# Borough of Fair Haven

## Environmental Resource Inventory 2017

October 2017

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# 1. Introduction & Purpose

This Environmental Resource Inventory (ERI) has been compiled by the Fair Haven Borough Environmental Commission. The ERI is conducted under the authority granted by the Environmental Commission Enabling Legislation (N.J.S.A. 40.56A) wherein it states that, "A...commission organized under this act shall have power to conduct research into the use and possible use of the open land areas of the municipality...It shall keep an index of all open marshlands, swamps and other wetlands, in order to obtain information on the proper use of such areas, and may from time to time recommend to the planning board, or, if none, to the mayor and governing body of the municipality, plans and programs for inclusion in a municipal master plan and the development and use of such areas."

This ERI is an unbiased report of integrated text and visual information, providing baseline documentation for measuring and evaluating environmental features and resource protection issues in the Borough of Fair Haven. This ERI is an important decision-making tool for the Borough to inform the Planning Board and the Council of natural and man-made resources and features within Fair Haven, particularly critical to land-use planning, zoning, lands to be protected and features of the habitat to be preserved. This ERI is a dynamic document in which future generations of the Environmental Commission should add to, revise and refine as knowledge is gained and more data becomes available.

Since the last ERI issued in 2004, the overall report format has been revised and updates have been made to hydrology, land use, climate, existing and planned infrastructure, and critical environmental issues.

# 2. Location

The Borough of Fair Haven is located along the southern banks of the Navesink River on the eastern edge of Monmouth County, New Jersey. The Borough contains approximately 1.5 square miles (sq mi) in an irregular rectangle of length roughly 1.5 miles east-west and 1 mile north-south as shown in **Figure 1**. It is bordered on the north by the Navesink River and by the Boroughs of Little Silver, Red Bank, and Rumson in the other directions. Buena Vista and Ridge/Harding on the east and south form the border between Fair Haven and the Borough of Rumson, and Harding Road separates Fair Haven from the Borough of Little Silver at the western end of its southern border. Fair Haven's western border with the Borough of Red Bank is quite irregular, consisting of a zigzag pattern of straight lines running north from the corner of Harding Road and Prospect Avenue to the junction of Haddon Park and the Navesink River, following streets for less than half its length. This regional context is important for understanding issues related to the town as well as why regional planning is needed on a cooperative basis between neighboring communities.

# 3. Physical and Environmental Setting

## 3.1 Geography & Topography

The Borough of Fair Haven and all of its surrounding communities are located within the Atlantic Coastal Plain Physiographic Province. The Coastal Plain is divided by a prominent belt of hills to form an Inner Plain and an Outer Plain. Fair Haven is located in the Outer Plain, which is generally characterized by plains and lowlands. The general topography of Fair Haven and its relation to the surrounding communities can be seen on the United States Department of the Interior Geologic Survey Long Branch Quadrangle (**Figure 2**). Based upon this geologic survey, Fair Haven has a level to moderate slope from the Borough's southern boundary along Ridge Road north toward the Navesink River. The only areas within Fair Haven with steep or critical slopes are found along major stormwater runoff corridors. These include Shippees Pond, Schwenker's Pond, Fourth Creek, and the nameless creek that runs north between Browns Lane and Doughty Lane under River Road before flowing into the Navesink River. The highest elevations in Fair Haven, approximately 90 feet above sea level, are found in its southeast corner near the intersection of Ridge Road and Buena Vista Avenue. The average elevation throughout the Borough is between 30 and 40 feet above sea level.

## 3.2 Geology

Fair Haven is underlain by unconsolidated sediments of the Mesozoic and Cenozoic ages. For long periods of geologic time this coastal plain existed as a shallow shelf and received sediments from the eroding Appalachian Mountains. The thickness of the coastal plain in the area of Fair Haven is in the range of 500 feet.

The sediments in Fair Haven are of marine and continental origins and are composed mainly of sands, silts and clays and greensands or glauconitic sands with interspaced gravel beds. There are 19 formations of sediment deposits in Monmouth County. Fair Haven is comprised of the Red Bank and Tinton Formations:

- The Red Bank formation consists of a red to yellow-brown sand at the top underlain by gray-brown sandy clay and clayey sand at the bottom. The basal 20 feet of sandy clay grades below into the Navesink formation. The Red Bank formation reaches a thickness of 140 feet in the northern part of the county in the area of Fair Haven.
- The Tinton formation is the youngest Cretaceous formation in New Jersey. It is found only in Monmouth County and attains a maximum thickness of 25 feet. The layer is recognized as a massive bed of indurated green sandy glauconite and contains poorly preserved marine fossils.

## 3.3 Soils

Out of the 43 major soil series and 114 minor soil types identified in Monmouth County by the USDA Soil Conservation Service, only two major soil series have been identified in Fair Haven. These are the Freehold Series and the Holmdel Series. **Figure 3** displays the locations of these soils.

The Freehold Series generally consists of deep, well-drained soils that were formed in coastal plain deposits containing glauconite. They typically have a dark yellowish brown sandy loam surface layer of approximately 9 inches. The next layer, down to 35 inches deep, is a friable dark brown sandy loam or sandy clay loam containing less than 10 percent (%) glauconite. The substratum down to 70 inches deep is stratified yellow brown loamy sand with thin sandy loam layers. In Fair Haven, these soils are nearly level to moderately sloping.

The Holmdel Series is also deep and formed from coastal plain sediment deposits. But all four layers are moderately to poorly sandy loam. 9 inches deep and of a dark grayish surface layer is approximately 10 inches deep and of a dark grayish brown color. The next two layers are 10 inches of yellowish brown

color over 18 inches of light olive brown. The substream down to 60 inches is stratified yellowish brown sandy loam and olive sandy loam. This soil type is found primarily around Fair Haven Fields and is nearly level.

## 3.4 Hydrology

### *3.4.1 Water Cycle*

Water is essential to all life on Earth. The abundance of water distinguishes the Earth from any other planet, but the amount of water on Earth has remained constant for millennia. Even though the quantity of water is great, only a small portion can be used for drinking water and other human needs. Ninety-seven % of the world's water supply is saltwater stored in the oceans. The remaining 3% is fresh water. However, most of this is unavailable for human use because it is frozen in the polar ice caps, glaciers, and icebergs; too difficult to tap (below 1.6 miles depth); or too polluted. This leaves 0.003% of water that is available as fresh surface or ground water that humans can use (Miller, 1988). Surface water is water that is visible above the ground surface, such as creeks, rivers, ponds, lakes, and wetlands. Ground water is that portion of water beneath the land surface that is within the zone of saturation (below the water table) where pore spaces are filled with water. An aquifer is a water-bearing rock or rock formation where water is present in usable quantities. Water is constantly recycled through the hydrologic cycle, also known as the water cycle (**Figure 4**). Precipitation falls on the ground and some travels on the surface of the land (called surface runoff), entering streams (where it can be seen as high flows after rain events), and eventually making its way back to the ocean. Some of the water from precipitation enters the ground but remains in the shallow layers where it is available for use by plants, where it returns to the atmosphere through transpiration by plants, while some water re-enters the atmosphere directly through evaporation from surface water. Evaporation and transpiration combined are known as evapotranspiration. The water that migrates below the root zone travels underground and exits the system as stream flow, known as ground water baseflow or ground water recharge. Ground-water baseflow can be calculated by measuring stream flow during dry weather conditions. A smaller portion of the water penetrates deeper into the ground and enters (or recharges) the saturated zone of the fractured bedrock, called the aquifer, where most wells obtain their water. Pollutants can enter water as it travels the water cycle. Surface runoff can pick up chemicals and soil on its way, depositing these pollutants in waterways. This is especially true of "uncontrolled runoff" on soils that are vulnerable to erosion. Water seeping into the soil can be cleansed of many pollutants by natural soil processes. However, if the pollutant is one that is resistant to break-down, or if the pollutant doesn't get exposed to the soil long enough (such as by entering a bedrock fracture or by entering the ground water through sub-surface disposal), pollutants can spread underground and pollute sources of drinking water. Movement of ground water is usually quite slow, on average, ranging from about one foot per day to perhaps ½ inch per month. A contaminant could also travel quickly through fractures, with little soil contact to allow for filtration or degradation of pollutants. An understanding of the water cycle emphasizes the connections between surface and ground water. While the Borough of Fair Haven relies exclusively on public water (not individual wells), the water is no less part of the natural water cycle, and is susceptible to human impacts and the influence of climate and geology.

### *3.4.2 Ground Water in Our Area*

The Aquifer at Fair Haven.

The Potomac Group Raritan and Magothy Formations of late to early Late Cretaceous age form an aquifer system consisting chiefly of interlayered beds of quartz sand, silt, and clay. The aquifer system is the most heavily pumped in New Jersey and contains fresh water over an area of about 2,500 sq mi.

### *3.4.3 Recharge*

Ground water recharge is defined as water added to an aquifer (for example, precipitation that seeps into the ground deep enough to enter the saturated zone of the fractured bedrock). A ground water recharge area is the land area that allows precipitation to seep into the saturated zone. These areas are generally at topographically high areas with discharge areas at lower elevations, commonly at streams or other water bodies (i.e. the ground water returns to surface water). Most ground water flows through the shallow layers of soil and weathered bedrock to the nearest stream. A smaller percentage penetrates deeper and recharges the aquifer. Recharge rates are expressed in terms of the amount of precipitation that reaches the aquifer per unit of time. Deep wells in strategic areas throughout the county are monitored regularly by the USGS to evaluate the ground water levels in the aquifer. The closest monitoring well to Fair Haven is in Tinton Falls. Monmouth County receives an average of 48 inches of precipitation annually (US Climate Data), and references vary widely about how much reaches the aquifer in areas like Fair Haven. This is because, while precipitation can be accurately measured, recharge cannot be directly measured. Many factors affect the amount of recharge that will occur in a given area, including climate (e.g. the amount, intensity, and form of precipitation, and the effect of wind, humidity and air temperature on evapotranspiration), soil, surficial geology, and vegetation factors. In addition, recharge of ground water varies seasonally. During the growing season, precipitation is intercepted by plants and returned to the atmosphere through transpiration. Evaporation likewise, is higher during the warmer months. Together, these are known as evapotranspiration. Therefore, most recharge occurs during late fall, winter, and early spring, when plants are dormant and evaporation rates are minimal (Heath, 1983). Relative to land use, recharge rates in forest areas are much higher than those in urban areas (Heath, 1983). This is because urban areas have large areas covered with impermeable surfaces, hastening runoff to surface water, instead of allowing precipitation to percolate into the ground. To ensure that water is available during all weather conditions for human consumption as well as ecosystems dependent on water, the New Jersey Department of Environmental Protection (NJDEP) established the Planning Threshold, or dependable yield, to be used for planning purposes. The most current NJDEP Water Supply Plan is for 2017 to 2022. These are some of the key findings:

- New Jersey typically has ample precipitation on average and the State's geology allows the storage of large quantities of groundwater as well as supports large surface water reservoirs.
- Generally, New Jersey has sufficient water available to meet needs into the foreseeable future provided we effectively:
    - Increase water efficiency through conservation and reuse;
    - Promote public education and outreach;
    - Address deteriorating infrastructure and ensure proper operation and maintenance of our water storage, treatment and distribution systems;
    - Pursue key water supply projects, including enhanced system interconnections and regional optimization of system networks and resources; and
    - Fully fund current monitoring efforts/assessment studies
- Using best available analysis of peak demand data, water availability in New Jersey is about 1,509 million gallons per day (mgd) while 207 mgd remains unused.
- Annual water use in New Jersey peaked at just over one trillion gallons during the period of 1990- 2015, though overall usage decreased in the last few years of this period to 610 billion gallons in 2015.
- Per capita potable water use in NJ decreased from about 155 gallons per day to 125 gallons per day between 1990 and 2015, due in part to diminished indoor usage associated with more efficient plumbing fixtures (EPA Act of 1992).

Water delivered to homes in Fair Haven from surface or ground water must first undergo treatment to render it potable. New Jersey American Water Company is the designated water service provider for the Fair Haven community. There are very few wells in the Borough and are mostly used for irrigation only.

In accordance with the NJDEP best management practices, the Borough of Fair Haven has required many builders of single family residences to install seepage pits or dry wells in order to mitigate and control runoff from roof areas. In this manner it is possible to recharge the underlying aquifer with predominantly pollutant free storm water runoff. This also has the effect of reducing surface water flows during times of intense precipitation.

The recharge of groundwater is an objective of every environmentally sound development and is stressed in Fair Haven by the NJDEP Division of Coastal Resources permit process for large projects. Care must be taken regarding the quality of water recharging in the ground. Dumps, landfills, and other waste disposal sites often have an adverse impact on groundwater quality.

Additionally, impervious surfaces, such as roads and parking lots added for use by motor vehicles poses the threat of hydrocarbon contamination as do lawn areas heavily maintained with fertilizer.

The Fair Haven Environmental Commission is implementing methods to deter storm water runoff from impervious surfaces (roofs, driveways, roads) in the Borough through education programs on rain barrel collection for residential roof run-off, rain garden sites, use of organic fertilizers and use of pervious surfacing materials where applicable.

### *3.4.4 Ground Water Quality*

Pollution, such as nitrates, bacteria, metals, pesticides and antibiotics, can enter ground water via non-point sources (including septic systems and runoff from fields and roads), and rain. The New Jersey Comparative Risk Project (2003) identified a number of possible human health risks from drinking water, including lead (which, when present, is usually from the plumbing [NJDEP, 2004]), radon, arsenic, methyl tert-butyl ether (MTBE), nitrates, and waterborne pathogens. Known Contaminated Sites (KCS) as listed by the NJDEP Bureau of Planning and Systems (**Attachment 1**), may also have the potential to contaminate ground water. The sites included in this dataset are handled under various regulatory programs administered by the NJDEP's Site Remediation and Waste Management program. It contains properties within the state where contamination of soil or ground water has been confirmed at levels equal to or greater than applicable standards. Sites identified in the KCS list can undergo a variety of activities, ranging from relatively simple soil removals to highly complex remedial activities. It is important to note that the list may include sites where remediation is either currently under way, required but not yet initiated or has been completed (and no longer considered contaminated).

### *3.4.5 Surface Water*

Surface runoff flow is directed into a network of conveyance systems. Depending upon the area of the Borough, the systems consist of a stormwater collection system which outlets runoff into existing Creeks and swales. Ultimately most surface water is conveyed to the Navesink River, although a small portion of surface waters are directed towards Little Silver Creek via a small Creek that traverses Harding Bird Sanctuary. Fair Haven has three streams that generally follow the slope of the land northward toward the Navesink River. They are Fourth Creek and the combination of Schwenkers Pond and Shippees Pond and are considered tidal. In addition, a nameless Creek runs north between Browns Lane and Doughty Lane under River Road before flowing into the Navesink River. Fair Haven has two other man-made and spring-fed ponds, McCarter Pond (originally made for ice harvesting) and Derrys Pond in the Nature area (made for irrigation).

The Navesink River is Fair Haven's greatest natural asset. The Navesink River is part of the Navesink-Shrewsbury estuary that connects with the Shrewsbury River before entering Sandy Hook Bay and the Atlantic Ocean. The Navesink watershed drains 95 sq mi. of urban/suburban residential development and agricultural lands. The tidal waters of the Navesink River extend from the Shrewsbury River near Sea Bright upstream to the dam at the Swimming River Reservoir. The average flow rate recorded at the USGS gauging station at Red Bank is 81.1 cubic feet per second. A dilution study conducted in 1985 found that the time needed for a theoretical slug of water to travel from the upper reaches of the Navesink to its mouth was 76 hours.

