILL RD
MALAGA RD
WILLOW GROVE LAKE
MAURICE RIVER
WHITEHALL BRANCH
STANTON AVE
BURNT MILL BRANCH
HUDSON BRANCH
DUTCH MILL RD
LAKE RD
MAIN RD
MARSH LAKE BRANCH
BLUE BELL RD
WHITEHALL RD
FARAWAY BRANCH
HOSPITALITY BRANCH
WHITE OAK BRANCH
PINE BRANCH
LONG BRANCH
BLACK WATER BRANCH
BLUEBELL RD
TUCKAHOE RD
PINEY HOLLOW RD
CEDAR LAKE
MCCARTHYS LAKES
MAIN LAKE BRANCH
WEST RIVER

322
47
40
55

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

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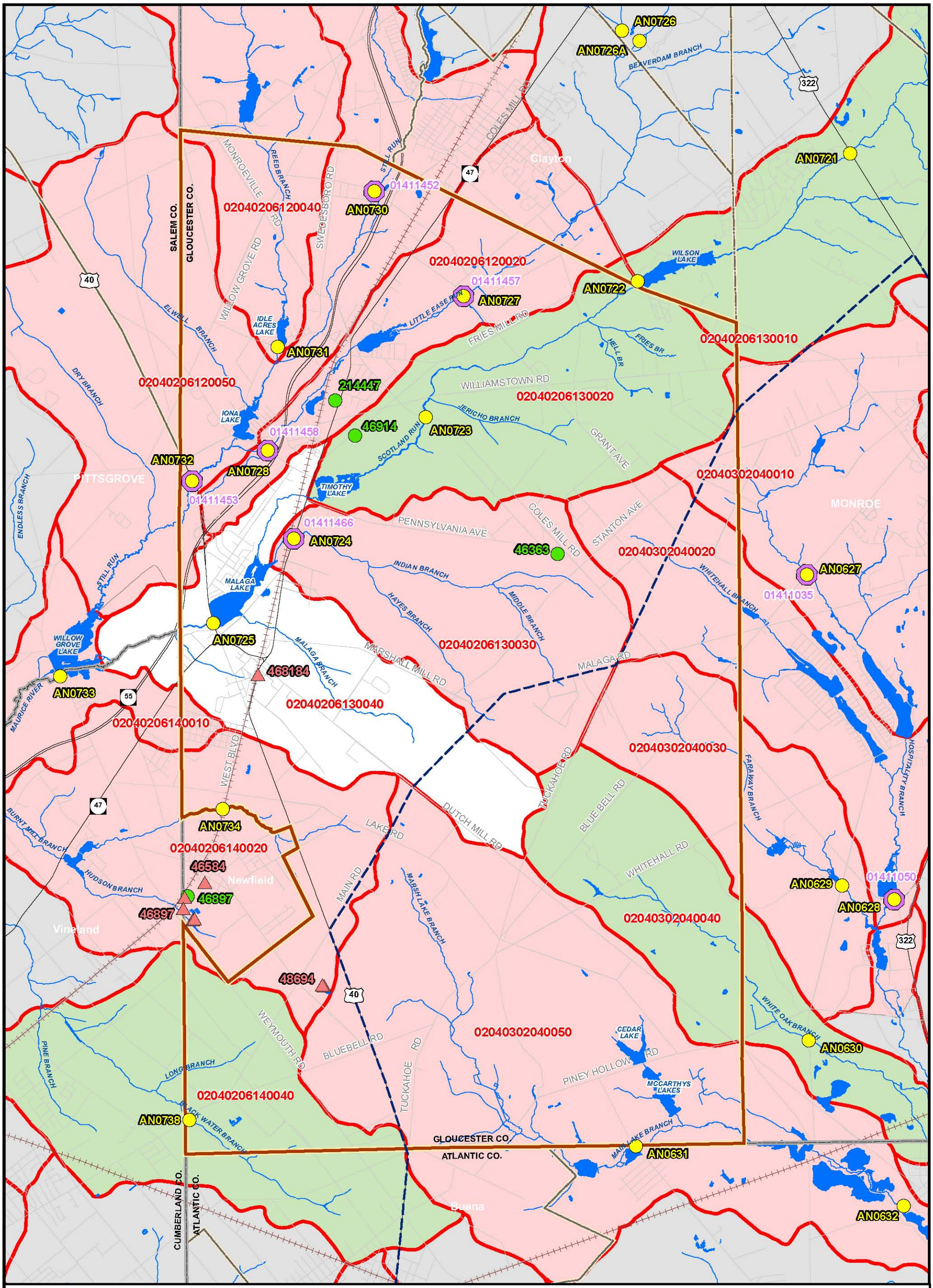
Miles

