ENVIRONMENTAL RESOURCE INVENTORY

for the TOWNSHIP of

LUMBERTON

BURLINGTON COUNTY, NEW JERSEY

prepared by:

Delaware Valley
Regional Planning
Commission

with:

The Open Space
and Environmental
Preservation Council
of Lumberton Township

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.

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

This report was funded by the Association of New Jersey Environmental Commissions (ANJEC) Smart Growth Assistance Grant Program, funded by the Geraldine R. Dodge Foundation and by the Borough of Woodstown. The authors are solely responsible for the report's findings and conclusions, which may not represent the official views or policies of the non-township funding agencies.

Cover Image: *Mule Farm* Source: DVRPC

LUMBERTON TOWNSHIP
ENVIRONMENTAL RESOURCE INVENTORY

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ACKNOWLEDGEMENTS

Many thanks are due to the organizations that provided funding for this *Environmental Resource Inventory for Lumberton Township*. They are:

- The Association of New Jersey Environmental Commissions (ANJEC) Smart Growth Assistance Grant Program, funded by the Geraldine R. Dodge Foundation.
- The Township of Lumberton
- The Delaware Valley Regional Planning Commission's Open Space and Greenways Program

Township Committee, Township of Lumberton

Mayor John Pagenkopf
Deputy Mayor Patrick Delany
Committeeperson Michael Mansdoerfer
Committeeperson Beverly Marinelli
Committeeperson James "Buddy" Miller, Jr.

The impetus for the creation of this document, and its guidance and review, came from the Lumberton Township Open Space and Environmental Preservation Council.

The Lumberton Township Open Space and Environmental Preservation Council

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Joseph Buerster
Steven M. Fairess
Mark Fisher, Chairperson
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Daniel M. Van Pelt, township manager; Brian Slaugh of Clarke, Caton, and Hintz; former mayor DeWitt Pennypacker; other township staff members; and various New Jersey state offices all provided information for this inventory.

The following DVRPC staff members made significant contributions to this report:

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Kim Korejko – GIS Analyst
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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.

Lumberton Township's natural resources have long shaped the lives of its inhabitants. Lumberton's thick forests and high-quality soils played major roles in its early settlement by Europeans. Its position along the Rancocas Creek made it a locally significant manufacturing and shipping center in the 19th century. With the historic settlement of Lumberton at its center, the township is a close residential community that preserves its post-Colonial charm. Most commercial establishments are located along or near Route 38. Lumberton's historic character and rural setting have also attracted medium-density residential development. As this activity increases, the character of Lumberton Township is changing. Documentation of the community's environmental resources is a necessity, especially if Lumberton is to support a healthy mix of agricultural, commercial, industrial and residential uses in the future.

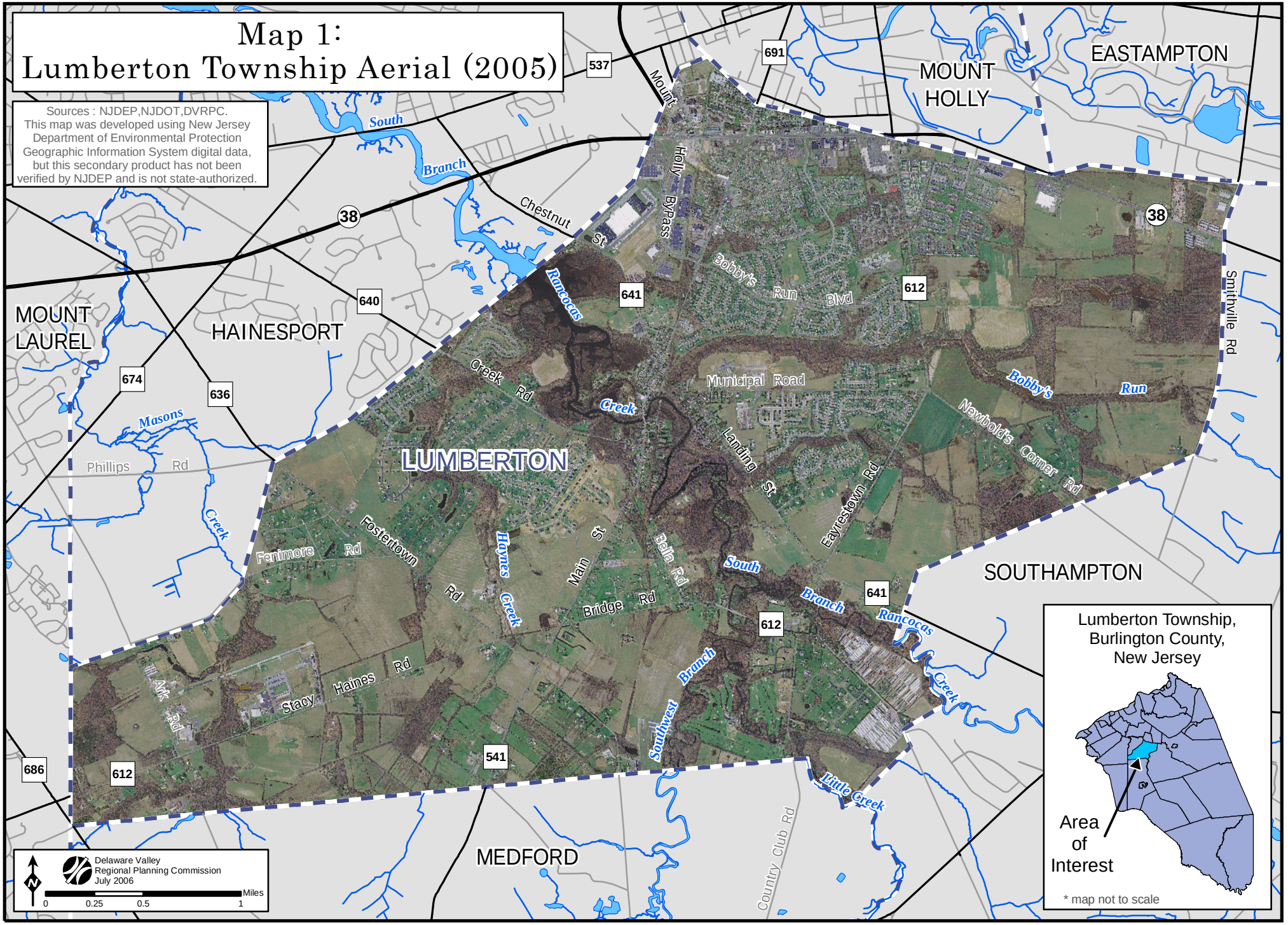
Lumberton's surface waters and groundwater resources will become increasingly important to its population and to that of neighboring communities. Its wetlands, upland forests, and grasslands – which provide significant habitat for endangered and threatened plants and animals – will be vital to the continued health of the community and the enjoyment of its citizenry. Knowledge of the environmental resources of the township will allow its citizens to make informed decisions as they decide Lumberton's future path and forge its emerging identity.

Preparing an Environmental Resource Inventory requires gathering all the existing information that can be found about those resources, and presenting it in a form that is usable by a broad audience. The Inventory reflects a particular moment in time, and should be updated as new data becomes available.

Several documents and reports were utilized in preparing the *Environmental Resource Inventory for Lumberton Township,* including the Lumberton Township *Master Plan,* the *Farmland Preservation Plan Element,* the *Housing Element* and the *Fair Share Plan,* along with a number of reference works. These are listed at the end of this document. The maps and data relating to Lumberton Township's natural resources are derived principally from the New Jersey Department of Environmental Protection's (NJDEP's) Geographic Information System mapping, and from *The Landscape Project* produced by the Endangered and Nongame Species Program of the New Jersey Fish and Wildlife Division.

Map 1:
Lumberton Township Aerial (2005)

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



BRIEF TOWNSHIP HISTORY

Lumberton Township was created by an act of the New Jersey State Assembly on March 14, 1860, and was formed from portions of Northampton, Eastampton, and Medford townships. Lumberton Township's name was inspired by the large amounts of oak and pine that were harvested for lumber in the area. Originally, Lumberton Township comprised an area of 20.7 square miles in the center of Burlington County. However, in 1924, the northwestern portion of the township, 6.8 square miles, detached to form Hainesport Township.

Before European settlers arrived in the Delaware Valley, Native Americans populated the Burlington County area. The Native Americans that lived in the Lumberton area belonged to the tribes of the Lenape Nation. One settlement was located west of present-day Eayrestown Road and north of Newbolds Corner, while another group settled along the Rancocas Creek in present-day Hainesport Township. There are signs of additional Native American settlements in Lumberton Township. In 1916, a group from the University of Pennsylvania excavated a mound on the Crispin Farm, at the intersection of Fostertown and Crispin roads. The university's archeologists discovered Native American tools and relics suggesting "fine workmanship."

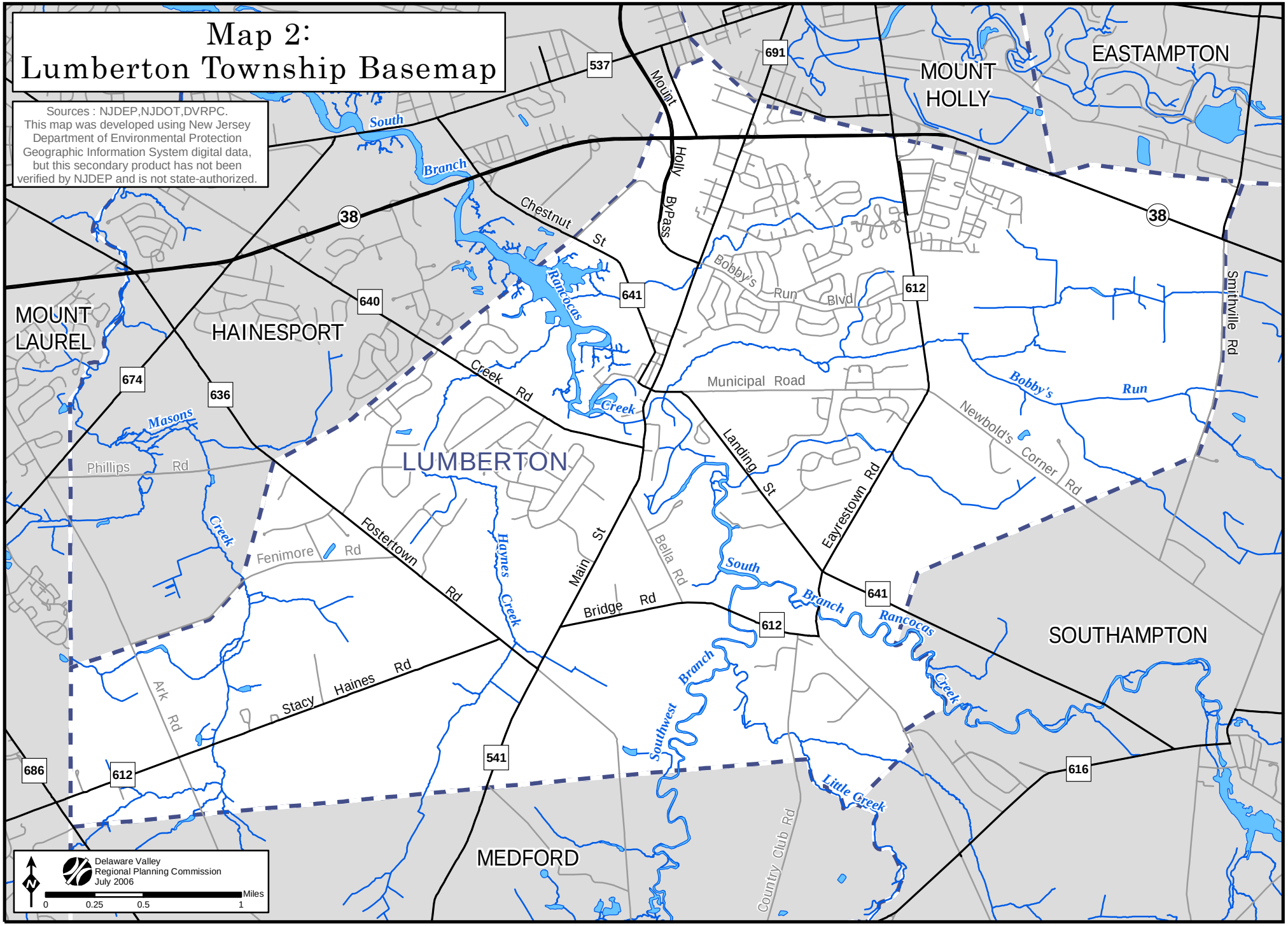
The first documented European settlers in Lumberton Township were English in origin. The early settlers traveled along the Rancocas Creek to reach the Lumberton area. In 1680, only three years after Burlington was founded by Quakers, John Haines pulled his boat to the side of the Rancocas and dug a cave on the north side of the creek. Haines lived in the cave until he was able to raise sufficient funds to build a house.

Another English settler, Doctor Robert Dinsdale, shares a similar story with Haines. Dinsdale, a nonconformist if not a Quaker, purchased a tract of land on the north side of the Rancocas Creek from his friend William Penn, while still in England. After arriving in North America in 1683, Dinsdale navigated his boat up the Rancocas along a tributary that would later be called Dinsdale Run or Bobby's Run in his honor. When Dinsdale came to his tract, he, too, dug a cave in which he lived for a year until his house was constructed.

Source: DVRPC

Historic homes along Main Street are reminders of Lumberton's pre-Colonial past.

Much like the rest of Burlington County, Lumberton was an attractive area for the newly arrived Quakers that settle after arriving in the colonies as it offered tall trees, fertile ground, and a tidal passage to the Delaware River. Early development in Lumberton occurred slowly during the 18th century. Several small houses dotted the Rancocas shoreline, but few settlers ventured into the interior


Map 2:
Lumberton Township Basemap
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Mount Holly ByPass
Chestnut St
Bobby's Run Blvd
Municipal Road
Bobby's Run
Smithville Rd
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bridge Rd
Bella Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Stacy Haines Rd
Ark Rd
Southwest Branch
Little Creek
Country Club Rd
537
691
38
640
641
612
674
636
686
541
616
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1

forests. The village of Lumberton grew slowly along the banks of the Rancocas Creek's South Branch, at the head of navigable waters leading to the Delaware River. This colonial settlement was modest in size, although only two miles south of Mount Holly, which was the Burlington County seat during the 18th century, as it is today. In 1795, one visitor commented that the village "contained but eleven dwellings and a meeting house, the whole number of inhabitants being thirty-three."

Waterways were important to Lumberton from its earliest days. In the 18th century, Lumberton became a regional shipping point in Burlington County, relying on the navigable waters of Rancocas Creek. In 1711, the first wharf was constructed behind the current location of the F.L Walther Elementary School. More development followed and, in a few years, the creek was lined with wharves, warehouses, shipyards, and iron works. Lumberton was also a shipping point for industry located in the dense Pinelands. Atsion Iron Works and Martha Iron and Glassworks had loading docks on Landing Street. By 1766, it was necessary for the West Jersey Colonial Assembly to establish guidelines for the accepted use of the creek and its banks. This legislation took the form of the Pioneer Navigation Act of 1766, which gave Lumberton's settlers the right to erect sawmills and forges, as well as the right to transport lumber, and iron merchandise down the Rancocas Creek.

Industry thrived around Lumberton's wharves in the Rancocas Creek. In 1807, Samuel Howell erected an iron works near the creek. This and other foundries in the area forged pipes used in the innovative public water system built in Brooklyn, New York. By the mid-19th century, the Rancocas Creek was lined by numerous large industries including sawmills, forges, and several iron companies. The creek was noticeably polluted and often filled with loose timbers, refuse, and noxious discharges. A group of Lumberton businessmen created an organization to exact taxes on all vessels traveling the creek, both freight and passenger, as well as on the local industries, in order to dredge and clear the creek routinely to allow for passage.

Lumberton was also home to a lime pulverizing plant, which, at its height, claimed to sell more than a million bushels of gas lime annually. In the 17th and 18th centuries gas lime, or hydrated lime, was first used as a pesticide to protect turnip crops from fly infestations. It was later used for purifying coal gas because it soaks up ammonia, hydrogen sulfide, and other impurities from coal.

As transportation methods and technology changed, Lumberton's economy also changed. Lumberton's early economic success was tied to its location at the southernmost navigable point on the Southern Branch of the Rancocas Creek. The advent of rail transportation in the mid–1800s threatened Lumberton's economic vitality. Rail transport brought goods to market in a faster and less expensive manner than water transport and reduced the need for most economic development to occur on or near navigable waterways.

In 1855, Lumberton tried to remain competitive with the railroad towns by introducing steamboat transportation along the Rancocas. This attempt was met with limited success. One of the most notable steamships, *The Barclay*, sailed out of Hainesport, which was a part of Lumberton Township at the time, down the Rancocas and southward to Camden and Philadelphia by the Delaware River. However, the *Barclay* was out of commission by 1870, less

than 15 years after steamships had first navigated the Rancocas. Some steamships, such as the *Steamlet*, were able to keep going into the early years of the twentieth century. However, even the last of these stalwart vessels succumbed to rail's domination. *Steamlet*'s Captain Bill Voorhees scuttled the steamboat with dynamite in Lumberton's harbor.

Source: DVRPC

The Rancocas Creek, once a major power source and transportation route for industry, is now primarily used for recreation and appreciated for its scenic beauty.

The most prominent manufacturing industry in Lumberton was shoe production, which located to the village because of its water access, railroad access, and nearby raw materials. The first factories were small, employing only a few people, and were located in modest buildings. David Brock opened the first shoe factory in 1825 on Creek Road. Samuel Holland started a shoe factory on Bridge Road in 1874. Frank Morton followed in 1877, locating his factory on Chestnut Road. The Ried Shoe Manufacturing Company opened the largest and most successful Lumberton shoe factory on North Main Street and East Landing Road, which employed more than 100 people from 1882 to 1933. In the late 1800s, a visitor to the township mentioned that Lumberton was particularly noted for its "...enterprising people and the manufacturing of shoes of all kinds."

For a short time in the 19th century, Lumberton became a modest resort community, as its location along the picturesque Rancocas Creek offered swimming, fishing, and boating. The village of Lumberton boasted a reliable hotel, a reputable boarding house, and a few restaurants and taverns.

Although Lumberton's manufacturing and shipping industries fluctuated in prominence, agriculture remained the foundation of the local economy. As late as 1974, 80% of Lumberton's land area was engaged in agricultural production. One nineteenth century visitor noted that Lumberton's land "surface is of such a wavy or rolling nature as to drain the land perfectly, thus fitting it for agricultural purposes." The crops grown in Lumberton were mostly consumer-based market goods, such as tomatoes, cabbage, string beans, corn, and potatoes. The Irish Cobbler Potato, a type of baking potato, was developed in Lumberton.

Throughout most of the twentieth century, agriculture remained the dominant land use in Lumberton Township. While developers began suburbanizing parts of Burlington County after World War II, Lumberton resisted becoming a "bedroom community" or even a rural commercial center. In a *Philadelphia Inquirer* article from July 1974, the reporter noted that the strong-willed people of Lumberton were a "community that had no intention of being stampeded into the current craze of helter-skelter development" and "believed they were still in charge of their fate." The "Bobby's Run" housing development, a 623-unit subdivision, was delayed for 15 years due to strong local opposition. In 1987, "Bobby's Run" was approved for construction. Also in the late 1980s, Lumberton experienced more large-scale industrial, commercial, and residential development within its borders. In 1986, the Lumberton Corporate Center was approved. This expansive 200-acre development is anchored by the CVS pharmacy's northeast distribution center.

Lumberton's thoughtful planning mitigated the negative effects of residential and industrial development and the township retains its bucolic charm. Most large-scale developments have centered on the bustling Route 38 corridor, where high-speed traffic and commercial development has occurred throughout Burlington County. Furthermore, several farms in the southwestern corner of the township are preserved, ensuring that future residents will also be able to enjoy the physical beauty and environmental benefits of rural landscapes.

Source: DVRPC

Large, productive farms and hobby farms are present in the southern half of the township.

TOWNSHIP LOCATION, SIZE, AND LAND USE

Lumberton is an incorporated township located in the center of Burlington County, New Jersey. The township is bounded by six municipalities: Hainesport Township to the north and northwest, Mount Holly Township to the north, Eastampton Township to the northeast, Southampton Township to the east, Medford Township to the south, and Mount Laurel Township to the southwest.

The historic village of Lumberton, located on the South Branch of the Rancocas Creek, is in the center of the township. The village of Lumberton is representative of a 19th century commercial center, which supported its agricultural hinterland and linked to larger commercial centers, such as Mount Holly to the north. The township is bisected by County Route 541, which flows into the major transportation corridor, State Highway 38. This highway connects central Burlington County with the New Jersey Turnpike, Camden County, and Philadelphia. Lumberton is roughly 20 miles from Philadelphia by way of State Highway 38, which connects directly to the Benjamin Franklin Bridge.

Lumberton Township occupies approximately 8,336 acres, or 13 square miles, on the Inner Coastal Plain of New Jersey. Currently, Lumberton's land use is in a period of transition. Historically, the township has been a stronghold of agricultural production in Burlington County. Much of the southern portion of the township still maintains its rural character. However, the northern portion of the township is rapidly changing. Many agricultural parcels are subdivided for new residential development. Most of Lumberton's housing units (2,286 of 4,053 total units) were built between 1980 and 2000. During the 1990s, Lumberton's population grew by 3,600 residents to a total population of 10,461 by 2000. This was a 54% increase over its 1990 US Census population. The US Census Bureau estimates that Lumberton's population reached 12,297 people in 2004. Population projections included in the township's *Housing Element and Fair Share Plan* estimate that by 2010 the municipality will have 12,810 residents. Other population projections, which differ slightly, are available from Burlington County.

Before European settlement, as much as 90 % of the township was covered with a mostly mixed deciduous hardwood forest consisting of oak, birch, ash, beech, hickory, walnut, and maple trees. Although large portions of that expansive forest are now gone, more than 7 percent of the township remains forested. Given the good soils in Lumberton, it is not surprising that as of 2002, 33% of the township's land area was dedicated to agricultural uses. The agricultural eastern half of the township is mostly dominated by row crops such as corn and soybeans.

Table 1 shows Lumberton's land cover grouped into general categories based on the New Jersey Department of Environmental Protection's (NJDEP's) 2002 color aerial photography. *Table 2* breaks down the 2002 general land cover categories into detailed land cover categories. See also **Map 2**.

Table 1: Lumberton Township General Land Cover Classes (2002)

General Land Classes	Acres	Percent
Agriculture	2,561.25	30.73%
Barren Land	139.69	1.68%
Developed	588.75	34.20%
Forest	2,851.34	7.06%
Water	95.81	1.15%
Wetlands	2,098.92	25.18%
Total	**8,335.75**	**100.00%**

Source: NJDEP, DVRPC, 2002 data, released 2006

Table 2: Lumberton Township Detailed Land Cover (2002)

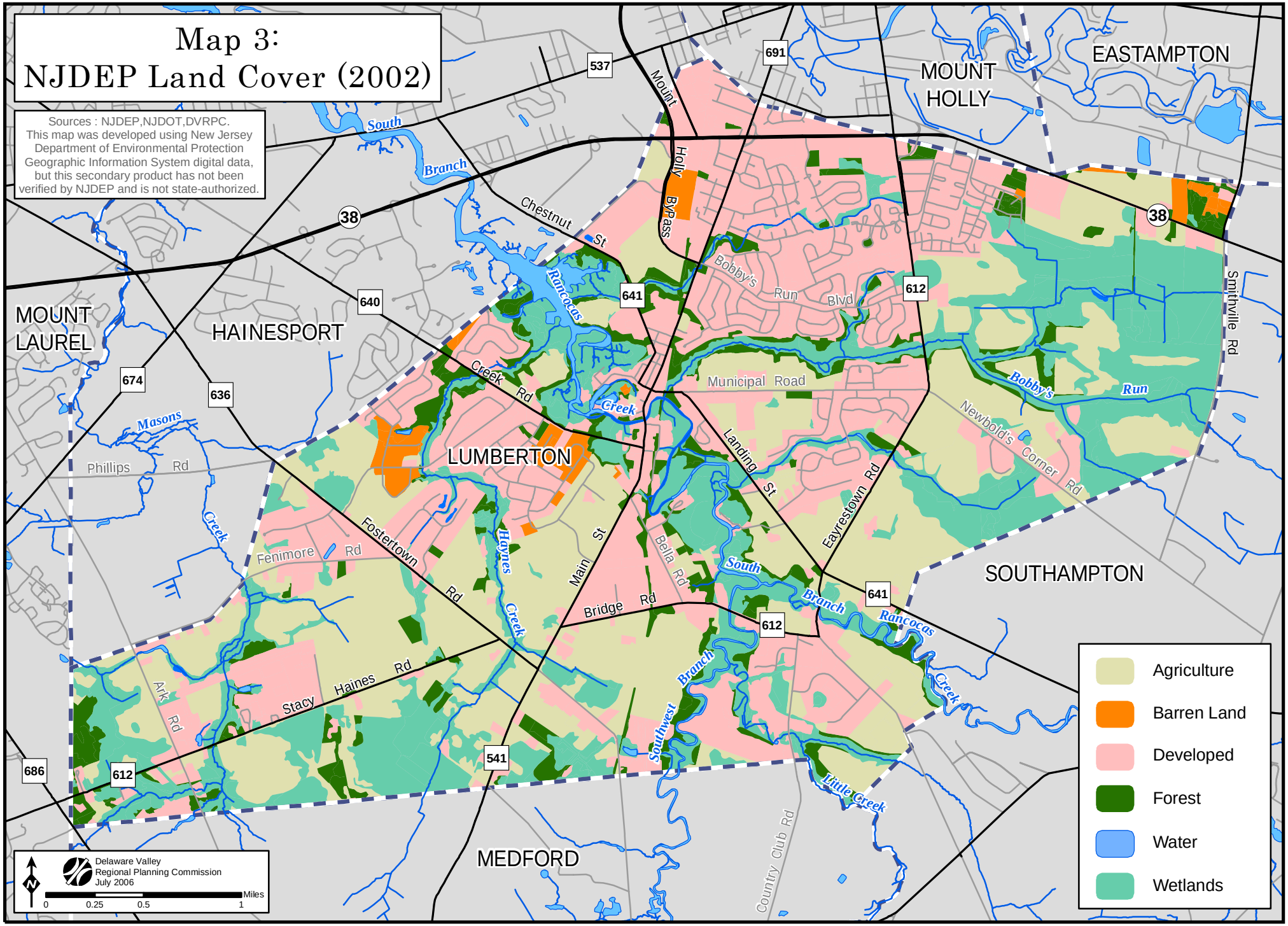
Land Use Categories	Acres	Percent
Agriculture – Cropland and pastureland	2,238.08	26.85%
Agriculture – Orchards, vineyards, nurseries, horticultural areas	241.65	2.90%
Agriculture – Other	81.51	0.98%
Airport Facilities	58.64	0.70%
Altered lands	17.46	0.21%
Artificial lakes	10.38	0.12%
Athletic fields (schools)	22.10	0.27%
Bridge over water	0.18	0.00%
Brush/shrubland – coniferous	11.15	0.13%
Brush/shrubland – deciduous	18.41	0.22%
Brush/shrubland – mixed	37.75	0.45%
Brush/shrubland – old field (brush covered)	44.37	0.53%
Cemetery	5.11	0.06%
Commercial/Services	234.62	2.81%
Forest – coniferous	20.15	0.24%
Forest – deciduous	410.77	4.93%
Forest – mixed (coniferous dominated)	26.38	0.32%
Forest – mixed (deciduous dominated)	19.78	0.24%
Industrial	105.92	1.27%
Major Roadway	8.44	0.10%
Natural lakes	4.33	0.05%
Other urban or built-up land	280.66	3.37%
Recreational land	139.15	1.67%
Residential, high density, multiple dwelling	180.64	2.17%
Residential, rural, single unit	837.82	10.05%
Residential, single unit, low density	234.74	2.82%
Residential, single unit, medium density	647.52	7.77%
Stormwater Basin	42.00	0.50%

Land Use Categories	Acres	Percent
Streams and Canals	12.65	0.15%
Tidal rivers, inland bays, and other tidal waters	68.27	0.82%
Transitional areas	122.23	1.47%
Transportation/Communications/Utilities	46.77	0.56%
Wetlands – agricultural (modified)	824.63	9.89%
Wetlands – disturbed wetlands (modified)	24.60	0.30%
Wetlands – former agricultural (becoming shrubby, not built-up)	23.13	0.28%
Wetlands – freshwater tidal marshes	90.07	1.08%
Wetlands – herbaceous	50.04	0.60%
Wetlands – managed in maintained greenspace (modified)	13.93	0.17%
Wetlands – managed in recreation area (modified)	8.15	0.10%
Wetlands – rights-of-way (modified)	23.31	0.28%
Wetlands – scrub/shrub (coniferous)	0.81	0.01%
Wetlands – scrub/shrub (deciduous dominated)	26.14	0.31%
Wetlands – scrub/shrub (deciduous)	62.22	0.75%
Wetlands – scrub/shrub (mixed - coniferous dominated)	4.52	0.05%
Wetlands – wooded (coniferous dominated)	1.78	0.02%
Wetlands – wooded (deciduous dominated)	10.40	0.12%
Wetlands – wooded (deciduous)	942.38	11.31%
Total Land Cover	**8,335.75**	100.00%

Source: NJDEP, DVRPC, 2002 data, released 2006

Source: DVRPC

Developed land, mostly consisting of single-family homes, is the largest land use, closely followed by agriculture, in Lumberton Township.


Map 3:
NJDEP Land Cover (2002)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Mount Holly Bypass
Chestnut St
Bobby's Run Blvd
Municipal Road
Smithville Rd
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bridge Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Bella Rd
Ark Rd
Stacy Haines Rd
Country Club Rd
Southwest Branch Rancocas Creek
Little Creek
537
691
38
640
641
612
674
636
686
541
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
Agriculture
Barren Land
Developed
Forest
Water
Wetlands

NATURAL RESOURCES

PHYSIOGRAPHY

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by four physiographic provinces. The rocky terrain of the Appalachian Province is at one extreme and the sands of the coast are at the other. Lumberton Township is located in the Atlantic Coastal Plain, the most southerly of these four provinces in New Jersey.