A watershed is defined as the land area drained by a set of brooks, streams, and rivers that generally flow in a common direction and terminate at a common destination, usually a large river, lake or the ocean. The bigger waterways of the Navesink watershed are the Hockhockson and Pine Brook Rivers loosely in or bordering Tinton Falls in the south, and the Big Brook, Mine Brook, Yellow Brook, Ramanessin Brook, Willow Brook and Hop Brook drain the hills of Holmdel, Colts Neck and Middletown to the west and north. These latter rivers meet to form the Swimming River Reservoir in Colts Neck which ultimately spills over into the Swimming River and on to the Navesink in Red Bank. Further to the north the Nut Swamp and Jumping Brooks feed the man-made Shadow Lake which along with Poricy Brook empties into the head of the Navesink near the North Jersey Coast Line train trestle. Other streams, most notably McClees Creek in Middletown's Navesink Hills, flow into the sides of the Navesink from Middletown, Fair Haven and Rumson. (The Navesink Watershed, Jerry and Kate Keelen 2003) Fair Haven embraces only 2.5 miles of river frontage along the Navesink, however, its shoreline is impacted by runoff from the entire watershed area.

### *3.4.6 Flood Prone Areas*

A floodplain is the land along a river or stream that is subject to periodic flooding when the river or stream overflows its banks. As required by the Flood Disaster Protection Act of 1973, the Federal Emergency Management Administration (FEMA) is responsible for delineating floodplains. According to FEMA, "Everyone lives in some type of flood zone." FEMA defines these geographic areas based on studies of flood risk. FEMA publishes Flood Insurance Rate Maps (FIRMs) that show the flood zone boundaries. FIRMs are the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP). Special Flood Hazard Areas (SFHAs) are defined as areas subject to inundation by a flood having, on average, about 1 in 100 chances in any given year, also referred to as the 1% annual chance flood. All of the Navesink shoreline in Fair Haven is either in an AE or VE designation as well as Shippees Pond and Fourth Creek shorelines (**Attachment 2**). Few residences are in a designated flood zone where flood insurance is required. Superstorm Sandy was a test to Fair Haven's flood prone areas. The 9-foot tidal surge caused most damage along Fourth Creek and the un-named creek on the north and south side of River Road where a few residences we impacted. Most of the shoreline homes, although now in a designated flood zone, did not see water damage.

## 3.5 Waters and Wetlands

The Borough contains a wide variety of jurisdictional and non-jurisdictional waters and wetlands features. The Borough's northerly boundary is along the Navesink River, a category one saline estuary (SE1C1), as defined by the New Jersey Surface Water Quality Standards (N.J.A.C. 7:9B). Per the water quality standards, category one waters are protected based on their "exceptional ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s) to protect their aesthetic value (color, clarity, scenic setting) and ecological integrity (habitat, water quality and biological functions." The Navesink River contains approximately 2,662 acres of shellfish growing waters that have been harvested by its inhabitants beginning well before European settlement of the area.

Fair Haven has approximately 2.5 miles of riverfront along the Navesink River. This 2.5 miles is based upon the many meanderings of various coves, inlets, and points. With the exception of a commercial marina, a private yacht club, and small areas of public access at the ends of four Borough streets, the properties along the Navesink River are mainly private residences. Interspersed along the developed land are some marine and estuarine coastal wetland habitats. These areas provide habitats for wildlife and also provide for the filtration and natural bioremediation of many of the pollutants that enter into the river from storm water outfalls.

Freshwater wetlands habitats coincide with the surface water tributaries of the Borough. A map of these wetland habitats is included as **Figure 5**. It should be noted that the mapped wetland habitats are approximate and if official boundaries are ever required, a formal delineation would be required by a certified wetland scientist.

Freshwater wetlands are identified using a three-parameter approach by identifying vegetation, soil type, and hydrology. Freshwater wetlands are also classified into three different resource values; exceptional, intermediate, and ordinary. Exceptional resource value wetlands are those that discharge into trout production waters or their tributaries, or provide habitat for threatened or endangered species. Ordinary resource value wetlands are those that are isolated wetlands or those more than 50% surrounded by development, less than 5,000 square feet (sq ft), or drainage ditches, swales and detention facilities. Intermediate resource value wetlands are those that are neither exceptional nor ordinary.

Coastal and freshwater wetlands contribute to the social, economic, and environmental health in many ways:

- Wetlands protect drinking water by filtering out chemicals, pollutants, and sediments that would otherwise clog and contaminate our waters.
- Wetlands soak up runoff from heavy rains and snow melts, providing natural flood control.
- Wetlands release stored flood waters during droughts.
- Wetlands provide critical habitats for a major portion of the State's fish and wildlife, including endangered, commercial and recreational species.
- Wetlands provide high quality open space for recreation and tourism

The significance for waters in wetlands is that these habitats, as well as the land areas surrounding these habitats, are that these areas are regulated by New Jersey environmental laws to protect public safety and the natural environment.[1] Under these Laws, certain activities (e.g. construction) must comply with the associated New Jersey regulation or rule. The rules that are utilized by the Department of Environmental Protection and other environmental agencies are codified at Title 7 of the New Jersey Administrative Code (N.J.A.C.). The full listing of New Jersey Environmental Regulations can be found at: http://www.nj.gov/dep/rules/nj_env_law.html

## 3.6 Vegetation

Wetland and upland vegetated communities are interspersed throughout Fair Haven adjacent to the Navesink River and throughout the parks and open space in town. Wetlands may be found along Fourth Creek, adjacent to Schwenker's Pond, off Brookside Terrace in River Oaks, within the Fair Haven Fields Natural Area, and the Harding Bird Sanctuary. Wetland habitats in town include smooth cordgrass (*Spartina alterniflora*) and common reed (*Phragmites australis*) dominated coastal wetlands along the Navesink River and its tributaries, and deciduous forest and scrub/shrub wetlands within the Fair Haven Fields Natural Area and the Harding Bird Sanctuary. Upland habitats include suburban maintained landscapes, woodlands, and meadows.

A 2008 report written for the Fair Haven Fields Advisory Committee entitled, *Fair Haven Fields Natural Area Assessment and Maintenance Plan,* documented six habitats (referred to as ecozones) as well as the vegetation species found within each of these habitats. Habitats in the Fair Haven Fields Natural area include Ridge Woods, Pine Grove, Northeast Woods, Northwest Woods, meadow, and pond including Fourth Creek and adjacent wetlands. Per the report, old growth hardwood trees along Ridge Road are identified as Ridge Woods; the eastern white pine dominated, two-and-a-half-acre narrow strip along Fair Haven Road is identified as Pine Grove; and the area bounded by the church and cell tower to the west and the edges of private property along the east form the boundaries of the Northwest and Northeast woods, a zone of 20 acres with predominately locust in the Northwest zone and sweet gum and swamp maple in the Northeast.

[1] Environmental laws for special water and wetland areas include the Waterfront Development Law (N.J.S.A. 12:5-1 et seq.), the Coastal Area Facility Review Act (N.J.S.A. 13:19-1 et seq.), the Wetlands Act of 1970 (N.J.S.A. 13.9A), and the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50).

A summary of the predominant species found within each of these habitats is included as **Table 1**. An exhausted list of vegetation, which includes herbaceous, shrub, vine, and tree species is beyond the scope of this document. However, a list of vegetation common to Monmouth County provided by the USDA can be found on the Native Plant Society of New Jersey's website (http://www.npsnj.org/pages/nativeplants_Plant_Lists.html).

# 4. Wildlife

The abundance of habitats in Fair Haven (i.e., Navesink River and its tributaries, wetlands, meadows, and woodlands), allow for a variety of permanent and migratory wildlife. Both terrestrial and aquatic fauna may be found within the Borough, including benthic invertebrates (i.e. organisms that live in or on the bottom sediments of rivers, streams, or open water bodies; eg. shellfish), fish, mammals, reptiles, amphibians, and birds. Terrestrial wildlife is categorized as animals that spend most of their life on land while aquatic animals spend most of their life in the water. For the sake of this report, all wildlife that live within the Navesink River and its tributaries are considered aquatic. Therefore, wetland species including amphibians, which spend equal parts of their life of land and water, are included in the terrestrial wildlife summary.

The following sections highlight the terrestrial and aquatic wildlife, and includes a summary on threatened and endangered species and their habitats.

## 4.1 Terrestrial Wildlife: Mammals, Reptiles, Amphibians, and Birds

Dozens of terrestrial species of wildlife reside in Fair Haven. Common mammals found in the Borough include gray squirrel, chipmunk, raccoon, opossum, white-footed mouse, eastern mole, groundhog, eastern cottontail rabbit, big brown bat, and white-tailed deer. Reptiles, such as the eastern garter snake and eastern box turtle may be found in woodland areas or residential yards. Wooded wetlands as well as the adjacent pond in the Fair Haven Field Natural Area, are home to painted turtles, bull frogs, green frogs, and spring peepers. However, the most abundant terrestrial wildlife are the birds. The variety of different bird habitats in the Borough allow for a variety of bird families that reside year-round or migrate through Fair Haven. The different groups of birds include woodpeckers, raptors, sparrows, and ducks to name a few. Approximately forty species of birds are considered year-round residents of Monmouth County. Species include the northern cardinal, Carolina chickadee, Carolina wren, American crow, blue jay, tufted titmouse, mourning dove, and American goldfinch. An exhausted list of birds that may be found in Fair Haven, be it migrant or resident, is outside the scope of this report. However, the Monmouth County Audubon Society has a checklist of bird species with their range key (i.e., common to scarce, winter, summer, migrant, year-round). A pdf version of the checklist may be found online: http://www.monmouthaudubon.org/PDF_files/BirdsofMonmouthCounty_Final.pdf and is also included as **Attachment 3** to this report.

## 4.2 Aquatic Wildlife: Mammals, Fish, Invertebrates

The Navesink River serves as an important nursery area for marine life, habitat for resident species, and as a migratory stopover or even passage between the Atlantic Ocean to brackish or freshwater spawning or feeding areas. The occasional dolphins (e.g., bottlenose, common) have been known to find their way into the River, chasing fish. Harbor seals, primarily found wintering along the sand bars at Sandy Hook, may also occasionally find their way up river. However, fish and shellfish are the most common wildlife found within the Navesink River and its tributaries. A summary of fish and invertebrates common to the aquatic areas in Fair Haven are included as **Table 2**.

## 4.3 Critical Wildlife Habitats and Threatened and Endangered Species

NJDEP's Division of Fish and Wildlife developed special habitat maps under a study known as the Landscape Project, identifying critical areas for threatened and endangered species based on land-use classifications and actual species sightings. The project focuses on large areas throughout the State that are ecologically similar in regard to plant and animal communities referred to as Landscape Regions. New Jersey is split into six Landscape Regions: Atlantic Coastal, Delaware Bay, Piedmont Plains, Pinelands, Skylands, and Marine. Fair Haven is located within the Atlantic Coast Region. Within the Landscape Region, habitats are divided into five different classes: forest, grassland, forested wetland, emergent wetland and beaches. The following Habitat ranks are assigned to the habitat classes for critical habitats:

- **Rank 5** is assigned to areas containing one or more occurrences of at least one wildlife species listed on as endangered or threatened on the Federal list of endangered and threatened species.
- **Rank 4** is assigned to areas containing one or more occurrences of at least one State endangered species.
- **Rank 3** is assigned to areas containing one or more occurrences of at least one State threatened species.
- **Rank 2** is assigned to areas containing one or more occurrences of at least one non-listed State priority species.
- **Rank 1** is assigned to areas that meet habitat-specific suitability requirements such as minimum size criteria for endangered, threatened or priority wildlife species, but do not intersect with any confirmed occurrences of such species.

Online public mapping of the Landscape Project habitats may be viewed at NJ Geoweb's site (http://www.nj.gov/dep/gis/geowebsplash.htm). A map of the habitats is included as **Figure 6** and species mapped within the region are included in **Table 3**. As indicated by the mapping, species Ranks of 3 and 4 for threatened and endangered species, respectively, are assigned to the open water areas (i.e., Navesink River and ponds), coastal wetlands, and beaches in the Borough for bald eagle, black-crowned night heron, least tern, and osprey.

# 5. Land Use

The Borough Zoning Map delineates areas of nine separate residential zones and two business Zones (**Figure 7**). A Public Use zone is also established within the Borough. The residential zones vary in minimum lot size 5,000 square feet to 40,000 square feet. At present, 83% of the residential lots in Fair Haven are in R-5, R-7.5, and R - O zones representing lot sizes of 5,000, 7,500, and 10,000 square feet respectively. This has yielded a higher population density than that of surrounding towns. Local trends in western Monmouth County reflect the propensity of increasing minimum lot sizes to decrease the density of residential development. At present, most of the residential development in the Borough reflects in-fill type developments limited to minor subdivisions of oversized parcels in otherwise developed areas.

The residential character of Fair Haven is illustrated by **Figure 8** and in more detail in **Table 4**, which display the Land Use in the Borough. Of its land area, 62.7% has been developed for residential use, and only 4.8% is used for business purposes. The remaining developed land in the Borough is dedicated to public uses, such as schools, houses of worship, and public streets.

Significantly, only 8.8% of the land in Fair Haven is undeveloped. This includes streams, ponds, and wetlands that, according to present laws and statutes, cannot be developed. In fact, almost 97% of the developable land in Fair Haven has been developed. While most of Fair Haven has been sub-divided for housing, the borough owns two large areas of open space - Fair Haven Fields and the Harding Bird Sanctuary.

# 6. Existing & Planned Infrastructure

Fair Haven is a fully developed community with a good amount of legacy infrastructure that needs to be maintained and updated as appropriate. Most residential and commercial lots have been developed and a good portion of the community area has been preserved as open space. A high level of redevelopment of commercial and residential properties has occurred in recent years, with a number of commercial projects under construction that should provide additional local jobs and shopping/dining options. Given these conditions, the focus on infrastructure is largely directed towards the careful management of existing facilities and also strategic acquisition, updating and disposal of public facilities. The overall goal is to provide a useful set of infrastructure that meets the needs of our residents and businesses and that also provides long term sustainability to the region. This chapter will outline some of the implemented and planned infrastructure improvements that are targeted to address our local environment.

## 6.1 Transportation

Fair Haven, like many towns in America and abroad is experiencing changing public expectations as to local retail and service needs. The growth of online shopping and changing family lifestyles is altering the pattern of consumption for households – and thus a change in local shopping activity. With over 8% of household spending currently being allocated to online shopping – up from 2% just a decade ago - the expectation is that these changes will continue to alter the need for local stores. In recent years, the Borough had a number of store closings that reflected these changes, with local banks, stationary and bicycle shops lost – but with expectations of future restaurant and services planned for their locations. While these changes may be disruptive or disconcerting to some residents – the Borough needs to continuously adapt to existing and future trends in household spending – be that house sharing via AirBNB, using car sharing services like ZipCar or using transportation network companies such as Lyft or Uber to get around – as well as the massive amount of local package delivery activity that comes from online shopping. Yet, Fair Haven even today continues to offer relatively broad set of commercial services that allow many residents to walk or bike to stores and shop locally.