Pinelands Boundary
Franklin
HUC 11 Watershed
HUC 14 Subwatershed

Maurice River
- 02040206140, Maurice River (above Sherman Ave Bridge)
- 02040206120, Still Run / Little Ease Run
- 02040206130, Scotland Run

Great Egg Harbor River
- 02040302040, Great Egg Harbor R (Lk Lenape to HospBr)

dvrpc



Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

2010 Integrated Water Quality Report
General Aquatic

- Fully Supporting
- Insufficient Information
- Not Supporting

- NJPDES Permit for Discharge to Ground Water (2007)
- NJPDES Permit for Discharge to Surface Water (2009)
- NJDEP Ambient Biomonitoring Network (AMNET) Sampling Site
- USGS Surface Water Quality Guage (2009)

- Pinelands Boundary
- Subwatershed Boundary (HUC 14)

Map 12: Surface Water Quality

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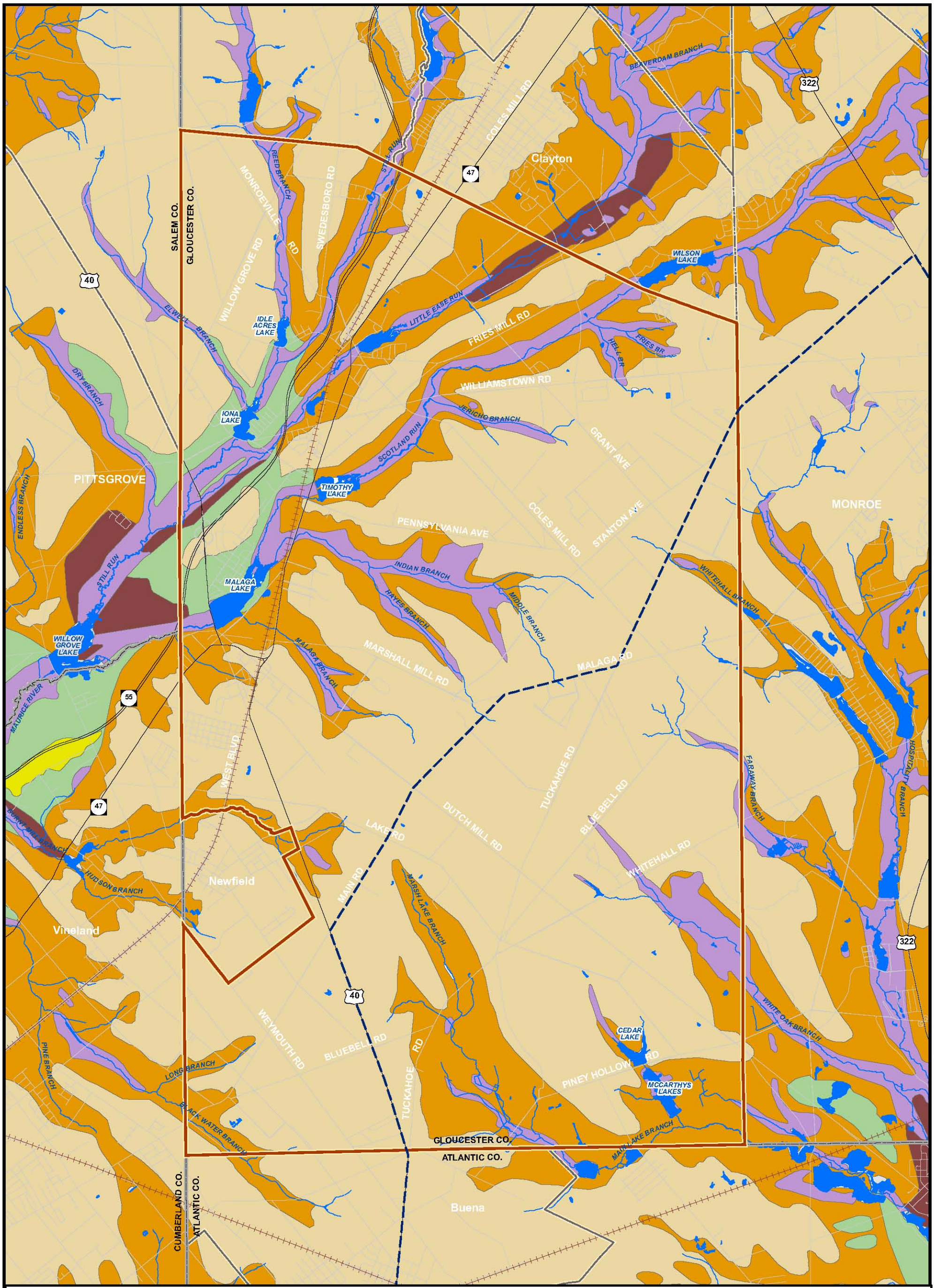

