NATURAL RESOURCE INVENTORY

Maple Shade Township
Burlington County, New Jersey

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October 2020

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INTRODUCTION

This Natural Resource Inventory (NRI) for Maple Shade Township has been compiled pursuant to the authorization of the Mayor and Township Council as a recipient of a Sustainable Jersey Grant. Sustainable Jersey is a certification program for municipalities in New Jersey that want to take steps to sustain their quality of life over the long term. The organization is a non-profit that provides tools, training and financial incentives to support and reward communities as they pursue sustainability programs. An NRI serves as an index of natural resources and serves as the first step to protecting and preserving the natural resources within a municipality.

Environmental goals and objectives of Maple Shade's 2016 Master Plan Re-Examination included identifying various natural resources, preserving environmentally sensitive areas in their natural state and protecting natural resource and areas of conservation. This document is therefore intended to be utilized by Maple Shade Township Planning and Zoning Boards and any other interested parties in the evaluation of environmental issues and making informed decisions in land use planning.

Maps for this NRI were generated using Geographic Information Systems (GIS) software. A GIS facilitates the linking of digital spatial data that define the location and boundaries of natural and cultural resources to databases that contain written information identifying the characteristics of each resource. A list of maps and figures is located in Table. Data used in this project were obtained from secondary sources including the New Jersey Department of Environmental Protection (NJDEP GeoWeb), the New Jersey Geological Survey (NJGS), the New Jersey Geographic Information Network (NJGIN) the New Jersey Office of State Planning, the Delaware Valley Regional Planning Commission (DVRPC) and the Natural Resource Conservation Service (NRCS). Most data sets were used as received from the source agencies,

but some were partially modified to include changes that have occurred since the original data was acquired or to include local information.

TABLE 1
LIST OF FIGURES

The following list of figures prepared for this Natural Resource Inventory are included within this report for ease of use and reference by the reader.

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POPULATION

Maple Shade Township comprises an area of approximately 3.83 square miles. The Township population recorded in the 2010 Census was 19,131. Substantial growth was recorded between 1950 and 1960 where the population grew 197%, from 6,560 to 12,947, and continued to grow to a peak of 20,525 in 1980. Population growth started to slow after 1980, and since then over all it has begun a trend of decreasing to 19,131 in 2010 (See Table 1 Population Trends). Population increase in Maple Shade has been directly related to new residential development.

TABLE 2

POPULATION TRENDS

Year	Population
1900	4,420
1910	5,096
1920	7,273
1930	5,117
1940	5,535
1950	6,560
1960	12,947
1970	16,464
1980	20,525
1990	19,211
2000	19,079
2010	19,131

(US Census Bureau)

CLIMATE

According to the Office of the NJ State Climatologist, Maple Shade Township has a continental climate and is located in the Southwest Zone of New Jersey. Its close proximity to the Delaware Bay adds a maritime influence to the climate. The moderating effect of the water also gives the region the longest growing season in New Jersey. Autumn frosts typically occur approximately four weeks later than in the

North and the last spring frosts are about for weeks earlier.

This region receives less precipitation than the Northern and Central Regions and typically has the highest average daily temperatures. Rainfall averages approximately 46.6 inches per year with July averaging the highest amount. Total annual snowfall accumulates at an average of 30 inches. Prevailing winds are from the southwest during the summer months and west to northwest winds throughout the winter season (Office of NJ State Climatologist).

LAND USE

The New Jersey Department of Environmental Protection Bureau of GIS online platform (NJ-GeoWeb) has mapped several different types of land uses within Maple Shade Township as of 2015. These land use types are interpreted from aerial infrared photography, and do not reflect changes in land use that have occurred since the data was acquired. Brief definitions of each land use category mapped in Maple Shade were provided by the NJ-GeoWeb Database and are provided in this section. Map units representing wetland areas are described in the Freshwater Wetlands section.

Agricultural

This map unit includes crop and pasture land, as well as orchards; vineyards; nurseries and horticultural areas of current use.

Residential

This map unit includes urban developed single-family detached units where lot boundaries are evident: Multi-family dwellings including duplexes, apartments, condominiums, etc. Also included in this unit are, row homes defined as a series of connected single-family houses forming a continuous group, and mobile Homes in areas containing a large group of transportable single-family dwellings. Maple Shade contains both of these types of residential development from low to high density.

Commercial

This map unit includes land areas that contain structures predominantly used for the sale of products and services. Examples include central business districts, malls, strip malls, shopping centers, hotels, motels, and warehousing and distribution centers. All landscaped areas associated with a Commercial area are also included in this category.

Industrial

This category includes industrial parks and small-scale manufacturing assembly land uses.

Community Services

Structures that provide non-commercial services, such as educational facilities, places of worship, cemeteries, hospitals/medical centers, museums, government centers (not

including military), correctional facilities, and social clubs. All landscaped areas associated with community services land use are also included in this category.

Recreation

Recreation areas are those developed for recreational activities. This includes recreational parks and playgrounds including those associated with schools, golf courses, picnic areas, camps, fairgrounds, recreational boat launches, swimming pools, theatres, stadiums and arenas, zoos, amusement parks, and non-military firing ranges.

Transportation

Transportation includes areas devoted to rail, air, marine and highway transportation. Examples include limited-access highways (highways that are at least double lane divided) and their ramps, railroad facilities (stations, roundhouses, and switching yards), airports, and truck and bus terminals. Two lane roads and residential streets are not identified as Transportation. The Transportation category takes priority over any other coexisting land use that may be present (i.e. highways over rivers or utility rights-of-way).

Barren Land

Barren lands are areas that are not clearly wooded, not agricultural, not developed, not landscaped, transitional or altered lands, or are cleared or unused but not tied to other uses.

Water Areas

Water Areas are rivers, canals, streams, lakes, artificial lakes, tidal rivers and inland bays, reservoirs, and ponds that have two definable boundaries. When coexisting with another land use other than Transportation, the Water land use takes priority.

Wetlands

Wetland areas have a variety of cover types including deciduous wooded forest, maintained grass lawn in recreational areas, scrub shrub land, freshwater and tidal marsh. They are often associated with lakes and streams or other sources of water, as well as low points in the landscape.

Wooded

Wooded (forested) areas are regions of continuous canopy or solid tree cover, woodlands, and natural lands. Wooded areas can be dominant deciduous, dominant coniferous or mixed, with varying canopy density. Hedgerows (windrows) and wooded areas associated with residences are not interpreted as Wooded.

STATE DEVELOPMENT AND REDEVELOPMENT PLAN

The New Jersey State Development and Redevelopment Plan (the Plan) was initially adopted in June of 1992. A new State Development and Redevelopment Draft Final Plan was adopted on March 1, 2001.

In 1985, the New Jersey State Legislature adopted the State Planning Act (under N.J.S.A. 52:18A-196 et. seq.). According to the New Jersey Office for Planning Advocacy, the Plan was developed because of the State's need for sound and integrated statewide planning in order to "…conserve its natural resources, revitalize its urban centers, protect the quality of its environment, and provide needed housing and adequate public services at a reasonable cost while promoting beneficial growth, development, and renewal…" (New Jersey Office for Planning Advocacy, 2000). The Plan was designed to establish statewide planning objectives "regarding land use, housing, economic development, transportation, natural resource

conservation, agriculture and farmland retention, recreation, urban and suburban redevelopment, historic preservation, public facilities and services, and intergovernmental coordination".

