

# ENVIRONMENTAL RESOURCE INVENTORY

for the TOWNSHIP of

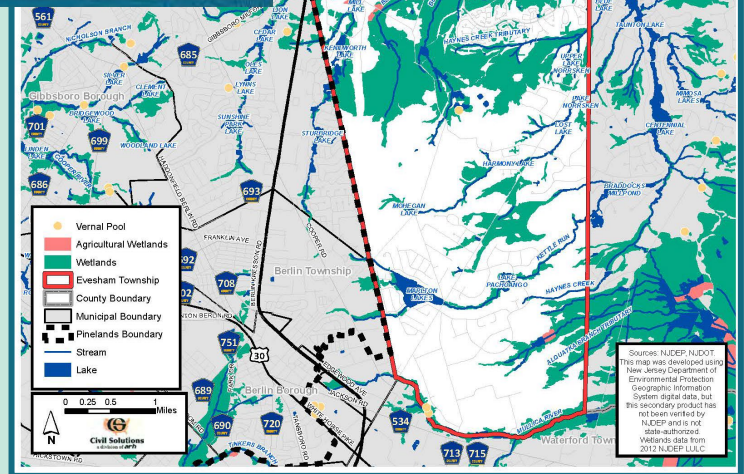
## EVESHAM

BURLINGTON COUNTY, NEW JERSEY



Originally prepared by:  
**Delaware Valley Regional  
Planning Commission  
(DVRPC) – 2009**

with:  
**The Environmental  
Commission of Evesham**



**2018**





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.

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*Cover Photo: Courtesy of John Volpa*

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## Acronyms

Acronym	Description		Acronym	Description
AMNET	Ambient Biomonitoring Network		NJDEP	New Jersey Department of Environmental Protection
ANJEC	Association of New Jersey Environmental Commissions		NJDOT	New Jersey Department of Transportation
AQI	Air Quality Index		NJPDES	New Jersey Pollution Discharge Elimination System
ASMN	Ambient Stream Monitoring Network		NPL	National Priorities List
BMPs	Best Management Practices		NR	National Register of Historic Places
CAA	Clean Air Act		NRCS	Natural Resources Conservation Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act		OPRA	Open Public Records Act
CLG	Certified Local Government		PCBs	polychlorinated biphenyls
CMP	Pinelands Comprehensive Management Plan		PCE	tetrachloroethylene
CREP	Conservation Reserve Enhancement Program		PDC	Pinelands Development Credit Program
CRP	Conservation Reserve Program		PMI	Pinelands Macrobiotic Index
DVRPC	Delaware Valley Regional Planning Commission		PNR	Pinelands National Reserve
EIS	Environmental Impact Statement		Ppb	Parts per billion
EMUA	Evesham Municipal Utilities Authority		PRM	Potomac-Raritan-Magothy aquifer
EPA	U.S. Environmental Protection Agency		PRP	primary responsible party
EQIP	Environmental Quality Incentive Program		PUD	Planned Unit Developments
FEMA	Federal Emergency Management Agency		PWTA	Private Well Testing Act
FSA	Farm Service Agency (within U.S. Department of Agriculture)		SHPO	State Historic Preservation Office
GIS	Geographic Information Systems		TCE	trichloroethylene
HUC	Hydrologic Unit Code		TMDL	Total Maximum Daily Load
LEED	Leadership in Energy and Environmental Design		UNESCO	United Nations Educational, Scientific, and Cultural Organization
MCL	Maximum Contaminant Level		USDA	U.S. Department of Agriculture
mgd	million gallons per day		USGS	U.S. Geological Survey
MOA	Memorandum of Agreement		UST	Underground Storage Tank
MS4	Municipal Separate Stormwater Sewer System		VOCs	Volatile Organic Compound
N.J.A.C.	New Jersey Administrative Code		WMA	Watershed Management Areas
NAAQS	National Ambient Air Quality Standards			

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*Courtesy of John Volpa*

*Lake in Evesham*

## INTRODUCTION

The purpose of an Environmental Resource Inventory is to identify and describe the natural resources of a community. A community's natural resources – its soil, water, air, forests, fields, and waterways – are fundamental to its character. They are the foundation for its economic success and its quality of life. 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.

Natural resources have long shaped the lives of Evesham's residents. Long before European settlement, the area's streams and fertile soils attracted Lenape Native Americans to Burlington County. European settlers also took advantage of the high-quality agricultural soils in the northern part of the township and also began damming the local streams to build grist mills and saw mills.

One of Evesham's special features is that approximately three-quarters of the township's area falls within the Pinelands, a sensitive ecological region on New Jersey's outer coastal plain. The Pinelands region is one of the last remaining large tracts of forest land on the entire East Coast, and is home to multiple endangered species. The area has sandy, acidic soils, which cover the Kirkwood-Cohansey aquifer, one of the world's largest underground aquifers.

As development and redevelopment continue in Evesham Township and throughout Burlington County, documentation of Evesham Township's natural resources enables the Township to better manage and ensure the availability of resources to support future residents. Resources such as surface and ground water will become increasingly important to the residents of the township and neighboring communities. Evesham Township's water, wetlands, forests, and grasslands provide significant habitat for a wide variety of plants and animals. The quality of these areas is important in maintaining the health and vitality of the township. With a detailed knowledge of these resources, Evesham Township's citizens will be able to balance growth with conservation, while maintaining and shaping their community's identity and the sense of place it provides.

Preparing an Environmental Resource Inventory requires gathering all the existing information that can be found about the municipality's natural resources, and presenting it in a form that is useful to a broad audience. The inventory reflects a particular moment in time, will be updated as new data becomes available. This document was initially prepared in 2009 and has been updated in 2018.

Various documents, reports, maps and data were utilized in preparing the *Environmental Resource Inventory for Evesham Township*. These reports, sources for maps and data relating to natural resources and a number of reference works are listed at the end of this document.

Information from maps and data relating to natural resources that is specific to Evesham Township has been included whenever it was available. Information from other reports about specific sites has also been incorporated, along with data provided by township and county staffs. The Environmental Resource Inventory has been reviewed and corrected by members of



the Environmental Commission and other township officials.

Somewhat lengthy introductions to some topics, especially surface water monitoring and groundwater, have been included in the ERI to give readers background on these complex topics. Hopefully, that background will also assist the Environmental Commission and other township officials to obtain additional data from state sources in the future and to determine the types of investigations that still need to be conducted.



*Courtesy of John Volpa*

*A Bog in Evesham*

## BRIEF HISTORY



**Figure 1: Original Evesham Township**

Seven townships were created from the land area occupied by the original Evesham Township

*Source: Evesham Township*

### Early Settlement

Before European settlers arrived in the Delaware Valley, American Indians populated the area now known as Burlington County. Recent archaeological findings show that humans have been present in the region for 8,000-10,000 years. The Lenape Indians, sometimes also referred to as the Delawares, resided in the area today called New Jersey when European settlers first arrived. Burlington County's Lenape were known as the Unami, or Turtle tribe. They farmed and fished during the warm seasons, and moved inland to headwater areas for hunting in the winter.

### European Settlement

The first European settlers in the Delaware Valley were the Dutch, who founded a colony near what is today Gloucester City in Camden County. They called the Delaware River the Zuydt, or South River, to distinguish it from the Hudson River in the north. Belgian Walloons fleeing persecution built the first recorded settlement in New Jersey on Burlington Island. They opened a trading post to barter with the indigenous people. In 1638, Swedish and Finnish settlers ventured to the Delaware Valley.

### English Settlement

In 1644, King Charles II of England took control of much of America's eastern seaboard, and deeded most of present-day New Jersey to his brother, the Duke of York. In 1677, the *Kent* brought English and Irish Quakers to Burlington County. They renamed the river the "Delaware" in honor of Sir Thomas West, Lord de la Warr. The London Quakers chose to settle between the Rancocas and Pennsauken Creeks, which was known as the London Tenth. Evesham Township is either named for the borough of Evesham, England (near Stratford-upon-Avon) or it may also honor Thomas Eves, one of the first settlers, who purchased 1,000 acres north of present day Greenfield Road in 1676. Other early settlers included the Hewlings, Ballinger, Evans, Wills, Inskeep, Lippincott, and Haines families according to a "Cultural Resources Survey Update" conducted by the Preservation Design Partnership in 1996.

### Early Government

Evesham Township was first created in 1688, when Burlington County was divided into 8 areas, each under a constable's jurisdiction. The eastern boundary followed the South Branch of the Rancocas, the southern boundary followed the Mullica River, and the western boundary was Cropwell Creek (see Figure 1). Evesham incorporated in 1692 as one of thirteen townships in Burlington. In 1798, the New Jersey legislature incorporated Evesham as one of New Jersey's original 104 townships. Over the next century, portions of the township broke away to form other townships, including Washington (1802), Medford (1847), and Mount Laurel Townships (1872). Shamong, Hainesport, and Lumberton townships were later divided off of Medford Township.

## **Agriculture, Industry, and Commerce**

Early settlers in Evesham were mostly farmers. The Lenape raised corn, tobacco, vegetable crops, and fruit. English settlers also participated in farming. Most of the farms were either dairy or produce farms, whose products were often taken to Camden, where they were then moved to Philadelphia by ferry for distribution. Farms tended to be located in the northern portion of the township because the settlers often found the sandy, acidic soils of southern Evesham inappropriate for raising crops. This explains why the central portion of southern New Jersey is often referred to as the “Pine Barrens.”

By the 1800s, many saw mills and grist mills had been built in Burlington County. They were powered by damming small stream tributaries to form millponds and lakes. Indeed, all of southern New Jersey lakes are man-made, although the mills that they powered are usually long gone. John Borton erected Evesham’s first gristmill around 1740 at the corner of Route 73 and Braddock’s Mill Road. There were also at least six other grist mills, two fulling mills, and one saw mill. In the 1830s and 1840s, marl—a mixture of green clay and shells that could be used as a fertilizer—was discovered in the area. As the extraction business boomed, the population grew and residents prospered. Local settlements were even renamed in honor of the resource—giving rise to the name Marlton, as well as the hamlet of Marlboro. Between 1846 and 1863, there was a glassworks in Kresson on the east side of present Route 73. In addition to agriculture and mills, other industries which were present in the Pinelands included lumbering, pitch/tar/turpentine production, charcoal production, bog iron manufacturing, glass manufacturing, sand and gravel mining, and tanning.

In the 1880s and 1890s, Evesham grew larger and developed more services for its residents. In 1880, a brick schoolhouse was built. In 1897, a water company laid the first water mains, and a gas works was built. The Marlton Firehouse Co. No. 1 opened in 1901. A newspaper called *The Central Record* reported the news, while a library circulated books.

## **Transportation**

The earliest roads in Evesham were trails used by native peoples, which tended to follow the higher ground between streams or sometimes ran along stream banks. European settlers moved in and expanded these roads, which initially led between households and mills, rather than between towns. Much of the early transportation took place on the water. For example, between the 1820s and the early 20<sup>th</sup> century, steamboats traveled up the Rancocas Creek to Lumberton on the South Branch and Mount Holly on the North Branch. The boats were not only used to bring materials for manufacturing but also to transport passengers.

In the late 1880s, railroads began to replace the waterways as the primary means of transport. By 1881, an extension had been built to connect the Camden and Atlantic Railroad to the Amboy Division of the Pennsylvania Rail Road at Medford. The extension was known as the Philadelphia Marlton and Medford Railroad, which connected Haddonfield to Medford through



Source: [www.waymarking.com](http://www.waymarking.com)

*Marlton Fire Company #1*

the northern section of Evesham. There were three regularly scheduled stops in Evesham (Cropwell, Marlton, and Elmwood Road), as well as several flag stops. There were generally four weekday round trips, and two round trips on Sundays. The trains usually had cars for both passengers and freight. Common cargo included milk cans, marl, U.S. mail, feed, coal, and building materials. By the 1920s, competition from the automobile made train travel less profitable. In 1923, the railroad reduced the number of trips it offered. The last passenger train operated on September 24, 1927. Today Route 70 is located where the railroad tracks once were.

Route 70 is a major east-west route connecting Philadelphia and the coastal resort towns of the Central Jersey shore.

Route 73, which connects Northeast Philadelphia with the Atlantic City Expressway, intersects with Route 70 in Evesham. Although the intersection is in the northwest section of Evesham, it serves as a functional center of the township. It lies just west of the Olde Marlton historic district. Routes 70 and 73 provide easy access to



*Source: Evesham Township*

*Marlton Station, built in 1881*

Interstate 295 and the New Jersey Turnpike. The developed areas of the township are within a 20-30 minute drive of Camden and Center City Philadelphia, via Route 70. Route 73 connects Evesham residents to other business centers in New Jersey.

### **Recent Housing and Development**

Most of Evesham's growth occurred in the 20th century. Evesham was ranked as one of the 50 best places to live in the Philadelphia metropolitan area according to the October 2006 issue of *Philadelphia* magazine. Nearly 94% of Evesham's housing units in existence in 2000 were built after 1960. Major subdivisions include: Brush Hollow, Briarwood, Kings Grant, Compass Point, The Sanctuary, Stone Mountain, Willow Ridge, Rainwood, Woodstream, The Maples, Marlton Lakes, and Stow Acres. Age-restricted housing – for childless households with at least one member over the age of 55 – is also becoming popular in New Jersey, and Evesham is no exception. The 2006 Master Plan identified a total of 1,689 units of age-restricted housing, 985 of which were completed or under construction, 83 of which were approved but not started, and 621 of which were proposed but not approved.



## **The Pinelands**

Suburban sprawl is a major issue in the Delaware Valley. Since 1970, the population of the Philadelphia metropolitan region has remained stable (less than 3% increase), but the amount of developed land has expanded by nearly half (43.5%). By 1972, people recognized the need for land-use management and groundwater protection, especially in the Pinelands region. The Pinelands Comprehensive Management Plan (CMP), which was adopted in 1980, controls the growth in the central part of southern New Jersey. The CMP is different from other land-use regulation and planning programs because it uses an ecosystem approach to protect natural resources. Pinelands protection arose, in part, because of proposals for transporting the groundwater beneath the Pinelands to other regions for water supply. Indeed, it was a similar plan in the 1800s – to utilize the groundwater as a water source for Philadelphia – that led Joseph Wharton to acquire the extensive lands now named for him (the Wharton State Forest).

The National Pinelands Reserve includes all of the land in Evesham south of Route 70. The New Jersey Pinelands Area is slightly smaller than the Pinelands National Reserve. The boundary passes along Route 70 and then south through Evesham along Braddock Mill Road, Tomlinson Mill Road, Elmwood Road, and Marlton Pike. Development south or east of these roads must be consistent with the Pinelands Comprehensive Management Plan (CMP). The densely populated areas of southern Evesham, such as the Marlton Lakes section, and the Bartons Run and Kings Grant Planned Unit Developments (PUDs), were approved before the CMP went into effect.



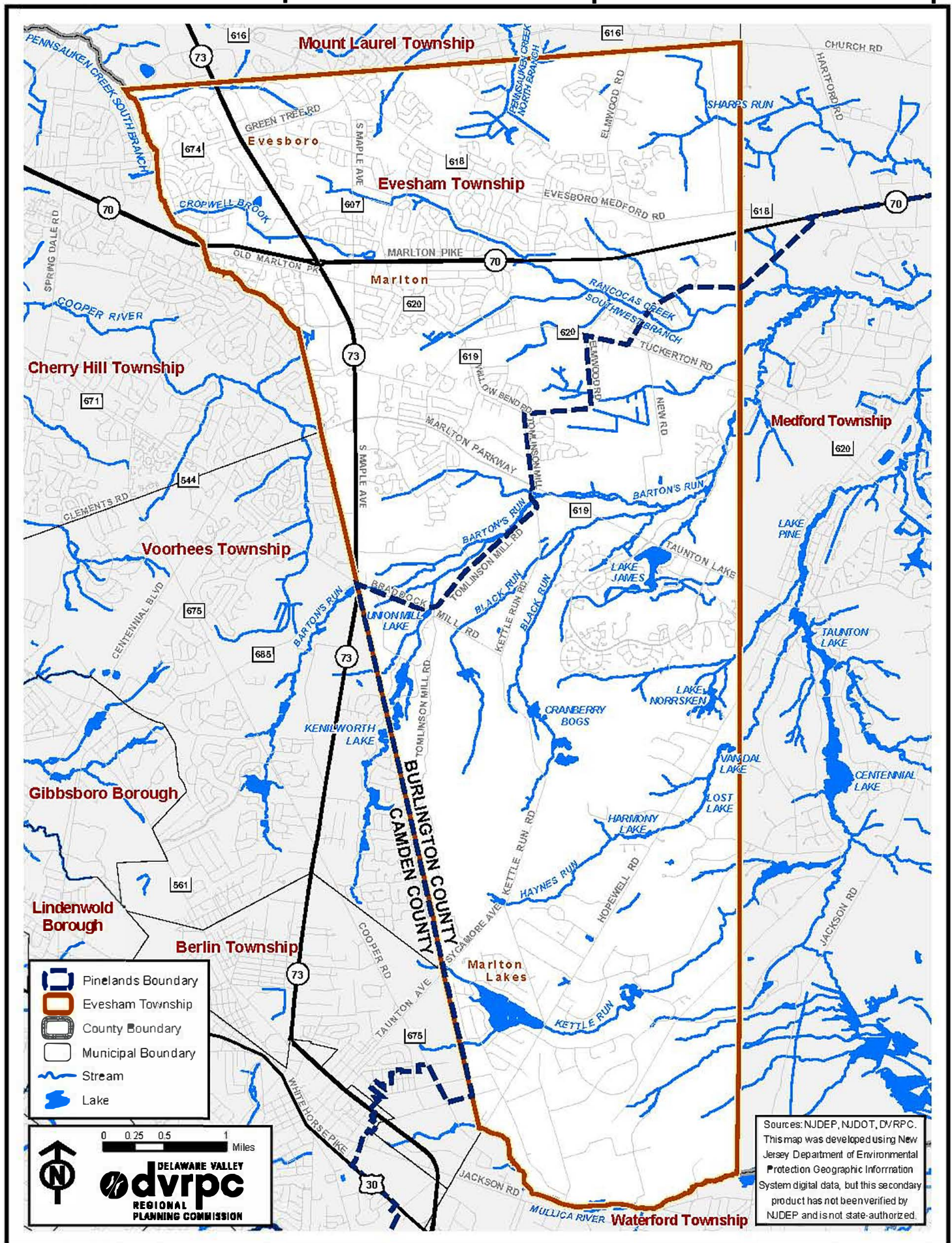
*Courtesy of John Volpa*

*Pitch Pines*



# Evesham Township

# Map 1: Evesham Township







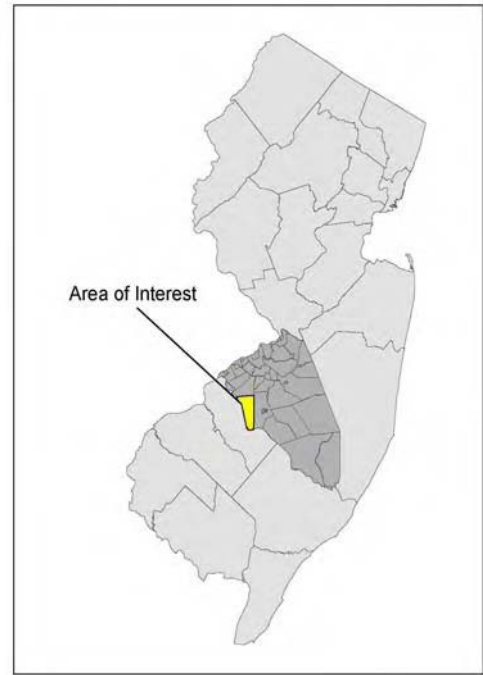


## EVESHAM TOWNSHIP: LOCATION, SIZE, & LAND USE

Evesham is located in Burlington County, New Jersey, adjacent to the Burlington-Camden county line (see Figure 2). It is surrounded by six municipalities: Mount Laurel to the north, Medford to the east, Waterford in Camden County to the south, and Berlin, Voorhees, and Cherry Hill townships in Camden County to the west (See **Map 1: Evesham Township**).

Evesham Township occupies approximately 18,930 acres, or 29.5 square miles, on the coastal plain of New Jersey, and had a population of 45,538 in 2010.

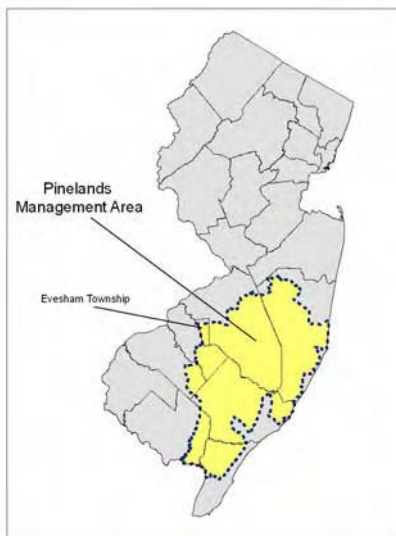
The portion of Evesham Township north of Taunton Lake Road and Marlton Parkway is more densely populated than the southern portion of the Township (See **Map 2: Aerial Photo**). The New Jersey Turnpike and Route 73 allow Evesham residents easy access to metropolitan Philadelphia. The middle portion of Evesham is traversed by several streams flowing from the higher elevation in the southwestern part of the township to the lower elevations in the north and east. Much of the middle of the township is covered by wetlands. The southern portion of Evesham is located within the Pinelands Management Area and is dominated by wooded areas.



Source: DVRPC

**Figure 2: The Location of Evesham Township**

### THE PINELANDS



Source: DVRPC

**Figure 3: The New Jersey Pinelands Management Area**

The Pinelands Commission describes the Pinelands as “a patchwork of pine oak forests, tea-colored streams and rivers, spacious farms, crossroad hamlets, and small towns stretched across southern New Jersey.” The area, which is located on the Outer Coastal Plain, is generally flat, with soils that tend to be extremely sandy and acidic. It is one of the largest remaining tracts of wilderness on the eastern seaboard of the United States.

The United States Congress created the Pinelands National Reserve under the 1978 National Parks and Recreation Act. It was the first National Reserve in the United States. In 1979, New Jersey created the Pinelands Commission, whose purpose is to preserve, protect, and enhance the natural and cultural resources of the Pinelands National Reserve (PNR). The PNR includes 1.1 million acres and covers 22% of New

Jersey’s land area, including all or part of over fifty municipalities in seven counties. UNESCO designated the area a U.S. Biosphere Reserve in 1983, and in 1988 it became an International Biosphere Reserve. The majority of the area is privately-owned, and one third is publicly owned. In general, the term “Pine Barrens” refers to the ecosystem, and the term “Pinelands” refers to the areas of the Pine Barrens that are regulated by federal and state legislation. Approximately three quarters of Evesham is within the Pinelands Management Area (see Figure 3). The Pinelands Commission engages in land use planning and serves as the regulatory agency that implements the Pinelands’ Comprehensive Management Plan. The Plan includes nine land-use management areas, as outlined in Table 1 below.

**Table 1: Type and Size of Pinelands Management Area**

Pinelands Management Area	Size in Acres
Preservation Area District	288,300
Forest Area	245,500
Rural Development Area	112,500
Regional Growth Area	77,200
Agricultural Production Area	68,500
Military and Federal Installation Area	46,000
Special Agricultural Production Area	40,300
Pinelands Villages	24,200
Pinelands Towns	21,500

*Source: NJDEP, Bureau of Geographic Information Systems*

In order to guide growth in the Pinelands into areas where infrastructure is available and away from preservation and agricultural areas, the Pinelands Commission developed the Pinelands Development Credit (PDC) Program. Agricultural and preservation lands are designated as “sending areas,” while regional growth areas and other areas where development is permitted are designated “receiving areas.” Each credit is worth the right to build an additional four houses in a regional growth area. Payment for the additional density—the credit—is used to compensate the owner in a sending area. For example, if the zoning in one part of a development area normally allows a base density of 20 homes on a 10 acre tract, a developer could buy 2 PDCs (worth a total of 8 houses) and instead build 28 units on the property. The credits can be bought and sold either privately or through the Pinelands Development Credit Bank.

**Table 2: Evesham General Land Use/Land Cover (2002)** shows Evesham’s land use/land cover grouped into general categories. **Table 3: Evesham Township Detailed Land Use/Land Cover (2002)** breaks down the data into more detailed land cover categories based on 2002 data from the New Jersey Department of Environmental Protection, which is the most recent land use data available that includes categories of vegetative cover. See **Map 3: NJDEP Generalized Land Cover (2002)**.

**Table 2: Evesham General Land Use/Land Cover Classes (2002)**

General Land Use/ Land Cover Class	Acres	Percent
AGRICULTURE	847.26	4.48
BARREN LAND	298.18	1.58
FOREST	4,333.04	22.89
URBAN	7,409.86	39.14
WATER	291.06	1.54
WETLANDS	5,751.53	30.38
<b>TOTAL</b>	<b>18,930.94</b>	<b>100.00</b>

Source: NJDEP, Bureau of Geographic Information Systems

**Table 3: Evesham Township Detailed Land Use/Land Cover (2002)**

Land Use Categories	Acres	Percent of Total Land Area
AGRICULTURAL WETLANDS (MODIFIED)	497.97	2.63%
AIRPORT FACILITIES	5.41	0.03%
ALTERED LANDS	55.60	0.29%
ARTIFICIAL LAKES	291.05	1.54%
ATHLETIC FIELDS (SCHOOLS)	101.34	0.54%
ATLANTIC WHITE CEDAR WETLANDS	26.10	0.14%
CEMETERY	6.02	0.03%
COMMERCIAL/SERVICES	791.68	4.18%
CONIFEROUS BRUSH/SHRUBLAND	30.89	0.16%
CONIFEROUS FOREST (10-50% CROWN CLOSURE)	124.00	0.66%
CONIFEROUS FOREST (>50% CROWN CLOSURE)	1,923.88	10.16%
CONIFEROUS SCRUB/SHRUB WETLANDS	17.91	0.09%
CONIFEROUS WOODED WETLANDS	1,031.88	5.45%
CROPLAND AND PASTURELAND	700.15	3.70%
DECIDUOUS BRUSH/SHRUBLAND	135.70	0.72%
DECIDUOUS FOREST (10-50% CROWN CLOSURE)	130.64	0.69%
DECIDUOUS FOREST (>50% CROWN CLOSURE)	561.69	2.97%
DECIDUOUS SCRUB/SHRUB WETLANDS	162.25	0.86%
DECIDUOUS WOODED WETLANDS	3,073.28	16.23%
DISTURBED WETLANDS (MODIFIED)	31.75	0.17%
FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)	80.85	0.43%
HERBACEOUS WETLANDS	70.83	0.37%
INDUSTRIAL	57.77	0.31%
INDUSTRIAL/COMMERCIAL COMPLEXES	15.31	0.08%
MAJOR ROADWAY	106.80	0.56%
MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	27.56	0.15%
MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	74.48	0.39%
MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND	93.77	0.50%

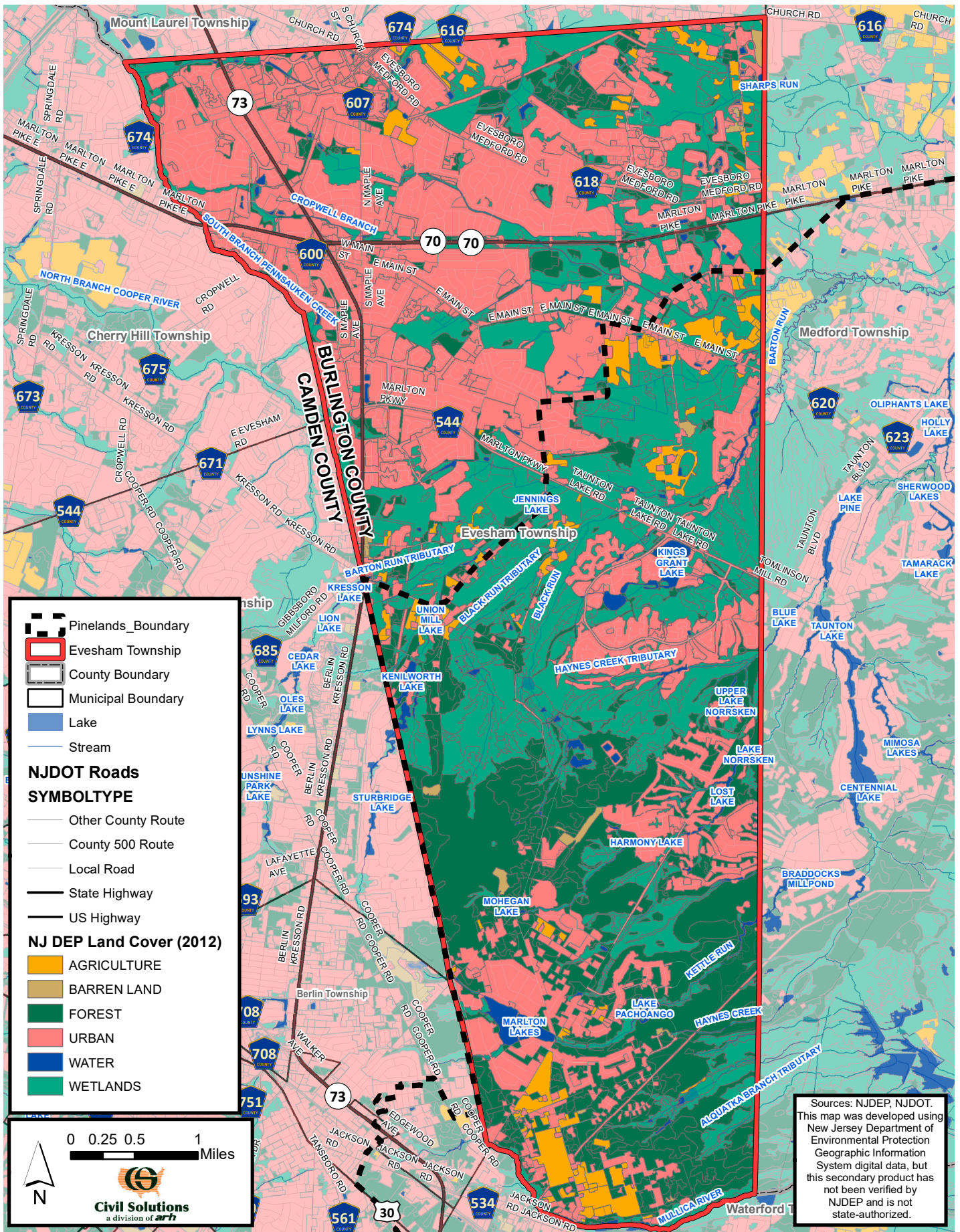
Land Use Categories	Acres	Percent of Total Land Area
MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)	20.76	0.11%
MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)	799.99	4.23%
MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)	26.84	0.14%
MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)	288.96	1.53%
MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)	22.08	0.12%
MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)	30.24	0.16%
MIXED WOODED WETLANDS (CONIFEROUS DOM.)	327.06	1.73%
MIXED WOODED WETLANDS (DECIDUOUS DOM.)	260.76	1.38%
OLD FIELD (< 25% BRUSH COVERED)	190.68	1.01%
ORCHARDS/VINEYARDS/NURSERIES/HORTICULTURAL AREAS	50.74	0.27%
OTHER AGRICULTURE	96.37	0.51%
OTHER URBAN OR BUILT-UP LAND	552.89	2.92%
PLANTATION	5.24	0.03%
RECREATIONAL LAND	526.14	2.78%
RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING	780.58	4.12%
RESIDENTIAL, RURAL, SINGLE UNIT	715.78	3.78%
RESIDENTIAL, SINGLE UNIT, LOW DENSITY	762.16	4.03%
RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY	2,668.71	14.10%
STORMWATER BASIN	79.81	0.42%
STREAMS AND CANALS	0.01	0.00%
TRANSITIONAL AREAS	201.70	1.07%
TRANSPORTATION/COMMUNICATION/UTILITIES	160.69	0.85%
UNDIFFERENTIATED BARREN LANDS	40.88	0.22%
UPLAND RIGHTS-OF-WAY DEVELOPED	9.25	0.05%
UPLAND RIGHTS-OF-WAY UNDEVELOPED	69.51	0.37%
WETLAND RIGHTS-OF-WAY	16.53	0.09%
<b>TOTAL</b>	<b>18930.94</b>	<b>100.00%</b>

Source: NJDEP, Bureau of Geographic Information System



# Map 3: NJDEP Generalized Land Cover (2012)

## Evesham Township







## NATURAL RESOURCES

### PHYSIOGRAPHY

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by four physiographic provinces (see Figure 4). The rocky terrain of the Appalachian Province is at one extreme and the sands of the coast are at the other. Evesham is located in the Coastal Plain, the southernmost of these four provinces in New Jersey.

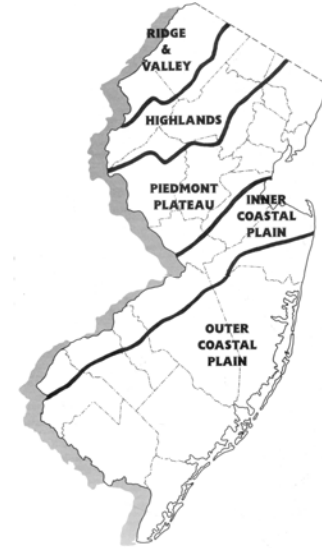
The Atlantic Coastal Plain landscape extends from Massachusetts to Texas and is divided into Inner and Outer sections. In New Jersey, the Inner Coastal Plain is made up of interbedded sand and clay. Deposits originating in the breakdown of Appalachian and Catskill sedimentary, metamorphic, and igneous rocks are interbedded 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 segments of the Coastal Plain is a belt of low hills, which runs northeast and southwest through the southern half of New Jersey. These hills are the youngest of the Cretaceous formations and are largely made up of sand and marl formations. The hills taper to fairly low elevations in Burlington County but are visible in the Mount Holly and Mount Laurel areas and continue down to Mullica Hill in Gloucester County. The Inner Coastal Plain lies to the west of this band of hilly formations and the Outer Coastal Plain lies to the east. Evesham straddles the divide of the Inner and Outer coastal plains.

### TOPOGRAPHY AND SURFACE LANDSCAPES

Evesham is generally flat with slopes of less than 10%. Eastern Evesham is the area with the lowest elevation in the township; the lowest point is on the border with Medford Township between Tuckerton Road and Marlton Pike and is approximately 50 feet in elevation. Elevation increases towards the west side of Evesham. The highest point in Evesham is approximately 215 feet in elevation and is located south of Kenilworth Lake along the Camden-Burlington county line.



*Source: NJ Audubon's Bridges to the Natural World*

**Figure 4: The Physiographic Regions of New Jersey**

## SOILS

Soil is the foundation for all land uses. A region's soil defines what vegetation is possible, influencing agricultural uses. It is also determinant how land can be developed for other purposes. Soil is also a natural resource that cannot be replenished on the human time scale.

Evesham Township soils consist of 30 series types and 71 variations within those series as identified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). These are listed in **Table 4** and shown on **Map 5: Soils**.

**Table 4: Evesham Township Soils**

Soil Code	Soil Description	Acres	Percent of all Acres	Designation*	Hydric Soil**
AdmA	Adelphia fine sandy loam, 0 to 2% slopes	129.54	0.68%	P-1	Yes
AdmB	Adelphia fine sandy loam, 2 to 5% slopes	56.98	0.30%	P-1	
AdmkB	Adelphia fine sandy loam, clayey substratum, 2 to 5% slopes	90.62	0.48%	P-1	
AdmmA	Adelphia high glauconite variant fine sandy loam, 0 to 2% slopes	498.37	2.64%	P-1	Yes
AdmmB	Adelphia high glauconite variant fine sandy loam, 2 to 5% slopes	41.71	0.22%	P-1	
AtsA	Atsion fine sand, 0 to 2% slopes	1,520.85	8.04%	U-1	Yes
AttA	Atsion sand, 0 to 2% slopes	503.43	2.66%	U-1	Yes
AttAr	Atsion-Berryland sands, 0 to 2% slopes, rarely flooded	12.34	0.07%	NA	Yes
BerAr	Berryland fine sand, 0 to 2% slopes, occasionally flooded	69.29	0.37%	U-1	Yes
BetAs	Berryland sand, 0 to 2% slopes, rarely flooded	17.22	0.09%	U-1	Yes
BugA	Buddtown fine sandy loam, 0 to 2% slopes	231.37	1.22%	P-1	Yes
BugB	Buddtown fine sandy loam, 2 to 5% slopes	278.06	1.47%	P-1	Yes
BuhA	Buddtown loamy fine sand, 0 to 2% slopes	69.28	0.37%	P-1	Yes
BuhB	Buddtown loamy fine sand, 2 to 5% slopes	20.89	0.11%	P-1	Yes
BukA	Buddtown-Deptford complex, 0 to 2% slopes	86.62	0.46%	P-1	Yes
BumA	Buddtown-Deptford loamy fine sands, 0 to 2% slopes	59.44	0.31%	P-1	Yes
CoeAs	Colemantown loam, 0 to 2% slopes, occasionally flooded	730.40	3.86%	NA	Yes
ComA	Collington fine sandy loam, 0 to 2% slopes	3.67	0.02%	P-1	
ComB	Collington fine sandy loam, 2 to 5% slopes	410.10	2.17%	P-1	
DocB	Downer loamy sand, 0 to 5% slopes	227.79	1.20%	S-1	Yes
EveB	Evesboro sand, 0 to 5% slopes	1,475.72	7.80%	NA	Yes
EveC	Evesboro sand, 10 to 30% slopes	25.13	0.13%	NA	
EveE	Evesboro sand, 5 to 10% slopes	12.12	0.06%	NA	
EvehB	Evesboro sand, loamy substratum, 0 to 5% slopes	5.06	0.03%	NA	
FmgAt	Fluvaquents, loamy, 0 to 3% slopes, frequently flooded	200.88	1.06%	U-1	Yes
FmhAt	Fluvaquents, sandy, 0 to 3% slopes, frequently flooded	400.24	2.12%	NA	Yes
FrFB	Freehold fine sandy loam, 2 to 5% slopes	262.40	1.39%	P-1	Yes
FrFC	Freehold fine sandy loam, 5 to 10% slopes	22.73	0.12%	S-1	
FrkC3	Freehold loamy sand, 0 to 5% slopes	225.61	1.19%	NA	
FrmB	Freehold loamy sand, 5 to 10% slopes	13.63	0.07%	P-1	
FrmC	Freehold sandy loam, 5 to 10% slopes, severely eroded	90.55	0.48%	S-1	
GahB	Galloway fine sand, 0 to 5% slopes	217.51	1.15%	S-1	Yes
GakB	Galloway sand, 0 to 5% slopes	0.55	0.00%	S-1	Yes
HodA	Holmdel fine sandy loam, 2 to 5% slopes	5.05	0.03%	P-1	Yes
HodB	Holmdel loamy sand, 0 to 5% slopes	579.85	3.07%	P-1	

Soil Code	Soil Description	Acres	Percent of all Acres	Designation*	Hydric Soil**
HofB	Holmdel-Urban land complex, 0 to 5% slopes	210.93	1.12%	NA	
JdrA	Jade Run fine sandy loam, 0 to 2% slopes	334.85	1.77%	S-1	Yes
KeaA	Keansburg fine sandy loam, 0 to 2% slopes	160.63	0.85%	L-1	Yes
KrbA	Kresson fine sandy loam, 0 to 2% slopes	615.01	3.25%	S-1	Yes
KreA	Kresson loam, 0 to 2% slopes	149.46	0.79%	S-1	Yes
KrhA	Kresson loamy sand, 0 to 5% slopes	27.31	0.14%	S-1	Yes
LakB	Lakehurst fine sand, 0 to 5% slopes	1,565.00	8.28%	NA	Yes
LakhB	Lakehurst sand, 0 to 5% slopes	1,424.07	7.53%	NA	Yes
LamB	Lakehurst sand, loamy substratum, 0 to 5% slopes	2.75	0.01%	NA	Yes
LanB	Lakehurst-Lakewood sands, 0 to 5% slopes	6.64	0.04%	NA	
LasB	Lakewood fine sand, 0 to 5% slopes	506.05	2.68%	NA	Yes
LasC	Lakewood fine sand, 5 to 10% slopes	108.78	0.58%	NA	
LasD	Lakewood sand, 0 to 5% slopes	1,383.93	7.32%	NA	
LatB	Lakewood sand, 10 to 15% slopes	13.68	0.07%	NA	
LatC	Lakewood sand, 5 to 10% slopes	92.48	0.49%	NA	
MakAt	Manahawkin muck, 0 to 2% slopes, frequently flooded	54.72	0.29%	U-1	Yes
MapA	Marlton fine sandy loam, 0 to 2% slopes	222.18	1.17%	P-1	
MapB	Marlton fine sandy loam, 2 to 5% slopes	703.13	3.72%	P-1	
MapC	Marlton fine sandy loam, 5 to 10% slopes	11.83	0.06%	S-1	
MunA	Mullica fine sandy loam, 0 to 2% slopes	381.23	2.02%	S-1	Yes
PefB	Pemberton sand, 0 to 5% slopes	496.30	2.62%	S-1	
PeftB	Pemberton sand, thick surface , 0 to 5% slopes	52.49	0.28%	S-1	
PhbC	Phalanx loamy sand, 5 to 10% slopes	9.16	0.05%	NA	
PHG	Pits, clay	65.98	0.35%	NA	
PHM	Pits, sand and gravel	9.82	0.05%	NA	
SapB	Sassafras-Urban land complex, 0 to 5% slopes	61.01	0.32%	NA	
ShsA	Shrewsbury fine sandy loam, 0 to 2% slopes	320.37	1.69%	S-1	Yes
ThfB	Tinton sand, 0 to 5% slopes	29.65	0.16%	S-1	
ThftB	Tinton sand, thick surface, 0 to 5% slopes	26.72	0.14%	S-1	
UdrB	Udorthents, refuse substratum, 0 to 8% slopes	17.33	0.09%	NA	
URCLAB	Urban land, clayey substratum, 0 to 8% slopes	8.75	0.05%	NA	
URSAAB	Urban land, sandy, 0 to 8% slopes	368.30	1.95%	NA	
WATER	Water	176.21	0.93%	NA	
WedB	Westphalia fine sandy loam, 2 to 5% slopes	608.63	3.22%	P-1	
WeeB	Westphalia loamy fine sand, 2 to 5% slopes	47.75	0.25%	P-1	Yes
<b>Total</b>		<b>18,910.86</b>	<b>100.00%</b>		

**\*Explanation of Designations**

P-1	Prime Farmland
S-1	Statewide Importance
U-1	Unique Farmland
L-1	Soil of Local Importance
NR	Soils not classified for farmland use: wet soils, pits, steep slopes, made land, etc.

\*\* Typically hydric soils are not considered to be Prime Farmland (P-1) because of their excessive water saturation. However, several soils in Evesham Township are classified by the Natural Resource Conservation Service (NRCS) as both Prime Farmland (P-1) and Hydric soils. This indicates that the soil meets the Prime Farmland (P-1) standards but is also a very wet soil. Thus, the only way that this soil can perform at its full potential is if the site is drained, reducing the effect of its hydric characteristics.