Thus, Fair Haven has significantly greater usage of non-motorized travel trips as compared to other suburban communities in New Jersey. On most school days, over 2/3 of our students (600+ children) walk or bicycle to our local K-8 schools. Many parents accompany their children. Bicycling and walking are common ways to access local shops, restaurants and services. Over the last two decades, the community has placed significant emphasis on infrastructure improvements that are designed to encourage active travel as a lifestyle and also to improve our public infrastructure that impacts the regional environment.

While driving in and out of the region is a common form of travel, the Borough Council has officially adopted a complete streets program and local street improvements are designed to include pedestrian and bicycle improvements in roadway renovation and reconstruction projects. The Borough is also in the process of completing a formal Bicycle and Pedestrian program and has already implemented a sidewalk connectivity project to address gaps in existing sidewalk infrastructure (**Figure 9**).

In terms of motor vehicle travel, the roadway and transportation system of the Borough of Fair Haven is based upon two main collector roads which traverse the length of town (**Figure 10**). An additional corridor (Rumson Road) provides additional capacity to the Southern portion of the Rumson Neck. These two-lane roadways provide east - West connectivity with both Rumson and Red Bank. The two Fair Haven Corridors - Ridge Road and River Road are county roadways and as such are maintained by the county. There are no current plans to expand the capacity of these roadways, although intersections will be modified as traffic volumes increase to warrant further signalization. In 2007, the Borough of Fair Haven implemented a number of traffic calming projects to slow and manage traffic along the River Road Corridor and improve pedestrian and bicycle safety. In subsequent years, the Borough has expanded our crosswalk and traffic calming along the River Road corridor and worked to implement a bicycle route along Ridge Road. Further improvements in pedestrian and bicycle facilities included the development of

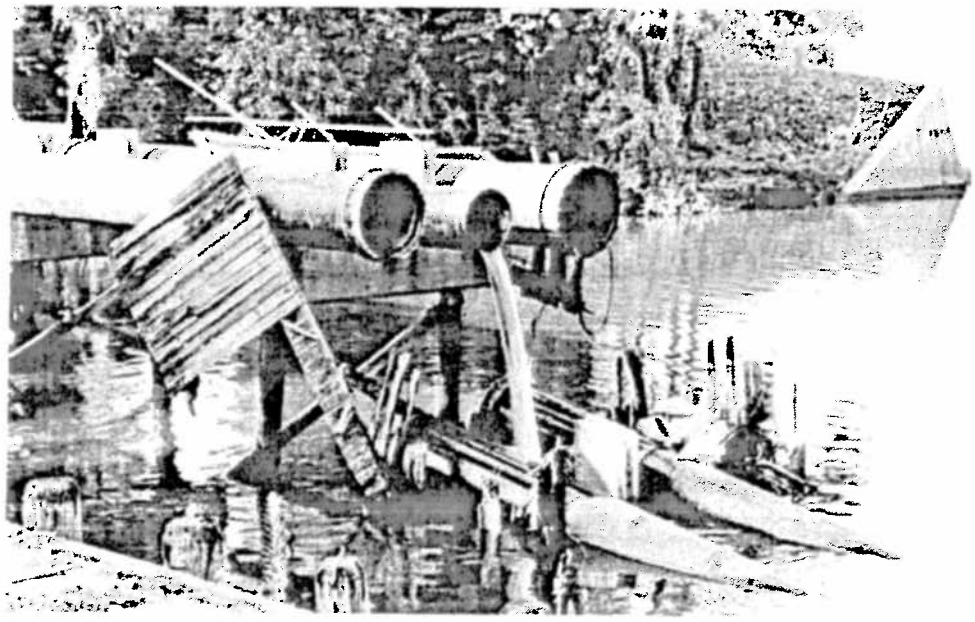
additional gravel paths in the Fair Haven Fields and the closing of Third Street to vehicular traffic during morning and afternoon school travel since 2006.

## 6.2 Stormwater Management

A number of culverts and storm water management systems have been improved in the last decade. Improvements to the bulkhead along River Road near Schwenkers Pond were made in 2002. In 2016, the Borough took full title to the complete area Schwenkers Pond and a significant portion of the streambed from the private owners in a donation to the Borough during the subdivision process. This donation added 4 acres in public space and made the water body more accessible to the general public and directly under the supervision and maintenance of the governing body. Plans are being developed to provide a public trail near the bank top of the pond stretching from Beekman to River Road. The Fourth Creek culvert system along River Road was rebuilt in 2008. Biological treatments were applied by certified providers to Schwenkers Pond and McCarter Pond in 2017 to help maintain water quality. The boroughs upland investments in storm water and pond maintenance are focused in part on providing improved water quality in our discharges into the Navesink River.

## 6.3 Utilities

The water and sewer infrastructure of the Borough of Fair Haven are owned by the respective utility authorities. The New Jersey American Water Company provides municipal water services for the Borough. The water conveyance system is made up of water mains ranging in size from 18-inch to 4-feet. The largest of the water mains is located along River Road. This main is 18-inch in diameter. The water main within Rumson Road is 16-inch in diameter. Several 10-inch, 12-inch and 8-feet cross connections between these mains exist. This looping affect provides nearly constant pressure conditions throughout the system. There has been considerable concern in recent years as to the age and condition of the water supply system. Notable failures of three main supply mains due to prior storm damage and poor repairs at the Swimming River Reservoir treatment plant resulted in near crisis of water supply to the borough and surrounding towns in 2012 (photo below from Monmouth County). The elected officials and management staff in the Borough continue to work with the private owner to assure needed and appropriate maintenance and capital improvements.



Sanitary sewer is collected within relatively small diameter sewer mains. These mains convey household sanitary sewer to one of eight pump stations located within the Borough. Sewage is pumped from these facilities for treatment by the Two River Water Reclamation Authority. The majority of the Borough's effluent is pumped to Red Bank where it flows via gravity through an 8-inch" diameter pipe to Little Silver. The effluent is then conveyed along Seven Bridges Road, through Oceanport, and finally to Monmouth Beach and the treatment facility. The sewer mains range from 18-inches to 48-inches along this path. After treatment by the Authority, the effluent is pumped through a 48" pipe into the Atlantic Ocean.

The electric grid is owned and operated by FirstEnergy Corporation via their subsidiary Jersey Central Power and Light. In the aftermath of Superstorm Sandy, the Borough experienced extending power outages – with sections of the Borough experiences 14 days of power loss. The Borough continues to discuss alternatives and hardening options for the electrical grid that may provide greater resiliency and redundancy for the power grid. Post sandy, a number of borough facilities had emergency generation added and the capacity of emergency generating was increased at other facilities.

## 6.4 Recycling

In terms of recycling, the Borough of Fair Haven has provided curbside recycling since the 1970's and also provides for recycling drop off at the borough garage. In 2016, the Borough of Fair Haven recycled 7,792 tons of materials. A broad list of the recycled materials is contained in **Table 5** below. These materials included commercial and residential Commingled glass, plastic, aluminum, tin, cardboard, mixed paper, and newspaper. This material was either transported to recycling facilities by our private trash and recycling service (M&S Waste Services) or by borough workers to local recycling facilities in Red Bank or Tinton Falls.

**Table 5 – Fair Haven Recycling - 2016**

| Item | Tons |
|---|---|
| Corrugated | 258.64 |
| Mixed Office Paper | 93.82 |
| Newspaper | 187.64 |
| Glass Containers | 65.67 |
| Aluminum Containers | 28.15 |
| Steel Containers | 28.15 |
| Plastic Containers | 75.06 |
| NonFerrous/Aluminum Scrap | 30.16 |
| White Goods & Light Iron | 22.54 |
| | |
| Leaves | 1,742.81 |
| Brush/Tree Parts | 3,908.16 |

# 7. Historical and Cultural Factors

## 7.1 History

Fair Haven, in its early recorded history served primarily as a thoroughfare between neighboring towns on the Red Bank Rumson peninsula because it was rural and sparsely populated. In the mid-1800s the waterfront played a major role in the town's development, as it provided a dock for steamboats that served New York and New Jersey and seafood (fish, oyster, and clams) for the fish market in New York City. The municipality of Fair Haven was incorporated in 1912 until then it was part of Shrewsbury Township. In the year 2000 it had a population of 5,937.

Over the past 100 years, Fair Haven has changed from a rural, seasonal community to a densely populated suburban community that still maintains a small-town character. The town's first permanent dwelling was built by Jeremiah Chandler in 1816 on the riverbank near the foot of what is now Fair Haven Road. The river provided an economic base for a growing community. By 1850, "Chandler's Dock" had been erected on a site adjacent to the present town dock. Steamboats on the New York Red Bank run made regular stops. They transported oysters, other river harvest, and farm produce to the city. During the latter years of the 19th and early part of the 20th centuries, boats such as the "Seabird" and "Albertina" (depicted on the Borough seal) continued that trade and brought numerous summer visitors, many of whom were famous vaudevillians. Nearby boarding houses and the old Van Tine and Atlantic Hotels catered to this clientele. The vaudevillians organized the Player's Club, whose site now serves as home to the Shrewsbury River Yacht Club. In the 1850s, Charles Williams, a free black person, built his home at the foot of DeNormandie Avenue. The structure is occupied today by his descendants, and is one of the oldest continuously inhabited houses in the Borough. Old timers (Don English) have told us there was an oyster shell "road" along the Navesink River bank from the vicinity of Hance Road to Fourth Creek.

A free black community had become established in town prior to the Civil War. Fisk Chapel, constructed in 1888, successor to several prior structures served as the community's church and social center. The building is listed on the National Register of Historic Places, and now is used as a Borough meeting hall after a thorough reconstruction in the 1995-2015 period.

The mid-19th century witnessed construction of many houses along the road leading to Chandler's Dock. Now called Fair Haven Road, the street was then the heart of town. At different times it has been known as "Van Tine Street", and "Pearl Street". The Hendrickson, Little, and other Fair Haven families were among the first to establish homes on the street. They were later joined, among others, by J.S. Throckmorton, captain of the "Albertina". Contemporaneously, adjoining streets (Clay, DeNormandie, and Gillespie) and adjacent parts of current day River Road were built up. In recognition of the many 19th century structures still found there, this part of town has become popularly known as the "Old Village". In more recent times the Borough of Fair Haven is primarily a residential community with a small business district.

## 7.2 Historical Areas

A Historic District, created by the Borough Council in 1993, represents the area's older section and gives the town its unique small village character. It includes the areas around the north end of Fair Haven Road and the east end of River Road, where 14 of its buildings are listed in the Monmouth County Historic Sites Inventory, as well as other buildings such as Bicentennial Hall.

Bicentennial Hall, originally named Fisk Chapel, was built as a church for the Bethel A.M.E. (African Methodist Episcopal) congregation in 1882 on land donated by Clinton Bowen Fisk, who was a distinguished Union General officer in the Civil War. The "Stick Style Gothic" church was moved from Fisk St. to its present location on Cedar St. in 1975 and renamed Bicentennial Hall. To be totally refurbished by 2017, it hosts local organizations such as the Fair Haven Garden Club, the Scouts, and the Historic

Association. The Fisk Chapel is listed as a building of Religion and Social/Humanitarian significance in both the State and National Register Historic Places.

Chandler's Dock, now represented by the Municipal Dock, at the foot of Fair Haven Road, can only be imagined based on remnants of old pilings at the site. The dock, first built in 1850 and rebuilt several times later, served as the steamboat landing for the boats until the 1920s. The Steamboats transported the river harvest of Oysters and clams to New York and ferried visitors to the area.

Early Fair Haven was a small cluster of homes built in the 1830's and 1840's along what was then called Van Tine St., later Clamshell Alley (because it was paved with clam and oyster shells from the river), Pearl St. and now Fair Haven Road. Of historical and architectural interest are 14 houses that are part of the Walking Tour of the Fair Haven. Historic District documented by the Fair Haven. Historic Society. These houses are along Fair Haven Road, River Road, Clay Street. and DeNormandie Avenue and display Greek Revival and Italianate styles as well as substantial examples of mid-19th century residence of this area. Examples are the

- Charles Doughty House on 55 Fair Haven Rd. owned by Mr. Doughty who was a member of the Fair Haven Dock and once served as a boarding house as "Sunnyside Cottage."
- to 70 Fair Haven Road, which was built in the early 19th Century with Greek Revival elements and operated as ice cream parlor by the Job family;
- Charles Williams House on 78 DeNormandie Avenue, built by Charles Williams a free black man around 1860 as a 2-story side-hall house with a and / Story wing, remains with the family. The present owner's grandmother was born in the house in 1861, and
- J. Soden House on 35 Clay Street was built between 1850 and 1860. The earliest part of the house is the left side with later addition on the right. The later additions are distinctive because of the so-called "jenkinhead roof," stick style vergeboard, and the windowed cupola.

The Fireman's Fair began in 1921 and continues today on the grounds of the present firehouse dedicated in 1953. The fair, with its typical rides, games, and food, is held during the last week of August and signifies the end of the summer. Manned by volunteers who cook, clean, sell tickets, work booths, and serve food, the fair benefits the local volunteer fire company.

The Dough Boy statue in Memorial Park at the corner of Fair Haven and River Roads was created in 1920 to commemorate the soldiers of World War I.

## 7.3 Recreational Areas

Distinctive to Fair Haven is that it is bordered on one side by the Navesink River which serves as an important recreational resource for its residents, offering fishing, crabbing, and boating. There are a few small beaches along the river, but they are accessible to and can accommodate only a few people at any one time. There is a municipal boat launching area at the end of Battin Road. To monitor usage, boat launching permits are issued through the Borough. The Fair Haven Dock, at the end of Fair Haven Road, is built on pilings that extend onto the river and ends with a covered section that provides seating for about 10 persons. The dock provides resident's opportunities to partake in sedate river related activities such as walking, viewing the river and sunset, fishing, or crabbing.

River Rats (a.k.a. Fair Sailing Club), a non-profit, volunteer organization founded in 1954 as Dads of Fair Haven, promotes water activities programs for adults and youngsters. Over 100 youngsters attend its sailing and water safety classes each year. Its property, at the end of Battin Road, is designed to accommodate its sailing classes and day sailing members by providing picnic tables, barbeque grills, sheds for storing sailing equipment, racks for dinghies and Sunfishes, and trailers for its boats. Member boats are moored in the mooring field in the river facing the club property. The Shrewsbury River Yacht Club, originally known as the Players Boat Club, was formed in 1910 by the vaudevillians from New York City and its houseboat served as a place for socializing. A more permanent clubhouse on a foundation of pilings in the river was built in 1929, and the club has evolved into today's Shrewsbury Yacht Club.

In 1956 Harding Park, situated on the north side of Ridge Road near its intersection with Harding Road, was designated the Harding Bird Sanctuary by the Fair Haven Borough Council and placed under supervision of the Fair Haven Garden Club. The Sanctuary can be entered on trails that begin on Ridge Road and Harvard Road. It contains several acres and is traversed by a small stream. There are a large variety of plants, both in the swampy areas and in the higher land east and west of the stream. The Garden Club has endeavored to maintain the Sanctuary as a wilderness area, a haven for birds, and a place that is open to anyone interested in a quiet walk through the woods. The Club has been improving the Sanctuary, in a manner consistent with these purposes, using funds raised during its annual plant sale. Over 20 varieties of wildflowers, ferns, and berry-bearing shrubs attractive to birds have been planted. Boy Scout troops have assisted by planning and constructing rustic bridges and mapping trail.