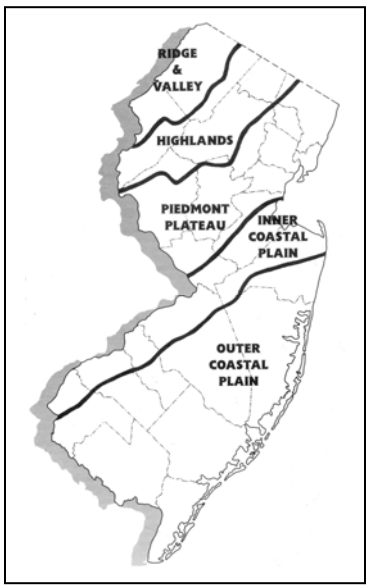


Figure 1: The Physiographic Regions of New Jersey

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. 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 Period, 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. In Burlington County the hills can be identified between Arney's Mount in Springfield Township and Big Hill in Southampton Township. The Inner Coastal Plain lies to the west of the band of hills and the Outer Coastal Plain lies to the east.

Lumberton Township is almost entirely within the Inner Coastal Plain, but rock fragments dating from both the Cretaceous and Cenozoic periods are present in the sands, gravels, and clay that comprise the township's topmost surface layer. Most of the township's soils are generally regarded as agriculturally productive. While most of Lumberton has good agricultural soils, a few miles to the east the soils become considerably sandier as the landscape begins to transition into the Pine Barrens.

TOPOGRAPHY

Lumberton Township's position along the Rancocas Creek has given it a divided character. The landscape is heavily dominated by wetlands along the creek as well as between smaller tributaries. The valleys of the Rancocas Creek and its numerous tributaries bisect the gently rolling upland. The highest elevations in the township approach 60 feet above sea level and occur in several areas of residential development. The lowest point is found along the banks of the main branch of Rancocas Creek immediately south of Landing Street at 10 feet above sea level.

The upland area is characterized by rich soils that once supported extensive mixed deciduous forests. Today, Lumberton's upland forests are dominated by beech, oak, maple, and birch trees. Along the river valleys are freshwater wetlands and wet forests of sweet gum and red maple. The streams are relatively flat, as in all of southern New Jersey, with mostly muddy and/or sandy bottoms, although the bottoms of some stream segments are lined with small rounded rocks and pebbles.

Source: DVRPC

Lumberton's landscape is accentuated by rolling hills and agricultural land uses.

Steep Slopes

A significant portion of Lumberton Township has slopes greater than 10% (the percent of vertical rise to horizontal distance). The steepest slopes are very steep indeed – up to 40% in some cases. Steep slopes are found almost entirely along the waterways of the township, including a variety of the smaller streams, and especially the south sides of Rancocas Creek's main branch and southwest branch. Most of these slopes are well vegetated, although farm fields and residential properties may extend to the edge of the plateau. In some locations, development has occurred on more moderate slopes, particularly the older residential neighborhoods near Creek Road and Chestnut Street. In many areas, buildings have been constructed on steep slopes or in floodplains.

In general, development of steep slope areas is inadvisable because it can result in soil instability, erosion, sedimentation of the stream below, increased stormwater runoff, and flooding. This causes habitat destruction, and potential damage to property. Erosion on steep slopes is especially prevalent where excessive tree removal has taken place.

Where steep slopes remain forested, some very old trees can be found in Lumberton Township. No detailed inventory of these sites exists at present, although some of the Lumberton endangered plant records from the state's Natural Heritage Database (see **Appendix D**) are from these habitats. Some regions have been negatively affected by fertilizers from adjoining farm fields, by runoff from development, or by recent flooding, but there may still be sites that are intact. Lumberton's steep slopes are depicted on **Map 4: Steep Slopes** on page 16.

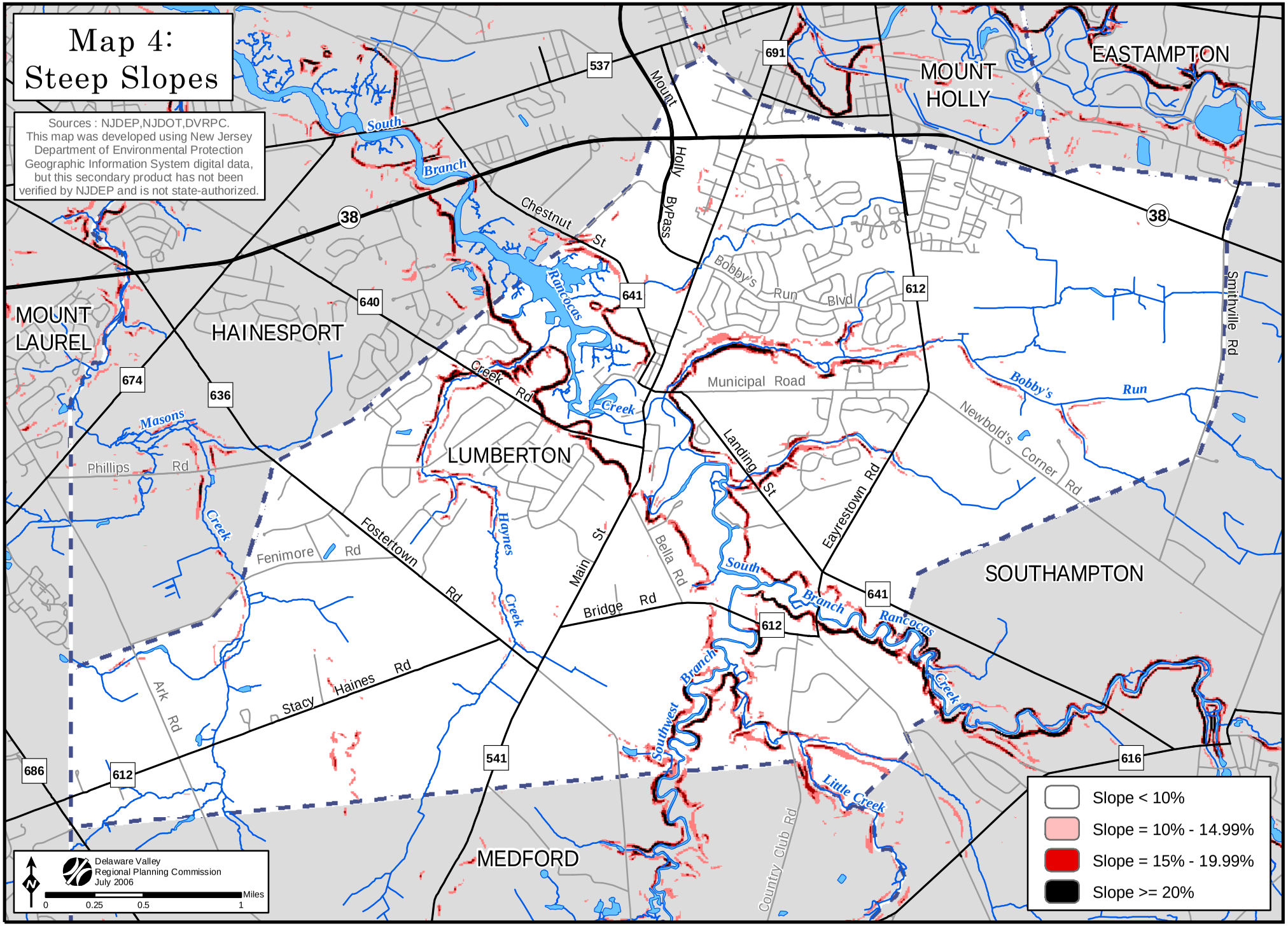
SOILS

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

Lumberton Township soils consist of 14 series types and 39 variations within those series (excluding water) as identified by the US Department of Agriculture's Natural Resources Conservation Service. These are listed in *Table 4: Lumberton Township Soils* and shown on **Map 5: Soils.**

Lumberton's soils are rich in agricultural value. The most abundant of all soils in Lumberton Township are those classified as Prime Farmland (P-1), which occupies 68% (5,624 acres) of the land surface. 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.

About 15% (1,239 acres) of soils in Lumberton are classified as Statewide Importance (S-1). These soils are close in quality to Prime Farmland and can sustain high yields of crops when


Map 4:
Steep Slopes
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Chestnut St
Mount Holly Bypass
Bobby's Run Blvd
Municipal Road
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bella Rd
Bridge Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Smithville Rd
Stacy Haines Rd
Ark Rd
Southwest Branch Rancocas Creek
Little Creek
Country Club Rd
537
691
38
640
674
636
612
641
541
686
616
Slope < 10%
Slope = 10% - 14.99%
Slope = 15% - 19.99%
Slope >= 20%
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1

correctly managed under favorable conditions. Farmland of Local Importance (L-1), which consists of soils that can support the production of high value, regional crops like horticultural crops or indigenous foods occupy less than 1% of Lumberton's land. The great majority of Lumberton's soils are valuable and rich farmland soils. See *Table 3: Agricultural Values for Lumberton Soils* for the acreage of each of these classes of farmland. See also **Map 6: Agricultural Quality of Lumberton Soils** for a visual depiction.

Table 3: Agricultural Values for Lumberton Soils

Designation	Type	Area (Acres)	Percent
P-1	Prime Farmland	5,623.50	68.28%
S-1	Statewide Importance	1,239.10	15.04%
L-1	Local Importance	33.4	0.41%
Other Soil	Wet soils, Pits, Steep slopes, Made land, etc.	1,296.10	15.74%
Water	Water	44	0.53%
Totals		**8,236.10**	**100.00%**

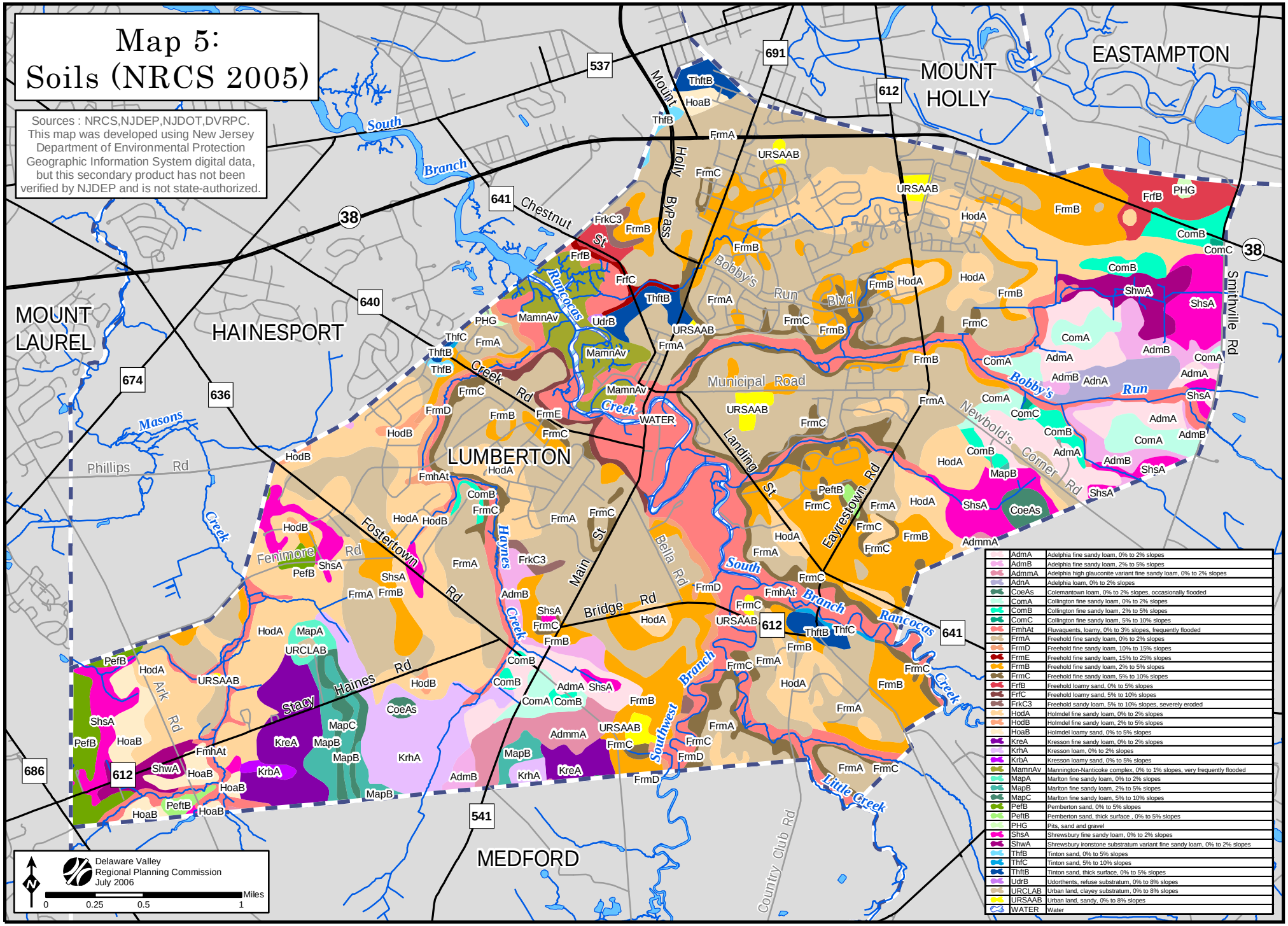
Source: NJ Farmlands Inventory, 1995 classifications; NRCS SSURGO data 2005

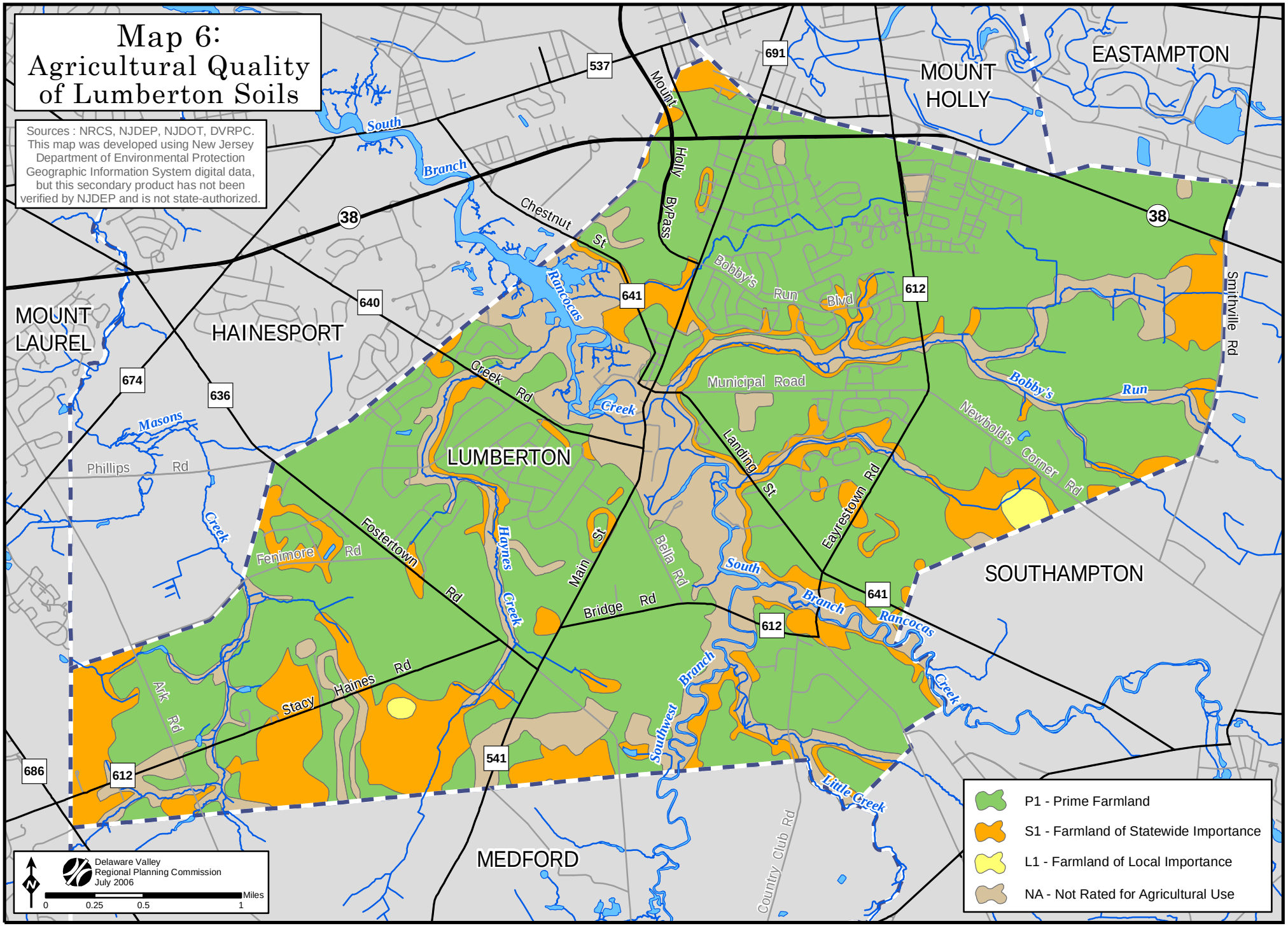
Soil Series

Several soil series appear more frequently in Lumberton Township than others, and are briefly described as follows:

Freehold Series
The most abundant soil series in Lumberton Township is the Freehold series. About 47% (3,877 acres) of Lumberton is made up of Freehold soils. These soils can be found on uplands in the coastal plains, have slopes ranging from 0 to 40%, are well-drained, moderately fertile soils formed by marine sediments containing glauconite. Found in many costal plain soils, glauconite is a maritime mineral that enhances soil fertility. Except for steep areas, Freehold soils support the growth of fruits, vegetables, grain, hay, pasture, nursery plants, and cultivated sod. They are designated as being prime farmlands and farmlands of statewide importance. In Lumberton, Freehold series soils can be found in the center portion of the township, from the northern border to the southern border on both sides of the South Branch of the Rancocas Creek. Freehold soils can often be found near soils from the Collington, Holmdel, Adelphia, and Tinton families. (Capability Units: I, II, III, IV, and VI)

Holmdel Series
Roughly 17% (1,377 acres) of the soils in Lumberton Township are from the Holmdel series. The Holmdel series ranges from moderately well drained to somewhat poorly drained loamy and sandy soils formed from marine deposits. The fertility of Holmdel soils is moderate to moderately high. All variants of the Holmdel series present in Lumberton Township are


Map 5:
Soils (NRCS 2005)
Sources : NRCS,NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
MEDFORD
South Branch Rancocas Creek
Mount Holly Bypass
Chestnut St
Bobby's Run Blvd
Municipal Road
Smithville Rd
Newbold's Corner Rd
Eayrestown Rd
Landing St
Main St
Bella Rd
Bridge Rd
Haines Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Creek Rd
Masons Creek
Ark Rd
Stacy Haines Creek
Haynes Creek
Southwest Branch Rancocas Creek
Little Creek
Country Club Rd
537
691
612
641
38
640
674
636
686
541
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
AdmA Adelphia fine sandy loam, 0% to 2% slopes
AdmB Adelphia fine sandy loam, 2% to 5% slopes
AdmmA Adelphia high glauconite variant fine sandy loam, 0% to 2% slopes
AdnA Adelphia loam, 0% to 2% slopes
CoeAs Colemantown loam, 0% to 2% slopes, occasionally flooded
ComA Collington fine sandy loam, 0% to 2% slopes
ComB Collington fine sandy loam, 2% to 5% slopes
ComC Collington fine sandy loam, 5% to 10% slopes
FmhAt Fluvaquents, loamy, 0% to 3% slopes, frequently flooded
FrmA Freehold fine sandy loam, 0% to 2% slopes
FrmD Freehold fine sandy loam, 10% to 15% slopes
FrmE Freehold fine sandy loam, 15% to 25% slopes
FrmB Freehold fine sandy loam, 2% to 5% slopes
FrmC Freehold fine sandy loam, 5% to 10% slopes
FrfB Freehold loamy sand, 0% to 5% slopes
FrfC Freehold loamy sand, 5% to 10% slopes
FrkC3 Freehold sandy loam, 5% to 10% slopes, severely eroded
HodA Holmdel fine sandy loam, 0% to 2% slopes
HodB Holmdel fine sandy loam, 2% to 5% slopes
HoaB Holmdel loamy sand, 0% to 5% slopes
KreA Kresson fine sandy loam, 0% to 2% slopes
KrhA Kresson loam, 0% to 2% slopes
KrbA Kresson loamy sand, 0% to 5% slopes
MamnAv Mannington-Nanticoke complex, 0% to 1% slopes, very frequently flooded
MapA Marlton fine sandy loam, 0% to 2% slopes
MapB Marlton fine sandy loam, 2% to 5% slopes
MapC Marlton fine sandy loam, 5% to 10% slopes
PefB Pemberton sand, 0% to 5% slopes
PeftB Pemberton sand, thick surface , 0% to 5% slopes
PHG Pits, sand and gravel
ShsA Shrewsbury fine sandy loam, 0% to 2% slopes
ShwA Shrewsbury ironstone substratum variant fine sandy loam, 0% to 2% slopes
ThfB Tinton sand, 0% to 5% slopes
ThfC Tinton sand, 5% to 10% slopes
ThftB Tinton sand, thick surface, 0% to 5% slopes
UdrB Udorthents, refuse substratum, 0% to 8% slopes
URCLAB Urban land, clayey substratum, 0% to 8% slopes
URSAAB Urban land, sandy, 0% to 8% slopes
WATER Water


Map 6:
Agricultural Quality
of Lumberton Soils
Sources : NRCS, NJDEP, NJDOT, DVRPC.
This map was developed using New Jersey
Department of Environmental Protection
Geographic Information System digital data,
but this secondary product has not been
verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
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Municipal Road
Smithville Rd
Creek Rd
Masons Creek
Phillips Rd
Fostertown Rd
Fenimore Rd
Haynes Creek
Main St
Bella Rd
Bridge Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Ark Rd
Stacy Haines Rd
Southwest Branch
Little Creek
Country Club Rd
P1 - Prime Farmland
S1 - Farmland of Statewide Importance
L1 - Farmland of Local Importance
NA - Not Rated for Agricultural Use
Delaware Valley
Regional Planning Commission
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1

considered prime farmland by the State of New Jersey. These soils allow for the production of corn, soybeans, small grains, hay, pasture, fruit, vegetables, and nursery plants. The native vegetation in the Holmdel series is forest consisting of red, white, and scarlet oak; yellow poplar; beech; and hickory. In Lumberton, the Holmdel series soils can be found in the northeast and southwest portions of the township. There are also scattered concentrations of Holmdel soils in the south and southeast portions of the township. The soils most closely associated with the Holmdel series include the Adelphia, Freehold, Kresson, Collington, Colemantown, and Marlton series. (Capability Units: II, III)

Fluvaquent Series

The third most common soil type in Lumberton Township is the Fluvaquent series, which accounts for close to 10% (818 acres) of the township's total area. The Fluvaquent series can be found in the center and eastern portions of the township along the South Branch of the Rancocas Creek and Bobby's Run. The Fluvaquent series are not good agricultural soils.

Adelphia Series

Seven percent (571 acres) of Lumberton Township's soils are of the Adelphia series. This series consists of soils with a loamy composition containing moderate amounts of glauconite. Adelphia series soils have a moderate concentration of organic matter and are moderately high in their natural fertility. Crops grown on Adelphia series soils include small grains, corn, soybeans, hay, pasture, tomatoes, potatoes, fruit, nursery stock, and sod. Adelphia series soils have been designated as prime farmland by the State of New Jersey, although much of the Adelphia soils in New Jersey have been urbanized. In Lumberton, the Adelphia series soils can be found in the far eastern portion of the township, near Bobby's Run. There are also pockets of Adelphia soils in the southern portion of the township. The Adelphia series soils are most closely associated with Colemantown, Collington, Freehold, Kresson, Shrewsbury, Tinton, and Marlton series soils. (Capability Units: II)

Shrewsbury Series

The fifth most abundant soil series in Lumberton Township is the Shrewsbury series, which forms 5% (398 acres) of the township's soils. Shrewsbury series soils consist of nearly level, wet, mottled gray soils. The soils drain poorly and occur in low topographic positions where

Capability Units

I – Soils have few limitations that restrict their use.

II – Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

III – Soils have severe limitations that reduce the choice of plants, require very careful management, or both.

IV – Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

V – Soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat.

VI – Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

VII – Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.

VIII – Soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to aesthetic purposes.

Source: Burlington County Soil Conservation District

they receive much surface water from the slopes above. In their natural condition the soils are moderately permeable, moderately fertile, moderately high in organic material, and saturated for six to eight months out of the year. As a result, these areas are prone to flooding. However, when Shrewsbury soils are drained they have a high available water capacity and can support the cultivation of corn, soybeans, small grains, hay, pasture, turf grass, and, in some areas, blueberries and vegetables. Soils from the Shrewsbury series have been designated by New Jersey as farmlands of statewide importance. In Lumberton, Shrewsbury soils are located primarily in the far eastern portion of the township, along the border of Southampton and Lumberton. Shrewsbury soils are most commonly associated with Adelphia, Collington, Holmdel, Freehold, and Tinton series soils. (Capability Units: III, IV)

Source: DVRPC

More than 68% of Lumberton's soils are rated as Prime Farmland, supporting most types of intensive agriculture and easily developed for residential use.

Kresson Series

Kresson series soils constitute nearly 5% (379 acres) of Lumberton Township's area. The Kresson series consists of somewhat poorly drained soils that contain large amounts of glauconite. The clayey consistency of Kresson soils gives them a high natural fertility, well suited for agricultural activity. The loamy sand substrate of the Kresson series is used for the cultivation of vegetables, corn, soybeans, small grains, hay, and pasture. However, the fine sandy loam and loam soils are difficult to work because the period of optimum moisture is so short that they are either too wet or too dry most of the time. The wooded areas containing Kresson series soils in Lumberton Township are populated with sweet gum, red maple, white oak, and yellow poplar trees. However, most areas in Lumberton Township containing Kresson

series soils have become urbanized. Kresson series soils can be found in the southern portion of the township along Lumberton's border with Medford Township. The soils closely associated with the Kresson series are the Adelphia, Colemantown, Collington, Freehold, and Marlton series. (Capability Unit: III)

Collington Series

The seventh most common soil family in Lumberton Township is the Collington series. This series contains 3% (254 acres) of the total township soil area. The Collington series soils are well-drained loamy soils that contain fair amounts of clay, especially in the subsoil. The Collington series occurs in high topographic positions and has slopes of as much as 10%. Collington soils have high organic matter content and a moderately high natural fertility. They are well suited for agricultural usage, especially the growth of fruits, vegetables, corn, small grains, soybeans, hay, and pasture. Historically, most potatoes grown in Burlington County have been raised in Collington soils. The natural vegetation that occurs in Collington soils is hardwood forest that consists of red oak, yellow poplar, hickory, ash, beech, with viburnums in the underbrush. However, most areas with Collington series soils have been urbanized. In Lumberton, the Collington series soils are located in the east at the split of Bobby's Run with an unnamed tributary and, in the south, along Haynes (or Haines) Creek of the South Branch of the Rancocas Creek that runs parallel to Main Street (County Route 541). The soils that are most closely associated with the occurrence of the Collington series are the Adelphia, Freehold, Holmdel, and Marlton series. (Capability Units: I, II, III)

Marlton Series

Marlton Series soils comprise roughly 2% (158 acres) of Lumberton Township's area. This series consists of nearly level to sloping, moderately well-drained and well-drained soils. Marlton series soils usually occur in high topographic positions. Marlton soils are not the best-suited series for agricultural usage. They tend to be either too wet or too dry to produce the desired yield. However, Marlton soils have been used to grow corn, tomatoes, soybeans, hay, and pasture. The native vegetation for the Marlton series is hardwood forest consisting of red, white, and willow oak; hickory; yellow poplar; ash; beech; red cedar; and Virginia pine. In Lumberton, Marlton series soils can be found in the southwestern portion of the township near Mason's Creek and Stacy Haines Road (County Route 612). The soils most commonly associated with the Marlton series are the Adelphia, Colemantown, Collington, Freehold, and Kresson series. (Capability Units: II, III)

Mannington-Nanticoke Series

Comprising roughly 2% (143 acres) of Lumberton's land, the Mannington-Nanticoke soil series is the ninth most common soil typology in the township. The Mannington-Nanticoke soil series is a soil formed by silty and loamy alluvial sediments underlain by a sequence of organic and mineral layers. This series is found in wetland areas located in the coastal plains of New Jersey. Until 1995, this soil series was mapped as tidal marsh/freshwater marsh miscellaneous land type. In Lumberton, Mannington-Nanticoke series soils can be found in the north/northwestern portion of the township where the tributaries of the South Branch of the Rancocas Creek meet before heading toward its junction with the North Branch. Since the Mannington-Nanticoke series is a wetland soil, it is very poorly drained. This series is not used for agricultural purposes and

supports mainly a wetland wildlife habitat. The most common vegetation includes arrow arum, sweet flag, spatterdock, and pickerelweed.