Source: USDA-Natural Resources Conservation Service

## Soil Quality Classification

State and national agricultural agencies classify farmland soils into several categories. Evesham contains Prime Farmland soils, Soils of Statewide Importance, Soils of Unique Importance, and Soils of Local Importance. About 52.84% of Evesham's land is rich, arable, and valuable soil. Each category of farmland is explained on the following pages. See **Table 5** below for the acreage in each category and **Map 4: Agricultural Quality of Soils**.

**Table 5: Agricultural Values for Evesham Soils**

Designation	Type	Acres	Percent
P-1	Prime Farmland	4,461.98	23.59%
S-1	Statewide Importance	3,004.36	15.89%
U-1	Unique Farmland	2,366.40	12.51%
L-1	Soil of Local Importance	160.63	0.85%
NA	Water; Soils not classified for farmland use: wet soils, pits, steep slopes, made land, etc.	8,917.50	47.16%
<b>Totals</b>		<b>18,910.86</b>	<b>100.00%</b>

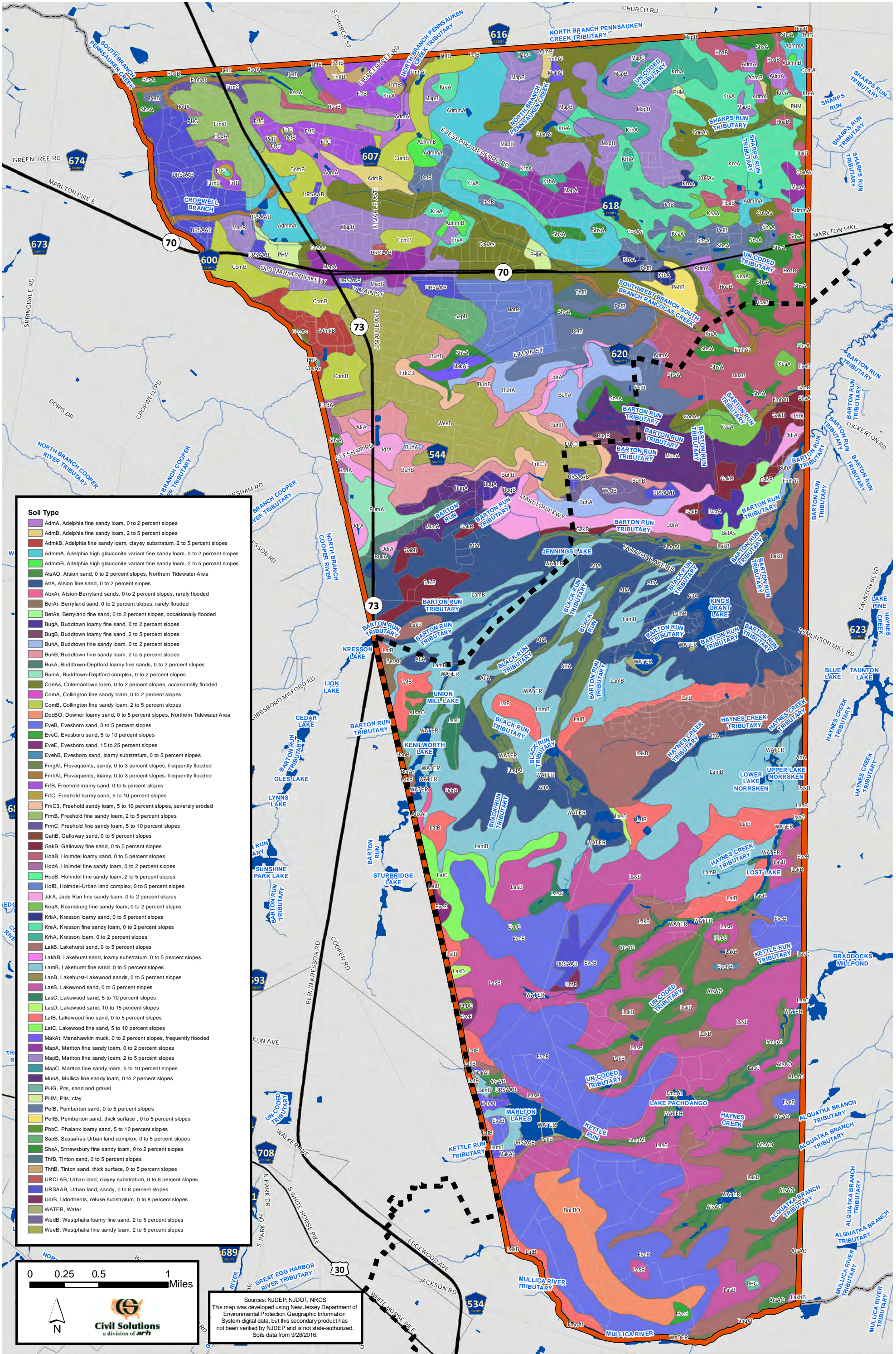
*Source: NJ Important Farmlands Inventory, NJ Natural Resources Conservation Service*

### ***Prime Farmland Soils***

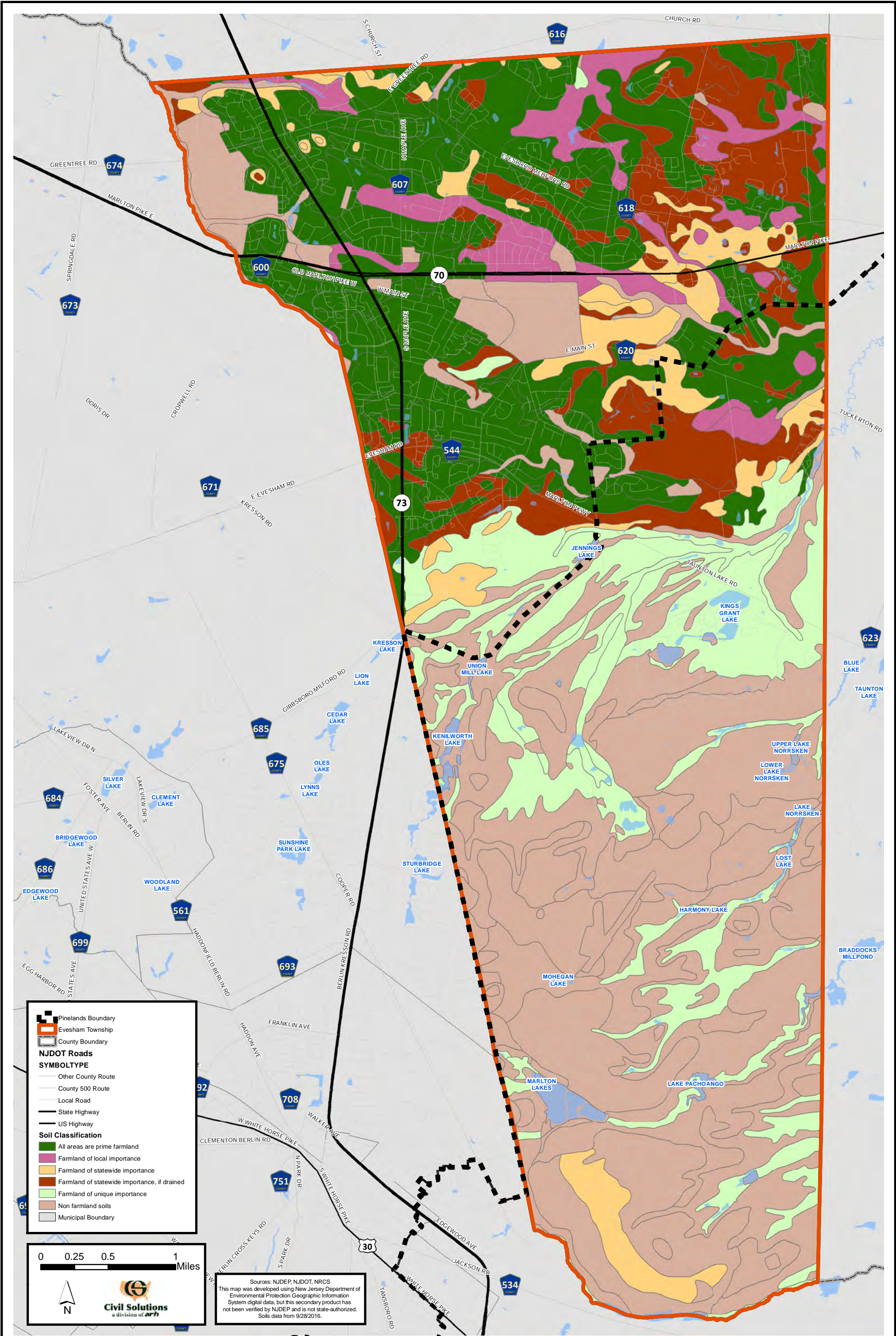
About 23.59% (4,461.98 acres) of Evesham's soils are considered Prime Farmland (P-1) soils. Prime Farmlands are lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They can sustain high yields of crops when managed with correct farming methods. Prime Farmlands are not excessively erodible or saturated with water for long periods of time, and do not flood frequently.

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 (or within the root zone if the root zone is less than 40 inches) must have a pH between 4.5 and 8.4 (mildly acidic to mildly basic). 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. When identifying qualifying prime soil mapping units within a state, state conservationists are allowed to deviate from the permeability standard or to adopt more stringent criteria for the other requirements.









Evesham Township

Map 5: Agricultural Quality of Soils



Land classified as Prime Farmland does not have to be farmed but does have to be available for such use. Thus, water or urban or built-up land does not qualify as Prime Farmland.

### ***Soils of Statewide Importance***

About 15.89% (3,004.36 acres) of Evesham's soils 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. Under such conditions, these yields may be as high as Prime Farmland yields.

Criteria for establishing Soils of Statewide Importance are determined by state agencies. In New Jersey, soils with a land capacity class of II or III that do not meet prime farmland criteria are rated as Soils of Statewide Importance. Soils in these capacity classes have moderate to severe limitations that reduce the choice of plants or require special conservation practices.

### ***Unique Farmland Soils***

Approximately 12.5%% (2,366.40 acres) of Evesham's soils are ranked as Unique Farmland (U-1) soils. Certain soil qualities, locations, growing seasons, and moisture supplies allow Unique Farmland to support specialized crops when properly managed. The USDA outlines specific Unique Farmland criteria that support a particular food or fiber crop, 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. In the Evesham area, these crops are mostly cranberries and blueberries.

### ***Land Not Appropriate for Farming***

Nearly half of the soils that are present in Evesham have not been rated for agricultural use by the Natural Resource Conservation Service (NRCS) and are labeled "NA." These soils and land masses are not appropriate for agricultural use, and may be best suited for other uses or they may not yet have been assessed for quality by NRCS. NRCS created all the Soil Quality Classifications in 1990 but in 2005 the agency created several new subtypes of soils, which are not yet rated. Soils that are not rated for agricultural use are not necessarily limited. Each soil's land capability class and subclass describe how the soil is limited with respect to different uses, and why the soil is limited.

### ***Hydric Soils***

More than 66.8%% of Evesham's land area consists of 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. They support the development of hydrophytic (water loving) vegetation only. Hydric soils have unique soil properties, and they are an important element to 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 high water table or flooding, can qualify as prime and statewide when the limitations are overcome by measures such as drainage or flood control. In other words, hydric soils can be productive for agriculture when drained by measures such as field tiles or field drains.

## **Soil Series**

Several soil series appear more frequently in Evesham than others, and are briefly described as follows according to the Burlington County Soil Survey and NRCS soil database.

### ***Lakehurst Series***

The most abundant soil series in Evesham is the Lakehurst Series. Nearly 16% of Evesham is made up of Lakehurst soils, which are usually found on broad flats bordering streams and depressions throughout the Coastal plain. This sandy series is generally found between elevations of 2 and 20 feet. The soils are moderately well drained, with rapid permeability to the subsoil and slow permeability to the substratum. The distance to bedrock is generally greater than 60 inches, while the seasonal high water table is 18 to 42 inches in depth. The vegetation is generally dominantly by pitch pines, shortleaf pines, black oaks, and white oaks, with an understory of lowbush blueberries and scrub oak. Where wildfires have been severe, pitch pine and black jack oak are dominant.

### ***Lakewood Series***

The Lakewood Series covers approximately 11% of Evesham. This soil series is mostly found on upland coastal plain marine terraces in elevations between 25 and 450 feet. It is mostly associated with woodland areas, where the vegetation is dominantly pitch pine, black oak, and white oak. Where wildfires have been severe, the trees are dwarfed, growing less than 5 feet tall and consist primarily of pitch pine, scrub oak, and blackjack oak.

### ***Atsion Series***

Slightly more than 11% of Evesham's soils fall into the Atsion Series, which tend to be found at lower lying elevations with slopes between 0 and 2%. Atsion soils are poorly drained; the seasonal high water table tends to be between 6 and 12 inches. The soil is strongly to extremely acidic. The associated land cover is often wooded areas, with some use for blueberry and cranberry production. Vegetation consists mostly of pitch pine mixed with black gum and red maple, with an undergrowth of highbush blueberries, sweet pepperbush, sheep laurel, and greenbriar.

### ***Evesboro Series***

Evesboro Series, which cover 8% of Evesham, are found on Coastal Plain uplands. The soils are excessively drained with a seasonal high water table at more than 6.0 feet. The area can be wooded, used for fruit and vegetable crops (such as peaches, grapes, sweet potatoes, pumpkins and melons), or utilized for urban land. Vegetation tends to consist of black oak, white oak, red oak, yellow poplar, and chestnut oak with scattered hickories, pitch pine, Virginia Pine, loblolly pine, and scrub and blackjack oaks.

### ***Marlton Series***

The Marlton Series is found in slightly less than 5% of Evesham's total land area. The series is found on low hills, flats, and depressions, and tends to be moderately well drained, with slow permeability and moderate shrink-swell capacity. Mixed oaks, hickory, sweetgum, yellow-poplar, American beech, and red maple are frequently found in areas with Marlton soils. While these soils were used for corn, tomatoes, soybeans, hay and pasture, most areas where this soil is found in New Jersey have rapidly urbanized.

## Soil Limitations for Development

Soil characteristics can severely restrict the use of sites for construction and development. **Table 6: Soil Limitations for Development** records the soils and their possible limitations for building foundations. This table is a summary of a report on building suitability available from the NRCS 2006 database for Burlington County soils. It is included here as a general guide and is not intended to eliminate the need for site analysis.

Another primary concern associated with development is a soil's ability to maintain a septic system disposal field. These fields require soils that have a low water table (over five feet below the surface) and high permeability to allow for proper drainage of wastewater. Soils with high water tables (five feet or less from the surface) create a potential for erosion, wet basements, and low permeability, often allowing wastewater to collect near the surface. Evesham Township's soils generally rate low for septic drainage field suitability in the northern part of the township. Because the suitability of a soil for a septic disposal field is very site-specific and relies on many factors, including but not limited to the soil type, there is not an accurate source of soil information on this subject. The best way to determine soil suitability for a septic system is to request a site survey by a professional.

**Table 6: Soil Limitations for Development**

Soil Description	Soil Code	Acres	Building without Basement	Building with Basement
AdmA	Adelphia fine sandy loam, 0 to 2% slopes	129.54	B	C
AdmB	Adelphia fine sandy loam, 2 to 5% slopes	56.98	B	C
AdmkB	Adelphia fine sandy loam, clayey substratum, 2 to 5% slopes	90.62	B	C
Admma	Adelphia high glauconite variant fine sandy loam, 0 to 2% slopes	498.37	B	C
AdmmB	Adelphia high glauconite variant fine sandy loam, 2 to 5% slopes	41.71	B	C
AtsA	Atsion fine sand, 0 to 2% slopes	1520.85	C	C
AttA	Atsion sand, 0 to 2% slopes	503.43	C	C
AttxAr	Atsion-Berryland sands, 0 to 2% slopes, rarely flooded	12.34	C	C
BerAr	Berryland fine sand, 0 to 2% slopes, occasionally flooded	69.29	C	C
BetAs	Berryland sand, 0 to 2% slopes, rarely flooded	17.22	C	C
BugA	Buddtown fine sandy loam, 0 to 2% slopes	231.37	B	C
BugB	Buddtown fine sandy loam, 2 to 5% slopes	278.06	B	C
BuhA	Buddtown loamy fine sand, 0 to 2% slopes	69.28	B	C
BuhB	Buddtown loamy fine sand, 2 to 5% slopes	20.89	B	C
BukA	Buddtown-Deptford complex, 0 to 2% slopes	86.62	B	C
BumA	Buddtown-Deptford loamy fine sands, 0 to 2% slopes	59.44	C	C
CoeAs	Colemantown loam, 0 to 2% slopes, occasionally flooded	730.40	C	C
ComA	Collington fine sandy loam, 0 to 2% slopes	3.67	B	A
ComB	Collington fine sandy loam, 2 to 5% slopes	410.10	B	A

Soil Description	Soil Code	Acres	Building without Basement	Building with Basement
DocB	Downer loamy sand, 0 to 5% slopes	227.79	A	A
EveB	Evesboro sand, 0 to 5% slopes	1475.72	A	A
EveC	Evesboro sand, 10 to 30% slopes	25.13	A	A
EveE	Evesboro sand, 5 to 10% slopes	12.12	C	C
EvehB	Evesboro sand, loamy substratum, 0 to 5% slopes	5.06	A	A
FmgAt	Fluvaquents, loamy, 0 to 3% slopes, frequently flooded	200.88	C	C
FmhAt	Fluvaquents, sandy, 0 to 3% slopes, frequently flooded	400.24	C	C
FrFb	Freehold fine sandy loam, 2 to 5% slopes	262.40	A	A
FrFc	Freehold fine sandy loam, 5 to 10% slopes	22.73	A	A
FrkC3	Freehold loamy sand, 0 to 5% slopes	225.61	B	B
FrmB	Freehold loamy sand, 5 to 10% slopes	13.63	A	A
FrmC	Freehold sandy loam, 5 to 10% slopes, severely eroded	90.55	B	B
GahB	Galloway fine sand, 0 to 5% slopes	217.51	B	C
GakB	Galloway sand, 0 to 5% slopes	0.55	B	C
Hoab	Holmdel fine sandy loam, 0 to 2% slopes	42.69	B	C
HodA	Holmdel fine sandy loam, 2 to 5% slopes	5.05	B	C
HodB	Holmdel loamy sand, 0 to 5% slopes	579.85	B	C
HofB	Holmdel-Urban land complex, 0 to 5% slopes	210.93	B	C
JdrA	Jade Run fine sandy loam, 0 to 2% slopes	334.85	C	C
KeaA	Keansburg fine sandy loam, 0 to 2% slopes	160.63	C	C
KrbA	Kresson fine sandy loam, 0 to 2% slopes	615.01	C	C
KreA	Kresson loam, 0 to 2% slopes	149.46	C	C
KrhA	Kresson loamy sand, 0 to 5% slopes	27.31	C	C
LakB	Lakehurst fine sand, 0 to 5% slopes	1565.00	A	C
LakhB	Lakehurst sand, 0 to 5% slopes	1424.07	B	C
LamB	Lakehurst sand, loamy substratum, 0 to 5% slopes	2.75	B	C
LanB	Lakehurst-Lakewood sands, 0 to 5% slopes	6.64	B	C
LasB	Lakewood fine sand, 0 to 5% slopes	506.05	A	A
LasC	Lakewood fine sand, 5 to 10% slopes	108.78	A	A
LasD	Lakewood sand, 0 to 5% slopes	1383.93	B	B
LatB	Lakewood sand, 10 to 15% slopes	13.68	A	A
LatC	Lakewood sand, 5 to 10% slopes	92.48	B	B
MakAt	Manahawkin muck, 0 to 2% slopes, frequently flooded	54.72	C	C
MapA	Marlton fine sandy loam, 0 to 2% slopes	222.18	B	B
MapB	Marlton fine sandy loam, 2 to 5% slopes	703.13	B	B
MapC	Marlton fine sandy loam, 5 to 10% slopes	11.83	B	B
MunA	Mullica fine sandy loam, 0 to 2% slopes	381.23	C	C
PefB	Pemberton sand, 0 to 5% slopes	496.30	A	C
PeftB	Pemberton sand, thick surface , 0 to 5% slopes	52.49	A	C
PhbC	Phalanx loamy sand, 5 to 10% slopes	9.16	B	B
PHG	Pits, clay	65.98	N/R	N/R
PHM	Pits, sand and gravel	9.82	C	C
SapB	Sassafras-Urban land complex, 0 to 5% slopes	61.01	A	A
ShsA	Shrewsbury fine sandy loam, 0 to 2% slopes	320.37	C	C

Soil Description	Soil Code	Acres	Building without Basement	Building with Basement
ThfB	Tinton sand, 0 to 5% slopes	29.65	A	A
ThftB	Tinton sand, thick surface, 0 to 5% slopes	26.72	A	A
UdrB	Udorthents, refuse substratum, 0 to 8% slopes	17.33	A	A
URCLAB	Urban land, clayey substratum, 0 to 8% slopes	8.75	B	B
URSAAB	Urban land, sandy, 0 to 8% slopes	368.30	A	A
WATER	Water	176.21	N/R	N/R
WedB	Westphalia fine sandy loam, 2 to 5% slopes	608.63	A	A
WeeB	Westphalia loamy fine sand, 2 to 5% slopes	47.75	A	A
<b>Total</b>		<b>18,910.86</b>		

### Key to Land Use Implications

<b>A = Not Limited</b>	Little or no limitation(s) or easily corrected by use of normal equipment and design techniques.
<b>B = Somewhat Limited</b>	Presence of some limitation, which normally can be overcome by careful design and management at somewhat greater cost.
<b>C = Very Limited</b>	Limitations that, normally, cannot be overcome without exceptional, complex, or costly measures.
<b>N/R = Not Rated</b>	Limitations are not rated.

Source: U.S. Department of Agriculture, Natural Resource Conservation Service

## STEEP SLOPES

Slope is measured as the percent of vertical rise to horizontal distance. Most of Evesham Township has slopes of 10% or less. Slopes between 15% and 20% are generally considered to be steep slopes, and there are some isolated areas of Evesham with slopes of 20% or more. These areas are generally along the township's border with Mount Laurel, southeast of Harmony Lake, and near Van Dal Lake and Lost Lake. There are also occasional steep slopes between Kettle Run Road and Tomlinsons Mill Road. (Evesham Township's steep slopes have been added to **Map 8: Flood Hazard Areas**.)

In general, development is inadvisable in steep slope areas because of soil instability, erosion, sedimentation of streams, increased stormwater runoff, and flooding. This causes habitat destruction, water pollution, and potential damage to property. Erosion on steep slopes is especially prevalent where excessive tree removal has taken place. On steep slopes, structures and septic systems should generally be limited or prohibited.

On steep slopes bordering creeks and streams, it is not unusual to see trees that have fallen into the gullies or into the streams themselves. In some places, the rate of tree loss is accelerated beyond natural rates by erosion from flash flooding, which in turn is often caused by increases in impervious surface upstream. However, trees on steep slopes fall for other reasons as well, including age, severe storms (especially if their roots have been exposed from erosion), and heat and water loss, which dries the soil.

## **CLIMATE**

Located along the 39<sup>th</sup> Parallel (about midway between the North Pole and Equator), New Jersey 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 west and northwest bringing cold, polar air masses from subarctic Canada.

The climate in New Jersey varies within five regions: North, Central, Southwest, Pine Barrens, and Coastal. Evesham straddles the Southwest and Pine Barrens zones. The northwestern portion of Evesham is in the Southwest Climate zone, while the remainder of Evesham is in the Pine Barrens zone. The Southwest region is generally warmer than the Pine Barrens, due to differences in soil composition and proximity to the Delaware Bay, which gives the Southwest region a maritime influence. The soils of the Southwest retain moisture better than those of the Pine Barrens, contributing to the warmer temperatures. The soils of the Pine Barrens are sandy and allow precipitation to rapidly infiltrate the ground and leave the surface dry. This, along with the swift rate at which solar radiation absorbed during the day is radiated back into space, allow for a wider range between the daily maximum and minimum temperatures than in the southwest. The Southwest experiences the longest growing season in the state thanks to the moderating effects of the Delaware Bay and the relatively early spring frosts and late fall frosts, compared to the other regions.

Detailed weather data from nearby Moorestown, New Jersey is available from the National Climatic Data Center within the National Oceanic and Atmospheric Administration. The Moorestown Station has been in operation since 1948. The mean temperature in the Evesham area for July is 76.3°F; the monthly mean temperature for January is 32.3°F. The Evesham area experiences a mean daily maximum temperature of 87.8°F in July and a mean daily minimum temperature in January of 23.2°F. The extreme temperatures recorded in Evesham are a low of -13°F on February 9, 1934 and a high of 106°F on July 10, 1936. The region's annual mean temperature is 54.7°F. This is slightly higher than the statewide annual mean temperature of 52.3°F.

### **Precipitation and Storm Events**

The normal average annual precipitation for the area from 1971 through 2000 was 48.25 inches, compared to a statewide normal annual precipitation of 47.87 inches. Evesham's location, approximately 12 miles inland, is also less susceptible to heavy rains associated with coastal storms. The Evesham area receives the most precipitation in August, which has a monthly average of 5.18 inches, and the least precipitation in February, which has an average precipitation of 2.95 inches.

Snowfall typically occurs in New Jersey when moist air from the south converges with cold air from the north. In Evesham, snowfall may occur from mid-October to mid-April, but is most likely to occur from December to March. The highest daily snow fall—22 inches—occurred on February 11, 1983.

Severe storm events, including thunderstorms, tropical storms, blizzards, ice storms, hail storms and tornadoes, occur in Burlington County. Tornadoes are infrequent; about five, generally weak, occur in New Jersey each year. Thunderstorms occur in Evesham mainly between May and August. Until 2011, hurricanes passed offshore of New Jersey. This changed with two significant storms in consecutive years with both causing torrential rains, winds and flooding. Hurricane Irene made landfall in the Little Egg Inlet on August 28, 2011. On October 29, 2012, Hurricane Sandy moved ashore near Brigantine, NJ as a post-tropical cyclone with hurricane-force winds. Sandy resulted in epic damaged to much of the New Jersey coast.



Source: DVRPC

*Evans Mill Pond*

## **Growing Seasons**

Evesham is within U.S. Department of Agriculture (USDA) Plant Hardiness Zone 7, 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. Nearly all of Burlington County, along with Salem County, portions of Cumberland, Gloucester, and Camden counties, and areas along the Atlantic coastline are designated as Zone 7, the warmest USDA Plant Hardiness Zone in New Jersey.

Evesham's agricultural growing season is approximately six months, or 180 days, from mid-April to mid-October. This is the period between the last spring frost and first autumn frost. However, harvesting 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 Evesham is about 60 days longer than in northern New Jersey, where frosts generally end in May and begin in October.

## **AIR QUALITY**

Air quality is one of the most difficult environmental resources to measure because its sources are diffuse and regional in nature. Sources of air pollution include industry, cars, trucks, buses, fires, and dust. Air pollutants can travel extremely far from their source. For example, the burning of coal in Ohio, Michigan, and Western Pennsylvania to generate electricity sends pollutants like sulfur, nitrogen, and particulate matter all the way to the East Coast. Local sources of air pollution include traffic and industrial complexes in the Delaware Valley.

In 1970, the Environmental Protection Agency (EPA) was formed to enforce the Clean Air Act (CAA). The CAA identified six *criteria* pollutants – ozone, particulate matter, sulfur dioxide,



## CRITERIA POLLUTANTS

**Ground level ozone** 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, or 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<sub>2</sub>)** 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<sub>2</sub> generally occur in areas with heavy traffic congestion. The highest levels of CO<sub>2</sub> typically occur during the colder months when air pollution becomes trapped near the ground beneath a layer of rising warm air.

**Nitrogen oxides** 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<sub>2</sub>)** is released into the atmosphere when fuel containing sulfur, such as coal and oil, is burned, and when gasoline is refined from oil. SO<sub>2</sub> dissolves in water vapor to form acid precipitation.

**Lead** 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.

nitrogen oxides, carbon monoxide, and lead – that are destructive to human health, and the built and natural environment (see **Criteria Pollutants** sidebar on the left). The EPA sets National Ambient Air Quality Standards (NAAQS) for these pollutants based on human health effects, as well as environmental and property damage.

In New Jersey, NJDEP does the air quality monitoring for the EPA (see NJAC 7:27). NJDEP's Bureau of Air Monitoring maintains a network of monitoring stations across the state. These stations continually monitor some or all of seven parameters – carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, smoke shade, particulate matter, and meteorological data. The monitoring station closest to Evesham Township is located approximately 20 kilometers away in Camden, New Jersey. The Camden Lab monitoring station tracks the concentration of all seven parameters. It is a neighborhood scale station for carbon monoxide, nitrogen oxide, sulfur dioxide, smoke shade, and particulates; this means, its measurements represent not just the immediate neighborhood, but also nearby neighborhoods up to 10 kilometers away. Camden Lab is an urban scale station – ideal for monitoring pollutants over an area of 10-100 kilometers – for ozone and meteorological parameters.

Under the CAA, the EPA limits the amount of other air pollutants and toxins that are emitted by point sources, such as chemical plants, industrial factories, power plants, and steel mills. The NJDEP Air Quality Permitting Program issues permits for stationary sources of air pollution, such as power plants, oil refineries, dry cleaners, food processing centers, and manufacturing plants, and regulates and monitors their emissions. There were 37 active air quality permits in Evesham Township between 2009 and 2016.

### ***Air Quality Index***

EPA created the Air Quality Index (AQI) to indicate a metropolitan 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 **Table 7** below.

**Table 7: Air Quality Index**

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>...air quality conditions are:</i>	<i>...as symbolized by this color:</i>
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: AIRNow

The daily score is based on whatever the highest individual pollutant score is reported. For example, if ozone scored 150 and particulate matter scored 100, the daily AQI would be 150 – Unhealthy for Sensitive Groups. The index is used to measure overall air quality by counting the number of days per year when the AQI of each metropolitan region exceeds 100. Across all metropolitan regions (with populations over 500,000), the number of days per year with an AQI of over 100 steadily decreased between 1988 and 2001. In 2005, the closest metropolitan region to Evesham Township, Philadelphia, had 28 days when the AQI exceeded 100.

New Jersey is subdivided into nine regions that each report the AQI. Burlington County is in Region 5: Central Delaware Valley. In 2104, this area reported 330 good (green) and 33 moderate (yellow) days, 2 days which were unhealthy for sensitive groups (orange), and 0 unhealthy (red) days. (Source: New Jersey's Air Monitoring website: [www.njaqinow.net](http://www.njaqinow.net), Annual Reports).

## **SURFACE WATER RESOURCES**

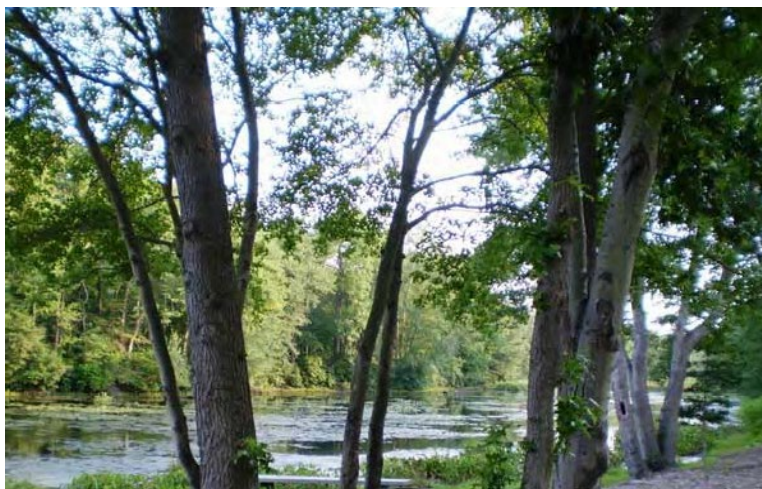
The majority of Evesham Township's land drains to the Delaware River. However, a small portion drains to the Mullica River, which flows to the Atlantic Ocean. The Township is located within four watersheds.

NJDEP manages natural resources on a watershed basis. The state has been divided into 20 Watershed Management Areas (WMAs). Evesham Township is located within 3 WMAs: 14 (Mullica River), 18 (Lower Delaware River), and 19 (Rancocas Creek).

## Watersheds

A watershed is all the land that drains to a particular waterway such as a river, stream, lake, or wetland. A watershed's boundaries are defined by the high points in the terrain, such as hills and ridges. Large watersheds are made up of smaller ones, down to the catchment level of a local site. So, for example, the Delaware River watershed is made up of many smaller watersheds, such as the Rancocas Creek watershed. This watershed, in turn, is formed by several subwatersheds, consisting of the land that drains to a major tributary or branch of the river, such as the Rancocas Creek Southwest branch subwatershed. These subwatersheds can be further subdivided into smaller ones, each surrounding the smaller tributaries that flow to the larger channel, and so on down to the catchment level. Watersheds are natural ecological units, where soil, water, air, plants, and animals interact in a complex relationship. Evesham lies within five HUC -11<sup>1</sup> watershed divisions, as shown in ***Table 8: Watersheds and Subwatersheds in Evesham.***

Nearly three quarters of Evesham's land – mostly in the central portion of the township – drains to the Rancocas Creek Southwest Branch, which eventually flows into the South Branch of the Rancocas Creek and on to the Delaware River. Around 15% of the township's land – mostly in the northwest section – drains into the Pennsauken Creek. Slightly over 7% of the municipality's land drains to the Mullica River, which also forms the southern boundary of the township. See also ***Table 8*** and ***Map 6: Watersheds*** and ***Map 7: Wetlands, Vernal Pools, and Dams.***



*Source: DVRPC*

*Evans Mill Pond*

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<sup>1</sup>“HUC” stands for Hydrological Unit Code, which is a numerical identification number given to every drainage system in the United States by the U.S. Geological Survey. HUC-11 codes are the 11-digit numbers applied to a part of a drainage area that is approximately 40 square miles in size. HUC-11 areas are further subdivided into HUC-14 subwatersheds, which are about 7 square miles in size and have a 14-digit identification number.



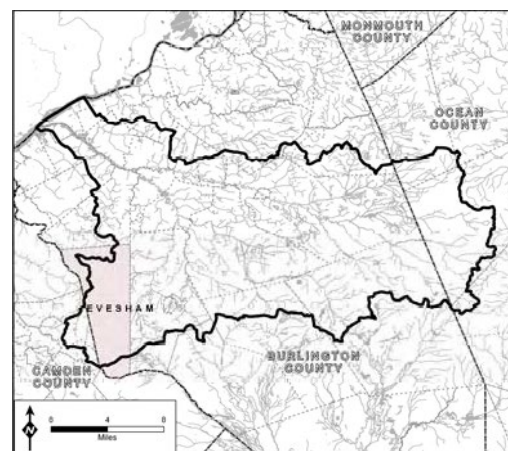
**Table 8: Watersheds and Subwatersheds in Evesham**

Watershed (HUC 11 Number)	Subwatershed within Evesham	Acreage within Evesham	Percent of Evesham land	HUC 14 Number
<b>Rancocas Creek SB SW Branch (02040202060)</b>		<b>14,153.63</b>	<b>74.76%</b>	
	Kettle Run (above Centennial Lake)	1,520.94	8.03%	2040202060010
	Lake Pine / Centennial Lake & tribs	2,855.98	15.09%	2040202060020
	Barton Run* (above Kettle Run Road)	899.35	4.75%	2040202060040
	Barton Run* (below Kettle Run Road)	4,766.57	25.18%	2040202060050
	Rancocas Ck SW Branch (above Medford)	3,177.44	16.78%	2040202060080
	Rancocas Ck SW Branch (below Medford)	933.36	4.93%	2040202060100
<b>South Branch Rancocas Creek (below Bobbys Run) (02040202070)</b>		<b>3.54</b>	<b>0.02%</b>	
	Rancocas Creek SB (below Rt 38)	3.54	0.02%	2040202070030
<b>Pennsauken Creek (02040202100)</b>		<b>2,949.62</b>	<b>15.58%</b>	
	Pennsauken Ck NB (above NJTPK)	1,193.86	6.31%	2040202100010
	Pennsauken Ck SB (above Rt 41)	1,755.77	9.27%	2040202100040
<b>Mullica River (above Basto River) (02040301160)</b>		<b>1,409.93</b>	<b>7.44%</b>	
	Alquatka Branch	1,026.17	5.42%	2040301160010
	Mullica River (above Jackson Road)	383.20	2.02%	2040301160020
<b>Cooper River (02040202110)</b>		<b>414.76</b>	<b>2.19%</b>	
	Cooper River NB (above Springdale Road)	414.76	2.19%	2040202110010

*Note:* The historic and more accurate name for Barton's Run is "Borton's Run," after John Borton, who erected Evesham's first gristmill at the corner of Route 73 and Braddock's Mill Road. See William R. Fair's book *Waterways of Camden County: A Historical Gazetteer* (Camden: Camden County Historical Society, 2002).

### ***Rancocas Creek Watershed***

Evesham's Southwest Branch flows into the Rancocas Creek South Branch, which ultimately joins the mainstem of the Rancocas Creek. The Rancocas, which means "many kinsmen" in the Lenni Lenape language, is the largest watershed in south central New Jersey, and was also the first watershed in New Jersey to have a management plan. The entire watershed drains 360 square miles covering 30 municipalities in Burlington, Camden, and Ocean counties. The watershed starts in the Pinelands, and it is the only Pinelands waterbody that flows to the Delaware River instead of to the Atlantic Ocean. Approximately 68% of the Rancocas Creek watershed is within the Pinelands Management Area, which is regulated by the Pinelands Commission. Evesham is located in the southwestern part of the Rancocas Watershed. Approximately 75% of Evesham falls within the Rancocas Creek watershed (see Figure 5).



Source: DVRPC

**Figure 5: Rancocas Creek Watershed**

The Rancocas Creek is composed of three branches: the North Branch, South Branch, and mainstem. The North Branch, which starts just south of Fort Dix, is 31 miles long and drains 167 square miles, making the North Branch the largest subwatershed within the Rancocas Creek

basin. The North Branch's main tributaries are: Greenwood Branch, McDonalds Branch, and Mount Misery Brook. The South Branch begins near Chatsworth and drains 144 square miles. Its tributaries include the Southwest Branch Rancocas Creek, Stop the Jade Run, Haynes Creek, and Friendship Creek.

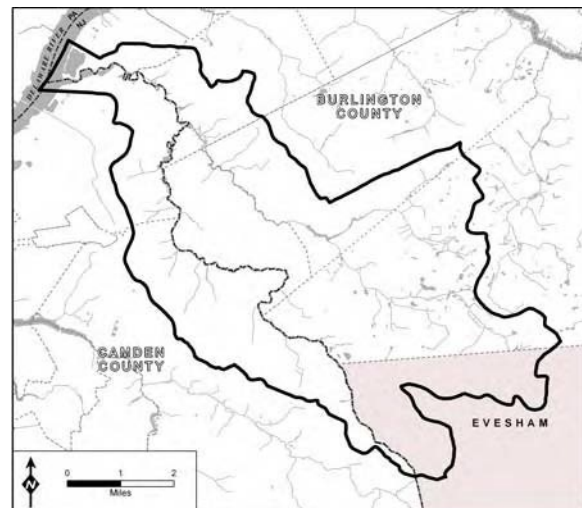
The tributaries that flow through Evesham all flow to the Southwest Branch. They include: Sharps Run, the Southwest Branch, Barton Run, and Hynes Run. The mainstem, which flows for approximately 8 miles, drains 49 square miles between the confluence of the North and South Branches at Hainesport and the Delaware River. The mouth of the Rancocas Creek is located between Riverside and Delanco on the Delaware River. The tidal influence of the stream is evident as far as 15 miles upstream from the mouth, near the dam at Mount Holly on the North Branch, Vincentown on the South Branch, and Kirby Mills on the Southwest Branch. The eastern part of the watershed is predominantly forested or agricultural, but the western side of the watershed is heavily developed. Approximately 40% of the total watershed is forested, 30% is developed, and 17% is used for agriculture, including cranberry bogs.

There are several sewage treatment plants that discharge to the Rancocas. In Evesham, for example, the Elmwood Plant discharges to the Southwest Branch of the Rancocas.

### ***Pennsauken Creek Watershed***

The Pennsauken Creek is a tributary of the Delaware River that is located in Watershed Management Area 18. It drains 33 square miles of southwestern Burlington County, as well as the northern parts of Camden County (see Figure 6). The mouth is located near Palmyra, New Jersey.

The headwaters of the North Branch of the Pennsauken are in Evesham. The creek then flows through Mount Laurel and into Strawbridge Lake in Moorestown, which was created in the 1920s by the damming of the North Branch of the Pennsauken and Hooten Creek. The South Branch of the Pennsauken is the boundary between Burlington and Camden counties. The land use in the Pennsauken Creek watershed is predominantly urban and suburban development, especially near the mouth, which is also bordered by industry. There are some areas of agricultural and forested land in the watershed as well.