Source : NJDEP,NJDOT,DVRPC, FEMA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

0 1 2
Miles

- Bridgeton Formation
- Eolian Deposits
- Lower Stream Terrace Deposits
- Swamp and Marsh Deposits
- Upper Stream Terrace Deposits
- Weathered Coastal Plain Formations

Pinelands Boundary

Map 13: Surface Geology

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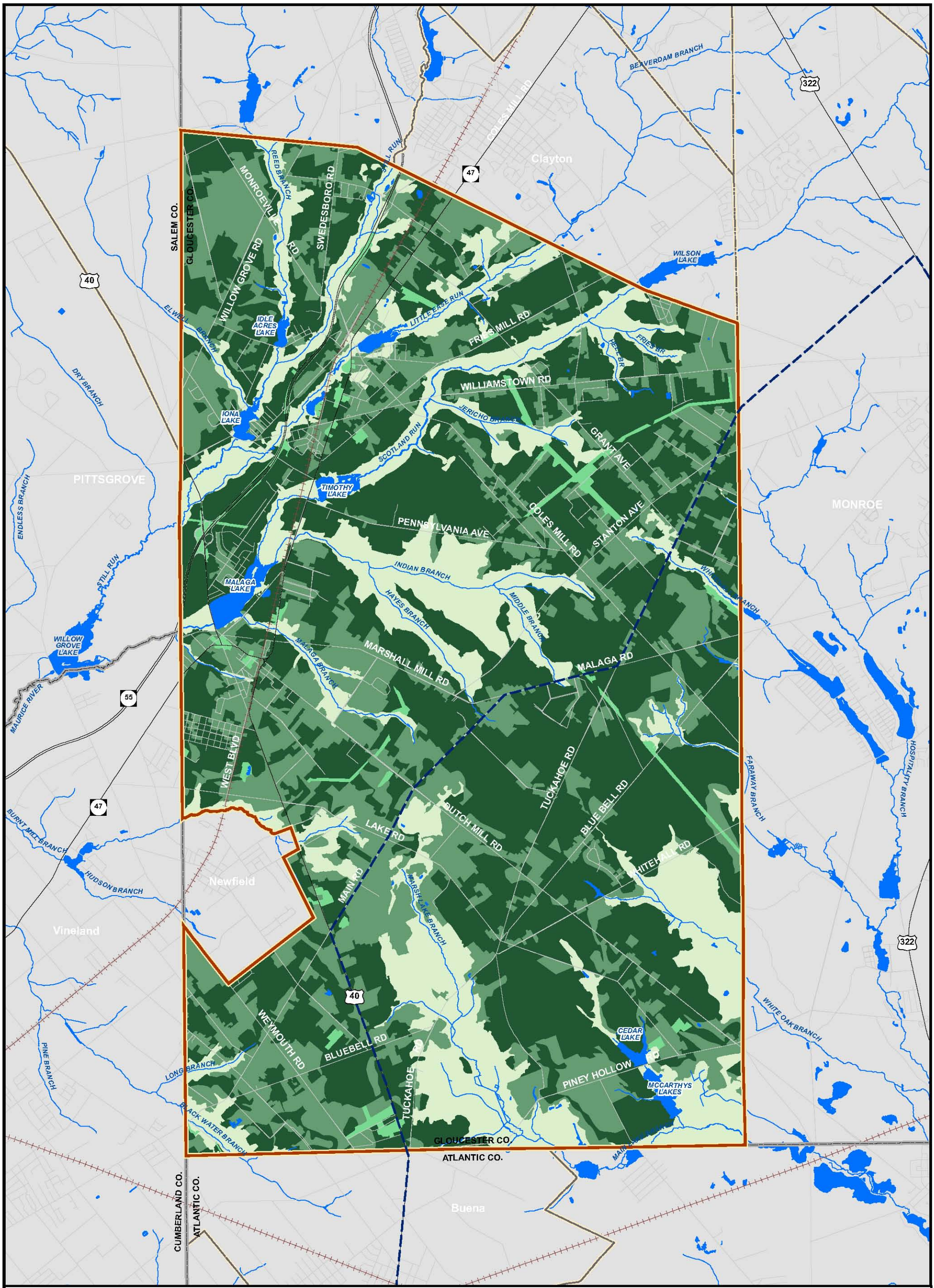