Tinton Series

The tenth most common soil typology in Lumberton Township, comprising 1% (108 acres) of the land, is the Tinton Series. These soils are well drained, ranging from gently to strongly sloping soils that have a thick sandy surface layer over glauconitic fine, sandy loam subsoil. The sandy surface layer is loose and subject to soil blowing and erosion. The Tinton soils are also known for their low organic matter content and low natural fertility. Agriculture is difficult and of limited productivity in Tinton soils. The most successful crops are pumpkins, cantaloupes, grapes, peaches, and sweet potatoes. However, these crops need the constant application of fertilizer and heavy irrigation to ensure their survival. Hardwood forest species such as oaks, hickories, and Virginia pines are the most common native vegetation found in the Tinton soil series. In Lumberton, the Tinton series soils can be found in small patches throughout the southern portion of the township and in one patch along the northern portion of the Lumberton section of the South Branch of the Rancocas Creek. The soils most commonly associated with the Tinton Series are the Adelphia, Collington, Freehold, and Shrewsbury soil series. (Capability Units: III, IV)

Table 4: Lumberton Township Soils

Soil Type	Soil Name	Acreage	Percentage of All Acres	Designation
AdmA	Adelphia fine sandy loam, 0 to 2 percent slopes	270.2	3.25%	P-1
AdmB	Adelphia fine sandy loam, 2 to 5 percent slopes	148.2	1.78%	P-1
AdmmA	Adelphia high glauconite variant fine sandy loam, 0 to 2 percent slopes	90.3	1.08%	N/A
AdnA	Adelphia loam, 0 to 2 percent slope	62.5	0.75%	P-1
Coes	Colemantown loam, 0 to 2 percent slopes, occasionally flooded	33.4	0.40%	L-1
ComA	Collington fine sandy loam, 0 to 2 percent slopes	138.9	1.67%	P-1
ComB	Collington fine sandy loam, 2 to 5 percent slopes	108.9	1.31%	P-1
ComC	Collington fine sandy loam, 5 to 10 percent slopes	6.1	0.07%	S-1
Fmht	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	817.6	9.82%	N/A
FrfB	Freehold loamy sand, 0 to 5 percent slopes	94	1.13%	P-1
FrfC	Freehold loamy sand, 5 to 10 percent slopes	16.8	0.20%	S-1
FrkC3	Freehold sandy loam, 5 to 10 percent slopes, severely eroded	27.3	0.33%	N/A
FrmA	Freehold fine sandy loam, 0 to 2 percent slopes	2388.4	28.69%	P-1
FrmB	Freehold fine sandy loam, 2 to 5 percent slopes	916.5	11.01%	P-1
FrmC	Freehold fine sandy loam, 5 to 10 percent slopes	337.9	4.06%	S-1
FrmD	Freehold fine sandy loam, 10 to 15 percent slopes	66.6	0.80%	N/A
FrmE	Freehold fine sandy loam, 15 to 25 percent slopes	29.6	0.36%	N/A
HoaB	Holmdel loamy sand, 0 to 5 percent slopes	109	1.31%	P-1
HodA	Holmdel fine sandy loam, 0 to 2 percent slopes	1243.7	14.94%	P-1
HodB	Holmdel fine sandy loam, 2 to 5 percent slopes	24.6	0.30%	P-1

Soil Type	Soil Name	Acreage	Percentage of All Acres	Designation
KrbA	Kresson loamy sand, 0 to 5 percent slopes	10.8	0.13%	S-1
KreA	Kresson fine sandy loam, 0 to 2 percent slopes	169.7	2.04%	S-1
KrhA	Kresson loam, 0 to 2 percent slopes	198.4	2.38%	S-1
Mamnv	Mannington-Nanticoke complex, 0 to 1 percent slopes, very frequently flooded	142.6	1.71%	N/A
MapA	Marlton fine sandy loam, 0 to 2 percent slopes	20.6	0.25%	P-1
MapB	Marlton fine sandy loam, 2 to 5 percent slopes	98	1.18%	P-1
MapC	Marlton fine sandy loam, 5 to 10 percent slopes	39.1	0.47%	N/A
PefB	Pemberton sand, 0 to 5 percent slopes	83.9	1.01%	S-1
PeftB	Pemberton sand, thick surface, 0 to 5 percent slopes	17.3	0.21%	S-1
PHG	Pits, sand, and gravel	8.8	0.11%	N/A
Shs	Shrewsbury fine sandy loam, 0 to 2 percent slopes	290.6	3.49%	S-1
Shsr	Shrewsbury	107.3	1.29%	N/A
ThfB	Tinton sand, 0 to 5 percent slopes	15.5	0.19%	S-1
ThfC	Tinton sand, 5 to 10 percent slopes	7.3	0.09%	S-1
ThftB	Tinton sand, thick surface, 0 to 5 percent slopes	84.8	1.02%	S-1
Udz	Udorthents, refuse substratum	2.7	0.03%	N/A
URCOB	Urban land	1.7	0.02%	N/A
USD	Urban land	47.7	0.57%	N/A
USF	Urban land	5.1	0.06%	N/A
Water	Water	44	0.53%	N/A
Total		**8,326.2**	**100.00%**	

Explanation of Designations

P–1	Prime Farmland
S–1	Statewide Importance
L–1	Local Importance
NA	Land not appropriate for farming, e.g. eroded, very steep slopes, pits, permanently wet soils, water, etc.

Source: NJDEP (2005) based on data from USDA and NRCS

Soil characteristics can severely restrict the use of sites for construction and development. *Table 5: Soil Limitations for Development* records the soils and their possible limitations for building foundations and septic systems. As indicated in the table, the township has some soils that are severely limited for on-site septic systems. Septic systems require soils that have a low water table (five feet or more from the surface) and high permeability to allow for proper drainage of wastewater. Soils with high water tables (five feet or less from the surface) create a potential for erosion, wet basements, and low permeability, often allowing wastewater to collect near the surface.

Table 5: Soil Limitations for Development

Soil Series	Soil Codes	Acres	Building without Basement	Building with Basement	Septic Systems
Adelphia	AdmA, AdmB, AdmmA, AdnA	571.2	B	C	C
Colemantown	Coes	33.4	C	C	C
Collington	ComA, ComB, ComC	253.9	B	A	C
Fluvaquent	Fmht	817.6	C	C	C
Freehold	FrfB, FrfC, FrkC3, FrmA, FrmB, FrmC	3780.9		A	C
Freehold	FrmD	66.6	B	B	C
Freehold	FrmE	29.6	C	C	C
Holmdel	HoaB, HodA, HodB	1377.3	B	C	C
Kresson	KrbA, KreA, KrhA	378.9	C	C	C
Mannington-Nanticoke	Mamnv	142.6	C	C	C
Marlton	MapA, MapB, MapC	157.7	B	B	B
Pemberton	PefB, PeftB	101.2	A	C	C
Pits, Sand and Gravel	PHG	8.8	A	A	C
Shrewsbury	Shs, Shsr	397.9	C	C	C
Tinton	ThfB, ThfC, ThftB	107.6	A	A	C
"U" Series	Udz, URCOB, USD, USF	57.2	NA	NA	NA
Water	Water	44	NA	NA	NA
Total		**8,326.4**			

Key to Land Use Implications	
A = Slight.	Little or no limitation(s) or easily corrected by use of normal equipment and design techniques.
B = Moderate.	Presence of some limitations, which normally can be overcome by careful design and management at somewhat greater cost.
C = Severe.	Limitations that normally cannot be overcome without exceptional, complex, or costly measures.

NJDEP (2005) based on data from USDA and NRCS

CLIMATE

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

The National Climate Data Center (NCDC) operates 19 stations in Burlington County, but none are in Lumberton Township. The Office of the State Climatologist operates two stations near

Lumberton; one in Moorestown Township and another in Pemberton Township. The annual mean temperatures as recorded by the State Climatologist stations are 47.9°F and 49°F, respectively.

Climate also varies within distinctive climate zones found throughout the state, including: the ridges and valleys, the highlands, the central Piedmont Plateau, the Inner Coastal Plain, and the Outer Coastal Plain. Lumberton Township is entirely within the Inner Coastal Plain, though Burlington County extends east into the Pine Barrens, in the Outer Coastal Plain. The soils in the Outer Coastal Plain are sandier and exhibit a strong radiational cooling after sunset.

In the past several years, Lumberton has experienced severe flooding during long periods of severe storms. These storm events are detailed within the *Environmental Issues* section, on page 85.

SURFACE WATER RESOURCES

All of Lumberton's land drains ultimately to the Delaware River. A majority of the land surface drains to the South Branch of the Rancocas Creek that flows through the center of the township. The far southern portion of the township drains into the Southwest Branch of the South Branch of the Rancocas Creek. Small portions of the northernmost reaches of Lumberton Township drain into the North Branch of the Rancocas Creek.

Watersheds

A watershed is all the land that drains to a particular waterway such as a river, stream, lake, or wetland. The high points in the terrain, such as hills and ridges, define the boundaries of a watershed. Large watersheds are made up of a succession of smaller ones, and smaller ones are made up of the smallest area – the catchment area of a local site. So, for example, the Delaware River watershed is made up of many smaller watersheds, such as the Rancocas Creek watershed which, in turn, consists of smaller watersheds such as the Rancocas South Branch. The Rancocas South Branch watershed is formed of several subwatersheds, consisting of the land that drains to a major tributary or branch of the creek, such as the Bobby's Run subwatershed. These subwatersheds can be further subdivided into smaller ones, each surrounding 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.

Rancocas Creek Watershed

The Rancocas Creek Watershed is the largest watershed in south-central New Jersey, and is composed of the Main Stem of the Rancocas Creek, the North Branch, the South Branch, and the Southwest Branch. Portions of Burlington, Camden, and Ocean counties, and approximately 25 municipalities (fully or in part) are included in this watershed, which covers 360 square miles,

and reaches deep into the Pinelands. The entire Rancocas watershed has been designated by NJDEP as one of 20 Watershed Management Areas (WMAs) in New Jersey. The Rancocas is WMA 19. According to DVRPC's 2000 land use data, over 40% of WMA 19 was covered by forest, 30% was developed land, and 17% was devoted to agricultural use including cranberry cultivation. All of Lumberton Township (more than 13 square miles) is within the Rancocas Creek watershed.

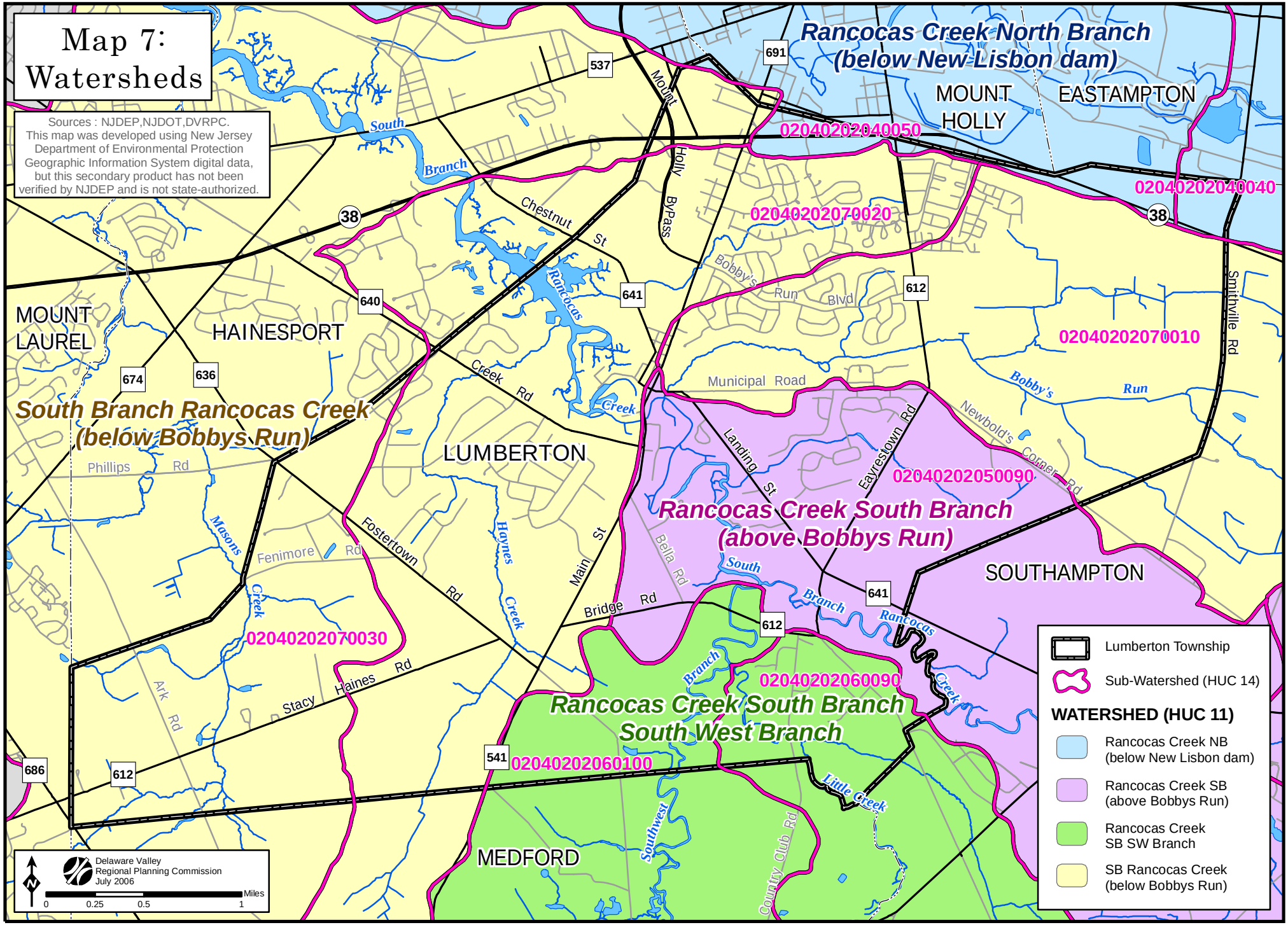
Source: DVRPC

A view of the Rancocas Creek South Branch as it passes underneath the bridge at Main Street.

The creek's headwaters start in the boggy areas of New Jersey's Pinelands, reaching from areas as spread out and diverse as Fort Dix in Plumsted Township, Ocean County, and a planned residential community in Voorhees Township, Camden County. Most of the watershed lies within Burlington County. The creek travels from these remote headwaters through Pinelands-protected areas, cranberry bogs, and agricultural lands to reach the fringe of suburbia at the border of the Pinelands boundary. From the subdivisions and shopping centers of the suburbs, the creek travels further into urbanized areas until it spills into the Delaware River between Riverside and Delanco. Along the way, the Rancocas Creek is a reappearing focal point in many of the towns and villages, especially Mount Holly, the county seat, as well as Browns Mills, Pemberton, Vincentown, Medford Lakes, Medford, and Lumberton.

A watershed as large as the Rancocas encompasses many different types of very important ecosystems. The Rancocas watershed is home to a variety of plant and animal species, wetland varieties, various types of streams with their own ecology woodland areas, and many other environmentally important areas. All of these areas are, in some way, linked to the health of the Rancocas Creek.

As one travels upstream from the Delaware River into Burlington County, the main channel of the Rancocas Creek splits into the North Branch and the South Branch at the border of Westampton and Hainesport townships, within the Rancocas State Park. Just to the east, the South Branch is joined by Mason's Creek, flowing from the south across part of Lumberton. Within Lumberton's boundaries, another stream joins the South Branch. This is the Haynes (or Haines) Creek, which crosses all of western Lumberton, flowing from Medford in the south. East of Main Street, Bobby's Run meets the South Branch. This tributary, with its headwaters in neighboring Southhampton Township, flows across the eastern half of Lumberton Township. See **Map 7: Watersheds** and **Map 8: Surface Water, Wetlands, and Vernal Pools.**


Map 7:
Watersheds
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
Rancocas Creek North Branch
(below New Lisbon dam)
02040202040050
02040202040040
02040202070020
02040202070010
South Branch Rancocas Creek
(below Bobbys Run)
02040202050090
Rancocas Creek South Branch
(above Bobbys Run)
02040202070030
02040202060090
Rancocas Creek South Branch
South West Branch
02040202060100
MOUNT HOLLY
EASTAMPTON
MOUNT LAUREL
HAINESPORT
LUMBERTON
SOUTHAMPTON
MEDFORD
Lumberton Township
Sub-Watershed (HUC 14)
WATERSHED (HUC 11)
Rancocas Creek NB (below New Lisbon dam)
Rancocas Creek SB (above Bobbys Run)
Rancocas Creek SB SW Branch
SB Rancocas Creek (below Bobbys Run)
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1

The Rancocas is a tidal stream all the way to Lumberton. Head of tide for the South Branch is at a point just west of Eayrestown Road.

Continuing upstream, the Rancocas South Branch divides again into its main stem, flowing from Southampton Township and points beyond, and the Southwest Branch, flowing from Medford Township and areas to the east and southeast. Little Creek, a tributary of the Southwest Branch, enters Lumberton Township from Southhampton Township and joins the Southwest Branch just below Bridge Road. Other large tributaries of the South Branch and the Southwest Branch outside of Lumberton are Jade Run, Burr's Mill Brook, and Bear Swamp River, all three of which drain areas of the Pinelands east and south of Lumberton. There are also many small unnamed tributaries throughout the Rancocas Creek watershed, including several in Lumberton.

Because of its large size, the Rancocas watershed is divided into seven HUC-11 watersheds.[1] Lumberton Township's land falls into four of these HUC-11 watershed units. A small part of the township, on its northern side, drains to the North Branch of the Rancocas. The land draining to the South Branch between Main Street and the eastern boundary of the township is part of the "South Branch of the Rancocas Creek (above Bobby's Run)" HUC-11 watershed, meaning that it is part of the South Branch watershed upstream from where Bobby's Run joins the South Branch. All remaining land in Lumberton draining to the South Branch and to Bobby's Run is in a separate HUC-11 – the "South Branch of the Rancocas Creek (below Bobby's Run)." The land that drains to the Southwest Branch is within its own HUC-11.

The percentage of Lumberton Township land that is in each of these four watersheds, along with the HUC-14 subwatersheds of each one, is listed in the following *Table 6*. See also **Map 7: Watersheds.**

Table 6: Watersheds in Lumberton Township

Watershed	USGS Watershed Code (HUC 11 Number)	Stream Classification	Acreage within Lumberton	Percent of Lumberton land	Subwatersheds (HUC 14 Numbers) within Lumberton
North Branch of the Rancocas Creek (below New Lisbon dam)	02040202**040**	FW2-NT	222	2.67%	02040202**040040** 02040202**040050**
South Branch of the Rancocas Creek (above Bobby's Run)	02040202**050**	FW2-NT	1,430	17.18%	02040202**050090**
South Branch of the Rancocas Creek (below Bobby's Run)	02040202**070**	FW2-NT	5,782	69.44%	02040202**070010** 02040202**070020** 02040202**070030**
Southwest Branch of the South Branch of the Rancocas Creek	02040202**060**	FW2–NT	891	10.71%	02040202**060090** 02040202**060100**

Source: NJDEP 2006

[1] "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, with the identification number for each one having 14 digits.

At one time, Rancocas Creek was navigable from the Delaware River up to Lumberton, south of Landing Street. During the 18th and 19th centuries, the creek was a transportation corridor between farming settlements, such as Vincentown, and the larger downstream communities of Delanco and Riverside.

There is little industry along the Rancocas today. Fortunately, one-third of the creek corridor is already largely preserved as parkland, preserved farms, or through conservation easements. About one-fifth of the land (or half the number of parcels) is considered developed, typically as residential, but also as commercial and industrial. There is a two-part Rancocas Greenway Plan, prepared by DVRPC in 1995 (the *Rancocas Main Stem Plan*) and in December 2002 (the *Rancocas Main Branches Greenway Plan*), that outlines detailed strategies for preservation of the stream corridor. Many of the municipalities along the Rancocas Creek have also generated open space plans and have identified stream corridor lands for preservation. In addition, Burlington County has a strong open space preservation program, and has also identified streamside lands targeted for protection.

Streams

There are a total of 30.5 stream miles flowing across Lumberton Township, nearly 19 of which are first 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.

Source: DVRPC

A view of Bobby's Run as it passes underneath Eayrestown Road.

Headwaters are of particular importance because they tend to contain a diversity of aquatic species and their condition affects downstream water quality. Because of their small size, they are highly susceptible to impairment by human activities on the land. First and second order streams are narrow and often shallow, and are characterized by relatively small base flows. This makes them subject to greater temperature fluctuations, especially when forested buffers on their banks are removed. They are also easily over-silted by sediment-laden runoff and their water quality can be rapidly degraded. In addition, first order streams are greatly affected by changes in the local water table because they are fed by groundwater sources. Headwaters are important sites for the aquatic life that is at the base of the food chain, and often serve as spawning or nursery areas for fish.

Table 7: Lumberton Township Streams

Stream Order	Miles
First Order streams (smallest)	14.26
Second Order streams	4.78
Third Order streams	3.54
Fourth Order and above streams (South Branch Rancocas Creek)	7.92
Total	**30.5**

Source: NJDEP

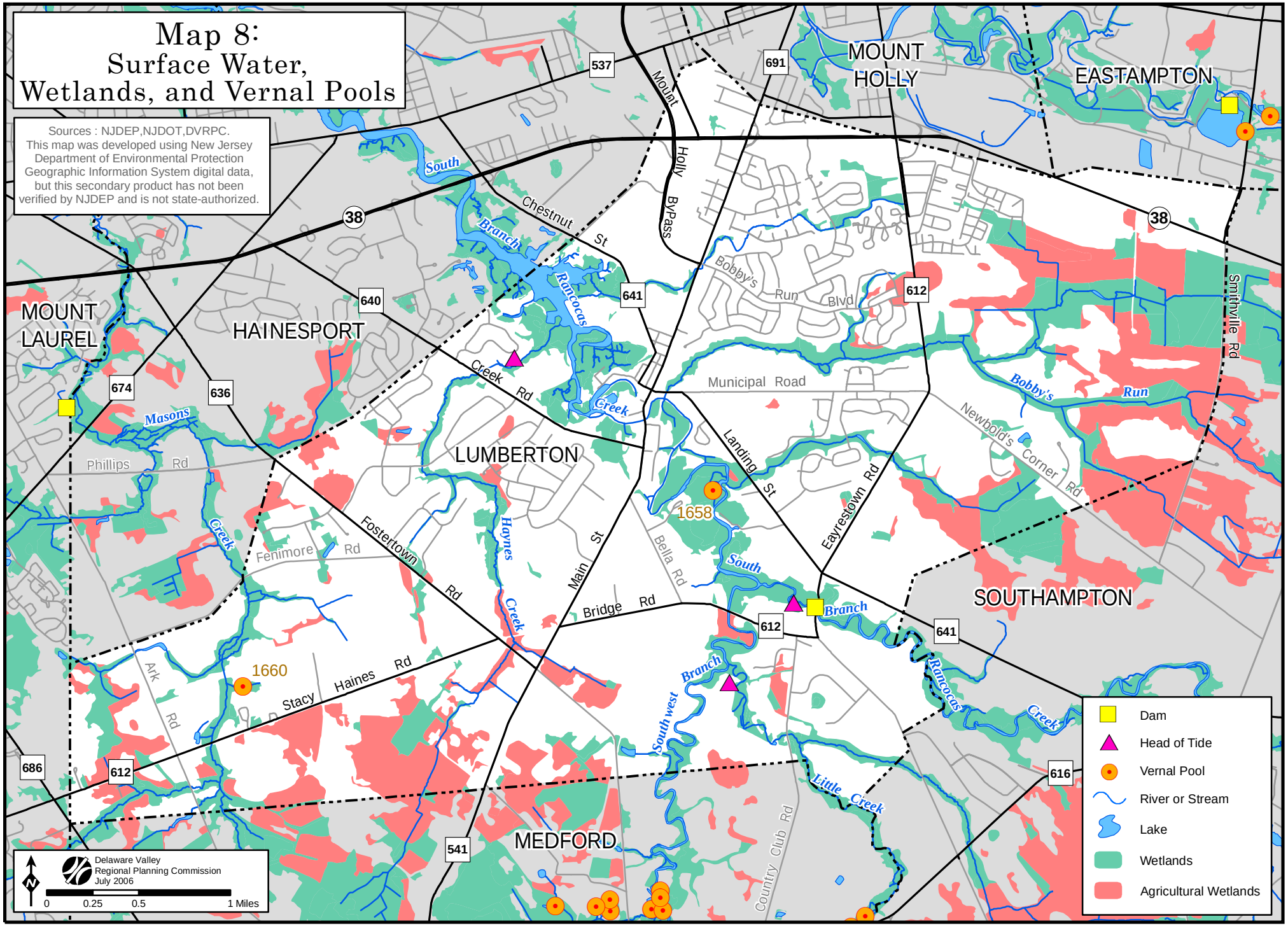
Wetlands

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

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," can determine for sure if there are freshwater wetlands on a property. An LOI verifies the presence, absence, and boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited and permits are required for most of them. Additional information on wetlands rules and permits is available through NJDEP and on its web site under "landuse." See **Sources of Information**, page 91.

All of Lumberton's wetlands are freshwater. Natural wetlands of all types total 1,189 acres within the township (14.3% of total land area), of which 955 acres are forested wetlands, 144 acres are low-growing emergent, scrub/shrub or herbaceous wetlands, and 90 acres are freshwater tidal marshes. There are three heads of tide located in Lumberton Township along Rancocas Creek's south branch, Haynes Creek, and the southwest branch. Therefore the township has a significant amount of tidal wetlands although it is completely inland. See **Map 8: Surface Water, Wetlands, and Vernal Pools**.

Lumberton also includes approximately 911 acres (about 11% of total land area) of modified or disturbed wetlands. Modified wetlands are former wetland areas that have been


Map 8:
Surface Water,
Wetlands, and Vernal Pools
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
537
691
38
640
641
612
674
636
686
541
616
Mount Holly ByPass
Chestnut St
Bobby's Run Blvd
Municipal Road
Smithville Rd
Newbold's Corner Rd
Eayrestown Rd
Landing St
Main St
Bella Rd
Bridge Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Ark Rd
Stacy Haines Rd
Country Club Rd
Creek Rd
South Branch Rancocas Creek
Masons Creek
Haynes Creek
Bobby's Run
Southwest Branch Rancocas Creek
Little Creek
1658
1660
Dam
Head of Tide
Vernal Pool
River or Stream
Lake
Wetlands
Agricultural Wetlands
Delaware Valley Regional Planning Commission
July 2006
0 0.25 0.5 1 Miles

altered by human activities and that no longer support typical wetland vegetation, or are not vegetated at all. Modified wetland areas do, however, show obvious signs of soil saturation and exist in areas shown to have hydric soils on U.S. Soil Conservation Service soil surveys. Lumberton's modified wetlands fall into the following categories: 825 acres of agricultural wetlands, 25 acres of disturbed wetlands, 23 acres of former agricultural wetlands, 16 acres of wetlands used as rights-of-way, and about 22 acres of wetlands found in maintained greenspace, lawn, or recreation area. A more detailed description of all of Lumberton's natural wetland areas is found in the *Biological Resources* section, under "Wetlands," page 60.

Source: DVRPC

Wooded wetlands create a riparian buffer along most of Rancocas Creek's riverbanks

Agricultural Wetlands

Agricultural wetlands occupy 825 acres (nearly 10% of total land area) of Lumberton Township. These "quasi-wetlands" are found in the farming areas of the township – in the eastern portion along Smithville Road, and in the southern portion near the South Jersey Regional Airport. Some smaller pockets of agricultural wetlands may have been replaced by recent residential development. Agricultural wetlands are lands under cultivation that are modified former wetland areas, but which still exhibit evidence of soil saturation in aerial infrared photo surveys. See **Map 8: Surface Water, Wetlands, and Vernal Pools**.

Agricultural wetlands were usually drained by a technique called "tile drainage." Tile drainage was a very common method of removing excess water from farm fields that exhibited one or more of the following characteristics: (1) small areas of isolated wetlands, (2) very flat land that

ponded in wet weather, (3) soils were slow to warm in the spring because of a relatively high water table, or (4) soils had a very high clay content and, therefore, drained slowly. Tile drainage was very labor intensive as it involved installing subsurface drainage pipes throughout a field at a depth of three to six feet. Tile drains were used sparingly, only where there were extremely wet spots. Therefore, the existence of tile drainage strongly indicates a natural wetland hydrology.

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

Vernal Pools

Vernal pools are bodies of water that appear following snowmelt and during spring rains, but which disappear or are dry during the rest of the year. They are highly important sites for certain rare species of amphibians. Particular types of frogs and salamanders will only breed in vernal ponds (obligate breeders), which provide their offspring with a measure of protection because the pond's impermanence prevents residence by predators of the eggs and young.

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

The New Jersey Division of Fish and Wildlife has been conducting a Vernal Pool Survey project since 2001, to identify, map, and certify vernal ponds throughout the state. Once a vernal pond is certified, regulations require that a 75-foot buffer be maintained around the pond. NJDEP's division of Land Use Regulation oversees this designation and restricts development around vernal ponds by denying construction permits. Local municipalities can provide additional protection by negotiating conservation easements on the land surrounding the pond or by instituting restrictive zoning such as passing a stream corridor protection overlay ordinance that specifically includes the vernal pools. A township can also include the pools in its official map.

The state has identified two potential vernal pools in Lumberton Township. Surveys of each pond are needed to determine what species are present and, indeed, if the pond is still in existence as a natural habitat. None of these sites had been surveyed as of November 2005.[2] See **Map 8: Surface Water, Wetlands, and Vernal Pools.**

[2] NJDEP and Rutgers Center for Remote Sensing and Spatial Analysis. http://www.dbcrssa.rutgers.edu/ims/vernal/, accessed May 2006.

Floodplains

Areas naturally subject to flooding are called floodplains, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal stream channel. The 100-year floodplain is defined as the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood that has a 1% chance of occurring in any given year).

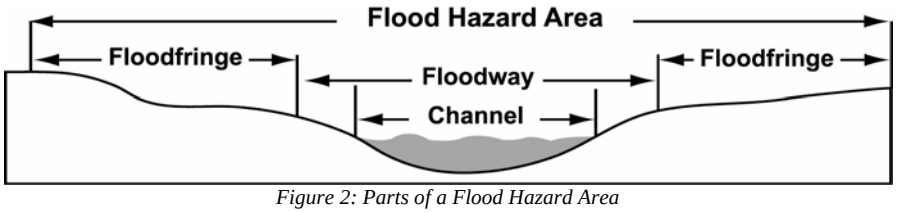


Figure 2: Parts of a Flood Hazard Area

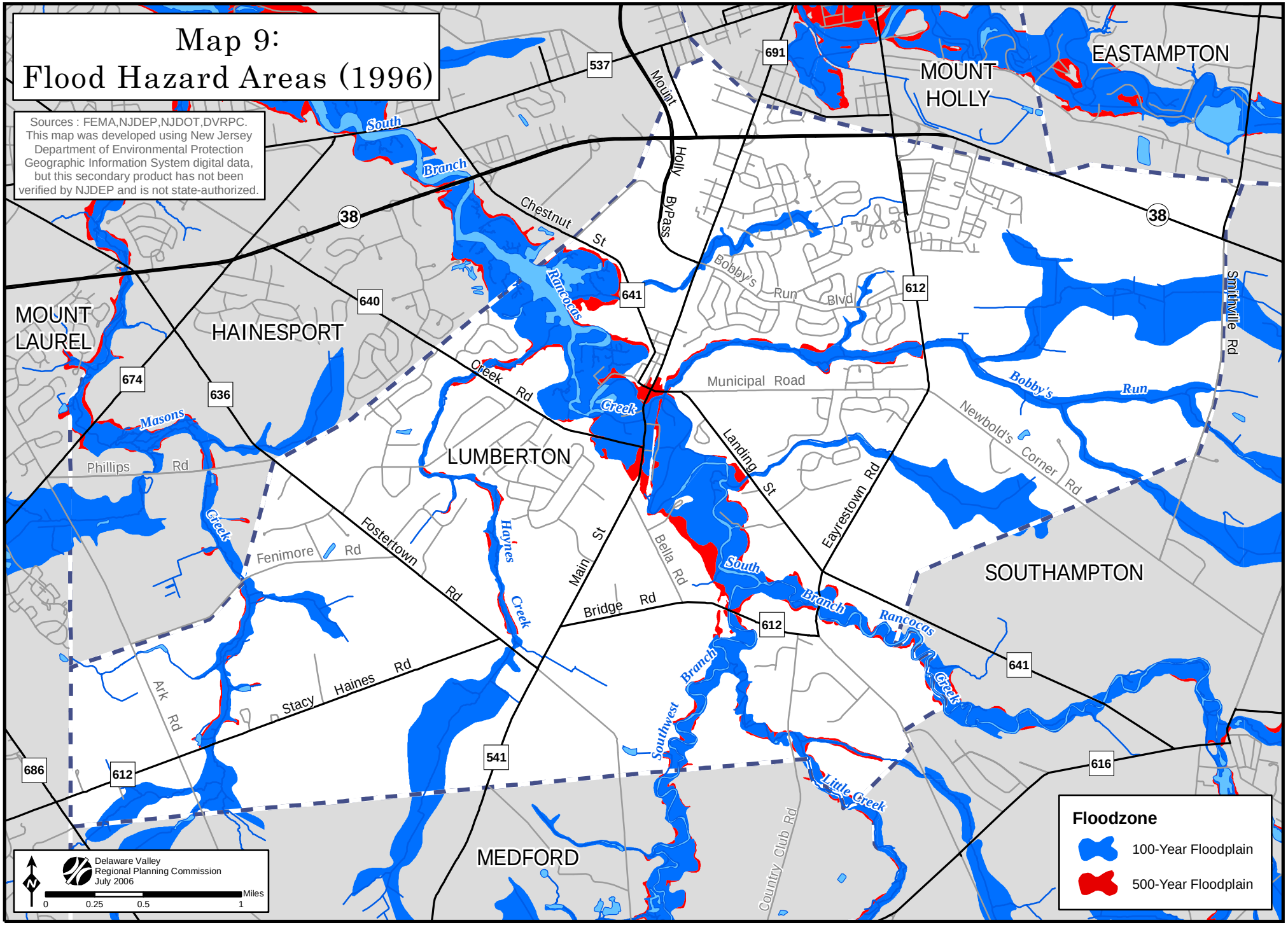
Although the terms "flood hazard area" and "100-year floodplain" denote similar concepts, NJDEP defines them in slightly different ways. New Jersey's regulations define the flood hazard area as the area inundated by a flood resulting from the 100-year discharge increased by 25%. This type of flood is called the "flood hazard area design flood" and it is the flood regulated by NJDEP.