The Resource Planning and Management Structure of the Plan has two basic concepts: Planning Areas and Centers/Environs. Planning Areas are determined by type and intensity of development, proximity to existing developed areas, public and private infrastructure, and environmental resources. Five Planning Areas are defined:

- PA1: Metropolitan Planning Area - Designed to "promote growth, stabilize and revitalize communities, modernize infrastructure, and redesign areas of sprawl".
- PA2: Suburban Planning Area - Designed to "promote much of the statewide growth in centers and redesign areas of sprawl"
- PA3: Fringe Planning Area - Designed to "accommodate growth in centers and keep environs largely open"
- PA4: Rural Planning Area, which includes PA4B, the Rural/Environmentally Sensitive Planning Area - Designed to "promote a viable agricultural industry, protect large contiguous areas of farmland – including those on environmentally sensitive land – and accommodate growth in centers".
- PA5: Environmentally Sensitive Planning Area, which includes PA5B, the Environmentally Sensitive/Barrier Island Planning Area - Designed to "protect environmental resources – including large areas of open lands and sensitive barrier islands – and accommodate growth in centers".

Centers are defined as central places within planning areas where growth should be either attracted or contained, depending on the unique characteristics and growth opportunities of each center and the characteristics of the surrounding planning area in which it is located. Environs are “areas outside centers and should be protected from the growth that occurs in centers”.

One State planning area is designated within Maple Shade Township: the Metropolitan Planning Area (PA1). It should be noted that State Planning Areas generally do not coincide with the Township boundaries, but extend into adjacent municipalities. The New Jersey State Development and Redevelopment Plan should be referenced for specific details on how the designated State planning areas may affect various aspects of development within Maple Shade Township. A copy of the Plan can be obtained from the New Jersey Office for Planning Advocacy website at www.nj.gov/state/planning/plan.html.

SANITARY SEWER SERVICE AREAS

This map represents the most current sanitary sewer service areas, as provided by the New Jersey Department of Environmental Protection. The coverage shows the existing sewer service areas for the Township, for various types of existing wastewater management facilities.

The entire Township is serviced by the Maple Shade Utilities sewage collection system. Waste water is treated at the Maple Shade Park Avenue Wastewater Treatment Plant. It should be noted that this plan is subject to change based upon Township, Burlington County Board of Chosen Freeholders, and NJDEP approved sewer extensions.

HISTORIC SITES

The Burlington County Division of Parks, as well as the State Historic Preservation Office (SHPO), manage and maintains existing cultural and historical heritage sites within the County. The Burlington County Open Space, Recreation, Farmland and Historic Preservation Trust was created by the Freeholders for the preservation of farmland, open space and historic resources and for the development, improvement and maintenance of the County's park system. This fund is supported by a dedicated property tax approved in referendum passed in 1996. In 1998, a referendum was approved which expanded the approved uses of Trust Fund revenues to include preservation of historic structures and sites. Maple Shade Township has one site listed on the National Register of Historic Places and three sites listed on the New Jersey Register of Historic Places:

Chesterford Schoolhouse – The school was constructed in 1811, and is one of the few early 19th century schools still standing in New Jersey; the building is currently in fair condition. The Schoolhouse was listed on the National Register of Historic Places as well as the State Register in 2009, and is under the ownership of Maple Shade Township. In 2006, the Township received a $35,000 grant through the Garden State Historic Preservation Trust Fund Historic Site Management Grant which helped fund the preparation of a National Register Nomination, completion of a preservation plan, and construction documents.

John and Robert Muffet House – Located at 919 East Main Street, this property was deemed eligible for listing as a historic property by SHPO 2001. It is a former brickyard, and was originally constructed as a double house for father and son in

1858. The property is currently privately owned, and maintained as apartments (mapleshadehistory.com).

William Matlack House – Located at 2 Dead End Drive, this property was deemed eligible for listing as a historic property by SHPO in 2001. This single family home was built in 1751, and is currently a private single family residence.

Camden and Burlington County Railroad – This is a right-of-way that is located between Camden City in Camden County, and Mounty Holly Township in Burlington County. It was deemed eligible for listing as a historic district by SHPO in 2006.

GEOLOGY

Physiography

Maple Shade Township is located entirely within the Atlantic Coastal Plain physiographic province. The Coastal Plain is characterized by low lying terrain with open stream valleys and broad, gently sloping divides. The Coastal Plan is further divided into the Inner and Outer Coastal Plains, of which Maple shade lies within the Inner. Topography in the Coastal Plain is a result of the differential erosion of unconsolidated, gently dipping strata of gravel, sand, silt, and clay. Relatively resistant geologic formations erode less rapidly and typically form the higher elevations. The North Branch of the Pennsauken Creek runs along the northern boundary of the municipality and the South Branch of the Pennsauken Creek runs along the entire southern boundary of the municipality. On the northeastern side of the Township near the Northern Branch of the Pennsauken Creek is an area of hills that are more than 75 feet above sea level.

Stratigraphy

The Atlantic Coastal Plain is mainly composed of strata of clay, silt, sand, and gravel deposited during the Cretaceous (65-144 million years ago) and Tertiary (1.8-65 million years ago) geologic time periods. These layers of unconsolidated sediment lie over a much older basement of Precambrian and early Paleozoic crystalline rocks (schist and gneiss). The sedimentary formations dip gently toward the southeast (10 to 60 feet per mile), and generally thicken toward the southeast (Kümmel, 1940).

Each sedimentary formation of the Coastal Plain consists of a succession of strata of similar or variable characteristics that were deposited over a particular interval of geologic time. The surface outcrop patterns of the formations are generally oriented from southwest to northeast. On a local scale, formation boundaries typically appear irregular due to their gentle dip and the effects of topography. Sedimentary strata of the Coastal Plain dip to the southeast, and the formations become successively younger toward the southeast. Brief descriptions of each formation that has exposure within the Township.

TABLE 3

GEOLOGIC FORMATIONS OF MAPLE SHADE TOWNSHIP

Age	Geologic Unit	Hydrogeologic Unit	Thickness (feet)
Upper Cretaceous	Englishtown Formation	Englishtown aquifer system	60
	Woodbury Formation	Merchantville-Woodbury confining bed	400
	Merchantville Formation		
	Magothy Formation	Potomac-Raritan-Magothy aquifer	200
	Raritan Formation		
Lower Cretaceous	Potomac Group		150

Adapted from Zapeca, (1989) & Sugarman, et al (2018)

The Merchantville Formation is the oldest outcropping glauconitic unit in the New Jersey Inner Coastal Plain. The predominant lithology of the Woodbury formation is gray and black clay and micaceous silt. The Merchantville Formation consists of glauconitic, micaceous black and gray clay and very fine grained quartz and glauconitic sand. In addition to glauconitic beds, the unit also contains sequences of micaceous clays and clayey silts.

The Englishtown Formation crops out in the western part of the New Jersey Inner Coastal Plain; the predominant lithology of this formation is tan and gray fine to medium grained sand and quartz and local clay beds. In parts of Burlington, Camden, Gloucester and Salem counties the aquifer is commonly less than 40 feet thick. The Englishtown aquifer system is separated from the Magothy aquifer by a thick clay-silt hydraulically confining bed composed primarily of the Woodbury and Merchantville formations. The confining unit is 100 to 250 feet thick near its outcrop belt and 250 to 400 feet thick in southeastern Burlington County.

In New Jersey, sediments of the Cretaceous Potomac Group and the Raritan and Magothy Formations have generally been combined and described as a single hydrologic unit or as an aquifer system because the individual formations are lithologically indistinguishable from one another over large areas of the Coastal Plain. Both the Raritan and Magothy formations are dominated by light gray fine to course grained sand and quartz with local beds of clay. Considerable amounts of silt and clay are locally interbedded with the sand and gravel of the Potomac Group of the lower aquifer.