Source : NJDEP,NJDOT,DVRPC, FEMA. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Inches per Year

- 0 - 1
- 2 - 6
- 7 - 10
- 11 - 14

Pinelands Boundary

Map 14: Groundwater Recharge

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Map 15: Public Water Supply Wells

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

Wellhead Protection Areas

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

- Public Non-Community Well
- Community Well
- Pinelands Boundary

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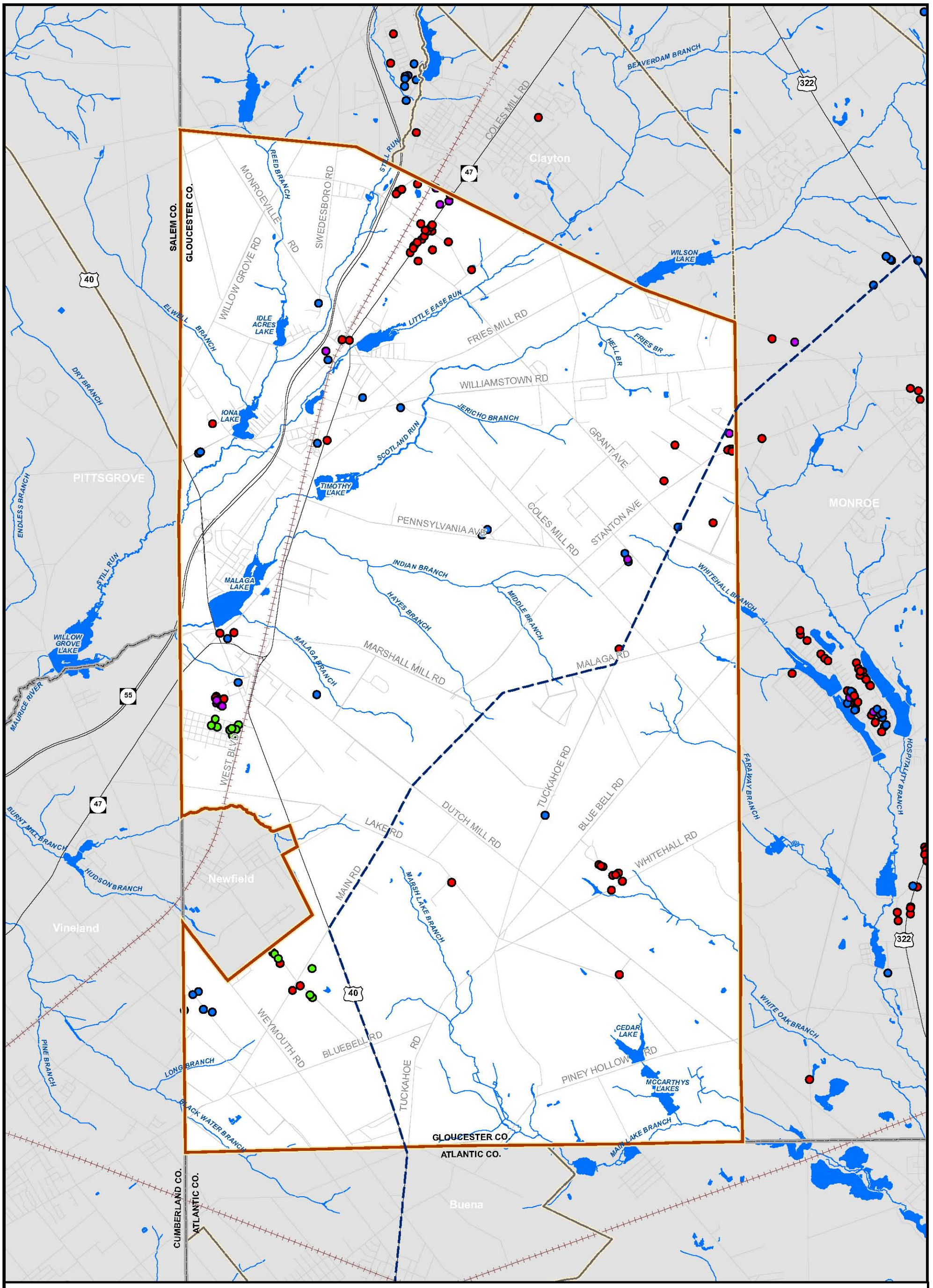