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

Source: DVRPC

Haynes Creek is a tributary to Rancocas Creek and suffered severe flooding in the summer of 2003.

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


Map 9:
Flood Hazard Areas (1996)
Sources : FEMA,NJDEP,NJDOT,DVRPC. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Masons Creek
Haynes Creek
Bobby's Run
Bobby's Run Blvd
Municipal Road
Chestnut St
Mount Holly ByPass
Creek Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Smithville Rd
Main St
Bella Rd
Bridge Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Stacy Haines Rd
Ark Rd
Southwest Branch Rancocas Creek
Little Creek
Country Club Rd
537
691
38
640
641
612
674
636
686
541
616
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
Floodzone
100-Year Floodplain
500-Year Floodplain

the NJDEP. Additional information on floodplain activities is available from NJDEP and from its web site under "Landuse." See **Sources of Information**, page 91.

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 Lumberton by using the Federal Emergency Management Agency's (FEMA's) 100-year floodplain maps. FEMA's maps show that almost 1,302 acres, or 15.6%, of Lumberton Township's land is within the 100-year flood hazard area, and an additional 115 acres are within the 500-year flood hazard area. Nearly all of Lumberton's floodplain areas are located along Rancocas Creek's main branch, south branch, and southwest branch as well as Mason's Creek, Bobby's Run, and Little Creek. Along Rancocas Creek's main branch, the 100-year floodplain extends about one-quarter mile on either side of the creek's channel. Some of Lumberton's oldest buildings are located within this expansive floodplain. Many of the other, smaller creeks, such as Bobby's Run and Little Creek, lie in relatively steep-banked stream valleys, where the extent of the floodplains are somewhat limited, compared to other parts of Rancocas Creek. See **Map 9: Flood Hazard Areas**.

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.

The South Branch of the Rancocas Creek is classified by the NJDEP as FW2-NT, which means that it is a freshwater stream that is not trout producing or trout maintaining. The other smaller streams located in Lumberton Township, including Southwest Branch, Bobby's Run, and Mason's Creek, are also classed as FW2-NT waters. See *Table 8: Water Quality Classifications of Streams in Lumberton Township.*

Table 8: Water Quality Classifications of Streams in Lumberton Township

Streams	Classification
South Branch of the Rancocas Creek	FW 2 – NT
Bobby's Run	FW 2 – NT
Mason's Creek	FW 2 – NT
Little Creek	FW 2 – NT

Source: NJDEP

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

The determination of whether or not water quality is sufficient to meet a waterbody's designated use(s) is based on numerous 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.

NJDEP operates two water-quality monitoring networks. In cooperation with the U.S. Geological Survey (USGS), it runs the Ambient Surface Water Monitoring Network (ASWM). This network contains 115 stations that monitor for nutrients (i.e., phosphorous and nitrogen), bacteria, dissolved oxygen, metals, sediments, chemicals, and other parameters.

The second water-quality monitoring system is the Ambient Biomonitoring Network (AMNET), which is administered solely by NJDEP. It 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.

Lumberton Township Stream Water Quality

There are no sites in Lumberton Township that are part of the USGS/NJDEP Ambient Surface Water Monitoring (ASWM) network at which chemical monitoring is conducted. However, there is one site along the South Branch of the Rancocas Creek in Vincentown, Southampton Township. This site is close enough to the Lumberton border that conditions there are possibly representative immediately downstream in Lumberton. The Vincentown site was tested for dissolved oxygen, pH, ammonia, nitrogen, phosphorous, metals, and a wide range of organic and inorganic chemicals. The site was sampled 12 times between November 2000 and August 2002. The results of these samples are summarized in *Table 9: New Jersey ASWM Sampling Location near Lumberton Township.* The station location is depicted on **Map 10: Water Quality – Nontidal Waters**.

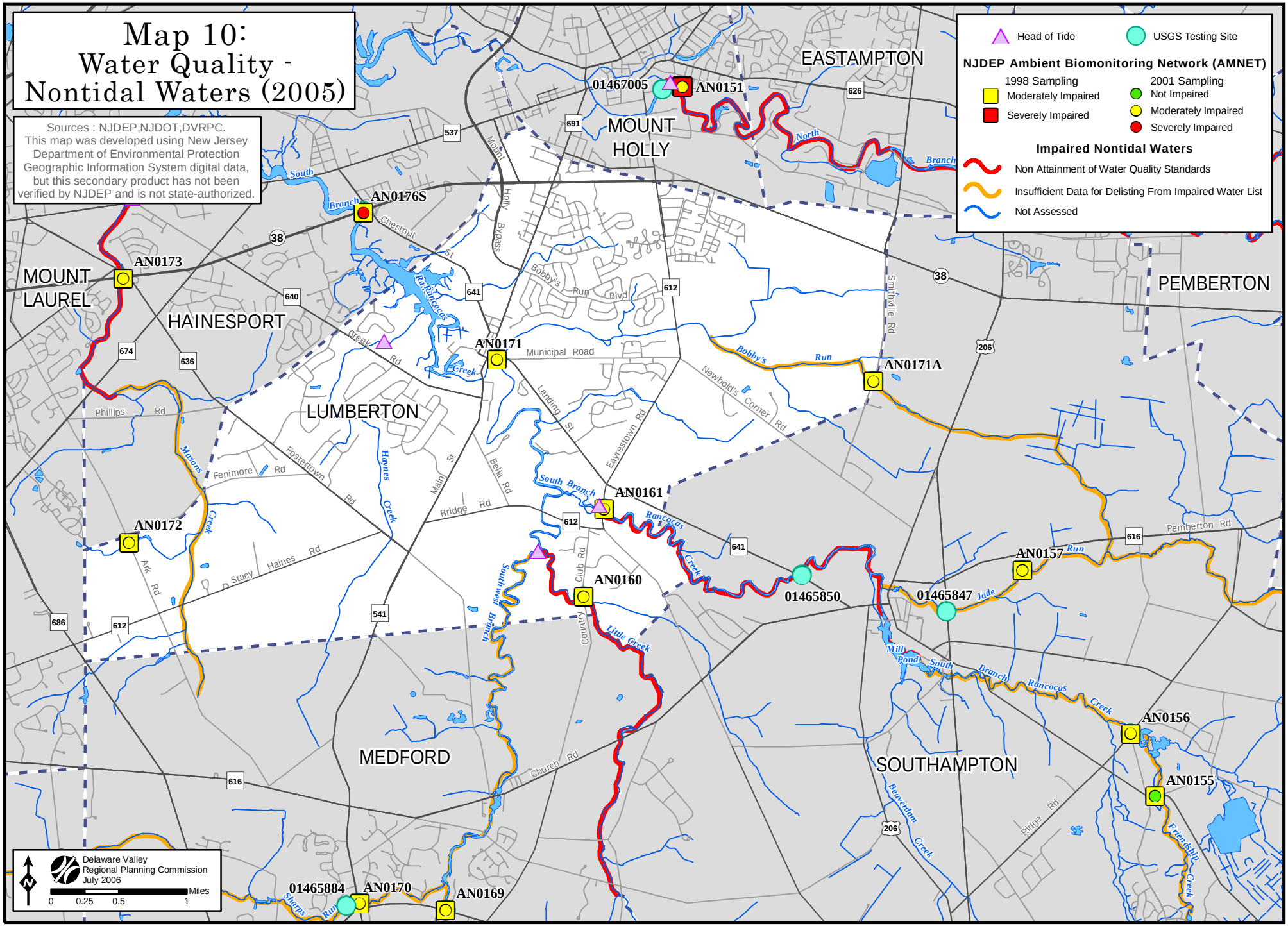
Source: DVRPC

Little Creek's water quality impairment may result from stormwater running off nearby land uses.

There are five AMNET sites that assess aquatic life within the nontidal portion of Lumberton Township's main streams, and an additional two sites downstream in other townships. NJDEP sampled each of these AMNET sites in July 1998 and again in July 2001. Each AMNET site was tested for only one water quality parameter – the diversity of the aquatic communities at that site. Specifically, the community of benthic (bottom-dwelling) macroinvertebrates (insects, worms, mollusks, and crustaceans that are large enough to be seen by the naked eye) is assessed.

In the 1998 (first round) sampling:
All five Lumberton sites were ranked as "moderately impaired" for aquatic life support. The downstream sites in Hainesport Township (AN0173 and AN0176S) were also moderately impaired.

In the 2000 – 2002 (second round) sampling:
All five "moderately impaired" 1998 Lumberton sites remained "moderately impaired" in the 2001 sampling. The impairment score of one site (AN0160) had improved between 1998 and 2001, but was not high enough to be considered "non-impaired." Two sites (AN0161 and AN0171A) received essentially the same impairment score in 2001. However, two sites (AN0171 and AN0172) both declined in impairment scores, but not enough to be considered "severely impaired." The downstream site (AN0173) in Hainesport Township also declined in impairment score, but not enough to be considered "severely impaired." The other site in Hainesport (AN0176S), which is close to Lumberton on the Rancocas South Branch, dropped


Map 10:
Water Quality -
Nontidal Waters (2005)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
Head of Tide
USGS Testing Site
NJDEP Ambient Biomonitoring Network (AMNET)
1998 Sampling
Moderately Impaired
Severely Impaired
2001 Sampling
Not Impaired
Moderately Impaired
Severely Impaired
Impaired Nontidal Waters
Non Attainment of Water Quality Standards
Insufficient Data for Delisting From Impaired Water List
Not Assessed
EASTAMPTON
MOUNT HOLLY
MOUNT LAUREL
HAINESPORT
LUMBERTON
PEMBERTON
MEDFORD
SOUTHAMPTON
01467005
AN0151
AN0176S
AN0173
AN0171
AN0171A
AN0161
AN0172
AN0160
01465850
AN0157
01465847
AN0156
AN0155
01465884
AN0170
AN0169
Municipal Road
Delaware Valley Regional Planning Commission
July 2006
Miles
0 0.25 0.5 1

from a "moderately" to a "severely impaired" condition.

Lumberton's AMNET stations are listed in *Table 10: New Jersey AMNET Sampling Locations for Lumberton Township and the 2004 Integrated Water Quality Monitoring and Assessment Report Status* and are depicted on **Map 10: Water Quality – Nontidal Waters**.

New Jersey's Integrated Water Quality Monitoring and Assessment Report

The federal Clean Water Act under Section 303(d) requires states to identify "Impaired Waters" where specific designated uses are not fully supported. Accordingly, in 2002 and again in 2004, NJDEP compiled the *Integrated Water Quality Monitoring and Assessment Report* (www.state.nj.us/dep/wmm/sgwqt), which included as sublist "4" and sublist "5" those waters that are determined to be impaired. Other lists in the report included waterways that are attaining standards (sublist "1") or where additional data is needed to determine their status (sublists "2" and "3").

The ASWM station in Vincentown is listed on the 2004 *Integrated Report's* Sublist 5 ("Impaired Waters") for three parameters: phosphorous, pH and lead. It is on Sublist 1 (fully attaining or non-impaired) for fecal coliform, temperature, dissolved oxygen, nitrate, dissolved solids, total suspended solids, ammonia, chromium, copper, nickel, selenium, and zinc.

Table 9: New Jersey ASWM Sampling Location near Lumberton Township

Site ID	Station Name/Water body	Municipality	Parameters Measured	2004 Status	Sampling Dates	Data Source
01465850	Rancocas Creek South Branch	Vincentown/ Southampton	Phosphorus, pH, Lead	Impaired	11/00 - 8/02	NJDEP/USGS Data
01465850	Rancocas Creek South Branch	Vincentown/ Southampton	Fecal Coliform, Temperature, Dissolved Oxygen, Nitrate, Dissolved Solids, Total Suspended Solids, Unionized Ammonia, Chromium, Copper, Nickel, Selenium, Zinc	Attaining	11/00 - 8/02	NJDEP/USGS Data
01465884	Sharps Run at Route 541	Medford	Temperature, pH, Nitrate, Total Suspended Solids, Unionized Ammonia	Attaining	11/00 – 8/02	NJDEP/USGS Data
01465884	Sharps Run at Route 541	Medford	Fecal Coliform	Impaired/ Threatened	11/00 – 8/02	NJDEP/USGS Data
01465884	Sharps Run at Route 541	Medford	Phosphorus	Impaired	11/00 – 8/02	NJDEP/USGS Data

Source: NJDEP 2004

Although the five AMNET stations in Lumberton showed moderate impairment for aquatic life of the stream segments above them in the 2001 round of monitoring, only two of these stream segments were placed on the 2004 *Integrated Report's* Sublist 5 as "Impaired Waters." Two streams were deemed to lack sufficient data for delisting, but that status places them on Sublist 3 rather than on Sublist 5. The remaining stream segment (South Branch from Main Street to

Eayrestown Road) was not included on the *Integrated Report's Impairment* lists, possibly because it is tidal. One of the Hainesport AMNET sites (AN0173 on Masons Creek) was placed on Sublist 5 as an "Impaired Water," but the other site (AN0176S on the South Branch) was not included there and the AMNET testing is being discontinued at that station.

Table 10: New Jersey AMNET Sampling Locations for Lumberton Township and the 2004 Integrated Water Quality Monitoring and Assessment Report Status

Site ID	Station Name/Waterbody	Municipality	Parameters Measured	1998 NJ Impairment Score*	2001 NJ Impairment Score*	2004 Impairment Status
AN0160	Little Creek at Eayrestown Road	Lumberton	Benthic Macroinvertebrates	12	21	Impaired
AN0161	South Branch Rancocas Creek at Mount Holly-Eayrestown Road	Lumberton	Benthic Macroinvertebrates	18	18	Impaired
AN0171	Bobby's Run at Newbold's Corner Road	Lumberton	Benthic Macroinvertebrates	12	9	Not Listed
AN0171A	Bobby's Run at Smithville Road	Lumberton	Benthic Macroinvertebrates	9	9	Insufficient Data
AN0172	Masons Creek at Ark Road	Lumberton	Benthic Macroinvertebrates	15	9	Insufficient Data
AN0173	Masons Creek at Route 38	Hainesport/Mount Laurel	Benthic Macroinvertebrates	18	15	Impaired
AN0176S	South Branch Rancocas Creek at Route 38	Hainesport	Benthic Macroinvertebrates	21	3	Discontinued testing as an AMNET site (now SASMN site)
AN0170	Sharps Run at Route 541	Medford	Benthic Macroinvertebrates	15	18	Insufficient Data

*** KEY:**

NJ Impairment Score	Biological Assessment
0-6	Severely Impaired
9-21	Moderately Impaired
24-30	Non-impaired

Source: NJDEP (2004)

In summary, the following waters in Lumberton are moderately or severely impaired:

For aquatic life:

- The entirety of Little Creek in Lumberton
- The South Branch of the Rancocas Creek from Eayrestown Road to its upstream headwaters in Southampton Township
- Bobby's Run from its confluence with an unknown tributary north of Newbold's Corner Road to its headwaters in Southampton Township. The creek is not "delisted" due to insufficient data.

- Masons Creek along the stretch that forms the border between Hainesport and Mount Laurel townships. The stretch from its headwaters in Medford Township through Lumberton and into Hainesport Township is not "delisted" due to insufficient data.
- The Southwest Branch of the Rancocas Creek in Lumberton to its confluence with Little Creek was not "delisted" due to insufficient data.

For phosphorus and pH:

- The South Branch of the Rancocas Creek from Vincentown to the confluence of the North and South Branches of the Rancocas in Hainesport.

For phosphors:

- The Southwest Branch of the Rancocas Creek from south of Medford for four miles to the confluence with Sharp's Run.

For fecal coliform:

- The South Branch of the Rancocas Creek from Vincentown to the confluence of the North and South Branches of the Rancocas in Hainesport.
- The Southwest Branch of the Rancocas Creek from south of Medford for four miles to the confluence with Sharp's Run.

Knowing the actual condition of streams and steam 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. Stream surveys by local organizations are much needed, along with regular monitoring of water quality on all of a community's waterways.

Source: DVRPC

Intermittent wetlands in Lumberton's wet forests.

Total Maximum Daily Loads

For each impaired waterway (waters on Sublist 5), the state is required by the US Environmental Protection Agency 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 nonpoint sources, such as runoff from various types of residential, commercial, or agricultural lands.

Only two TMDLs have been established for any part of the Rancocas Creek. The one most relevant to Lumberton's waters is a TMDL for fecal coliform that was proposed on April 21, 2003, for the Southwest Branch stream segment above the monitoring station near Medford (01465884). This station is at the confluence of Sharp's Run and the Southwest Branch. The Southwest Branch segment is four miles in length and the watershed draining to this segment is 3,079 acres in size. The land use in this watershed is 19.9% agricultural, 23.3% urban (i.e. "developed"), 48.9% wetlands, and 7.3% forest. The TMDL established by NJDEP requires an 88% reduction in fecal coliform contamination throughout the watershed. Potential sources of this contamination include pet waste in urban development areas, Canada geese on fields and inactive farms, and two large horse farms in the watershed. The implementation plan includes bacterial source monitoring to determine exactly what animal group(s) is responsible for the fecal coliform load, followed by specific efforts to reduce that load. Although proposed and adopted in 2003, the actual steps toward implementation are still going on as of January 2006.

In general, implementation of a TMDL relies on actions mandated by the Municipal Stormwater Management program, including the ordinances required to be adopted by municipalities under that permit (see **Figure 3** on page 47 for details of the Statewide Basic Requirements of this program). It also depends on voluntary improvements to land and runoff management in agricultural areas. A list of U.S. Department of Agriculture and New Jersey 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**.

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 Lumberton. These sources are also the most difficult to identify and remediate because they are diffuse, widespread, and cumulative in their effect. Most nonpoint source pollution in the Rancocas Creek watershed is known to derive 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. Some of this runoff comes to the waterways from similar sources in upstream townships and some of it derives from Lumberton land uses.

In March 2003, the NJDEP issued a new Stormwater Management Rule, as required by the US 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, municipalities were required to obtain a New Jersey Pollution Discharge Elimination System (NJPDES) general permit for the stormwater system and its discharges within their 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.

See **Figure 3** on page 47 for details of the Statewide Basic Requirements of this program.

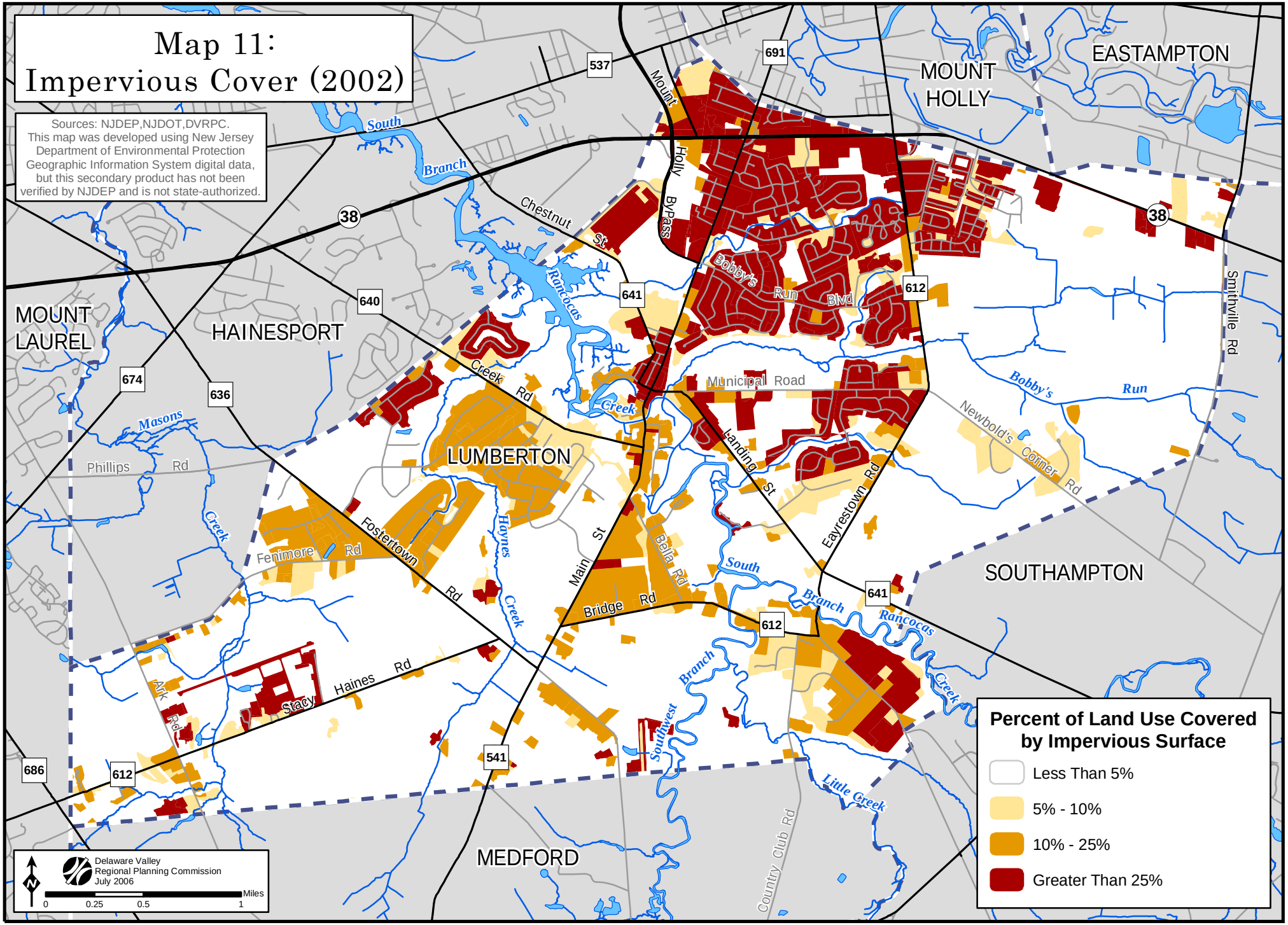
Impervious Coverage

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. 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. **See Map 11: Impervious Cover** on page 46, which shows the amount of impervious cover in the township.

Inadequate Stream Buffers

The stream buffer is the region immediately beyond the banks of a stream that serves to limit the entrance of sediment, pollutants, and nutrients into the stream itself. Stream buffers are quite effective at filtering substances washing off the land. The vegetation of the buffer traps sediment and can actually utilize (uptake) a percentage of the nutrients flowing from lawns and farm fields.

When forested, a stream buffer promotes bank stability and serves as a major control of water temperature. The buffer region also serves as a green corridor ─ a greenway ─ for wildlife to move between larger forested habitat areas. Residents can utilize these greenways for recreation with the addition of trails, bikeways, and access points to water for fishing and canoe/kayak launching.


Map 11:
Impervious Cover (2002)
Sources: NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Chestnut St
Mount Holly Bypass
Bobby's Run Blvd
Municipal Road
Smithville Rd
Bobby's Run
Newbold's Corner Rd
Eayrestown Rd
Landing St
Main St
Bridge Rd
Bella Rd
Fostertown Rd
Haines Rd
Ark Rd
Stacy
Fenimore Rd
Phillips Rd
Masons Creek
Haynes Creek
Southwest Branch Rancocas Creek
Country Club Rd
Little Creek
537
691
38
640
641
612
674
636
686
541
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
Percent of Land Use Covered by Impervious Surface
Less Than 5%
5% - 10%
10% - 25%
Greater Than 25%

Stormwater Management Statewide Basic Requirements
Towns, Highway Agencies, and Institutions

1. Control post-construction stormwater management in new development and redevelopment through:

    - Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.
    - Adoption and implementation of a stormwater control ordinance in accordance with N.J.A.C. 7:8. This ordinance requires retention on site of 100% of preconstruction recharge, and use of low-impact design in stormwater facilities, among other features.
    - Ensuring compliance with Residential Site Improvement Standards for stormwater management. The RSIS is currently being revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.
    - Ensuring long-term operation and maintenance of Best Management Practices on municipal property.
    - Requiring that new storm drain inlets meet new design standards.

2. Conduct local public education:

    - Distribute educational information (about stormwater requirements, nonpoint source pollution, and stewardship) annually to residents and businesses and conduct a yearly "event" (such as a booth with these messages at a community day).
    - Have all municipal storm drain inlets labeled with some type of "don't dump" message.
    - Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives.
    - Distribute information annually regarding proper identification, handling, and disposal of wastes including pet waste and litter.

3. Control improper disposal of waste through improved yard waste collection and through adoption of ordinances (pet waste, litter, improper dumping, and wildlife feeding).

4. Control solids and floatables through increased street sweeping, retrofitting storm drain inlets during road repairs, and instituting programs for stormwater facility management, for roadside erosion control, and for outfall pipe scouring/erosion.

5. Improve maintenance yard operations, specifically for de-icing material storage, fueling operations, vehicle maintenance, and housekeeping operations.

6. Increase employee training about all of the above.

Source: NJDEP *Figure 3: Stormwater Management Basic Requirements*

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 less agreement and much continuing research on the appropriate minimum width of a buffer. In literature on this issue, a recommended minimum buffer width of 100 feet is most common, with differing activities permitted in each of three zones within the buffer. Buffers of up to 300 feet are recommended for wildlife corridors and potential passive recreational use, such as walking trails.

The New Jersey Freshwater Wetlands Protection Act incorporates buffer requirements into its wetland protection regulations. The width of the "transition zone" extending beyond a wetland is determined by the value of the wetland, based on its current use and on the documented

presence/absence of threatened or endangered species. Municipalities may not establish buffers on wetlands that exceed those required by the state statute. However, the municipality can make certain that those limits are accurate through its review of the wetlands delineation process, and it can also monitor use of the land within the transition area and take action against encroachments.

Source: DVRPC

Stretches of the Rancocas Creek are protected by healthy riparian buffers.

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

Point Sources of Pollution

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

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program. Under NJPDES, any facility discharging over 2,000 gallons per day (gpd) of wastewater directly into surface water or groundwater (generally through a septic system) must apply for and obtain a permit for discharging. Rather than creating individually tailored permits for each and every facility, the Division of Water Quality uses scientific standards to create and issue general permits for different categories of dischargers.

NJDEP enforces the terms of the NJPDES permit by visiting discharging facilities and requiring facilities to conduct water quality, biological, and toxicological analyses, and thermal impact and cooling water assessments periodically.

Under the Open Public Records Act (OPRA) of 2002, a list of active NJPDES permits is available. As of December 15, 2005, six NJPDES permits were issued to individual facilities in Lumberton Township. These are shown in *Table 11: New Jersey Pollution Discharge Elimination Permit System (NJPDES) Permits* and depicted on **Map 17: Approved Sewer Service Areas.**

Since the adoption of the federal Clean Water Act and the implementation of NJPDES in subsequent years, water pollution from point sources has decreased dramatically. However, as development has continued to spread throughout New Jersey, nonpoint source pollution has increased substantially in recent decades. NJDEP's new Stormwater Management Rules, described previously, focus on reducing and controlling nonpoint sources of water pollution.