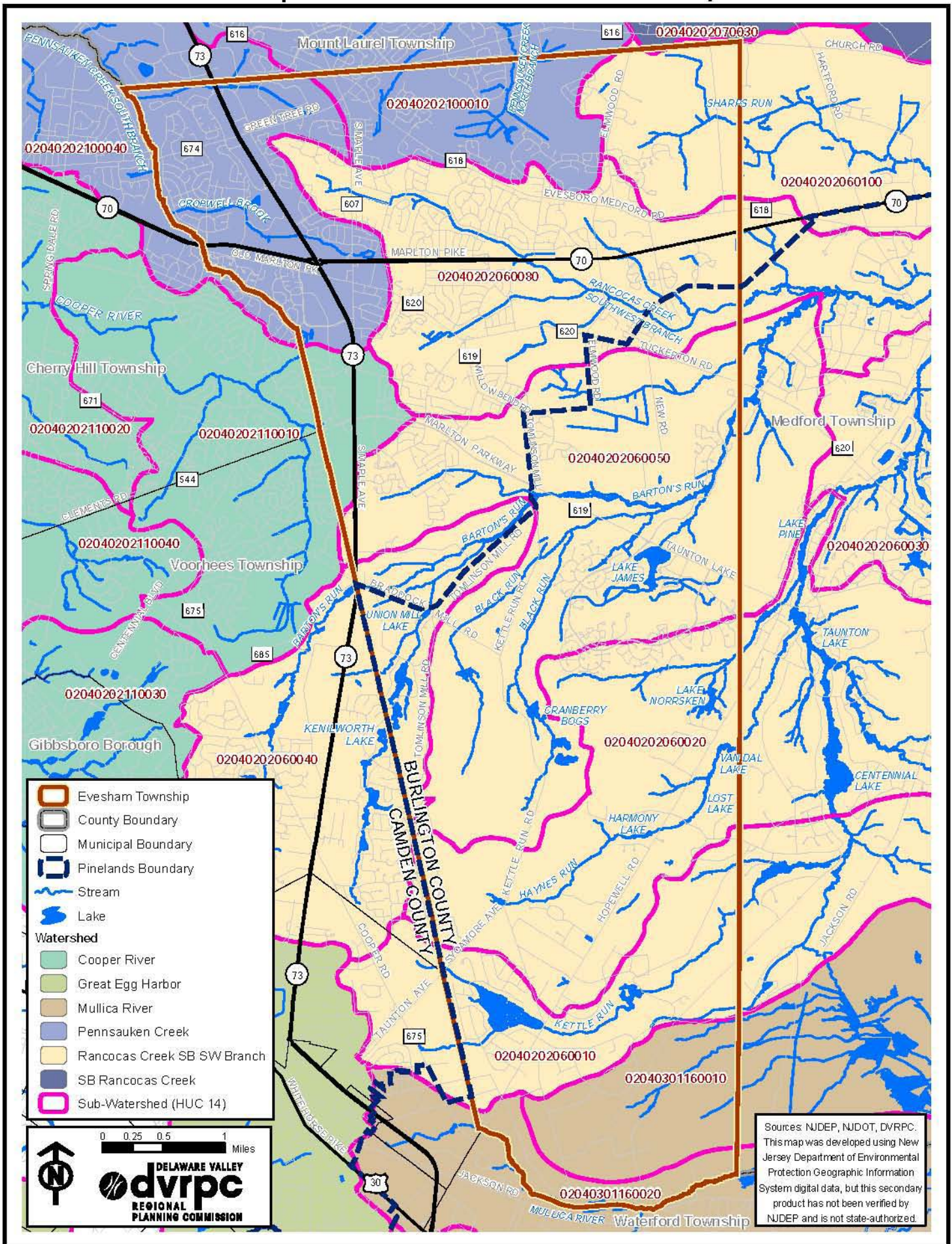


Source: DVRPC

**Figure 6: Pennsauken Creek Watershed**

Cropwell Creek and the Pennsauken Creek South Branch begin in the northwestern corner of Evesham, while the Pennsauken Creek North Branch begins in northern Evesham and flows towards

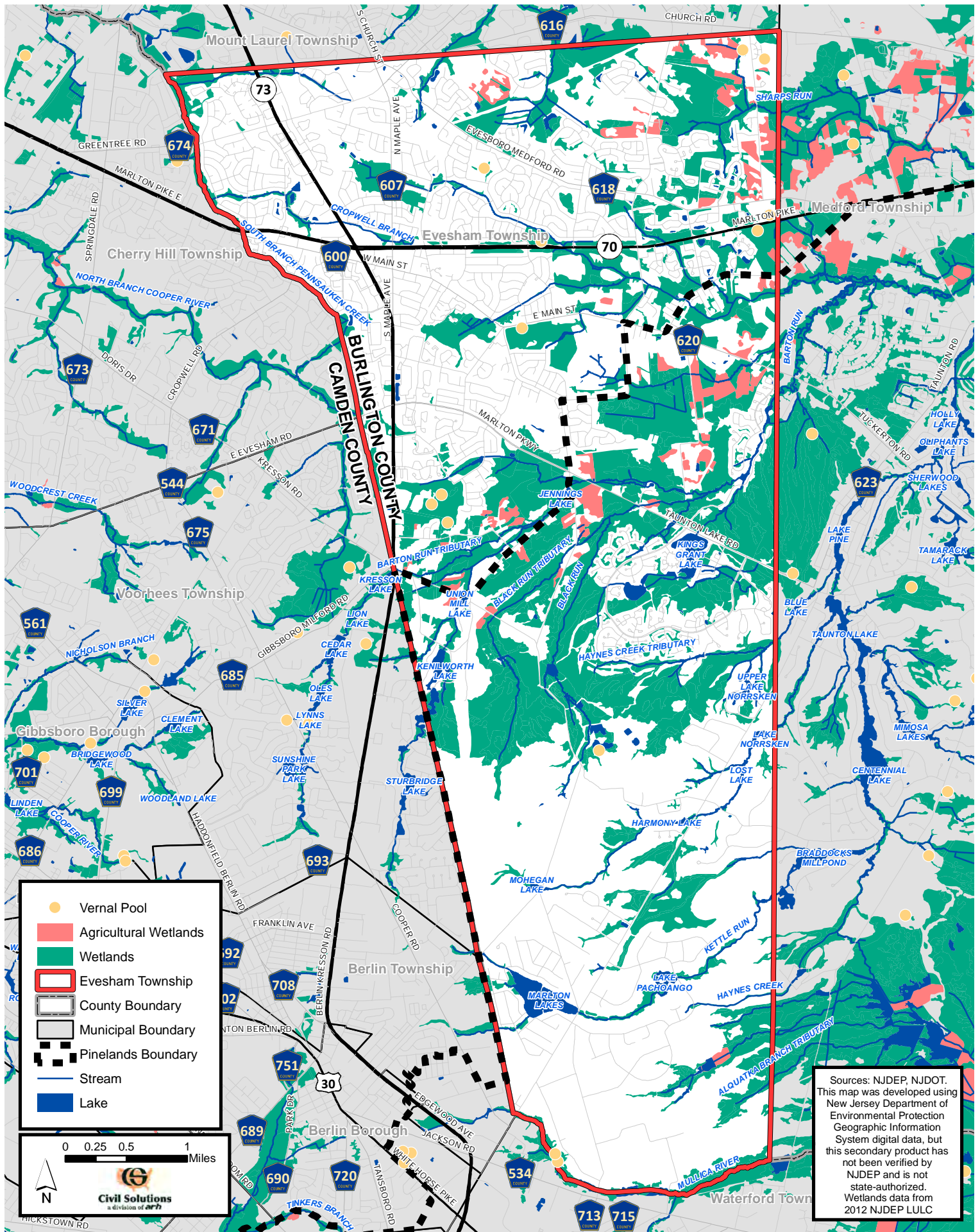






# Evesham Township

# Map 7: Wetlands, Vernal Pools

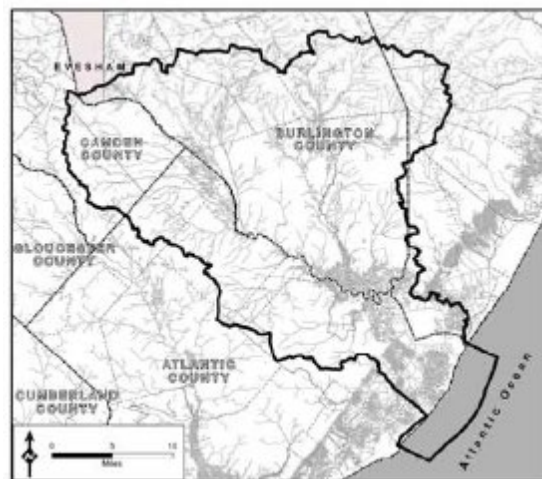


Mount Laurel. Evesham's Woodstream Wastewater Sewage Treatment Plant discharges to the South Branch of the Pennsauken Creek.

### ***Mullica River Watershed***

The Mullica River and its tributaries are one of the main drainage systems for the Pinelands. The total area of the Mullica River watershed is slightly less than 570 square miles, and includes all or part of 23 municipalities across Atlantic, Burlington, Camden and Ocean Counties (see Figure 7). The population centers in the Mullica River watershed are Winslow, Galloway and Hammonton.

The portion of the Mullica River watershed within Evesham is located entirely within the Pinelands Management Area. Much of the land in the Mullica River watershed is currently unaltered. Most the land is located within state parks and forests, and only about 20% of the watershed's total area is devoted to agriculture and development. The watershed means that the water is generally of high quality and there are numerous native species found in the area. The Mullica River eventually flows into the Great Bay estuary which, despite its location only ten miles north of Atlantic City, is one of the least disturbed estuaries in the Northeastern United States.

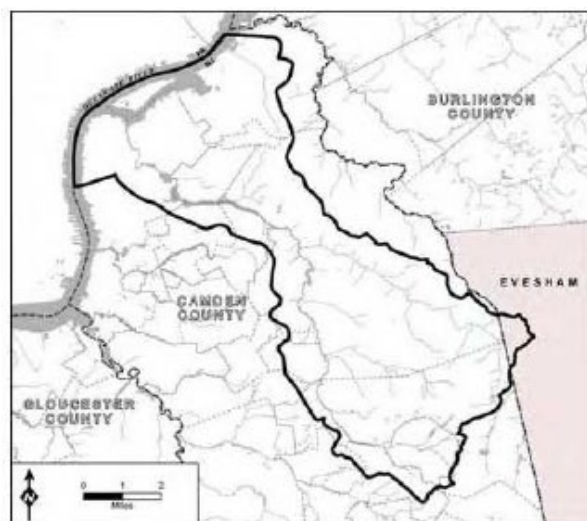


Source: DVRPC

**Figure 7: Mullica River Watershed**

### ***Cooper River Watershed***

Only a small portion of the Cooper River watershed is located in Evesham, mostly on either side of Route 73 between Brick Road and Sunbird Drive. The Cooper River, which is named after some of the earliest settlers of Camden County, is situated in the northern part of Watershed Management Area 18. The watershed contains approximately 57 miles of streams, which drain an area of 40 square miles (see Figure 8). The headwaters of the South Branch begin in Gibbsboro, but the headwaters of the North Branch begin in Voorhees Township, just west of Evesham Township. Some of the tributaries are: Chandlers Run, Millard Creek, Nicholson Branch, the North Branch, and Tindale Run. The river is tidal up to the Cooper River Parkway Dam at Kaighn Avenue in Camden. There are no large tributaries to the Cooper River in Evesham Township but there is land area that drains directly to the North Branch.



Source: DVRPC

**Figure 8: Cooper River Watershed**

Seventy percent of the Cooper River watershed is classified as urban land and the river branches and main stem flow through 16 Camden County municipalities, including Cherry Hill, Voorhees, Haddonfield, Haddon Township, Collingswood, Camden City, and Pennsauken, before it empties into the Delaware River in Camden City. Many nearby residents use the river for recreational activities such as fishing and canoeing. Although the water quality in the upper regions of the watershed is often quite good, the quality deteriorates downstream, where the watershed is very developed.

## Streams

Evesham Township is the source for multiple stream systems (see **Table 9: Evesham Township Streams** below). Approximately 57 stream miles cross Evesham Township altogether. Of these, the vast majority – nearly 95% – are first order or second order (headwater) streams. That is, they are the initial sections of stream channels with no contributing tributaries (first order streams), or they are stream channels formed from only one branching section of tributaries above them (second order streams). The headwaters are where a stream is “born,” and actually begins to flow. See **Map 7: Wetlands, Vernal Pools, and Dams**.

**Table 9: Evesham Township Streams**

Stream Order	Miles
First Order Streams (smallest)	36.79
Second Order Streams	17.36
Third Order Streams	3.28
<b>Total Stream Miles</b>	<b>57.42</b>

*Source: NJDEP*

Headwaters are of particular importance because their condition affects downstream water quality and because they tend to contain a greater diversity of aquatic species. Due to 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 usually 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.



## Lakes and Ponds

There are 254.13 acres of small lakes and artificial ponds in Evesham. Principal lakes include Kenilworth Lake, Lake Norrsken, Harmony Lake, Lost Lake, Van Dal Lake, and the Marlton Lakes. Kenilworth Lake and the Cranberry Bogs are on tributaries of Barton's Run, which eventually flows into the Southwest Branch of the Rancocas, just past the Evesham-Medford Township line. Harmony Lake, Lost Lake, and Van Dal Lake are on Haynes Run, which flows toward Medford Township. The Marlton Lakes are along Kettle Run.



Source: John Volpa

*Lakeside Trees*

All lakes in Evesham are classified as artificial waterbodies by NJDEP. Artificial lakes and ponds are man-made impoundments of water that are formed by damming. They are often used for irrigation and flood control. Artificial ponds and lakes may also be the result of extractive mining operations or cranberry farming. Naturally occurring lakes and ponds do not exist in southern New Jersey. See **Map 7: Wetlands, Vernal Pools, and Dams**.

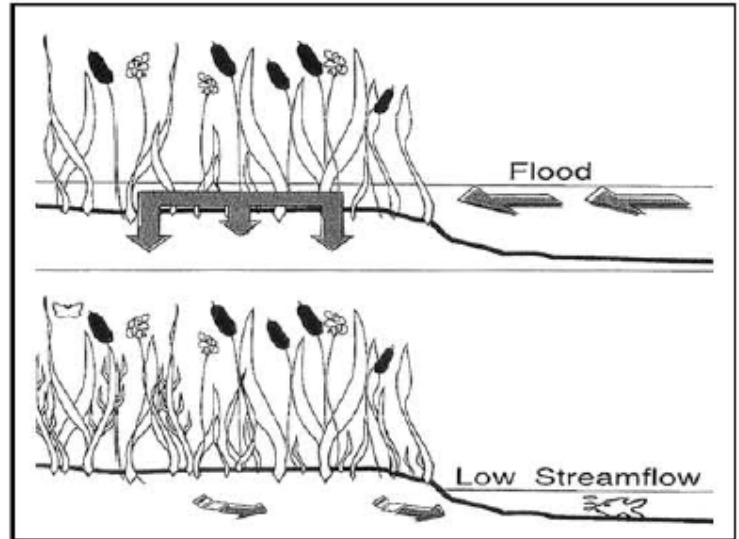
## Wetlands

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, 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 (see Figure 9).

New Jersey protects freshwater (interior) 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 determine if there are freshwater wetlands on a property. An LOI verifies the presence, absence, or boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited and permits are required for most of them.

All of Evesham's wetlands are freshwater. Natural wetlands of all types total 5,751.53 acres (or 30.38% of the township's total area). The vast majority of these wetlands are deciduous wooded wetlands, followed by coniferous wooded wetlands, and modified agricultural wetlands. Other types of wetlands account for less than 5% of the township's area. See **Map 7: Wetlands, Vernal Pools, and Dams**.

Evesham also includes 231.17 acres of wetlands, covering approximately 1.2% of the township, that have been altered by human activities and no longer support typical wetland vegetation or are not vegetated at all. These 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



Source: *The Streams of Washington Township*, with permission.

**Figure 9: Wetlands**

Wetlands vegetation traps and holds flood water, allowing it to percolate into the ground.

Service soil surveys. Modified wetlands fall into categories defined by the *Anderson Land Use Classification* system as follows: There are 80.85 acres of former agricultural wetlands, 31.74 acres of disturbed wetlands, 16.52 acres of wetland right-of-ways, and approximately 102 acres of wetlands found in maintained greenspace, lawns, or recreation areas.

## Agricultural Wetlands

Agricultural wetlands occupy 497.97 acres (2.63%) of Evesham Township. These "quasi-wetlands" are found scattered as small sites throughout the township. These wetlands tend to border natural wetlands or streams. Agricultural wetlands are modified former wetland areas that are under cultivation. They still exhibit evidence of soil saturation in aerial infrared photo surveys, but do not support natural wetland vegetation. See **Map 7: Wetlands, Vernal Pools, and Dams**.

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, which is:

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 ([www.nrcs.usda.gov/programs/wrp](http://www.nrcs.usda.gov/programs/wrp)), a voluntary program that offers landowners incentives for restoring and protecting wetlands on their property, including agricultural wetlands. Restoring agricultural wetlands requires removing them from agricultural use and restoring them to their natural state. This program provides technical and financial assistance to landowners who can enroll eligible lands through permanent easements, 30-year easements, or restoration cost-share agreements.

## **Vernal Pools**

Vernal pools are bodies of water that appear following snowmelt and during spring rains, but that disappear or are dry during the rest of the year. They are highly important sites for certain rare species of frogs and salamanders, called obligate breeders. Obligate breeders will only breed in vernal pools because the pool's impermanence prevents residence by predators who would consume the eggs and young. Vernal pools also provide habitat for amphibians and reptiles that do not exclusively breed in them, but may use the pools at some point in their life cycles for breeding or other purposes (facultative breeders).

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

Wetlands, including vernal pools or intermittent ponds, are afforded greater protection within the Pinelands portion of Evesham. Unless they have been certified, non-Pineland vernal pools less than 1 acre in size can be filled. 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. Once a vernal pond is certified, regulations require that a 75-foot buffer be maintained around the pond. NJDEP's Division of Land Use Regulation oversees this designation and restricts development around vernal ponds by denying construction permits. Local municipalities can provide additional protection by instituting restrictive zoning or negotiating conservation easements on the land surrounding the pond. 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: [www.sjlandwater.org/ongoing/vernalpools.htm](http://www.sjlandwater.org/ongoing/vernalpools.htm).



The state has identified 14 possible vernal pools within Evesham, which are listed in **Appendix A: Vernal Pools in Evesham Township**. With the exception of two near the Mullica River, most of the vernal pools are concentrated in the northern half of the township. They are located in a rough line that runs from southwest Evesham through the township to northeast Evesham. Volunteers can survey each pool to determine what species are present and if the pool is still in existence as a natural habitat.



Source: John Bunnell

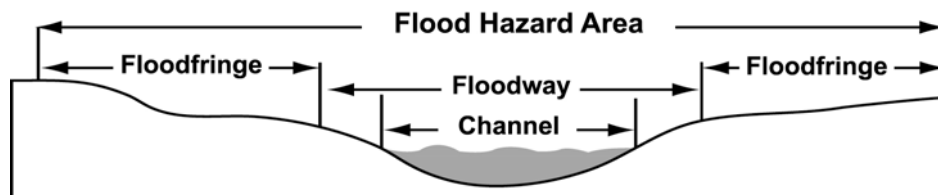
*Northern gray tree frog*

Once surveyed, the New Jersey Division of Fish and Wildlife will review the data and those pools that meet the criteria will be certified. A certified vernal pool is defined as 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.

## Floodplains

Areas naturally subject to flooding are called floodplains, or flood hazard areas (see Figure 10). 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 1% chance of occurring in any given year).

Although the terms “flood hazard area” and “100-year floodplain” denote 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%. This type of flood is called the “flood hazard area design flood,” and it is the flood regulated by NJDEP.

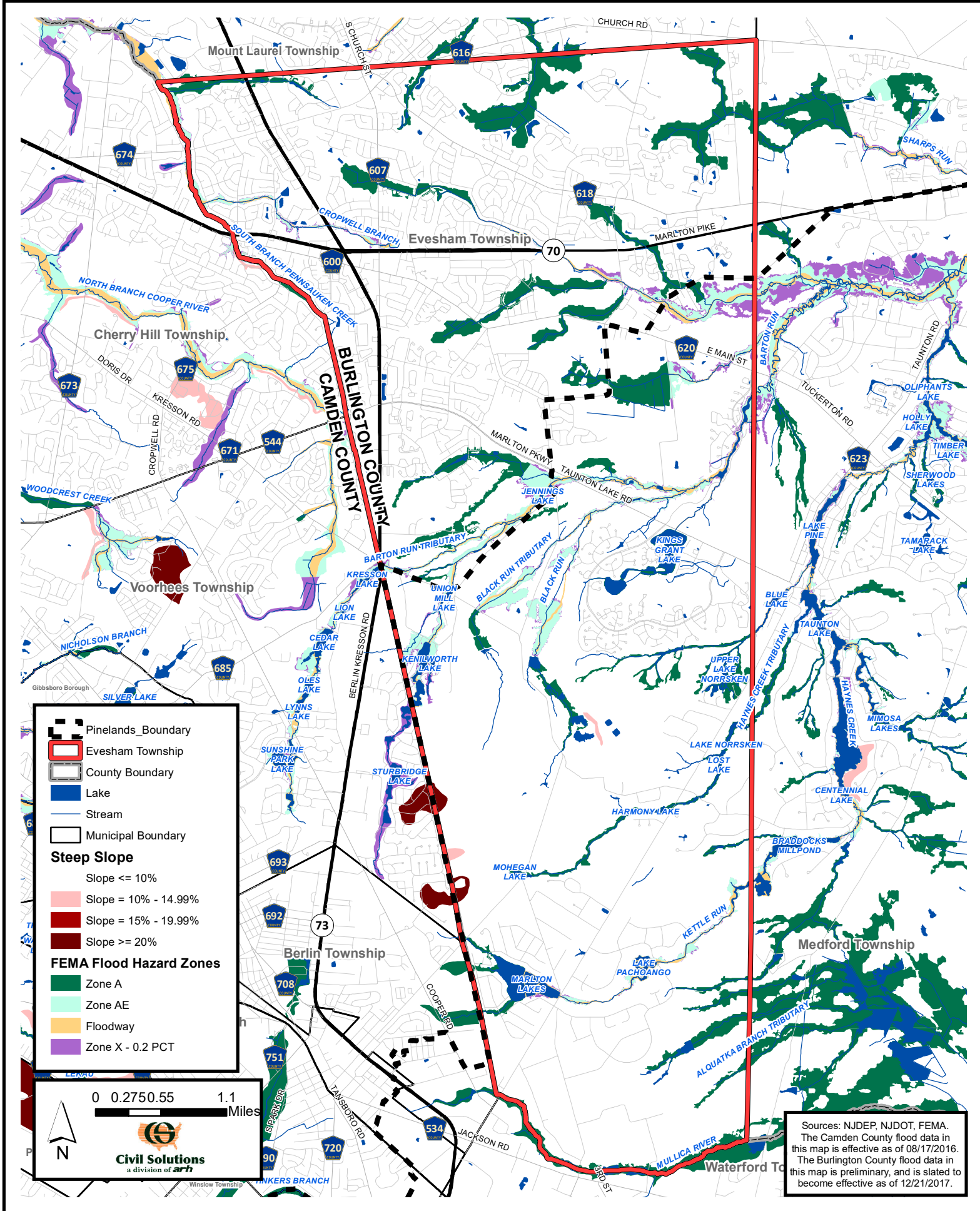


Source: The Streams of Washington Township

**Figure 10: Parts of a Flood Hazard Area**

# Evesham Township

## Map 8: Flood Hazard Zones and Steep Slopes



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 remove and mitigate various pollutants because their vegetation removes excess chemical loads from the water and filters sediments. All efforts to keep development out of floodplains will help to preserve the flood-carrying capacity of streams and their water quality.

In New Jersey and throughout the country, building in areas subject to flooding is regulated to protect lives, property, and the environment. New Jersey regulates construction in the flood hazard area under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq., and its implementing rules at N.J.A.C. 7:13. Activities that are proposed to occur in a flood hazard area require a stream encroachment permit or a letter of non-applicability from the NJDEP. Additional information on floodplain activities is available from NJDEP and from its website under “Land Use.” Additional information can also be found in Chapter 78, entitled “Flood Damage Prevention,” of the Evesham Township Code.

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 Evesham by using the Federal Emergency Management Agency’s (FEMA’s) 100-year floodplain maps. FEMA’s maps show that 1937.13 acres (10.23%) of the township’s land area fall within the 100-year floodplain (see **Table 10: Flood Hazard Acreage** below). Presumably, the flood hazard area would be slightly larger.<sup>2</sup>

Evesham’s floodplain areas are located along most water bodies, with the largest floodplains surrounding the Cranberry Bogs east of Kettle Run Road, along an unnamed tributary south of Tuckerton Road, and near unnamed tributaries in the southeast corner of the township. Smaller streams may periodically flood, but the Federal Emergency Management Agency and NJDEP have not delineated these floodplains because the risk to property and human health is usually minor. See **Map 8: Flood Hazard Areas and Steep Slopes** and the narrative on **Flooding** in the Environmental Issues section of this document.

**Table 10: Flood Hazard Area Acreage**

Category	Acres
100-year floodplain	1,937.13
500-year floodplain	114.58

*Source: Federal Emergency Management Agency (FEMA)*

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<sup>2</sup> Site plan and subdivision applications require detailed engineering studies that depict the boundaries of the flood hazard area at a large scale.



## Surface Water Quality

Water quality standards are established by federal and state governments to ensure that water is suitable for its intended use. The federal Clean Water Act (P.L. 95-217) requires that wherever possible water-quality standards provide water suitable for fish, shellfish, and wildlife to thrive and reproduce and for people to swim and boat.

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. Tributary streams that are not explicitly classified by the NJDEP take the classification of the river into which they flow.

Evesham contains both freshwater and Pinelands water streams. The streams that are part of the Cooper River and Pennsauken Creek drainage systems are classified as FW2–NT, meaning that they are freshwater streams that are not trout producing or trout maintaining. The remainder of the waterways in Evesham all begin in the Pinelands Management Area, and are therefore classified as Pinelands water (PL). See **Table 11** below.

**Table 11: Water Quality Classifications of Streams in Evesham**

Streams	Classification
Cooper River	FW2-NT
Mullica River (above Basto)	PL
Pennsauken Creek	FW2-NT
Rancocas Creek SB (below Bobbys Run)	PL
Rancocas Creek SB SW Branch	PL

Source:

*Surface Water Quality Standards, Statutory Authority: N.J.S.A. 58:10A-1 et seq., 58:11A-1 et seq., and 13:1D-1 et seq., Re-adopted: October 17, 2016, Last Amended - January 18, 2011 (43 N.J.R. 174(b))*  
([http://www.nj.gov/dep/rules/rules/njac7\\_9b.pdf](http://www.nj.gov/dep/rules/rules/njac7_9b.pdf))

According to NJDEP rules, FW2 (both trout maintaining and not) 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 waterbody's designated use(s) is based on whether the waterbody is within established limits for certain surface water quality parameters. Some examples of surface water quality parameters include fecal coliform,

dissolved oxygen, pH, phosphorous, and toxic substances. NJDEP also evaluates water quality by examining the health of aquatic life in a stream.

### ***New Jersey's Integrated Water Quality Monitoring and Assessment Report***

The Federal Clean Water Act (Act) mandates that states submit biennial reports to the U.S. Environmental Protection Agency (USEPA) describing the quality of their waters. States must submit two reports: 1) the *Water Quality Inventory Report* or “305(b) Report,” documenting the status of principal waters in terms of overall water quality and support of designated uses, and 2) a list of waterbodies that are not attaining water quality standards – the “303(d) List.” States must also prioritize 303(d)-listed waterbodies for Total Maximum Daily Load (TMDL) analyses and identify those high priority waterbodies for which they anticipate establishing TMDLs in the next two years. See the section entitled, “Total Maximum Daily Load (TMDL)” for a description of a TMDL.

Since 2002, NJDEP has integrated the 303(d) List and the 305(b) Report into a single report according to the USEPA’s guidance. The “2012 New Jersey Integrated Water Quality Monitoring and Assessment Report,” was released in September 2014. There is also a draft 2014 report of the title, “20214 New Jersey Integrated Water Quality Assessment Report” release December 2015 and a methods document for a developing report for 2016. The 2018 update of the ERI refers to and takes data from the draft 2014 report.

NJDEP reports the attainment/nonattainment of water quality standards required for achieving designated uses on a HUC-14 subwatershed basis. (See **Watersheds** section for a definition of a subwatershed.) **Map 6: Watersheds** shows the subwatersheds with their 14-digit Hydrologic Unit Code numbers (HUC-14). NJDEP identifies the designated uses applicable to each HUC-14 subwatershed (assessment unit) and assesses the status of attainment for each applicable designated use. Designated uses include:

- Aquatic life (general)
- Aquatic life (trout)<sup>3</sup>
- Primary contact recreation
- Secondary contact recreation
- Drinking water supply
- Industrial water supply
- Agricultural water supply
- Shellfish harvesting<sup>4</sup>
- Fish consumption

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<sup>3</sup> None of the subwatersheds in Evesham Township were assessed for “Aquatic Life (trout)”.

<sup>4</sup> None of the subwatersheds in Evesham Township were assessed for “Shellfish.”

The assessment unit is then given a result for each applicable designated use. These assessment results include: “Fully Supporting,” “Not Supporting,” and “Insufficient Information” (Not Assessed). In order to determine whether or not an assessment unit supports a designated use, NJDEP has identified a suite of parameters that serve as the minimum data set associated with each designated use.

NJDEP based the assessment of entire HUC-14 watersheds on the results of one or more monitoring site(s) within the subwatershed. These results were extrapolated to represent all the waters within the entire HUC-14 boundary. In practice, the HUC-14 approach provides a conservative assessment since any impairment of any waterbody (stream, river, etc.) in a given HUC-14 subwatershed will result in that entire subwatershed being listed as impaired for that use. See ***Table 12: 2014 Draft Integrated List of Waterbodies by Subwatershed, Evesham Township*** for the status of each of Evesham’s HUC-14 watersheds.

If one or more designated uses are assessed as Not Supporting, the pollutant causing the non-attainment status is identified on the “303(d) List of Impaired Waters with Priority Ranking.” When the pollutant causing non-attainment is not known, the pollutant is listed as “pollutant unknown” or “toxic unknown.” ***Table 13: New Jersey’s 303(d) Draft List of Impaired Waters with Priority Ranking*** lists the non-attaining assessment units and their pollutants in Evesham Township. The ranking (low, medium, high) refers to the priority given a specific assessment unit when determining the schedule for a TMDL. High priority assessment units are those for which the State intends to establish a TMDL in the next two years.



Source: DVRPC

*Country Farms Pond*



**Table 12: 2014 Draft Integrated List of Waterbodies by Subwatershed, Evesham Township**

<b>Assessment Unit ID (Subwatershed)</b>	<b>Assessment Unit Name</b>	<b>Aquatic Life (general)</b>	<b>Recreation</b>	<b>Water Supply</b>	<b>Fish Consumption</b>
02040202110010	Cooper River NB (above Springdale Road)	Not Supporting	Not Supporting	Not Supporting	Not Supporting
02040301160010	Alquatka Branch	Insufficient	Insufficient	Insufficient	Insufficient
02040301160020	Mullica River (above Jackson Road)	Not Supporting	Insufficient	Fully Supporting	Not Supporting
02040202100010	Pennsauken Ck NB (above NJTPK)	Not Supporting	Not Supporting	Not Supporting	Insufficient
02040202100040	Pennsauken Ck SB (above Rt 41)	Not Supporting	Not Supporting	Not Supporting	Insufficient
02040202060040	Barton Run* (above Kettle Run Road)	Not Supporting	Fully Supporting	Not Supporting	Insufficient
02040202060050	Barton Run* (below Kettle Run Road)	Not Supporting	Fully Supporting	Not Supporting	Insufficient
02040202060010	Kettle Run (above Centennial Lake)	Not Supporting	Insufficient	Fully Supported	Insufficient
02040202060020	Lake Pine / Centennial Lake & tributaries	Not Supporting	Fully Supporting	Fully Supported	Insufficient
02040202060080	Rancocas Ck SW Branch (above Medford Br)	Not Supporting	Not Supporting	Not Supporting	Insufficient
02040202060100	Rancocas Ck SW Branch (below Medford Br)	Not Supporting	Not Supporting	Not Supporting	Not Supporting

Source: NJDEP, Bureau of Freshwater and Biological Monitoring

\* The historic name for Barton's Run is "Borton," as described in William R. Fair's book *Waterways of Camden County: A Historical Gazetteer* (Camden: Camden County Historical Society, 2002).

**Table 13: New Jersey's 303(d) Draft List of Impaired Waters with Priority Ranking, August 2014**

Assessment Unit ID (subwatershed)	Assessment Unit Name	Parameter	Priority*
02040202110010-01	Cooper River NB (above Springdale Road)	Arsenic	L
		DDT	L
		Dissolved Oxygen	M
		PCB	L
02040301160020-01	Mullica River (above Jackson Road)	DDT	L
		Mercury	L
		PCB	L
		pH	M
02040202100010-01	Pennsauken Ck NB (above NJTPK)	Arsenic	L
		Cause Unknown	L
02040202100040-01	Pennsauken Ck SB (above Rt 41)	Arsenic	L
		Dissolved Oxygen	M
		Phosphorus	M
		Total Suspended Solids	M
02040202060040-01	Barton Run (above Kettle Run Road)**	Arsenic	L
		Dissolved Oxygen	M
		pH	M
02040202060050-01	Barton Run (above Kettle Run Road)**	Arsenic	L
		Dissolved Oxygen	M
		pH	M
		Phosphorus	M
02040202060010-01	Kettle Run (above Centennial Lake)	pH	M
02040202060020-01	Lake Pine / Centennial Lake & tributaries	pH	M
02040202060080-01	Rancocas Ck SW Branch (above Medford Br)	Arsenic	L
		Nitrate	M
		pH	M
		Phosphorus	M
		Total Suspended Solids	M
02040202060100-01	Rancocas Ck SW Branch (below Medford Br)	Arsenic	L
		Dissolved Oxygen	M
		PCB	L
		pH	M
		Phosphorus	M
* H = High, M= Medium, L= Low			
** The historic name for Barton Run is “Borton’s Run,” as described in William R. Fair’s book <i>Waterways of Camden County: A Historical Gazetteer</i> (Camden: Camden County Historical Society, 2002).			

Source: NJDEP Bureau of Freshwater and Biological Monitoring, "2014 New Jersey Integrated Water Quality Assessment Report," Draft December 2015

### ***Water Quality Monitoring Networks***

The determination of whether or not water quality is sufficient to meet an assessment unit's designated use(s) is based on testing results from various water quality monitoring networks. Across the state, NJDEP primarily relies on two water quality monitoring networks: the ***Ambient Stream Monitoring Network (ASMN)*** and the ***Ambient Biomonitoring Network (AMNET)***. NJDEP runs the ASMN network in cooperation with the U.S. Geological Survey (USGS). This network contains 115 stations that monitor for nutrients (i.e. phosphorous and nitrogen), bacteria, dissolved oxygen, metals, sediments, chemical, and other parameters. AMNET, which is administered solely by NJDEP, evaluates the health of aquatic life as a biological indicator of water quality. This network includes 820 monitoring stations located throughout the state. Each station is sampled once every five years. The first round of sampling for all stations took place

between 1992 and 1996 and a second round occurred between 1997 and 2001. A third round of sampling took place between 2002 and 2006.

### ***Ambient Biomonitoring Network***

There are four AMNET stations in Evesham, which are sampled every 5 years. See **Table 14** below. NJDEP most recently sampled the Evesham sites in July 2006. (As of this update, July 2006 was the most recent, published sampling). Each AMNET site was tested for the diversity of the aquatic communities at that site – specifically, the benthic macroinvertebrates (bottom-dwelling insects, worms, mollusks, and crustaceans that are large enough to be seen by the naked eye). The numbers and types of species present are directly related to water quality. As the pollution level increases, more sensitive species disappear first, followed by others. As these species “drop out,” the diversity of the community drops as well. Benthic macroinvertebrate sampling is simple and inexpensive, and offers a holistic indication of overall water quality. Sites can be classified as either non-impaired, moderately impaired, or severely impaired for aquatic life support.

Samples were taken in Evesham in July 2006. The NJDEP revised the classification system for this round of AMNET samples. The new system divided the state into three geographical areas: High Gradient (above the Fall Line), Low Gradient (Coastal Plain excluding Pinelands), and Pinelands (the boundary of the Pinelands National Reserve plus a 5 kilometer buffer). The new classification system has several benefits. It takes into account that macroinvertebrate communities in New Jersey were shown to have statistically significant differences by geographic region. Additionally, it recognizes that Pinelands streams have low pH and conductivity, which do not resemble high quality streams in other portions of the state. For example, tea-colored streams in other areas might be an indication of poor water quality, but in the Pinelands this is simply reflective of the high iron content of the soil, as well as the tannins released by some forms of vegetation, such as cedars. Finally, the Pinelands Macroinvertebrate Index (PMI) has a finer resolution because it grades on a scale of excellent, good, fair and poor.

**Table 14: New Jersey AMNET Sampling Locations for Evesham Waterways**

Site ID	Station Name	Waterbody	Impairment Score
AN0162	Elmwood Rd Next to S T P	Southwest Br Rancocas Ck	27.50
AN0167	Hopewell Rd Out of Marlton Lk	Kettle Run	38.36
AN0165	Braddock Mill Rd	UNT (Unnamed Tributary) to Black Run	57.79
AN0164	Kettle Run Rd Pipe	Black Run	75.70

Source: NJDEP, Bureau of Freshwater and Biological Monitoring, “Ambient Monitoring Network, Lower Delaware Water Region, Watershed Management Areas 17, 18, 19, and 20, Round 3 (2006-2007) Benthic Macroinvertebrate Data, Volume 1 of 2,” October 2010

**Key for Table 14**

Pinelands Macroinvertebrate Index (PMI) Score	Biological Assessment
<34	Poor
<56-34	Fair
<63-56	Good
≥63	Excellent



### ***Other Monitoring***

Certain fish may contain toxic chemicals, such as PCBs, dioxins, or mercury, which accumulate in the tissues of aquatic wildlife. 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 of PCB, Dioxin, and Mercury, adopting advisories to guide residents on safe consumption practices. Although the DEP has not issued any fish advisories for Evesham Township, it has issued advisories for fish in several other Burlington County water bodies, including Batsto Lake, Crystal Lake, Harrisville Lake, the Mullica River, Mirror Lake, Strawbridge Lake, and Wading River. In addition to these warnings, the DEP urges residents to follow the general and statewide fish consumption advisories as outlined by the NJDEP Division of Science, Research, and Technology (see sidebar to the right).

### **N.J. DEPARTMENT OF ENVIRONMENTAL PROTECTION FRESHWATER FISH ADVISORIES**

Fishing provides enjoyable and relaxing recreation and many people like to eat the fish they catch. Fish are an excellent source of protein, minerals and vitamins, are low in fat and cholesterol, and play an important role in maintaining a healthy, well-balanced diet.

However, certain fish may contain toxic chemicals, such as polychlorinated biphenyls (PCBs), dioxins, and mercury, which accumulate in water and aquatic life. Chemical contaminants such as dioxin and PCBs are classified by the U.S. Environmental Protection Agency as probably 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 catches fish at numerous sampling stations throughout the state and tests for contaminant levels, adopting advisories to guide residents on safe consumption practices.

Recreational fishermen and women should regularly check for local fish advisories on NJDEP's web site: [www.nj.gov/dep/dsr/fishadvisories/freshwater-advisories.htm](http://www.nj.gov/dep/dsr/fishadvisories/freshwater-advisories.htm)

For a list of 2016 advisories, refer to:  
<http://www.state.nj.us/dep/dsr/fishadvisories/2016-fish-advisories.pdf>

### ***Pinelands Commission Monitoring***

The Pinelands Commission has been evaluating the ecological consequences of the Comprehensive Management Plan for the Pinelands National Reserve since the early 1990s. A study of the Mullica River Basin was the initial focus of the monitoring program. That study established that changes in stream vegetation, fish assemblages, and anuran (frog and toad) communities parallel increasing land-use intensity and degradation of water-quality. In 2001 Commission scientists conducted a similar study of the Rancocas Creek Basin, which was published as a report in 2003 (see **Sources** section).

The Rancocas study essentially confirmed the findings of the Mullica River study, although the stream vegetation communities (the percentage of non-Pinelands or disturbance-indicator species) could not be as certainly tied to land-use and water quality because of differences in the physiography between the two basins. However, fish and anuran assemblages did correlate well

with the gradient of water-quality conditions and with the percentage of altered land within the sub-basin.

Sites that were monitored for water quality in Evesham are shown in **Table 15** below. The parameters that were monitored were pH and specific conductance, the latter being a measure of the ability of water to conduct an electrical current. Changes in these two measures are associated with variations in other water quality parameters, such as increased nutrient and ion concentrations, and with changes in the composition of biological communities. The report states, “Pinelands stream sites with extensive upstream development tend to display higher pH and specific conductance values and higher concentrations of dissolved solids than those in basins with little altered land.”

**Table 15: Pinelands Water Quality Monitoring Sites in the Rancocas Creek Basin in Evesham Township**

Site Name	Percentage Land Use			Median Values	
	Developed Land	Upland Agriculture	Wetland Agriculture	pH	Specific Conductance
<b>Primary sites monitored June – November 2001</b>					
Barton Run below Jennings Lake	50.8	1.6	1.2	7.2	151
Black Run at Route 544 (1)	6.8	1.5	2.6	4.1	60
Black Run below abandoned cranberry bog	1.4	0.0	0.0	4.4	83
Black Run tributary at Kettle Run Road (1)	1.7	1.9	1.6	4.3	64
Kettle Run below Hopewell Road	42.5	1.5	0.0	6.9	163
<b>Supplemental sites monitored for a four-week period during October – November 2001</b>					
Barton Run below Jennings Lake	50.8	1.6	1.2	6.7	161
Black Run at Route 544 (1)	6.8	1.5	2.6	4.4	74
Black Run below abandoned cranberry bog	1.4	0.0	0.0	4.3	96
Black Run tributary at Kettle Run Road (1)	1.7	1.9	1.6	4.1	72
Kettle Run below Hopewell Road	42.5	1.5	0.0	6.5	122
(1) Intermittent Flow					

Source: Zampella et al. *The Rancocas Creek Basin: A report to the Pinelands Commission, 2003* (<http://www.nj.gov/pinelands/infor/reports/Rancocas%20Final%20Report.pdf>)

The median pH of 20 streams that drained basins with less than 10% altered lands (minimally disturbed) ranged from 3.8 to 4.8 over the entire Rancocas basin. In contrast, the pH of streams in the ten most heavily altered basins (where altered land ran from 40% to 56%) ranged from 6.1 to 7.2. Streams in Evesham fell into both categories.

For the minimally disturbed reference sites, specific conductance ranged from 28 to 83  $\mu\text{Scm}^{-1}$ . For the ten most heavily altered stream basins with 40% or more altered land cover, the median specific conductance ranged from 106 to 331  $\mu\text{Scm}^{-1}$ . Again, the measures were higher for streams in areas of Evesham with high levels of developed land cover (e.g., Barton Run below Jennings Lake and Kettle Run below Hopewell Road).

Black Run and Black Run tributary sites supported only native fish communities while non-native species were found at the more disturbed sites. Fish and anuran assemblages correlated well with the gradient of water-quality conditions and the percentage of altered land within the sub-basin.

Anuran communities were assessed using nighttime vocalization surveys. Some of the sites differed from those used for fish, and water quality monitoring and monitoring occurred in only June and July of 2001. In the Rancocas Creek Southwest Branch study basin, which included sites within Evesham Township, carpenter frogs were heard at only Black Run and at Kettle Run at Camp Kettle Run. The latter site had only one individual calling, but Black Run bog supported a large chorus of this species. Black Run is one of the few stream systems in this part of the Rancocas basin that has a median pH value of less than 4.5 and very little altered land in the study-basin.

### ***Total Maximum Daily Loads***

For each impaired waterway, the state is required by the USEPA to establish a Total Maximum Daily Load (TMDL). A TMDL quantifies the amount of a pollutant a waterbody can assimilate (its loading capacity) without violating water quality standards. A TMDL's purpose is to initiate a management approach or restoration plan based on identifying the sources of a pollutant and determining the percent reductions of the pollutant that must be achieved by each source. These sources can be point sources, such as sewage treatment plants or non-point sources, such as runoff from various types of residential, commercial, or agricultural lands. A TMDL goes through four stages; it is "proposed" in a report by NJDEP, "established" when NJDEP finalizes their report, "approved" by EPA Region 2, and "adopted" when NJDEP adopts it as an amendment to a water quality management plan.