AQUIFERS

Aquifers are saturated geologic formations capable of yielding significant quantities of water under conventional pumping pressures. There are two types of aquifers, confined and unconfined, where the term confined refers to the presence of hydraulically restrictive sediment layers around the resources. An unconfined aquifer is a near surface aquifer that has the water table as its upper boundary (also called a water table aquifer). As such, the water levels in these aquifers can rise and fall with the water table. A confined aquifer is a fully saturated unit bounded above and below by relatively impermeable formations called confining units, causing it to be under pressure. Aquifers are also given a rank of A through E to distinguish their range of median yields in gallons of water per minute.

Table 4

Aquifer Ranks

Aquifer Rank	Range of Median Yields (gpm)
A	> 500
B	250 to 500
C	100 to 250
D	25 to 100
E	< 25

In 2015 the population of Burlington County used 55 billion gallons of water per year. Groundwater demand peaked in 1998 at 80 billion gallons and has shown a variable but steady decline since then. This is due to differences in recharge rates based on surrounding surficial and bedrock geology. Aquifers underlying Maple Shade Township include the Merchantville-Woodbury confining unit (Rank B), the Englishtown aquifer system (Rank E), and the Potomac-Raritan-Magothy aquifer system (Rank A). The Merchantville-Woodbury confining bed is the most extensive confining bed within the New Jersey Coastal Plain. It functions as an effective confining layer between the upper aquifer of the Potomac-Raritan-Magothy aquifer system and

the Englishtown aquifer system. The Englishtown aquifer is not a major source of water in Burlington County.

In the southern Coastal Plain of New Jersey, the Potomac Group and the Raritan and Magothy Formations are subdivided into three aquifers, designated lower, middle and upper and two confining beds that lie interjacent to the aquifers. The lower aquifer is used for water supply primarily in northwestern Burlington County, where Maple Shade is located. These are highly productive and the most used aquifers in the Coastal Plain. The water quality of these aquifers is generally excellent, though there are large iron concentrations in some areas.

Groundwater recharge is the transmission of water from the surface to the saturated zone beneath the water table. Areas of high aquifer recharge areas typically correspond to the outcrop occurrence of permeable strata that are hydraulically connected to an aquifer. Potential recharge areas therefore roughly correspond to areas where geologic formations comprising aquifers are exposed at the surface. Actual groundwater recharge is dependent on climate, soil characteristics, slope, vegetative cover, and land use. A method for quantitatively evaluating recharge areas and creating detailed groundwater recharge maps has been proposed by the New Jersey Geological Survey (Charles and others, 1993).

HYDROLOGY

Major surface hydrologic features within Maple Shade Township are presented on the Streams and Lakes Map. The New Jersey Department of Environmental Protection has divided the State into 20 Watershed Management Areas for the purposes of environmental planning and management. The major drainage systems of Maple Shade Township are within Lower Delaware Watershed Management Area (WMA) 18. The northern side of the Township is within

the subwatershed Pennsauken Creek Northbound (below Strawbridge Lake) subwatershed; the southern portion of the Township is within the Pennsauken Creek Southbound (below Route 41) subwatershed.

Pennsauken Creek is a 3.8-mile-long tributary of the Delaware River in Burlington and Camden counties. The North Branch of the Pennsauken is in Burlington County while the South Branch forms the boundary between Burlington and Camden Counties. The northern and southern branches of the Pennsauken Creek form the respective borders of Maple Shade Township have a point of confluence at the north western portion of Maple Shade Township. The Pennsauken Creek drains 33 square miles of southwestern Burlington County and northern Camden County and joins the Delaware River near Palmyra, New Jersey. The south branch of the Pennsauken Creek is tidally influences to a point of approximately 400 FT south of the Maple Ave. Bridge. The north branch is tidal to a point of approximately 600 FT west of the Lenola Rd. Bridge.
(https://www.dvrpc.org/reports/03023.pdf)
(http://ready.nj.gov/programs/pdf/mitigation2014/2014-Appendix-P.pdf)

All streams within Maple Shade Township are classified as FW2-NT by the New Jersey Department of Environmental Protection Surface Water Quality Standards (NJAC 7:9B; NJDEP, 2016). FW2 is a general surface water classification applied to fresh waters that are not considered to be of exceptional quality, significance, or resource value (i.e., not FW1 waters), NT is the designation for non-trout waters. Water quality in the State is monitored by the NJDEP; there are several water quality data exchange stations on the Northern Branch and Southern Branch of the Pennsauken Creek.The most recent monitoring results publicly available were published in 2016 and reflect water quality data generated between January

2010 and July 2015 (please refer to https://www.nj.gov/dep/wqmp/docs/202190916-int-wqa-report.pdf)

FLOOD-PRONE AREAS

Flood-prone areas are caused by either tidal or fluvial influences. In Maple Shade Township, the Pennsauken Creek is tidally influenced by the Delaware River up until the head of tide. Head of tide represents the farthest upstream limit of tidal influence in a waterbody. The head of tide for the Pennsauken Creek Tributary on the western boarder of Maple Shade is located just south of the Maple Avenue, W. Main Street Bridge. The head of tide for the main branch of the Pennsauken Creek on the eastern boarder of Maple Shade is located just west of the point where the creek crosses under S. Lenola Road. Fluvial, or riverine flooding, is directly influenced by the downstream transportation of water. Waterbodies of fluvial influence have an additional regulated zone called a floodway. The FEMA definition of a floodway of a water body is the channel of a river or other watercourse, and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. The base flood elevations (BFE) is the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) for zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1– A30, AR/AH, AR/AO, V1–V30, and VE.

Readers of this Natural Resource Inventory are directed to the flood mapping provided by the Federal Emergency Management Agency (found at FEMA.GOV), and through the State of NJ, Department of Environmental Protect, Office of Floodplain Management, at State of NJ, Department of Environmental Protection, Bureau of Dam Safety and Flood Control, PO Box 419, Trenton NJ 08628-0859.

(https://msc.fema.gov/portal/advanceSearch#searchresultsanchor)

FRESHWATER WETLANDS

Originally adopted in 1989, the Freshwater Wetlands Protection Act was set forth to define procedures to define wetlands areas and formally recognize the vital ecological and socioeconomic value of this resource. Wetlands are generally defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support vegetation adapted for life in saturated soil conditions. Extended periods of inundation create anaerobic conditions that cause the depletion of color from soil layers. These soils are referred to as hydric soils. The Freshwater Wetlands Map for Maple Shade depicts wetlands within the Township as interpreted by the New Jersey Department of Environmental Protection. These wetland areas are classified according to the U.S. Geological Survey Land Use and Land Cover classification system used for Land Use mapping. The wetlands map is intended for use as a planning guide to indicate areas that may potentially contain regulated wetlands. Actual determination of regulated areas is dependent on a field delineation of the wetland boundary in accordance with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989) as required by the NJDEP.

Freshwater wetlands in Maple Shade are commonly associated with stream corridors and broad stream valleys. General wetland types found within the Township include:

> Deciduous Wooded Wetlands – This map unit includes closed canopy swamps associated with watercourses and marsh edges, as well as isolated wetlands. The wetlands are dominated by deciduous tree species (>75%) with an average height greater than 20 feet.

Deciduous Shrub/Scrub Wetlands – This map unit includes brush/shrub land swamps with deciduous species less than 20 feet in height predominant (>75%).