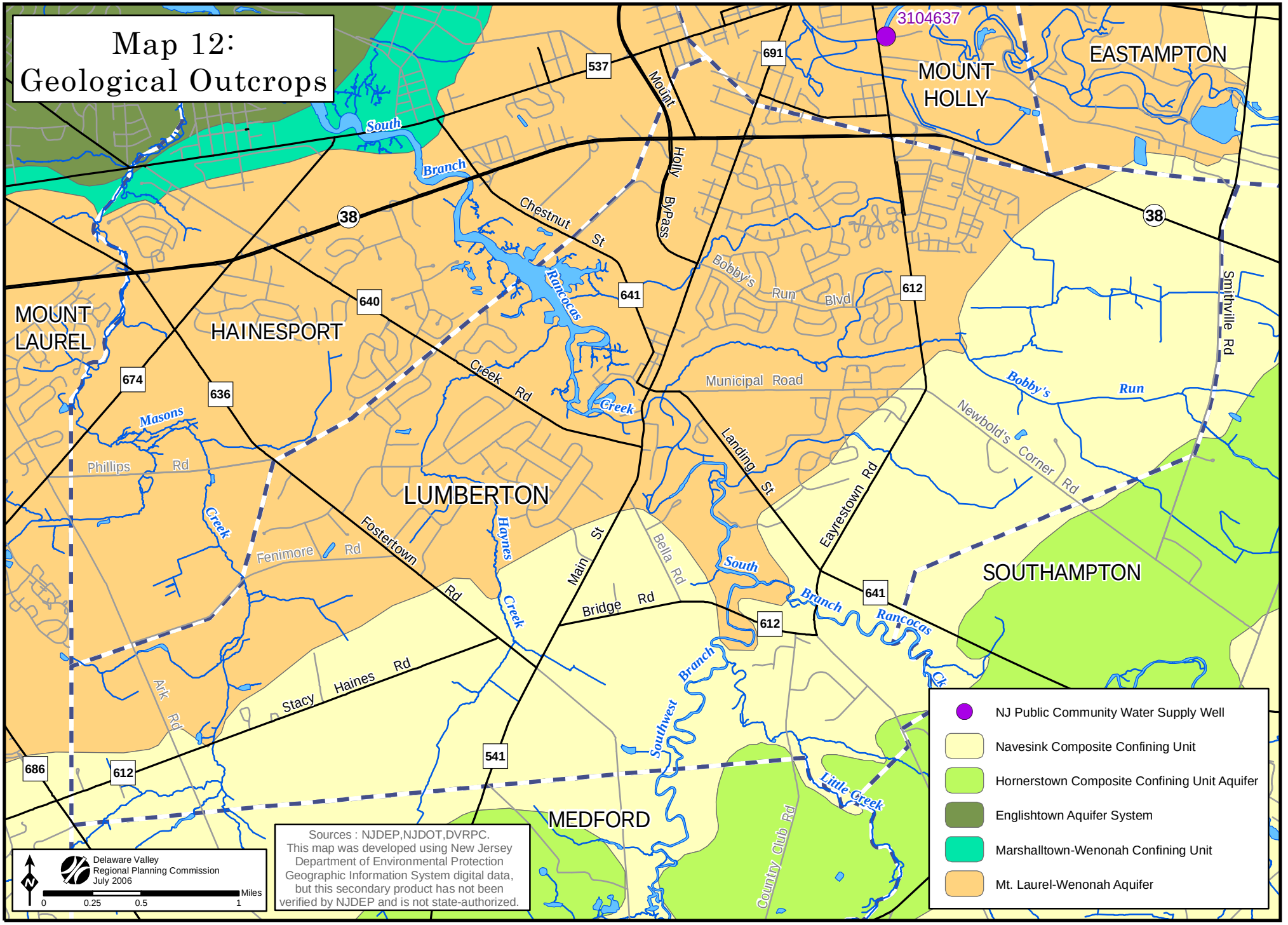
Table 11: New Jersey Pollution Discharge Elimination Permit System (NJPDES) Permits

NJPDES Permit Number	Facility Name	Effective Start Date	Expiration Date*	Discharge Category Description	Street Address
NJ0106321	South Jersey Regional Airport	7/1/95	6/30/98	Stormwater	68 Stacy Haines Road
NJ0135119	Sancoa Industrial Campus	2/1/02	1/31/07	Discharge to Groundwater	92 Ark Road
NJG0109215	Ark Road Educational Campus	6/1/03	5/31/08	Sanitary Subsurface Disposal (GP)	71 Ark Road
NJG0144584	Wills Bus Service Inc.	8/5/03	5/31/07	Basic Industrial Stormwater GP - NJ0088315 (5G2)	721 Main Street
NJG0145726	Hy Way Garage Inc	2/1/05	1/31/10	Scrap Metal Processing/Auto Recycling (GP)	1807 Route 38
NJG0150193	Lumberton Township	4/1/04	2/28/09	Tier A Municipal Stormwater General Permit	35 Municipal Drive

*Source: NJDEP, Division of Water Quality, 2005 * Expired permits are still listed on OPRA because the NJPDES sites may still be active, despite not having updated the permit.*

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.


Map 12:
Geological Outcrops
3104637
MOUNT HOLLY
EASTAMPTON
MOUNT LAUREL
HAINESPORT
LUMBERTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Mount Holly ByPass
Chestnut St
Bobby's Run Blvd
Municipal Road
Bobby's Run
Smithville Rd
Newbold's Corner Rd
Eayrestown Rd
Landing St
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bella Rd
Bridge Rd
Stacy Haines Rd
Ark Rd
Southwest Branch
Little Creek
Country Club Rd
537
691
38
640
641
612
674
636
686
541
NJ Public Community Water Supply Well
Navesink Composite Confining Unit
Hornerstown Composite Confining Unit Aquifer
Englishtown Aquifer System
Marshalltown-Wenonah Confining Unit
Mt. Laurel-Wenonah Aquifer
Delaware Valley Regional Planning Commission
July 2006
Miles
0 0.25 0.5 1
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

A cross section across southern New Jersey from west to east would show that the aquifers are not horizontal but tilt toward the southeast, getting deeper as they cross the state toward the Atlantic Ocean. Because of this tilting, each aquifer emerges on the land surface in a sequential manner. The deepest strata emerge on the surface near the Delaware River. Where a layer 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. It outcrops to the northwest of Lumberton Township, in Hainesport and Mount Laurel townships. Other smaller aquifers on top of the PRM are the Englishtown and the Mount Laurel-Wenonah. The large Kirkwood-Cohansey formation, which overlies these older formations, begins east of the Inner/Outer Coastal Plain divide and does not, therefore, outcrop in Lumberton Township.

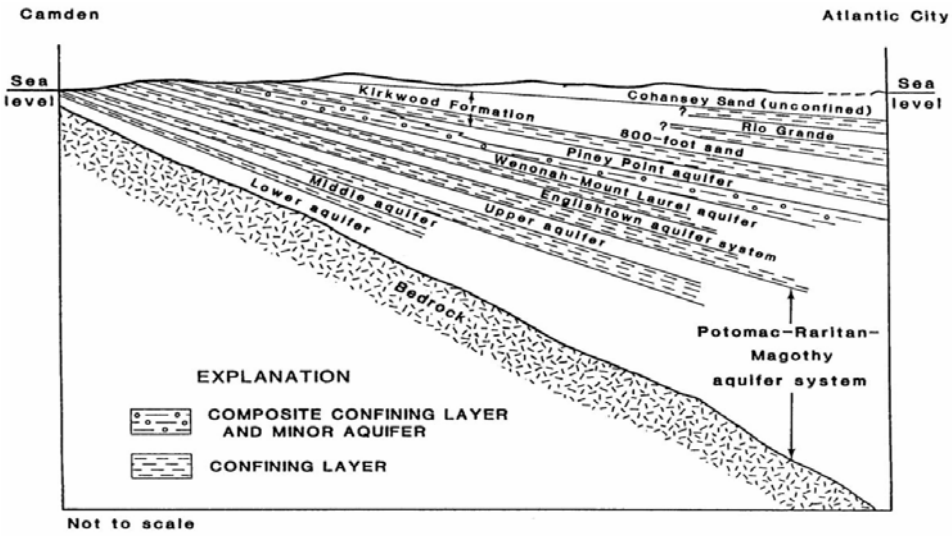


Figure 4: Aquifers of Southern New Jersey along a Line from Camden to Atlantic City

Source: U.S. Geological Survey

Geological Formations

Three geological formations outcrop in Lumberton Township. One of these formations is an aquifer and two are confining beds. The only aquifer that outcrops in Lumberton is the Mount Laurel-Wenonah aquifer system, composed of water-bearing sands and gravels. See **Map 12: Geological Outcrops** for a visual depiction of the aquifer and confining bed outcrop areas. The Hornerstown and Navesink Composite Confining Units that outcrop in Lumberton are described in the succeeding paragraphs.

Hornerstown and Navesink Composite Confining Units

Overlying the Mount Laurel-Wenonah aquifer and subjacent to the Kirkwood-Cohansey aquifer system lies a complex series of geologic units – ranging in age from late Cretaceous to Miocene

(23 to 150 million years ago) – known as the Hornerstown and Navesink composite confining bed. The confining bed consists of the Navesink formation and, depending on location within the coastal plain, can include other geological units. In Lumberton Township, Hornerstown sand outcrops alongside the Navesink formation. These layers were formed by the advancing and retreating of the sea across southern New Jersey, and thus are high in glauconite. The confining units have low to moderate permeabilities and are generally described together. This composite confining unit becomes thicker as it travels eastward from 50 feet in Lumberton Township to 796 feet at Island Beach State Park.

Aquifers

Several aquifers underlie parts of Lumberton Township. Three major aquifers – Wenonah-Mount Laurel, Englishtown, and Potomac-Raritan-Magothy (PRM) – provide public and private drinking water for Lumberton residents.

Englishtown Aquifer System

Some private wells in residential developments built more than 20 years ago may draw from the Englishtown aquifer system. The Englishtown formation, of the late Cretaceous age, outcrops in the Inner Coastal Plain in an irregular band that extends from Raritan Bay to the Delaware River adjacent to Salem County. Where the Englishtown formation is exposed, the primary components are fine- to medium-grained sands. In parts of Burlington, Camden, Gloucester, and Salem counties, the aquifer is commonly less than 40 feet thick. In Lumberton Township, the top of the Englishtown aquifer is about 100 feet below ground surface and its base is 200 feet below sea level, making it about 100 feet thick. It is not a major source of water in Burlington County due to its small size and greater proportion of fine-grained sediments, resulting in lower yields. More productive aquifers lie above and below it. In Monmouth and Ocean counties, this aquifer system is a significant water source.

PRIVATE DRINKING WELLS

Private wells supplying potable water are not routinely monitored like public community water systems (public water) and public noncommunity wells. Beginning in 2002, however, 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 A: Private Well Testing Act** for more information about private wells and drinking water in Burlington County.

Wenonah-Mount Laurel Aquifer System

Very few private wells may draw from the Wenonah-Mount Laurel aquifer system. The Wenonah-Mount Laurel aquifer is composed of the Wenonah formation and the Mount Laurel Sand, both of the Late Cretaceous age (130 to 150 million years ago). It is thickest in

Burlington, Camden, Gloucester, and Salem counties, reaching 100 to 120 feet, with its top and base being approximately 175 feet and 205 feet below sea level, respectively.

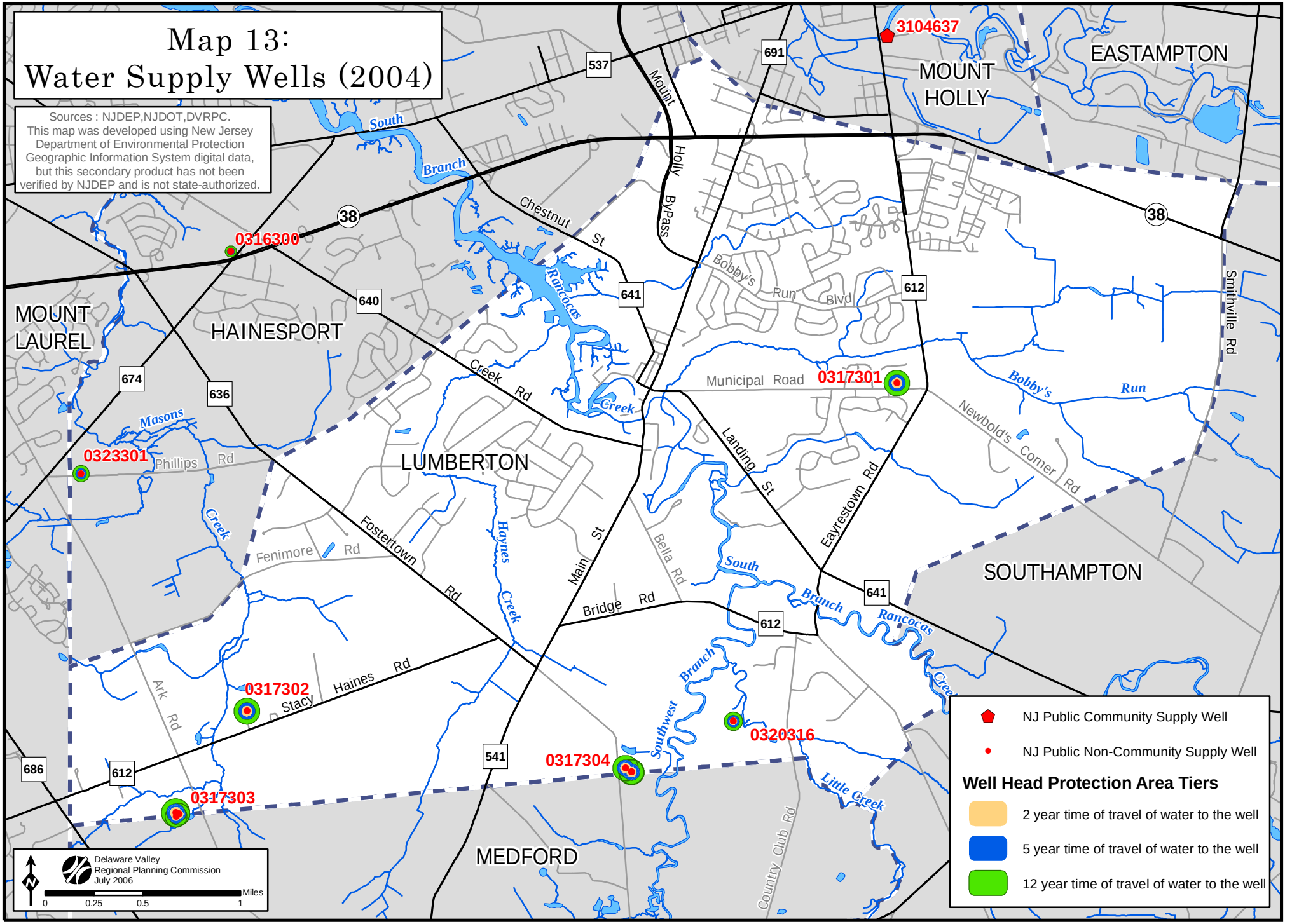
Potomac-Raritan-Magothy Aquifer System (PRM)

The Potomac-Raritan-Magothy (PRM) is the principal geological formation underlying Lumberton Township and the primary source of drinking water for Lumberton's public wells and most private ones. This multiple aquifer is actually a large series of formations that have been combined and described as a single unit because the individual formations – the Potomac group and the Raritan and Magothy formations – are lithologically indistinguishable from one another over large areas of the Coastal Plain. That is, they are composed of materials of like kind and size laid down by both an advancing and retreating sea across southern New Jersey, and by deposits of material that came from the breakdown and erosion of the Appalachian and Catskill mountains beginning in the Cretaceous Period (60 to 150 million years ago).

In the Delaware Valley, three aquifers have been distinguished within the PRM system – designated as lower, middle, and upper – and divided by two confining units or layers between the three water-bearing strata. The aquifers themselves are largely made up of sands and gravels, locally 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.

The PRM is the primary source of drinking water for New Jersey residents from Burlington to Salem counties, as well as for communities in Delaware. Because of such high usage, PRM aquifer water levels have declined. This became so serious that the New Jersey Department of Environmental Protection established Water Supply Critical Area #2 in 1986. 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. All of Lumberton Township is within the boundary of the Critical Area.

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, Ocean, Gloucester, 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.


Map 13:
Water Supply Wells (2004)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
3104637
0316300
0317301
0323301
0317302
0317303
0317304
0320316
MOUNT HOLLY
EASTAMPTON
MOUNT LAUREL
HAINESPORT
LUMBERTON
SOUTHAMPTON
MEDFORD
Rancocas Creek
South Branch Rancocas Creek
Southwest Branch
Little Creek
Haynes Creek
Masons Creek
Bobby's Run
Municipal Road
Chestnut St
Mount Holly ByPass
Bobby's Run Blvd
Smithville Rd
Creek Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Bella Rd
Main St
Bridge Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Haines Rd
Stacy
Ark Rd
Country Club Rd
537
691
38
640
674
636
641
612
541
686
NJ Public Community Supply Well
NJ Public Non-Community Supply Well
Well Head Protection Area Tiers
2 year time of travel of water to the well
5 year time of travel of water to the well
12 year time of travel of water to the well
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1

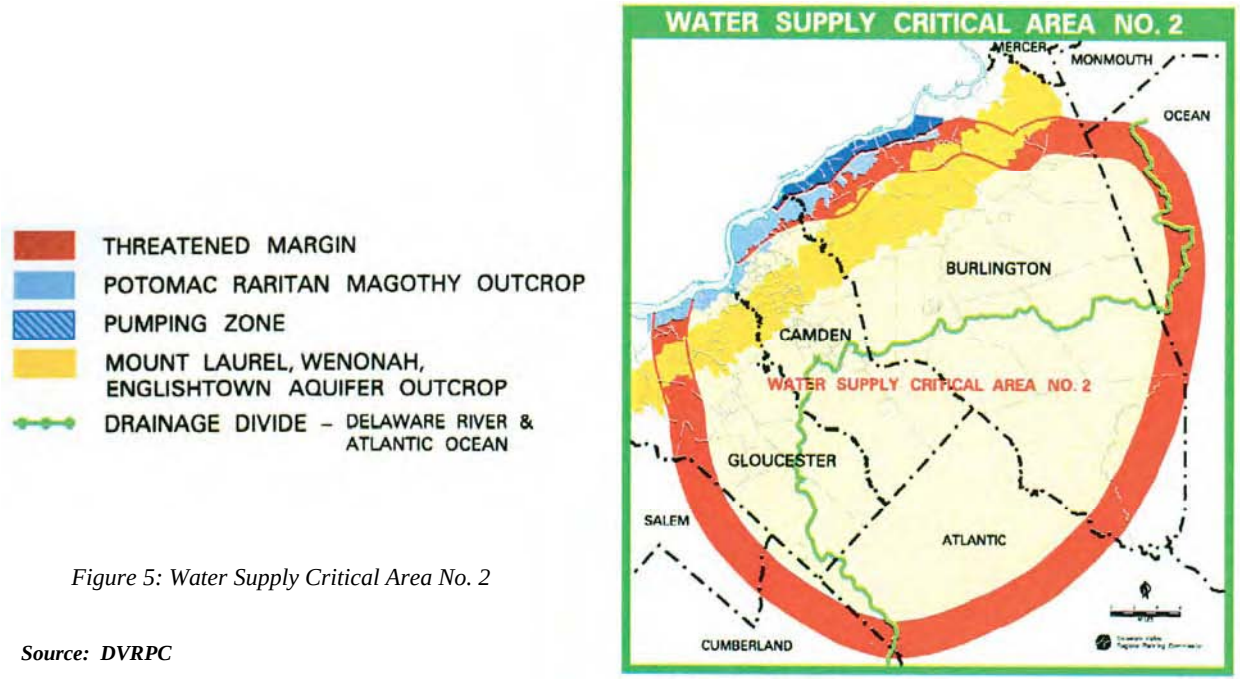


Figure 5: Water Supply Critical Area No. 2

Source: DVRPC

The PRM does not outcrop in Lumberton Township; rather it outcrops under and immediately beside the Delaware River in New Jersey and Pennsylvania. River water actually enters and recharges the upper and middle PRM aquifers.

Water Supply Wells

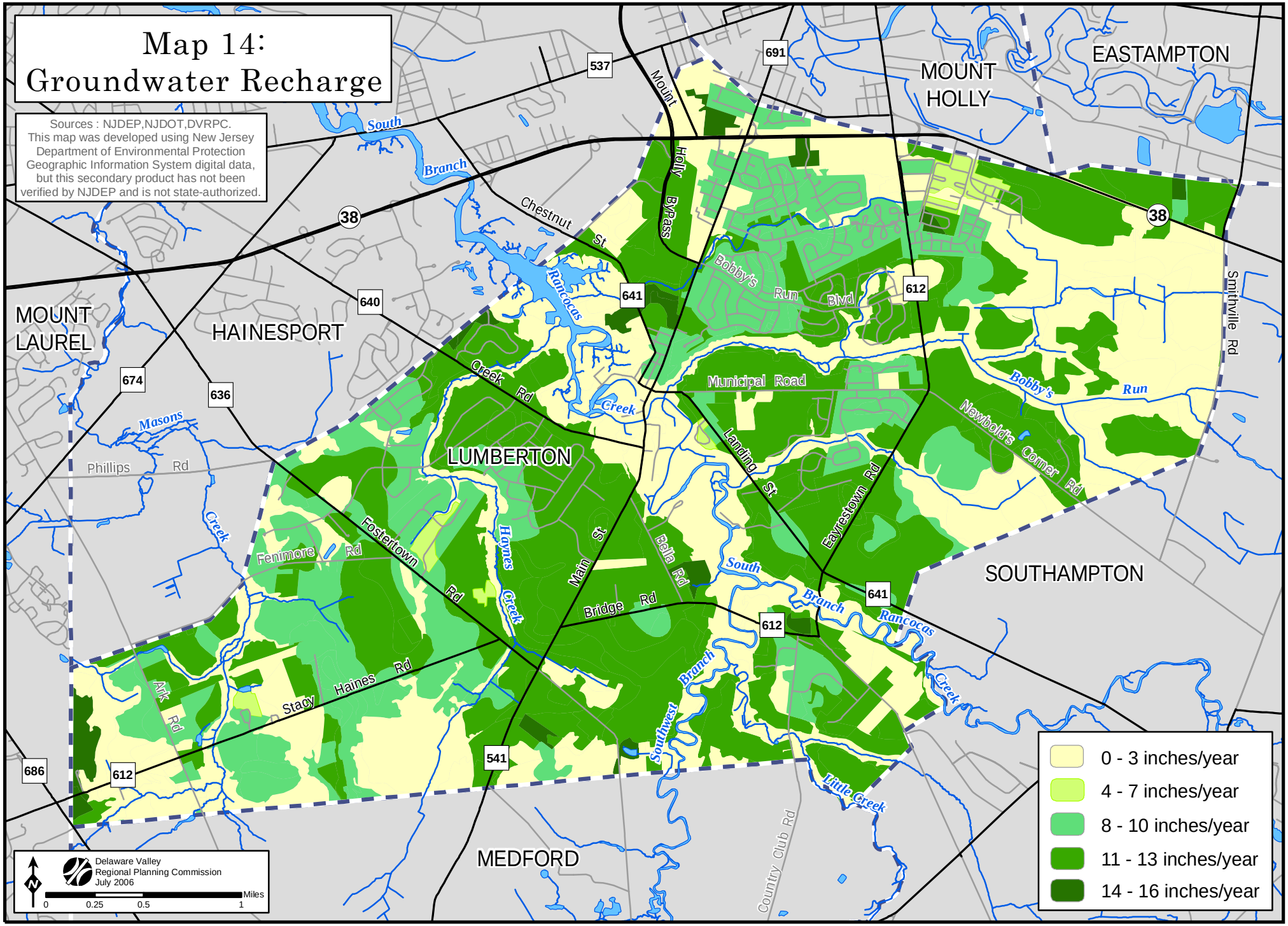
There is one active public water supply well serving Lumberton Township, but it is located in Mount Holly Township and is listed in *Table 12: Public Water Supply Well Serving Lumberton Township* and shown on **Map 13: Water Supply Wells**. This well pumps from the PRM.

Table 12: Public Water Supply Well Serving Lumberton Township

Well ID #	Original Owner	Aquifer	Depth to Top of Well (feet)	Depth to Bottom of Well (feet)
3104637	Mount Holly Water	Middle PRM	307	342

Source: NJDEP

Public noncommunity wells are another part of a public water system. There are two types of noncommunity water systems, transient and non-transient, referring to the type of populations that utilize them. A non-transient water system serves at least 25 of the same people daily at a minimum of six months per year. Non-transient noncommunity water systems serve places like schools, factories, and office parks. A transient noncommunity water system serves at least 25


Map 14:
Groundwater Recharge
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
South Branch Rancocas Creek
Chestnut St
Mount Holly ByPass
Bobby's Run Blvd
Municipal Road
Bobby's Run
Smithville Rd
Newbold's Corner Rd
Eayrestown Rd
Landing St
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haines Rd
Stacy Haines Rd
Ark Rd
Haynes Creek
Main St
Bella Rd
Bridge Rd
South Branch Rancocas Creek
Southwest Branch Rancocas Creek
Little Creek
Country Club Rd
537
691
38
640
674
636
641
612
541
686
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
0 - 3 inches/year
4 - 7 inches/year
8 - 10 inches/year
11 - 13 inches/year
14 - 16 inches/year

people daily, but the population changes each day, such as at rest stops, gas stations, and restaurants. See *Table 13: Public Noncommunity Wells in Lumberton Township*.

Table 13: Public Noncommunity Wells in Lumberton Township

Well ID #	Original Owner	Well Depth	Well Type
0317301	Midway School	180	Non-transient
0317302	South Jersey Regional Airport	350	Transient
0317303	Burlington County Special Services	376	Non-transient
0317303	Burlington County Special Services	367	Non-transient
0317303	Burlington County Special Services	379	Non-transient
0317304	Flying W Airport	180	Transient
0317304	Flying W Airport	180	Transient
0317304	Flying W Airport	200	Transient
0320316	Golden Pheasant County Club	175	Transient

Source: NJDEP

Groundwater Recharge

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

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. The New Jersey Department of Environmental Protection has used this methodology to map and rank land areas throughout the state as to groundwater potential. Recharge is equivalent to the amount of precipitation that will reach the water table in an area with a particular combination of soils and land use. It is expressed as inches per year.

In Lumberton, lands with groundwater recharge of greater than 11 inches per year, the highest in the township, are located in sizable patches on land in between the South Branch of the Rancocas Creek and its tributaries. A substantial section of high recharge lands are located in the vicinity of South Main Street, Bridge Road and Bella Road. Lands immediately adjacent to the Rancocas Creek South Branch floodplain and marshes, and developed lands in the northern and eastern sections of the township, exhibit less groundwater recharge. Over half of the township's recharge areas recharge to the Mount Laurel-Wenonah Aquifer system; the remaining land recharges the Hornerstown Sand Composite Confining Unit, which is not a water-bearing geologic strata. More than 42% (3,546 acres) of Lumberton's land recharges between 11 and 16 inches per year. About 20% (1,661 acres) of Lumberton recharges between 8 and 10 inches per year. See **Map 14: Groundwater Recharge**.

In general, on these high recharge lands, the amount of paving and other impervious cover has the most detrimental impact, although they are also usually the places that are most suitable for building because they are areas of well-drained soils. Conversely, these are also regions where the dilution of substances from septic systems, such as nitrates, may require a larger land area because the soils are usually more "porous." For example, minimum average lot sizes of two to four acres are often needed for proper nitrate dilution from septic systems in areas having 10 or more inches per year of groundwater recharge.

BIOLOGICAL RESOURCES

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

Lumberton contains numerous types of habitats, all of which are important for maintaining biodiversity. Forested wetlands are the most common ecosystem type in Lumberton. Along Lumberton's stream corridors and lakeshores are herbaceous wetlands, which support plants that require constantly saturated soils; and within and around waterbodies are submerged communities, which require persistent standing water. Upland forests, which were once the most abundant type of natural habitat in Lumberton, occur where land is dry and undeveloped. The following sections will identify and describe in more detail the plant and animal communities that inhabit these unique ecosystems within Lumberton Township.

NATURAL VEGETATION

A region's vegetation is dependent on many factors, the most important of which are climate and soils. Lumberton's climate is cool and temperate with rainfall averaging 46 to 47 inches per year. The majority of Lumberton's soils are generally well-drained soils, supporting a large diversity of trees and crops. The area also has a substantial amount of poorly drained soils that exhibit ponding and sustain wetland plants. See the **Soils** section on page 15 for a detailed description of Lumberton's soils.

Lumberton's natural vegetation types, along with human-influenced types of land cover, have been tabulated and mapped by NJDEP's 2002 land cover analysis. This data, based on infrared aerial photography, is the most recent available. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the U.S. Geologic Survey. See **Map 15: Natural Vegetation (NJDEP 2002)**.