In general, implementation of a TMDL relies on actions mandated by the Municipal Stormwater Management program, including the ordinances that municipalities are required to adopt under that permit (see **inset box** on page 53 for details of the Statewide Basic Requirements of this program). It also depends on voluntary improvements in land and runoff management of agricultural areas. A list of US Department of Agriculture and New Jersey Department of Agriculture programs that provide funding and technical assistance on relevant projects for farm landowners is included in **Appendix B: Federal and State Conservation Programs for Farmers**.

A TMDL determines the percentage of reduction needed in order for a stream segment to meet the water quality standard. Because of the extent of extrapolation required for this approach, NJDEP will perform more detailed testing to determine the actual cause, source and extent of impairment in the HUC-14 subwatershed before developing a TMDL or taking other regulatory action to address the impairment. The largest contributors to poor water quality are nonpoint and stormwater point sources. For example, during rain events, runoff from various land uses transports pollutants (such as fecal coliform from geese, farm animals, and domestic pets) into waterbodies. Nonpoint sources also include inputs from "illicit" sources such as failing sewage conveyance systems, sanitary sewer overflows, and failing or inappropriately located septic systems.

The state is in charge of prioritizing the 303(d)-listed waterbodies for Total Maximum Daily Load (TMDL) analyses and identifying those high priority waterbodies for which they anticipate establishing TMDLs in the next two years. The state prioritizes TMDLs for pathogens (such as fecal coliform, and phosphorus contamination) over benthic macroinvertebrates, and has prioritized TMDL development for six impairments in Evesham:



- Pennsauken Ck SB (above Rt41)—Phosphorus
- Rancocas Creek SB (below Rt 38)—Pathogens
- Rancocas Creek SB (below Rt 38)—Phosphorus
- Rancocas Ck SW Branch (above Medford Br)—Pathogens
- Rancocas Ck SW Branch (above Medford Br)—Phosphorus
- Rancocas Ck SW Branch (below Medford Br)—Phosphorus

### ***Need for Monitoring***

Knowing the actual condition of streams and stream banks, and planning for their improvement, requires fuller surveys and more frequent monitoring than the state can provide. The state primarily monitors main channels in nontidal areas and only does biological assessments on a five-year cycle. Even that schedule is difficult for the State to achieve. Stream surveys by local organizations are needed, along with regular monitoring of water quality on all of a community's waterways. Because Evesham's Pinelands are studied and monitored by the Pinelands Commission science staff, there is more detail available on streams in the lower part of Evesham—those in the Rancocas and Mullica watersheds. However, streams in “upper” Evesham might benefit from local monitoring.

### **Causes of Water Quality Impairments**

#### ***Stormwater Runoff***

Stormwater runoff and other nonpoint source pollution (pollution coming from a wide variety of sources rather than from a single point such as a discharge pipe) have the largest effect on the water quality and channel health of streams in Evesham. These sources are also the most difficult to identify and remediate because they are diffuse, widespread, and cumulative in their effect. Known causes of non-point source pollution include septic system effluent, agricultural runoff, construction activities, and stormwater drainage. Most non-point source pollution in Evesham Township derives from stormwater drainage off paved surfaces such as streets, commercial/industrial areas, and residential sites (with and without detention basins), and from agricultural fields that lack adequate vegetative buffers.

In March 2003, the NJDEP issued a new Stormwater Management Rule, as required by the U.S. Environmental Protection Agency's Phase II Stormwater Management Program for Municipal Separate Stormwater Sewer Systems (MS4). The rule lays out guidance and requirements for management of and education about stormwater at the local level. It applies to all towns in New Jersey, all county road departments, and all public institutional facilities on large sites (such as hospitals and colleges). Beginning in 2004, every municipality was required to obtain a New Jersey Pollution Discharge Elimination System (NJPDES, pronounced “En-Jip-Dees”)) general permit for the stormwater system and its discharges within municipal borders, which are considered to be owned and “operated” by the municipality.

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. Fulfillment of these Statewide Basic Requirements is scheduled to occur over

the course of five years. All of the requirements are intended to reduce water pollution from stormwater runoff.

**Table 16: Stormwater Management Statewide Basic Requirements**

<b>Tier A Towns, Highway Agencies, and Institutions</b>	
1. Control post-construction stormwater management in new development and redevelopment through:	<ul style="list-style-type: none"> <li>• Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.</li> <li>• 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.</li> <li>• Ensuring compliance with Residential Site Improvement Standards for stormwater management. The RSIS is currently being revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.</li> <li>• Ensuring long-term operation and maintenance of Best Management Practices on municipal property.</li> <li>• Requiring that new storm drain inlets meet new design standards.</li> </ul>
2. Conduct local public education:	<ul style="list-style-type: none"> <li>• 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).</li> <li>• Have all municipal storm drain inlets labeled with some type of “don’t dump” message.</li> <li>• Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives.</li> <li>• Distribute information annually regarding proper identification, handling, and disposal of wastes including pet waste and litter.</li> </ul>
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.	<i>Source: NJDEP</i>

### ***Impervious Coverage***

The volume of runoff that is carried to a stream also impacts 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. An increase in impervious coverage decreases groundwater recharge potential, which can lead to a decrease in stream base flow during the dry summer months. In general, scientists have found that levels of impervious cover of 10% 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% to 30%, streams can become severely degraded.

The effects of impervious cover can be minimized by reducing the requirements for road widths and parking, encouraging the use of impervious building materials, discouraging the destruction of stream buffers, and encouraging the use of better designs for stormwater management. Most New Jersey municipalities have specific limits on allowable impervious coverage per zoning category. Evesham Township currently has impervious coverage limits in its zoning districts, which vary by zoning district as well as by the permitted use. Some of these limits are rather high; for example, 55-65% of the lot is allowed to be covered in Commercial-1 (C-1) zones (depending on use). Other towns have adopted lower thresholds, and have provided higher allowances in exchange for lower-impact stormwater design. For example, a shopping center might be allowed a lower maximum impervious coverage, but could obtain a higher ratio in exchange for providing a green roof or pervious pavement in the parking area.

### ***Inadequate Stream Buffers***

The stream buffer is the region immediately adjacent to the banks of a stream that serves to limit the entrance of sediment, pollutants, and nutrients into the stream itself. Vegetated stream buffers are quite effective at filtering substances washing off the land. The buffer's vegetation 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 for wildlife to move between larger forested habitat areas. Residents can use these greenways for recreation with the addition of trails, bikeways, and access points for fishing and canoe/kayak launching.



*Source: Dr. Joseph Orlins*

*An example of heavy erosion of stream banks*

The importance of a healthy, intact buffer zone (also referred to as a “riparian corridor”) has been well documented scientifically over the past 20 years, especially for headwater streams. There is little agreement and much continuing research about the appropriate minimum width of a buffer. In literature on this issue (e.g. Honachefsky 2000), 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.

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 can also monitor use of the land within the transition area and take action against encroachments.

The U.S. Department of Agriculture and the New Jersey Department of Agriculture support various programs dedicated to stream buffer restoration, including the Conservation Reserve Program (CRP), administered by the USDA's Farm Service Agency (FSA), and the New Jersey version of this program which is known as CREP (Conservation Reserve Enhancement Program). This program is designed to help farmers reduce impairments from agricultural water runoff sources in an effort to improve water quality. The program compensates farmland owners 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 the USDA, encourage the environmentally conscious management of agricultural lands. The NRCS funds practices that address issues such as surface water quality, erosion, and fertilizer/pesticide runoff. These are all programs in which individual landowners volunteer to take part. Information about what vegetation is best for riparian buffers in different parts of New Jersey can be found on the Rutgers Cooperative Extension's website at: <https://rucore.libraries.rutgers.edu/rutgers-lib/27418/>. Also see **Appendix B: Federal and State Conservation Programs for Farmers** for a listing of these programs.

It is particularly beneficial for farmers and property owners in Evesham to take advantage of the numerous state and federal programs that encourage agricultural best management practices (BMPs) regarding stream buffers because Evesham contains the headwaters of multiple streams. If the water quality in Evesham Township decreases because of excessive nutrients, siltation, or pollution, the damage will have much greater consequences because stream headwaters are particularly fragile ecosystems that can affect the ecology of the whole stream (See subsection about **Streams** in the **Surface Water Resources** section). The Pinelands Preservation Alliance suggests that townships adopt ordinances to improve water quality protection, including establishing stream and lake buffers, limiting fertilizer/pesticides, allowing cluster development, requiring water conservation landscaping by minimizing turf, requiring golf courses to practice integrated pest management, enforcing no-mow zones, encouraging form based zoning, and mandating Leadership in Energy and Environmental Design (LEED) Certification for new buildings.

### ***Point Sources of Pollution***

Point sources of pollution, which come from a single source or "point" such as an industrial discharge pipe, 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 and "nonpoint source" pollution (coming from many diffuse sources, such as through stormwater), but did not require states to regulate nonpoint sources until recently.

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program (*N.J.A.C. 7:14A*). Under NJPDES, any facility discharging over 2,000 gallons per day (gpd) of domestic or industrial wastewater directly into surface water or groundwater (usually through a septic system) must apply for and obtain a permit for discharging. Water quality monitoring is also required. Rather than creating individually tailored permits for 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 NJPDES permits by visiting discharging facilities and requiring facilities to conduct water quality, biological, and toxicological analyses, and thermal impact and cooling water assessments periodically.

As of March 2017, nine NJPDES permits had been issued in Evesham. These are shown in **Table 17: Evesham NJPDES Permits** and depicted on **Map 14: Approved Sewer Service Area and NJPDES Permits**.

**Table 17: Evesham NJPDES Permits**

	Facility Name	Effective Start Date	Expiration Date	Discharge Category Description	Document Status	Street Address
NJ0024031	ELMWOOD STP	2/1/2014	1/31/2019	Sanitary Wastewater	Approved	260 N ELMWOOD RD
NJ0024040	WOODSTREAM STP	1/1/2015	12/31/2019	Sanitary Wastewater	Approved	BRANDYWINE DR
NJ0029203	KINGS GRANT STP	12/1/2003	12/31/2019	Discharge to Groundwater	Expired	TOMLINSON MILL-TAUNTON RD
NJG0110108	OWENS-CORNING FIBERGLAS CORP	2/1/2013	1/31/2018	Basic Industrial Stormwater GP-NJ0088315 (5G2)	Approved	KETTLE RUN RD
NJG0157520	ELMWOOD WTP	2/1/2013	1/31/2018	Basic Industrial Stormwater GP- NJ0088315 (5G2)	Approved	260 N ELMWOOD RD
NJG0171336	ELLIS PROPERTY	8/1/2016	6/30/2020	General Remediation Clean UP (GP)	Approved	150 SHARP ROAD
NJG0200344	ELMWOOD WTP	1/1/2013	12/31/2017	Sludge Quality Category 3 (GP)	Approved	260 N ELMWOOD RD
NJG0200352	WOODSSTREAM STP	1/1/2013	12/31/2017	Sludge Quality Category 3 (GP)	Approved	BRANDYWINE DR
NJG0211737	KINGS GRANT STP	1/1/2014	12/31/2018	Sludge Quality Category 2 (GP)	Approved	TOMLINSON MILL-TAUNTON RD

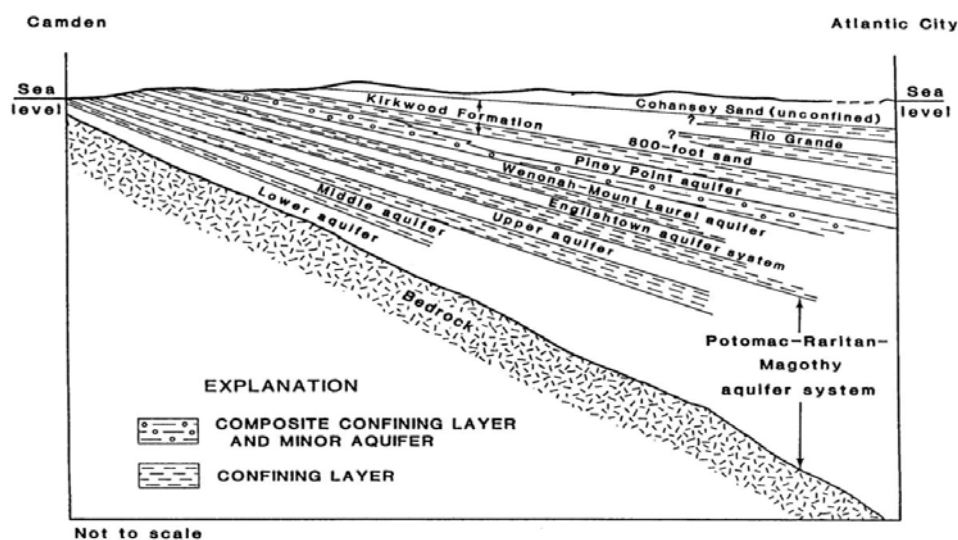
Source: NJDEP Data Miner, (<https://www13.state.nj.us/DataMiner>; select "Search Published Documents" then select NJPDES Excel Reports)

Since the adoption of the federal Clean Water Act in 1972 and the implementation of the NJ Pollution Discharge Elimination System in subsequent years, water pollution from point sources has decreased drastically. However, as development has continued to spread through New Jersey, nonpoint source pollution has increased to the extent that it is the major source of water pollution today.

## 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 would show that the layers are not horizontal but tilt downward toward the southeast, getting deeper as they cross the state toward the Atlantic Ocean (see Figure 11). Because of this tilting, each layer formation emerges on the land surface in a sequential manner. The deepest formations emerge on the surface near the Delaware River. Where a formation emerges is its “outcrop” area. The Potomac-Raritan-Magothy (PRM) formation, the deepest and most abundant aquifer, is a major water source for Inner Coastal Plain communities. Other aquifers on top of the PRM are the Englishtown, the Wenonah-Mount Laurel, and the Kirkwood-Cohansey. The Kirkwood-Cohansey is a formation composed of two thick layers, the Kirkwood (lower) and the Cohansey (upper) that overlie the older formations. It begins east of the inner/outer coastal plain divide.



Source: U.S. Geological Survey

**Figure 11: Aquifers of Southern New Jersey along a line from Camden to Atlantic City**

### Aquifers

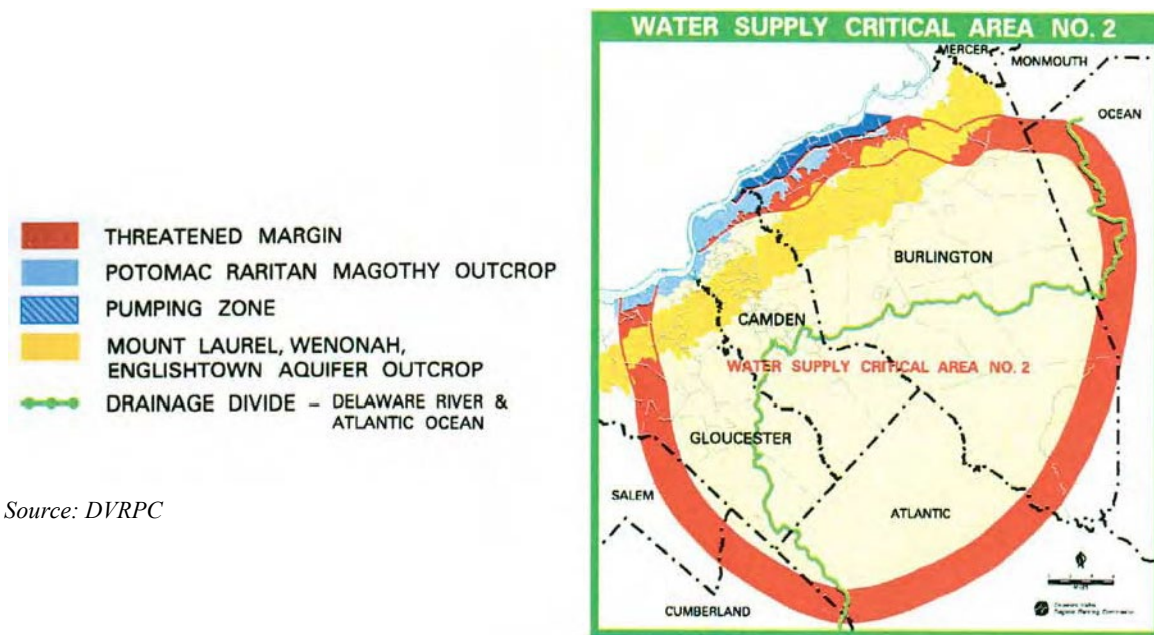
The majority of Evesham Township’s public water is drawn from the Potomac-Raritan-Magothy Aquifer System, with additional water from the Wenonah-Mount Laurel aquifer. See **Map 9: Geologic Outcrops**. Private wells in the southern part of Evesham may tap the Kirkwood-Cohansey aquifer.



### ***Potomac-Raritan-Magothy Aquifer System (PRM)***

The PRM is a major source of drinking water to New Jersey residents from Burlington to Salem counties, as well as to communities in Delaware. This multiple aquifer system is a large series of formations that have been combined and described as a single unit because the individual formations – the Potomac group and the Raritan and Magothy formations – are lithologically indistinguishable from one another over large areas of the Coastal Plain. That is, they are composed of materials of like kind and size laid down by both an advancing and retreating sea across southern New Jersey and by deposits of material that came from the breakdown and erosion of the Appalachian and Catskill Mountains beginning in the Cretaceous Period (60 to 150 million years ago).

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



Source: DVRPC

**Figure 12: Water Supply Critical Area Number 2**

Because of high usage, PRM aquifer water levels have declined. The water level drop became so serious that the New Jersey Department of Environmental Protection established Water Supply Critical Area #2 in 1986 (see Figure 12). All water supply companies within Critical Area #2 were given annual limits on water withdrawals in the PRM. Usage from the PRM was cut back by over 20% and no increases in pumping were allowed. Piping of treated Delaware River water filled the gap in much of the region. As shown in Figure 12, Evesham Township falls within Water Supply Critical Area #2.

There is increased concern that additional pumping from the aquifer in the borderline areas will necessitate the expansion of the Critical Area boundaries. Thus, water supply companies in Burlington and Salem counties have and will continue to have difficulty getting approvals from the New Jersey Department of Environmental Protection for any additional water allocations from the PRM.

The PRM does not outcrop in Evesham Township; rather it outcrops under and immediately beside the Delaware River in New Jersey and Pennsylvania. River water enters and recharges the lower and middle PRM aquifers. Because 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 water supply (see sidebar on Private Drinking Wells below).

### ***Wenonah-Mount Laurel Aquifer System***

The Wenonah-Mount Laurel aquifer is composed of the Wenonah Formation and the Mount Laurel Sand Formation, both of late Cretaceous period. It is thickest in Burlington, Camden, Gloucester, and Salem counties, reaching 100 to 120 feet in width.

The Wenonah-Mount Laurel aquifer is affected by withdrawals from the Englishtown aquifer, which lies below it. As a result of Englishtown withdrawals, more Wenonah-Mount Laurel water leaks through the confining layer to the Englishtown aquifer. Reductions in the Potomac-Raritan-Magothy Aquifer System also negatively affect water levels in the Wenonah-Mount Laurel aquifer.

### **PRIVATE DRINKING WELLS**

Private wells, supplying potable water, are not routinely monitored like public community water systems (public water) and public non-community wells. 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. Prior to 2002, each county health department mandated what parameters were to be tested for real estate transactions.

See **Appendix C: Private Well Testing Act** for more information about private wells and drinking water.

### ***Composite Confining Unit***

A composite confining unit overlies the Wenonah-Mount Laurel aquifer. The Navesink Formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, the Vincentown Formation, the Manasquan Formation, Shark River Marl, the Piney Point Formation and the basal clay of the Kirkwood Formation form this unit. These geologic formations, ranging in age from late Cretaceous to Miocene, are dominated by silty and clayey glauconitic quartz sands. Red Bank sand and the Vincentown and Piney Point formations are somewhat permeable and function as aquifers in some locales.

### ***The Vincentown Formation***

Outcroppings of this formation are irregular compared to the bands that are characteristic of the other formations described. Generally, the Vincentown is found approximately one hundred feet below the surface. Although it is primarily a confining bed, it is tapped in many places by domestic, industrial, and public wells. It is most productive as an aquifer at its thickest areas, which exceed 140 feet. In other areas the Vincentown formation ranges from 20 to 80 feet in thickness. Recharge is inter-formational from the Kirkwood.

### ***Kirkwood-Cohansey Aquifer System***

The Kirkwood-Cohansey aquifer system is one of the largest sources of groundwater in New Jersey. The Kirkwood Formation, along coastal areas, appears as thick clay beds, with interbedded zones of sand and gravel. The Cohansey Sand, also of Miocene age, is coarser grained than the underlying Kirkwood Formation. It contains minor amounts of pebbly sand and interbedded clay. Some local clay beds within the Cohansey Sand are relatively thick.

The surficial nature of the Kirkwood-Cohansey makes it vulnerable to contamination from various land uses. Water from this aquifer has a lower pH and contains elevated levels of iron and manganese. Radium and mercury have also been found in this water. Industrial chemicals, pesticides and agricultural chemicals used for crop production and residential landscaping, and products of septic tank effluent have all been found in water from the aquifer in various areas in southern New Jersey. Residents and township officials must take great care to prevent contamination on the land surface because toxins can easily enter the groundwater of this unconfined aquifer (lacking protective clay layers above it).

In Evesham, it is particularly important to protect groundwater because this aquifer feeds most of the more sensitive streams in the township. Additionally, many residents in the southern end of the township rely on groundwater for their drinking water. Once groundwater becomes contaminated, it is not only very difficult but also very costly to remediate. Therefore, the best alternative is to prevent contamination in the first place by limiting the potential for pesticides, fertilizers, road salt, motor oil, septic waste, and toxic chemicals to reach the groundwater. This can be done by regulating point and non-point pollution sources. See **Surface Water Quality and Causes of Water Quality Impairments**.

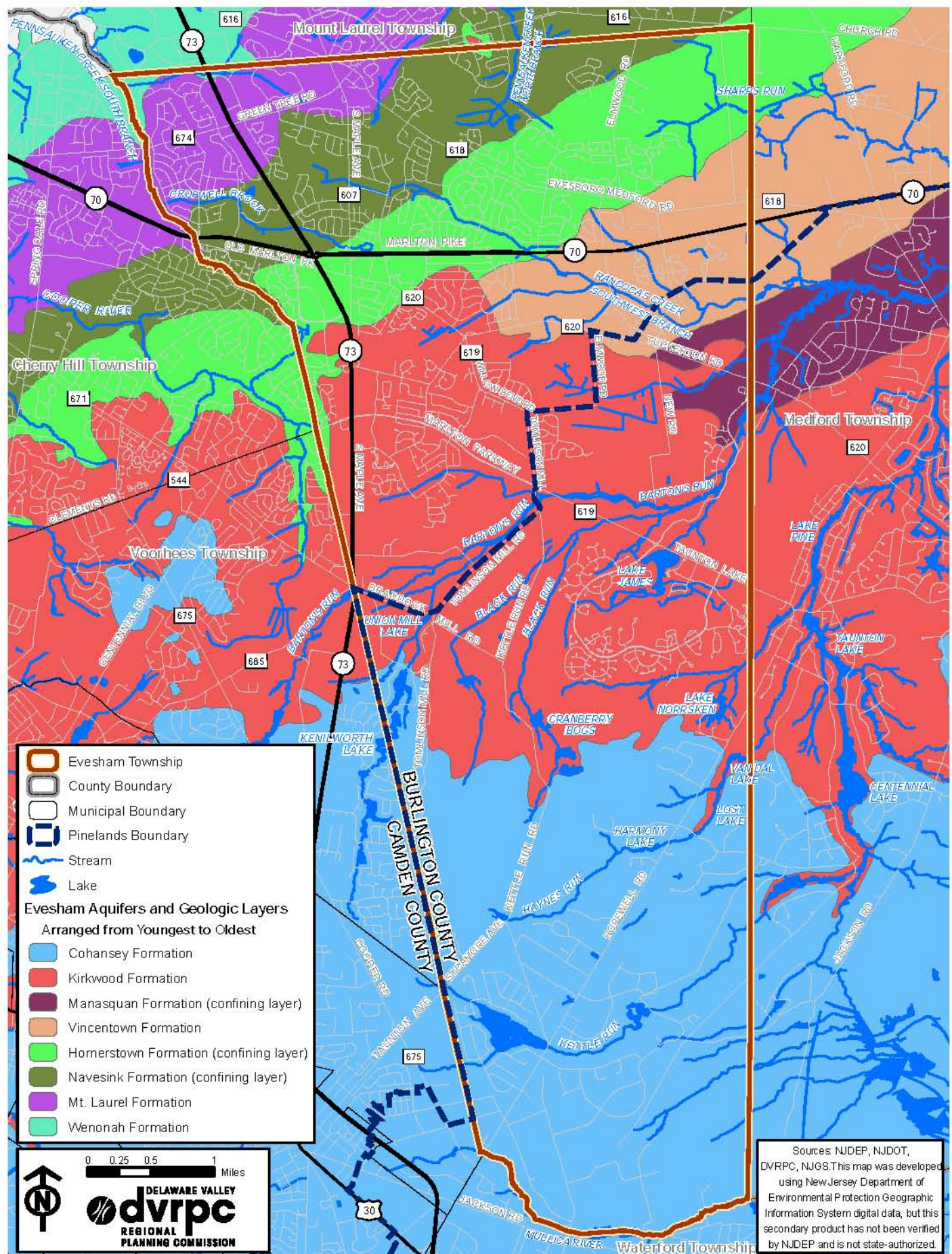
### **Groundwater Recharge**

Recharge of groundwater is an important issue in southern New Jersey because of the dependence on aquifers for drinking water and agricultural use. Not all of the precipitation that falls to the earth replenishes the underlying aquifers. The amount of rainwater that actually enters an aquifer and reaches the saturated zone to become groundwater is a function of many factors, including the nature and structure of the aquifer itself, climatic conditions, the soil type, and the vegetation of an area.

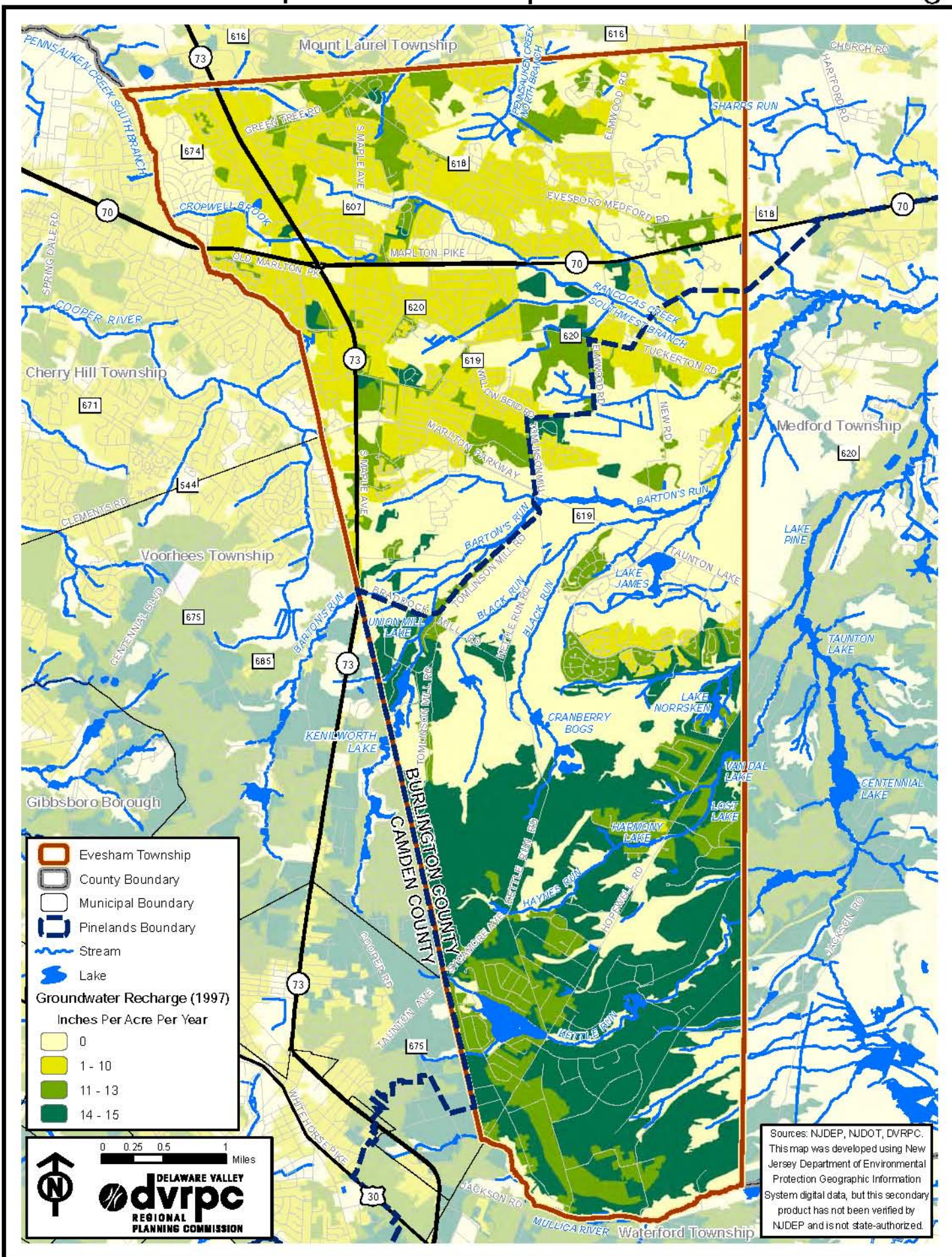
The New Jersey Geological Survey has developed a methodology for evaluating land areas for their ability to transmit water to the subsurface, using precipitation records, soil surveys, and land use/land cover data. NJDEP has used this methodology to map and rank the groundwater recharge potential of land areas throughout the state. Recharge is measured as the amount of precipitation that will reach the water table in one year, expressed as inches per acre per year.

Half of the land in Evesham has groundwater recharge rates of over 5 inches per acre per year. Areas with recharge rates greater than 11 inches are found mostly in the southern half of the township, and constitute about 35% of Evesham's land. The areas in the northern portions of Evesham have low recharge rates because this is where most of the development is concentrated; recharge cannot occur in areas with impervious pavement. The northern areas of the town are also on top of a marl layer which precludes rapid infiltration. Evesham's lowest











recharge rates are associated with the areas where there is a great deal of wetlands. See **Map 10: Groundwater Recharge**.

In general, 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 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 ten or more inches per year of groundwater recharge. Some townships that depend entirely on well water and septic tanks require nitrate dilution analysis for every subdivision, no matter how small, to make sure that septic systems do not contaminate groundwater. Nitrate dilution analysis determines the minimum lot size needed for proper dilution of the nitrates generated by a typical septic system. The dilution is by rainfall through the soil and its effectiveness varies by soil type.

### Water Supply Wells

There are eleven active public water supply wells in Evesham. Public water supply wells are listed in **Table 18: Public Water Supply Wells**. The wells pump water mainly from the Upper PRM aquifer, but also from the Lower PRM and Mount Laurel-Wenonah aquifers. All public wells in the area are shown on **Map 11: Public Water Supply Wells**.

**Table 18: Public Water Supply Wells**

Well ID #	Original Owner	Aquifer	Top of Well Screen (ft)	Bottom of Well Screen (ft)
3106840	Evesham MUA	Lower Potomac-Raritan-Magothy	546.50	593.00
3106841	Evesham MUA	Upper Potomac-Raritan-Magothy	545.08	591.00
3149822	Evesham MUA	Upper Potomac-Raritan-Magothy	542.80	617.80
3144924	Evesham MUA	Mount Laurel-Wenonah aquifer	190.00	265.00
3148248	Evesham MUA	Upper Potomac-Raritan-Magothy	0.00	0.00
3105458	Evesham MUA	Upper Potomac-Raritan-Magothy	464.00	500.00
3107883	Evesham MUA	Upper Potomac-Raritan-Magothy	478.00	548.17
3109595	Evesham MUA	Upper Potomac-Raritan-Magothy	416.00	463.00
3107453	Evesham MUA	Upper Potomac-Raritan-Magothy	457.67	549.67
3120373	Evesham MUA	Upper Potomac-Raritan-Magothy	375.58	433.67
3114627	Evesham MUA	Upper Potomac-Raritan-Magothy	405.00	441.00

Source: NJDEP

Public non-community wells are another part of a public water system. There are two types of non-community water systems, transient and non-transient, which indicate the type of populations who utilize them. A non-transient 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. A transient non-community water system serves at least 25 people each day, but the population

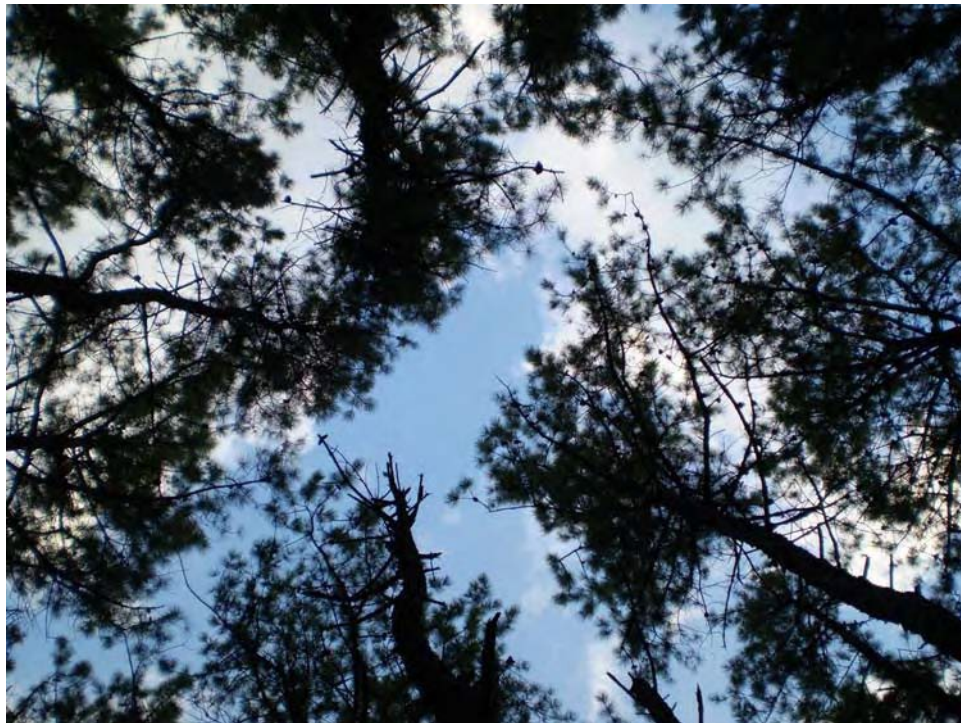
changes each day. These systems are at such places as rest stops, gas stations, and restaurants. See **Table 19** below.

**Table 19: Public Non-Community Wells**

Well ID #	Original Owner	Well Depth
0313300	ARCHWAY UPPER SCHOOL	180
0313308	YMCA CAMP MOORE	77
0313304	LINK'S GOLF COURSE	180
0313310	CAFE SOCIETY	180
0313307	EVESHAM SKATING CENTER	180

*Source: NJDEP*

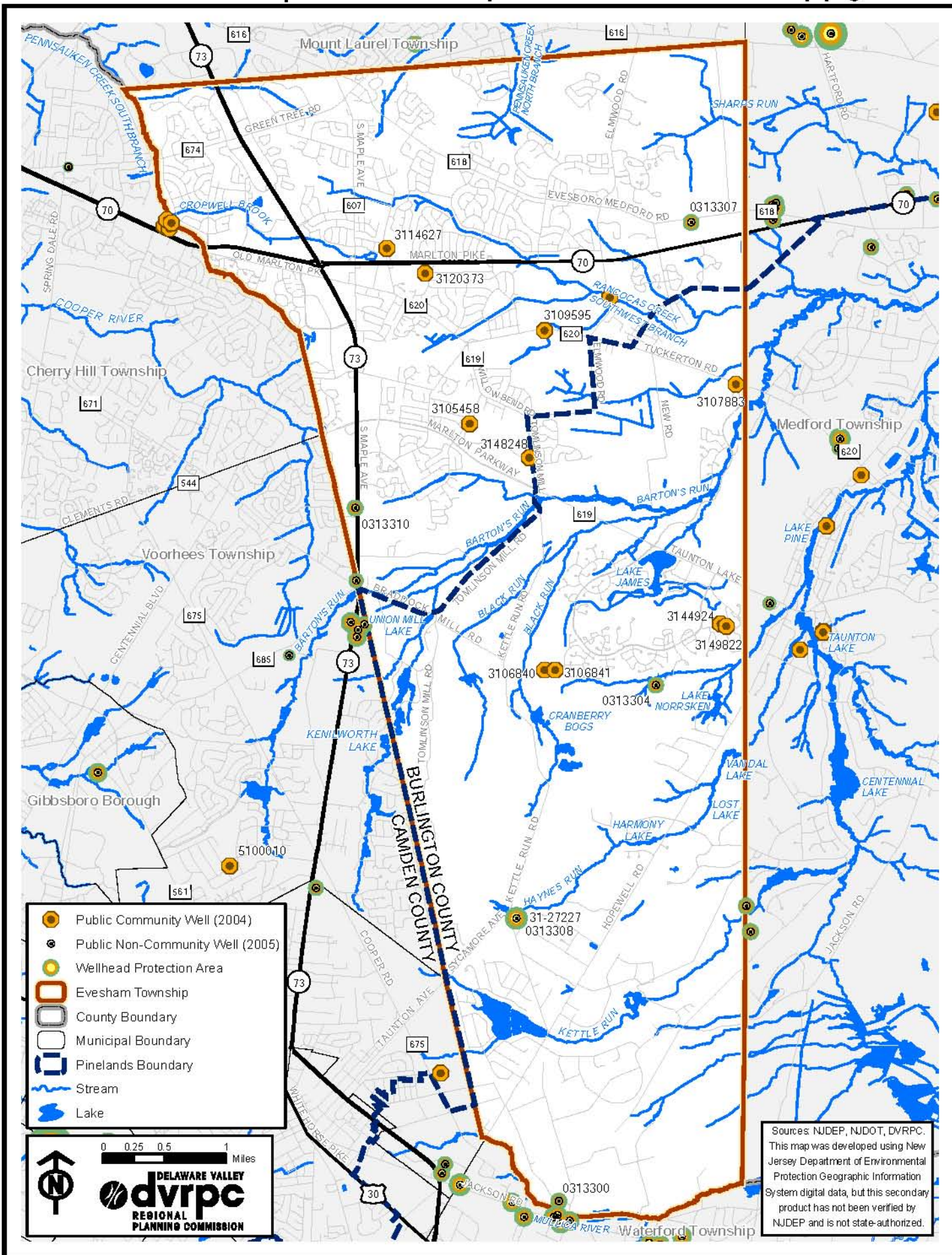
Many residents in the Southern End of the Township have private wells, including those living in Little Mill, Marlton Lakes, Dock Road, and Mill Road. The exception is the Sanctuary development which has public water from the EMUA. All areas in the southern end of the township are on septic systems.



*Source: DVRPC*

*Looking at the sky through the pines*









## BIOLOGICAL RESOURCES

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

Evesham contains numerous types of natural habitats, all of which are important for maintaining biodiversity. Wetlands, which support plants that require constantly saturated soils, are the most abundant type of natural habitat in Evesham. Upland forests make up most of the remainder of major habitats present in Evesham, and brushlands and scrublands are also present. The following sections identify and describe in more detail the plant and animal communities that inhabit these ecosystems within Evesham.

### NATURAL VEGETATION

An area's vegetation is dependent on many factors, the most important of which are climate and soils. The region has a cool, temperate climate with rainfall averaging 48.25 inches per year. See the **Climate** section for a detailed description of Evesham's variable climate. Evesham's variety of hydric and non-hydric soils support diverse populations of trees, crops, and wetland vegetation. See the **Soils** section for a detailed description of Evesham's soils.

Evesham's natural vegetation types, along with human-influenced types of land cover, have been tabulated and mapped by NJDEP's 2012 land cover analysis. This is the most recently available remotely sensed data that shows vegetative cover. 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 **Table 20: Evesham Township Natural Vegetation** and **Map 12: Natural Vegetation**.