Herbaceous Wetlands – These wetlands are non-tidal swamps that are dominated by herbaceous vegetation. Herbaceous vegetation is defined as vegetation that does not have persistent woody growth above ground. Typical herbaceous wetlands may be located on open lake edges and floodplains, and in abandoned wet agricultural fields.

Modified Agricultural Wetlands - This map unit includes cultivated lands that are former natural wetlands.

Managed Wetlands – This map unit includes modified former natural wetland areas that are managed for miscellaneous types of recreational land. Also included in this category are maintained grass lawn areas.

Disturbed Wetlands – These areas are former natural wetlands that have been disturbed by clearing, filling, or excavating. The soil shows signs of saturation, but typical wetland vegetation may or may not be present.

Freshwater Tidal Marshes – These areas are wetlands that are influenced by freshwater with some intrusion of saltwater.

COASTAL WETLANDS

When the Wetlands Act of 1970 came into effect the Department formally defined Coastal Wetlands. This formal definition included “any bank, marsh, swamp, meadow, flat or other low land subject to tidal action in the State of New Jersey along the Delaware bay and Delaware river, Raritan bay, Barnegat bay, Sandy Hook bay, Shrewsbury river including Navesink river, Shark river, and the coastal inland waterways extending southerly from Manasquan Inlet to Cape May Harbor, or at any inlet, estuary or tributary waterway or any thereof, including those areas now or formerly connected to tidal waters whose surface is at or below an elevation of 1 foot above local extreme high water.” With this definition came official state mapping of delineated coastal wetland areas imposed on a 1970 aerial. Similar to freshwater wetlands, coastal wetlands are areas where soil is inundated for extended periods of time, however, it is with salt or brackish water on a tidal cycle. These areas develop into tidal marshes and are host to vegetation that can tolerate a saline environment. The limit of coastal wetlands within the township coincide with the head of tide. A coastal wetlands map is not provided in this report due to the level of detail needed to make the imagery clear. The mapping can instead be found on as “1970 Black and White Imagery” the Department’s NJ-GeoWeb database (https://www.nj.gov/dep/gis/geowebsplash.htm) under the imagery tab.

TIDELANDS

In Maple Shade, the State has mapped tidelands claims in both the Pennsauken Creek and its tributary on the east and west boarders of the Township. These mapped claim areas extend up each water body until the head of tide. The New Jersey DEP defines tidelands, also known as riparian lands, as all lands that are currently and formerly flowed by the mean high tide of a natural waterway. The Delaware River, a naturally tidal body of water, is an example of tidelands and is what extends the tidelands claim into the Pennsauken Creek. New Jersey

contains an extensive network of tidelands, which the State claims ownership of, and holds in trust for the people of the state. All tidelands are overseen by the Tidelands Resource Council, a board of twelve Governor-appointed volunteers, along with DEP staff at the Bureau of Tidelands Management. Common uses of tidelands include docks, mooring piles, bulkheads and other fill materials. Readers of this report are encouraged to visit the NJDEP website to find out more about this resource.

AIR QUALITY

One of the most difficult environmental resources to measure is air quality. Pollution has many sources including industries, internal combustion motors, fires, and dust. The effects of air pollution can be felt far away from its source. Increased public awareness regarding air quality issues led to laws such as the Air Pollution Control Act of 1955 and the Clean Air Act of 1963. The Air Quality Act was later passed in 1967, granting the federal government increased enforcement and led to widespread air quality monitoring and inspections.

Then, the Clean Air Act of 1970 caused major changes in federal government's role in air pollution control. It allowed federal and state governments to regulate emissions from both stationary and mobile sources. At about the same time, the U.S. Environmental Protection Agency (EPA) was created, then tasked to implement the requirements of the Clean Air Act of 1970.

In New Jersey, the Department of Environmental Protection's Bureau of Air Monitoring has established 43 stations throughout the State. These monitoring stations continually monitor all of some of seven (7) parameters set forth by the EPA in the National Ambient Air Quality Standards (NAAQS). These parameters are carbon monoxide, nitrogen oxides, ozone, sulfur

dioxide, smoke shade, particulate matter, and meteorological data. There are two (2) types of NAAQ Standards, the primary standard focuses on the effects on human health, and the secondary standard focuses on environmental and property damage.

Burlington County is located within the Central New Jersey Air Monitoring region. The monitoring sites located within 30 miles of Maple Shade Township within this region are: the Rider University monitoring station, which measures ozone (O_3) only; Trenton Library monitoring station, which measures Particulate Matter (PM) 2.5 only; Colliers Mills monitoring station, which measures O_3 only.

Air Quality Index (AQI) was created by the EPA to specify a region's air quality by measuring the levels of five (5) criteria pollutants: ground level ozone, particulate matter, carbon monoxide, nitrogen oxides, and sulfur dioxide. The AQI is used to determine the potential human health hazards caused by breathing unhealthy air. The scale used by the AQI measures ranges from 0 to 500 and is divided into six (6) color-coded categories as is shown below.

TABLE 5

AIR QUALITY INDEX and ASSOCIATED HEALTH IMPACTS

AQI Level of Health Concern	Numerical Value	Meaning	Color Code
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk.	Green
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Yellow
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Orange
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.	Red
Very Unhealthy	201 to 300	Health warnings of emergency conditions. The entire population is more likely to be affected.	Purple
Hazardous	301 to 500	Health alert: everyone may experience more serious health effects.	Maroon

(2018 NJ Air Quality Report)

Based on the findings of the most recent summary data available from the EPA, in 2019 the Air Quality Index Summary for the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD region reported 180 days of good air quality, 169 days of moderate air quality and 16 days of unhealthy air quality for sensitive groups. (https://www.epa.gov/outdoor-air-quality-data/air-quality-index-report). Based upon data available in the 2018 NJ Air Quality Report from NJDEP, the Central New Jersey Air Monitoring region exceeded ozone requirements 14 days in 2018.

SOILS

Soil Series

Abbreviated descriptions of the soils series that have been mapped in Maple Shade Township have been obtained from the Soil Conservation Service of the United States Department of Agriculture soil survey for Burlington County (USDA NRCS Soil Map).

Colemantown Series (CoeAs)

The Colemantown series consists of poorly drained soils with high glauconite content. Glauconite is an iron potassium phyllosilicate mineral of green coloration that is indicative of continental shelf marine depositional environments. They are usually found at low points in the landscape and as a result have a seasonal high water table between 0 and 12 inches from the ground surface. A typical soil profile has about 10 inches of loamy topsoil followed by a layer of sandy clay loam to 24", then clay loam below 24". These soils have a high natural fertility due to abundant organic matter content, as well as high available water capacity. Maple shade hosts areas of Colemantown loam (CoeAs), this soil has 0 to 2 percent slopes. The Colemantown series soils are listed as hydric soils.

Collington Series (ComB)

The Collington series consists of well-drained, loamy soils that contain moderate amounts of glauconite. Deeper layers of this series contain a greater percentage of clay than surface layers. Similar to the Colemantown series, Collington soils also have a high available water capacity and moderate organic matter content. A typical profile of this series consists of 10” of fine sandy loam topsoil, with a subsoil layer of loam that extends down to about 38”. Further substratum consists of varying layers of loamy sand and sandy loam. Maple Shade hosts areas of Collington fine sandy loam (ComB), this soil has 2 to 5 percent slopes. The Collington series soils are not listed as hydric.