Sources: NJDEP, NJDOT, DVRPC, FEMA, Gloucester County Health Department. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

0 1 2
Miles

Parameter

- Mercury
- Mercury and VOC
- VOC
- Nitrate

Pinelands Boundary

Map 16: Groundwater Risk (1996-2011)

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Map 17: Natural Vegetation (2007)

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

Pinelands Boundary

Vegetation

- Brush/Shrubland
- Brush/Shrubland - Oldfield
- Upland Forest - Coniferous
- Upland Forest - Mixed (Con. Dom.)
- Upland Forest - Deciduous
- Upland Forest - Mixed (Decid. Dom.)
- Water
- Wetlands - Modified
- Wetlands - Scrub/Shrub
- Wetlands - Herbaceous
- Wetlands - Phragmites Dominated
- Wetlands - Wooded - Deciduous
- Wetlands - Wooded Mixed (Decid. Dom.)
- Wetlands - Wooded - Coniferous
- Wetlands - Wooded - Atlantic White Cedar
- Wetlands - Wooded Mixed (Con. Dom.)
- All other land cover

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Map 18: Landscape Project Priority Habitats (2012)

Source : NJDEP,NJDOT,DVRPC, FEMA.
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.

0 1 2
Miles

Habitat Patches

- Rank 1: Meet species-specific requirements such as minimum core size or are criteria for endangered, threatened or special wildlife.
- Rank 2: Species-specific patches w/ one or more occurances of species considered to be of special concern.
- Rank 3: Species-specific patches containing one or more occurences of State threatened species.
- Rank 4: Species-specific patches w/ one or more occurrences of State endangered species.