It is generally believed that the vegetation found in the Pinelands today developed within the past 12,000 to 10,000 years. The New Jersey Pine Barrens ecosystem is home to approximately 800 species of flowering plants and 25 species of ferns. Among them are various types of wildflowers, as well as some carnivorous plants, such as pitcher plants and sundews. The forests usually have three levels: groundcover (made up of mosses, lichen, grasses, ferns, and small shrubs, such as low blueberry, sweet pepperbush, bayberry, scrub oak, and highbush blueberry), the understory, and a canopy (trees such as pitch pine, post oak, red maple, American holly, Atlantic white cedar, and sour gum). Trees that are common in the upland areas of the Pinelands include chestnuts, pitch pines, short-leaf pines, and oaks (such as black, scarlet, blackjack, white, and post). Vegetation common in the bog/swamp areas includes: Atlantic white cedar, pitch pine,

red maple, black gum, swamp magnolia, and gray birch. See **Appendix D: Streamside Plants Documented in Pineland Areas of Evesham Township.**

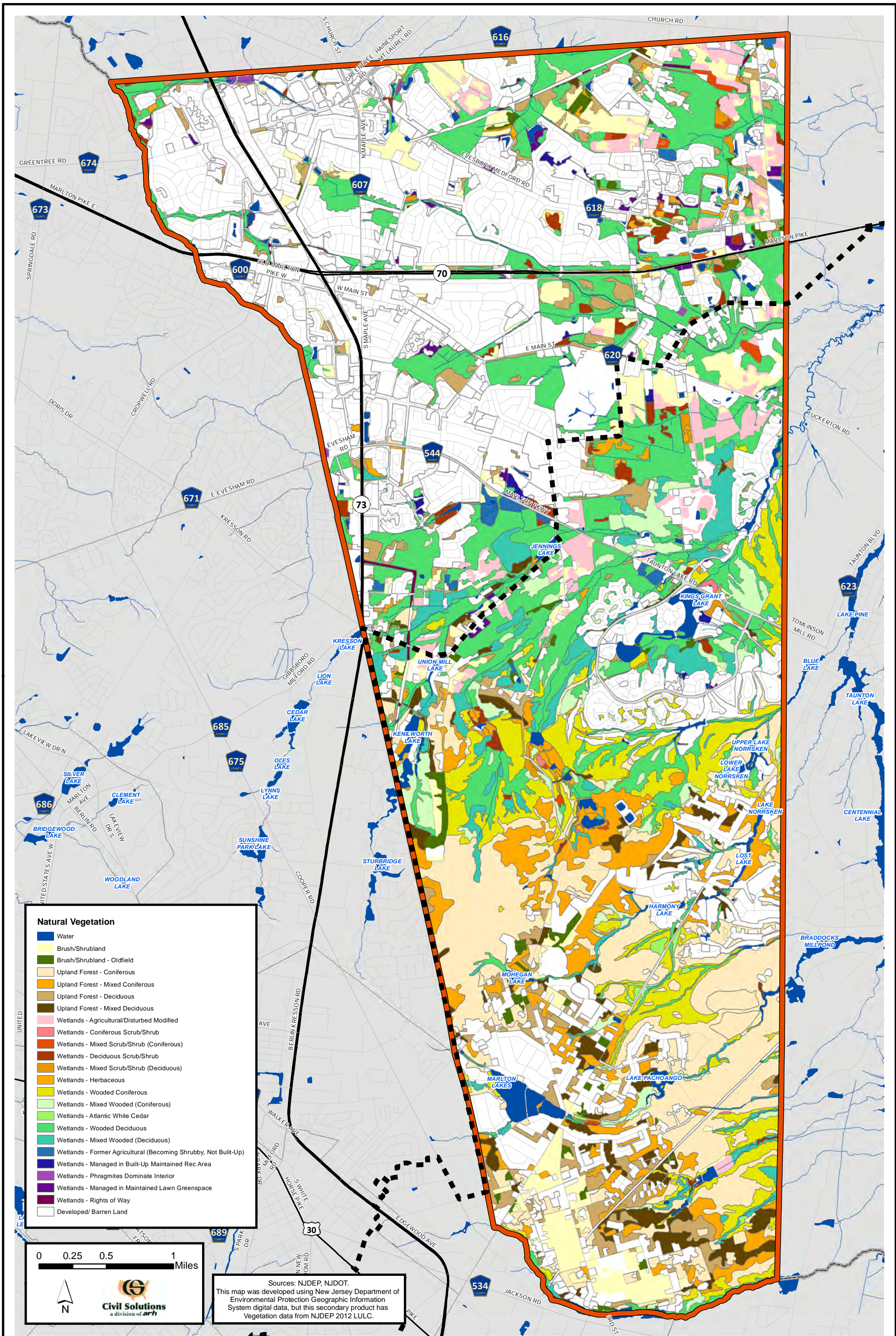
**Table 20: Evesham Township Natural Vegetation**

TYPE OF VEGETATION	ACRES	PERCENT TOWNSHIP AREA
<b><i>Wetlands</i></b>	<b>5717.10</b>	<b>30.20%</b>
DECIDUOUS WOODED WETLANDS	3,073.28	30.20%
CONIFEROUS WOODED WETLANDS	1,031.88	16.23%
AGRICULTURAL WETLANDS (MODIFIED)	497.97	5.45%
MIXED WOODED WETLANDS (CONIFEROUS DOM.)	327.06	2.63%
MIXED WOODED WETLANDS (DECIDUOUS DOM.)	260.76	1.73%
DECIDUOUS SCRUB/SHRUB WETLANDS	162.25	1.38%
FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)	80.85	0.86%
MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	74.48	0.43%
HERBACEOUS WETLANDS	70.83	0.39%
DISTURBED WETLANDS (MODIFIED)	31.75	0.37%
MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)	30.24	0.17%
MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	27.56	0.16%
ATLANTIC WHITE CEDAR WETLANDS	26.10	0.15%
MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)	22.08	0.14%
CONIFEROUS SCRUB/SHRUB WETLANDS	17.91	0.12%
<b><i>Forest</i></b>	<b>3,876.77</b>	<b>20.48%</b>
CONIFEROUS FOREST (>50% CROWN CLOSURE)	1,923.88	10.16%
MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)	799.99	4.23%
DECIDUOUS FOREST (>50% CROWN CLOSURE)	561.69	2.97%
MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)	288.96	1.53%
DECIDUOUS FOREST (10-50% CROWN CLOSURE)	130.64	0.69%
CONIFEROUS FOREST (10-50% CROWN CLOSURE)	124.00	0.66%
MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)	26.84	0.14%
MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)	20.76	0.11%
<b><i>Brush/Shrubland</i></b>	<b>1,151.18</b>	<b>6.08%</b>
CROPLAND AND PASTURELAND	700.15	3.70%
OLD FIELD (< 25% BRUSH COVERED)	190.68	1.01%
DECIDUOUS BRUSH/SHRUBLAND	135.70	0.72%
MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND	93.77	0.50%
CONIFEROUS BRUSH/SHRUBLAND	30.89	0.16%
<b><i>Lakes</i></b>	<b>291.05</b>	<b>1.54%</b>
ARTIFICIAL LAKES	291.05	1.54%
<b>TOTAL</b>	<b>11,054.01*</b>	<b>58.39%</b>

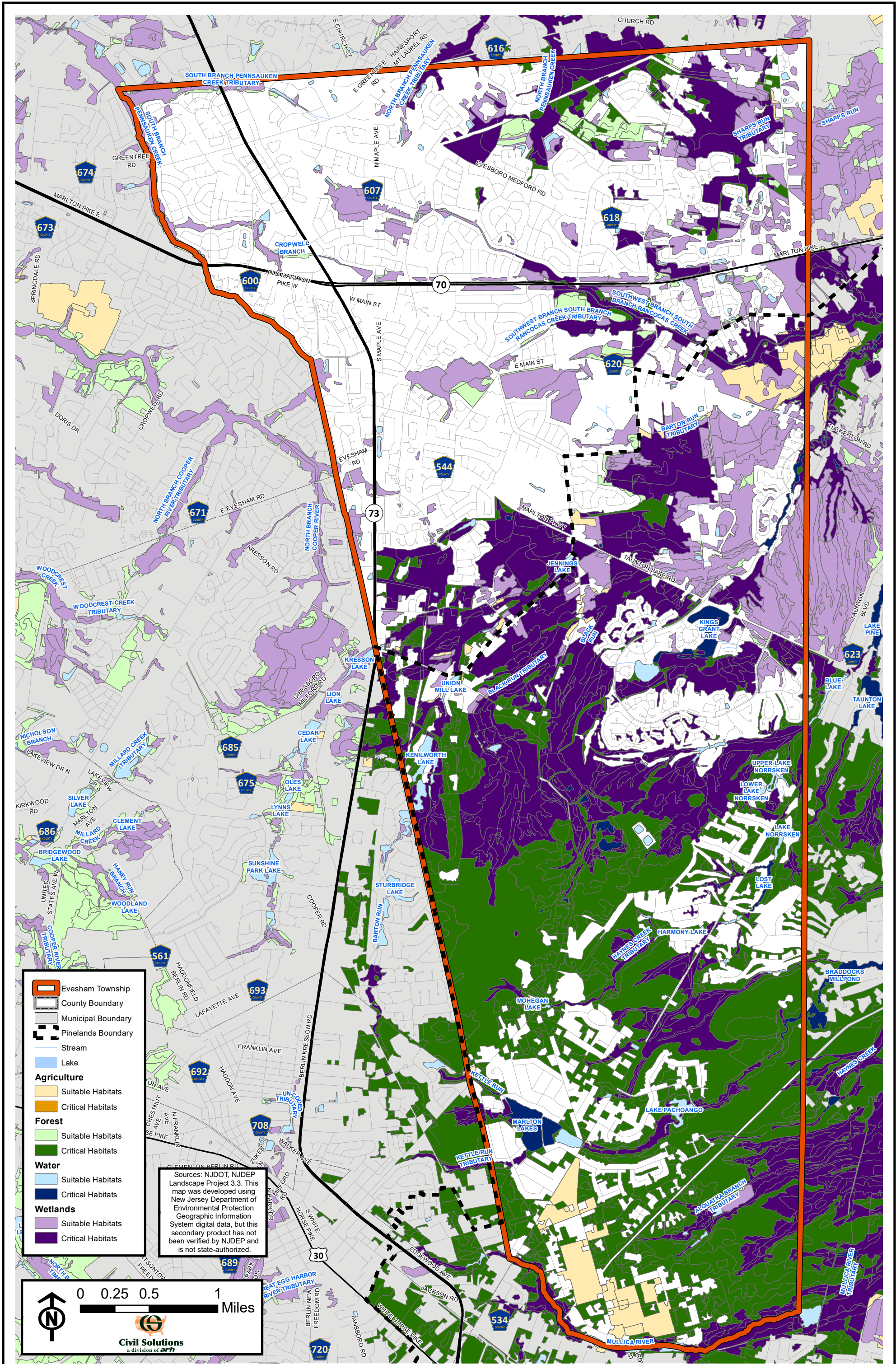
Source: NJDEP (2002 Land Cover)

Note: Total acres of vegetation is not equivalent to total township area.









Evesham Township

Map 13: Landscape Project  
Priority Habitats



## Wetlands

Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivities far greater than those found on dry land. Wetlands play a vital role in maintaining water quality by cleaning 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.

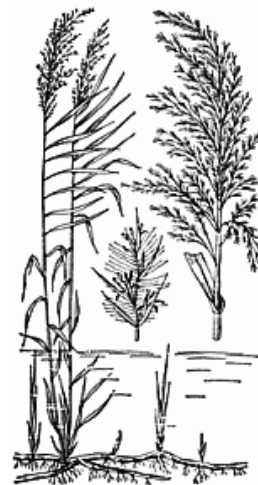
Most wetlands in Evesham are found in association with major streams and their tributaries, including Barton Run, Black Run, Kettle Run, Pennsauken Creek, and Sharps Creek. Wetlands are dominant in the central portion of Evesham, where Barton Run and its tributaries are located. Wetlands provide high-quality animal and plant habitats, purify surface and groundwater, and create picturesque landscapes that add to the quality of life for area residents. Evesham's most abundant wetlands are deciduous wooded wetlands and coniferous wooded wetlands. All are listed in *Table 18*.

Deciduous wooded wetlands (sometimes referred to as forested wetlands) occupy 3,073.28 acres of Evesham Township and support mixed hardwoods that flourish at low elevations. Some common trees in the area's deciduous wooded wetlands are red maple, black tupelo, ash, black willow, American beech, swamp white oak, willow oak, southern red oak, and sweetgum. Similar to deciduous wooded wetlands are deciduous-dominated mixed wooded wetlands, occupying 260.76 acres of Evesham. Vegetation in such wetlands is composed of greater than 50% but less than 75% deciduous species. Deciduous and mixed deciduous wooded wetlands are found along nearly all stream corridors in Evesham.

Coniferous and coniferous-dominated wetlands are the second most common type of wetland found in Evesham, occupying about 1,358.94 acres combined. These closed-canopy wetlands support species such as the loblolly pine, pond pine, Atlantic white cedar, and red maple.

Other types of wetlands found in Evesham include scrub/shrub, Atlantic white cedar, and herbaceous. Scrub/shrub wetlands consist of woody species less than 20 feet tall. These wetlands may be usually in early successional stages and will later become shrub-dominated wetlands or those dominated by canopy species. Atlantic white cedar wetlands are found primarily in southern New Jersey and consist of Atlantic white cedars and other trees such as red maple, and shrubs such as blueberry.

Herbaceous wetlands cover less than 0.37%% of Evesham Township. Herbaceous wetlands may include plants such as Jack-in-the-pulpit, jewelweed, ferns, rice cutgrass, reed canary grass, pond lily, tearthumb, arrow-leaved tearthumb, and



Source: [www.agroportal.ru](http://www.agroportal.ru)

**Figure 13: Phragmites**

The invasive species Phragmites crowds out native vegetation.



broadleaf cattail. Herbaceous wetlands may be dominated by *Phragmites*, a reed that colonizes easily and pushes into wetland areas from adjoining dryer land, growing through underground shoots that make it difficult to eradicate (see Figure 13). As it spreads, it tends to trap silt and gradually raise the land level, converting the habitat to one that is dryer. This conversion, plus its manner of growth, enables *Phragmites* to push out other wetland species of plants. *Phragmites* does not provide good habitat for wildlife and tends to become a monoculture, so it is considered an invasive species.

Modified wetlands are areas that have been altered by human activities and do not support natural wetland vegetation, but which do show signs of soil saturation on aerial infrared surveys. Agricultural wetlands, described in some detail in the Surface Water section, occupy 497.97 acres of land that is now under cultivation. This figure may be larger because not all modified agricultural wetlands show well on aerial infrared photos. Other modified wetlands encompass former agricultural wetlands, disturbed wetlands and wetlands that occur in maintained greenspaces such as open lawns, golf courses, and storm water swales.

## Upland Forests

Upland areas are those locations without water at or near the soil surface. About 22.89% of Evesham is composed of upland forests. Much of the area's original upland forests have been cleared and converted to development. The remaining upland forests are primarily located in the southern half of the township.

Upland forests are the third most abundant general land cover type in Evesham after urban land use and wetlands. Approximately 4,333.04 acres of Evesham is upland forest, the vast majority of which is coniferous forest. These forests are mostly made up of successional, or pioneer, plants – like Virginia pine, scrub pine, and pitch pine – which may eventually be overgrown by dominant deciduous trees, such as ash, birch, oak, and hickory—or may remain as the dominant population in Evesham's Pinelands environment.

The upland forests of the Pinelands are dominated by pitch pines, short-leaf pines, and several species of oaks.

The understory is composed of various shrubs, such as scrub oak, black huckleberry, lowbush blueberry, and mountain laurel. The ground is also covered by lichens, mosses, bracken ferns, bearberry, and teaberry.



Source: Science Office, New Jersey Pinelands Commission

*Pinus rigida* (Pitch Pine)

## Grasslands and Agricultural Lands

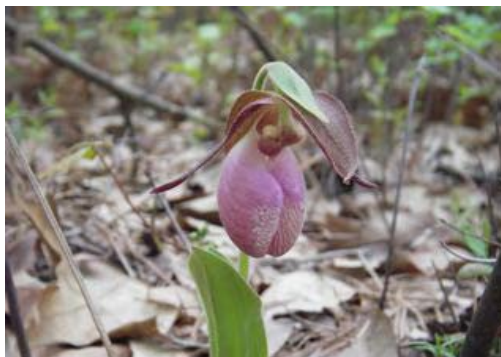
NJDEP defines grassland habitat as brushland, shrubland or old fields that were cleared or disturbed at one time and then abandoned. Following abandonment, old fields are overgrown by perennial herbs and grasses. These pioneer plants remain the dominant species for 3 to 20 years. Later, woody plants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

According to 2002 NJDEP land cover data, only about six percent of Evesham's land cover consists of brushland, shrubland or old fields. Old fields are sections of farmland that have become idle and have transitioned to land suitable for grassland and brushland species habitat. Patches of these lands are scattered throughout Evesham, and are often found adjacent to agricultural lands and upland forests.

## 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 groups according to their importance (five being the highest). Ranks three through five are considered "critical" habitats that possess two exceptional conditions: (a) a documented occurrence of one or more species included on either a federal or state endangered or threatened species list, and (b) a sufficient amount of habitat type to sustain these species. These habitats are collectively known as "critical habitat." Rank 2 habitats have one or more occurrences of at least one "state species of special concern," and Rank 1 habitat is deemed suitable for species that are included on the state or federal threatened and endangered species lists but for which there are no documented occurrences or sightings. Rank 2 and 1 habitats are labeled "suitable habitats." It is important to preserve both levels of habitat in order to maintain the diversity of species that still exists in the area.

The Landscape Project identifies both "critical" and "suitable" habitat in Evesham. The rankings in Evesham are primarily the result of habitat being either "critical" or "suitable" for rare bird species, such as the red-shouldered hawk or the barred owl, or for endangered reptiles and amphibians, such as the Pine Barrens treefrog. See **Table 21** below and **Map 13: Landscape Project Priority Habitats**.



*Pink Lady Slipper*

*Courtesy of John Volpa*

**Table 21: Landscape Project Habitat Rankings – Acreage in Evesham**

Category	Rank	Area (Acres)
<b>Upland Forest</b>		<b>8,640.67</b>
	Critical Habitat (4)	5,511.65
	Critical Habitat (3)	902.32
	Suitable Habitat (2)	2,226.70
	Suitable Habitat (1)	0.00
<b>Forested Wetlands</b>		<b>4,949.44</b>
	Critical Habitat (4)	1,744.99
	Critical Habitat (3)	1,072.15
	Suitable Habitat (2)	2,132.29
	Suitable Habitat (1)	0.00
<b>Emergent Wetlands</b>		<b>745.97</b>
	Critical Habitat (4)	0.00
	Critical Habitat (3)	57.14
	Suitable Habitat (2)	688.83
	Suitable Habitat (1)	0.00
<b>Grasslands</b>		<b>916.37</b>
	Critical Habitat (4)	0.00
	Critical Habitat (3)	0.73
	Suitable Habitat (2)	873.34
	Suitable Habitat (1)	0.00
<b>Total Habitat</b>		<b>15,252.45</b>

Source: NJDEP

#### Key to Table 21

Rank	Combined Category	Explanation
5	Critical habitat	Documented occurrence of one or more species included on the federal endangered or threatened species list <u>and</u> a sufficient amount of habitat type to sustain these species
4	Critical habitat	Documented occurrence of one or more species included on the state endangered species list <u>and</u> a sufficient amount of habitat type to sustain these species
3	Critical habitat	Documented occurrence of one or more species included on the state threatened species list <u>and</u> a sufficient amount of habitat type to sustain these species
2	Suitable habitat	One or more occurrences of at least one “state species of special concern” <u>and</u> a sufficient amount of habitat type to sustain these species
1	Suitable habitat	Habitat deemed suitable for species that are included on the federal or state threatened and endangered species lists but for which there are no documented occurrences or sightings <u>and</u> a sufficient amount of habitat type to sustain these species

#### Landscape Project Data on Upland Forest Habitat

The Landscape Project ranks about 6,413.97 acres in Evesham as “critical” upland forest habitat, and nearly 2,226.70 acres as “suitable” upland forest habitat. Upland forest habitat is found primarily in the southern half of the township. Upland forests are home to rare species such as



timber rattlesnakes, barred owls, northern pine snakes, Pine Barrens treefrogs, red-shouldered hawks, and red-headed woodpeckers, and to the species of special concern such as eastern box turtles, eastern king snakes, great blue herons, wood thrushes, and brown thrashers.

### **Landscape Project Data on Emergent Wetland Habitat**

The Landscape Project divides wetland habitats into two types – emergent and forested wetlands. Emergent wetlands are marshy areas characterized by low-growing shrubs and herbaceous (non-woody) plants in standing water. About 688.83 acres in Evesham are identified as emergent wetlands habitat and are ranked at the “suitable” level. No emergent wetlands in the township are classified as “critical.” Small patches of emergent wetland habitat are found throughout the township, mainly along waterways and adjacent to forested wetlands. Animal species that can be found in these wetland habitats include turtles, fish, mollusks, crustaceans, and insects. Emergent wetlands are also important habitats for migratory waterfowl and passerines (smaller perching birds, such as migrating flycatchers and thrushes). In Evesham Township in particular, this habitat is suitable for carpenter frogs, Fowler’s toads, great blue herons, and Pine Barrens treefrogs.

### **Landscape Project Data on Forested Wetland Habitat**

Evesham’s forested wetlands occupy 4,949.44 acres of which 2,919.14 acres are ranked as critical. “Critical” forested wetlands in Evesham are located primarily in the central portion of the township. “Suitable” forested wetland habitat supports wildlife along the other waterways in the township. Forested wetlands support species such as migratory and nesting warblers, many of which are species of special concern. They can also be home to various rare amphibians (frogs and salamanders). In Evesham Township, forested wetlands are critical or suitable for barred owls, brown thrashers, carpenter frogs, eastern king snakes, Fowler’s toads, great blue herons, Pine Barrens treefrogs, timber rattlesnakes, and wood thrushes.

### **Landscape Project Data on Grassland-Species Habitat**

The Landscape Project designates nearly all of Evesham’s remaining habitat as “suitable” or “critical” grassland-species habitat. Less than 1 acre is ranked as “critical” grassland-species habitat, though there are 873.34 acres of “Suitable” habitat. Grassland-dependent species (mostly birds) are the most threatened group of species in New Jersey, primarily because the most common form of habitat used by these species, agricultural fields, is the most threatened habitat in the state due to development pressure as well as to changed agricultural practices.

Examples of grassland-dependent species that use grassland habitat for nesting or feeding include the vesper sparrow and some species of butterflies and moths. Evesham’s designated grasslands provide critical or suitable habitat for eastern box turtles and northern pine snakes.

## NEW JERSEY PINELANDS STUDIES

The NJDEP Landscape Project data is based on sightings of endangered species on parcels of land that are over 25 acres in size. The Landscape Project methodology for ranking habitat patches works well where patch sizes are relatively small or discontinuous, but it is less suitable to the New Jersey Pinelands, where there are large areas of contiguous habitat. The New Jersey Pinelands Commission, which is responsible for administering the Pinelands Comprehensive Management Plan (CMP), undertook an ecological-integrity assessment of the Pinelands to provide a more detailed analysis of habitats. The assessment's purpose was to evaluate the ecological status of the entire 938,173-acre (379,827-hectare) Pinelands Area and to identify the areas that are most intact and undisturbed – that have the highest ecological integrity.



Source: DVRPC

*Grassy areas with pine woods, on the Aerohaven site*

In order to evaluate ecological integrity, the Pinelands Commission looked at three factors: landscape integrity, wetlands integrity, and aquatic integrity. In addition to the data presented in the full report, published in 2008, the Pinelands Commission also developed a report entitled *Sub-regional Resource Protection Plan for Southern Medford/Evesham Townships*, which was released in 2006. This report is a more local plan that looks specifically at the Pinelands areas of Evesham and Medford townships. It documents ecological integrity, although it uses a different methodology, and devises a number of actions for protection of significant landscape habitats.

### Landscape Integrity

Landscape integrity is a measure of the extent of intact Pinelands habitat in an area. Pinelands habitat includes upland forests, water, and wetlands, with the exception of managed wetlands and wetland agriculture. For the *Sub-regional Plan*, The Pinelands Commission study scientists determined which lands were “altered” based on 2000 DVRPC Land Use/Land Cover data. They included all developed land and upland agricultural land as “altered.” Remaining land was subdivided into grid “cells” and the study then used Geographic Information Software to compute the distance of each cell of habitat to the nearest altered land. Land farthest from altered land was given a value of 10, while the land closest to the altered land was given a value of 1.

## **Wetlands Integrity**

Wetland integrity is a measure of the percentage of intact habitat in a wetland-drainage unit that is neither developed nor upland agriculture. A wetland-drainage unit is defined as a discrete area of wetlands and the adjacent uplands that contribute surface water and groundwater to the wetlands. The Pinelands Commission study for the *Sub-regional Plan* used a process similar to the landscape integrity analysis for the Pinelands as a whole to calculate watershed integrity, except in this case, the study scientists computed the straight line distance from a “wetlands” or “water” cell to altered land. Again, the ten percent of habitat farthest from altered land was given a value of ten, while the ten percent that was closest to the altered land was given a value of one.

## **Watershed Integrity**

Aquatic integrity has been shown to be a function of the percentage of land, within the boundaries of a subwatershed, that is neither developed nor in agriculture. In general, water quality and biological communities decline as the level of altered land increases within a subwatershed. Dissolved solids and pH both rise as altered land increases. The Pinelands study for the *Sub-regional Plan* computed the sum of the area of developed and upland agricultural land in each drainage sub-basin or subwatershed and then divided this number by the total area of each sub-basin. This was then used to classify the subwatersheds into three categories: least altered (<10% altered), altered (10-30% altered), and most altered (>30% altered). In the *Sub-regional Plan*, this approach was used to characterize the 104 sub-basins within the Pinelands in Evesham and Medford

## **Pinelands Commission Conclusions Related to Evesham Township**

Based on the Landscape, Wetlands, and Watershed Integrity analyses, plus additional rare plant and animal sighting data, three areas in the Evesham-Medford study were found to have particularly high resource value. One area is in eastern Medford Township. In Evesham, the southeastern portion of the township connecting to Medford is the second area. The Black Run drainage area and lands to the south of it is the third region. All three regions scored high in the integrity studies and all are deemed most important for preservation because of the biological communities that they support.

The *Sub-regional Resource Protection Plan* also looked at issues pertaining to land use in both Evesham and Medford, including population figures, infrastructure, zoning, township open space programs, and development pressures. The last were found to be high. The Study also laid out recommended Protection Strategies that could be used to protect these areas. These include changes in zoning, transfers between “sending” and “receiving” areas, clustering, direct acquisition, increased stewardship, and tax incentives. To date (March 2009) Medford Township has adopted the *Sub-regional Plan*. Evesham has not yet done so.



## **Other Pinelands Commission Studies**

The Pinelands Commission has undertaken extensive scientific testing over the last 40 years. In the early 1990s, the Commission launched its long-term environmental monitoring program. The Pinelands Commission has released several reports about the watersheds within the Pinelands using the results of the long-term environmental monitoring program. Two of these reports – those on the Rancocas Creek Basin and the Mullica River Basin – are relevant to Evesham Township. They provide information about water quality, stream vegetation, fish assemblages, and anuran (frog and toad) assemblages. The data from these reports show that when there are changes in land use intensity and water quality, there are also corresponding changes in the composition of stream vegetation, fish assemblages, and anuran communities.

One of the Pineland Commission's current projects is the Kirkwood-Cohansey Project. In 2001, the New Jersey legislature directed the Pinelands Commission to prepare an assessment of how to meet future water-supply needs while protecting the Kirkwood-Cohansey aquifer. The legislation authorized \$5.5 million for the Commission to undertake this study in cooperation with NJDEP, Rutgers University, the U.S. Fish & Wildlife Service, and the U.S. Geological Survey. The project involves analyzing hydrology, species and community indicators, ecological-process indicators, landscape models, and build-out and water-demand.

There are two major research questions being addressed by the current phase of the Kirkwood-Cohansey study. The first is to determine what the effects of groundwater diversions from the aquifer are on stream flows and wetland water levels. The second question asks what the probable ecological effects are on aquatic and wetland communities of induced stream-flow and groundwater-level changes.

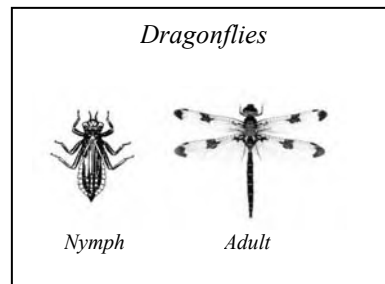
## **ANIMAL COMMUNITIES**

Although no comprehensive inventory of the different animal species within New Jersey, Burlington County, or Evesham exists, there are records of sightings, biological studies of range, environmental impact assessments, and evaluations of endangered and threatened status. Evesham, however, is luckier than most communities because the New Jersey Pinelands are an extensively studied ecosystem. As a result, the descriptions of locally occurring animals are often more comprehensive here than in other areas. For example, according to the Pinelands Commission, 39 species of mammals, 299 birds, 59 reptile and amphibian species and 91 fish species have been identified as occurring within the Pinelands. This means that it is possible that many of these species occur in the southern half of Evesham, which is in the Pinelands Management Area. Using federal, state, scientific, and nonprofit sources, it is possible to identify and describe known and possible animals of Evesham.

**See Appendix E: Vertebrate Animals Known or Probable in Evesham Township.**

## Invertebrates

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



**Figure 14: Dragonfly Nymph and Adult**

The nymph is a common macroinvertebrate found in southern New Jersey's waterways

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 long period of time. The NJDEP Ambient Biomonitoring Network (AMNET) surveys streams for macroinvertebrate communities, which indicate certain levels of water quality, as was discussed in the **Surface Water Quality** section of this document.

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 the State of New Jersey. In Evesham, the triangle floater, a freshwater mussel, is listed as a threatened species.

## 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. Many species of birds both migrate and nest in Evesham, using the wetlands and other natural habitats to rest and feed. New Jersey is located in the Atlantic Flyway, a bird migration route that parallels the Atlantic coast east of the Appalachian mountains on the North American continent. Birds favor this path because there is abundant food located along the north-south route. Because New Jersey is located approximately half way between the North Pole and the equator, it is an important stopover site for many migrating bird species.

## Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are over 80 mammal species in New Jersey, of which nine are listed by the state as endangered. Some common mammals found in Evesham include cottontail rabbits, eastern gray squirrels, skunks, raccoons, opossums, and white-tailed deer.

Management of white-tailed deer is an issue in New Jersey. Deer often come into conflict with humans in suburban and farm areas. According to the U.S. Department of Agriculture, deer cause more damage to agricultural crops than any other vertebrate wildlife species. Farmers in densely human-populated areas appear to be the most affected. Additionally, deer can devastate the understory of forests through overgrazing, destroying the growth of seedlings and young trees. Finally, as most motorists are aware, collisions between deer and automobiles frequently result in serious damage.

Controlling deer numbers has become increasingly difficult in New Jersey, primarily because suburban landscaping provides year-round food, which supports population growth. The principal method of culling the population – hunting – is often not feasible in suburban environments.

To minimize human-deer conflicts, the New Jersey Agricultural Experiment Station recommends both lethal and nonlethal deer management options for community-based deer management programs. For example, municipalities can extend the hunting season, issue depredation permits to private landowners, engage in sharp shooting, and employ traps and euthanasia to reduce deer numbers. Alternatively, communities and private landowners can choose to apply nonlethal, although more costly, deer management strategies such as installing reflectors and reducing speed limits on rural roads to decrease deer-vehicle collisions, modifying habitat by planting unappealing plants on commercial and residential properties, using taste-based and odor-based repellents, and employing traps and translocation techniques.



*Courtesy of Mike Baird*

*Red-shouldered Hawk*

### ***Birds***

There are between 350 and 500 bird species in New Jersey, which is an exceptional number given the state's small size. New Jersey is an important location for migratory birds flying 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 the New Jersey Atlantic Coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Common birds in Burlington include geese, ducks, vultures, woodpeckers, doves, swallows, crows, grackles, jays, robins, starlings, wrens, cardinals, finches, sparrows, and some hawks. Wild turkeys are becoming

increasingly common in South Jersey, and wild turkey hunting is popular. The red-shouldered hawk, an endangered bird species; the Cooper's hawk, a threatened bird species; and other rare and endangered species have been sighted in Evesham. According to the Landscape Project, Evesham contains suitable habitat for a variety of predatory birds including hawks, falcons, and eagles.



## ***Fishes***

When European settlers arrived in present-day Burlington County, they encountered American Indians who regularly fished along the inland streams and gathered shellfish in the Delaware River. Due to the unintended consequences of 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. Evesham Township's freshwater streams may contain sunfish, shiner, pickerel, pumpkinseed, eastern mudminnow, common carp, largemouth bass, perch, darter, crappie, and the American eel. Other fish species are documented for Evesham in the "Annotated Checklist and Distribution of New Jersey Freshwater Fishes" by Rudolf G. Arndt. See **Sources of Information** and **Appendix E: Vertebrate Animals Known or Probable in Evesham Township**. Pineland species have been documented by the Pinelands Commission at five sites in Evesham. See **Pinelands Commission Studies** subsection in **Water Quality** section.

## ***Endangered Vertebrates***

According to the Natural Heritage Database and the Landscape Project, a number of rare wildlife species have been sighted in Evesham. Brief descriptions, provided by the New Jersey Fish and Wildlife Service, of some of the township's endangered and threatened species and their preferred habitat follow.

The bald eagle (*Haliaeetus leucocephalus*) is a type of raptor, which people often call a "bird of prey." Bald eagles are incredibly large; they can have a wingspan of between 7 and 8 feet when they are mature. Although they have mottled plumage when they are young, by the time they reach four years old they begin to develop the characteristic white head and tail, as well as the brown body feathers. Bald eagles are found in forested areas near water, as their primary diet consists of fish. In New Jersey they can be found near the Delaware River, the Delaware Bay, and the tributaries associated with these bodies of water. When nesting, the eagles choose a tall tree that is taller than the surrounding trees. Sometimes they also choose a lone tree in an open field. The bald eagle population declined in the United States as a result of shooting,

### **FEDERAL ENDANGERED SPECIES ACT\***

An "Endangered" species is in danger of extinction throughout all or a significant portion of its range.

A "Threatened" species is one that is likely to become endangered in the near future.

### **NEW JERSEY ENDANGERED SPECIES ACT\*\***

An "Endangered" species is in danger of immediate extinction within the state due to one of several factors: loss or degradation of habitat, over-exploitation, predation, competition, disease, or environmental pollution.

A "Threatened" species is one that may become endangered if environment conditions continue to deteriorate. It is vulnerable due to one of several factors: small population size, restricted range, narrow habitat affinities, or significant population decline.

A species of "Special Concern" is one that warrants special attention because of the evidence of population decline, environmental deterioration, or habitat modification that would result in becoming Threatened. Special Concern status also extends to species whose population size is unknown or unstudied.

\* Definitions adapted from U.S. Fish and Wildlife Service, "Listing a Species and Threatened or Endangered: Section 4 of the Endangered Species Act." Washington, DC: February 2001.

\*\* Definitions adapted from N.J. Division of Fish, Game, and Wildlife, Endangered and Nongame Species Program, "Status Definition." Trenton, NJ: April 2002.

poisoning, and the pesticide DDT. Although the bald eagle is still listed as a state endangered species, it has made a dramatic recovery in New Jersey. When Congress passed the Endangered and Nongame Species Conservation Act in 1973, there was just one nesting pair of bald eagles in New Jersey. Today there are nearly 60 nesting pairs of eagles in the state. In Evesham, the Bald Eagle may be seen foraging in open areas, especially near water.

The red-shouldered hawk (*Bueto lineatus*) is a soaring hawk about as big as a crow. The hawk requires mature wet woods such as riparian forests for breeding and mixed woodlands near old growth forests containing standing water for nesting. Red-shouldered hawks prefer a closed canopy of tall trees with an open sub-canopy and variable amounts of understory shrubs and seedlings. In southern New Jersey, these hawks are found in vast and contiguous freshwater wetlands, especially hardwood or mixed wood/cedar swamps containing maple, black gum, Sassafras, magnolia, and Atlantic white cedar. The red-shouldered hawk avoids nesting near residences, roads, and development. Habitat loss and declines in population in the Northeast have resulted in the listing of this species as endangered in New Jersey, threatened in New York, and of special concern in Connecticut.

The Pine Barrens treefrog (*Hyla andersonii*) has many unique identifying characteristics—a nasal, honking "quonk-quonk-quonk" call, vibrant coloration, a tiny inch and a half long body, and an appetite for mosquitoes. They are also found in a specific type of habitat—sandy, acidic and mucky soils that offer dense shrubs, heavy ground cover, and shallow ponds, bogs and ditches for breeding needs. The Pine Barrens treefrog was first described in New Jersey and, in the state, occurs only in what is now known as the Pinelands. Recognized in New Jersey as an endangered species since 1979, the status of the Pine Barrens treefrog has been upgraded to "threatened" due to being locally abundant in some areas of New Jersey where this treefrog is known to occur.

The barred owl (*Strix varia*) is a large fluffy-looking owl with brown barring on the upper breast and brown streaking on the lower breast and belly. The throat is white and the round head lacks ear tufts, while the facial disk is grayish-white with a brown outline. The large facial disk funnels sounds towards the owl's proportionally gigantic ears, providing it with extraordinary hearing for detecting minute noises, such as the rustling of mice in the dark. Unlike all other eastern owls excluding the barn owl, the eyes of the barred owl are dark brown. The hooked bill is buff yellow. The feet and toes are feathered and the talons are dark brownish-black. Sexes are similar in plumage and, although there is much overlap, females may be larger than males. Juveniles resemble adults. Barred owls fly with slow, moth-like wing beats that are interspersed with glides. In flight, the head appears large and the wings are broad and rounded. Soft feathers and serrated edges on the outer wing feathers minimize noise, enabling these and all other owls to fly silently—an advantage that enables them to surprise their prey.



Source: [www.dnr.state.wi.us](http://www.dnr.state.wi.us)

Barred Owl

The Cooper's hawk (*Accipiter cooperii*) is a member of the Accipiter family – woodland hawks that prey on smaller birds – and is especially adapted to fly through dense cover while chasing prey. In southern New Jersey, Cooper's hawks breed in remote wooded wetlands dominated by red maple or black gum. Adjacent upland pine or mixed oak/pine forests usually provide a buffer for nesting hawks. These hawks generally nest in sub-climax forests composed of trees 30 years or older, creating a closed canopy. On average, a hawk will place the nest more than a third of a mile away from the nearest human inhabitant. While other raptor species were threatened due to hunting practices, Cooper's hawk populations were not threatened until widespread suburbanization. Additionally, the pesticide DDT impaired many bird species' reproduction and contributed to declining populations from the 1950s to 1970s. Populations began to recover due to the nationwide ban of DDT in 1972, coupled with the reforestation of old fields throughout New Jersey. The hawk was listed as endangered in 1974 and downgraded to threatened in 1999 on the state list. The loss of large, contiguous forests remains a threat to this species and warrants the continued protection of Cooper's hawk nesting habitats.

### ***Timber rattlesnake***

The timber rattlesnake (*Crotalus horridus*) is the only rattlesnake in New Jersey. It has a strongly triangular head and a large, heavy body. The head is unmarked, and the tail is black. The body is often yellow or brown with dark crossbands, but occasionally the dark pigment is so wide that the snake looks almost entirely black. The snake is venomous. In the Pine Barrens, the rattlesnake is found in scattered populations in the swamps and pine-oak forests, where it dens along riverbeds. These reptiles were once found throughout the state but habitat loss, illegal collecting, road-side mortality, and unjustified killing have contributed to declines in rattlesnake numbers in New Jersey.

In 1998, a scientist from the College of New Jersey discovered a timber rattlesnake – an endangered species in New Jersey – near Kettle Run Lake on the Evesham-Medford border. After implanting the snake with a radio-transmitter, the snake was tracked back to its hibernation den, which was located on land scheduled to become The Sanctuary housing development. The land was approved for approximately 250 single-family dwelling units on 1.0 acre lots.

A protracted legal battle ensued, in which the Pinelands Preservation Alliance, the New Jersey Audubon Society, and the Natural Resources Defense Council challenged the development. It was argued that the development should not proceed because one of the rules in the Pinelands Comprehensive Management Plan states that no development can be approved unless it avoids irreversibly damaging habitats that are critical to the survival of threatened or endangered species.

Eventually, in a court-mediated settlement agreement, the Pinelands Commission allowed the developer to build the majority of the homes that had been planned. Part of the agreement was that the developer had to install five culverts and 2.7 kilometers of fences to guide the snakes away from the developed areas and to an area of preserved land when they came out of hibernation each year.

In 2001, the Pinelands Commission and the New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program initiated a timber rattlesnake monitoring program in



the area with the partially constructed residential development. The study's aim was to locate undocumented hibernacula, assess how the movement of individual snakes changed before and after the construction of the fences, and determine whether the fences and culverts effectively direct snakes away from the development and towards the forested areas. The study concluded that the fences were ineffective for that particular purpose; as they did not prevent any of the transmitter-equipped snakes from entering the constructed portions of the development.

See **Appendix E: Vertebrate Animals Known or Probable in Evesham Township** and **Appendix F: Threatened and Endangered Species in Evesham Township**, and **Appendix G: New Jersey Endangered and Threatened Species**.



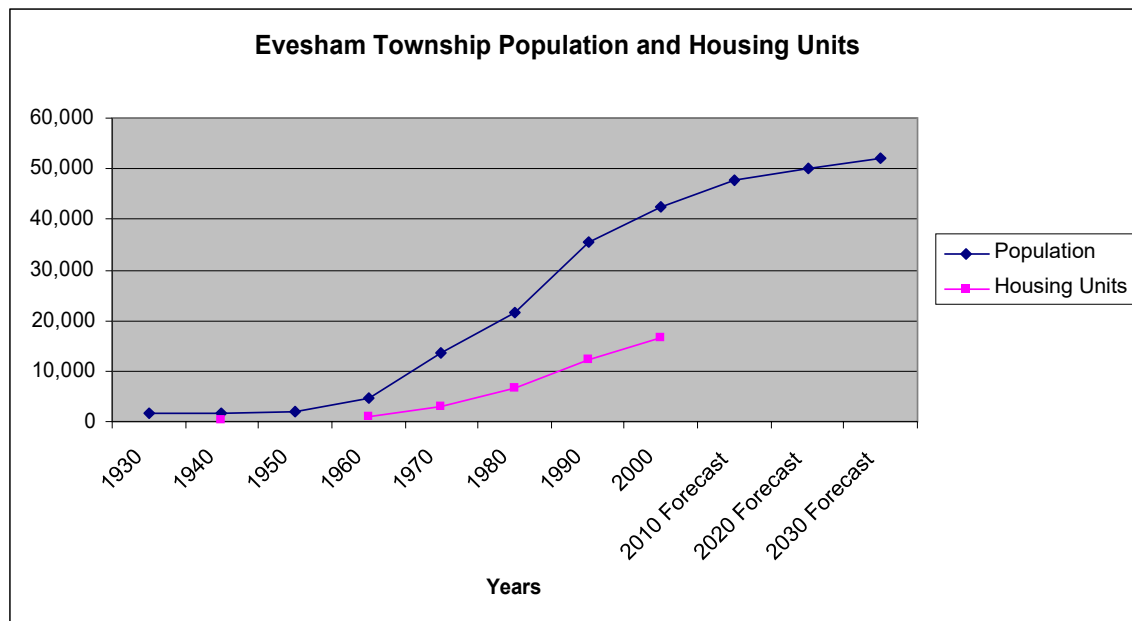
*Courtesy of NJ Pinelands Commission*

*Timber Rattlesnake*

## THE BUILT ENVIRONMENT

### POPULATION AND HOUSING

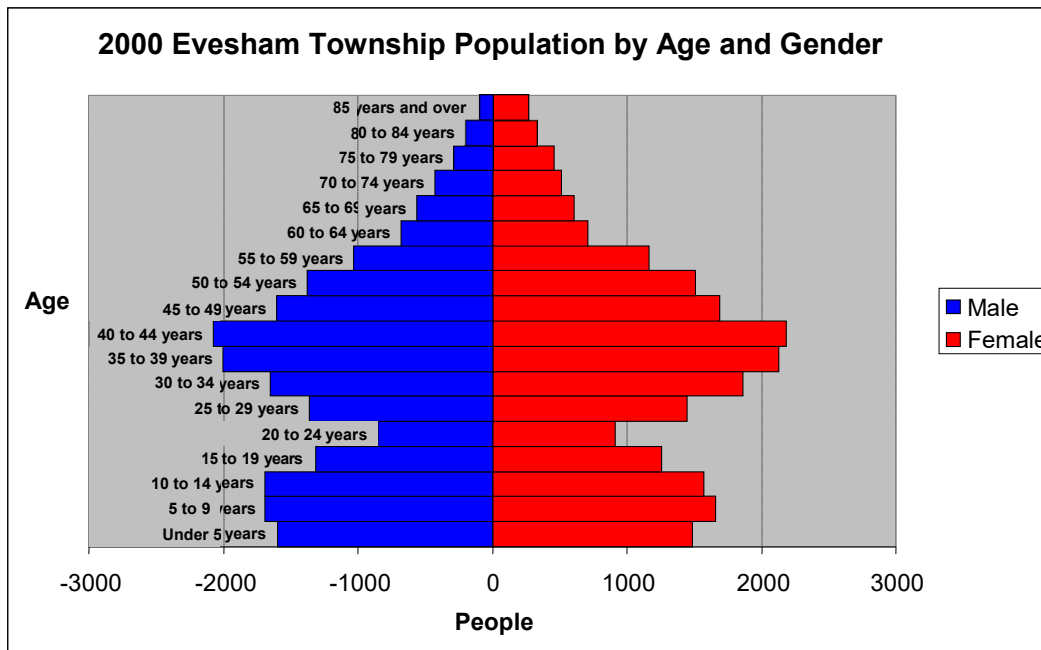
Evesham experienced explosive growth in the last four decades of the twentieth century. In 1960, it had a population of less than 5,000, and by 2000, there were 42,275 residents – an 800+% increase in 40 years. The growth rate was fastest between 1960 and 1970, but over 13,801 residents moved into the township between 1980 and 1990. Although the growth rate slowed by 2000, Evesham’s population still grew by approximately 20% from 35,309 to 42,275 between 1990 and 2000. At the time of the 2000 Census, Evesham was the most populous township in Burlington County. The Delaware Valley Regional Planning Commission (DVRPC) also ranked Evesham as one of the 15 fastest growing municipalities in DVRPC’s nine county metropolitan planning region in terms of absolute change between 1990 and 2000. Evesham continues to grow, with an estimated 2007 population of 45,619 and an expected 2035 population of 52,867 (see Figure 15).