Fair Haven Fields consists of 77 publicly held acres that were once part of the Lovett Nursery. The Borough acquired the property in 1974 through the use of Green Acres Funding. It is bordered on the south by Ridge Road and on the other three sides by residential properties. Thirty-eight acres of Fair Haven Fields are designated a natural area, thirty-seven acres have been developed for recreational purposes, two acres serve as garden plots for residents, and the remaining two acres are used as a leaf composting area for the Borough. The natural area contains a meadow, ponds, and woods including a small stand of 200-year old oak trees. It is a haven for numerous species of birds and small mammals. The area is traversed by a series of pathways, covered with wood chips that allow access to these various areas. The recreational portion of Fair Haven Fields contains tennis courts, a soccer field, and three baseball diamonds.

In addition to the designated park areas, ball fields located between 3rd and Jackson Streets and on the Corner of 3rd Street and Cedar Avenue as well as the fields behind Knollwood School and McCarter Park across from Sickles School also serve as recreational area for the town.

# 8. Environmental Factors

## 8.1 Climate

Fair Haven's is in New Jersey's Coastal climate zone. This abundance of nearby water acts to moderate temperatures throughout the year. Day-to-day weather variations result primarily from high and low-pressure systems that move across the area in the prevailing westerly atmospheric flow of the northern hemisphere in our latitudes.

A long and continuous record of Fair Haven weather observations is unavailable. However, a comparison of unofficial Fair Haven observations with official records from the Long Branch and Sandy Hook cooperative observing stations indicates that, despite their closer proximity to the ocean, Fair Haven experiences conditions nearly identical to theirs. The statistical data reported below are based on information collected at stations.

The yearly average temperatures in Fair Haven is 53 degrees Fahrenheit (°F). The average low temperature is 25°F in January. The average high temperature is 84°F in July. Average low temperatures in December, January, and February are below 32°F. Care must be taken in the installation of below ground piping to account for frost heaving.

Fair Haven's total precipitation averages approximately 47 inches per year, which is higher than the national average of 39 inches per year. Fair Haven receives an average of 25 inches of snow per year. Precipitation is distributed relatively evenly throughout the year with little year to year variance. During a typical year, Fair Haven will have 209 sunny days and 77 days with precipitation.

Fair Haven is not known for experiencing extreme weather phenomena. Thunderstorms are common, especially during the summer months, 5-6 such storms per year could have heavy rain and/or high wind. There have been no tropical storms in the past two years.

So-called "nor'easters" occur more frequently than tropical cyclones and are most common in the period from November through March. They typically produce winds of between 20 and 30 miles per hour and precipitation over an extended period of time, but some have produced winds in excess of 60 miles per hour and over 3 inches of rain, and significant snowfalls in Fair Haven.

A sea breeze, that is a cool easterly wind off the Atlantic Ocean, are common in Fair Haven. Fog can arise during a sea breeze or when warm moist air spreads over cool ground. Dense fog can persist for several hours at a time, particularly during overnight and early morning hours.

## 8.2 Climate Change

Gases present in the atmosphere that have the ability to absorb and emit infrared radiation are called greenhouse gases. Human activities have raised the amount of greenhouse gases in the atmosphere and continue to do so. The primary greenhouse gas is Carbon Dioxide (CO2). Since measurements started of C02 at the Mauna Loa Observatory in Hawaii, concentration of CO2 in the atmosphere has had an accelerating growth rate. On July 27, 2017, Mauna Loa reported an atmospheric concentration of CO2 of 407.05 parts per million (ppm). By comparison the amount recorded in 1958 was 315 ppm. It is estimated that the pre-industrial revolution concentration was 270-280 ppm.

According to the Office of the NJ State Climatologist: "The statewide average temperature in 2012 was the highest in 118 years of records. The 56.0°F average for 2012 is 2.8°F above the 1981-2010 mean. Nine of the ten warmest calendar years on record have occurred since 1990 and the five warmest years have occurred since 1998." While any individual year can be lower than the prior (it was 54.9 in 2016), the long-term trend is increasing average temperatures.

Increasing levels of greenhouse gases and rising average temperatures can have acute and chronic effects on human health and the environment. Some acute effects would be more flooding, stronger

storms, longer and more severe allergy seasons. Chronic or secondary effects include increased ground level ozone, increased particulate contamination, increased asthma in children, among others.

## 8.3 Air Quality

### *8.3.1 National "Clean Air" Standards*

The quality of the air we breathe has a dramatic effect on how we live in Fair Haven. Through strict air quality standards and monitoring, New Jersey's overall air quality has improved over the past years. According to the NJDEP Bureau of Air Monitoring, unhealthy ratings have not been recorded in New Jersey since 2012 (data published through 2015). As a comparison, "unhealthy" days occurred every 30 days, on average, over the 1995 - 1997 periods. Further, in the 1985-1987 period, "unhealthy" ratings were recorded on and average of about 1 day in 8.

Air quality is governed by and monitored under the federal Clean Air Act. National health standards have been set for six pollutants carbon monoxide, lead, nitrogen dioxide, Ozone, particulates, and sulfur dioxide. The pollutants most common to this area, a "non-metropolitan area", are ozone (more commonly known as smog) and particulates (soot and dust).

The federal Clean Air Act was signed into law in 1970, with major amendments made in 1977 and 1990. The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to:

- Review public health standards for each pollutant for which a health standard has been set, every five years
- Update the standards, if necessary, to "protect public health with an adequate margin of safety," based on the latest, best-available scientific evidence
- Consider only public health, and not costs of compliance, when setting air quality standards and save cost considerations for the implementation phase of the standards process.

In 1997 new, more stringent, federal health standards for Ozone and particulates were adopted by the EPA, when it and the independent Clean Air Scientific Advisory Council determined that the existing standards were not adequately protecting public health. The new standards are more difficult for most states, including New Jersey, to meet. While there were no "unhealthy: days related to ozone, there were 18 days where there was a "unhealthy for sensitive groups" health risk from ozone. The monitoring station closest to Fair Haven, registered a "unhealthy for sensitive groups" level of ozone 4 of those 18 days.

New Jersey had 4 days where the health risk was "unhealthy for sensitive groups" for particulates, but only one of these were reported at the sampling station closest to the Fair Haven area.

### *8.3.2 State, County, local air monitoring sites and statistics*

Air pollution levels change during the day and from one season to another. These changes are due to variations in the weather and in the types and amounts of pollution that are released into the air. Just one of the ways weather can affect air quality is through high temperature and bright sunlight. These are exactly the conditions when many of us like to be outside. The higher the temperature and the more direct the sunlight, the more ozone is produced, making summertime the most critical time to watch out for unhealthy levels of ozone.

In order to accurately track the ever-changing air quality, New Jersey has organized monitoring sites across the State. The closest to Fair Haven is Monmouth University, which monitors and reports the current air quality readings for Ozone and several other pollutants. The results can be accessed in real time at http://www.njaqinow.net.

Monmouth University and the County of Monmouth both use the national system called the Air Quality Index. The Air Quality Index compares pollutant levels to the health standards, takes into account multiple pollutants and assigns an air quality rating like "good" or "unhealthy." A color scale is used to show health

standards: green is used to show areas rated good, yellow for moderate, brown for unhealthy for sensitive groups, red for unhealthy, and magenta for very unhealthy.

Ground-level ozone is formed from automobile, industrial and other pollutants by chemical reactions when there is bright sunshine with high temperatures. The highest ozone concentrations usually occur between 2 p.m. and 8 p.m. from May through September.

The NJDEP declares Ozone action days when they are forecasting high concentrations of ground-level Ozone. According the NJDEP, "ground level ozone can lower your resistance to diseases such as colds and pneumonia. It can also damage lung tissue, intensify heart and lung diseases (such as asthma), and cause coughing and throat irritation. Even healthy adults doing heavy exercise or manual labor outdoors may experience the unhealthy effects of ozone. Other people that are sensitive to ozone include the very young and those with pre-existing breathing problems. When ozone reaches unhealthy levels, children and people with asthma are most at risk."

The following are the actions the NJDEP recommends be taken when ozone level reaches unhealthy levels:

- Children and people with asthma should reduce outdoor activities
- Healthy individuals should reduce strenuous outdoor activities such as jogging
- In addition, during the summer ozone season, the NJDEP recommends that everyone should help contribute to lowering the potential for high risk health days by:
- Properly maintain your vehicle to comply with the air pollution standards
- Make sure your car's gas cap fits properly
- Refuel cars after dusk
- Do not "top off" your tank
- Avoid unnecessary trips or consolidate trips
- Limit idling your car
- Carpool or use public transportation
- Limit the use of gasoline powered mowers
- Use water-based paints
- Barbecue without starter fluid

### *8.3.3 Static sources of air pollution*

There are no major licensed air emission sources in Fair Haven.

### *8.3.4 Major vehicular air pollution areas*

Fair Haven does not have any major vehicular air pollution areas. However, within a few miles of Fair Haven are Route 35 and the Garden State Parkway, both of which are heavily traveled, especially during the peak summer season when ground-level ozone is at its highest level.

## 8.4 Noise

Borough of Fair Haven does not suffer from industrial or manufacturing noise. The major source of noise within the Borough is two-fold. Firstly, the three main collector roadways generate mixed vehicle traffic of passenger cars, motorcycles, and commercial trucks. Secondly, the residential areas of the Borough are subject to summertime lawn maintenance activities and wintertime snow removal activities. These factors generate the most common form of noise pollution within the Borough.

When measured from approximately 50-feet, Sound generated by motor vehicles range up to 70 decibels (dB). Motorcycles range up to 90 to 100 dB. Lawnmowers, leaf blowers, edgers, and other landscaping activities bring noise levels near 100dB. According to the Occupational Safety & Health Administration, regular and sustained exposure above 90 to 95 dB may cause permanent hearing damage.

## 8.5 Critical Environmental Issues

### *8.5.1 Stormwater Management*

Over the past several years, a number of issues contributing to Storm Water Management have been addressed, and remedial planning is underway.

Solutions to re-direct McCarter's Pond's current and obvious evolution to a wetland are under study and recommendations are expected to preserve it as a pond, suitable for fishing, ice skating, and use as an attractive small neighborhood park, possibly with picnic facilities.

By 2017, Schwenker's Pond had been acquired by the borough, with a consultant hired to recommend the future role of the pond. The pond is fed by a multitude of storm water inputs, and is increasingly polluted by rotting vegetation and algae encouraged by local fertilizer input. The solution being framed needs to address the control and treatment of incoming storm water, using effective but expensive storm water filtering collectors placed judiciously on feeder streets, some of which lie outside Fair Haven. The flow from Schwenker's pond to Shippee's Pond and its ultimate flow to the Navesink River is also a component of the end target of keeping the Navesink pollution free. Large scale dredging of Schwenker's Pond will likely prove unaffordable and may necessitate drying and using the spoils on-site, while dredging a channel to provide unimpeded water flow to the Navesink. The collection and retention of water now being fed into the pond will need to be partially accomplished by retaining the water on the sites where it falls.

### *8.5.2 Climate Change*

Long range planning for expected climate change must recognize that Fair Haven, with beachfront property at sea level, has elevations no more than 80 feet above sea level, with projections for increased sea levels over the next century. These projections need to be refined, to be specific to Fair Haven, and formulated as maps with altitudes above sea level shown for each future 10-year period. Future vulnerabilities from increased sea level riverfront boundaries, and well as the Navesink feeder waterways will predict areas requiring our future planning and land use and highway/street restrictions.

### *8.5.3 Wildlife Accommodation*

Already Fair Haven is seeing the infiltration of new wildlife from the increased residential and business land use in surrounding areas, and deer and red fox are becoming common sights and adaptable to suburban style. It will be advisable, each year starting in 2018, to conduct a census to document the scope of this phenomena for future reference and possible action.

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## Section 3.5 – Waters and Wetlands

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NJDEP. 2017. New Jersey Environmental Rules. http://www.nj.gov/dep/rules/nj_env_law.html

## Section 3.6 – Vegetation

The Native Plant Society of New Jersey. 2013. Plant Lists. http://www.npsnj.org/pages/nativeplants_Plant_Lists.html

## Section 4 – Wildlife

Monmouth County Audubon Society. 2013. Birds of Monmouth County. http://www.monmouthaudubon.org/PDF_files/BirdsofMonmouthCounty_Final.pdf

State of New Jersey. 2017. NJ-GeoWeb. Version 3.0. http://www.nj.gov/dep/gis/geowebsplash.htm

## Section 8.1 – Climate

NOAA Cooperative Institute for Climate and Satellites (NCICS). 2017. State Climate Summary for New Jersey. https://statesummaries.ncics.org/nj

Climate-Data.org. 2017. Climate: Fair Haven. https://en.climate-data.org/location/140682/

Office of NJ State Climatologist. 2017. https://climate.rutgers.edu/stateclim/

NOAA National Centers for Environmental Information. 2017. NOAA Storm Events Database. Version 3.0 https://www.ncdc.noaa.gov/stormevents/

## Section 8.3 – Air Quality

NJDEP. 2017. Clean Air NJ. http://www.nj.gov/dep/cleanairnj/airquality.html

# Tables

Table 1
Dominant Vegetation Species in the Fair Haven Fields Natural Area

| Common Name | Ridge Woods | Northwest Woods | Northeast Woods | Pine Grove | Pond and Wetlands | Meadow |
|---|---|---|---|---|---|---|
| ***Trees*** | | | | | | |
| American beech | x | | | | | |
| American holly | d | x | x | | d | |
| Ash | x | | | | | |
| black locust | d | d | x | x | | |
| Castor aralias | | | x | | | |
| chestnut oak | | x | x | | | |
| devil's walking stick | | | x | | | |
| eastern white pine | | | | d | | |
| Hickory | x | | | | | |
| Japanese maple | | | x | | | |
| large leaf magnolia seedling | | | | | x | |
| little leaf linden | x | | | | | |
| mulberry | | x | x | | | |
| Norway maple | x | x | x | | | |
| Norway spruce | | | | x | | |
| oriental spruce | | x | | | | |
| ornamental apple | x | | | | | |
| red maple | x | | | | | |
| red oak | x | x | x | | | |
| sassafras | x | | | | | |
| silver maple | | x | x | | | |
| swamp maple | | | d | | d | |
| swamp white oak | | x | | | | |
| sweet gum | x | | d | | d | |
| tree of Heaven* | x | | x | x | | |
| tulip tree | x | x | x | | | |
| white dogwood | x | x | x | | | |
| white oak | x | | x | | | |
| wild black cherry | d | x | x | x | | |
| willow oak | | | | | x | |
| ***Shrubs*** | | | | | | |
| Andromeda | | | | | x | |
| azalea | x | x | | | x | |
| blueberry | | | | | x | |
| sweet pepperbush | x | | | | | |
| Filbert | x | | | | | |
| Japanese holly | | x | x | | d | |
| Laurel | x | | | | | |
| rhododendron maximum | x | | | | | |
| viburnum | x | d | x | | x | |
| witch hazel | x | | | | | |