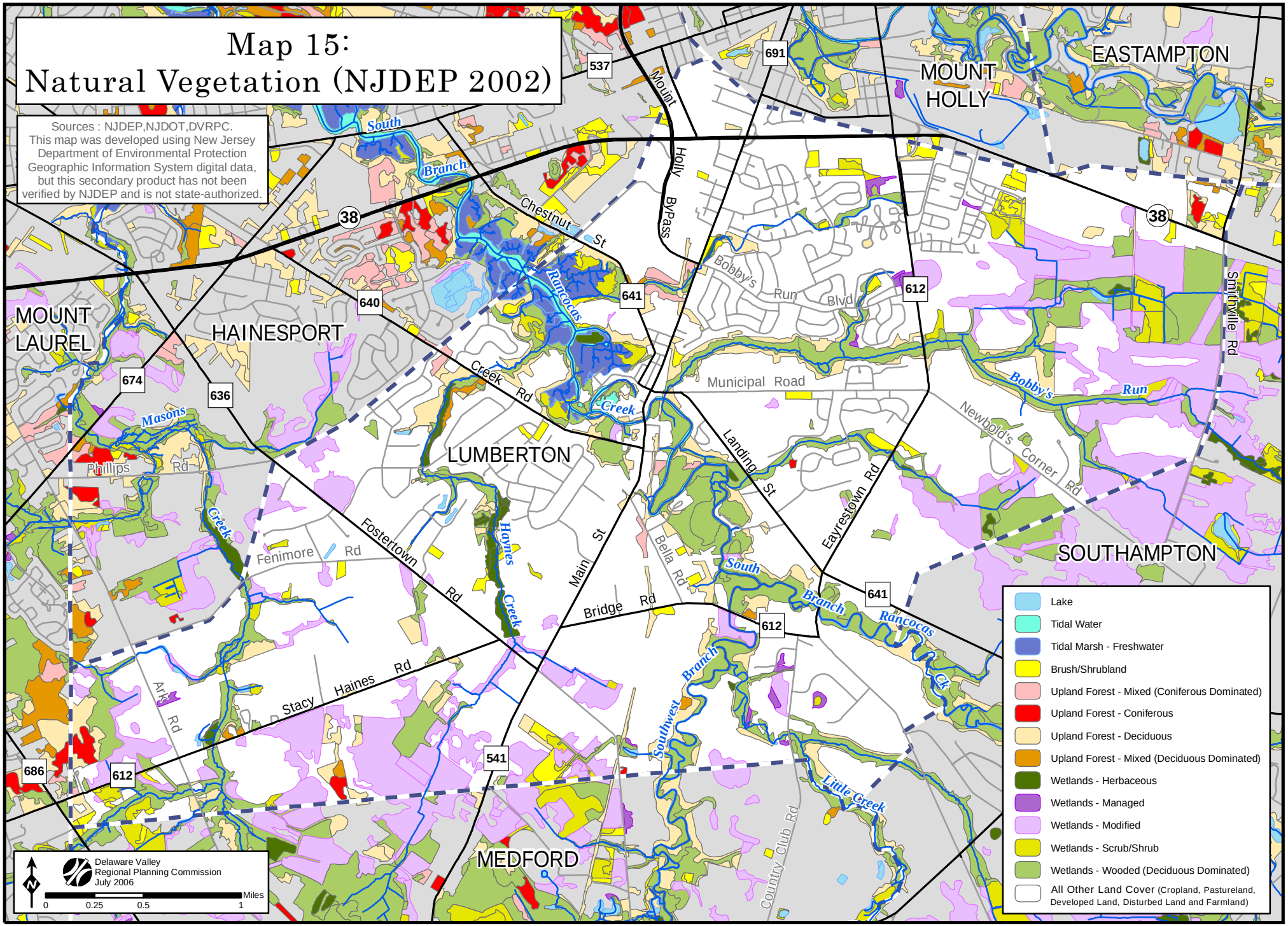
Table 14: Lumberton Township Natural Vegetation

Type of Vegetation	Acres	% of Total Land Area
Artificial Lakes	10.38	0.12%
Brush/Shrubland – coniferous	11.15	0.13%
Brush/Shrubland – deciduous	18.41	0.22%
Brush/Shrubland – mixed	37.75	0.45%
Brush/Shrubland – old field (brush covered)	44.37	0.53%
Forest – coniferous	20.15	0.24%
Forest – deciduous	410.77	4.93%
Forest – mixed (coniferous dominated)	26.38	0.32%
Forest – mixed (deciduous dominated)	19.78	0.24%
Modified Wetlands (agricultural wetlands)	824.63	9.89%
Modified Wetlands – disturbed wetlands	24.60	0.30%
Modified Wetlands – former agricultural wetlands, becoming shrubby	23.13	0.28%
Modified Wetlands – managed wetland in maintained greenspace	13.93	0.17%
Modified Wetlands – managed wetland in maintained recreation area	8.15	0.10%
Modified Wetlands – wetland rights-of-way	16.12	0.28%
Natural Lakes	4.33	0.05%
Streams and Canals	12.65	0.15%
Tidal rivers, inland bays, and other tidal waters	68.27	0.82%
Wetlands – deciduous dominated scrub/shrub wetlands	26.14	0.31%
Wetlands – coniferous scrub/shrub wetlands	0.81	0.01%
Wetlands – freshwater tidal marshes	90.07	1.08%
Wetlands – wooded (deciduous dominated)	10.40	0.12%
Wetlands – wooded (deciduous)	942.38	11.31%
Wetlands – herbaceous wetlands	50.04	0.60%
Wetlands – scrub/shrub (coniferous)	0.81	0.01%
Wetlands – scrub/shrub (deciduous)	62.22	0.75%
Wetlands – scrub/shrub (mixed - coniferous dominated)	4.52	0.05%
Wetlands – wooded (confierous dominated)	1.78	0.02%
Total Vegetation Land Cover	**2,784.11**	**33.49%**

Source: NJDEP (2002 Land Cover); released 2006

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 more than 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


Map 15:
Natural Vegetation (NJDEP 2002)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
537
691
38
640
641
612
674
636
686
541
Mount Holly ByPass
Chestnut St
Rancocas Creek
Bobby's Run Blvd
Municipal Road
Creek Rd
Masons Creek
Phillips Rd
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bridge Rd
Bella Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Smithville Rd
South Branch Rancocas Cik
Southwest Branch
Little Creek
Country Club Rd
Stacy Haines Rd
Ark Rd
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
Lake
Tidal Water
Tidal Marsh - Freshwater
Brush/Shrubland
Upland Forest - Mixed (Coniferous Dominated)
Upland Forest - Coniferous
Upland Forest - Deciduous
Upland Forest - Mixed (Deciduous Dominated)
Wetlands - Herbaceous
Wetlands - Managed
Wetlands - Modified
Wetlands - Scrub/Shrub
Wetlands - Wooded (Deciduous Dominated)
All Other Land Cover (Cropland, Pastureland, Developed Land, Disturbed Land and Farmland)

acres of wetlands in the United States since the beginning of European settlement.

Nearly all wetlands in Lumberton Township are found in association with major streams and their tributaries. Wetlands are dominant along the township's major waterways: Rancocas Creek's South Branch, Southwest Branch, Masons Creek, Little Creek, and Bobby's Run. Wetlands provide high-quality animal and plant habitat, purify the township's surface and ground waters, and create picturesque landscapes that add immeasurably to the quality of life for township residents. According to the Anderson Land Use Classification System, Lumberton Township has four major types of wetlands: (1) wooded wetlands dominated by deciduous trees, (2) scrub/shrub wetlands dominated by deciduous woody plants, (3) herbaceous wetlands, and (4) freshwater tidal marshes.

Common throughout Lumberton Township are deciduous wooded wetlands (sometimes referred to as forested wetlands). Deciduous wooded wetlands occupy about 954 acres (11.5%) of Lumberton's total land area and support mixed hardwoods that flourish in lowlands. Some common trees in Lumberton's deciduous wooded wetlands are American sycamore, river birch, white ash, swamp white oak, green ash, and sweet gum.

Source: DVRPC

The township has sizeable areas of herbaceous and scrub/shrub wetlands, like these found along Little Creek.

Closely associated with deciduous wooded wetlands are scrub/shrub wetlands, occupying about 67.8 acres (1.4%) of Lumberton. These wetlands are generally composed of young, medium-height, primarily deciduous woody plants. Lumberton's scrub/shrub wetlands are composed of young saplings of red maple, ash, and sweet gum; and dominated by shrub species like silky dogwood, buttonbush, winterberry, swamp rose, elderberry, southern arrowhead, and hazel alder.

Large swaths of deciduous wooded and scrub/shrub wetlands, surrounded by protective upland forest, survive between residential developments along the Rancocas Creek's south and southwest branches and Bobby's Run. Wooded wetlands are also found to a lesser extent along Masons Creek and Little Creek.

In Lumberton, herbaceous wetlands occupy about 50 acres (less than 1%) of the township's land area. Herbaceous wetlands generally occur along lake edges, open floodplains, and former agricultural wetland fields. Herbaceous wetlands are found in close proximity to wooded wetlands along some of Lumberton's major and minor streams. A significant amount of Lumberton's herbaceous wetlands are found along Bobby's Run and its unnamed tributaries. Long swaths are also found along the Haynes Creek. Herbaceous wetland plants include rice cutgrass, reed canary grass, pond lily, tearthumb, arrow-leafed tearthumb, broadleaf cattail, and the common reed (Phragmites).

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. Modified wetlands encompass agricultural wetlands, former agricultural wetlands, disturbed wetlands, and wetlands that occur in maintained green spaces such as open lawns, golf courses, and storm water swales. Lumberton has extensive swaths of modified wetlands covering 911 acres (11%) of the township's land area. Nearly all (825 acres) of Lumberton's modified wetlands consist of agricultural wetlands. In fact, agricultural wetlands are the most common type of wetlands as categorized by the Anderson Land Use Classifications System.

Source: DVRPC

Upland forests and wetland forests grow adjacent to each other throughout Lumberton.

Upland Forests

Upland areas are those locations without water at or near the soil surface. More than 477 acres (over 5%) of Lumberton is composed of upland forests, as of the 2002 land cover analysis by NJDEP. Most of Lumberton's original upland forests were cleared and converted to farms or residential or commercial development. Nearly all old growth forests were harvested for lumber

during colonial times. The remaining upland forests are second or third growth, and tend to be located near stream corridors, or are patchy woodlands on less desirable soils associated with large farms.

Upland forests are the second most abundant vegetative land cover in Lumberton, after natural wetlands. The great majority, 411 acres, of Lumberton's upland forests consists of deciduous trees. The composition of Lumberton's upland deciduous forests is largely one of mixed oaks – black, red, chestnut, Shumard and scarlet oaks – joined by other hardwoods, such as paper birch, American beech, honey locust, hickory and sweet gum. The understory is dominated by flowering dogwood, black cherry, ironwood, and sassafras. Vines – such as Virginia creeper, wild grapes, Japanese honeysuckle, and poison ivy – are common. Spicebush, arrowwood, and black haw are common shrubs in moister locations.

Coniferous trees occur on about 20 acres (less than 1%) of Lumberton. These forests are mostly made up of successional, or pioneer, plants like Virginia pine, scrub pine, and pitch pine, which will eventually be overgrown by dominant deciduous trees, such as ash, birch, oak, and hickory.

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 time. 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.

Source: DVRPC

Agricultural lands provide important grassland-type habitat for birds migrating along the East Coast Flyway.

Nearly 112 acres (1%) of Lumberton's land cover consists of brushland, shrubland or old fields. In Lumberton, brushland is generally found adjacent to residential, commercial, and industrial development, while old fields occur more often near agricultural or wetland areas.

In addition to brushland and old fields, active agricultural cropland and pastureland is considered suitable "grassland" habitat for wildlife. That is, species that are grassland specialists will use agricultural cropland and pastureland as well as brushland and old fields. Agricultural cropland and pastureland is the single

most abundant type of vegetative land cover in Lumberton Township, accounting for 2,561 acres (about 31%) of the township's land area in 2002.

LANDSCAPE PROJECT PRIORITY HABITATS

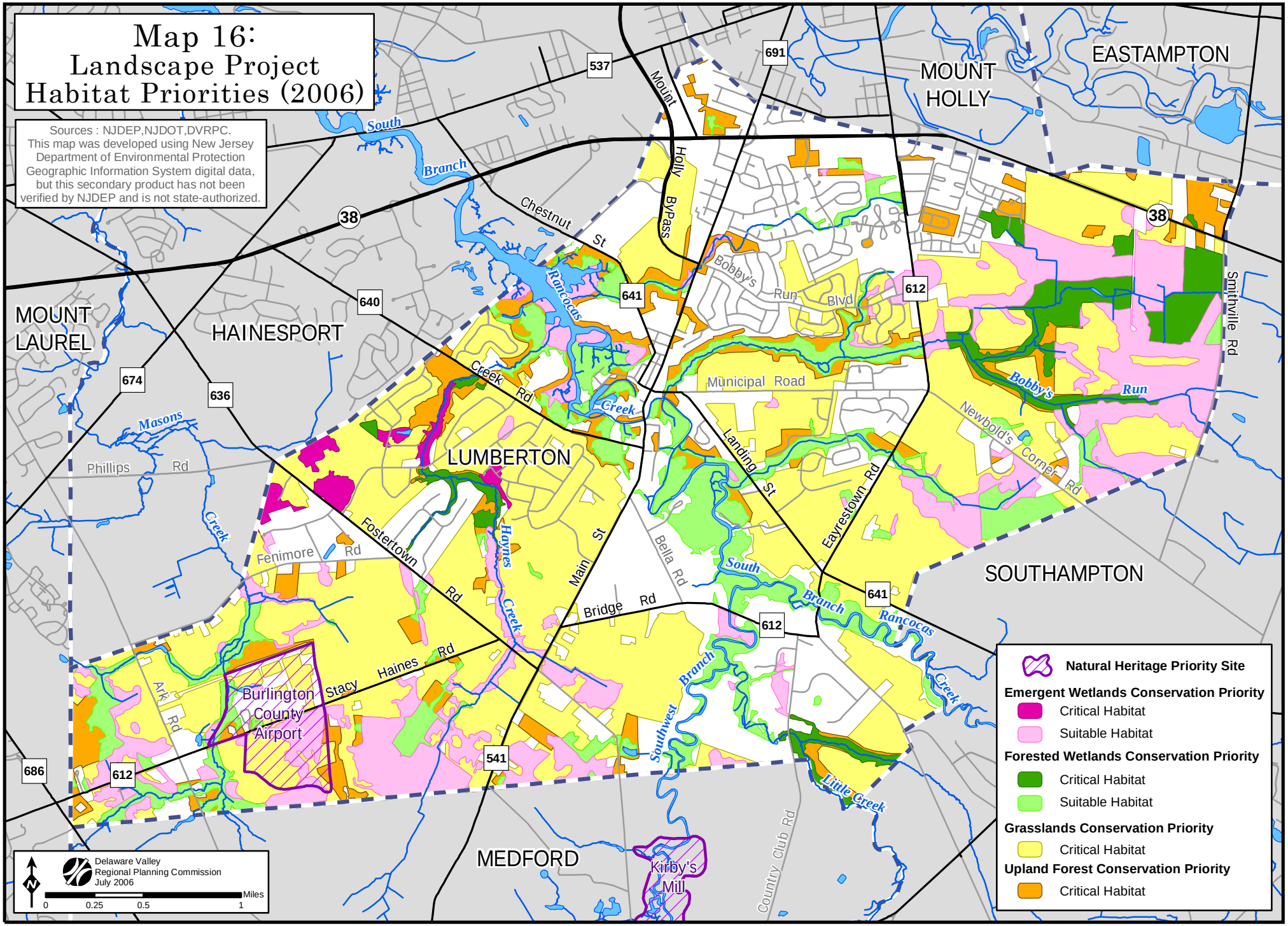
The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish & Wildlife, documents the value of various types of habitats within New Jersey. It categorizes these habitats into one of five groups according to their importance (five being the highest). Categories three through five include habitats throughout the state that possess two exceptional conditions: (1) a documented occurrence of one or more species on either the federal or the state threatened and endangered species lists, and (2) a sufficient amount of habitat type to sustain these species. These habitats are collectively known as "critical habitat." Categories one and two include habitats that either have a documented occurrence of a *species of special concern* in New Jersey or are habitat 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. These habitats are labeled "suitable habitats."

The Landscape Project identifies both critical and suitable habitat in Lumberton Township. It is important to preserve both levels of habitat in order to maintain the diversity of species that still exists in the township. The rankings in Lumberton are primarily the result of habitat being either critical or suitable for rare bird species such as the bald eagle, barred owl, eastern meadowlark, and upland sandpiper, or for endangered reptiles and amphibians such as the Fowler's toad. See **Map 16: Landscape Project Habitat Priorities**.

Table 15: Landscape Project Habitat Rankings – Acreage in Lumberton Township

Category	Rank	ACRES	% of Total Habitat	% of All Lumberton Land
Forested Wetlands	Critical Habitat (5)	35.74	0.54%	0.43%
	Critical Habitat (3)	215.17	3.24%	2.58%
	Suitable Habitat (2)	32.23	0.48%	0.39%
	Suitable Habitat (1)	766.44	11.53%	9.19%
Upland Forest	Critical Habitat (5)	248.38	3.74%	2.98%
	Suitable Habitat (2)	1,088.23	16.37%	13.06%
Emergent Wetlands	Critical Habitat (5)	63.63	0.96%	0.76%
	Suitable Habitat (1)	1,055.92	15.88%	12.67%
Grassland	Critical Habitat (5)	1,432.34	21.55%	17.18%
	Critical Habitat (4)	5.58	0.08%	0.07%
	Suitable Habitat (2)	1,703.97	25.63%	20.44%
Total Habitat		**6,647.62**	100.00%	79.75%
Total Lumberton Land		**8,335.75**		**100.00%**

Source: NJDEP, 2006


Map 16:
Landscape Project
Habitat Priorities (2006)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
Burlington County Airport
Kirby's Mill
South Branch Rancocas Creek
Southwest Branch Rancocas Creek
Little Creek
Masons Creek
Haynes Creek
Bobby's Run
Municipal Road
Chestnut St
Mount Holly ByPass
Main St
Bridge Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Haines Rd
Ark Rd
Bella Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Smithville Rd
Country Club Rd
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541
686
Delaware Valley Regional Planning Commission
July 2006
Miles
0
0.25
0.5
1
Natural Heritage Priority Site
Emergent Wetlands Conservation Priority
Critical Habitat
Suitable Habitat
Forested Wetlands Conservation Priority
Critical Habitat
Suitable Habitat
Grasslands Conservation Priority
Critical Habitat
Upland Forest Conservation Priority
Critical Habitat

Landscape Project Data on Wetland Habitat

The Landscape Project divides wetland habitats into two types: forested and emergent wetlands. Emergent wetlands are marshy areas characterized by low-growing shrubs and herbaceous plants in standing water. About 1,055 acres (16% of total land area) in Lumberton are identified as priority emergent wetlands habitat and are ranked at the suitable level. About 64 acres (less than 1%) are classified as critical habitat. Animal species that can be found in these wetland habitats include endangered turtles, rare fish, mollusks, crustaceans, and insects. Emergent wetlands are also important habitat for migratory waterfowl and passerines (smaller perching birds) such as migrating flycatchers and warblers.

Lumberton's forested wetlands are the third most common Landscape Project habitat type in the township, occupying 1,049 acres (13% of total land area). About 251 acres (3%) of total land area) are identified as critical habitat. Forested wetland habitat in Lumberton is located along the upper stretches of the Rancocas Creek north of Creek Road, and Mason's Creek, near the Burlington County Airport. 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).

Landscape Project Data on Upland Forest Habitat

The Landscape Project ranks 1,337 acres (16% of Lumberton's total land cover) as suitable or critical upland forest habitat. More than 248 acres (3% of total land area) are ranked as critical upland habitat. This swath of critical upland forest is found in the northeastern section of Lumberton, immediately north and south of Route 38 and surrounded by development and farmland, respectively. Suitable upland forest habitat can be found along the Rancocas Creek South and Southwest branches and Bobby's Run.

Landscape Project Data on Grassland Habitat

The Landscape Project designates nearly 38% of the township as suitable or critical grassland habitat. Approximately 1,438 acres of farmland (17% of total land area) are ranked as critical grassland-species habitat. These areas are found in the southwestern quadrant of the township, bordering Hainesport Township to the west and Medford Township to the south. Another 1,704 acres of farmland (20.4% of total land area) are ranked as suitable grassland-species habitat. These areas are found throughout the eastern half of the township. Grassland-dependent species are the most threatened group of species in New Jersey, primarily because the most common form of grassland habitat – agricultural fields – is the most threatened habitat in the state due to development pressure and rising land values. Unfortunately, much of the critical grassland habitat in Lumberton has been displaced by residential development.

Nearly all of Lumberton's agricultural land is designated as critical or suitable grassland habitat because of some of the following reasons: (1) migrating birds cannot visually distinguish cropland from grassland; (2) cropland turns into grassland when it is fallow for one year or more;

(3) some crops, like alfalfa and soybeans provide suitable nesting habitat for some birds, especially for sparrows; and (4) all or most of Endangered and Threatened birds are area-sensitive, requiring large ranges that include agricultural "grasslands." The Landscape Project includes this land in its assessment because agricultural lands provide important disturbance buffers between the rare and endangered wildlife species and humans, and between the rare species and widespread predatory animals like dogs and cats.

Examples of grassland-dependent species that use grassland habitat for nesting or feeding include the grasshopper sparrow, vesper sparrow, and some species of butterflies and moths.

Source: DVRPC

Preserved open space along Bobby's Run provides critical upland forest habitat and suitable wetlands habitat for threatened and endangered species.

ANIMAL COMMUNITIES

Although no comprehensive inventory of the different animal species within New Jersey, Burlington County, or Lumberton Township exists, there are records of sightings, biological studies of range, and assessment of endangered and threatened status. Using federal, state, and other scientific sources, it is possible to identify and describe known and possible animal communities of Lumberton Township.

Invertebrates

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

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 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 (page 37).

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. Of particular interest are freshwater mussels. At one time, freshwater mussels were abundant in the streams of the area and were a major food source for native peoples. Parts of Rancocas Creek provided suitable mussel habitat. Unfortunately, due to destruction of suitable aquatic habitats by dams and pollution, the native mussel population has sharply declined. Of those species on the New Jersey Endangered and Threatened list, one, the dwarf wedgemussel, is listed as endangered under the federal Endangered Species Act

Vertebrates

Vertebrates are less numerous than invertebrates but their larger size makes them much more visible, and thus better studied and recorded. Fish species are fairly well documented, as are mammals. Birds that nest in the township are known, but migrants that depend on Lumberton's wet forests as stopover sites in which to rest and feed are not as thoroughly inventoried.

Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are more than 500 mammal species in New Jersey, of which only nine are listed as endangered and none are listed as threatened by the state. Some common mammals found in Lumberton Township include cottontail rabbits, eastern gray squirrels, skunks, little brown bats, raccoons, and white-tailed deer.

Management of white-tailed deer is an issue in New Jersey. While many residents prize the presence of mammalian life, deer often come into conflict with humans in suburban areas. According to the US 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; and because the principal method of culling the population – hunting – is 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 sharpshooting, 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 bad tasting plants on commercial and residential properties, using taste-based and odor-based repellents, and employing traps and translocation techniques.

Birds

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

Common birds in Lumberton Township and Burlington County are 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 the township. The

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, or 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.

NJDEP issued a fish advisory for the following species of fish in Burlington County: largemouth bass, smallmouth bass, striped bass, chain pickerel, yellow bullhead, sunfish, brown bullhead, American eel, striped bass, channel catfish, white catfish, and bluefish. Recreational fishermen and women should regularly check for local fish advisories on NJDEP's Division of Science, Research and Technology web site: http://www.nj.gov/dep/dsr/njmainfish.htm

bald eagle, an endangered bird species; the upland sandpiper, another endangered bird species; the barred owl, a threatened bird species; and other rare species have been sighted in the township. According to the Landscape Project, Lumberton contains suitable habitat for a variety of predatory birds including hawks, falcons, and especially eagles.

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

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

Common Reptiles and Amphibians

Reptiles can be quite elusive when surveys attempt to document them. Some species, such as the Fowler's toad (a species of special concern), have been well documented in Lumberton. Amphibians of some types are abundant, such as bullfrogs. Other species are rare because they depend on vernal ponds, as was discussed in the Surface Waters – Vernal Pools section of this document (page 34).

Fishes

When European settlers arrived in present-day Burlington County, they encountered Native Americans 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 water bodies, and conducts research and management surveys.

Rudolf G. Arndt, a professor at the Richard Stockton College of New Jersey, created the "Annotated Checklist and Distribution of New Jersey Freshwater Fishes, with Comments and Abundance" (see **Sources of Information**) by drawing together all the fish inventories for New Jersey, along with his own collection data. Thirty fish species are documented in the waterways of Lumberton. A record of those fish species is included in **Appendix C: Vertebrate Animals Known or Probable in the Township of Lumberton.**

Endangered Vertebrates

According to the Natural Heritage Database and the Landscape Project, a significant amount of rare wildlife has been sighted in Lumberton Township over the course of the past 100 years. Brief descriptions of a few such species and their preferred habitat, provided by the New Jersey Fish and Wildlife Service, follow:

The bald eagle (*Haliaeetus leucocephalus*) is an endangered species in New Jersey. Its seven- to eight-foot wingspan, full white head, and dark brown plumage make the bald eagle very identifiable. Their habitat consists of areas of forest near the Delaware River and its tributaries. Bald eagles choose the largest and tallest trees in a forest to set up their nests. They also prefer these trees to be in close proximity of water. This allows the bald eagle to forage for fish from its nest. The bald eagle population was depleted in New Jersey through habitat destruction, shootings, intentional poisonings, and especially the application of DDT, a pesticide that was widely used in post-World War II New Jersey to control the mosquito population. This chemical accumulated in the bodies of the bald eagle, which caused the eggshells of fledgling bald eagles to crack easily during the incubation period. By 1970, only one bald eagle nest remained in the state. As a direct result, the bald eagle was listed as endangered under New Jersey's Endangered Species Act in 1974. New Jersey's bald eagle population has improved since the federal government placed a ban on DDT in 1972. In 2001, the New Jersey Endangered and Nongame Species Program recorded 27 bald eagle nests as active in the state. That number continues to grow.

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, overexploitation, 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.

The barred owl (*Strix varia*) is a threatened species in New Jersey. It is a large, fluffy-looking owl with brown barring on the upper breast and brown streaking on the lower breast and belly. Its eyes are a distinctive dark brown color. Traditionally,

the barred owl was known as the "swamp owl." This name originated from the barred owl's choice habitat in old-growth wetland forests. The owl needs old-growth, mature, wet woods that contain large trees with cavities for nesting. In southern New Jersey, the barred owl inhabits both deciduous wetland forests and Atlantic white cedar swamps associated with stream corridors. Mixed hardwood swamps, dominated by red maple and black gum, are also suitable habitats. The destruction of these old-growth wetland forests during the post-World War II building boom is thought to be the main reason for the decline of the barred owl. Hunting has also played a part in the barred owl's precarious situation. In 1979, the barred owl was listed as a threatened species in New Jersey. Currently, the barred owl population is declining further as forested lands become developed.

The eastern box turtle (*Terrapene carolina*) is listed as a species of special concern in New Jersey. It is known to be present still in Lumberton Township. This small (four- to six-inch) turtle can be found all over the state and lives in many different habitats. Their tall, domelike shells and coloration – which ranges from spots of yellow, orange or olive on a dark brown background – can identify them. Even though eastern box turtles can live in many different habitats, they are mostly terrestrial. However, box turtles enjoy soaking themselves in water or mud during the summer. Continued residential development has limited the habitats available to the eastern box turtle and reduced their numbers over the years.

The eastern meadowlark (*Sturnella magna*) is a medium-sized songbird whose numbers are in decline in Lumberton Township. The eastern meadowlark can be discerned by its yellow throat, chest, and belly accentuated with a streaked brown back. The eastern meadowlark's habitat consists of grasslands, pastures, hayfields, cropland, golf courses, and other various types of open fields. Their nests are constructed on the ground, intertwined with the surrounding grasses. Often their nests have roofs or arches for added protection. The eastern meadowlark's numbers are declining in recent years in relation to agriculture's decline in southern New Jersey. The large expanses of farms that covered Burlington County provided the eastern meadowlark with many habitat choices.

The Fowler's toad (*Bufo woodhousii fowleri*) is a species of special concern in New Jersey. It is a small (two- to three-inch) toad that can be identified by its brown/dark brown colorations, multiple warts, and light line running down its spine. Fowler's toads inhabit sandy locations and vernal pools throughout the state. In Lumberton, the health of the species is linked to the health of the few remaining vernal pools. These pools are favored breeding grounds of the toad.

The upland sandpiper (*Bartramia longicauda*) is an endangered species in New Jersey. Inhabiting dry inland fields, upland sandpipers are slender, brown shorebirds with thin necks, long tails, varied brown colorations, and long yellow legs. The bill of the upland sandpiper is short and straight with a slight curve at the tip. The upland sandpiper inhabits grasslands, fallow fields, and meadows that are often associated with pastures, farms, or airports. Pastures that particularly receive light to moderate levels of grazing offer quality habitat for upland sandpipers. Hayfields and small farms also provide habitats; however, large monocultures of row crops are of limited value because of heavy mechanical and chemical activity. Airports also provide habitat for the upland sandpiper, especially in southern New Jersey. In Lumberton, the South Jersey Regional Airport provides such critical habitat. During the nineteenth century, the

upland sandpiper populations grew rapidly as agricultural fields expanded production in southern New Jersey. However, by the turn of the twentieth century the upland sandpiper was on the verge of extinction in New Jersey, caused by overhunting. Recovery throughout the first half of the twentieth century was followed by the development of modern monoculture farming in the second half, which has caused substantial habitat loss and has exacerbated the quick decline in the sandpiper population. As a result, the State of New Jersey placed the upland sandpiper on its threatened species list in 1979, and, in 1984, upgraded its status to endangered. However, the upland sandpiper is only considered a species of management concern at the national level.

See **Appendix C** for a list of *Vertebrate Animals Known or Probable in the Township of Lumberton*.
See **Appendix D** for a list of *Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lumberton Township.*
See **Appendix E** for a list of *State Endangered and Threatened Species*.

NATURAL HERITAGE DATABASE AND NATURAL HERITAGE PRIORITY SITES

Natural Heritage Priority (NHP) sites are areas designated by the New Jersey Division of Parks and Forestry's Office of Natural Lands Management as exemplary natural communities within the state that are critically important habitats for rare species. Preserving these areas is a top priority for efforts to conserve biological diversity in New Jersey.

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

NHP designations are based on the records of the Natural Heritage Database, which lists documented sightings of endangered and threatened species. Information on particular sites may also be provided by the Nature Conservancy or by the NJDEP Endangered and Nongame Species Program, and especially through the latter agency's Landscape Project.

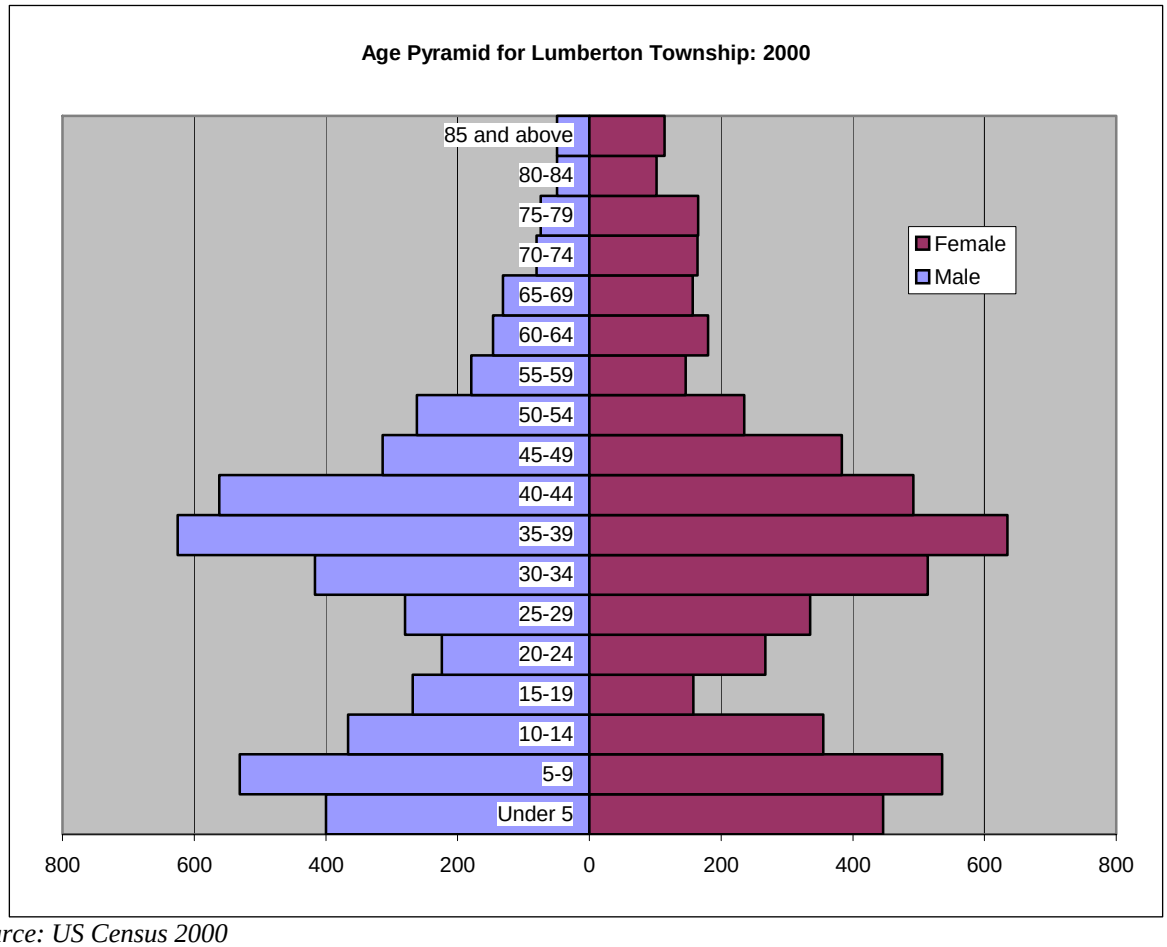
Lumberton Township has within its borders one of only 410 NHP sites in New Jersey: the **Burlington County Airport NHP Site** located on and around the South Jersey Regional Airport. The site's delineation extends to the north along the boundary between the airport and agricultural fields, to the west along Masons Creek, to the south near Lumberton's border with Medford Township, and to the east adjacent to a rising hill of upland forest. It is a habitat, which is 70% open grasslands, 19% forest, and 11% intense human use. It is ideal habitat for grassland bird species that prefer to nest in forests adjacent to large areas of open land. The **Burlington County Airport NHP Site** has a biodiversity rating of B5, meaning it is of general biodiversity interest. According to the Natural Heritage Database, state-designated endangered and state threatened birds species were sighted on this site. See **Map 16: Landscape Project Habitat Priorities** for the location of this NHP site.