Source: U.S. Census & DVRPC Population Forecasts

**Figure 15: Growth of Evesham Township Population and Housing by Year**

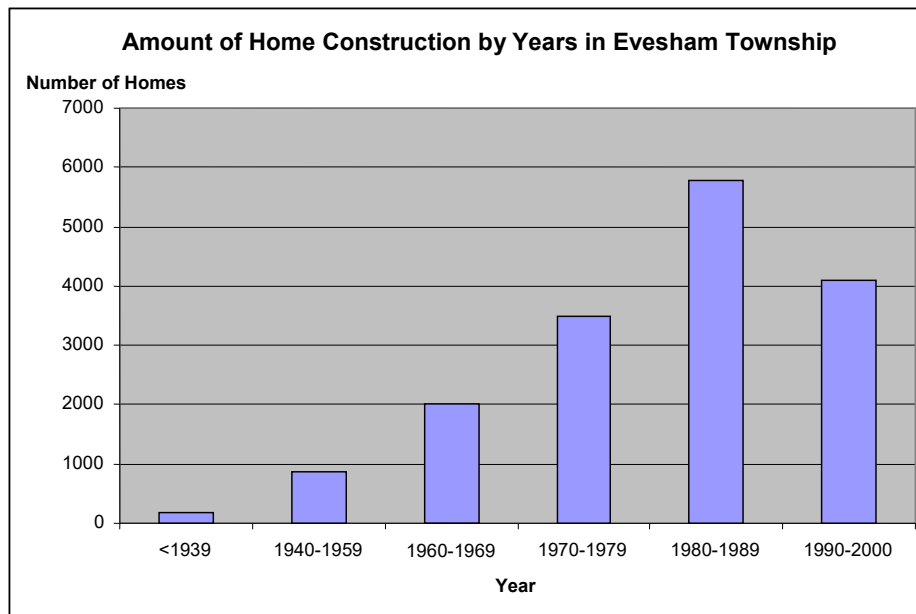
According to the 2000 Census, 11,485 residents (27.16%) of Evesham’s population were under the age of 18. By comparison, only 24.8% of New Jersey’s population and 25.2% of Burlington County’s population were under the age of 18 in 2000. This age group represents those residents who are most physically active in the community and most likely to use public recreational facilities (see Figure 16).



**Figure 16: 2000 Evesham Township Population by Age and Gender**

*Source: 2000 U.S. Census*

There were 16,436 housing units in Evesham in 2000. Approximately three-quarters of Evesham's dwellings are either single-family detached or single family attached units. The remainder are multifamily units and a few mobile homes. Approximately one quarter of Evesham's units in existence in 2000 were built between 1990 and 2000, while 35% were constructed in the 1980s, 21% in the 1970s, and the rest prior to 1970 (see Figure 17).



*Source: 2000 U.S. Census*

**Figure 17: Home Construction by Date in Evesham Township**



Several subdivisions were approved for Evesham Township recently, as is shown in **Table 22** below. A total of 167 units have been approved.

**Table 22: Recent Development Approvals**

<b>Name</b>	<b>Address</b>	<b>Block and Lot</b>	<b>Acres</b>	<b>Description</b>
Mend	200 Sharp Rd.	14/2	49.16	104 apartments
Deluca Homes Phase II: Sharp Run Seniors	Sharp Rd.	15/8	11.58	22 single family age restricted
Procacci Development Co., Inc.: Sharp Run Estates	205 Sharp Rd.	15/3, 15/4,15/5,15/6, 15.12	42.17	38 twin residential dwelling units*
James Gatto	49 5 <sup>th</sup> Street	137/1-137/20	1.29	3 single family lots
<b>TOTAL</b>			<b>104.20</b>	<b>167 units</b>

Source: Evesham Township

\* preliminary site plan approval only

## TRANSPORTATION

Evesham Township is relatively accessible compared to other parts of rural southern New Jersey. According to the New Jersey Department of Transportation (NJDOT), Evesham has a total of 178.95 miles of roads. Of these, 8.08 miles are maintained by NJDOT, 15.32 are maintained by Burlington County, and 154.83 are maintained by the municipality. Major thoroughfares, such as State Routes 70 and 73, facilitate travel between Evesham and the Philadelphia metropolitan region, while County Routes 600, 607, 618, 619, 620, and 674, as well as smaller rural arterials and collectors, connect to local roads within the township.

While Evesham is most easily accessed by car, there are also opportunities to use mass transit in the area. New Jersey Transit bus route 406 serves Evesham Township. The northern portions of Evesham are within a short drive of several transit services, including the Burlink ([www.ridetheshuttle.com](http://www.ridetheshuttle.com)), RiverLINE (<http://www.riverline.com/>), New Jersey Transit's Atlantic City Rail Line (<http://www.njtransit.com/>), Port Authority Transit Corporation (PATCO; <http://www.ridepatco.org/>), Southeastern Pennsylvania Transportation Authority (SEPTA; <http://www.septa.org/>), and Amtrak (<http://www.amtrak.com/>).

Cross County Connection, a non-profit transportation management association in southern New Jersey, partners with the NJDOT, NJ Transit, and the U.S. Federal Highway Administration to improve the quality of life through transportation solutions. Their website, [www.driveless.com](http://www.driveless.com), provides information about mass transit, car and vanpooling, bicycling, walking, telecommuting, and flexible scheduling. There are schedules, fare information, and maps of the different transit systems, as well as e-mail or SMS traffic alerts and a database of contacts for carpooling. Discounts at local merchants are available through the Caring Commuter program.

The Evesham Township Council provides free transportation within the township for seniors aged 55 and over. Appointments must be scheduled one week in advance. The service is available weekdays from 8 am to 4 pm (excluding holidays). Shopping trips to township supermarkets are scheduled by neighborhoods, in order to accommodate as many people as possible. Additional information is available by calling 856-988-9866.

Burlington County provides free county bus transportation to senior citizens (60 and older) and adult disabled residents (21-59 years of age) through the Burlington County Transportation System (BCTS), which operates Monday through Friday 8 am – 5 pm. More information is available at: <http://www.co.burlington.nj.us/departments/transportation/index.htm>

## **MUNICIPAL SERVICES**

### **Drinking Water**

The Evesham Municipal Utilities Authority (EMUA) is a public body that owns and operates water and sewer facilities in Evesham. It was initially established as the Evesham Sewerage Authority in 1955, and later reorganized into the EMUA in 1959. The EMUA operates 170 miles of potable water lines. Most of the EMUA's service is provided in the northern and central portions of the township, with limited service in the southern part of the municipality. EMUA's total annual water use is 1.5 billion gallons.

EMUA customers receive a combination of groundwater and treated surface water. Eleven wells, which range in depth from 300 to 623 feet, provide water for local residents. The Potomac-Raritan-Magothy aquifer, which is the major water supply for Evesham (see **Aquifers** section), is being depleted faster than the natural recharge rate. As a result, water company allocations from well withdrawal are limited. The EMUA purchases additional water supplies from nearby water companies, such as the Mt. Laurel Township Municipal Utilities Authority (182 million gallons) and the New Jersey American Water Company (365 million gallons). New Jersey American provides water drawn from the Delaware River and treated at its plant in Delran. Between October 1<sup>st</sup> and June 30<sup>th</sup>, the EMUA recharges the PRM Aquifer from well #13, which is in the Mt. Laurel Aquifer. From July 1<sup>st</sup> to September 30<sup>th</sup>, they recover the previously recharged water from well #14, which is in the Potomac-Raritan-Magothy aquifer.

See **Map 11: Public Water Supply Wells** and **Tables 18 and 19**. These are described in the **Water Supply Wells** section of this document.

### **Sewer**

The Evesham Municipal Utilities Authority (EMUA) operates a public sewer system within the municipality. See **Map 14: Approved Sewer Service Area and NJPDES Permits**. There are a total of approximately 175 miles of sewer lines in Evesham that connect to Evesham's three modern sewage treatment plants. The Kings Grant plant is the smallest, with a capacity of approximately 600,000 gallons per day. This facility discharges to recharge basins and a

sprinkler system, when temperatures permit (in all but the coldest months of the year). All of Kings Grant's recharge will soon be through recharge basins.

The Elmwood Wastewater Treatment Plant has a capacity of 2.1 million gallons per day (mgd), and discharges treated water to the Southwest Branch of the Rancocas Creek. Recently, the EMUA began providing recycled water to the municipal golf course for irrigation purposes, thus saving the golf course from pumping 100,000 gallons of water per day from their own private well. This example of water conservation is being evaluated for other possible township and local board uses, as well as for other private golf courses.

Finally, the Woodstream Wastewater Treatment Plant has a capacity of approximately 1.2 mgd, and discharges to the South Branch of the Pennsauken Creek. Although the majority of the Township is approved for sewer service, there are certain areas that still rely on septic systems.

In order to comply with the federal Clean Water Act, New Jersey has a statewide Water Quality Management Plan, which is administered by the Department of Environmental Protection. DEP divided the state into several planning areas. Evesham falls under the Tri-County Water Quality Management Board, which coordinates water supply and wastewater treatment plans for Burlington, Camden, and Gloucester counties. The Tri-County Water Quality Management Board also maintains the Tri-County Water Quality Management Plan, which addresses wastewater and water quality issues over a twenty year timeline. The Tri-County Board operates through the Delaware Valley Regional Planning Commission (DVRPC), which is the agency that facilitated the development of the Tri-County Water Quality Management Plan in the late 1970s.

## **Trash and Recycling**

Curbside municipal trash service is available in Evesham on a weekly basis. Recycling – including glass bottles and jars, aluminum and steel food and beverage cans, plastic bottles, newspaper, and cardboard – is picked up by Burlington County twice a month. Bulk waste (items which are too big to fit in a trash collection container but cannot be recycled) is collected on the first trash collection day of the quarter. Residents must schedule pickups of brush or appliances/large metal items through the Department of Public Works. Leaf collection takes place in November and December, and Christmas tree removal occurs in January. Residents can bring hazardous household waste, such as used motor oil, computers, paint, and paint thinners, to the Public Works Facility at 501 Evesboro-Medford Road.

Burlington County's conversion to single stream recycling started September 1st 2014.

Studies show single stream recycling brings with it an increase of 10 percent or more in recycling. The more that is recycled, the less goes to our landfills. Last year, recycling saved the towns more than \$3.2 million in landfill tipping fees. Those cost-savings are effectively tax savings, since they improve the bottom line of municipal budgets.

The cost of the program is included in tipping fees – with no additional costs to the towns. In addition, the program is operated through the Occupational Training Center of Burlington County and provides jobs to individuals with disabilities.

When single stream began in September 2014, #1 & #2 plastic food trays were added to the #1 & #2 plastic bottles we currently collect as well as #5 plastics. Collection of #3, #4, #6 or #7 types of



plastic containers are not accepted until recycling markets improve. Major changes in the global plastic market have made it very difficult to find environmentally sound markets for #3, #4, #6 or #7 plastics.

## **Education**

Evesham contains several public schools, seven of which are elementary schools (Beeler, DeMasi, Evans, Jaggard, Marlton, Rice, and VanZant) and two of which are middle schools (DeMasi and Marlton). There are a total of approximately 4,600 students in the schools.

Evesham students, along with students from the neighboring town of Medford, attend the Lenape Regional High School District, which includes three schools: Lenape High School, Shawnee High School, and Cherokee High School. In addition to public schools, there are also several private schools in the town, which are all listed in ***Table 23*** below.

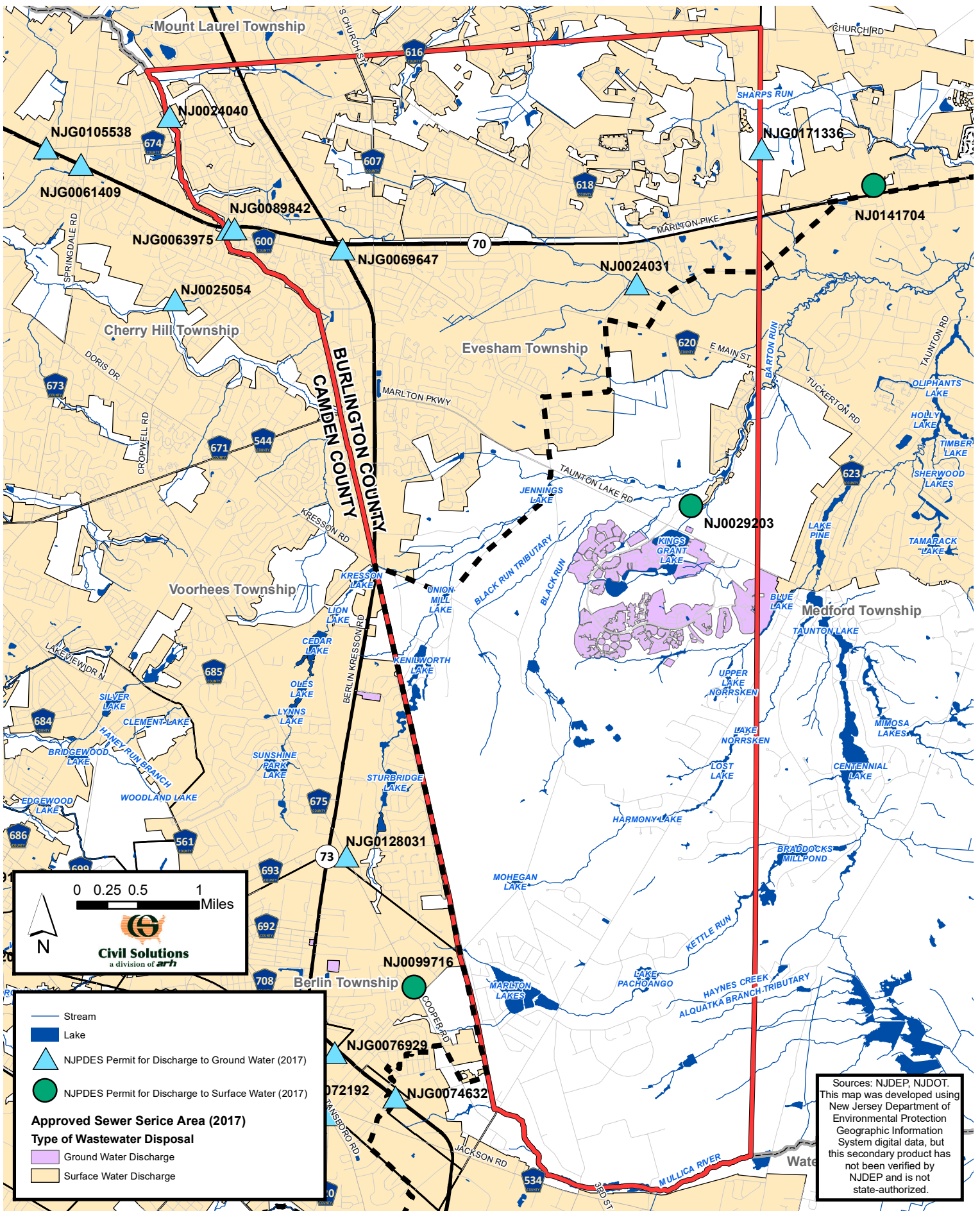
**Table 23: Schools in Evesham Township**

<b>Name</b>	<b>Type</b>	<b>Grades</b>	<b># of Students</b>
Frances Demasi Elementary	Public	K-5	288
Marlton Elementary	Public	K-5	475
Florence V. Evans Elementary	Public	K-5	505
H.L. Beeler Elementary	Public	K-5	434
J. Harold Vanzant Elementary	Public	K-5	389
Robert B. Jaggard Elementary	Public	K-5	401
Richard L. Rice	Public	K-5	478
Marlton Middle	Public	6-8	833
Frances Demasi Middle	Public	6-8	792
Cherokee High School	Public	9-12	2219
Chesterbrook Academy	Nonsectarian Private	PreK-K	30
Excel Learning Center, Inc.	Nonsectarian Private	PreK-K	89
Under the Sun Learning Center	Nonsectarian Private	PreK-K	33
Joyful Noise Christian School	Nondenominational Christian	PreK-K	100
Marlton Christian Academy	Assembly of God Private School	PreK-7	80
St. Joan of Arc Elementary School	Roman Catholic Private School	K-8	427
Greenberg Education Center	Nonsectarian Private	2-12	26

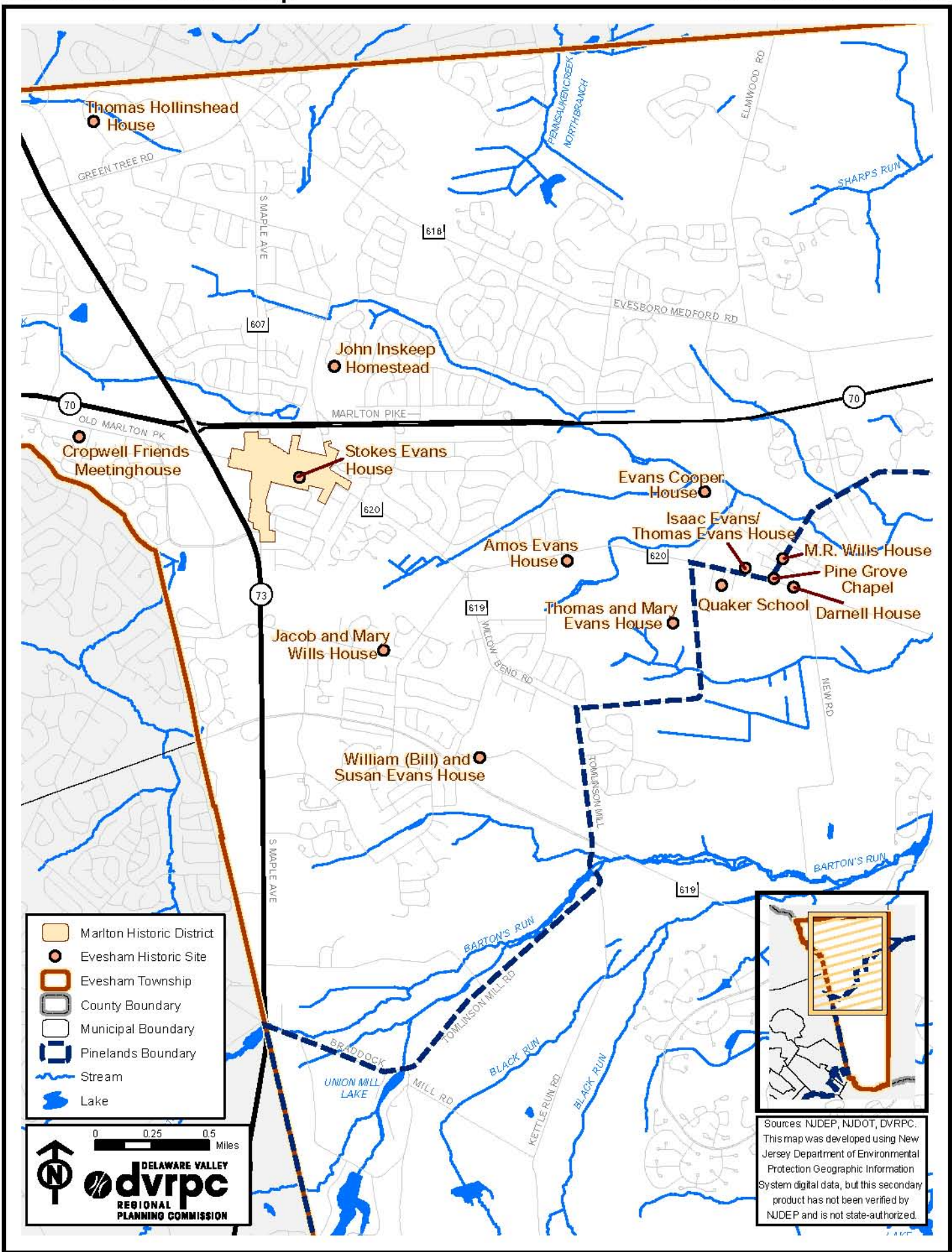
*Source:* [www.nces.ed.gov](http://www.nces.ed.gov) for public schools, 2014/2015 school year; private school data from PSS Private School Universe Survey, 2013/2014 school year, <https://nces.ed.gov/surveys/pss/>

# Map 14: Approved Sewer Service Area and NJPDES Permits

## Evesham Township







## HISTORIC RESOURCES

Protection and preservation of historic structures, lands, and views are of high importance to Evesham Township residents. In 1985, Evesham Township hired ACROTERION, a preservation consulting group, to conduct a survey of the Township's historic sites and structures. More than 100 structures were identified in the survey. Several are eighteenth-century structures, such as the Jacob Wills House, the Rising Sun Tavern, and the Thomas Evans House, the oldest surviving structure in Evesham.

Evesham has ten sites on both the National and State Registers of Historic Places. Additionally, five sites were issued a State Historic Preservation Office (SHPO) Opinion, which reviews a site's eligibility for inclusion on the State Register of historic places.<sup>5</sup> The Evesham Historic Preservation Commission lists 162 sites on its historical inventory, some of which have the potential to be listed as local, state, or national landmarks, but have not been nominated by local citizens or identified by the SHPO for such a designation. The township boasts numerous 18<sup>th</sup> and 19<sup>th</sup> century structures, most of which are houses in Marlton (see Figure 15).

See **Map 15: Historic District and Historic Sites**, **Table 24** below, and **Appendix H: Partial Inventory of Locally Significant Historic Sites in Evesham Township**.

**Table 24: Sites listed on the National or State Registers of Historic Places**

Name	Location	National Register	State Register
Savich Farm (Benjamin Cooper Farm) (ID#807)	E. Main St.	NR: 12/12/1978 (NR Reference #: 78001744)	SR: 12/16/1977
Jacob Wills House (ID#809)	Brick Road, west of Evans Road	NR: 11/1/1990 (NR Reference #: 89002296)	SR: 11/29/1989
Cropwell Friends Meetinghouse (ID#795)	810 Cropwell Road	NR: 8/14/1992 (NR Reference #: 92000976)	SR: 6/25/1992
William and Susan Evans House (ID#801)	2 Bills Lane	NR: 8/14/1992 (NR Reference #: 92000978)	SR: 6/25/1992
Thomas Hollinshead House (ID#804)	18 West Stow Road	NR: 8/14/1992 (NR Reference #: 92000977)	SR: 6/25/1992
Evans-Cooper House (ID#799)	North Elmwood Road	NR: 8/26/1993 (NR Reference #: 93000868)	SR: 7/20/1993
Thomas and Mary Evans House (ID#802)	South Elmwood Road	NR: 8/26/1993 (NR Reference #: 93000867)	SR: 7/20/1993
John Inskeep Homestead (ID#2987)	70 North Locust Road	NR: 8/26/1993 (NR Reference #: 93000866)	SR: 7/20/1993
Amos Evans House (ID#797)	501 East Main Street, Marlton	NR: 9/2/1994 (NR Reference #: 94001008)	SR: 6/28/1994
Stokes-Evans House (ID#808)	52 East Main Street, Marlton	NR: 8/30/1994 (NR Reference #: 94001009)	SR: 6/28/1994

<sup>5</sup> Filing an Environmental Impact Statement (EIS) usually prompts the issuance of a SHPO Opinion. The use of federal funding for a project often triggers the requirement to perform an EIS, which may result in NJDEP recognizing possible threats to certain historic sites and identifying those sites as eligible for listing in the State Register of historic places.

*Table 24 (continued)*

Name	Location	National Register	State Register
Darnell House (ID#796)	960 Tuckerton Rd.		SHPO Opinion: 2/15/1978
Isaac Evans House (ID#800)	875 East Main Street		SHPO Opinion: 2/15/1978
Pine Grove Chapel (ID#805)	Tuckerton Road and Marlton Pike		SHPO Opinion: 2/15/1978
Quaker School (ID#806)	130 Paul Rd.		SHPO Opinion: 2/15/1978
M.R. Wills House (ID#810)	2240 Old Marlton Pike		SHPO Opinion: 2/15/1978

*Source: New Jersey State Historic Preservation Office*

Evesham requires that archaeological surveys be completed before significant developments are built. The Township also requires residents in the historic village of Olde Marlton to preserve historical structures. To assist in this task, the Township formed the Evesham Township Historic Preservation Commission in 1987. The Commission encourages the continued use of historic structures, and fosters appreciation of the Evesham Township Historic District. It has published two guides to help owners and tenants comply with Evesham's historic preservation regulations. Currently, the Historic Preservation Commission is not active.

The Historic District of Evesham Township was nominated for inclusion on the national and state registers in 1989. The Olde Marlton Village Historic District is centered around the intersection of Maple Street and Main Street, and also includes all or parts of Blue Anchor Street, Cottage Street, Cooper Avenue, Locust Avenue, Community Avenue, Oak Lane, and Oak Avenue. To support and sustain the historical, cultural, architectural, and social heritage of Evesham



*Source: McCabe, Wayne T. & K. Gordon, A Penny A View*

*Main Street, Marlton, looking east*

Township, the Department of Community Development regulates buildings within the Historic District, including façades, signage, and structural changes. According to Section 160-28 of the Evesham Zoning Code, property owners are required to obtain a "certificate of appropriateness" for any exterior work on a building visible from a street within the historic district.

Evesham has a Historical Society, located at 10 Madison Court in Marlton, New Jersey. The group meets on a monthly basis, and membership is open to all for a nominal fee. The meetings take place in the Inskeep/Higginbotham House, a mid-18<sup>th</sup> century farmhouse.

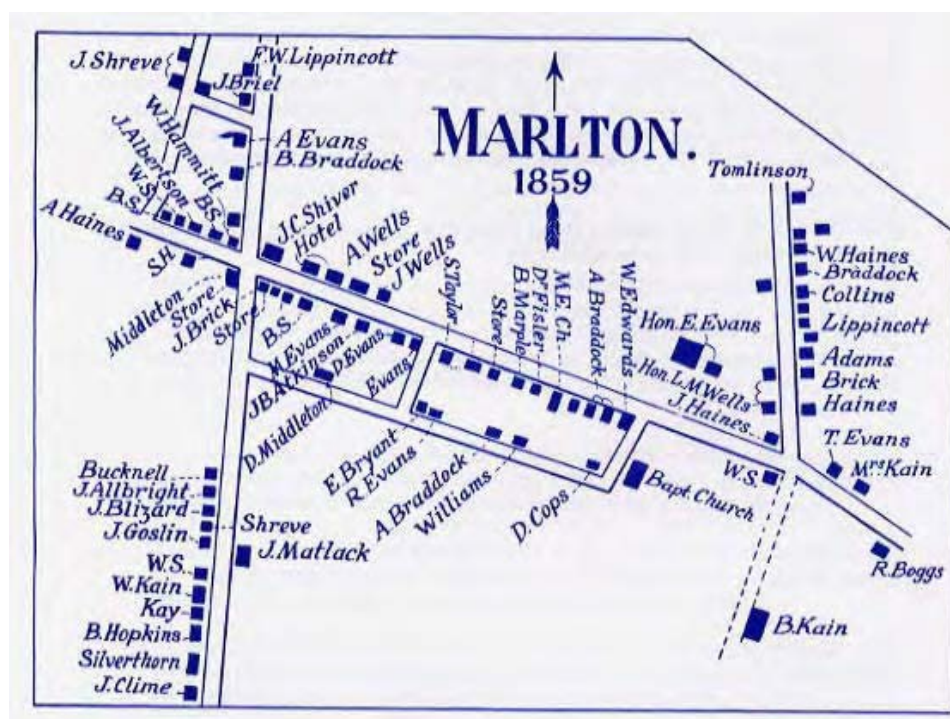
Aside from local ordinances regulating the appearance of historic structures, Evesham Township is also a Historic Preservation Certified Local Government (CLG), which makes federal and state



funding available for program implementation and rehabilitation. Jointly administered by the National Park Service and the State Historic Preservation Office, the CLG program provides technical assistance and funding to community-based preservation efforts. To participate, a municipality must maintain a historic preservation commission, survey local historic properties, provide opportunities for public participation in preservation activities, and develop and enforce local preservation laws.

There are federal incentives for individuals, organizations, or firms who 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.

Investing in historic preservation efforts can provide a municipality with important and impressive returns, and Evesham Township is a prime example. Private and public efforts in the Olde Marlton Historic District have created an attractive place to live, work, and play and stimulated new investment in the historic village. The historic district is a draw for antique collectors and tourists. Furthermore, historic preservation maintains Evesham Township's character, distinctly separating it from other rural and suburban communities.



Source: Evesham Historic Preservation Commission ([www.historic-vesham.org/hpc/Map1859.htm](http://www.historic-vesham.org/hpc/Map1859.htm))

**Figure 18: Map of Marlton, 1859**

## EXISTING OPEN SPACE

Evesham's parks and recreations areas are maintained by the Evesham Township Department of Public Works and managed by the Department of Recreation and Senior Services, which provides services for infants through senior citizens (See **Map 16: Existing Open Space** and **Map 17: Zoning Map**). In addition to quarterly events, the Department also sponsors annual special events, such as the the Independence Day Celebration, Summer Concerts the Fall Festival, and WinterFest.

The Evesham Township Department of Recreation and Senior Services offers the Triple-A Summer Camp, which is focused on Academics, Arts, and Athletics. The program runs for 10 weeks in the summer.

Open space in Evesham is made up of both active and passive facilities. There are parks, playgrounds, athletic fields and courts, and open space areas (See **Table 25: Available Recreational Fields**). Evesham Township Memorial Sports Complex is located adjacent to the municipal building on Tuckerton Road. The site is approximately 200 acres in size, of which about 35 acres are devoted to active use. In addition to a playground, there are four baseball fields, a soccer field, and a football field. In 2010 and again in 2016, synthetic turf fields were added to the complex, replacing grass fields. One turf field is multi-use; the other is for soccer only. In May of 2014, the Diamonds at Arrowhead Park, a four-field youth complex for baseball and softball, was opened. The Recreation Center (known by township residents as the "Blue Barn") is also located at the Memorial Sports Complex. It is approximately 28,000 square feet in size and contains 3 basketball courts, as well as 2 classrooms.

The Gibson House Community Center is located at 535 East Main Street. It is open Mondays through Fridays from 8:00AM to 4:00PM and is host to a variety of events, including classes, lunches, and bingo for seniors. Near the Gibson House, there is a 141 acre, 18-hole public golf course called the Indian Spring Country Club in Evesham. Other private golf courses in the township include the Links Golf Club and Little Mill Country Club.

Numerous small parks have active recreational facilities as well. Many of these were established as part of development projects and are not well utilized. Evesham Township is in the process of creating an Open Space and Recreation Plan that will document these sites and identify township needs and goals.

Some of the open space in Evesham is privately owned. For example, Kings Grant maintains a host of recreational facilities, including a community building available for rent, tennis courts, basketball courts, softball field, street hockey rink, volley ball courts, eight tot lots, nature trails, biking paths, bathing beach on Lake James, boating and fishing on the lake systems, and the Swim Club. "The Links" golf course abuts Kings Grant.

In addition to the Department of Recreation & Senior Services, Evesham also has the Marlton Recreation Council, a non-profit volunteer organization that provides organized sports and promotes sportsmanship for local youth. Approximately 7,000 children and teenagers participate in the activities, including basketball, softball, baseball, wrestling, soccer, football, cheerleading, field hockey, track, volleyball, lacrosse, street hockey, roller hockey, and golf. Other groups devoted to recreation and open space in Evesham are Evesham's Environmental Commission.

In order to decrease the burden that additional development places on the township's infrastructure and schools, as well as to preserve open space, recreational areas, and historic structures for future generations to enjoy, the Evesham Township Council approved Resolution 105-98, a referendum regarding the levy for recreation/open space preservation within Evesham. Evesham Township residents approved the ballot measure to implement an Open Space Tax six months later on November 3, 1998. The one cent tax per \$100 assessed value allowed the township to purchase privately-owned land in order to preserve farmland, open space, recreational areas, or properties worthy of historic preservation. Only areas zoned for residential development – not commercial development – are considered for preservation. On June 13, 2000, the Township Council passed Resolution 122-2000 to increase the Recreation/Open Space Preservation Tax by two cents, which was approved by the voters in November of that year. Under the current tax, the township brought in an estimated \$847,000 in calendar year 2007.

**Table 25: Available Recreation Fields**

ACTIVITY/ FACILITY	Currently Available			
	Private	School	Township	Total
<b>Badminton</b>	n/a	n/a	n/a	n/a
<b>Basketball</b>	14	6	23	43
<b>Handball</b>	1	0	1	2
<b>Ice Hockey</b>	1	0	8	9
<b>Tennis</b>	23	6	14	43
<b>Volleyball</b>	5	0	0	5
<b>Baseball/Softball</b>	4	24	8	36
<b>Field Hockey</b>	n/a	n/a	n/a	n/a
<b>Football</b>	0	4	11	15
<b>Soccer*</b>	0	20	23	43
<b>Golf-driving Range</b>	0	0	1	1
<b>¼ Mile Running Track</b>	4	1	4	9
<b>Multiple Recreation Court (basketball, volleyball, tennis)</b>	n/a	n/a	n/a	n/a
<b>Trails</b>	1	1	2	4
<b>Archery Range</b>	n/a	n/a	n/a	n/a
<b>Combination Skeet and Trap Field (8 Stations)</b>	n/a	n/a	n/a	n/a
<b>Golf (18-hole standard)</b>	2		1	3
<b>Swimming Pools</b>	17	0	0	17
<b>Beach Areas</b>	n/a	n/a	n/a	n/a

Source: Evesham Township

\* Includes soccer/lacrosse fields

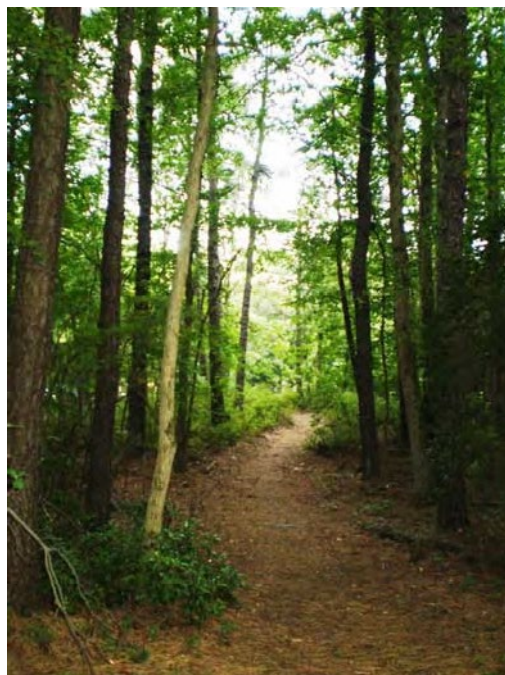


An Open Space and Recreation Plan was written and finalized in 2012 and adopted as an element of the township's Master Plan in June of 2012. This plan provides an accounting of active and passive recreation areas and facilities in the township and detailed information on the active and passive recreational needs and opportunities within the township including the preservation of open space.



*Source: DVRPC*

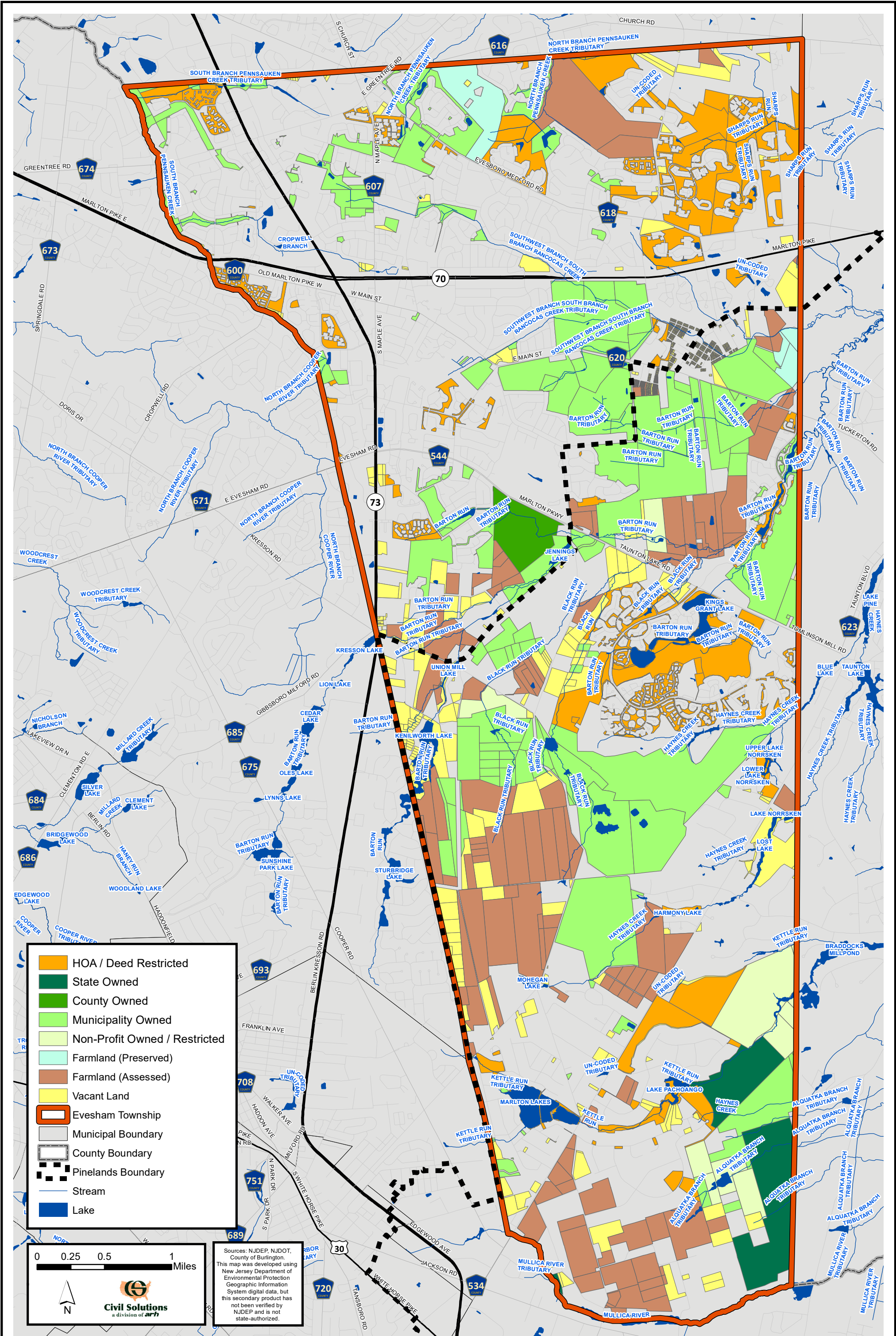
*The sign at the entrance to Evesham's Memorial Sports Complex*



*Source: DVRPC*

*Trail to Little Mill Park*

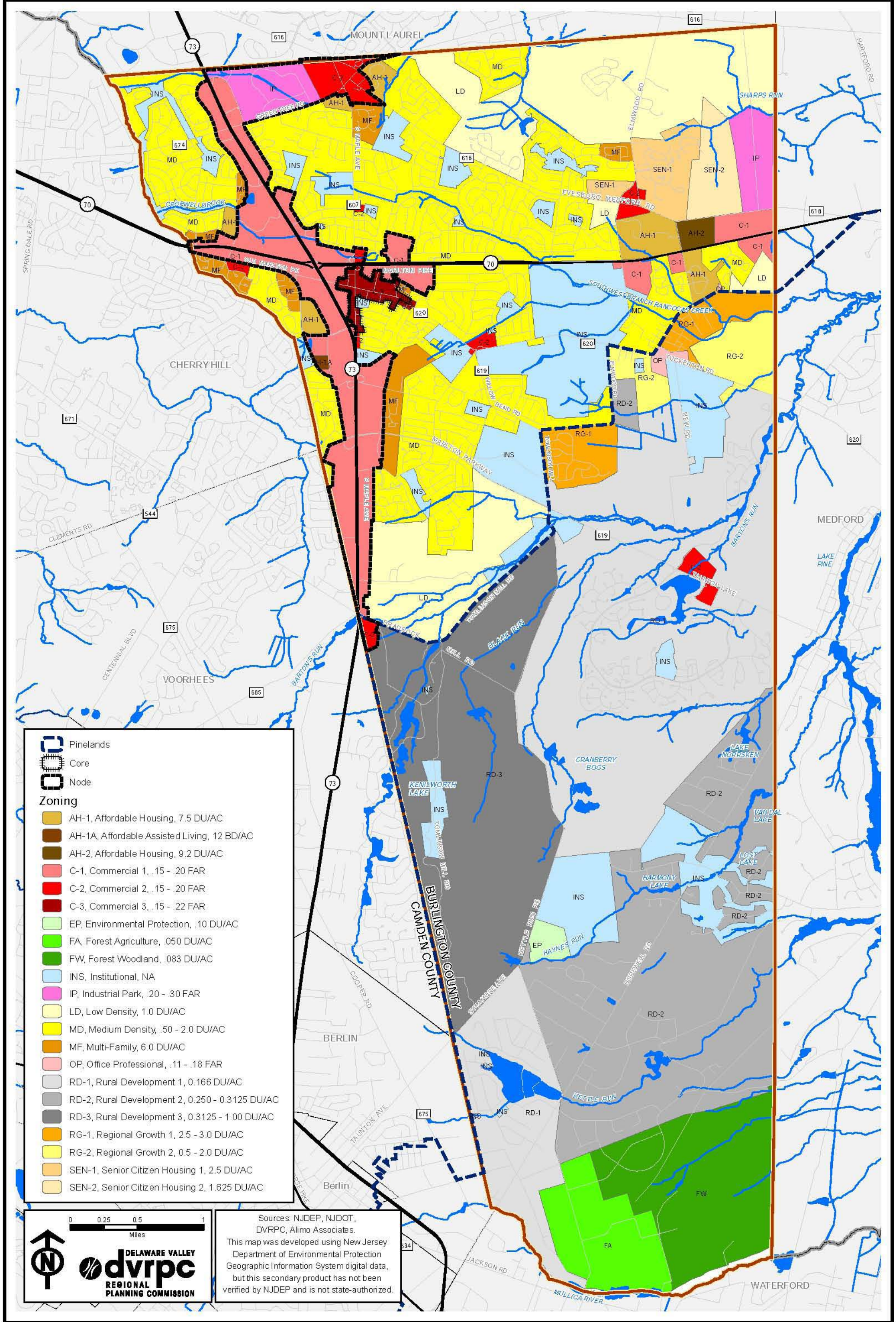




Evesham Township

Map 16: Existing Open Space





Evesham Township

Map 17: Zoning



## ENVIRONMENTAL ISSUES

### KNOWN CONTAMINATED SITES

NJDEP's 2016 Inventory of Known Contaminated Sites reported 569 such sites in Burlington County. Twenty-five of these sites are located in Evesham Township. See **Table 26: Known Contaminated Sites in Evesham Township** for a list and **Map 18: Known Contaminated Sites** for the location of these sites. There are additional contaminated sites in the municipalities surrounding Evesham Township. Mt. Laurel Township has 50 contaminated sites, Medford Township has 34, Berlin Township has 9, Cherry Hill Township contains 93, and Voorhees has 16.