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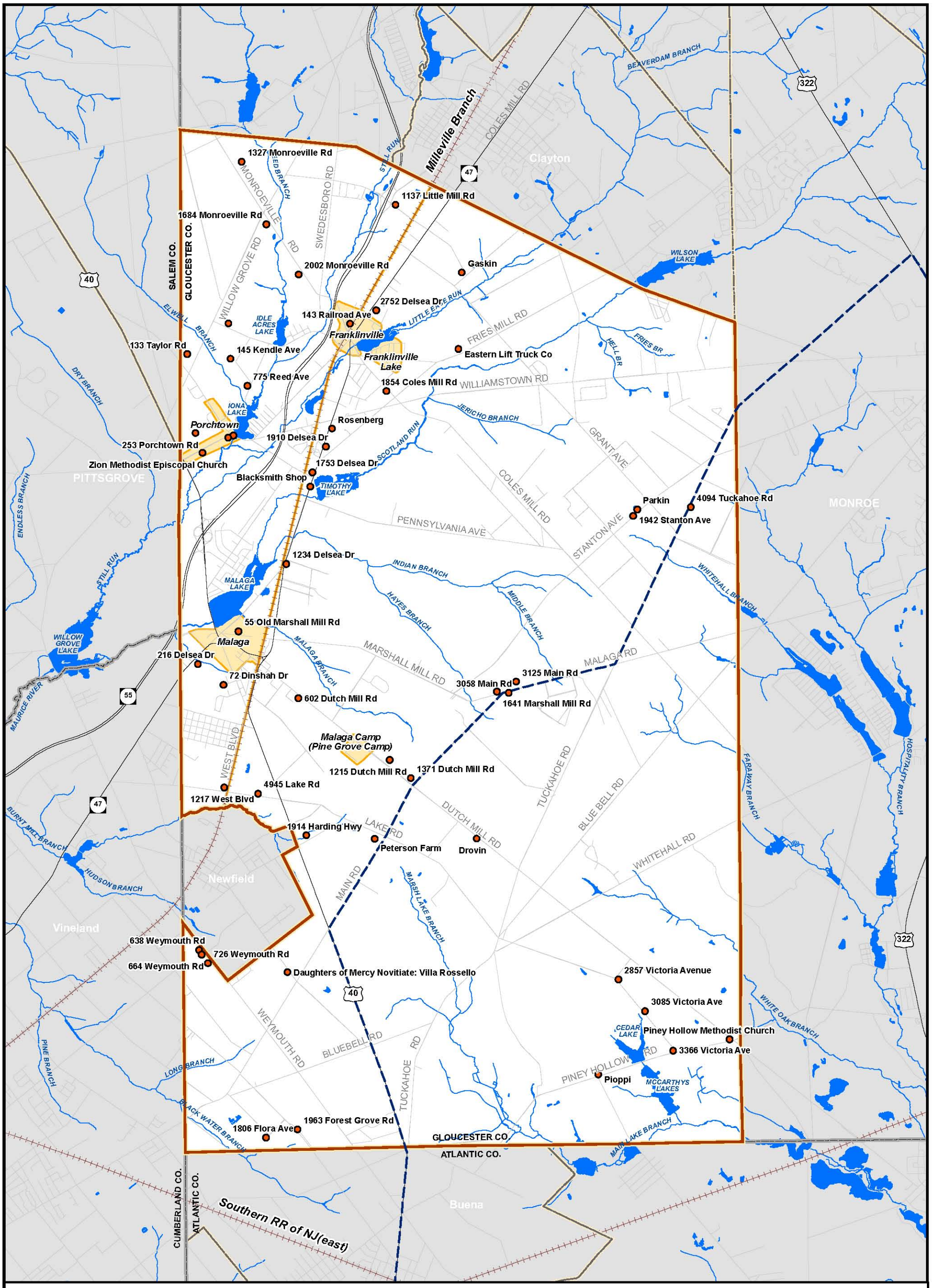

Source : NJDEP, NJDOT, DVRPC, FEMA, NJ State Historic Preservation Office. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