THE BUILT ENVIRONMENT

POPULATION

The 1990 US Census listed a population of 6,705 residents for Lumberton Township. By the 2000 Census, this had grown to 10,341, which was an increase of 54% over the 1990 figures. DVRPC projections forecast 11,740 residents for Lumberton Township by 2005 and 13,040 by 2010.

According to the 2000 Census, 3,060 residents are under the age of 18, which is 30% of Lumberton's total population. Of those residents, 2,214 are children between the ages of 5 and 18. This age group represents those residents who are most physically active in the community and most likely to use public recreational facilities.



Source: US Census 2000

Information collected from the US Census data indicated that Lumberton experienced an explosive residential housing boom between 1990 and 2000, as more than 1,200 housing units

were built, increasing the number of housing units by 43%. This trend is continuing as the Lumberton Planning Board approved an additional 416 single-family homes in the years 2000 and 2001, and continues to have applications coming in for review.

TRANSPORTATION

Lumberton Township is located in Burlington County. It is almost equidistant from Center City Philadelphia and Trenton, New Jersey. Route 38 runs directly from the northern part of the township to the Benjamin Franklin Bridge, which connects Camden with Philadelphia. Interstate 295 – connecting Camden with Trenton – and the New Jersey Turnpike are within a few miles of the township. Lumberton has an advantageous position as it is part of the suburban and rural interior of large Burlington County, but has access to the major thoroughfares that traverse the county's urbanized communities in the west.

Route 38 is one of the main roads that connect Camden City, Cherry Hill, and Moorestown, with more rural areas of Burlington County. The major artery passes through Lumberton Township along its northern edge, but is far enough removed from the heart of the township to avoid some of the impacts associated with such a highway.

Continued easy access to major roads is integral to the quality of life of Lumberton residents because more than 90% of the township's employed population commutes to work by automobile, as reported by the 2000 US Census (nearly 85% of Lumbertonians commute by driving alone, while 10% carpool). Roughly 60% of the employed residents of Lumberton commute 30 minutes or less to places of employment. The mean travel time to work for New Jersey residents is 30 minutes.

County roads within the township include routes 541, 612, 636, 640, 641, and 691. These provide access and connections within the township, and are remnants of past land uses that connected farming centers of activity. The majority of them connect to Route 541 (Main Street). In some cases, these formerly rural routes struggle to handle the increasing volumes of traffic associated with the township's growth. Smaller roads in the township are a mixture of old rural lanes and newer subdivision thoroughfares.

Much like the Rancocas Creek, which supported thriving industry, commerce, and shipping ports, the county routes brought early settlers and travelers to Lumberton. They traveled through Lumberton on bumpy country roads as they made their way to larger communities. After the College of New Jersey was moved from Newark to Princeton in 1756, people traveling from all points south of Lumberton, including Philadelphia and Camden, took Route 541 – a stagecoach route and toll road – through Medford, Lumberton, and Mount Holly to present-day U.S. Route 206, a toll road then as well. The busy toll road, Route 541 (Main Street), was at one time an Indian trail and people had to file across the Rancocas Creek bridge, crossing in a single line. In 1874, Lumberton residents raised private funds and used collected tolls to build a covered bridge, which was replaced by an iron bridge in 1891.

HISTORIC RESOURCES

Protection and preservation of historic structures, lands, and views are of high importance to Lumberton Township residents. The township has one site – the Eayres Plantation and Mill Site – on both the National and State Registers of Historic Places. Three additional sites and the Lumberton Historic District were issued a State Historic Preservation Office (SHPO) Opinion, which reviews a site's eligibility for inclusion on the State Register of Historic Places.[3] Numerous other sites may have the potential to be listed as local, state or national landmarks, but have not been nominated by local citizens or identified by SHPO for such a designation. The township boasts numerous 18th and 19th century structures, including charming storefronts and merchant homes, most of which are along Lumberton's Main Street. Some larger historic farm homesteads are scattered throughout the township.

See *Table 16: Sites Listed on the National & State Registers of Historic Places* for sites currently listed on the national and state registers.

Table 16: Sites Listed on the National & State Registers of Historic Places

Name	Location	Register	State ID#
John Bispham House	Route 38	State Historic Preservation Office Opinion 6/7/1979	820
Eayres Plantation and Mill Site	Eayrestown-Red Lion Road and East Bella Bridge Road	National & State	821
18th Century Grist and Fulling Mill		State Historic Preservation Office Opinion 10/30/1981	2993
Lumberton Historic District	Main Street between Lumberton-Bella Bridge Road and Ross Street	State Historic Preservation Office Opinion 6/30/1977	822
Mill Dam		State Historic Preservation Office Opinion 10/30/1981	2994

Source: New Jersey State Historic Preservation Office

The Lumberton Township Historical Society serves the township and collects and holds information on the community's historic resources. The historical society accepts donations of historic and interesting objects, and operates a museum, which is housed in the Ridgeway Gaun Building, located at 602 Main Street.

New Jersey municipalities are permitted to identify, designate, and regulate their own historic resources through the adoption of historic preservation ordinances (which are recognized as zoning laws under the New Jersey Municipal Land Use Law). While the township does not have an established historic district or historic preservation commission to oversee it, Township

[3] 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.

Ordinance 130-35 does authorize the establishment of such a district and commission to oversee a historic district. Lumberton's historic area, as reviewed by the New Jersey SHPO, includes parcels fronting Main Street between Bridge Road to the south and Ross Street to the north.

The National Park Service and the New Jersey SHPO jointly administer the Certified Local Governments (CLG) program, which provides technical assistance and funding for community-based preservation efforts. As of October 2003, only three municipalities in Burlington County – Burlington City, Evesham Township, and Mount Holly Township – are CLGs. To participate, municipalities 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. If Lumberton Township were to become a CLG, it would be eligible to draw on an exclusive pool of matching federal and state funds for program implementation or rehabilitation work.

There are also 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.

Source: DVRPC

Historic homes built in the 19th century line Lumberton's Main Street.

Investing in historic preservation efforts can provide a municipality with important and impressive returns. Private and public efforts to preserve and rehabilitate historic districts create attractive places to live, work and play; and stimulate new investment in older residential and commercial centers. A historic district, like that in neighboring Mount Holly, can become a regional draw for tourists and boutique customers. Furthermore, historic preservation maintains a municipality's character, distinctly separating it from other rural and suburban communities, for both new and established residents.

TOWNSHIP UTILITIES AND SERVICES

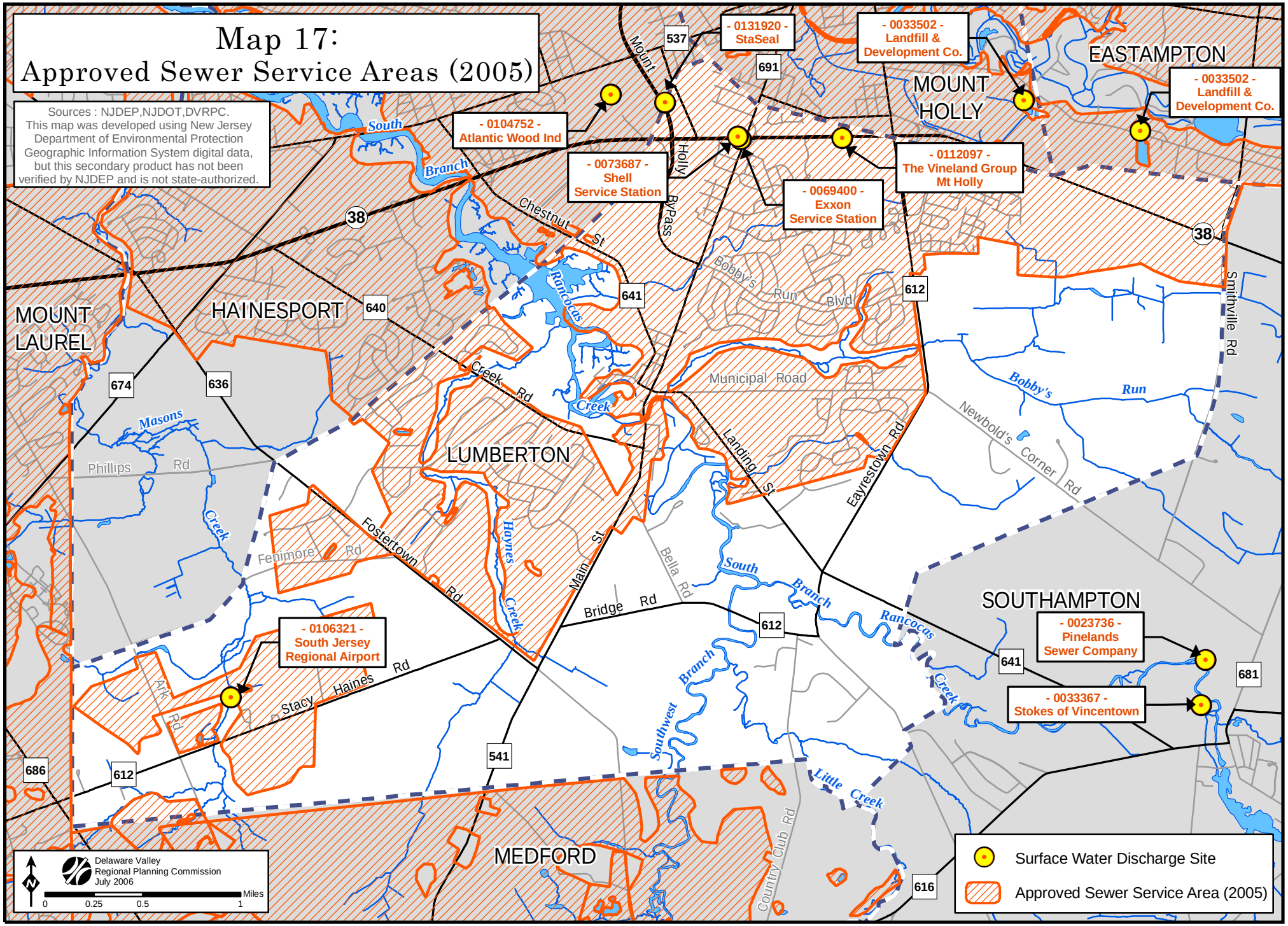
Drinking Water

Residences in the more developed sections of Lumberton, including the historic Village of Lumberton, are supplied with public drinking water by Mount Holly Water Company. Drinking water is derived primarily from public supply wells drilled into the PRM aquifer and located in neighboring Mount Holly Township (see **Aquifers**, page 52). Newer residential developments along Municipal Road, Bobby's Run Boulevard, and the western side of Eayrestown Road, are also served with public water. Township residents who live in less developed areas in the southern part of Lumberton rely on private wells.

There is only one public drinking water well, owned and operated by the Mount Holly Water Company and it is listed in *Table 12* on *page 55*. **Map 13: Water Supply Wells** on *page 54* shows it and the location of public noncommunity water supply wells.

Sewer

As with public water, sewer service is provided to the more developed sections of Lumberton, including the historic center and newer developments like Bobby's Run. The Village of Lumberton, the northern area between Eayrestown Road and Chestnut Street, mostly north of Municipal Road, and a band of land along the northern border east of Eayrestown Road, are approved for sewer service; meaning residents in other areas, which are increasingly residential, will be responsible for their own private septic service. All public sewage treatment is provided through the Mount Holly Municipal Utility Authority and its wastewater treatment plant, located on Rancocas Road in Mount Holly, which discharges to the north branch of the Rancocas Creek. The Mount Holly Municipal Utility Authority has applied to amend its Wastewater Management Plan to add two large areas of land to the sewer service area. One area is adjacent to existing development on the east side of Eayrestown Road. This area is the designated receiving area for the second phase in Lumberton's Transfer of Development Rights (TDR) program. The second area – known as Rockhill Farm – is south of Bridge Road and contains part of the southwest branch of the Rancocas Creek as it flows into Medford Township. These amendments are under review by NJDEP, as of January 2006.


Map 17:
Approved Sewer Service Areas (2005)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
- 0131920 - StaSeal
- 0033502 - Landfill & Development Co.
- 0104752 - Atlantic Wood Ind
- 0073687 - Shell Service Station
- 0069400 - Exxon Service Station
- 0112097 - The Vineland Group Mt Holly
- 0033502 - Landfill & Development Co.
- 0106321 - South Jersey Regional Airport
- 0023736 - Pinelands Sewer Company
- 0033367 - Stokes of Vincentown
MOUNT LAUREL
HAINESPORT
LUMBERTON
MOUNT HOLLY
EASTAMPTON
SOUTHAMPTON
MEDFORD
Municipal Road
Bobby's Run Blvd
Newbold's Corner Rd
Smithville Rd
Eayrestown Rd
Landing St
Main St
Bridge Rd
Fostertown Rd
Fenimore Rd
Phillips Rd
Haines Rd
Stacy Rd
Ark Rd
Bella Rd
Country Club Rd
Chestnut St
Mount Holly Bypass
Rancocas Creek
South Branch Rancocas Creek
Southwest Branch Rancocas Creek
Little Creek
Masons Creek
Haynes Creek
Bobby's Run
537
691
38
641
612
640
674
636
686
541
616
681
Delaware Valley Regional Planning Commission July 2006
0 0.25 0.5 1 Miles
Surface Water Discharge Site
Approved Sewer Service Area (2005)

See **Map 17: Approved Sewer Service Areas** for the location of the currently approved sewer service areas.

Township Services

Trash and Recycling

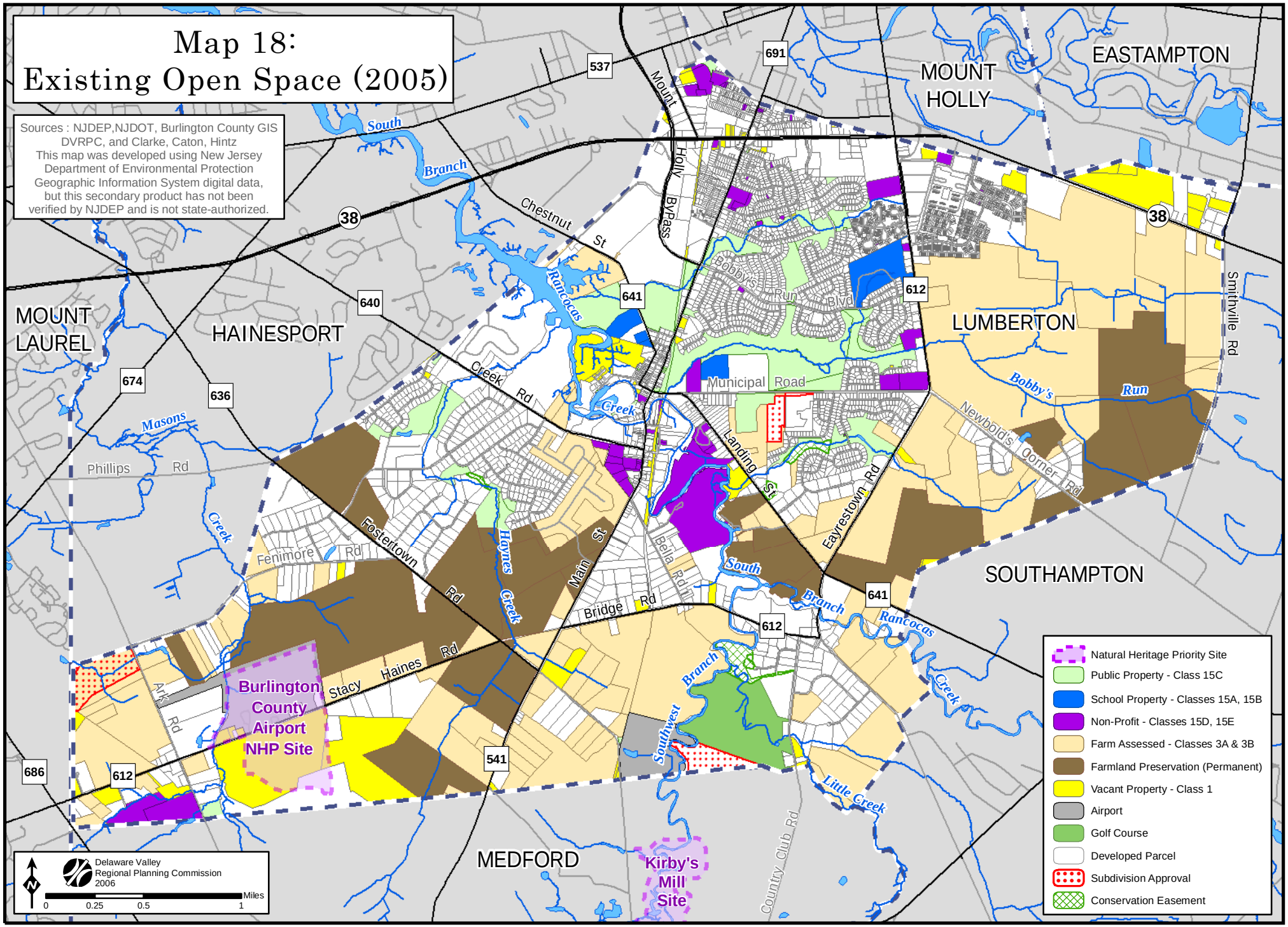
In Lumberton Township, trash is picked up on a weekly basis by municipal employees in the Department of Public Works. Burlington County collects commingled glass, metal cans, plastics, cardboard, and paper on a biweekly schedule. The Department of Public Works also schedules bulk trash (grass clippings, yard waste, Christmas trees) periodically through the year. The Public Works building is open on the first and third Saturdays of every month for disposal of household trash and hazardous materials such as concrete, bricks, pressure-treated wood, tires, car batteries, rechargeable batteries, household appliances, motor oil, antifreeze, and paint. Vegetative waste is processed at the Lumberton Township Recycling Center and used as landfill cover at the closed municipal landfill, or available for use as mulch by township residents. Hazardous materials are disposed of at a specially equipped landfill in Florence Township, Burlington County.

Education

Lumberton Township has one of the fastest growing public school systems in the state of New Jersey. Over the past ten years, Lumberton has added between 80 and 100 new pupils every year to the school population. In 2004-2005, Lumberton Township schools had 1,765 students enrolled in grades K-8. These 1,765 students are spread across three elementary schools and one middle school. The youngest of Lumberton's children – those enrolled in pre-kindergarten, kindergarten, and first grade – attend the Florence L. Walther School, located at 56 Chestnut Road. The children enrolled in second and third grade attend the Ashbrook School, which is located at 33 Municipal Drive. After attending Ashbrook, Lumberton's pupils move on to Bobby's Run School, located at 32 Dimsdale Drive, where they attend fourth and fifth grade. The final stop in the Lumberton School District is the Lumberton Middle School, which educates children in grades six through eight. After completing eighth grade, Lumberton's children attend the Rancocas Valley Regional High School, which is located at 520 Jacksonville Road in neighboring Mount Holly. This regional high school has a student population of 1,970 students that come from Eastampton, Hainesport, Lumberton, Mount Holly, and Westampton townships.

Parks and Recreation

Lumberton Township has an extensive recreation program for a modestly sized municipality. Lumberton's Public Works Department maintains over 411 acres of active and passive recreation lands, which include recreation facilities, sport fields, and large areas of natural lands along creeks. The township also employs a committed recreation director who works with a 12-person


Map 18:
Existing Open Space (2005)
Sources : NJDEP,NJDOT, Burlington County GIS DVRPC, and Clarke, Caton, Hintz
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
MOUNT LAUREL
HAINESPORT
MOUNT HOLLY
EASTAMPTON
LUMBERTON
SOUTHAMPTON
MEDFORD
Burlington County Airport NHP Site
Kirby's Mill Site
South Branch Rancocas Creek
Bobby's Run Blvd
Municipal Road
Chestnut St
Mount Holly ByPass
Creek Rd
Phillips Rd
Masons Creek
Fenimore Rd
Fostertown Rd
Haynes Creek
Main St
Bridge Rd
Bella Rd
Landing St
Eayrestown Rd
Newbold's Corner Rd
Smithville Rd
Stacy Haines Rd
Ark Rd
Southwest Branch
Little Creek
Country Club Rd
537
691
38
640
641
612
674
636
686
541
Natural Heritage Priority Site
Public Property - Class 15C
School Property - Classes 15A, 15B
Non-Profit - Classes 15D, 15E
Farm Assessed - Classes 3A & 3B
Farmland Preservation (Permanent)
Vacant Property - Class 1
Airport
Golf Course
Developed Parcel
Subdivision Approval
Conservation Easement
Delaware Valley Regional Planning Commission 2006
Miles
0
0.25
0.5
1

Recreation Advisory Committee and numerous local organizations and businesses to organize several ongoing community events, youth programs, and design initiatives.

Village Green is located on Main Street (Route 541) and offers passive open space and trails along Bobby's Run, as well as active recreation facilities, including tennis courts, playgrounds, a picnic area, a horse arena, and public restrooms. It connects to FL Walther Park, which offers public baseball fields and multipurpose fields adjacent to the FL Walther School. Bobby's Park is located within the Bobby's Run residential development. It is a large active recreation area with a hockey rink, playgrounds, baseball and softball fields, two soccer fields, a basketball court, tennis courts, passive open space, and a paved jogging trail. It is near the Nature Trail, which is along Bobby's Run between Main Street and Eayrestown Road. There are several other public park areas that are directly connected to newer residential developments. They include: Turnbridge Road Park, Canterbury Court Park, Country Village, and Glenwood Pocket Park.

In 2000, Lumberton Township residents approved a referendum to initiate a one-cent property tax dedicated to open space acquisition and preservation. The tax was increased to three cents in a 2003 referendum, and generated more than $70,000 annually. In 2005, the increased tax rate of three cents expired. A 2005 referendum to maintain the increased tax rate was defeated, as many voters believed new residences and a property value reassessment would generate the same level of open space funding. Despite this momentary setback, Lumberton continues its aggressive and proactive stance on open space and farmland preservation. In 1995, Lumberton became the first municipality (aside from those communities in the Pinelands area) to start a Transfer of Development Rights program. Over 1,400 acres of farmland have been permanently preserved by the township and Burlington County. In 2005, the township was awarded a Planning Incentive Grant for $1.5 million from the State Agricultural Development Commission.

See **Map 18: Existing Open Space 2005**.

Source: DVRPC

Holly Taylor, Mark Fisher, and Tom Polinski of Lumberton Township's Open Space and Environmental Preservation Council with Kerry Miller of the Association of New Jersey Environmental Commissions at Village Green.

ENVIRONMENTAL ISSUES

KNOWN CONTAMINATED SITES

There are 630 contaminated sites in Burlington County. Ten of these sites are located in Lumberton Township. There are also 9 sites in Mount Holly, 1 in Eastampton,, 2 in Mount Laurel, and 11 in Hainesport that are close to Lumberton's borders. See *Table 18: Known Contaminated Sites in Lumberton Township & Region*. See also **Map 19: Known Contaminated Sites**.

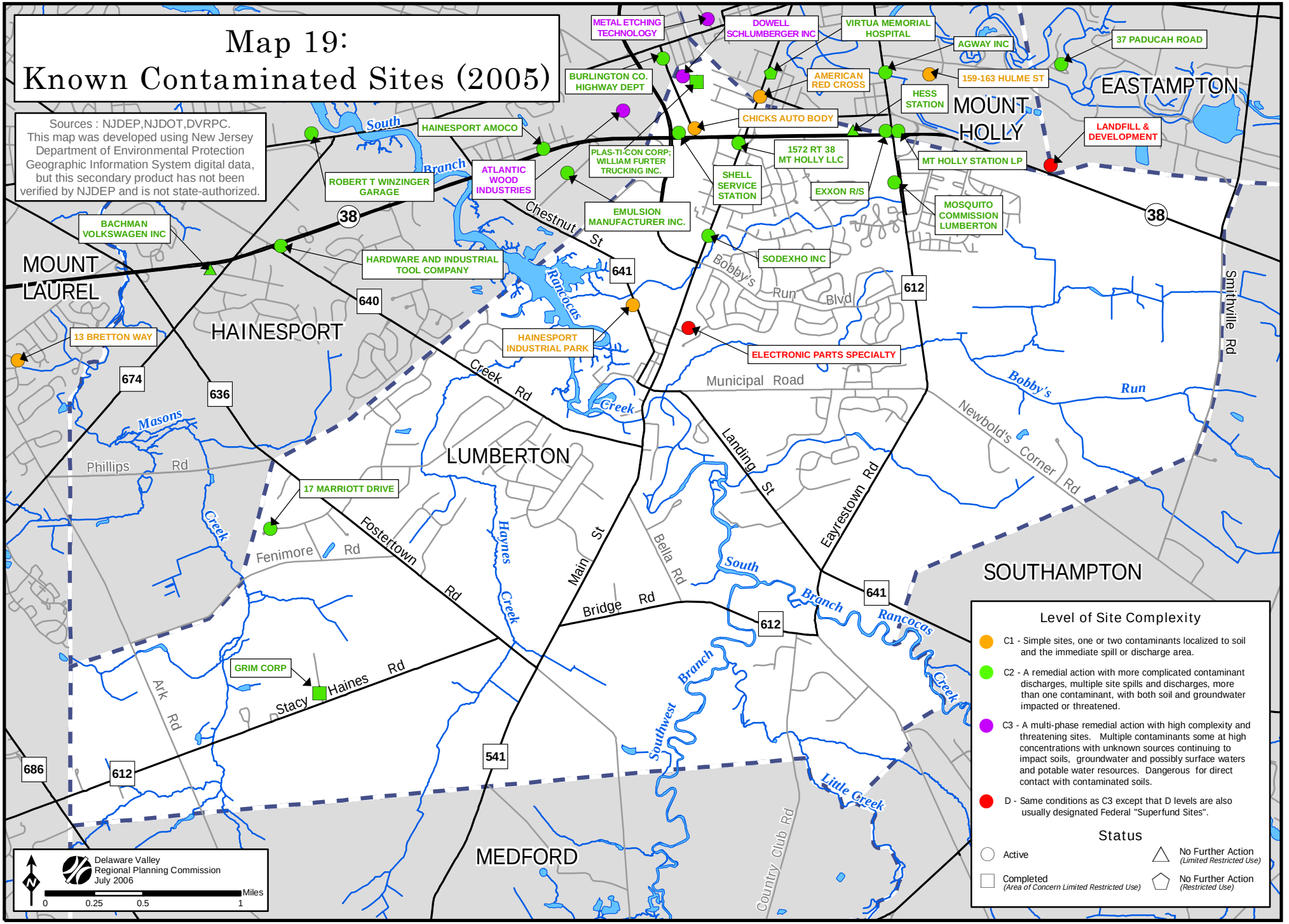
The New Jersey *Known Contaminated Sites List* includes former factory sites, landfills, and locations of current or former leaking underground storage tanks; sites where chemicals or wastes were once routinely discharged; and places where accidents have resulted in spills and pollution. Contamination 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 as Superfund sites, which make them eligible for federal and state cleanup funds. Other sites may be remediated by state cleanup funds (via the New Jersey Spill Compensation and Control Act), and the majority of the sites are remediated by the responsible parties as required pursuant to state and federal regulations.

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

The Lumberton landfill is a known contaminated site that is currently undergoing environmental remediation.

Underground Storage Tanks

There are a few commercial sites with regulated underground storage tanks that contain hazardous substances, pursuant to *N.J.A.C. 7:14B et seq*. They are listed in *Table 17: Underground Storage Tanks in Lumberton Township.* A site may also be listed on *Table 18: Known Contaminated Sites* depending on contamination level and remediation activity. There may also be private residences in Lumberton Township that still have underground storage tanks, used primarily to hold home heating oil. As these tanks age


Map 19:
Known Contaminated Sites (2005)
Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
METAL ETCHING TECHNOLOGY
DOWELL SCHLUMBERGER INC
VIRTUA MEMORIAL HOSPITAL
AGWAY INC
37 PADUCAH ROAD
BURLINGTON CO. HIGHWAY DEPT
AMERICAN RED CROSS
159-163 HULME ST
HESS STATION
EASTAMPTON
MOUNT HOLLY
CHICKS AUTO BODY
LANDFILL & DEVELOPMENT
HAINESPORT AMOCO
South Branch Rancocas Creek
PLAS-TI-CON CORP; WILLIAM FURTER TRUCKING INC.
1572 RT 38 MT HOLLY LLC
MT HOLLY STATION LP
ROBERT T WINZINGER GARAGE
ATLANTIC WOOD INDUSTRIES
SHELL SERVICE STATION
EXXON R/S
MOSQUITO COMMISSION LUMBERTON
38
Chestnut St
EMULSION MANUFACTURER INC.
BACHMAN VOLKSWAGEN INC
SODEXHO INC
MOUNT LAUREL
HARDWARE AND INDUSTRIAL TOOL COMPANY
641
612
Bobby's Run Blvd
640
HAINESPORT
HAINESPORT INDUSTRIAL PARK
Smithville Rd
13 BRETTON WAY
ELECTRONIC PARTS SPECIALTY
674
636
Municipal Road
Creek Rd
Creek
Bobby's Run
Masons Creek
Phillips Rd
LUMBERTON
Newbold's Corner Rd
Landing St
Eayrestown Rd
17 MARRIOTT DRIVE
Fostertown Rd
Haynes Creek
Main St
Bella Rd
Fenimore Rd
SOUTHAMPTON
Bridge Rd
South Branch Rancocas Creek
641
612
GRIM CORP
Stacy Haines Rd
Ark Rd
Southwest Branch Rancocas Creek
686
612
541
Little Creek
Country Club Rd
MEDFORD
Delaware Valley Regional Planning Commission
July 2006
Miles
0 0.25 0.5 1
Level of Site Complexity
C1 - Simple sites, one or two contaminants localized to soil and the immediate spill or discharge area.
C2 - A remedial action with more complicated contaminant discharges, multiple site spills and discharges, more than one contaminant, with both soil and groundwater impacted or threatened.
C3 - A multi-phase 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.
D - Same conditions as C3 except that D levels are also usually designated Federal "Superfund Sites".
Status
Active
Completed
(Area of Concern Limited Restricted Use)
No Further Action
(Limited Restricted Use)
No Further Action
(Restricted Use)

and rust, they often begin to leak, which becomes a serious threat to the groundwater below them. Those private residences are not publicly listed by NJDEP unless they pose a human health hazard.