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 the "Superfund" because sites on the NPL are eligible for federal cleanup funds.

### The Ellis Property

Burlington County has 39 current and nominated Superfund sites, one of which—the Ellis Property—is located in Evesham Township. The Ellis Property (EPA ID#: NJD980529085) was proposed for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) on December 1, 1982. The site was once a dairy farm, but it was also used for drum storage and reconditioning operations.



Source: [http://www.state.nj.us/dep/srp/publications/site\\_status/1998/html/98highli3.htm](http://www.state.nj.us/dep/srp/publications/site_status/1998/html/98highli3.htm)

Approximately 300 drums were discovered on the 36-acre property. Many of the drums had corroded, allowing the contents – including polychlorinated biphenyls (PCBs); heavy metals like arsenic, chromium, and lead; and Volatile Organic Compounds such as trichloroethylene (TCE) and tetrachloroethylene (PCE) – to leak into the soil and groundwater. The underlying Englishtown Aquifer was polluted as a result. Although the Englishtown Aquifer is not currently a source for municipal drinking water,

*Shallow soil remediation in progress at the Ellis Property*

approximately 3,500 people live within a 3-mile radius of the site. In fact, there are 20 potable wells within a one mile radius of the site.

Because no primary responsible party (PRP) can be found, the federal government and state government have taken charge of the remediation actions. This included removing the drums, neutralizing the acidic soil with lime, removing contaminated soil to a licensed off-site facility, and extracting and treating groundwater. The soil excavation was completed in 1998, while groundwater remediation continues to this day.

In September of 2015, the EPA published a report entitled, “THIRD FIVE-YEAR REVIEW REPORT, ELLIS PROPERTY SUPERFUND SITE, BURLINGTON COUNTY, NEW JERSEY.” The purpose of the review was to determine if the remedy at the site is and will continue to be protective of human health and the environment.

For site management purposes, the Ellis Property is divided into two operable units (OU): OU1 and OU 2. OU1 addresses the contaminated soils. OU2 addresses the contaminated groundwater. The OU1 remedy has been amended in the 2013 Record of Decision (ROD) Amendment. The OU2 remedy is currently operating to address the contaminated groundwater. The Five-Year Review Report evaluated the operating OU2 groundwater remedy. The report concluded:

*“This five-year review assessment found that the remedial actions implemented at the Ellis Property Superfund site currently protect human health and the environment. However, in order to be protective in the long-term, additional excavation and in-situ source remediation activities selected in the 2013 ROD Amendment need to be implemented, and the operation, maintenance, and groundwater monitoring activities need to be conducted in accordance with the groundwater pump and treat system operation and maintenance plan.”<sup>1</sup>*

The Five-Year Review Report should be on file with the Evesham Library which serves as the local site repository and is also available at the EPA website for the Ellis Property:

<https://semspub.epa.gov/src/collections/02/SC/NJD980529085>.

Also in September of 2015, the Final Design Report (FDR) for the Ellis Property was completed and approved by the Environmental Protection Agency (EPA). The FDR provides the remedial action required for the property along with the detailed activities, including drawings and specifications, for the remediation.

With the completion and approval of the FDR for the Ellis Property, the next step would have been the final cleanup of the property. However, due to limited EPA funding for remediation of superfund sites, an EPA panel did not select the Ellis Property to receive funding. The EPA panel meets annually, and the Ellis Property will be considered for funding again at that time.

At the time of revision of this document, a request was made of Mr. Richard Ho at the EPA ([ho.richard@epa.gov](mailto:ho.richard@epa.gov), (212) 637-4372), Remedial Project Manager for the Ellis Property, for a copy of the Final Design Report.

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<sup>1</sup> THIRD FIVE-YEAR REVIEW REPORT ELLIS PROPERTY SUPERFUND SITE BURLINGTON COUNTY, NEW JERSEY, Prepared by U.S. Environmental Protection Agency, Region 2, New York, New York, September 29, 2015.

While the Ellis Property is handled by the federal government, sites with less serious contamination are handled by state programs or through private funds. The New Jersey Site Remediation Program's role is not limited to the oversight and cleanup of sites with confirmed contamination, but also includes cases where contamination is suspected but not yet confirmed. As of March 2016, there are 25 active sites, 4 pending, and 341 closed known contaminated sites in Evesham. **Table 26: Known Contaminated Sites in Evesham Township** lists only the active known contaminated sites. For additional information about each site listed and closed and pending sites, visit [www.nj.gov/dep/srp/kcsnj](http://www.nj.gov/dep/srp/kcsnj).

## The Aerohaven Site



Source: DVRPC

*The preserved Aerohaven property*

Owens Corning, a glass fiber and building materials manufacturer with a plant in Berlin, New Jersey, disposed of Kaylo, an insulation product containing asbestos, on the Aero Haven Airport site from 1961-1972. The fill was used to extend the Aero Haven Airport runways. Owens Corning bought the property in 1986. In September 1994, Owens Corning entered into a Memorandum of Agreement (MOA) with the New Jersey Department of Environmental Protection to close and remediate the site.

On June 22, 2007, NJDEP approved a Remedial Action Report (RAR). The area was secured with a fence and capped with a Claymax 500SP geocomposit clay cap, with a permeability of  $1 \times 10^{-9}$  cm/sec permeability. Several months later, on October 31, 2007, a deed notice was recorded for the property. Owens Corning never received a No Further Action letter because there are still some metals (iron, manganese) in the wells, which may be due to background conditions. The capped portion of the site (the southern portion) continues to be maintained by Owens Corning, while the northern portion is owned by Evesham Township as open space.



**Table 26: Known Contaminated Sites In Evesham Townshnship**  
(see end of table for an explanation of the abbreviations)

Site ID	PI Number	Name	Address	Bureau	Homeowner	Case Types (Start Date)	Remedial Level
10869	1198	APCO PETROLEUM MARLTON CORP BP	929 RT 70 West	BOMM	No	CEA (8/2/2004); Fixed Fee Case (8/12/2008); LSRP 2-10 CAOC (5/1/2012); LSRP GW FEE (5/1/2012); Regulated UST (8/26/1991)	C2
10903	4982	MARLTON CITGO	210 RT 70	LSR	No	LSRP 0-1 CAOC (10/6/2014); Regulated UST (4/14/2004)	C2
10886	5946	SHELL GAS STATION	RT 73 & MAPLE AVE	BOMM	No	LSRP 2-10 CAOC (3/23/2010); LSRP GW FEE (3/23/2010); Regulated UST (7/6/1992)	C2
10879	7205	SRB SERVICE MARLTON LLC	771 RT 70	BUST	No	LSRP 2-10 CAOC (10/8/2010); LSRP GW FEE (10/8/2010); Regulated UST (4/13/1993)	C2
17095	7877	MGA PETROLEUM	930 936 RT 70	BUST	No	LSRP 2-10 CAOC (9/20/2011); LSRP GW FEE (9/20/2011); Regulated UST (11/18/1985)	C2
10891	13389	MARLTON SUNOCO SERVICE INC	71 E MAIN ST	INS	No	Fixed Fee Case (12/2/1999); LSRP 2-10 CAOC (11/17/2011); Regulated UST (2/18/1999); Spill Act Discharge (3/8/2012)	C2
10872	14800	SUNOCO 0004-6284	930 RT 70	BUST	No	LSRP 2-10 CAOC (3/26/2011); LSRP GW FEE (3/26/2011); Regulated UST (9/29/1989)	C2
50999	15121	BD OF ED BUS GARAGE	OAK AVE	LSR	No	LSRP 2-10 CAOC (2/24/2012); LSRP GW FEE (2/24/2012); Regulated UST (8/3/1990)	C2
51413	16941	EXECUTIVE LUBE CENTER INC	8 RT 70	(None)	No	LSRP 0-1 CAOC (5/12/2014); Regulated UST (8/24/2005)	C1
54486	23757	ENGAR MACHINE SHOP	N ELMWOOD RD	BISR	No	ISRA (11/30/1988); LSRP 0-1 CAOC (11/18/2011); LSRP GW FEE (11/18/2011)	C2
49628	025862	AERO HAVEN AIRPORT(FORMER)	450 KETTLE RUN RD	LSR	No	Commercial (9/6/1994); Landfill (11/28/2011); LSRP Default Category (3/17/2015); Spill Act Discharge (3/17/2015)	C3

Site ID	PI Number	Name	Address	Bureau	Homeowner	Case Types (Start Date)	Remedial Level
37212	190983	GREENTREE SQUARE SHOPPING CENTER	900 RT 73	(None)	No	LSRP 0-1 CAOC (11/16/2011); LSRP GW FEE (11/16/2011); Other (3/18/1999); Spill Act Discharge (11/16/2011)	C2
158603	208683	PRIVATE RESIDENCE	ELIZABETH CT S	BFO-S	Yes	Home Owner (10/18/2003); MOA (9/30/2003); Nonreg UST (10/8/2003)	C2
188889	248193	MARLTON LAKES GROUND WATER CONTAMINATION	HOLLY RD & WALNUT AVE	ICU	No	IEC (3/3/2005); Publicly Funded (3/3/2005);	C3
18340	G000004493	ELLIS PROPERTY	150 SHARP RD	BOMM	No	Fixed Fee Case (7/8/1982); Publicly Funded (7/8/1982)	C3
70855	G000041211	MARLTON GREEN SHOPPING CENTER	36 RT 73	BOMM	No	CEA (7/25/2003); Fixed Fee Case (8/1/2003); MOA (11/23/1999); Other (12/29/1999)	C2
70906	G000043570	NJ DOT SECTION (5) MARLTON CIRCLE RT 73	RT 73 & MARLTON CIR	BFO-S	No	Linear Construction (5/10/2000); NJDOT Rd Proj (5/10/2000)	D
27173	26345	D. MINSTER	MAPLE AVE	LSR	No	LSRP Default Category (7/9/2014); Spill Act Discharge (7/1/2014)	B
10874	483130	MASTER CLEANERS & TAILORS	101 RT 70	(None)	No	LSRP 0-1 CAOC (11/11/2008); LSRP GW FEE (11/11/2008); MOA (11/11/2008); Spill Act Discharge (11/11/2008)	C2
359865	487162	CHESTERBROOK ACADEMY	108 EVESBORO MEDFORD RD	CAS	No	Child Care Facility (1/26/2009); Fixed Fee Case (1/26/2009); Historic Pesticide (1/26/2009)	B
477140	601865	995 ROUTE 73	995 RT 73	CAS	No	LSRP 0-1 CAOC (4/11/2014); Spill Act Discharge (2/25/2013)	B

Site ID	PI Number	Name	Address	Bureau	Homeowner	Case Types (Start Date)	Remedial Level
554105	694315	20 CONTINENTAL LANE	20 CONTINENTAL LN	LSR	No	LSRP 0-1 CAOC (6/22/2015); Spill Act Discharge (6/1/2015); Stop Bill-LSR Fee General (12/14/2015)	B
554517	694826	PRIVATE RESIDENCE	CARLTON AVE	(None)	Yes	(None)	(None)
10878	703542	LEES DUTCH CLEANERS @ EVESHAM PLAZA	740 750 RT 70	LSR	No	LSRP 0-1 CAOC (10/9/2015); LSRP GW FEE (10/9/2015); Spill Act Discharge (8/13/2015); Stop Bill-LSR Fee General (11/4/2015)	C2
65850	G000032442	MARLTON SQUARE SHOPPING CENTER	36 RT 70	BOMM	No	CEA (1/27/2006); Fixed Fee Case (1/28/2006)	C2

Source: NJDEP DataMinter, March 2016

*See Key to Remedial Levels on next page*



### Key to Remedial Levels

Remedial Level	Explanation of site complexity
<b>B</b>	A single-phase remedial action in emergency area of site
<b>C1</b>	A remedial action with simple sites; one or two contaminants localized to soil and the immediate spill or discharge area.
<b>C2</b>	A remedial action with more complicated contaminants localized to soil and the immediate spill or discharge area
<b>C3</b>	A multiphase remedial action with high complexity and threatening sites. Multiple contaminants, some at high concentrations, with unknown sources continuing to impact soils, groundwater, and possibly surface waters and potable water resources. Dangerous for direct contact with contaminated soils.
<b>D</b>	Same conditions as C3 except that D levels are also usually designated federal "Superfund Sites."
<b>U</b>	Not Yet Determined
<b>NA</b>	Not Assessed.

### Key to Lead Agencies

Acronyms	Bureau	Telephone No.
<b>BFO-S</b>	Bureau of Field Operations - Southern	(609) 584-4150
<b>BISR</b>	Bureau of Industrial Site Remediation	(609) 777-0899
<b>BOMM</b>	Bureau of Operation, Maintenance & Monitoring	(609) 984-2990
<b>BUST</b>	Bureau of Underground Storage Tanks	(609) 292-8761
<b>OWR</b>	Office of Wellfield Remediation	(609) 984-2990
<b>BSCM</b>	Southern Case Management (formerly BUST - Bureau of Underground Storage Tanks)	(609) 292-8761

### Other Abbreviations:

**CAS** – Case Assignment Section

**CEA** – Classification Exception Area

**ISRA** – Industrial Site Recovery Act

**LSR** – Licensed Site Remediation

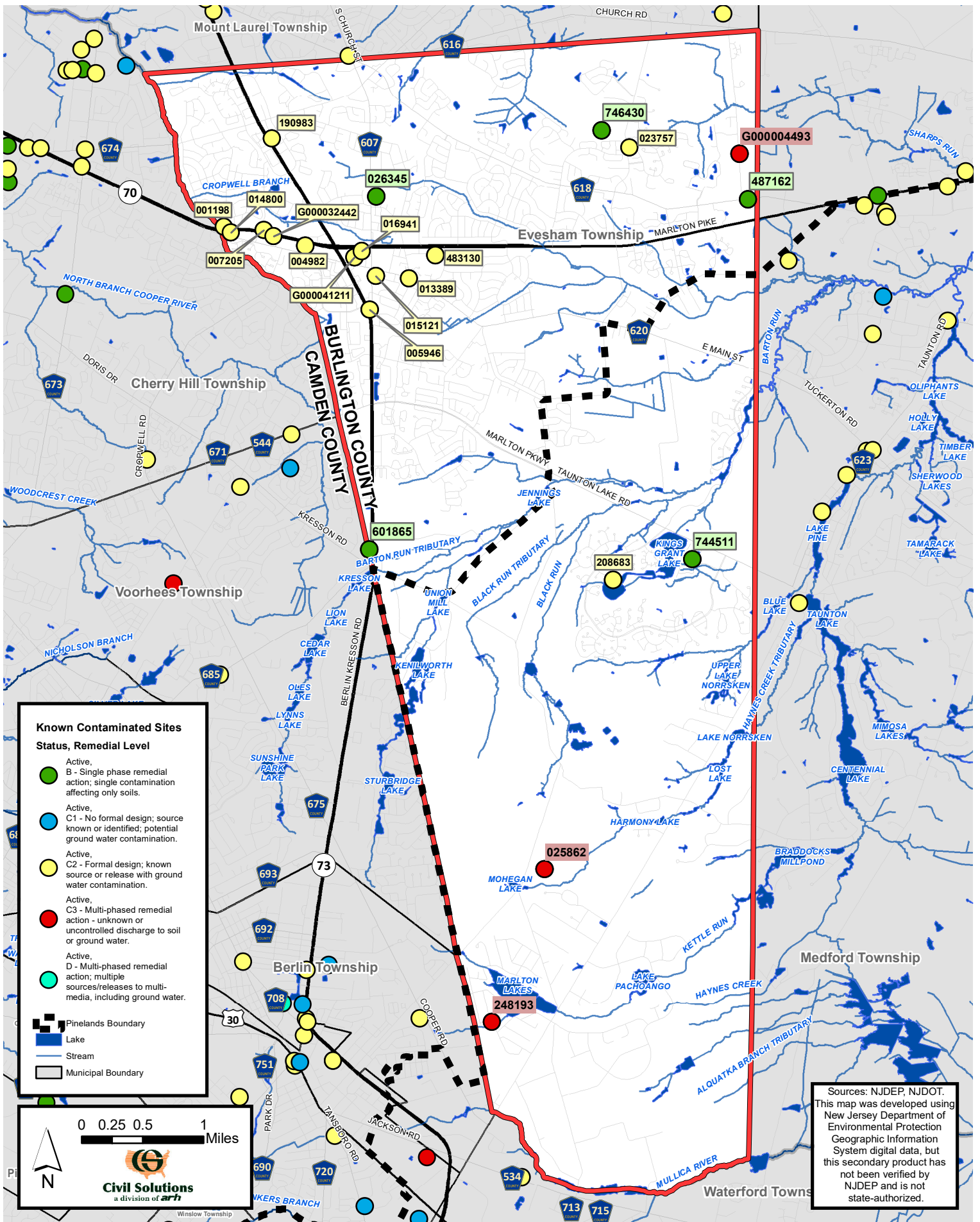
**MOA** – Memorandum of Agreement (between responsible party at a site and NJDEP)

**NJDOT** – New Jersey Department of Transportation

**Reg** – regulated

**UST** – Underground Storage Tanks. Gas station tanks are regulated. Private residence heating oil tanks are unregulated.

See also the NJDEP Site Remediation Program glossary at [www.nj.gov/dep/srp/community/basics/glossary.htm](http://www.nj.gov/dep/srp/community/basics/glossary.htm).



## **The PH-32 Nike Missile Battery**

At the end of World War II, the U.S. Army realized that its conventional anti-aircraft artillery would not adequately defend U.S. cities from the faster, higher flying, and more maneuverable planes that were being introduced by other nations, such as the Soviet Union. The United States decided to develop a system of Anti Aircraft Guided Missiles. The benefit of this new system would be that the missiles could be guided to intercept aircraft, regardless of the pilot's evasive tactics, unlike conventional anti-aircraft artillery that followed a predetermined trajectory that could not be altered after firing. Within the continental United States, over 200 Nike missile sites were constructed in defensive "rings" surrounding major urban and industrial areas. Due to its proximity to both New York City and Philadelphia, New Jersey was the location of more than one dozen U.S. Army Nike missile installations, including the PH-32 Nike Missile Battery in Evesham.

The PH-32 Nike Missile Battery, which stretched across 35 acres of land on Tomlinson Mill Road between Elmwood and Taunton Lake Road (directly across from Cherokee High School), was designed to defend Philadelphia and was activated July 1, 1955. For a period of eight years, PH-32 was manned 24 hours a day by approximately 100 men. The site was divided in two sections—the Control Area (also known as the Integrated Fire Control area) and the Launch Area. PH-32 launch area contained two underground magazines that stored 30 Nike-Ajax missiles. In 1963, PH-32 was deactivated along with six other Philadelphia-designated sites. By 1974, all Nike Missile sites were deactivated. No missiles were ever fired from these Nike bases over the two decades of operation.

After PH-32 was deactivated, it was turned over to Burlington County, which used the site as a Civil Defense Control Center, Fire/Rescue/Police Academy and Police Target Range. In the early 1970s, the site was purchased by Evesham Township and all existing buildings were torn down. The control area was sold to a developer in the early 1990s, who constructed the Briarwood community.

In a September 1990 DEP Hazardous Waste Management report, John Trela stated, "Considering the relatively low levels of petroleum hydrocarbons detected in the shallow wells and the depth of the public water supply wells, the potential for any health effects as a result of operations at Nike Missile Site PH-32 is remote."

Today, the Briarwood development takes up half of the former PH-32 site, while the other half is still owned by the Township and remains undeveloped. The magazines are still there, except now they are filled with water and covered with welded metal. The rest of the area is in need of cleanup. There are stacks of old tires, charred scraps of metal, and large piles of rock and brick. According to the Marlton Economic Development Committee, there are no plans to build on this site.

## **Owens Corning - Berlin**

Situated in Berlin, NJ, the Owens Corning facility manufactured high-temperature insulation materials from 1958 until operations ceased in October 1993. Because of its manufacturing operations, the site, located at 150 Jackson Road in Berlin, NJ was entered into the Industrial Site Recovery Act (ISRA)



program after operations ceased. Site investigation activities, conducted in cooperation with and under the direction of the Licensed Site Remediation Professional (LSRP) in accordance with the regulations of the New Jersey Department of Environmental Protection (NJDEP), identified soil and groundwater impacts related to the former manufacturing operations. The identified impacts are primarily related to the historic use of DOWTHERM A™ (a heat transfer fluid). Impacts to soil are delineated within the site's boundaries.<sup>2</sup> Impacts to groundwater continue to be monitored by Owens Corning and have required sampling of private, potable wells in Evesham Township.

Beginning in 2011, Owens Corning began groundwater testing at the former manufacturing facility.<sup>3</sup> Testing is focused on two constituents of DOWTHERM A™: 1, 1-Biphenyl and Diphenyl ether. In early 2012, results found levels of constituents related to DOWTHERM A™ in area groundwater to the east of the former manufacturing facility that necessitated the commencement of off-site action including a well survey and testing program along with the delineation of the extent of impacts to groundwater.<sup>4</sup>

In July of 2012, three wells in Waterford Township were found to contain levels of either one or both of the DOWTHERM A™ constituent above the applicable ground water quality (GWQ) standards. This finding resulted in Owens Corning expanding the well survey area to include properties in Atco, Camden County and Evesham Township, Burlington County.

Testing of five wells in Evesham Township in August 2012 resulted in all five wells meeting the applicable GWQ standards for DOWTHERM A™ constituents. One of the five wells contained levels of a constituent that was not the focus of the Owens Corning environmental investigation. In accordance with regulatory requirements, Owens Corning notified the NJDEP and provided assistance to the property owner to understand the options available to them through the state.

Figure 15, from November 2012, shows the location of the former Owens Corning facility in Berlin along with off-site monitoring wells, off-site grab groundwater locations, and locations where DOWTHERM A™ constituents were found to be above or below the NJDEP's Groundwater Quality Standards (GWQS).

As well testing and groundwater impact delineation continues, Owens Corning has most recently been required to sample additional private, potable wells in Evesham Township. This testing impacted properties along Kettle Run Road and Raymond Avenue.

By February 2016, Owens Corning had completed the installation of five (5) temporary groundwater borings along Kettle Run Road. Samples were collected at various depths at each drilling location from depths of 21 feet below ground surface (BGS) to 125 feet BGS. The samples were analyzed for two DOWTHERM A™ constituents. A total of 30 samples were collected, and two of those samples were found to contain levels of Diphenyl ether. The results of one of those two was slightly above the state's action threshold of 100 parts per billion (ppb). Both of the samples also had detections of 1, 1-Biphenyl ether, but the levels were below the state's action threshold of 400 ppb.

The detection of DOWTHERM A™ constituents in two of the 30 samples, required Owens Corning to perform a NJDEP mandated "step out" and sample water from private water wells within a certain

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<sup>2</sup> <http://www.occommunityinformationsite.com/>; accessed on March 30, 2016.

<sup>3</sup> <http://www.occommunityinformationsite.com/docs/community-display-board-Jan13.pdf>; accessed on March 30, 2016.

<sup>4</sup> Ibid.

distance of where the contaminated samples were collected. Eleven (11) private wells along Kettle Run Road required testing.

By March 2016, Owens Corning had sampled ten (10) of the eleven (11) wells. Samples collected from one (1) of the wells found Diphenyl ether that exceeded its applicable groundwater quality standard (GWQS) as shown in the table below.

Owens Corning “Step Out” Results from Private Well that Exceeded GWQS

Constituent	Sample 1	Duplicate Sample	Groundwater quality standard (GWQS)
Diphenyl ether	100 ppb	110 ppb	100 ppb
1, 1-Biphenyl ether	25 ppb	25 ppb	400 ppb

In response to the sample results, Owens Corning filed an Immediate Environmental Concern (IEC) with the NJDEP. In addition, Owens Corning started providing bottled, potable water to the residents whose well was impacted and is required to establish a water delivery service to meet near-term drinking and cooking needs. The long term solution is for Owens Corning to design and install a Point-of-Entry Treatment (POET) system.

The contaminated sample of the private well on Kettle Run Road, required a second “step-out.” Three additional property owners along Kettle Run Road were contacted and their wells will require testing.

As of the publication of this update, Owens Corning continues to keep Evesham Township apprised of their ongoing testing.

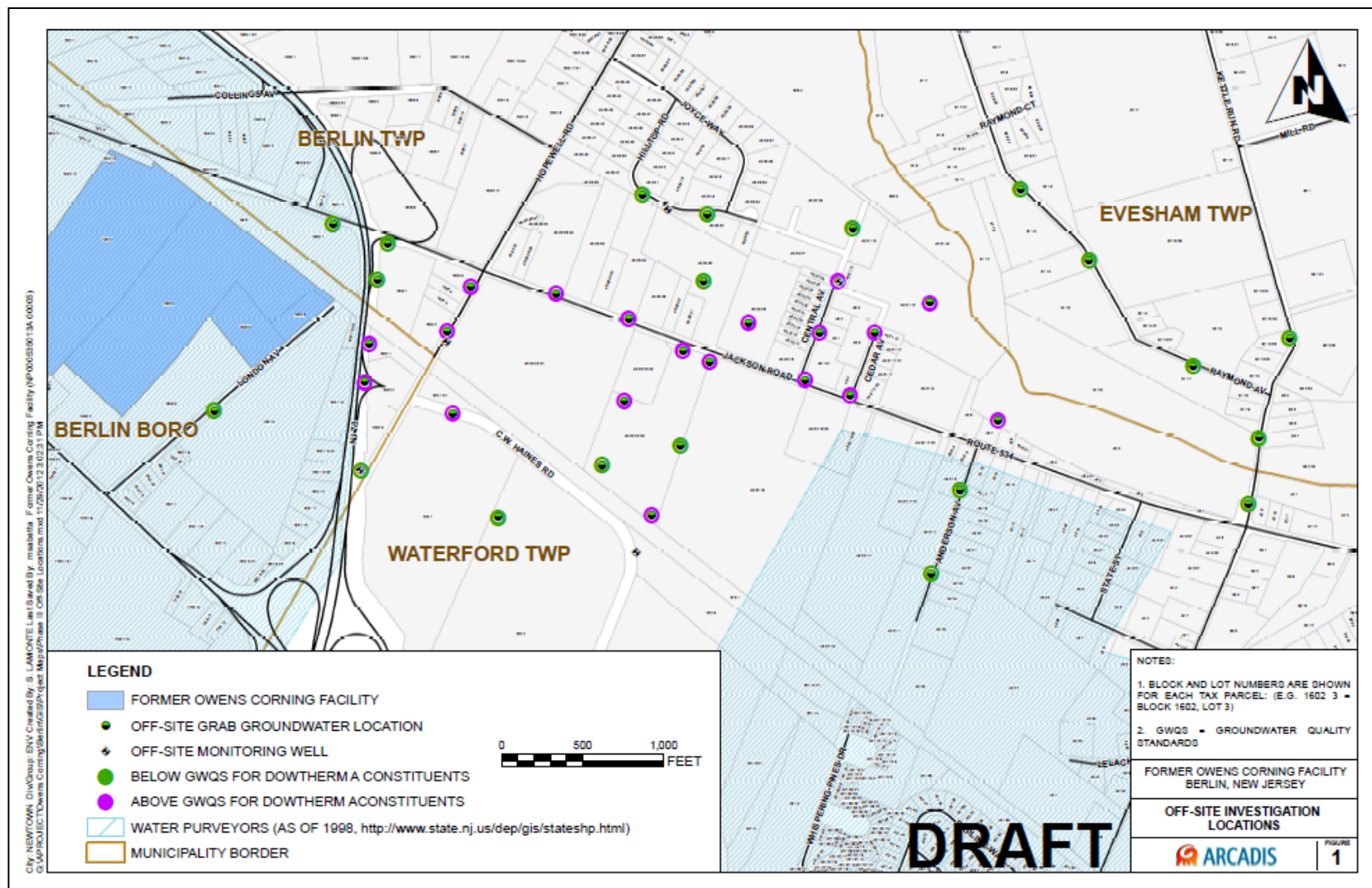


Figure 19: Owens Corning Phase III Off Site Locations from November 2012



## **RADON**

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

NJDEP classifies municipalities into three categories – high (Tier 1), moderate (Tier 2), or low (Tier 3) – as to the risk of having high radon levels. Evesham is listed as a Tier 2 municipality with moderate potential of having dangerous radon levels in homes.

The criteria for a Tier 2 municipality designation is that 5 to 25%, of 25 or more homes tested, have radon concentrations greater than or equal to 4.0 picocuries per liter in air. The level at which homeowners should take immediate action is 4.0 picocuries per liter in air. If radon levels are high in a home, NJDEP suggests that the homeowner take the following actions: (1) prevent radon from entering the house by repairing cracks and insulation and (2) dilute radon concentrations currently in the house by installing a radon extraction system and/or frequently ventilating indoor air. NJDEP maintains [www.njradon.org](http://www.njradon.org) as an information source for concerned citizens. Free information packets are available upon request. All companies conducting radon testing and mitigations are certified by NJDEP and listed on their website.

## **FLOODING**

During the morning of July 12, 2004, a warm air front moving from the southwest stalled over Burlington County. A low-pressure system that was supported by cooler air from the northwest developed along the warm front. The result of these two forces colliding was a record-breaking 24-hour deluge that ravaged Burlington County. Areas within the county received in excess of 13 inches of rain. The sudden rains swelled the Rancocas Creek and its tributaries. Water rushed into the creek's 100-year floodplain and beyond. The creek breached numerous dams in the Pinelands region, exacerbating the severe flooding that occurred downstream. The New Jersey Interagency Waterway Infrastructure Improvement Task Force later determined that the July 12-15, 2004 storm was a 1,000-year storm. No lives were lost as a result of the flooding, but more than 750 people were forced to evacuate. New Jersey Governor James McGreevey declared a state of Emergency in both Burlington and Camden Counties.

In Evesham, residents experienced sewer overflows and water backing up into their homes. Several Evesham Municipal Utilities Authority facilities also experienced storm damage. Well No. 6 on Elmwood Road had been flooded. EMUA employees took precautionary steps including shutting down the well, collecting samples, increasing the chlorine level, and

continuously flushing the water main. Fecal coliform and e-coli were discovered in the samples, and local television and radio stations as well as newspapers received a press release outlining a Boil Water Advisory, which was lifted on July 15, 2004. The EMUA has addressed its emergency preparedness in three areas—Staffing Levels, Operating Procedures, and Public Notification Procedures – as a result of the 2004 floods.

The 2004 severe flooding occurred in several Burlington County townships as a result of the torrential rains, combined with a series of dam failures along the Rancocas Creek. Eighteen dams failed and 27 were significantly damaged by the storm (see ***Table 27: Dams Damaged in Evesham Township, July 2004***). The dams failed in a chain reaction starting with a dam between Papoose Lake and Lake Stockwell near Camp Ockanickon in Medford. Water rushed over and underneath the barrier, eroding the structure until it completely failed. The quick flow of water from the Papoose Lake dam overwhelmed dams downstream. Crane Lake Dam in Evesham (a Class III Low Hazard Dam) failed, and Kenilworth Lake Dam #1 sustained structural damages during the flood.

The South Branch of the Rancocas Creek far exceeded measurements for the 100-year recurrence interval flood. The U.S. Geological Survey (USGS) streamgage station at Vincentown recorded the South Branch's peak stage (the height of the river from normal conditions) at 12.34 feet, which considerably exceeded the old record of 7.98 feet set in 1978. The peak discharge of the South Branch of the Rancocas Creek was three times greater than the previous record, moving 4,200 cubic feet of water per second.

The fiscal impact of the July 2004 floods was drastic. Area residents and businesses reported millions of dollars in damages. In light of the dam failures, Governor James E. McGreevey directed the Department of Environmental Protection (DEP) to reopen the application process for low-interest loans to fund dam repairs, which voters approved in a \$95 million bond initiative in November 2003. Additionally, Governor McGreevey pledged \$5 million to help towns rebuild, and the White House gave the Federal Emergency Management Agency approval to allocate about \$20 million in relief to the affected areas. Flood insurance would have covered the damage; however, many people in the township did not have flood insurance and were forced to finance the rebuilding with their own funds. Those who did have flood insurance often did not receive their reimbursement funds until 2005.

The reconstruction of the dams has also proved to be an expensive and complicated endeavor. The dams were constructed towards the end of the nineteenth century for agricultural and milling industries in the area. In the 1920s, residential communities grew around those man-made lakes. Through the years, the dams were only mildly upgraded from their original earthen construction. Some dams had concrete spillways, but all dams had significant portions that were constructed from compacted earth. The cost to rebuild these dams will be high. In the years since the storm, the state of New Jersey has authorized \$22.4 million in low-interest loans for the reconstruction and repairs of the privately-owned dams. However, the high costs associated with reconstruction are prohibitive. Many dams that existed before the July 2004 deluge might not be rebuilt (for further information about the floods, see the articles listed in **Sources of Information**).

**Table 27: Dams Damaged in Evesham Township, July 2004**

<b>Failed</b>	<b>Damaged</b>
Crane Lake Dam (L)	Marlton Lakes Upper Dam (S)
Lost Lake Dam (U)	Kenilworth Lake Dam (S) *
Elmwood Waste Water Treatment Dam (U)	Union Mill Lake Dam (U)
	Van Dal Lake Dam (U)

*Source: Philadelphia Inquirer, 2004*

**Key to Dam Codes**

<b>Abbreviation</b>	<b>Description</b>
<b>*</b>	Lake behind dam was ordered lowered for safety reasons
<b>H</b>	high-hazard dam (potential to cause loss of life if dam breached)
<b>S</b>	significant-hazard dam (potential to cause major property damage if breached)
<b>L</b>	low-hazard dam
<b>U</b>	unclassified (unknown to state before the flooding)

In 2016, reconstruction on the Tomlinson Mill Road dam was completed. This dam was identified as a priority since it held back a large body of water and its culverts (pipes under the roadway) were deteriorating and not large enough to convey significant storms without overtopping the road and weakening the structure. A failure of the dam would have resulted in significant property damage downstream. In addition, utility poles across Tomlinson Mill Dam carry high voltage power lines, including various cable and fiber optic wires resulting in possible communication outages to residents in the surrounding area should the dam fail.

The new Tomlinson Mill Dam ensures that Jennings Lake is preserved. Future generations will experience numerous recreational opportunities, wildlife habitat (including sensitive vegetation and a rare species of fresh water mussel), as well as scenic views that enhance the enjoyment of our natural surroundings and the diverse experiences available to all of Evesham.

Dam upgrades will help to mitigate the impact of future floods, however, Evesham needs to address storm water drainage. As the amount of impervious surface increases in the community, the severity of floods will also increase. Unfortunately, flooding is inevitable when 13 inches of rain fall on an area within a 24-hour period. The severity of these incidents can be decreased by using stormwater best management practices. Preserving land in floodplains and limiting impervious surface coverage can also reduce the damage caused by torrential rain events.

## **DRINKING WATER WELLS**

According to a July 2008 NJDEP report on the New Jersey Private Well Testing Act (PWTA) program, between September 2002 and April 2007, 12% of the 25,256 wells tested in nine Southern New Jersey counties exceeded one or more Maximum Contaminant Levels allowed in drinking water. Failures for gross alpha particle activity were most common (10.8 %), followed by nitrates (3.2%), VOCs (1.5%), mercury (.9%), and fecal coliform/E. coli (.8%).



## **Tetrachloroethylene Contamination in Evesham Township Wells**

In 2005, a home in Evesham Township tested its private well under the PWTA program. The well was contaminated with tetrachloroethylene, a solvent widely used by the dry cleaning industry. The test result indicated that the well had 4 parts per billion (ppb) of tetrachloroethylene, although the Maximum Contaminant Level (MCL)—the highest level allowed in drinking water—is 1 ppb.

The Burlington County Health Department sampled 18 private wells in the vicinity of the contaminated well because the PWTA authorizes the county health authority to notify neighboring properties within 200 feet of the contaminated well. Of the 18 wells tested, 12 were found to have tetrachloroethylene concentrations that exceeded the MCL, with one well having an extremely high concentration of 840 ppb. The County Health Department then contacted NJDEP's Site Remediation Program to assist with follow-up testing and remedial activities.

The NJDEP tested 95 private wells in the area. Of those, 21 wells exceeded the MCL for tetrachloroethylene, with the highest concentration at 70 ppb. In addition, 6 of the 93 private wells exceeded the MCL for mercury. The drinking water remedial treatment costs related to the tetrachloroethylene and mercury contamination were covered by the NJDEP's Spill Compensation Fund (also known as the "Spill Fund"). NJDEP is still investigating to determine the source of the tetrachloroethylene and it continues to test wells in the area to determine if the plume is moving. (See "Marlton Lakes Groundwater Contamination Site" entry in **Table 26**).

### **Berlin Well #12**

In February 2004, the New Jersey Department of Environmental Protection (NJDEP) revoked the water allocation permit for Berlin Borough's supply well No. 12, which had drawn down the water table and dried up Kettle Run stream in Evesham Township. The dry stream threatened the nearby wetlands, which contained swamp pink, a federally listed endangered plant species.

Marlton Lakes residents had become aware of the problem in 2000, when the main feeder stream to Marlton Lakes went dry. A coalition of Marlton Lakes residents, Evesham Township, the NJ Environmental Federation, and the Pinelands Preservation Alliance convinced NJDEP Commissioner Bradley Campbell to order Berlin Borough to turn the well off permanently. This marked the first time that a well was required to be turned off to protect an endangered species.



*Source: Michael A. Hogan Swamp Pink (Helonias bullata)*

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## **APPENDICES**

**Appendix A:** Vernal Pools in Evesham Township

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## APPENDIX A: VERNAL POOLS IN EVESHAM TOWNSHIP

Vernal Pool Status	X-Coordinate	Y-Coordinate
Potential vernal habitat location	508902.718738	4403937.999910
Potential vernal habitat location	508873.624988	4404040.999910
Potential vernal habitat location	507404.093739	4412356.499910
Potential vernal habitat location	507193.437489	4412598.499910
Potential vernal habitat location	507320.749989	4412723.999910
Potential vernal habitat location	509236.503570	4413972.400910
Potential vernal habitat location	508370.372406	4414930.632340
Potential vernal habitat location	508619.677945	4416073.979130
Potential vernal habitat location	511475.720045	4416229.830290
Potential vernal habitat location	507863.057495	4417034.873060
Potential vernal habitat location	511554.566251	4418495.995290
Potential vernal habitat location	511266.611075	4418614.025670
Vernal habitat location	509420.593738	4409360.999910
Vernal habitat location	511629.178685	4416436.205700

Source: [www.dbcrrsa.rutgers.edu/ims/vernal](http://www.dbcrrsa.rutgers.edu/ims/vernal)



## APPENDIX B: FEDERAL & 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 Burlington 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 primary environmental goals of this program include reducing soil erosion, reducing sedimentation in streams and lakes, improving water quality, establishing wildlife habitat, and enhancing forest and wetland resources. Website: [www.nrcs.usda.gov/programs/crp/](http://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% of the cost to establish approved practices. Additional information can be found at [www.fsa.usda.gov](http://www.fsa.usda.gov) or contact the local Farm Services Agency (FSA) Office or Soil and Water Conservation District Office.

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. Please see the website for more details:  
[www.nrcs.usda.gov/programs/wrp/](http://www.nrcs.usda.gov/programs/wrp/).

The **Grassland Reserve Program (GRP)** is another conservation program authorized by the 2008 Farm Bill. GRP is a voluntary program that protects 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. For more information and application procedures, visit the GRP website: [www.nrcs.usda.gov/programs/grp/](http://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 outline 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 initiative 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% 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% 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. For more information and application procedures, visit the NJ WHIP website: [www.nj.nrcs.usda.gov/programs/whip/](http://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% and sometimes up to 90%, while still engaging in livestock or agricultural production activities. For more information please visit the website:  
[www.nrcs.usda.gov/programs/eqip](http://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. For more information please visit the website: [www.nrcs.usda.gov/programs/new\\_csp/csp.html](http://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. For more information about FRPP, please visit the website: [www.nrcs.usda.gov/programs/frpp/](http://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. For additional information visit [www.epa.gov/region02](http://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. For additional information visit [www.epa.gov/region02](http://www.epa.gov/region02).

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. More information is available at: <http://njfieldoffice.fws.gov/partners>.

## STATE PROGRAMS

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 give landowners up to 50% of costs associated with approved soil and water conservation projects. Farms are only eligible if they are already enrolled in a permanent or 8-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. For more information contact the local Soil Conservation District or the State Agricultural Development Committee at (609) 984-2504 or visit the website: [www.state.nj.us/agriculture/sadc/sadc.htm](http://www.state.nj.us/agriculture/sadc/sadc.htm) for additional details.

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% cost-share is required of the landowner. While the LIP is seeking funding for additional habitat protection projects, it may be another year before grants are available. To learn more about the program in general visit the website: [www.state.nj.us/dep/fgw/ensp/lip\\_prog.htm](http://www.state.nj.us/dep/fgw/ensp/lip_prog.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.)

## APPENDIX C: PRIVATE WELL TESTING ACT

The Private Well Testing Act (*N.J.S.A. 58:12A-26 et seq.*), passed in 2002 and administered by NJDEP, requires that well water be tested for contaminants when properties served by certain types of drinking water wells are sold or leased. The law does not prohibit the sale of property if the water fails one or more drinking water test standards. Rather, the fundamental goal of the PWTA is to ensure that purchasers and lessees of properties served by private potable wells are fully aware of the quality of the untreated drinking water sources prior to sale or lease. The state law allows the buyer and seller to determine which party will pay for the test, as well as what actions, if any, need to be taken if test results indicate a contaminant is present in the water above an applicable standard. However, individual county health rules may mandate that certain actions are required in order for a real estate transaction to be finalized.