Fluvaquents (FmhAt)

Fluvaquents are comprised of poorly drained sands and loams found within flood plains. A typical profile may include 0” to 5” of very dark grayish brown loam, 5”-12” of dark gray silt loam, 12” to 18” of grayish brown sandy clay loam, 18” to 24” of dark yellowish brown sandy clay loam and 24” to 50” of light brownish gray sandy loam. Maple Shade hosts areas of Fluvaquesnts that are loamy in nature (FmhAt), these soils have 0 to 3 percent slopes. Fluvaquents are listed as a hydric soil.

Holmdel Series (HoaB, HodkA, HofB)

The *Holmdel* sandy loam is a moderately well to somewhat poorly drained soil in depressional areas and on low divides. A typical profile has a 10” thick dark grayish brown sandy loam surface layer, yellowish brown sandy loam from 10” to 20” deep, mottled yellowish brown sandy clay loam from 20” to 38” deep, and a mottled yellowish brown and light olive brown sand and sandy loam substratum from 38” to a depth of 60” or more. The depth to the seasonal high water table is between 1.5’ to 4.0’. Holmdel

soils are not listed as hydric soils. Maple Shade hosts areas of Holmdel loamy sand (HoaB), Holmdel fine sandy loam (HodkA) and Holmdel-Urban land complex (HofB). Holmdel loamy sand (HoaB) has 0 to 5 percent slopes. Holmdel fine sandy loam (HodkA) has a clayey substratum and 2 to 5 percent slopes. Holmdel-Urban land complex (HofB) has variable qualities due to disturbance, but usually has 0 to 5 percent slopes.

Keyport Series (KeoB, KeoC)

The Keyport series consist of nearly level to moderate sloping well-drained soils in depressional areas and on low divides and side slopes. A typical profile may include 0" to 10" brown sandy loam, 10" to 18" yellowish brown silty clay loam, 18" to 44" mottled dark yellowish brown silty clay loam, and 44" to 60" gray silty clay loam. These soils have a seasonal high water table at 1.5' to 4.0' deep. Maple Shade hosts areas of Keyport loam, (KeoB) which has 2 to 5 percent slopes, and Keyport loam (KeoC) which has 5 to 10 percent slopes. The Keyport series is not listed as hydric soils.

Mannington-Nanticoke complex (MamnAv, MamuAv)

The Mannington-Nanticoke complex is a soil series consisting of a mix of other soil components such as Mannington, Nanticoke, and Udorthents. The Mannington-Nanticoke complex (MamnAv) has major components of Mannington and Nanticoke soils inclusions of Udorthents, while the Mannington-Nanticoke-Udorthents complex (MamuAv) has major components of all three soils. These soils are typically mucky, silt loam, and peat mixtures. They have a very high seasonal high water table of 0 to 6 inches below the surface, and flood very frequently. The Mannington-Nanticoke complex

(MamnAv) and Mannington-Nanticoke-Udorthents complex (ManuAv) are both listed as hydric soils.

Pits (PHG)

This unit consists of disturbed areas that have historically been excavated for sand and gravel. Soils in these areas are typically sandy with varying amounts of gravel and fragments of iron cemented sandstone. The properties and characteristics of this map unit vary from location to location, and onsite investigation is generally required to determine suitability for an intended use. There are no specified slopes for this soil type. Due to their highly disturbed nature, hydric soil conditions may develop in older pit areas.

Sassafras Series (SabB, SaeB, SaeC, SaekB, SapB, SapkB)

The Sassafras series consists of moderately well drained, fine sandy loam with clayey substratum formed in old alluvium over clayey estuarine deposits. Sassafras loam sand consists of well-drained soil composed of loamy sand from 0” to 12”; sandy loam from 12” to 18”; sandy clay loam from 18” to 28; loamy sand from 28” to 40” and sand from 40” to 80”. Depth to water table is more than 80”. All areas are considered farmland of statewide importance (see page 40 for prime farmland details). The Sassafras series are not listed as hydric soils.

Udorthents (UdrB)

Areas mapped as Udorthents consist of soils that have been altered by excavating or filling. In filled areas these soils typically consist of loamy material that is more than 20” thick. The filled areas are on flood plains, in tidal marches, and on areas of moderately well drained to very poorly drained soils. The properties and characteristics of these soils

vary greatly from place to place, and onsite investigation is needed to determine suitability for most uses. This classification of Udorthents (UdrB) have 0 to 8 percent slopes. Udorthents are listed as hydric soils.

Urban land (URCLAB, URSAAB, URSACB)

The Urban land map unit consists of areas that are more than 85% covered by impermeable surfaces. Urban land is typically covered by dwellings, roads, shopping centers, parking lots, and industrial areas. Relatively small areas of undisturbed soils and Udorthents may be included in this map unit. Properties and characteristics vary from site to site, and field investigation is needed to determine suitability for most intended uses. Urban land is mapped in complexes with various undisturbed soil series where the areas of each are in an intricate pattern such that they were not mapped separately. Urban land (URCLAB) has a clayey substratum, Urban land (URSAAB) is sandy in nature, and Urban land (URSACB) is sandy over clayey material. All three types of Urban land listed in this section have 0 to 8 percent slopes. Urban land is not ranked as hydric soils because of their highly variable qualities.

Woodstown Series (WofA, WofkB)

The *Woodstown* series is a moderately well drained to somewhat poorly drained, fine sandy loam with clayey substratum formed in sandy marine deposits or alluvium over clayey estuarine deposits. A typical profile consists of fine sandy loam from 0” to 34” deep; stratified sand to loam sand from 34” to 40” and clay from 40” to 60”. Depth to the seasonal high water table is between 18” to 42”. All areas are considered prime farmland. Woodstown fine sandy loam (WofA) has 0 to 2 percent slopes, while Woodstown fine sandy loam (WofkB) has a clayey substratum and 2 to 5 percent slopes. The Woodstown series is not listed as a hydric soil.

TABLE 6
SELECTED SOIL PROPERITES

MAP UNIT	SOIL SERIES	SLOPE %	DEPTH TO SHWT (in)	DRAINAGE CLASS	FLOODING FREQUENCY	SURFICIAL PERMEABILITY (in/hr)	HYDROLOGIC GROUP	SURFACE EROSION POTENTIAL K-FACTOR
CoeAs	Colemantown loam	0-2	0”-12”	Poorly Drained	Occasionally	0.06 to 0.20 in/hr	C/D	.32
ComB	Collington fine sandy loam	2-5	>80”	Well Drained	None	0.20 to 2.00 in/hr	B	.20
FmhAt	Fluvaquents	0-3	6”-18”	Somewhat Poorly Drained	Frequent	0.57 to 1.98 in/hr	B/D	.28
HoaB	Holmdel fine sandy loam	0-5	6”-36”	Moderately Well Drained	None	0.60 to 2.00 in/hr	C	.10
HodkA		0-2	6”-36”					.20
HofB	Holmdel-Urban land complex	0-5	6”-36”	Moderately Well Drained	None	0.60 to 2.00 in/hr	C	.24
KeoB	Keyport loam	2-5	18”-30”	Moderately Well Drained	None	0.00 to 0.20 in/hr	D	.32
KeoC		5-10	18”-42”					
MamnAv	Mannington-Nanticoke complex	0-1	0”-6”	Very Poorly Drained	Very Frequent	0.20 to 0.60 in/hr	C/D	.37
MamuAv	Mannington-Nanticoke-Udorthents complex	0-1	0”-6”	Very Poorly Drained	Very Frequent	0.20 to 0.60 in/hr	C/D	.37
PHG	Pits, sand & gravel	Properties Variable Due to Disturbance						
SabB	Sassafras loamy sand	0-5	>80”	Well Drained	None	0.20 to 2.00 in/hr	B	.20
SaeB	Sassafras fine sandy loam	2-5	48”-122”	Well Drained	None	0.20 to 2.00 in/hr	B	.28
SaekB		0-2	40”-60”	Moderately Well Drained		0.00 to 0.20 in/hr		
SapB	Sassafras-Urban land complex	0-5	>80”	Well Drained	None	0.20 to 2.00 in/hr	B	.20
SapkB		0-5	>80”	Well Drained	None	0.20 to 2.00 in/hr	B	.28
UdrB	Udorthents	0-8	>80”	Well Drained	None	0.01 to 14.17 in/hr	B	Properties Variable
URCLAB	Urban land	0-8	Properties Variable Due to Disturbance					
URSAAB								
URSACB								
WofA	Woodstown fine sandy loam	0-2	18”-24”	Moderately Well Drained	None	0.20 to 6.00 in/hr	B	.24
WofkB	Woodstown fine sandy loam	2-5	18”-42”	Moderately Well Drained	None	0.00 to 0.20 in/hr	B	.24