Table 1
Dominant Vegetation Species in the Fair Haven Fields Natural Area

| Common Name | Ridge Woods | Northwest Woods | Northeast Woods | Pine Grove | Pond and Wetlands | Meadow |
|---|---|---|---|---|---|---|
| ***Herbaceous*** | | | | | | |
| bamboo | | | | | | x |
| black eyed Susan | | | | | | x |
| bluegrass | | | | | | x |
| butterfly weed | | | | | | d |
| Fern | | x | x | | x | |
| Fescue | | | | | | x |
| garlic mustard* | x | x | x | x | d | x |
| Lamium | | | x | | | |
| milkweed | | | | | | d |
| mondo grass | | x | x | | x | |
| mugwart * | x | | | | d | |
| Queen Anne's Lace | | | | | | x |
| Rye | | | | | | x |
| Trillium | | | x | | | |
| Violet | | | | | | d |
| Yarrow | | | | | | d |
| ***Vine*** | | | | | | |
| English Ivy* | x | | | x | | |
| honeysuckle* | x | | | | | |
| multiflora rose | x | x | x | | x | |
| Oriental bittersweet* | x | | | x | | |
| porcelainberry | | x | | | x | x |

Notes:

D – dominant

X – present

* – invasive

## Table 2
## Common Invertebrate and Fish Species Found in the Navesink River

| Common Name | Scientific Name |
|---|---|
| **Invertebrates** | |
| acorn barnacle | *Semibalanus balanoides* |
| blue claw crab | *Callinectes sapidus* |
| blue mussel | *Mytilus edulis* |
| common spider crab | *Libinia emarginata* |
| fiddler crab | *Uca pugilator* |
| grass shrimp | Palaemonetes spp. |
| green crab | *Carcinus maenas* |
| jellyfish | Cnidaria |
| periwinkle snail | *Littorina littorea* |
| polychaete worm | Polychaeta |
| ribbed mussel | *Geukensia demissa* |
| **Fish** | |
| American eel | *Anguilla rostrata* |
| Atlantic herring | *Clupea harengus* |
| Atlantic silverside (spearing) | *Menidia menidia* |
| bay anchovy | *Anchoa mitchilli* |
| bluefish | *Pomatomus saltatrix* |
| cownose rays | *Rhinoptera bonasus* |
| croaker | *Micropogonias undulatus* |
| fluke/ summer flounder | *Paralichthys dentatus* |
| hogchoker | *Trinectes maculatus* |
| king fish | *Scomberomorus cavalla* |
| menhaden/ moss bunker | *Brevoortia tyrannus* |
| mummichog | *Fundulus heteroclitus* |
| northern pipefish | *Syngnathus fuscus* |
| oyster toadfish (sally growler, oyster cracker) | *Opsanus tau* |
| sand lance | *Ammodytidae* |
| sculpin | *Cottoidea* |
| sea robin | *Triglidae* |
| striped bass | *Morone saxatilis* |
| striped killifish | *Fundulus majalis* |
| weakfish | *Cynoscion regalis* |
| windowpane | *Scophthalmus aquosus* |
| winter flounder | *Pseudopleuronectes americanus* |

**Table 3**
**Threatened and Endangered Species Mapped within Fair Haven**

| Common Name | Scientific Name | Habitat | Listing |
|---|---|---|---|
| Bald Eagle | *Haliaeetus leucocephalus* | Foraging | State Endangered |
| Black-crowned Night-heron | *Nycticorax nycticorax* | Foraging | State Threatened |
| Least Tern | *Sternula antillarum* | Foraging | State Endangered |
| Osprey | *Pandion haliaetus* | Foraging; Nest | State Threatened |

**Table 4**
**Fair Haven Land Use**

| Land Use | Acres | % of Total |
|---|---|---|
| **Developed Land:** | | |
| Residential | 640.6 | 62.7 |
| Commercial/Mixed Urban | 49.2 | 4.8 |
| **Public:** | | |
| Borough Property | 106.9 | 10.5 |
| Schools | 10.1 | 1.0 |
| **Quasi-Public:** | | |
| Houses of Worship | 12.4 | 1.2 |
| Streets & Highways | 113.3 | 11.1 |
| **Total Developed** | **932.5** | **91.3** |
| | | |
| **Undeveloped Land:** | | |
| Wetlands | 50.2 | 4.9 |
| Forest/Wooded | 33.9 | 3.3 |
| Barren Land | 5.5 | 0.6 |
| **Total Undeveloped** | **89.6** | **8.8** |
| **Total Borough Area** | **1022** | **100** |

# Figures

**FIGURE 1 - TAX MAP**

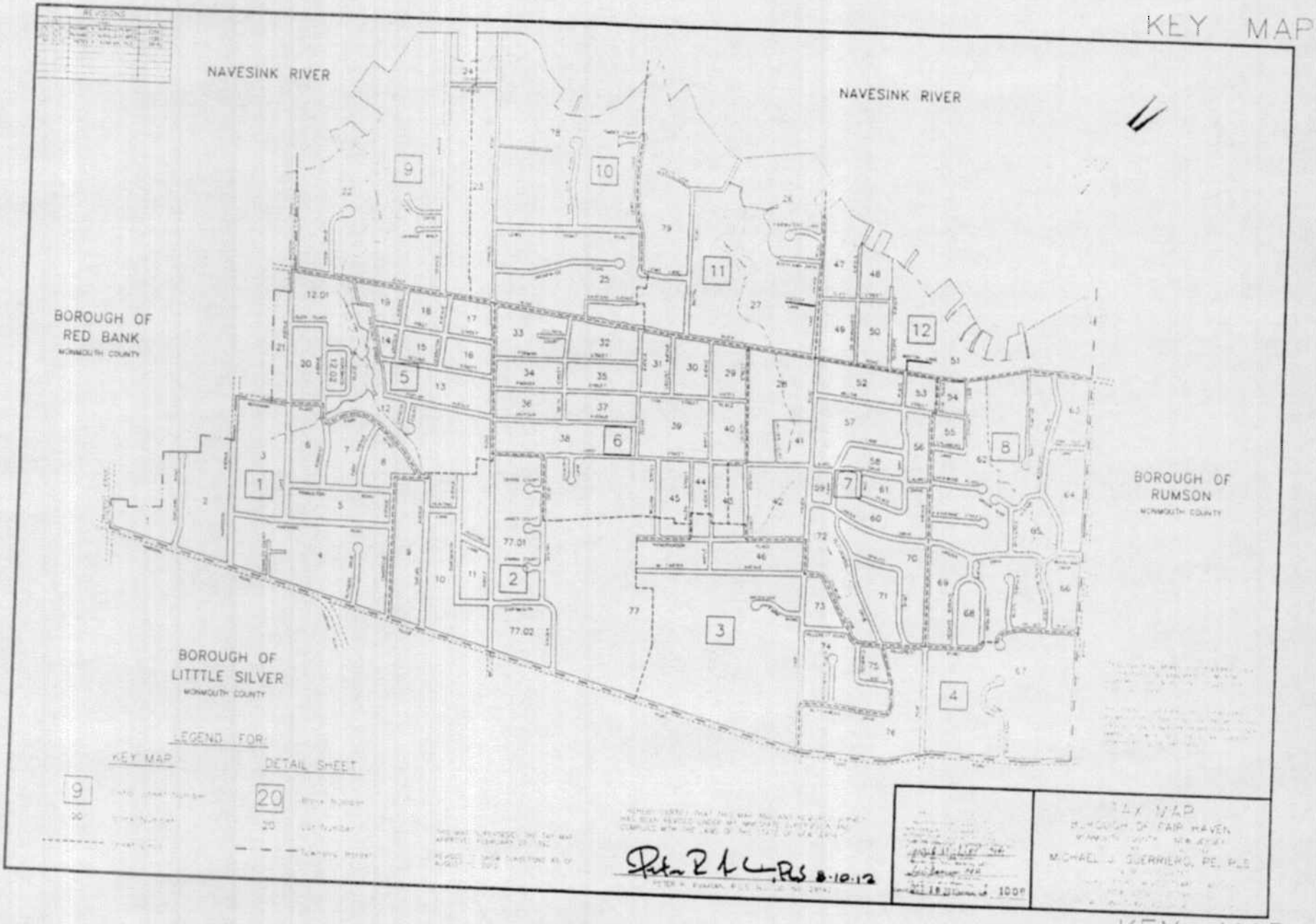
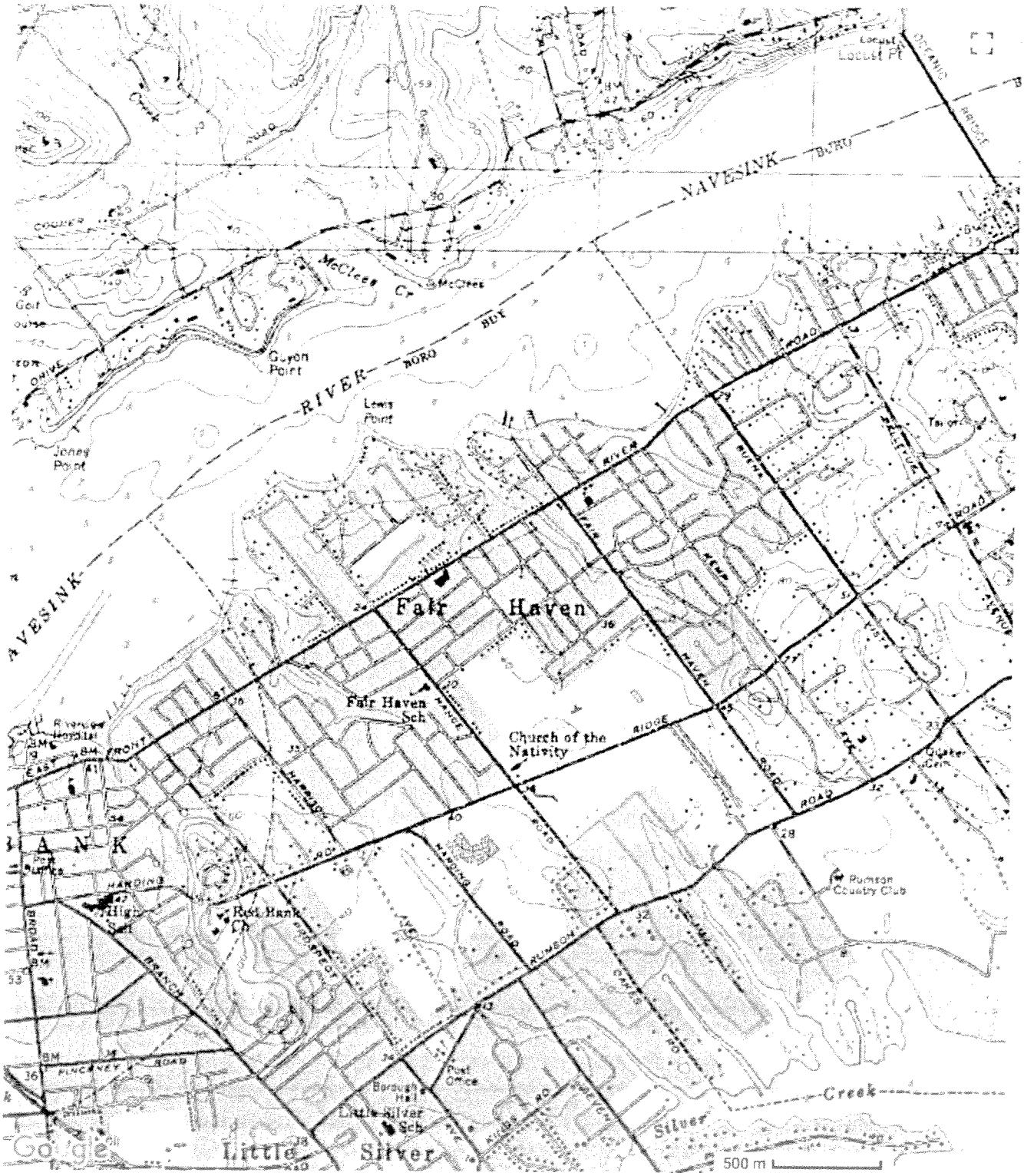


**FIGURE 2** Fair Haven Topo Map in Monmouth County New Jersey




Map provided by TopoZone.com

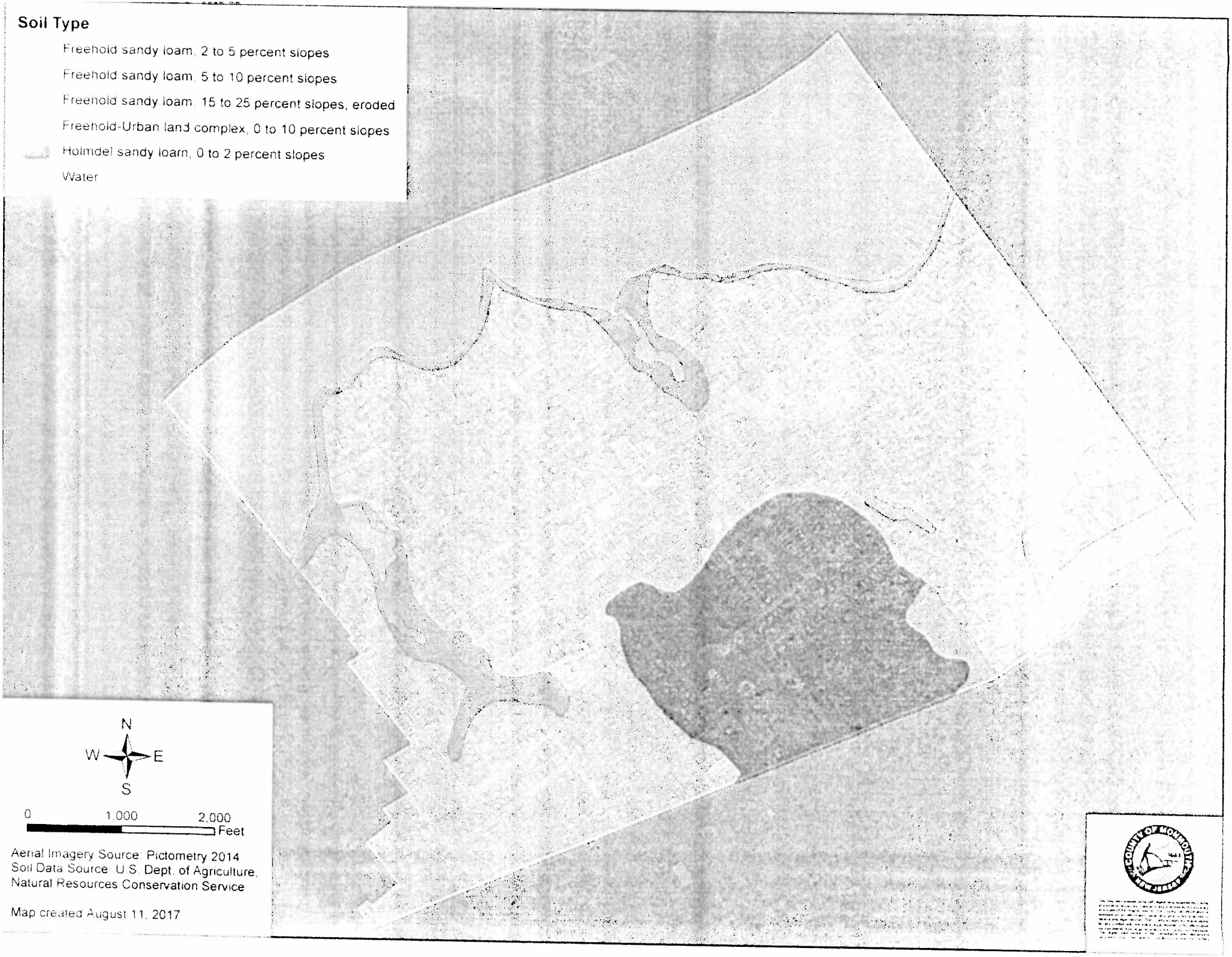

Soil Type
Freehold sandy loam, 2 to 5 percent slopes
Freehold sandy loam, 5 to 10 percent slopes
Freehold sandy loam, 15 to 25 percent slopes, eroded
Freehold-Urban land complex, 0 to 10 percent slopes
Holmdel sandy loam, 0 to 2 percent slopes
Water
N
W
E
S
0
1,000
2,000
Feet
Aerial Imagery Source: Pictometry 2014
Soil Data Source: U.S. Dept. of Agriculture, Natural Resources Conservation Service
Map created August 11, 2017