Table 17: Underground Storage Tanks in Lumberton Township

ID Number	Name	Street Address	Town	Status	Lead Agency
227884	Wawa Food Market #957	Route 38	Lumberton	In compliance	BSCM
7382	1572 Route 38 Mount Holly, LLC	Route 38 & Lumberton Road	Lumberton	Active	BSCM
7612	Shell Service Station 138438	1543 Route 38 & Mount Holly Bypass	Lumberton	In compliance	BSCM
11296	Mosquito Commission – Lumberton	6500 Eayrestown Road	Lumberton	Active	BSCM

Source: NJDEP

Table 18: Known Contaminated Sites in Lumberton Township & Region

Site ID	Name	Address	Town	Status	Lead Agency*	Remedial Level*
10814	1572 RT 38 Mount Holly, LLC	RT 38 & Lumberton Road	Lumberton	Active	BOMM	C2
10819	Dowell Schlumberger, INC	28 Maple Avenue	Lumberton	Active	BNCM	C3
10821	Shell Service Station # 138438	1543 RT 38 – Mount Holly Bypass	Lumberton	Active	BOMM	C2
15485	Grim Corporation	Stacey Haines Road & Industrial Blvd.	Lumberton	CAC	BOMM	C2
40309	County Mosquito Commission	6500 Eayrestown Road	Lumberton	Active	BSCM	C2
48735	Plas-Ti-Con Corporation	30 Maple Avenue	Lumberton	CAC	BOMM	C2
48735	William Furter Trucking, INC	30 Maple Avenue	Lumberton	CAC	BOMM	C2
129054	17 Marriott Drive	17 Marriott Drive	Lumberton	Active	BFO-S	C2
157331	Chick's Auto Body	6 Maple Avenue	Lumberton	Active	BFO-S	C1
165211	Sodexho, Inc.	692 Main Street	Lumberton	Active	BFO-S	C2
170083	37 Paducah Road	37 Paducah Road	Eastampton	Active	BFO-S	C2
10833	Cumberland Farms # 2923	Marne Highway & Delaware Avenue	Hainesport	Active	BSCM	C2
10836	Atlantic Wood Industries	735 Route 38	Hainesport	Active	BNCM	C3
10841	Oakdale Service Center	903 Marne Highway	Hainesport	Active	BSCM	C2
25796	Hainesport Amoco	1205 Route 38	Hainesport	Active	BSCM	C2
40310	Burlington County Highway Department	9 Maple Avenue	Hainesport	Active	BSCM	C2
43238	Bachman Volkswagen, INC	2610 Route 38	Hainesport	NFA-A	BSCM	C2
51358	Robert T. Winzinger Garage	2025 Marne Highway	Hainesport	Active	BSCM	C2

Site ID	Name	Address	Town	Status	Lead Agency*	Remedial Level*
53005	Hardware and Industrial Tool Company	Route 38 & Creek Road	Hainesport	Active	BFO-S	C2
63984	Emulsion Manufacturer, INC	Industrial Blvd & Lumberton Road	Hainesport	Active	BFO-S	C2
64753	Hainesport Industrial Park	East Park Ave	Hainesport	Active	BFO-S	C1
74628	Colonial Chemical Company	5400 Delaware Ave	Hainesport	Active	BNCM	C2
14121	Electronic Parts Specialty (EPSCO)	Cole Street	Lumberton	Active	BDC	D
10693	Hess Station # 30297	Route 38	Lumberton	NFA-A	BSCM	C2
10697	Metal Etching Technology	4 Lippincott Lane	Mount Holly	Active	BNCM	C3
10699	Exxon R/S 3-2151	1651 RT 38 & Pine St.	Mount Holly	Active	BSCM	C2
10700	Mt. Holly Station, LP	RTE 38 & Pine St	Mount Holly	Active	BSCM	C2
14416	Virtua Memorial Hospital of Burlington County	175 Madison Avenue	Mount Holly	NFA-A	BSCM	C2
15906	Landfill and Development	Route 38	Mount Holly	Active/NPL	BCM	D
63684	Agway, INC	201-203 Pine Street	Mount Holly	Active	BFO-S	C2
88093	159-163 Hulme St	159-163 Hulme St	Mount Holly	Active	BFO-S	C1
123540	American Red Cross Building	205 Madison Ave	Mount Holly	Active	BFO-S	C1
65839	13 Bretton Way	13 Bretton Way	Mount Laurel	Active	BFO-S	C1
73307	309 Maple Road	309 Maple Road	Mount Laurel	Active	BFO-S	C1

Source: NJDEP (2005)

***** See tables that follow for explanations of Status, Lead Agencies, and Remedial Level

Explanation of Codes

Code	Status	Lead Agencies
NFA–A	No further action for a partial area of a site	
CAC	Completed – Area of Concern Limited Restricted Use	
NPL	National Priority List (also known as "Superfund")	
BOMM		Bureau of Operation, Maintenance & Monitoring
BFO-S		Bureau of Field Operations – Southern Office
BNCM		Buren of Northern Case Management (formerly Bureau of Environmental Evaluation, Cleanup and Response Assessment))
BSCM		Bureau of Southern Case Management (formerly BUST – Bureau of Underground Storage Tanks)

Explanation of Remedial Levels

Remedial Level	Explanation of Site Complexity
B	A single-phase remedial action in emergency response; simple removal activities of contaminants; usually no impact to soil or groundwater.
C1	A remedial action with simple sites; one or two contaminants localized to soil and the immediate spill or discharge area.
C2	A remedial action with more complicated contaminant discharges; multiple site spills and discharges; more than one contaminant, with both soil and groundwater impacted or threatened.
C3	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.
D	Same conditions as C3 except that D levels are also usually designated federal "Superfund Sites."
NA	Not assessed

See **Sources of Information, Section 7: Environmental Issues** for contact information of Lead Agencies.

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 severe flooding in Lumberton was a result of torrential rains combined with a series of dam failures in the Medford Lakes region. Eighteen dams failed and 27 were significantly damaged by the storm. 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.

The South Branch of the Rancocas Creek, which flows through the center of Lumberton, well exceeded measurements for the 100-year recurrence interval flood. The USGS 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. Lumberton's Main Street was submerged under six feet of water. 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. In Lumberton, 108 houses were damaged by the floodwaters for a total cost of $12 million. Flood insurance would have covered the damage. However, many people in the township did not have flood insurance and were left

financing the rebuilding out of their own pockets. Many of those who did have flood insurance 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 toward 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 year since the storm, the state of New Jersey 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.

Although dam upgrades occurring upstream would mitigate the impact of future floods, Lumberton needs to address stormwater drainage. As the amount of impervious surface increases in the developing community, the severity of floods will also increase. Unfortunately, flooding is inevitable when 13 inches of rain falls on an area in a 24-hour period. The severity of these incidents can be decreased by better stormwater drainage practices. Additionally, preserving land in floodplains and limiting impervious surface coverage can reduce the damage caused by torrential rain events.

RADON

Radon is a radioactive gas that comes from the natural decay of uranium found in nearly all soils. It is invisible, odorless, and tasteless. It moves up through the ground to the air above, and into all types of homes through cracks and other holes in foundations. A build-up of radon-contaminated air within a home can pose a long-term health hazard to residents, specifically for lung cancer. The only method of detection is to conduct a test of the air within a home. Fortunately, radon testing is inexpensive.

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.

NJDEP classifies townships into three categories as to the risk of having high radon levels. Lumberton Township is listed as a Tier 2 municipality with moderate risk of having high radon levels in homes. Tier 3 is the lowest level. The level at which homeowners should take immediate action is 4.0 picocuries per liter in air. While state law does not require radon testing before a real estate transaction, NJDEP recommends that a contingency clause be included in a sale contract allowing the buyer to have the home tested for radon and fixing the home if an elevated level of radon gas is discovered. State law (N.J.A.C. 26:2D-73) does require, at the time of a real estate transaction, that the seller provide the buyer with a copy of the results of any radon testing if such testing was conducted during tenure.

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To learn more about a contaminated site, contact one of the lead agencies overseeing the case or visit the web site: http://www.state.nj.us/dep/srp/. Site Remediation and Waste Management, formerly known as the Site Remediation Program, is a program unit within NJDEP that provides financial aid and technical guidance in cleaning up the state's more serious contaminated sites that pose a danger to human health and the environment. SRWM maintains an inventory of 38,000 sites, of which 25,000 require no further remediation action. The bureaus within SRWM are listed below for easy reference:

Bureau	Acronym	Telephone No.	Bureau	Acronym	Telephone No.
Case Management	BCM	(609) 633-1455	Field Operation - Case Assignment Section	BFO-CA	(609) 292-2943
Construction	BC	(609) 984-2991	Field Operations - Initial Notice	BFO-IN	(609) 633-0708
Emergency Response Region I	BER-I	(973) 669-3955	Field Operations - Northern Field Office	BFO-N	(973) 669-3960
Emergency Response Region II	BER-II	(609) 584-4130	Field Operations - Southern Field Office	BFO-S	(609) 584-4150
Environmental Evaluation, Cleanup and Responsibility Assessment	BEECRA	(609) 777-0899	Fund Management, Compliance and Recovery	BFMCR	(609) 633-0719
Environmental Measurements and Site Assessment	EMSA	(609) 584-4280	Site Management	BSM	(609) 984-2990
Underground Storage Tanks	BUST	(609) 292-8761			

CITATIONS

P.L. 93-205. *Federal Endangered Species Act of 1973 (ESA).*

P.L. 95-217. *Federal Clean Water Act.*

P.L. 96-510. *Federal Comprehensive, Environmental Response, Compensations and Liability Act of 1980 (CERCLA).*

P.L. 105-312. *Federal Migratory Bird Treaty Act of 1918.*

N.J.S.A. 13:1B-15.151 et seq. *New Jersey Endangered Plant Species Act.*

N.J.S.A. 23:2A et seq. *New Jersey Endangered and Nongame Species Conservation Act of 1973.*

N.J.S.A. 58:10A-1 et seq. *New Jersey Water Pollution Control Act.*

N.J.S.A 58:16A-50 et seq. *New Jersey Flood Hazard Area Control Act.*

N.J.A.C. 7:7A et seq. *New Jersey Freshwater Wetlands Protection Act Rules.*

N.J.A.C 7:8 et seq. *Stormwater Management Rules*

N.J.A.C. 7:9B-1.12. *New Jersey Surface Water Quality Standards.*

N.J.A.C. 7:9E. *Private Well Testing Act*

N.J.A.C. 7:13 et seq. *New Jersey Flood Hazard Area Control.*

N.J.A.C. 7:14A-2 et seq. *New Jersey Pollution Discharge Elimination System – General Program Requirements.*

N.J.A.C 7:15 et seq. *Water Quality Management Planning Rule*

N.J.A.C. 10:1B. *Open Public Records Act of 2002*

Lumberton Township Ordinance 130-35. *Historic/Architectural District and historic sites.*

APPENDIX A: 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, 5 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 groundwater 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.

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)

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 groundwaters tend to be acidic (pH below 7), while groundwaters 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.

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 Burlington, Camden, Gloucester, and Salem – are required to test for mercury, which has been linked to neurological problems.

The test results for Burlington County and Lumberton Township are summarized in the table below. NJDEP's initial report indicates the presence of several drinking water contaminants – including mercury; gross alpha (radium); 1,2,3 trichloropropane; and 1,2 dichloropropane – in the county's groundwater, but not necessarily in the township's groundwater.

Summary of PWTA Test Results for Burlington County (September 2002 – March 2003)

Municipality	**# Wells sampled**	**Total # Wells over the MCL***	**Fecal coliform/ E. coli**	**Nitrate**	**Mercury**	**Any VOC** over the MCL**
Lumberton Township	8	0	0	0	0	0
Burlington County Totals	***392***	***15***	***2***	***12***	***1***	***0***

Source: NJDEP, Division of Science, Research, and Technology (DSRT)

* MCL – Maximum Contaminant Level, set as the limit of a particular substance allowable to achieve a water quality standard
** VOC – Volatile Organic Compound.

APPENDIX B: Federal and State Conservation Programs for Farmers

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

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

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: 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 an agreement signed by Governor McGreevy in February 2004, the USDA provides $77 million and the state contributes $23 million for New Jersey farmers to install stream buffers, in order to reduce the flow of nonpoint source pollution into the state's waterways. New Jersey's goal is to enroll 30,000 acres of agricultural land into this state-federal program over a 10-year period. 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 or contact the local 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 Farm Security and Rural Investment Act of 2002 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/farmbill/2002/

The **Grassland Reserve Program (GRP)** is another conservation program authorized by the Farm Bill 2002. 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, hay production, 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.fsa.usda.gov/dafp/GRP/default1.htm

The **Wildlife Habitat Incentives Program (WHIP)** is similar to those above in that it is also a USDA voluntary program, but differs in that WHIP targets landowners who want to preserve and protect fish and wildlife habitat on nonfederal lands. The program provides technical and cost sharing provisions to protect these environments. Enrollment consists of a cost-share agreement lasting from 5 to 10 years. In New Jersey, NRCS has received over $900,000 to implement WHIP since 1998, where the majority of funds has been used for cost-share payments to landowners. A state plan has been developed in New Jersey and targets several areas as priority wildlife habitat areas. NRCS has also targeted a priority species – the bog turtle – for protection. For more information visit the NRCS New Jersey website: www.nj.nrcs.usda.gov

The **Environmental Quality Incentives Program (EQIP)** is also a part of the reauthorized Farm Bill of 2002. 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

The **Conservation Security Program (CSP)** is a voluntary program administered by the NRCS and authorized by the Farm Bill 2002. 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 rangeland. 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/csp/

The **Forestland Enhancement Program (FLEP)** is also authorized through the Farm Bill 2002 and replaces the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP). FLEP is a voluntary program for landowners of nonindustrial private forest and provides

technical, educational and cost-sharing assistance in an effort to promote the conservation of these forested areas. Landowners must have a forest management plan and are limited to 1,000 acres per year for the cost-share practices. For more information about this program, please visit the website: http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml and the National Association of State Foresters website to find your local agency: www.stateforesters.org

The **Farm and Ranch Lands Protection Program (FRPP)** is a voluntary land conservation program that assists farmers to keep 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 authorized by the Farm Bill 2002 and managed by the NRCS. Conservation easements are purchased by the state, tribal or local entity. The participating landowner agrees not to convert their land to nonagricultural uses, as well as 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/farmbill/2002/ and search for the Farm and Ranch Lands Protection Program.

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 eight-year easement program. Soil projects can include measures to prevent or control erosion, control pollution on agricultural land, and improve water management for agricultural purposes. Projects must be completed within three years of SADC funding approval. However, under special circumstances the grant may be renewed for an additional year. For more information contact the local Soil Conservation District or the State Agricultural Development Committee at (609) 984-2504 or visit the website: 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 administered by the New Jersey Department of Environmental Protection's Division of Fish and Wildlife Endangered Nongame Species Program. Participating landowners receive both technical and financial assistance through this competitive grant program. Last year, $1.12 million was awarded for a variety of preservation programs including habitat improvements, habitat management and habitat protection projects. 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. Interested landowners are encouraged to contact Kim Korth, ENSP assistant zoologist at (609) 984-1581 for additional details. To learn more about the program in general, visit the website: http://www.state.nj.us/dep/fgw/ensp/lip_prog.htm or http://www.state.nj.us/dep/fgw/ensp/pdf/lip_broch.pdf

APPENDIX C: Vertebrate Animals Known or Probable in the Township of Lumberton

Species	General Habitat	Township Locations
Mammals		
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
Birds		
Great Blue Heron	Open Marsh, Lake Edges	Throughout
Great Egret	Open Marsh, Lake Edges	Throughout
Snowy Egret	Open Marsh, Lake Edges	Throughout
Green-backed Heron	Open Marsh, Lake Edges	Throughout
Mute Swan	Open Water	Large Lakes
Snow Goose	Winter Migrant in Fields	Open Farms
Canada Goose	Open Water, Fields	Throughout
Wood Duck	Forested Wetlands	Throughout
Green-winged Teal	Wetlands	Winter Migrant
Black Duck	Marsh, Lakes	Throughout
Mallard	Wetlands	Throughout
Gadwall	Open Water	Winter Migrant
Blue-winged Teal	Wetlands	Winter Migrant
Northern Shoveler Duck	Open Water	Winter Migrant

Species	General Habitat	Township Locations
Ring-necked Duck	Open Water	Winter Migrant
Greater & Lesser Scaup	Open Water	Winter Migrant
Bufflehead	Open Water	Winter Migrant
Hooded Merganser	Open Water	Winter Migrant
Ruddy Duck	Open Water	Winter Migrant
Black Vulture	Open fields	Throughout
Turkey Vulture	All Habitats	Throughout
Osprey	Open Water	Lakes and Ponds
Northern Harrier	Open Fields	Throughout
Sharp-shinned Hawk	Woodlands	Throughout
Cooper's Hawk	Woodlands	Throughout
Red-shouldered Hawk	Wetland Forests	Throughout; Endangered
Broad-winged Hawk	Woodlands	Throughout
Red-tailed Hawk	All Habitats	Throughout
American Kestrel	Open Fields	Throughout
Ringed-neck Pheasant	Old Fields, Farms	Released; Throughout
Wild Turkey	Woodlands	Throughout
Bobwhite	Old Field, Woodlands	Throughout
Killdeer	Bare Ground, Lake Edges	Throughout
Lesser Yellowlegs	Lake Edges	Throughout
Solitary Sandpiper	Lake Edges	Throughout
Spotted Sandpiper	Lake Edges	Throughout
American Woodcock	Wetland Forests	Throughout
Laughing Gull	Open Water, Parking Lots	Summer Visitor
Ring-billed Gull	Open Water, Parking Lots	Throughout
Herring Gull	Open Water, Dumps	Winter Visitor
Rock Dove	Houses and Bridges	Residential Areas
Mourning Dove	Woodlands	Throughout, Common
Black-billed Cuckoo	Woodlands	Occasional
Yellow-billed Cuckoo	Woodlands	Throughout
Barn Owl	Farmland	Throughout
Eastern Screech Owl	Woodlands	Throughout
Great Horned Owl	Woodlands	Throughout
Barred Owl	Wetland Forests	Wooded Wetlands
Saw-whet Owl	Wetland Forests	Wooded Wetlands
Common Nighthawk	Upland Woodlands	Summer Night Sky
Chimney Swift	Bridges, House Chimneys	Residential Areas
Ruby-throated Hummingbird	Woodlands and Fields	Throughout
Belted Kingfisher	Wetlands	Throughout
Red-headed Woodpecker	Upland Forest	Raccoon Creek Forests
Red-bellied Woodpecker	Woodlands	Throughout
Yellow-bellied Sapsucker	Woodlands	Fall Migrant
Downy Woodpecker	Woodlands	Throughout
Hairy Woodpecker	Woodlands	Throughout
Northern Flicker	Woodlands	Throughout; Common
Wood Pee-wee	Woodlands	Upland Woods

Species	General Habitat	Township Locations
Eastern Phoebe	Woodlands	Throughout
Great Crested Flycatcher	Woodlands	Upland Woods
Eastern Kingbird	Fields, Farmland	Throughout
Purple Martin	Open Fields, Wetlands	Agricultural Areas
Tree Swallow	Wetlands	Throughout
Barn Swallow	Buildings, Bridges	Throughout
Blue Jay	Woodland	Throughout; Common
American Crow	All Habitats	Throughout, Common
Carolina Chickadee	Woodlands	Throughout, Common
Eastern Tufted Titmouse	Woodlands	Throughout, Common
White Breasted Nuthatch	Woodlands	Throughout
Brown Creeper	Woodlands	Throughout
Carolina Wren	Edge of Woodlands	Edges, Yards
House Wren	Edge of Woodlands	Throughout
Golden- and Ruby-crowned Kinglets	Woodlands	Winter Migrant
Eastern Bluebird	Edge of Woodlands	Throughout
Wood Thrush	Woodlands	Throughout
American Robin	All Habitats	Throughout, Common
Catbird	Edge of Woodlands	Throughout
Mockingbird	Edge of Woodlands	Throughout, Common
Brown Thrasher	Woodlands	Throughout
Cedar Waxwing	Old Fields, Young Woodlands	Throughout
Starling	All Habitats	Residential Areas; Pest
White-eyed Vireo	Woodlands	Throughout
Philadelphia Vireo	Woodlands	Migrant
Red-eyed Vireo	Woodlands	Wetland Forests
Yellow Warbler	Upland Forest	Throughout
Chestnut-sided Warbler	Woodlands	Migrant
Black-throated Blue Warbler	Woodlands	Migrant
Yellow-rumped Warbler	Woodlands	Throughout
Pine Warbler	Woodlands	Throughout
Prairie Warbler	Shrubby Areas	Throughout
Palm Warbler	Pine Woodlands	Throughout
Black and White Warbler	Pine Woodlands	Migrant
American Redstart	Rich Woodlands	Throughout
Ovenbird	Woodlands	Throughout
Yellowthroat	Shrubby Areas	Throughout
Scarlet Tanager	Woodlands	Throughout
Cardinal	Edge of Woodlands	Throughout; Common
Indigo Bunting	Edges of Old Fields	Throughout
Chipping Sparrow	Woodlands	Throughout
Field Sparrow	Old Fields	Throughout
Song Sparrow	Old Fields	Throughout
White-throated Sparrow	Woodlands	Winter Migrant
Dark-eyed Junco	Woodlands	Winter Migrant

Species	General Habitat	Township Locations
Common Grackle	All Habitats	Throughout; Common
Brown-headed Cowbird	Open Areas	Throughout; Pest
Orioles: Orchard and Baltimore	Woodlands	Throughout
House Finch	Open Areas	Throughout
Pine Siskin	Woodlands	Winter Migrant
American Goldfinch	Open Areas, Old Fields	Throughout
House Sparrow	Old Fields	Residential Areas; Common
Reptiles		
Bog Turtle	Muddy Agricultural Fields/Wetlands	Endangered
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 Water Snake	Wetlands	Throughout
Garter Snake	All Habitats	Throughout
Eastern Ribbon Snake	Wetlands	Throughout
Southern Ringneck Snake	Woodlands	Throughout
Northern Black Racer	Edge of Woodlands	Throughout
Rough Green Snake	Woodlands	Throughout
Black Rat Snake	All Habitats	Throughout
Amphibians		
Red-backed Salamander	Woodlands	Throughout
Fowler's Toad	Uplands	Throughout
Spring Peeper	Wetlands	Throughout
Bull Frog	Lakes and Ponds	Throughout
Green Frogs	Wetlands	Throughout
Wood Frog	Woodlands	Throughout
Southern Leopard Frog	Wetlands	Throughout
Fishes		
American Eel	All Waters	Throughout
Blueback Herring	Rivers	Throughout
American Shad	Rivers and Streams	Throughout
Alewife	Rivers and Streams	Possible
Gizzard Shad	Rivers and Streams	Throughout
Satinfin Shiner	Rivers and Streams	Throughout
Common Carp	Streams	Throughout
Eastern Silvery Minnow	Rivers and Streams	Throughout
Golden Shiner	Streams and Ponds	Throughout
Ironcolor Shiner	Streams and Ponds	Throughout
Spottail Shiner	Streams and Ponds	Throughout

Species	General Habitat	Township Locations
Cheek Chub	Streams	Throughout
Fallfish	Streams	Throughout
White Sucker	Streams	Throughout
Creek Chubsucker	Streams	Throughout
White Catfish	Rivers and Streams	Throughout
Brown Bullhead	River, Lakes and Streams	Throughout
Yellow Bullhead	River, Lakes and Streams	Throughout
Channel Catfish	Rivers and Streams	Throughout
Redfin Pickerel	Streams, Lakes and Ponds	Throughout
Chain Pickerel	Lakes and Streams	Throughout
Pirate Perch	Streams	Throughout
Eastern Mudminnow	Streams	Throughout
Banded Killifish	Streams and Ponds	Throughout
Mummichog	Streams	Throughout
White Perch	Rivers, Streams, Lakes and Ponds	Throughout
Striped Bass	Lakes and Ponds	Throughout
Blackbanded Sunfish	Rivers, Streams, Lakes and Ponds	Throughout
Bluespotted Sunfish	Rivers, Streams, Lakes and Ponds	Throughout
Banded Sunfish	Rivers, Streams, Lakes and Ponds	Throughout
Bluespotted Sunfish	Streams and Ponds	Throughout
Redbreast Sunfish	Lakes and Streams	Throughout
Green Sunfish	Lakes and Streams	Throughout
Bluegill	All Waters	Throughout
Large-mouth Bass	Lakes, Ponds	Throughout
Pumpkinseed	All Waters	Throughout
Black Crappie	Lakes, Ponds	Throughout
Tessellated (Johnny) Darter	Streams	Throughout
Yellow Perch	Streams	Throughout
Walleye	Streams	Throughout
Swamp Darter	Swamps	Probable
Mud Sunfish	Streams and Swamps	Probable
Tadpole Madtom	Lakes and Streams	Probable

Source: Modified version of Table 11 of the *Environmental Resource Inventory for Franklin Township, Gloucester County New Jersey.* Fish data obtained from NJ Division of Fish & Wildlife, Bureau of Fisheries and from Arndt, Rudolf G. "Annotated Checklist and Distribution of New Jersey Freshwater Fishes…" See *Biological Resources* in **Sources of Information**, p. 93.

APPENDIX D: Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lumberton Township

Scientific name	Common Name	Federal Status*	NJ Status*	State Rank**
Ecosystems/Habitat				
Freshwater tidal marsh complex				S3
Haliaeetus leucocephalus	Bald eagle – foraging area	LT	E	S1B, S2N
Haliaeetus leucocephalus	Bald eagle – nest buffer	LT	E	S1B, S2N
Vertebrates				
Strix varia	Barred owl		T/T	S3B
Terrapene carolina	Eastern box turtle		Special concern	S5B
Sturnella magna	Eastern meadowlark		D/S	S3B, S4N
Bufo woodhousii fowleri	Fowler's toad		Special concern	S4
Bartramia longicauda	Upland sandpiper		E	S1B

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

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

**** Key to State Element Rank**

S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
S2	Imperiled in NJ because of rarity (6 to 20 occurrences).
S3	Rare in state with 21 to 50 occurrences. Includes elements that are widely distributed but with small populations/acreage, or with restricted distribution but locally abundant.
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.
B	Breeding populations
N	Nonbreeding populations

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

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

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

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

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

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

APPENDIX E: State Endangered and Threatened Species

Birds			
Endangered		**Threatened**	
American Bittern	*Botaurus lentiginosos*	Bobolink	*Dolichonyx oryzivorus* BR
Eagle, bald	*Haliaeetus leucocephalus* BR **	Eagle, bald	*Haliaeetus leucocephalus* NB **
Falcon, peregrine	*Falco peregrinus*	Hawk, Cooper's	*Accipiter cooperii*
Goshawk, northern	*Accipiter gentilis* BR	Hawk, red-shouldered	*Buteo lineatus* NB
Grebe, pied-billed	*Podilymbus podiceps**	Night-heron, black-crowned	*Nycticorax nycticorax* BR
Harrier, northern	*Circus cyaneus* BR	Night-heron, yellow-crowned	*Nyctanassa violaceus*
Hawk, red-shouldered	*Buteo lineatus* BR	Knot, red	*Calidris canutus* BR
Owl, short-eared	*Asio flammeus* BR	Osprey	*Pandion haliaetus* BR
Plover, piping	*Charadrius melodus***	Owl, barred	*Strix varia*
Sandpiper, upland	*Batramia longicauda*	Owl, long-eared	*Asio otus*
Shrike, loggerhead	*Lanius ludovicianus*	Rail, black	*Laterallus jamaicensis*
Skimmer, black	*Rynchops niger* BR	Skimmer, black	*Rynchops niger* NB
Sparrow, Henslow's	*Ammodramus henslowii*	Sparrow, grasshopper	*Ammodramus savannarum* BR
Sparrow, vesper	*Pooecetes gramineus* BR	Sparrow, Savannah	*Passerculus sandwichensis* BR
Tern, least	*Sterna antillarum*	Sparrow, vesper	*Pooecetes gramineus* NB
Tern, roseate	*Sterna dougallii***	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Wren, sedge	*Cistothorus platensis*		

Reptiles			
Endangered		**Threatened**	
Rattlesnake, timber	*Crotalus h. horridus*	Snake, northern pine	*Pituophis m. melanoleucus*
Snake, corn	*Elaphe g. guttata*	Turtle, Atlantic green	*Chelonia mydas***
Snake, queen	*Regina septemvittata*	Turtle, wood	*Clemmys insculpta*
Turtle, bog	*Clemmys muhlenbergii***		
Atlantic hawksbill	*Eretmochelys imbricata***		
Atlantic leatherback	*Dermochelys coriacea***		
Atlantic loggerhead	*Caretta caretta***		
Atlantic Ridley	*Lepidochelys kempi***		

Amphibians			
Endangered		**Threatened**	
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, eastern tiger	*Ambystoma tigrinum*	Salamander, long-tailed	*Eurycea longicauda*

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

**** Also on the federal Endangered and Threatened list**

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

Title: ***Environmental Resource Inventory for the Township of Lumberton, Burlington County, New Jersey***

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Publication No. **06033**

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

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ABSTRACT

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

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LUMBERTON

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