0 1 2
Miles

Historic Structure

Pinelands Boundary

Historic District

Map 19: Historic Resources

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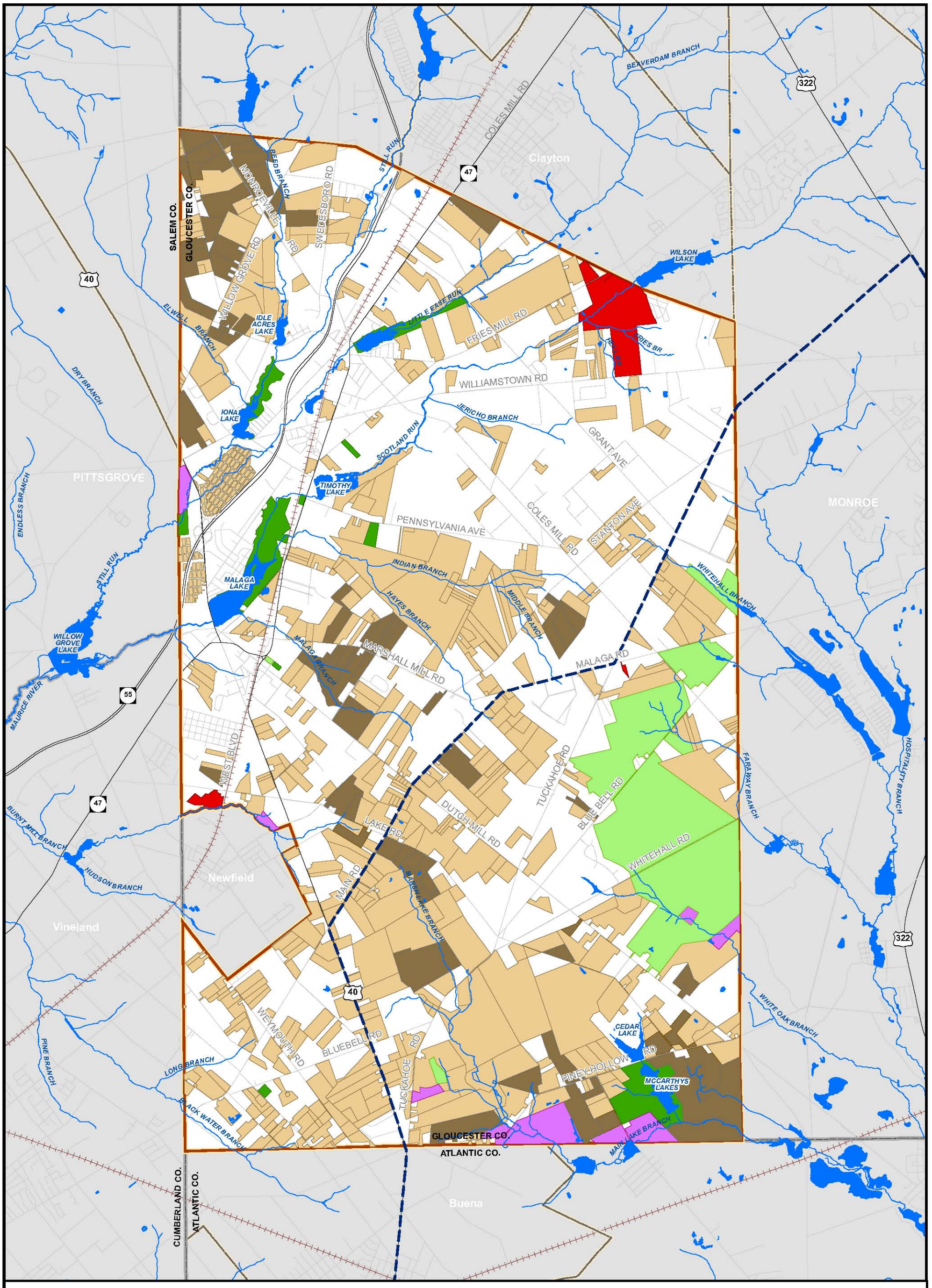

Source : NJDEP,NJDOT,DVRPC, FEMA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

0 1 2
Miles

Preserved Open Space

- County
- Municipal
- Nonprofit
- Preserved Farmland
- State
- Farmland Assessed (Unpreserved)
- Pinelands Boundary

Map 20: Existing Open Space

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Map 21: Conservation Areas

Source : NJDEP, NJDOT, DVRPC, FEMA, NJ Audubon Society
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0 1 2
Miles

- Southern Pine Barrens Macrosite Important Bird Area
- White Oak Branch WMA
- Atlantic White Cedar Wetlands
- Piney Hollow Natural Area
- Unexpected Wildlife Refuge
- Scotland Run Park
- Natural Heritage Priority Site
- Pinelands Boundary