FIGURE 4 – THE WATER CYCLE

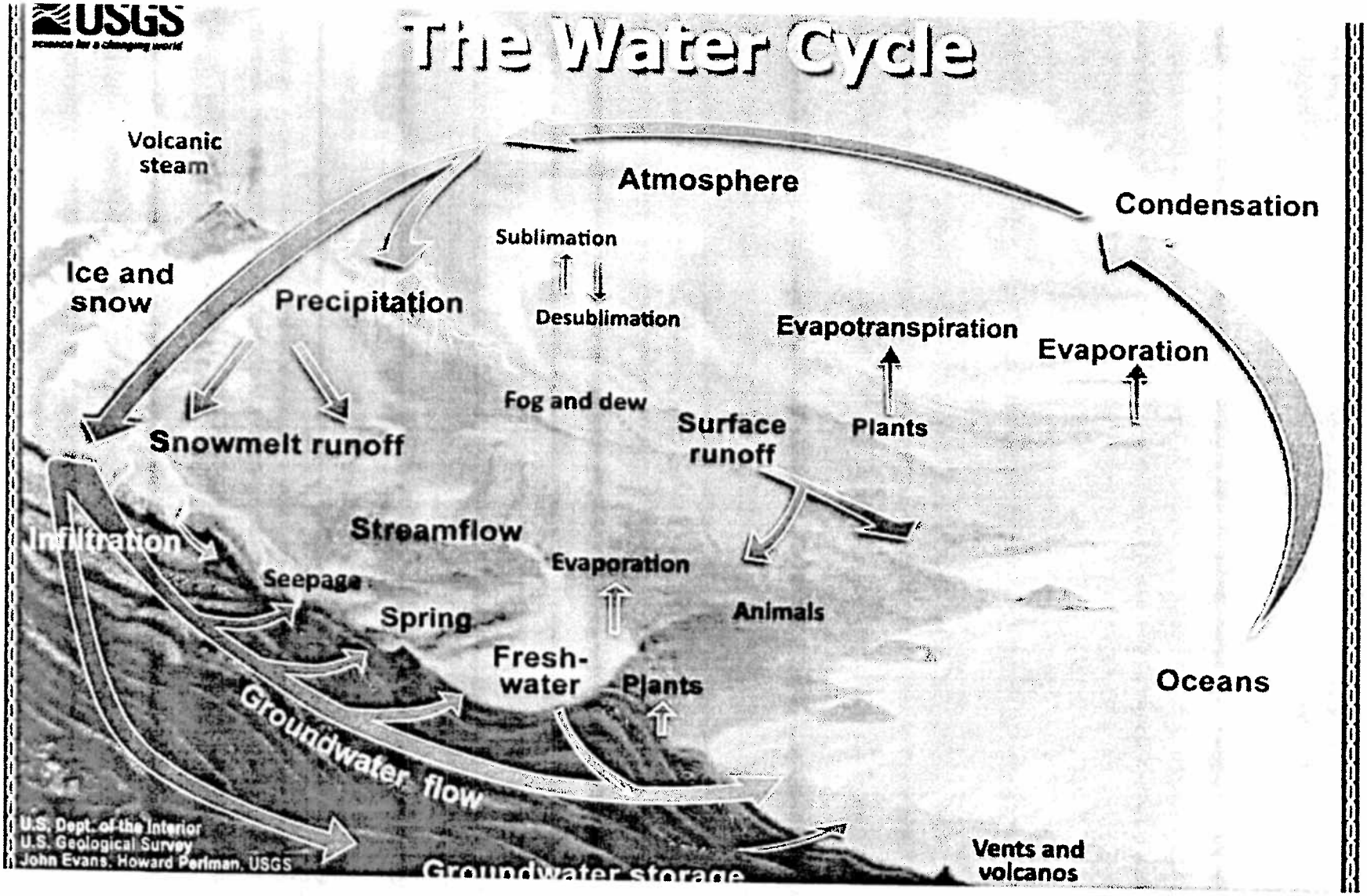
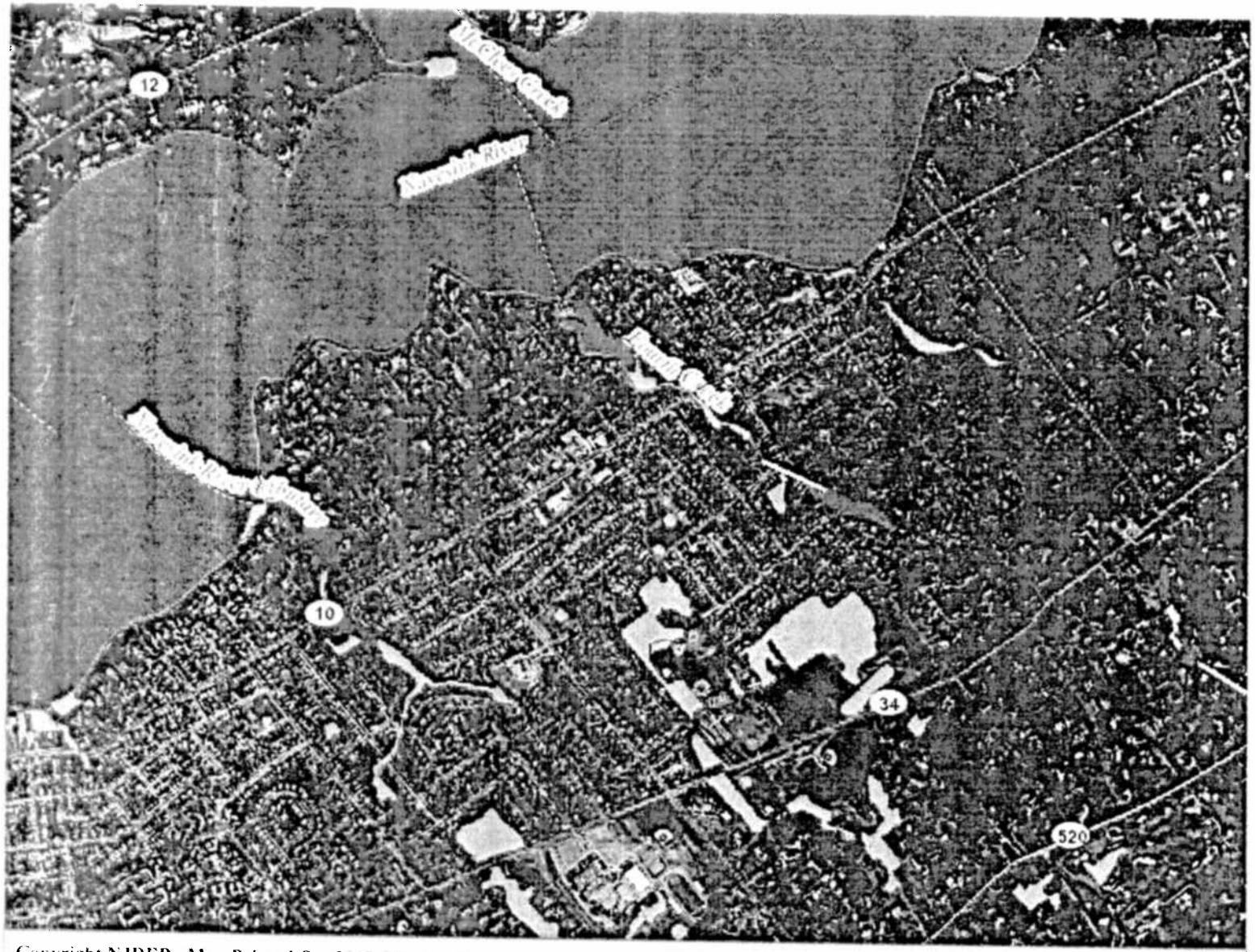
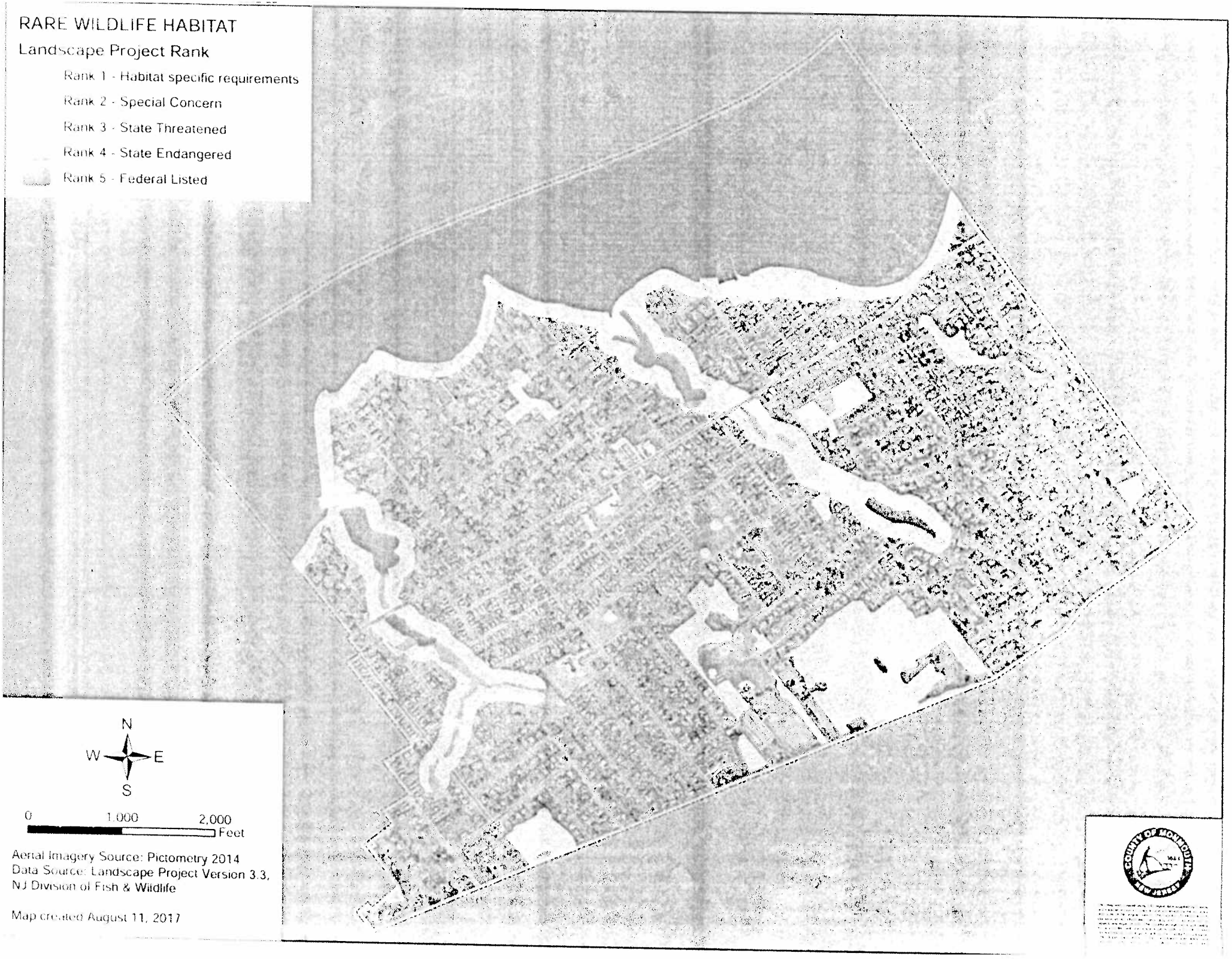


**FIGURE 5 - WETLANDS MAP**




Copyright NJDEP - Map Printed On 2017-08-22 21:05

Powered by NJDEP's NJ-GeoWeb


RARE WILDLIFE HABITAT
Landscape Project Rank
Rank 1 - Habitat specific requirements
Rank 2 - Special Concern
Rank 3 - State Threatened
Rank 4 - State Endangered
Rank 5 - Federal Listed
N
W
E
S
0
1,000
2,000
Feet
Aerial Imagery Source: Pictometry 2014
Data Source: Landscape Project Version 3.3,
NJ Division of Fish & Wildlife
Map created August 11, 2017
COUNTY OF MONMOUTH
NEW JERSEY