The PWTA program requires that water be tested for primary contaminants (health-based) and secondary parameters (aesthetic characteristics). Primary contaminants are contaminants that may cause a potential health risk if consumed on a regular basis above the established maximum contaminant level (MCL). New Jersey regulates 18 primary contaminants, five more than federal EPA requirements.

Primary contaminants include bacteriological (fecal coliform and *E. coli*), Volatile Organic Compounds (VOCs), inorganics (arsenic, lead, mercury, and nitrates), and Radiological (radium decay) substances. A certified laboratory must collect a water sample at a point before the water goes through any treatment. This sample represents the condition of the ground water in the aquifer, which may be different from water out of a kitchen faucet. Property owners may choose to also have the tap water tested to assure that filters or treatments are working effectively.

The PWTA program requires tests for three naturally occurring secondary parameters: pH, iron, and manganese. Secondary drinking water standards address aesthetics such as corrosivity, taste, and color, and testing for these parameters determines if water is suitable for laundering, plumbing, and showering. For example, due to the nature of soils and geology in southern New Jersey, the ground waters tend to be acidic (pH below 7), while ground waters in the northern part are neutral (pH=7) to basic (pH above 7). If the pH is too low (less than 6.5) water has a bitter metallic taste, and causes corrosion of pipes and fixtures. If the pH is too high (greater than 8.5) the water has a slippery feel, it tastes like soda, and deposits can form on plumbing fixtures.

### Volatile Organic Compounds regulated by NJDEP

- Benzene
- Carbon Tetrachloride
- meta-Dichlorobenzene
- ortho-Dichlorobenzene
- para-Dichlorobenzene
- 1, 1-Dichloroethane
- 1, 2-Dichloroethane
- 1, 1-Dichloroethylene
- *cis* – 1, 2-Dichloroethylene
- *trans* – 1, 2-Dichloroethylene
- 1, 2-Dichloropropane
- Ethylbenzene
- Methyl tertiary butyl ether
- Methylene Chloride
- Monochlorobenzene
- Naphthalene
- Styrene
- 1, 1, 2, 2-Tetrachloroethane
- Tetrachloroethylene
- Toluene
- 1, 2, 4-Trichlorobenzene
- 1, 1, 1-Trichloroethane
- 1, 2, 2-Trichloroethane
- Trichloroethylene
- Vinyl Chloride
- Xylenes (Total)

Test results are reported by the lab to the person who requested the testing, to NJDEP, and to the local health authority. Suspicious or unexpected results are neither confirmed nor verified by NJDEP. Local health authorities will investigate suspect results, if necessary.

In February 2004, NJDEP released an online report summarizing the initial well test results reported to the agency during the PWTA program's first six months (September 2002 to March 2003). Results for 5,179 wells are included, which represent approximately 1% of private wells used as potable water supplies in New Jersey. The compilation of water test results is organized by county and municipality but does not include the names of specific property owners, their addresses, or well locations, because releasing that information is prohibited by law. About 92% of the 5,179 wells passed all the required (health-based) standards, with the exception of lead. Of the 8% (417 wells) of wells sampled that exceeded the maximum contaminant level for primary contaminants, the most common reason for failure statewide was nitrate (inorganics), followed by fecal coliform (bacteriological), and VOCs. Nitrates are found in groundwater due to a number of factors, including natural deposits, runoff from fertilizer, leaching from septic tanks, and from sewage pipes.

More wells in northern New Jersey were found to have fecal coliform or *E. coli* bacteria than in southern New Jersey. The northern/southern difference is probably due to the different geology in these regions. Northern New Jersey is characterized by limestone subject to solution cavities, fractured bedrock, or gravel water-bearing zones, while the southern part of the state is composed mainly of coastal plain sand and gravel, which appears to provide better protection of groundwater from fecal contaminants.

For those wells in the counties where mercury testing is required, 14 wells failed for mercury. Nine southern counties, including Gloucester, Camden, Burlington, and Salem, are required to test for mercury, which has been linked to neurological problems.



## APPENDIX D: STREAMSIDE PLANTS DOCUMENTED IN PINELAND AREAS OF EVESHAM TOWNSHIP

Scientific Name	Common Name
<i>Acer rubrum</i>	red maple
<i>Ailanthus altissima</i>	tree of heaven
<i>Alnus serrulata</i>	azel alder
<i>Amelanchier canadensis</i>	anadian serviceberry
<i>Apios americana</i>	groundnut
<i>Apocynum cannabinum</i>	Indianhemp
<i>Arisaema triphyllum</i>	Jack in the pulpit
<i>Aronia arbutifolia</i>	Red Chokeberry
<i>Asclepias incarnata</i>	swamp milkweed
<i>Aster nemoralis</i>	bog aster
<i>Aster racemosus</i>	white aster
<i>Bidens coronata</i>	crowned beggarticks
<i>Bidens frondosa</i>	devil's beggartick
<i>Bidens laevis</i>	smooth beggartick
<i>Boehmeria cylindrica</i>	smallspike false nettle
<i>Botrychium dissectum</i>	cutleaf grapefern
<i>Callitriche heterophylla</i>	twoheaded water-starwort
<i>Carex canescens</i>	silvery sedge
<i>Carex debilis</i>	white edge sedge
<i>Carex lurida</i>	shallow sedge
<i>Carex striata</i>	Walter's sedge or tussock sedge
<i>Carya sp</i>	hickory
<i>Catalpa bignonioides</i>	southern catalpa
<i>Cephalanthus occidentalis</i>	common buttonbush
<i>Chamaecyparis thyoides</i>	Atlantic white cedar
<i>Chamaedaphne calyculata</i>	leatherleaf
<i>Chasmanthium laxum</i>	slender woodoats
<i>Cinna arundinacea</i>	sweet woodreed
<i>Clethra alnifolia</i>	coastal sweetpepperbush
<i>Commelina communis</i>	Asiatic dayflower
<i>Cornus amomum</i>	silky dogwood
<i>Cuscuta sp</i>	dodder
<i>Cyperus strigosus</i>	strawcolored flatsedge
<i>Decodon verticillatus</i>	swamp loosestrife
<i>Dioscorea villosa</i>	wild yam
<i>Drosera intermedia</i>	spoonleaf sundew
<i>Dulichium arundinaceum</i>	threeway sedge
<i>Echinochloa muricata</i>	rough barnyardgrass
<i>Eleocharis acicularis</i>	needle spikerush
<i>Erechtites hieracifolia</i>	American burnweed
<i>Eubotrys racemosa</i>	swamp doghobble
<i>Eupatorium dubium</i>	coastalplain joeypyeweed
<i>Eupatorium leucolepis</i>	justiceweed
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort
<i>Eupatorium rugosum</i>	white snakeroot
<i>Fraxinus pennsylvanica</i>	green ash
<i>Galium tinctorium</i>	stiff marsh bedstraw

Scientific Name	Common Name
<i>Gaylussacia dumosa</i>	dwarf huckleberry
<i>Glechoma hederacea</i>	ground ivy
<i>Glyceria obtusa</i>	Atlantic mannagrass
<i>Helonias bullata</i>	Swamp pink
<i>Hypericum canadense</i>	lesser Canadian St. Johnswort
<i>Hypericum densiflorum</i>	bushy St. Johnswort
<i>Ilex laevigata</i>	smooth winterberry
<i>Ilex verticillata</i>	common winterberry
<i>Impatiens capensis</i>	jewelweed
<i>Iris versicolor</i>	harlequin blueflag
<i>Itea virginica</i>	Virginia sweetspire
<i>Juglans nigra</i>	black walnut
<i>Juncus canadensis</i>	Canadian rush
<i>Juncus effusus</i>	common rush
<i>Kalmia latifolia</i>	mountain laurel
<i>Leersia oryzoides</i>	rice cutgrass
<i>Lindera benzoin</i>	northern spicebush
<i>Liquidambar styraciflua</i>	sweetgum
<i>Liriodendron tulipifera</i>	tuliptree, yellow poplar
<i>Lobelia canbyi</i>	Canby's lobelia
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Ludwigia alternifolia</i>	seedbox
<i>Ludwigia palustris</i>	marsh seedbox
<i>Lycopus uniflorus</i>	northern bugleweed
<i>Lycopus virginicus</i>	Virginia water horehound
<i>Lysimachia terrestris</i>	earth loosestrife
<i>Magnolia virginiana</i>	sweetbay
<i>Microstegium vimineum</i>	Nepalese browntop
<i>Mikania scandens</i>	climbing hempvine
<i>Mimulus ringens</i>	Allegheny monkeyflower
<i>Mitchella repens</i>	partridgeberry
<i>Morus rubra</i>	red mulberry
<i>Nuphar variegata</i>	variegated yellow pond-lily
<i>Nyssa sylvatica</i>	tupelo, blackgum
<i>Onoclea sensibilis</i>	sensitive fern
<i>Osmunda cinnamomea</i>	cinnamon fern
<i>Oxalis sp</i>	wood sorrel
<i>Panicum clandestinum</i>	deertongue
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Peltandra virginica</i>	green arrow arum
<i>Phalaris arundinacea</i>	reed canarygrass
<i>Phragmites australis</i>	common reed
<i>Picea abies</i>	Norway spruce
<i>Pilea pumila</i>	Canadian clearweed
<i>Pinus rigida</i>	pitch pine
<i>Platanus occidentalis</i>	American sycamore
<i>Polygonum arifolium</i>	halberdleaf tearthumb
<i>Polygonum cespitosum</i>	cepitose knotweed
<i>Polygonum cuspidatum</i>	Japanese knotweed
<i>Polygonum persicaria</i>	spotted ladythumb
<i>Polygonum punctatum</i>	dotted smartweed
<i>Polygonum sagittatum</i>	arrowleaf tearthumb

Scientific Name	Common Name
<i>Potamogeton diversifolius</i>	hair-like pondweed
<i>Potamogeton epihydrus</i>	ribbonleaf pondweed
<i>Prunus serotina</i>	black cherry
<i>Quercus alba</i>	white oak
<i>Rhexia virginica</i>	handsome Harry
<i>Rhododendron viscosum</i>	swamp azalea
<i>Rubus hispidus</i>	bristly dewberry
<i>Rubus sp</i>	blackberry
<i>Salix sp</i>	willow
<i>Sambucus canadensis</i>	American black elderberry
<i>Sanicula canadensis</i>	Canadian blacksnakeroot
<i>Scirpus cyperinus</i>	woolgrass
<i>Scutellaria lateriflora</i>	blue skullcap
<i>Smilax rotundifolia</i>	roundleaf greenbrier
<i>Solanum nigrum</i>	black nightshade
<i>Solidago rugosa</i>	wrinkleleaf goldenrod
<i>Sparganium americanum</i>	American bur-reed
<i>Spiraea alba var latifolia</i>	white meadowsweet
<i>Symplocarpus foetidus</i>	skunk cabbage
<i>Thalictrum pubescens</i>	king of the meadow
<i>Thelypteris palustris</i>	eastern marsh fern
<i>Thelypteris simulata</i>	bog fern
<i>Toxicodendron radicans</i>	eastern poison ivy
<i>Triadenum virginicum</i>	Virginia marsh St. Johnswort
<i>Typha latifolia</i>	broadleaf cattail
<i>Utricularia subulata</i>	zigzag bladderwort
<i>Vaccinium corymbosum</i>	highbush blueberry
<i>Viburnum dentatum</i>	southern arrowwood
<i>Viola lanceolata</i>	bog white violet
<i>Vitis labrusca</i>	fox grape
<i>Woodwardia areolata</i>	netted chainfern

Source: Zampella, Robert A., John F. Bunnell, Kim J. Laidig, and Nicholas A. Procopio. *The Rancocas Creek Basin. A Report to the Pinelands Commission on the Status of Selected Aquatic and Wetland Resources*. New Lisbon, NJ: The Pinelands Commission, 2003.





## APPENDIX E: VERTEBRATE ANIMALS KNOWN OR PROBABLE IN EVESHAM TOWNSHIP

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, Common
White-footed Mouse	Woodlands	Throughout
Jumping Mouse	Fields	Throughout
Meadow Vole	Open Fields	Throughout
Red-backed Vole	Woodlands	Throughout
Muskrat	Wetlands	Throughout
Brown Rat	Wetlands, Homes, Farms	Throughout
House Mouse	Homes and residential areas	Throughout
Red Fox	All Habitats	Throughout
Raccoon	All Habitats	Throughout, Common
Long-tailed Weasel	Wetlands	Throughout
Striped Skunk	Uplands	Throughout, Common
White-tailed Deer	All Habitats	Throughout, Common
Mink	Wetlands	Throughout
Coyote	Woodlands and Fields	Throughout

REPTILES		
Species	General Habitat	Township Locations
Common Snapping Turtle	Ponds and Lakes	Throughout
Stinkpot Turtle	Wetlands	Throughout
Spotted Turtle	Freshwater Wetlands and Ponds	Throughout
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 pine snake	Uplands	Threatened - NJ
Northern Water Snake	Wetlands	Throughout
Garter Snake	All Habitats	Throughout
Eastern Ribbon Snake	Wetlands	Throughout
Southern Ring neck Snake	Woodlands	Throughout
Northern Black Racer	Edge of Woodlands	Throughout
Rough Green Snake	Woodlands	Throughout
Black Rat Snake	All Habitats	Throughout
Timber Rattlesnake	Pinelands	Endangered - NJ

<b>AMPHIBIANS</b>		
<b>Species</b>	<b>General Habitat</b>	<b>Township Locations</b>
Carpenter frog		<u>Documented occurrence</u> ; Black Run bog - upper, Kettle Run at camp Kettle Run
Fowler's Toad		<u>Documented occurrence</u> : Lady's Lake, Kettle Run above Hopewell Road, Haynes Creek tributary above Kettle Run Road
Northern Spring Peeper		<u>Documented occurrence</u> : Mullica River impoundment above Jackson-Medford Road (Lady's Lake)
Green Frog		<u>Documented occurrence</u> : Mullica River impoundment above Jackson-Medford Road (Lady's Lake); Jennings Lake; Black Run Bog - upper; Kettle Run impoundment above Georgia O'Keefe Way; Kettle Run above Hopewell Road; Kettle Run at camp Kettle Run; Haynes Creek tributary above Kettle Run Road
Northern gray treefrog		possible
Pine Barrens Treefrog		Pinelands
Bullfrog		<u>Documented occurrence</u> : Mullica River impoundment above Jackson-Medford Road (Lady's Lake); Barton Run Impoundment above Tuckerton Road; Jennings Lake; Black Run Bog - upper; Kettle Run above Hopewell Road; Kettle Run at camp Kettle Run; Haynes Creek tributary above Kettle Run Road
Southern leopard frog		possible

<b>FISH</b>		
<b>Species</b>	<b>General Habitat</b>	<b>Township Locations</b>
American eel	Rivers and streams	Throughout
Goldfish	Lakes	Throughout
Grass Carp	Rivers and streams	Throughout
Satinfish shiner	Rivers and streams	Rancocas, Pennsauken Creek
Spotfin shiner	Rivers and streams	Rancocas
Common carp	Rivers and streams, Lakes	Rancocas, Pennsauken Creek
Eastern silvery minnow	Rivers and streams	Pennsauken Creek
Common shiner	Rivers and streams	Rancocas
Golden shiner	Rivers and streams	Documented PC
Ironcolor shiner	Rivers and streams	Rancocas, Pennsauken Creek
Spottail shiner	Rivers and streams	Rancocas
Swallowtail shiner	Rivers and streams	Rancocas
Blacknose dace	Rivers and streams	Rancocas
White sucker	Rivers and streams	Rancocas, Pennsauken Creek
Creek chubsucker	Rivers and streams	Documented PC
White catfish	Rivers and streams	Rancocas
Yellow bullhead	Rivers and streams	Documented PC
Brown bullhead	Rivers and streams	Documented PC
Tadpole madtom	Rivers and streams	Documented PC

Redfin pickerel	Rivers and streams	Documented PC
Chain pickerel	Rivers and streams	Documented PC
Eastern mudminnow	Rivers and streams	Throughout
Pirate perch	Rivers and streams	Documented PC
Banded killifish	Rivers and streams	Mullica River
Mud sunfish	Rivers and streams	Throughout
Blackbanded sunfish	Rivers and streams	Throughout
Bluespotted sunfish	Rivers and streams	Documented PC
Banded sunfish	Rivers and streams	Documented PC
Redbreast sunfish	Rivers and streams	Documented PC
Pumpkinseed	Rivers and streams	Documented PC
Bluegill	Rivers and streams	Documented PC
Largemouth bass	Rivers and streams	Documented PC
White crappie	Rivers and streams	Rancocas
Black crappie	Rivers and streams	Documented PC
Swamp darter	Rivers and streams	Documented PC
Tessellated darter	Rivers and streams	Documented PC
Yellow perch	Rivers and streams	Rancocas
This fish listing is based in part on Rudolph Arndt's Annotated Checklist (see <b>Sources</b> ) and reflects historical records as well as current documentation by the Pinelands Commission ("Documented PC").		

<b>BIRDS</b>			
<b>Species</b>	<b>General Habitat</b>	<b>Preferred Habitat/Township Sightings</b>	<b>Status in South Jersey*</b>
<b>* B = Breeding; M = Migrant; W = Winter; R = Year-round resident</b>			
Pied-bill grebe	Lakes, ponds	Kings Grant lake	B - Scattered Locations; W
Double-crested cormorant	Open water	Kings Grant lake – Spring & fall	B
Great blue heron	Open marsh, lake edges		B
Great egret	Open marsh, lake edges	Occasional visitor	B
Snowy egret	Open marsh, lake edges	Migrant in Evesham	B - Coast & Del. R.
Green heron	Open marsh, lake edges		B
Black-crowned night heron	Open marsh, lake edges	Occasional visitor	B
Black vulture	Open fields	Nest in Evesham	R
Turkey vulture	Open fields, woodlands	Found in Pinelands	R
Snow goose	Open farm fields	Winter migrant in fields	W & M
Canada goose	Open water, fields		R
Mute swan	Open water	Large 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
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	W
Lesser scaup	Open water	Winter migrant	W

Species	General habitat	Preferred habitat/township sightings	Status In South Jersey*
Bufflehead	Open water	Winter migrant	W
Hooded merganser	Open water	Winter migrant	W
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	May be nesting in Evesham, near Kings Grant	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 esp in Pinelands	R
Wild turkey	Open fields, woodlands	Becoming common	R
Northern bobwhite	Old field, brushy areas, woodlands	Has declined	R
American coot	Ponds and lakes, marshes	Kings Grant lake	W
Killdeer	Open areas, farmland, parking lots	Bare ground	R
Greater yellowlegs	Lake edges, mudflats	Summer/fall migrant	M
Lesser yellowlegs	Lake edges, mudflats	Summer/fall migrant	M & W
Solitary sandpiper	Lake edges, mudflats, pond edges	Summer/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 in Evesham	W
Herring gull	Open water, dumps, parking lots	Winter visitor in Evesham	R
Great black-backed gull	Open water, mudflats	Winter visitor in Evesham	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	Like large unbroken forests	B
Yellow-billed cuckoo	Woodlands, dense thickets	Pinelands	B
Barn owl	Farmland	Uncommon	R
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



Species	General habitat	Preferred habitat/township sightings	Status In South Jersey*
Whip-poor-will	Mixed pine and deciduous woods		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	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 - uncommon	R
Northern flicker	Woodlands	Woods with openings - common	R
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	Nests In Kings Grant II and Hamilton Georgetown	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	Nests in Evesham	B - Mostly North Jersey
White eyed vireo	Woodlands; edges; brushy areas		B
Red-eyed vireo	Woodlands		B
Yellow-throated vireo	Woodlands - deciduous or mixed	Forest edges; uncommon	B - More Abundant In North Jersey
Blue jay	Woodland	Common	R
American crow	All habitats	Common	R
Fish crow	All habitats	Near water	R
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	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		R
Brown creeper	Woodlands	Pinelands forests; migrants in yards, forest edges	B & M
Carolina wren	Edge of woodlands; yards		B
House wren	Edge habitat altered by man		B

Species	General habitat	Preferred habitat/township sightings	Status In South Jersey*
Winter wren	Woodlands	Winter migrant	B - North Jersey
Golden-crowned kinglet	Woodlands	Winter migrant	B - North Jersey
Ruby-crowned kinglet	Edge of woodlands	Fall migrant	M
Blue-gray gnatcatcher	Woodlands	Nests in deciduous trees within Pinelands	B
Eastern bluebird	Edge of woodlands; fields		R
Veery	Woodlands	Most likely seen as migrant	B
Hermit thrush	Woodlands	Migrant	M
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		M
Cedar waxwing	Upland forest	B - mixed woods; fairly common in Pinelands	R
Blue-winged warbler	Woodlands	Forest edges	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
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- dunes, field edges among shrubs	M & W
Black-throated green warbler	Woodlands, esp. Coniferous	Mostly migrant in Evesham	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 in Evesham	B - Eastern Pinelands & Bayshore Area
Pine warbler	Woodlands	OPEN PINE OR MIXED FOREST	B
Prairie warbler	Old fields, woodland edges	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 forests	B
American redstart	Woodlands	Deciduous wet forests but more common in fall	B & M

Species	General habitat	Preferred habitat/township sightings	Status In South Jersey*
Prothonotary warbler	Woodlands	Wet forests - 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
Canada warbler	Woodlands	Migrant	B - North NJ; M
Common yellowthroat	Brushy & marshy areas	Low, wet open areas; forest edges; wet forest understory	B
Hooded warbler	Woodlands	Wet deciduous forests, esp with laurel understory; Pinelands, white cedar swamps	B
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
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; marshes; dunes	Farmland, airports, man-made habitats. Probably seen in winter in Evesham	B - North Jersey & Salem Co.; W
Grasshopper sparrow	Old fields, fallow farm fields	Likes hedgerows. Uncommon	B
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	B-North Jersey; M
Blue grosbeak	Old fields; woodland edges	Nests at Aerohaven	B
Indigo bunting	Woodland edges; open brushy areas; farmland	Not abundant in much of Pinelands	B

Species	General habitat	Preferred habitat/township sightings	Status In South Jersey*
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	B
Rusty blackbird	Woodlands, ;swampy thickets	Mix less with other blackbirds. 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 in Evesham	B- North Jersey; W
House finch	Suburbs; feeders	Nest in conifers; abundant at winter feeders	B
Pine siskin	Open woodlands, old fields	Often with goldfinches in small flocks	R
American goldfinch	Old fields; orchards; hedgerows; suburbs, thistle feeders	Residential areas; common	B
House sparrow	Open areas	Common in all habitats	B
* B = Breeding; M = Migrant; W = Winter; R = Year-round resident			

Sources: Walsh, Joan, et al. *Birds of New Jersey*; Personal observation: Ken Tischner, Steven Sobocinski



## APPENDIX F: ENDANGERED AND THREATENED SPECIES IN EVESHAM TOWNSHIP

Scientific name	Common Name	Federal Status*	NJ Status*	State Rank**
<i>Carex barrattii</i>	Barratt's Sedge			S4
<i>Cornus foemina</i>	Stiff Dogwood			S2
<i>Helonias bullata</i>	Swamp-pink	LT	E	S3
<i>Penstemon laevigatus</i>	Smooth Beardtongue		E	S1
<i>Ranunculus longirostris</i>	Long-beak Water Buttercup			S2
<i>Satittaria australis</i>	Southern Arrowhead		E	S1
<i>Sphenopholis pensylvanica</i>	Swamp Oats			S2
<i>Utricularia biflora</i>	Two-flower Bladderwort		E	S1
<i>Haliaeetus leucocephalus</i>	bald eagle		E	S1B, S1N
<i>Strix varia</i>	barred owl		T/T	S2B, S2N
<i>Toxostoma rufum</i>	brown thrasher		SC/S	S3B, S4N
<i>Rana virgatipes</i>	carpenter frog		SC	S3
<i>Terrapene carolina carolina</i>	eastern box turtle		SC	S3
<i>Lampropeltis g. getula</i>	eastern king snake		U	S3
<i>Bufo woodhousii fowleri</i>	Fowler's toad		SC	S3
<i>Ardea Herodias</i>	great blue heron		SC/S	S3B, S4N
<i>Pituophis melanoleucus melanoleucus</i>	northern pine snake		T	S2
<i>Hyla andersonii</i>	Pine barrens tree frog		T	S2
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker		T/T	S2B, S2N
<i>Buteo lineatus</i>	red-shouldered hawk		E/T	S1B, S2N
<i>Crotalus horridus horridus</i>	timber rattlesnake		E	S1
<i>Alasmodonta undulate</i>	triangle floater		T	S2
<i>Hylocichla mustelina</i>	wood thrush		SC/S	S3B

### \* Key to Federal and State Status Codes

<b>T</b>	Threatened species – may become endangered if conditions surrounding the species begin to or continue to deteriorate.
<b>E</b>	Endangered species – one whose prospects for survival within the state are in immediate danger due to one or many factors.
<b>INC</b>	Increasing species – population has exhibited a significant increase
<b>S</b>	Stable species
<b>D</b>	Declining species – species that exhibited a continued decline in population numbers of the years.
<b>SC</b>	Special Concern – 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

### \*\* Key to State Element Rank

<b>S1</b>	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
<b>S2</b>	Imperiled in NJ because of rarity (6 to 20 occurrences).
<b>S3</b>	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.
<b>S4</b>	Apparently secure in state, with many occurrences.
<b>S5</b>	Demonstrably secure in state and essentially ineradicable under present conditions.
<b>SX</b>	Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. No longer a conservation priority.
<b>SH</b>	Element of historical occurrence in New Jersey. No extant occurrences are known, but not all historical occurrences have been surveyed, and unsearched potential habitat remains. Remains a conservation priority.
<b>B</b>	Breeding
<b>N</b>	Non-breeding

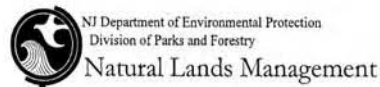
## CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

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.**



## APPENDIX G: STATE THREATENED AND ENDANGERED SPECIES

Birds			
Endangered		Threatened	
Bittern, American	<i>Botaurus lentiginos</i> BR	Bobolink	<i>Dolichonyx oryzivorus</i> BR
Eagle, bald	<i>Haliaeetus leucocephalus</i> BR	Eagle, bald	<i>Haliaeetus leucocephalus</i> NB
Falcon, peregrine	<i>Falco peregrinus</i>	Hawk, Cooper's	<i>Accipiter cooperii</i>
Goshawk, northern	<i>Accipiter gentilis</i> BR	Hawk, red-shouldered	<i>Buteo lineatus</i> NB
Grebe, pied-billed	<i>Podilymbus podiceps</i>	Night-heron, black-crowned	<i>Nycticorax nycticorax</i> BR
Harrier, northern	<i>Circus cyaneus</i> BR	Night-heron, yellow-crowned	<i>Nyctanassa violaceus</i>
Hawk, red-shouldered	<i>Buteo lineatus</i> BR	Knot, red	<i>Calidris canutus</i> BR
Owl, short-eared	<i>Asio flammeus</i> BR	Osprey	<i>Pandion haliaetus</i> BR
Plover, piping	<i>Charadrius melodus</i> **	Owl, barred	<i>Strix varia</i>
Sandpiper, upland	<i>Batramia longicauda</i>	Owl, long-eared	<i>Asio otus</i>
Shrike, loggerhead	<i>Lanius ludovicianus</i>	Rail, black	<i>Laterallus jamaicensis</i>
Skimmer, black	<i>Rynchops niger</i> BR	Skimmer, black	<i>Rynchops niger</i> NB
Sparrow, Henslow's	<i>Ammodramus henslowii</i>	Sparrow, grasshopper	<i>Ammodramus savannarum</i> BR
Sparrow, vesper	<i>Pooecetes gramineus</i> BR	Sparrow, Savannah	<i>Passerculus sandwichensis</i> BR
Tern, least	<i>Sterna antillarum</i>	Sparrow, vesper	<i>Pooecetes gramineus</i> NB
Tern, roseate	<i>Sterna dougallii</i> **	Woodpecker, red-headed	<i>Melanerpes erythrocephalus</i>
Wren, sedge	<i>Cistothorus platensis</i>		
Reptiles			
Endangered		Threatened	
Rattlesnake, timber	<i>Crotalus h. horridus</i>	Snake, northern pine	<i>Pituophis m. melanoleucus</i>
Snake, corn	<i>Elaphe g. guttata</i>	Turtle, Atlantic green	<i>Chelonia mydas</i> **
Snake, queen	<i>Regina septemvittata</i>	Turtle, wood	<i>Clemmys insculpta</i>
Turtle, bog	<i>Clemmys muhlenbergii</i> **		
Atlantic hawksbill	<i>Eretmochelys imbricata</i> **		
Atlantic leatherback	<i>Dermochelys coriacea</i> **		
Atlantic loggerhead	<i>Caretta caretta</i> **		
Atlantic Ridley	<i>Lepidochelys kemp</i> **		
Amphibians			
Endangered		Threatened	
Salamander, blue-spotted	<i>Ambystoma laterale</i>	Salamander, eastern mud	<i>Pseudotriton montanus</i>
Salamander, eastern tiger	<i>Ambystoma tigrinum</i>	Salamander, long-tailed	<i>Eurycea longicauda</i>
Treefrog, southern gray	<i>Hyla chrysocelis</i>	Treefrog, pine barrens	<i>Hyla andersonii</i>

Invertebrates			
Endangered		Threatened	
Beetle, American burying	<i>Nicrophorus mericanus</i> **	Elfin, frosted (butterfly)	<i>Callophrys irus</i>
Beetle, northeastern beach tiger	<i>Cincindela d. dorsalis</i> **	Floater, triangle (mussel)	<i>Alasmidonta undulata</i>
Copper, bronze	<i>Lycaena hyllus</i>	Fritillary, silver-bordered (butterfly)	<i>Bolaria selene myrina</i>
Floater, brook (mussel)	<i>Alasmidonta varicosa</i>	Lampmussel, eastern (mussel)	<i>Lampsilis radiata</i>
Floater, green (mussel)	<i>Lasmigona subviridis</i>	Lampmussel, yellow (mussel)	<i>Lampsilis cariosa</i>
Satyr, Mitchell's (butterfly)	<i>Neonympha m. mitchellii</i> **	Mucket, tidewater (mussel)	<i>Leptodea ochracea</i>
Skipper, arogos (butterfly)	<i>Atrytone arogos arogos</i>	Pondmussel, eastern (mussel)	<i>Ligumia nasuta</i>
Skipper, Appalachian grizzled (butterfly)	<i>Pyrgus wyandot</i>	White, checkered (butterfly)	<i>Pontia protodice</i>
Wedgemussel, dwarf	<i>Alasmidonta heterodon</i> **		
Mammals		Fishes	
Endangered		Endangered	
Bat, Indiana	<i>Myotis sodalis</i> **	Sturgeon, shortnose	<i>Acipenser brevirostrum</i> **
Bobcat	<i>Lynx rufus</i>		
Whale, black right	<i>Balaena glacialis</i> **		
Whale, blue	<i>Balaenoptera musculus</i> **		
Whale, fin	<i>Balaenoptera physalus</i> **		
Whale, humpback	<i>Megaptera novaeangliae</i> **		
Whale, sei	<i>Balaenoptera borealis</i> **		
Whale, sperm	<i>Physeter macrocephalus</i> **		
Woodrat, Allegheny	<i>Neotoma floridana magister</i>		

\*\* Also on the federal Endangered and Threatened list  
BR – breeding population only; NB – non-breeding population only

Source: NJ Division of Fish and Wildlife Endangered and Nongame Species Program. "New Jersey's Endangered and Threatened Wildlife." 2008. Available online: <http://www.nj.gov/dep/fgw/tandespp.htm> (Accessed March 3, 2009).






## APPENDIX H: PARTIAL INVENTORY OF LOCALLY SIGNIFICANT HISTORIC SITES IN EVESHAM TOWNSHIP




Information was taken from the Evesham Historic Preservation Commission's website

(<http://www.historic-evesham.org/hpc/sites.asp>)

Key:	NR = National Register	SR = State Register	SHPO = State Historic Preservation Office
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Name		Location/ National Register/ State Register	Description
Savich Farm (Benjamin Cooper Farm) [Site] (ID#807)		E. Main St.  NR: 12/12/1978 (NR Reference #: 78001744)  SR: 12/16/1977	The primary significance of this property lies in the potential for the excavation of additional archeological remains. Excavation revealed extensive and unusual Archaic cremation cemetery dating back to 2,300 B.C. and late Woodland features. Unfortunately, the Italianate Savich farmhouse, built circa 1870, and its noteworthy interior burned in 1985.
Jacob Wills House (ID#809)		Brick Road, west of Evans Road  NR: 11/1/1990 (NR Reference #: 89002296)  SR: 11/29/1989	Dr. Daniel Wills settled on a plantation on Rancocas Creek after arriving in Burlington on the "Kent" in 1677. He later acquired large landholdings in the region. This house stands on a 1888 acre parcel originally purchased by James Wills in 1737. The house remained in the Wills family until 1906 when the property was sold to George and Margaret Olt. The exterior of the house is an excellent example of a local 18th Flemish checkerboard farm house. The clapboard section appears to be the oldest part of the house. The center chimney placement is unusual for this region. This house is one of the few surviving Flemish bond with glazed headers farmhouses in Evesham.
Cropwell Friends Meetinghouse (ID#795)		810 Cropwell Road  NR: 8/14/1992 (NR Reference #: 92000976)  SR: 6/25/1992	The Meeting House is a fine example of a traditional rural Quaker meeting house, typical of those built in the Philadelphia/southern New Jersey region. In 1785, Cropwell members of the Evesham Friends purchased a 3 acre lot on which they built a school, completed 1786. They desired a meeting separate from Evesham's and first worshipped in a nearby schoolhouse in 1794. The brick meeting house was built in 1809, with money bequeathed by Samuel Borroughs expressly for that purpose, and reflects the prosperity of the Friends at that time. This structure and its setting is the only tangible non-residential link to the original colonial Quaker settlements of Evesham Township.

Name		Location/ National Register/ State Register	Description
William and Susan Evans House (ID#801)		2 Bills Lane  NR: 8/14/1992 (NR Reference #: 92000978)  SR: 6/25/1992	The house is architecturally significant as a structure embodying the distinctive characteristics of early 19th century brick farmhouse once so numerous in southern New Jersey. Because the house was built in sections, it also effectively conveys the evolution of a house from its beginnings in the Federal period to a larger house with Victorian features. As a whole, the house illustrates the evolution of a Quaker farmhouse from the late 18th century through the 19th century. The house is also historically significant because of its affiliation with members of the Evans family, early settlers of Evesham Township. Descendants of the original owners continue to live at Hillside Farm.
Thomas Hollinshead House (ID#804)		18 West Stow Road  NR: 8/14/1992 (NR Reference #: 92000977)  SR: 6/25/1992	Thomas Hollinshead inherited 450 acres from his grandfather Thomas Eves II and built the house in 1776. Gable end headers "H" is for Hollinshead, "T" for Thomas and "L" for his wife, Lydia. Hollinshead actively participated in township affairs as a trustee of the Cropwell Meeting, as an executor of and witness to many wills and as a guardian to orphans. The house is believed to be one of the sites in Evesham used by British soldiers retreating from Philadelphia to Monmouth June 18-19, 1778, and being devout Quakers with no desire for combat, the Hollinshead family abandoned their home during the retreat. The Hollinshead family heirs sold the property to William Allcott, whose name appears on the 1859 and 1876 maps. The last to farm the property was Ed Stowe. He sold the property to the Formigli Company in 1982. The house was sold to Frank Messina for \$1 for restoration. Architecturally, the house significant as a fine example of colonial architecture in this area with some unique features. The asymmetry of the three bay front facade, the arrangement of three rooms without hall and the interior brick wall dividing the house in half are some of the unusual features of the house. Interior woodwork details are of high quality.
Evans-Cooper House (ID#799)		North Elmwood Road  NR: 8/26/1993 (NR Reference #: 93000868)  SR: 7/20/1993	The house is architecturally significant as a structure embodying the distinctive characteristics of a late 18th and early 19th century brick farmhouse. Because the house was built in sections, it also effectively conveys the evolution of a house from its beginnings in the Federal period to a larger house with Second Empire features. As a whole, the house illustrates the evolution of a late 18th century farmhouse through the 19th century. The house is also historically significant because of its affiliation with members of the Evans family, early settlers of Evesham Township. The house was probably built by John Evans [1770-1841]. The house descended in the Evans family in the 19th century. Lydia Evans Cooper, wife of Benjamin Cooper inherited the house. It was probably during her ownership that the house was "modernized" with Second Empire features.

Name		Location/ National Register/ State Register	Description
Thomas and Mary Evens House (ID#802)		South Elmwood Road  NR: 8/26/1993 (NR Reference #: 93000867)  SR: 7/20/1993	The house is significant as a structure that shows the evolution of a late 18th century residence through two centuries. The building is a good example of a brick Evesham farmhouse with a dated gable, a building type acknowledged as being threatened in the 1985 Survey. The house is also historically significant because of its affiliation with members of the Evens and Eves families, early settlers of Evesham Township. The house is located on the original 1,000 acre Evans tract. Thomas Evens was the grandson of the original settler Thomas Evans. Letters formed by brick headers in the E gable end are "E" Evens, "T" Thomas and "M" Mary Eves, his wife. Mary Evens, was the daughter of Joseph Eves, for whom "Evesboro" was named. The land at this site provided meadows for a dairy, prime farmland for grains, hay and vegetables, and a clear spring. Thomas owned several farms and tracts of woodlands. The last farmer at the site was Robert Jaggard, for whom the Jaggard School was named.
John Inskeep Homestead (ID#2987)		70 North Locust Road  NR: 8/26/1993 (NR Reference #: 93000866)  SR: 7/20/1993	The house is significant as an example of an 18th century Evesham township farmhouse that has evolved over time. The first house on the site, built in c. 1725 by John Inskeep II, burned in 1770. A new house was built in 1771 by John Inskeep III probably on the same foundation of the burned structure. It is believed that the north side of the structure is the house built in c.1771. A c. 1810 addition was added by either John Inskeep or his sons. In c. 1860 the house was enlarged to its present form by Elizabeth Inskeep Haines and her husband Joshua Haines. The house remained in Inskeep family until 1936. The most profitable use of the land was for a dairy, meadows, grain and hay. The enormous barns, now demolished, stored hay and housed the large dairy herd. The house appears on the 1876 Burlington County map as the property of Dr. Elijah Woolston, husband of Rachel Inskeep Haines Woolston.
Amos Evans House (ID#797)		501 East Main Street, Marlton  NR: 9/2/1994 (NR Reference #: 94001008)  SR: 6/28/1994	This house sits on part of the original 1000 acre property of the Thomas Evans family. William, eldest son of Thomas, received 200 acres of the property as a gift from his father, and constructed the original house on this site c. 1740. Two brick additions were made to the original frame house. The current house on this site was probably built in 1785 by Enoch Evans. Two families and their descendants have occupied the farm, Evans for 211 years, and George Bowker since 1912. The house is significant because it has retained a high degree of late 18th century architectural details. It is one of the few remaining brick farmhouses with glazed headers and construction date on the gable end. The house has retained an extraordinary amount of original interior detail including hardware, doors, and beaded board partitions. The house is also historically significant because of its affiliation with members of the Evans, early settlers of Evesham Township.

Name		Location/ National Register/ State Register	Description
Stokes-Evans House (ID#808)		52 East Main Street, Marlton  NR: 8/30/1994 (NR Reference #: 94001009)  SR: 6/28/1994	The house is an outstanding example of a vernacular Federal/Greek Revival style house. Most notable are its Greek Revival N elevation porch and the numerous surviving interior elements. The property is also notable for its associations with local residents, merchant Isaac Stokes and State Assemblyman and surveyor Ezra Evans. Henry Lippincott [surveyor, sheriff] and Mark Lippincott [coal dealer] also resided here. The public library was also housed in this building for many years. This building on East Main Street is one on the streetscape which reflects Marlton's history from the nineteenth to the twentieth centuries. Architecturally, the streetscape has an example of almost every type of architecture found in Marlton including Federal, Victorian pattern book, and American Foursquares. See the East Main Street Streetscape Survey Form for further information.
Darnell House (ID#796)		960 Tuckerton Rd.  SHPO Opinion: 2/15/1978	This house sits on part of the original 1000 acre property of the Evans family. Nathan Evans purchased 233 acres from his father Thomas in 1756 and presumably built this house. The house was built to face the Marlton Pike constructed in the 1750s. When Nathan died in 1769 the property was divided among his four sons. His son Isaac inherited the house. The house is identified on the 1849, 1859 and 1876 Evesham Township maps as the property of the Darnell family. This dwelling is one of several brick farmhouses in the Township.
Isaac Evans House (ID#800)		875 East Main Street  SHPO Opinion: 2/15/1978	This house sits on part of the original 1000 acre property of the Evans family. Isaac Evans purchased 186 acres from his father Thomas in 1750 and presumably built a house. The Evesham Township maps indicate that the house was owned by the Evans family through much of the 19th century. The house was owned by Clayton Evens in c. 1900. The house is believed to have been a stop on the Underground Railroad although there is no known documentary evidence to prove this claim.
Pine Grove Chapel (ID#805)		Tuckerton Road and Marlton Pike  SHPO Opinion: 2/15/1978	This building is the focal point of the hamlet of Pine Grove and the only building to perpetuate the name. Until the building was built in 1906 the congregants met in a nearby Quaker schoolhouse at 130 Paul Road.



Name		Location/ National Register/ State Register	Description
Quaker School (ID#806)		130 Paul Rd.  SHPO Opinion: 2/15/1978	This building is one of two schools in Evesham built by the Quakers in the 18th century. The earliest school located at Cropwell, built in 1785, was demolished. Atlases of Evesham Township indicate it was used as public school in the 19th century. Congregants met here at the turn of the century before Pine Grove Chapel [Survey #087] was constructed.
M.R. Wills House (ID#810)		2240 Old Marlton Pike  SHPO Opinion: 2/15/1978	The 1849, 1859 and 1876 Evesham township maps identify this as the property of M. R. Wills. The Wills family were early settlers of Evesham Township.



## DELAWARE VALLEY REGIONAL PLANNING COMMISSION

### Publication Abstract

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**Title:** *Environmental Resource Inventory  
for Evesham Township,  
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### ABSTRACT

This publication documents the natural and community resources of Evesham Township, Burlington County, New Jersey. The natural resource information includes descriptions, tables and maps of land use; soils; steep slopes; drinking water aquifers and wells; surface waters including watersheds, streams, lakes, wetlands, and floodplains; impacts on water resources; groundwater; vegetation including forests and grasslands; animal communities; threatened and endangered species; NJ Landscape Project, Heritage Priority Sites, and Pinelands conditions. There is also an Environmental Issues section that includes information on known contaminated sites, radon, flooding, and well contamination. Community resources that are briefly described include population, transportation, water and sewer infrastructure, township services, and protected open space. A short history of the community is also included along with an inventory of registered historic buildings.

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