(NRCS, 2020)

NOTES:

1. SHWT is apparent seasonal high water table; a '+' sign indicates a water table above the surface of the soil.
2. Urban land complexes are undifferentiated areas of soil and urban land (impermeable surfaces). Properties for urban land vary greatly from site to site.
3. When two hydrologic soil groups are shown, the D group is the soil's characteristic during the wetter months of the winter and spring (see definition on page 37).

Soil Properties

The Soil Survey of Burlington County, New Jersey (1961) contains information on soil properties, characteristics, and limitations pertaining to agriculture, woodland management, recreation, wildlife habitat, site development, sanitary facilities, construction materials, water management, engineering, and hydrology. A table of selected properties for the soil types occurring in Maple Shade Township is included in this document (see Table 6).

Texture

Textural classes are defined by the relative proportion of sand, silt, and clay particles in a soil mass. Sand includes soil particles ranging in size from 2mm to 0.05mm; silt particles range from 0.05mm to 0.002mm; clay particles are smaller than 0.002mm (U.S.D.A. System of Soil Textural Classification). The sand size fraction may be subdivided into very coarse, coarse, medium, fine, and very fine sand. Gravel includes particles greater than 2mm.

Slope

Slope is the inclination of the land surface from the horizontal. The slope between two points on the land surface is thus the difference in elevation divided by the horizontal distance between the points, which may be expressed as a percentage. Moderate to severe limitations on site development are generally associated with slopes in excess of 10% (slope classes D and E).

Seasonal High Water Table

The water table refers to the saturated zone in a soil profile. The seasonal high water table is the highest point at which water sits in the soil during the wettest months of the winter and spring. It is often indicated by depleted colors such as grey and black as well as the presence of mottles. Mottles are described as secondary soil colors that are not associated with the compositional properties of the soil caused by prolonged saturation, function of depth, or weathering. The elevation of this surface varies spatially and with time, and is usually highest in the winter and early spring. A perched water table occurs where a saturated zone overlies an unsaturated zone, usually due to the presence of a low permeability layer impeding the vertical movement of ground water. Moderate limitations on site development are generally associated with a depth to the seasonal high water table less than 4 feet; severe limitations exist for groundwater shallower than 1 foot below the land surface. See Table 6 for a complete list of all seasonal high water tables by soil type.

Drainage Class

Drainage is the removal of excess surface and subsurface water. The Soil Conservation Service defines seven classes of natural soil drainage (Jablonski & Baumley, 1989 and NRCS, 1993).

Excessively Drained: Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow.

Somewhat Excessively Drained: Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow.

Well Drained: Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season. Wetness does not inhibit growth of roots for significant periods during most growing seasons. The soils are mainly free of the deep redoximorphic features that are related to wetness.

Moderately Well Drained: Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough

that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 3 FT, periodically receive high rainfall, or both.

Somewhat Poorly Drained: Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly Drained: Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very Poorly Drained: Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or

permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Flooding

Flooding is the temporary covering of the soil surface by flowing water due to overflowing streams or runoff from adjacent slopes. The Soil Conservation Service has estimates of the frequency, duration, and probable period of occurrence of flooding for each soil series.

Table 7

Categories for Flooding Frequency

None	Flooding is not probable;
Rare	Flooding is unlikely but possible under unusual weather conditions (up to 0 to 5 percent chance of flooding in any year);
Occasional Common	Flooding occurs infrequently under normal weather conditions (5 to 50 percent chance of flooding in any year); This term is used when classification as occasional or frequent does not affect interpretations;
Frequent	Flooding occurs often under normal weather conditions (more than a 50 percent chance of flooding in any year).

(NRCS, 2020)

Soil survey information on flooding is based on the physical characteristics and typical landscape position of a soil series. The Federal Emergency Management Agency (FEMA) has more detailed information available as part of the National Flood Insurance Program. FEMA delineated flood zones are based on topographic data and hydraulic engineering calculations. A Flood-Prone Areas Map for Maple Shade Township is included in this document.

Permeability

Permeability is the property that characterizes a soils ability to transmit water or air. The permeability of a particular soil is dependent on the size, shape, and structural arrangement of the soil particles. Soil Survey estimates of permeability are reported as the number of inches per hour that water moves vertically downward through saturated soil. The following terms are used to describe permeability in soil descriptions:

Table 8

Permeability Rates

Very Slow	< 0.06 in/hr
Slow	0.06-0.2 in/hr
Moderately Slow	0.2-0.6 in/hr
Moderate	0.6-2.0 in/hr
Moderately Rapid	2.0-6.0 in/hr
Rapid	6.0-20 in/hr
Very Rapid	> 20 in/hr

(NRCS, 2020)

Surficial permeability refers to water movement through the surface of an undisturbed soil profile. The Soil Survey of Burlington County contains permeability estimates for additional horizons in the profile of each soil type. Soil permeability can be a critical parameter in the design of septic system disposal fields and stormwater management systems. Soil survey estimates of permeability are typically used as a planning guide in land use or agricultural uses. Actual permeability is generally assessed by onsite, evaluation and laboratory testing.

Hydrologic Group

Soil series are assigned to one of four hydrologic groups according to the estimated stormwater runoff that would occur during long-duration storms. The groupings assume a soil to be unvegetated, and are determined by the rate at which a soil passes water when thoroughly wet. The hydrologic soil grouping is a key factor in stormwater management designs.

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell

potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two groups, the first grouping refers to runoff when the soil is drained (relatively low water table) and the second grouping refers to runoff when the soil is undrained (relatively high water table).

Erosion Potential

Soil erosion is the removal of soil material from the land surface by the action of rainfall and surface runoff. The K-factor is used to indicate the susceptibility of a soil to sheet and rill erosion (sheet erosion is the removal of a layer of soil material; rill erosion is the removal of soil in a network of shallow, steep-sided channels). Estimates of the K-factor are primarily based on the percentage of silt, sand, and organic matter in a soil. Values of K range from 0.05 to 0.69, with higher values indicating a greater susceptibility to sheet and rill erosion by water.

PRIME FARMLAND

The Prime Farmland Map for Maple Shade Township is based on data provided by the Natural Resource Conservation Service (NRCS). Prime farmland is generally defined by the U.S. Department of Agriculture as land with the soil quality, growing season, and moisture content needed to produce a sustained high yield of crops while employing conventional farming methods. This mapping therefore identifies the location and extent of the most suitable land for producing crops. Prime farmland will typically meet the following criteria (Jablonski & Baumley, 1989):

- Adequate and dependable moisture content;
- Favorable temperature and length of growing season;
- Soils have acceptable pH levels;
- Soils have few or no rocks;
- Soils are permeable to water and air;
- Soils are not excessively erodible;
- Soil is not saturated with water for long periods and does not flood frequently during the growing season or is protected from flooding;
- Slope is mainly 0 to 6 percent.