# FIGURE 7 - ZONING MAP

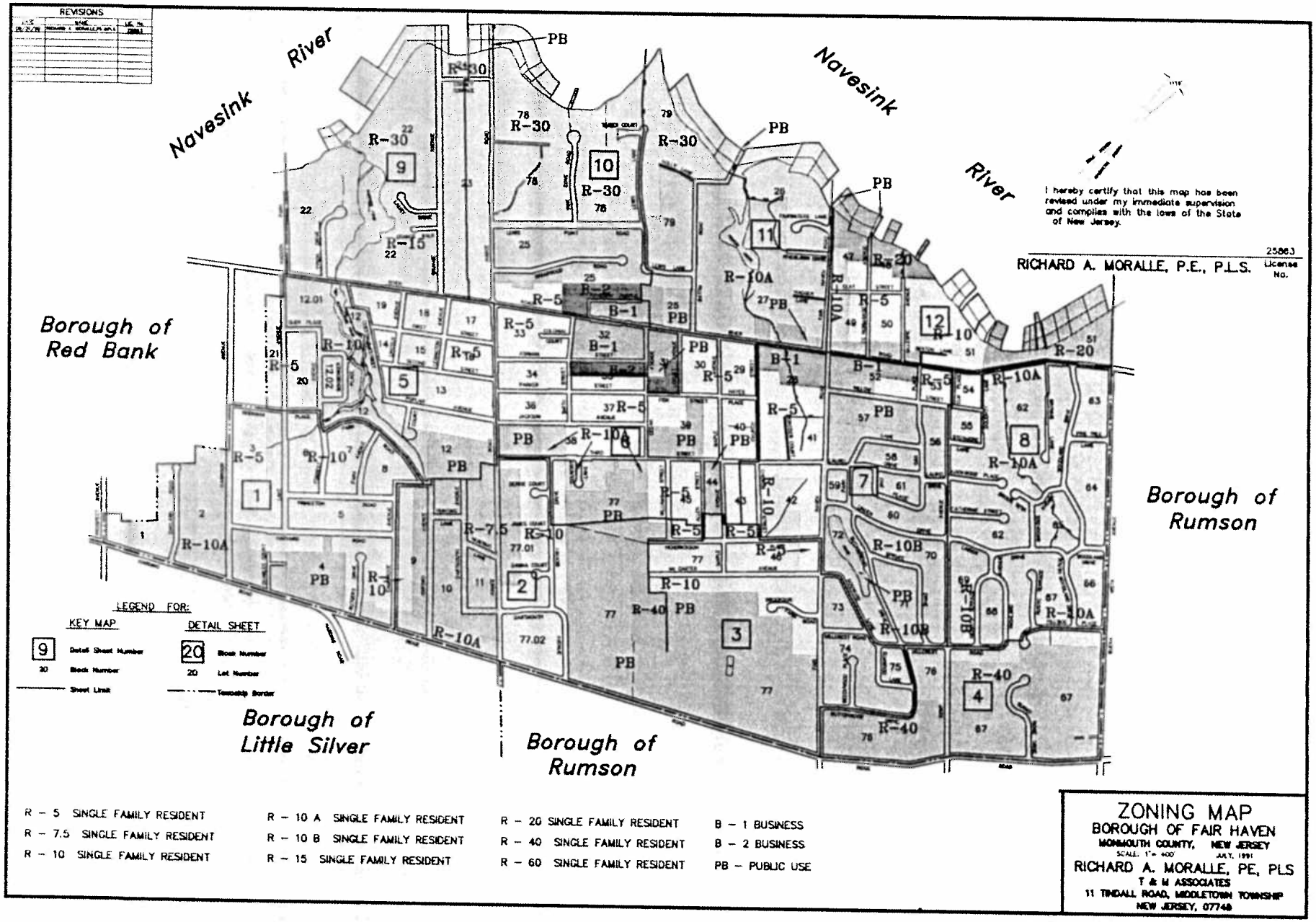
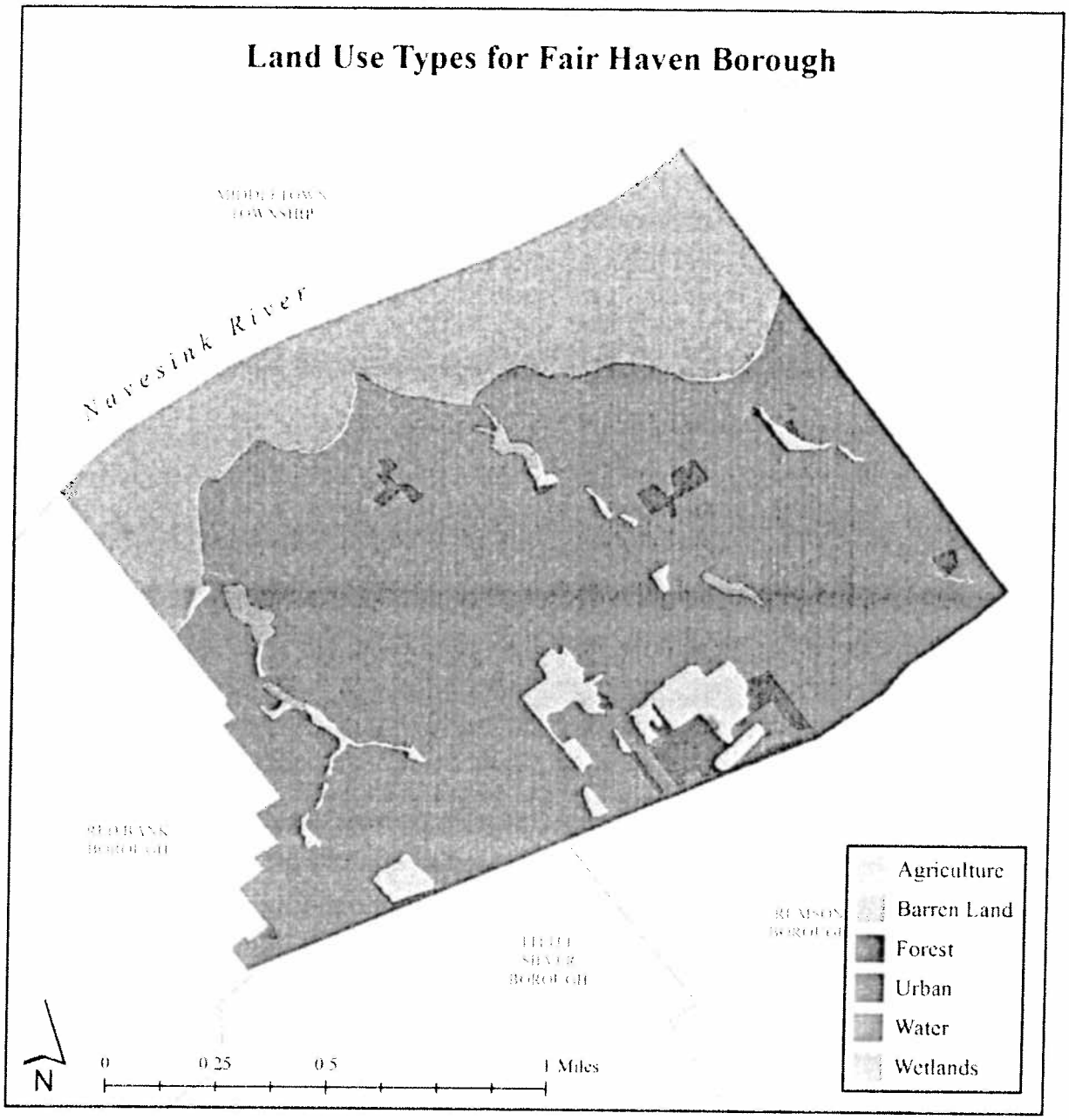


**Figure 8 - Land Use Map**



## FIGURE 9 – SIDEWALK CONNECTIVITY MAP

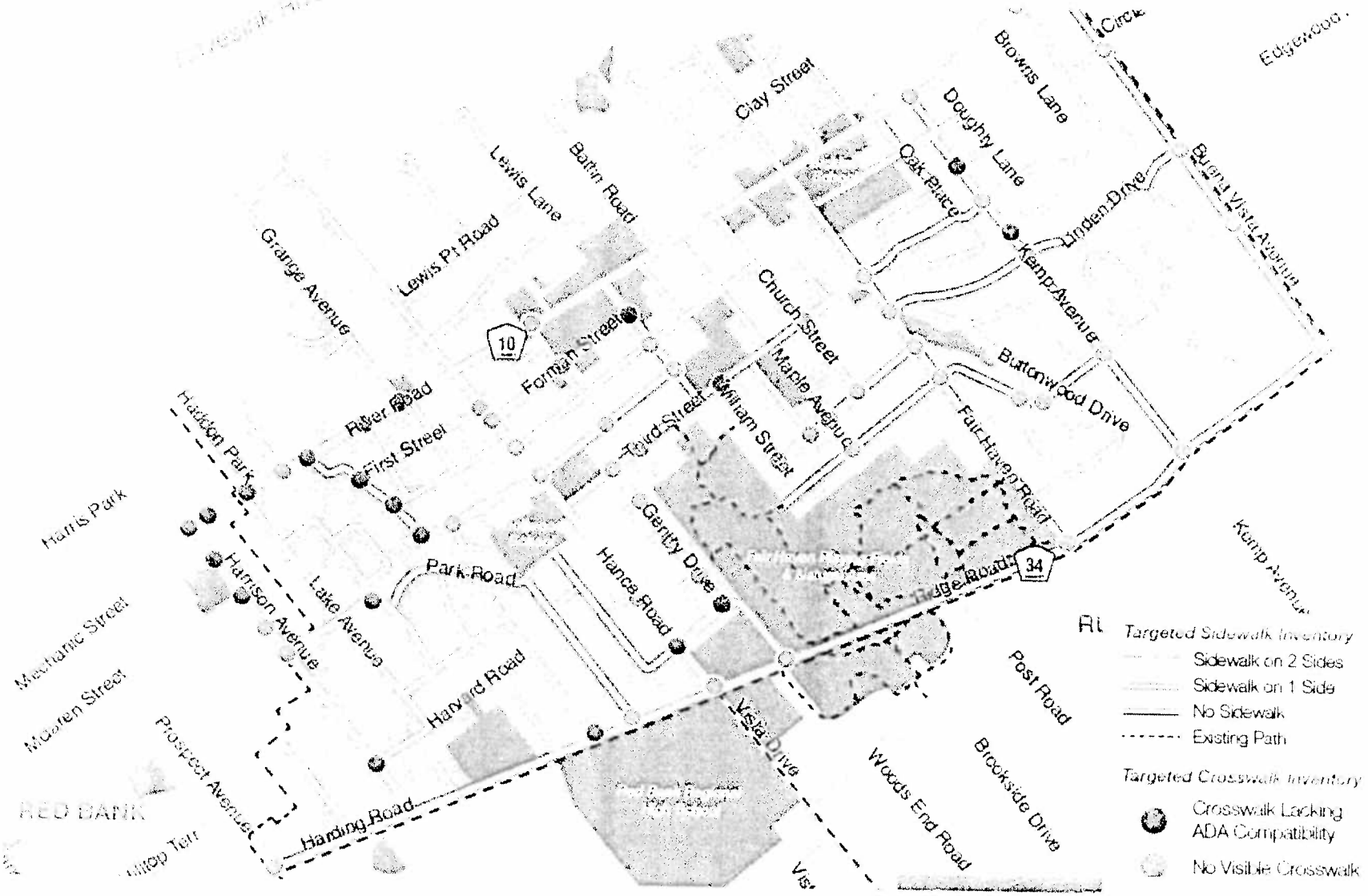
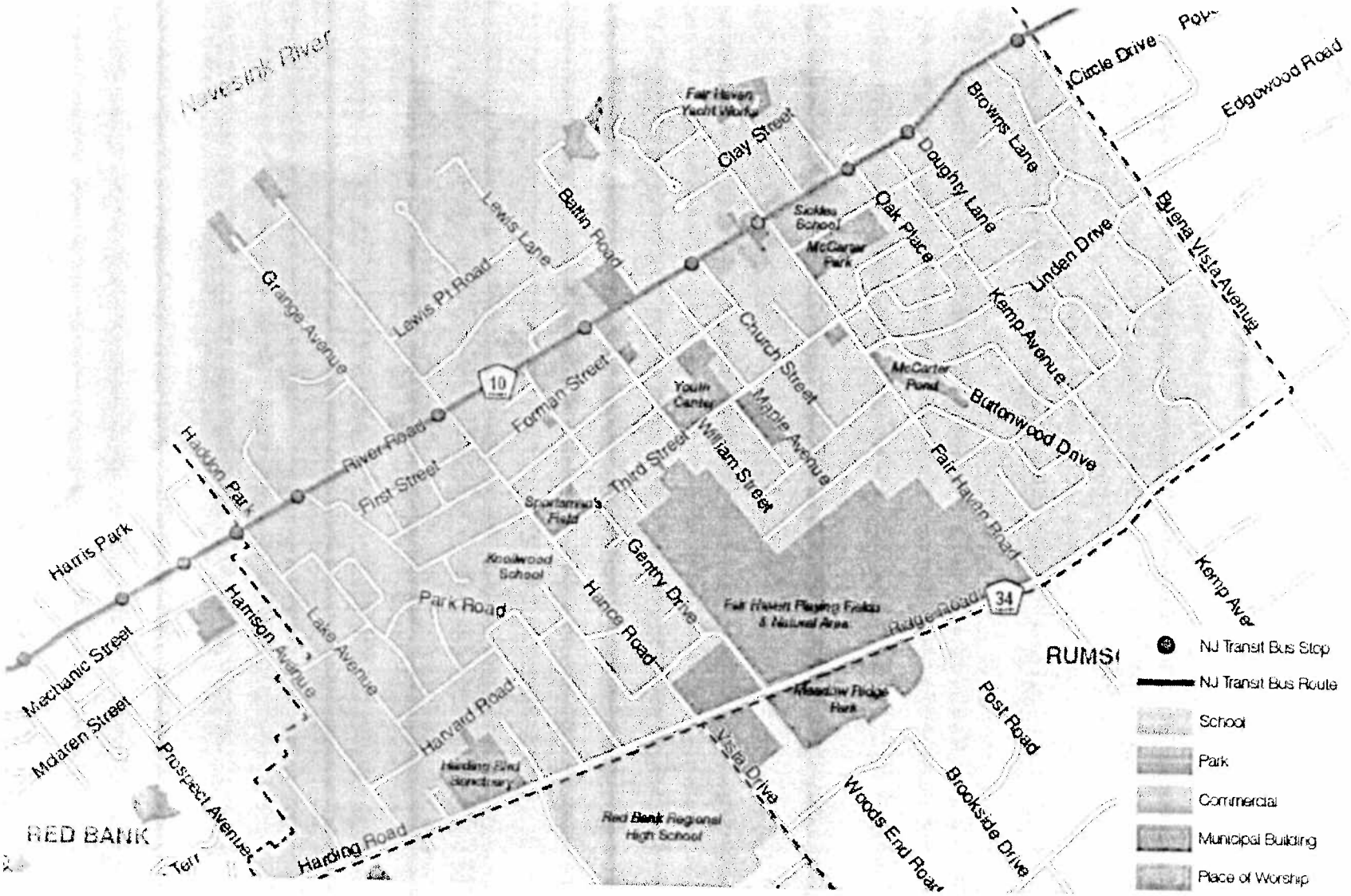


**FIGURE 10 – TRANSPORTATION MAP**



# Attachments

Attachment 1

Known Contaminated Site List

**Monmouth County (Active)**

top | Inactive sites

| Site Name<br>Municipality<br>Information Links (if available) | CR Contact<br>Phone | Category<br>PF/RP | Lead<br>PI |
|---|---|---|---|
| Arch Cleaners<br>Red Bank | Sue Shannon<br>(609) 292-1156 | Vapor Intrusion<br>PF | OWR<br>503598 |
| Bayside Drive Seep<br>Highlands Boro. | Heather Swartz<br>(609) 984-7135 | Vapor Intrusion<br>PF | OWR<br>471243 |
| Magnolia Avenue Ground Water<br>(aka White Swan Cleaners/Sun Cleaners Superfund site)<br>Wall Twp.<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/g000037452.htm<br>▸ EPA: http://www.epa.gov/region02/superfund/npl/whiteswan/ | Heather Swartz<br>(609) 984-7135 | Vapor Intrusion<br>PF | BCM<br>G000037452 |
| NJNG Co. Long Branch Plant<br>Long Branch City<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/longbranch/<br>▸ http://www.nj.gov/dep/ej/pupdate.html | Heather Swartz<br>(609) 984-7135 | Industrial<br>RP | BCM/EJ<br>21314 |