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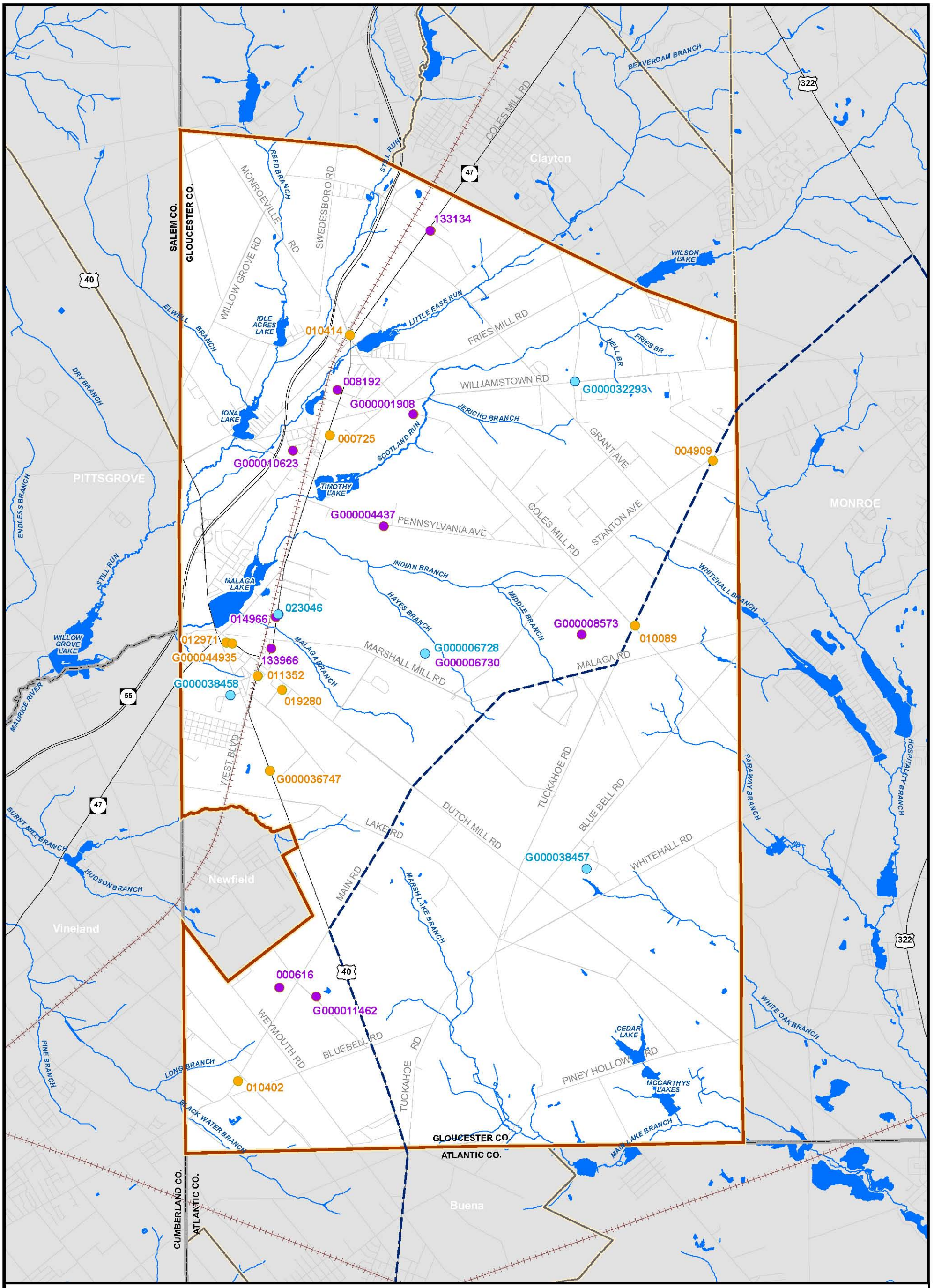

Source : NJDEP,NJDOT,DVRPC, FEMA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Map 22: Known Contaminated Sites (2009)

- Pinelands Boundary
- 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

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Abstract

This publication documents the natural and community resources of Franklin Township, Gloucester 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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