In addition, land classified as prime farmland is either in active agricultural production or is available for that use. Areas of water or urban or built-up land are generally not identified as prime farmland. The NRCS (formerly the SCS, Soil Conservation Service) mapping does not reflect some relatively recent changes from agricultural to non-agricultural land use that have occurred since the mapping was completed. Some areas shown as prime farmland in Maple Shade Township therefore overlap with developed residential or commercial land and would not be currently classified as prime farmland.

Lands that meet the criteria for prime farmland are generally gently sloping with well to moderately well drained, sandy loam and loamy sand soils. In Maple Shade Township, prime farmland generally corresponds to Collington, Holmdel, Keyport, Sassafras and Woodstown soils in areas of agricultural land use. Please note that the parcel data used on the GIS map is more current that Prime Farmland data available at the time of preparation.

FORESTS

The Department's NJ-GeoWeb resource was used to identify types of forested areas within the Township. There is only one type of forest coverage mapped in the Township, deciduous forest, which exists primarily in the form of deciduous wooded wetlands. Deciduous wooded wetlands exist mostly around the boarders of the Township, near the Pennsauken Creek and its Tributaries. While not mapped, deciduous wooded uplands boarder the edges of the mapped wetlands areas, and upland deciduous trees can be found throughout the Township.

Deciduous forests within the upland portions of Maple Shade commonly include the following species:

Dominant Trees

White Oak	(Quercus alba)
Red Oak	(Quercus rubrum)
Black Locust	(Robinia psuedoacacia)
Scarlet Oak	(Quercus coccinea)
Black Oak	(Quercus velutina)
Tulip Tree	(Liriodendron tulipifera)
American Beech	(Fagus grandifolia)
Chestnut Oak	(Quercus prinus)

Non-Dominant Trees

Shagbark Hickory	(Carya ovata)
Pignut Hickory	(Carya glabra)
Black Birch	(Betula lenta)
White Ash	(Fraxinus americana)
Red Cedar	(Juniperus virginiana)
Black Cherry	(Prunus serotina)
American Holly	(Ilex opaca)
White Mulberry	(Morus alba)
Sugar Maple	(Acer saccharum)

Flowering Dogwood	(Cornus florida)
Tree-of-Heaven	(Ailanthus altissima)
Black Walnut	(Juglans nigra)

The following tree species commonly occur in deciduous forests within the lowland portions of the Township:

Dominant Trees

Red Maple	(Acer rubrum)
Silver Maple	(Acer saccharinum)
Pin Oak	(Quercus palustris)
Gray Birch	(Betula populifolia)
Sweetgum	(Liquidambar styraciflua)
Blackgum	(Nyssa sylvatica)

Non-Dominant Trees

Green Ash	(Fraxinus pennsylvatica)
River Birch	(Betula nigra)
Box Elder	(Acer negundo)
American Hornbeam	(Carpinus caroliniana)
Sweetbay Magnolia	(Magnolia virginiana)
American Sycamore	(Platanus occidentalis)
Black Willow	(Salix nigra)

This G.I.S. mapping such as NJ-GeoWeb is a general assessment of the Township's woodlands, and is intended for overall planning purposes. A site-specific assessment of forest types requires an onsite inspection and evaluation.

RARE SPECIES AND NATURAL COMMUNITIES

This map coverage has been provided by the N.J. Department of Environmental Protection Landscape Project Data. The term rare has been utilized by the Natural Lands Management

Office to include both endangered and threatened plant and animal species, and species that could potentially become endangered or threatened if the population continues a downward trend. Also included within this coverage are natural communities. Maple Shade Township hosts foraging habitat for a number of State listed endangered species along the eastern and north western portions of the municipality border. These species include black-crowned night-heron and bald eagle. All habitat for these species is found in and around river and stream corridors of the North Branch of the Pennsauken Creek, and South Branch of the Pennsauken Creek Tributaries.

APPENDIX I

WILDLIFE

WILDLIFE

Lists of the mammals, birds, reptiles, amphibians, and fish common to western Burlington County were adapted from State checklists generated by the New Jersey Division of Fish and Wildlife. Wildlife habitats found within Maple Shade include open land habitat (cropland, pasture, meadows, and scrub-shrub terrain), woodland habitat (deciduous forested wetlands), and wetland habitat (marshes, swamps, and other shallow water areas). These generalized habitat types are typically intermingled with each other and with the increasing suburban environment in the Township. Relatively larger parcels of wildlife habitat in Maple Shade generally coincide with the cropland, forest, and wetland areas shown on the land use map.

Endangered species are defined as those whose prospects for survival within the State are in immediate danger due to one or many factors including habitat loss, over exploitation, predation, competition, or disease. An endangered species requires immediate assistance or extinction may follow. Species listed as threatened may become endangered if conditions surrounding the species begin to or continue to deteriorate. The potential for a particular rare species to be present in the Township is dependent on the presence of suitable habitat. Identification of suitable habitat generally requires a field evaluation by an experienced wildlife biologist.

MAMMALS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Oppossum	Didelphis marsupialis	Red Squirrel	Tamiasciurus hudsonicus
Smokey Shrew	Sorex fumeus	Southern Flying Squirrel	Glaucomys volans
Short-tailed Shrew	Blarina brevicauda	Beaver	Castor candensis
Least Shrew	Crytotis parva	White-footed Mouse	Peromyscus leucopus
Eastern Mole	Scalopus aquaticus	Red-backed Vole	Clethrionomys gapperi
Star-nosed Mole	Condylura cristata	Meadow Vole	Microtus pennsylvanicus
Little Brown Bat	Myotis lucifugus	Pine Vole	Microtus pinetorum
Keen Myotis	Myotis septentrionalis	Muskrat	Ondatra zibethicus
Small-footed Myotis	Myotis leibii	Southern Bog Lemming	Synaptomys cooperi
Silver-haired Bat	Lasionycteris noctivagans	Brown Rat	Rattus norvegicus
Eastern Pipistrel	Pipistrellus subflavus	House mouse	Mus musculus
Big Brown Bat	Eptesicus fuscus	Meadow Jumping Mouse	Zapus hudsonius
Red Bat	Lasiurus borealis	Red Fox	Vulpes vulpes
Hoary Bat	Lasiurus cinereus	Gray Fox	Urocyon cinereoargenteus
Eastern Cottontail	Sylvilagus floridanus	Raccoon	Procyon lotor
New England Cottontail	Sylvilagus transitionalis	Long-tailed Weasel	Mustela frenata
European Hare	Lepus capensis	Mink	Mustela vison
Eastern Chipmunk	Tamias striatus	Striped Skunk	Mephitis mephitis
Woodchuck	Marmota monax	River Otter	Lutra canadensis
Gray Squirrel	Sciurus carolinensis	White-tailed Deer	Odocoileus virginianus

REPTILES OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Common Snapping Turtle	Chelydra s. serpentina
Stinkpot	Sternotherus odoratus
Eastern Mud Turtle	Kinosternon s. subrubrum
Spotted Turtle	Clemmys guttata
Eastern Box Turtle	Terrapene c. carolina
N. Diamondback Terrapin	Malaclemys t. terrapin
Red-eared Turtle	Pseudemys scripta elegans
Eastern Painted Turtle	Chrysemys p. picta
Northern Fence Lizard	Sceloporus undulates hyacinthinus
Five-lined Skink	Eumeces fasciatus
Northern Water Snake	Nerodia s. sipedon
Northern Brown Snake	Storeria d. dekayi
Northern Red-bellied Snake	Storeria o. occipitomaculata

COMMON NAME	SCIENTIFIC NAME
Eastern Garter Snake	Thamnophis s. sirtalis
Eastern Ribbon Snake	Thamnophis s. sauritus
Eastern Smooth Earth Snake	Virginia v. valeriae
Eastern Hognose Snake	Heterodon platyrhinos
Northern Ringneck Snake	Diadophis punctatus edwardsi
Eastern Worm Snake	Carphophis a. amoenus
Northern Black Racer	Coluber c. constrictor
Rough Green Snake	Opheodrys aestivus
Corn Snake	Elaphe g. guttata
Black Rat Snake	Elaphe o. obsolete
Northern Pine Snake	Pituophis m. melanoleucus
Eastern King Snake	Lampropeltis g. getulus
Eastern Milk Snake	Lampropeltis t. triangulum
Northern Scarlet Snake	Cemophora coccinea copei
Timber Rattlesnake	Crotalus h. horridus

AMPHIBIANS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Marbled Salamander	Ambystoma opacum
Spotted Salamander	Ambystoma maculatum
Eastern Tiger Salamander	Ambystoma t. tigrinum
Red-spotted Newt	Notophthalmus v. viridescens
Northern Dusky Salamander	Desmognathus f. fuscus
Red-backed Salamander	Plethodon c. cinereus
Four-toed Salamander	Hemidactylium scutatum
Northern Red Salamander	Pseudotriton r. ruber
Eastern Mud Salamander	Pseudotriton m. montanus
Northern Two-lined Salamander	Eurycea b. bislineata
Eastern Spadefoot Toad	Scaphiopus h. holbrookii
Fowler's Toad	Bufo woodhousii fowleri
Northern Cricket Frog	Acris c. crepitans
Northern Spring Peeper	Hyla c. crucifer
Pine Barrens Treefrog	Hyla andersonii
Northern Gray Treefrog	Hyla versicolor
New Jersey Chorus Frog	Pseudacris triseriata kalmi
Bullfrog	Rana catesbeiana
Carpenter Frog	Rana virgatipes
Green Frog	Rana clamitans melanota
Wood Frog	Rana sylvatica
Pickerel Frog	Rana palustris
Northern Leopard Frog	Rana pipiens

BIRDS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
American Bittern	Botaurus lentiginosos
Red-Winged Blackbird	Agelaius phoeniceus
Northern Bobwhite	Colinus virginianus
Indigo Bunting	Passerina cyanea
Northern Cardinal	Cardinalis cardinalis
Catbird	Dumetella carolinensis
Black-Capped Chicadee	Parus atricapillus
Carolina Chicadee	Parus carolinensis
Brown-Headed Cowbird	Molothrus ater
American Crow	Corvus brachyrhynchos
Mourning Dove	Zenaida macroura
American Black Duck	Anas rubripes
Mallard	Anas platyrhynchos
Wood Duck	Aix sponsa
Northern Common Flicker	Colaptes auratus
Great Crested Flycatcher	Myiarchus crinitus
Olive-Sided Flycatcher	Contopus borealis
American Goldfinch	Carduelis tristis
Boat-tailed Grackle	Quiscalus major
Common Grackle	Quiscalus quiscula
Evening Grosbeak	Hesperiphona vespertinus
Rose-breasted Grosbeak	Pheucticus ludovicianus
Great Black-backed Gull	Larus marinus

BIRDS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Herring Gull	Larus argentatus
Osprey	Pandion haliaetus
Ovenbird	Seiurus aurocapillus
Eastern Screech Owl	Otus asio
Barred Owl	Strix varia
Great Horned Owl	Bubo virginianus
Ring-Necked Pheasant	Phasianus colchicus
Eastern Phoebe	Sayornis phoebe
American Redstart	Setophaga ruticilla
American Robin	Turdus migratorius
Spotted Sandpiper	Actitis macularia
Yellow-Bellied Sapsucker	Sphyrapicus varius
Snowy Egret	Egretta thula
Song Sparrow	Melospiza melodia
Starling	Sturnus vulgaris
Barn Swallow	Hirundo rustica
Cliff Swallow	Hirundo pyrrhonota
Tree Swallow	Tachycineta bicolor
Chimney Swift	Chaetura pelagica
Scarlet Tanager	Piranga olivacea
Brown Thrasher	Toxostoma rufum
Wood Thrush	Hylocichla mustelina
Tufted Titmouse	Parus bicolor

BIRDS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Red-eyed Vireo	Vireo olivaceus
Laughing Gull	Larus atricilla
Ruffed Grouse	Bonasa umbellus
Red-shouldered Hawk	Buteo lineatus
Red-tailed Hawk	Buteo jamaicensis
American Kestrel	Falco sparverius
Green-backed Heron	Butorides striatus
Great Blue Heron	Ardea herodias
Ruby-throated Hummingbird	Archilochus colubris
Blue Jay	Cyanocitta cristata
Dark-eyed Junco	Junco hyemalis
Killdeer	Charadrius vociferus
Eastern Kingbird	Tyrannus tyrannus
Belted Kingfisher	Ceryle alcyon
White-breasted Nuthatch	Sitta carolinensis
Northern Oriole	Icterus galbula
Yellow-throated Vireo	Vireo flavifrons
Turkey Vulture	Cathartes aura
Black and White Warbler	Miniotilta varia
Black-throated Blue Warbler	Dendroica caerulescens
Blue-winged Warbler	Vermivora pinus
Yellow-throated Warbler	Dendroica dominica
Cedar Waxwing	Bombycilla cedrorum

BIRDS OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Downy Woodpecker	Picoides pubescens
Hairy Woodpecker	Picoides villosus
Red-bellied Woodpecker	Melanerpes carolinus
Eastern Wood Pewee	Contopus virens
Carolina Wren	Thryothorus ludovicianus
House Wren	Troglogytes aedon
Canada Goose	Branta Canadensis
Eastern Bluebird	Sialia sialis
Northern Mockingbird	Mimus polyglottos
Yellow-Rumped Warbler	Dendroica coronata
White-Throated Sparrow	Zonotrichia albicollis
House Sparrow	Passer domesticus
House Finch	Carpodacus mexicanus
Rock Dove	Columba livia
Sharp-Shinned Hawk	Accipiter striatus
Purple Martin	Progne subis
American Woodcock	Philohela minor
Rufous-Sided Towhee	Pipilo erythrophthalmus

FISH OF BURLINGTON COUNTY

COMMON NAME	SCIENTIFIC NAME
Largemouth bass	Micropterus salmoides
Chain pickerel	Esox niger
Grass pickerel	Esox spp.
Bluegill sunfish	Lepomis macrochirus
Pumpkinseed sunfish	Lepomis gibbosus
Bluespotted sunfish	Enneacanthus gloriosus
Redbreast sunfish	Lepomis auritus
Golden shiner	Notemigonus crysoleucas
Brown bullhead	Ictalurus nebulosus
Black crappie	Pomoxis nigromaculatus
White sucker	Catostomus commersoni
Creek chubsucker	Erimyzon oblongus
Fallfish	Semotilus corporalis
Johnny darter	Etheostoma nigrum
Mudminnow	Umbra pygmaea
American eel	Anguilla rostrata
Brown trout	Salmo trutta
Carp	Cyprinus carpio

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