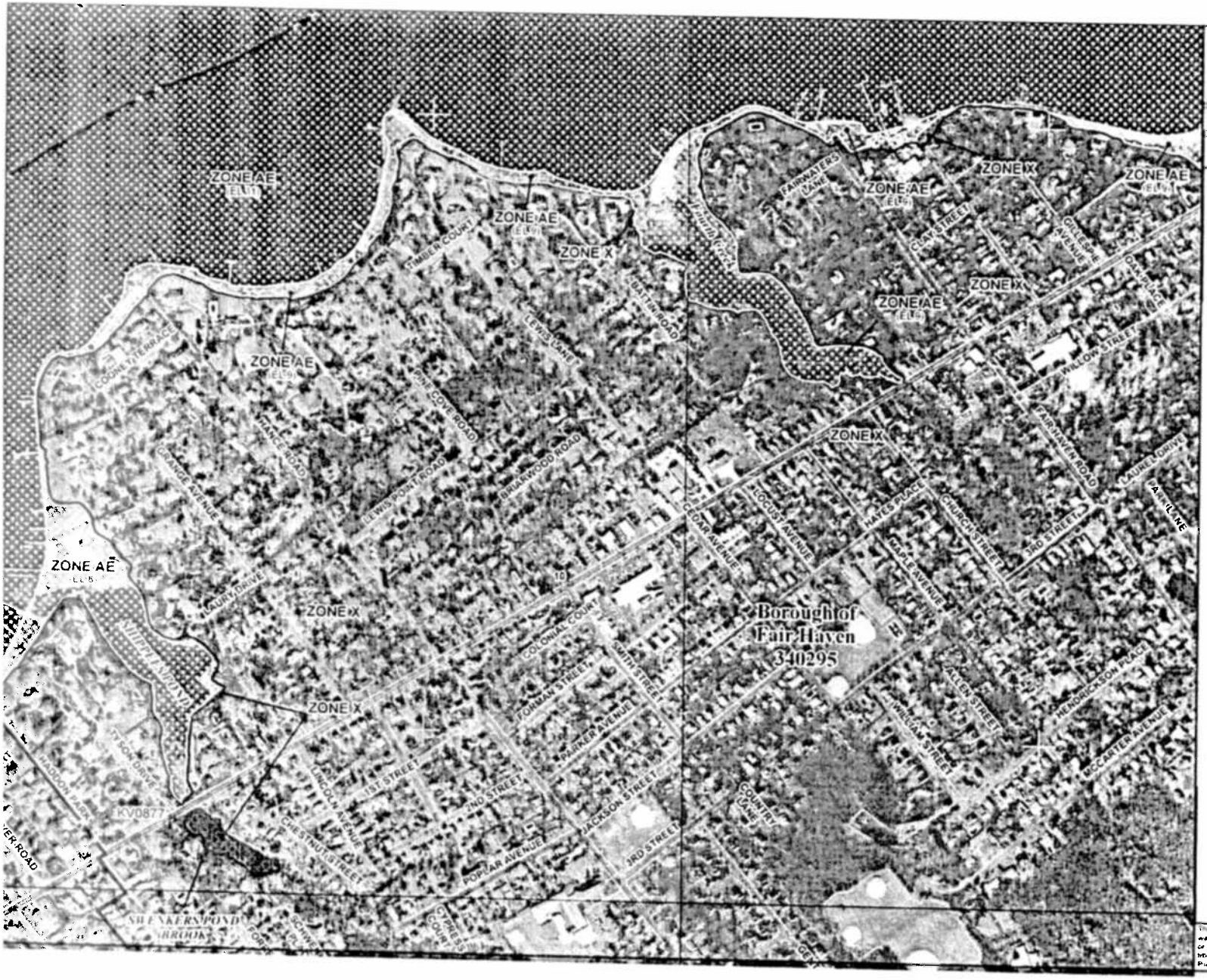
**Monmouth County (Inactive)**

Top | Active sites

| Site Name<br>Municipality<br>Information Links (if available) | CR Contact<br>Phone | Category<br>PF/RP | Lead<br>PI |
|---|---|---|---|
| 1603 Dumont Terrace<br>Wall Twp.<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/g000035423.htm | | Gas Station<br>PF | BOMM<br>G000035423 |
| Arky Property<br>Marlboro. Twp.<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/g000004859.htm | | Junkyard<br>PF | BCM<br>G000004859 |
| Burnt Fly Bog<br>Marlboro. Twp.<br>▸ OCR: http://www.epa.gov/region02/superfund/npl/0200528c.pdf | | Superfund<br>PF | BIDC<br>G000004397 |
| Frequency Engineering<br>Farmingdale Boro.<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/g000004410.htm | Karen Kloo<br>(609) 777-1971 | Industrial<br>RP | BCM<br>G000004410 |
| Hurley GW (BCM)<br>Howell Twp.<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/g000004410.htm | Karen Kloo<br>(609) 777-1971 | Industrial<br>PF | BCM<br>G000004410 |
| Imperial Oil<br>Marlboro. Twp.<br>▸ OCR: http://www.epa.gov/region02/superfund/npl/imperialoil/ | | Superfund<br>PF | BCM/BDC<br>G000004865 |
| Lone Pine Landfill<br>Freehold Township<br>▸ EPA: http://www.epa.gov/region02/superfund/npl/0200558c.pdf | Karen Kloo<br>(609) 777-1971 | Superfund<br>RP | BCM<br>G000004426 |
| Sals/LaCantina<br>Neptune City<br>▸ OCR: http://www.nj.gov/dep/srp/community/sites/pi/012646.htm | Karen Kloo<br>(609) 777-1971 | Vapor Intrusion<br>PF | OWR<br>012646 |

Attachment 2

FEMA FIRMette




NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0181F

# FIRM

FLOOD INSURANCE RATE MAP

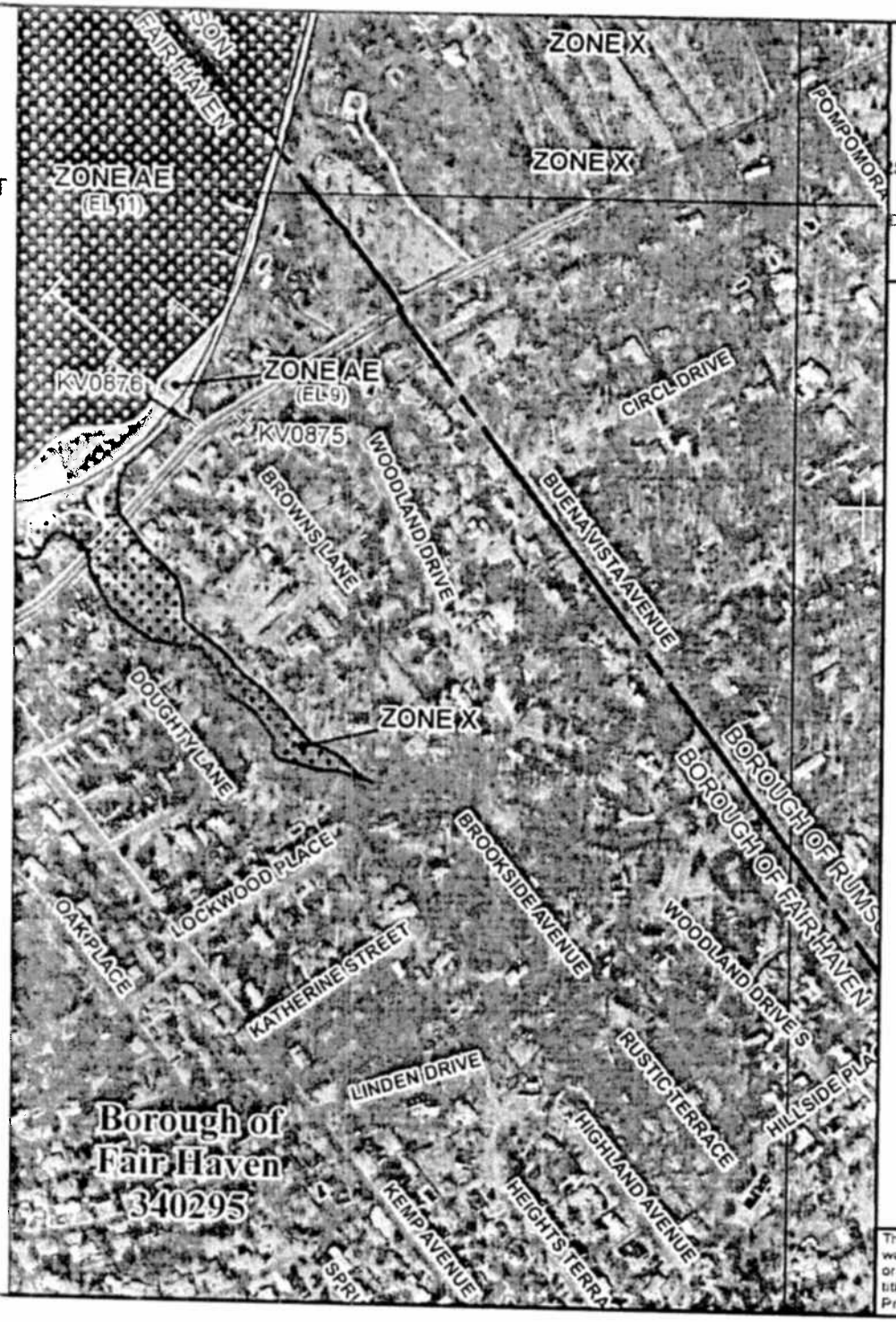
MONMOUTH COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)

PANEL 181 OF 457

MAP NUMBER
34025C0181F

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency




MAP SCALE 1" = 500'

50 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0182F

# FIRM

FLOOD INSURANCE RATE MAP

MONMOUTH COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)

PANEL 182 OF 457

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINING

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| FAIR HAVEN, BOROUGH OF | [illegible] | [illegible] | F |
| LITTLE SILVER, BOROUGH OF | [illegible] | [illegible] | F |
| RUMSON, BOROUGH OF | [illegible] | [illegible] | F |

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
34025C0182F

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Attachment 3

Monmouth County Audubon Society Checklist

# Birds of Monmouth County

2013 Check-list and Field Card

Monmouth County Audubon Society

Date _____ Locality _____

Weather _____

KEYS:

C = Common
U = Uncommon
O = Occasional
R = Rare
R* = Very rare or unexpected
p = Pelagic

| Species | |
|---|---|
| ❒ Black-bellied Whistling-Duck | R* |
| ❒ Greater White-fronted Goose | O |
| ❒ Snow Goose | U |
| ❒ Brant | C |
| ❒ Barnacle Goose | R |
| ❒ Cackling Goose | R |
| ❒ Canada Goose | C |
| ❒ Mute Swan | C |
| ❒ Tundra Swan | O |
| ❒ Wood Duck | C |
| ❒ Gadwall | C |
| ❒ Eurasian Wigeon | O |
| ❒ American Wigeon | C |
| ❒ American Black Duck | C |
| ❒ Mallard | C |
| ❒ Blue-winged Teal | U |
| ❒ Northern Shoveler | C |
| ❒ Northern Pintail | U |
| ❒ Green-winged Teal | C |
| ❒ Canvasback | U |
| ❒ Redhead | U |
| ❒ Ring-necked Duck | C |
| ❒ Tufted Duck | R |
| ❒ Greater Scaup | C |
| ❒ Lesser Scaup | U |
| ❒ King Eider | O |
| ❒ Common Eider | O |
| ❒ Harlequin Duck | O |
| ❒ Surf Scoter | C |
| ❒ White-winged Scoter | U |
| ❒ Black Scoter | C |
| ❒ Long-tailed Duck | C |
| ❒ Bufflehead | C |
| ❒ Common Goldeneye | U |
| ❒ Barrow's Goldeneye | R |
| ❒ Hooded Merganser | C |
| ❒ Common Merganser | C |
| ❒ Red-breasted Merganser | C |
| ❒ Ruddy Duck | C |
| ❒ Northern Bobwhite | R |
| ❒ Ring-necked Pheasant | O |
| ❒ Ruffed Grouse | R |
| ❒ Wild Turkey | U |
| ❒ Red-throated Loon | C |
| ❒ Pacific Loon | R |
| ❒ Common Loon | C |
| ❒ Pied-billed Grebe | C |
| ❒ Horned Grebe | C |
| ❒ Red-necked Grebe | O |
| ❒ Eared Grebe | R |
| ❒ Western Grebe | R |
| ❒ Northern Fulmar | R p |
| ❒ Cory's Shearwater | U p |
| ❒ Greater Shearwater | U p |
| ❒ Sooty Shearwater | C p |
| ❒ Manx Shearwater | R p |
| ❒ Audubon's Shearwater | R p |
| ❒ Wilson's Storm-Petrel | C p |
| ❒ Leach's Storm-Petrel | R p |
| ❒ Magnificent Frigatebird | R* |
| ❒ Brown Booby | R p |
| ❒ Northern Gannet | C p |
| ❒ Double-crested Cormorant | C |
| ❒ Great Cormorant | C |
| ❒ Anhinga | R |
| ❒ American White Pelican | R |
| ❒ Brown Pelican | O |
| ❒ American Bittern | O |
| ❒ Least Bittern | O |
| ❒ Great Blue Heron | C |
| ❒ Great Egret | C |
| ❒ Snowy Egret | C |
| ❒ Little Blue Heron | U |
| ❒ Tricolored Heron | U |
| ❒ Prothonotary Warbler | U |
| ❒ Swainson's Warbler | R |
| ❒ Tennessee Warbler | U |
| ❒ Orange-crowned Warbler | O |
| ❒ Nashville Warbler | U |
| ❒ Connecticut Warbler | R |
| ❒ Mourning Warbler | O |
| ❒ Kentucky Warbler | R |
| ❒ Common Yellowthroat | C |
| ❒ Hooded Warbler | U |
| ❒ American Redstart | C |
| ❒ Cape May Warbler | U |
| ❒ Cerulean Warbler | R |
| ❒ Northern Parula | C |
| ❒ Magnolia Warbler | C |
| ❒ Bay-breasted Warbler | U |
| ❒ Blackburnian Warbler | U |
| ❒ Yellow Warbler | C |
| ❒ Chestnut-sided Warbler | U |
| ❒ Blackpoll Warbler | C |
| ❒ Black-throated Blue Warbler | C |
| ❒ Palm Warbler | C |
| ❒ Pine Warbler | C |
| ❒ Yellow-rumped Warbler | C |
| ❒ Yellow-throated Warbler | O |
| ❒ Prairie Warbler | C |
| ❒ Townsend's Warbler | R |
| ❒ Black-throated Green Warbler | C |
| ❒ Canada Warbler | U |
| ❒ Wilson's Warbler | U |
| ❒ Yellow-breasted Chat | U |
| ❒ Eastern Towhee | C |
| ❒ American Tree Sparrow | C |
| ❒ Chipping Sparrow | C |
| ❒ Clay-colored Sparrow | O |
| ❒ Field Sparrow | C |
| ❒ Vesper Sparrow | O |
| ❒ Lark Sparrow | O |
| ❒ Savannah Sparrow | C |
| ❒ Grasshopper Sparrow | U |
| ❒ Henslow's Sparrow | R |
| ❒ Le Conte's Sparrow | R |
| ❒ Nelson's Sparrow | U |
| ❒ Saltmarsh Sparrow | U |
| ❒ Seaside Sparrow | U |
| ❒ Fox Sparrow | U |
| ❒ Song Sparrow | C |
| ❒ Lincoln's Sparrow | U |
| ❒ Swamp Sparrow | C |
| ❒ White-throated Sparrow | C |
| ❒ Harris's Sparrow | R |
| ❒ White-crowned Sparrow | U |
| ❒ Golden-crowned Sparrow | R |
| ❒ Dark-eyed Junco | C |
| ❒ Summer Tanager | O |
| ❒ Scarlet Tanager | C |
| ❒ Western Tanager | R |
| ❒ Northern Cardinal | C |
| ❒ Rose-breasted Grosbeak | C |
| ❒ Black-headed Grosbeak | R |
| ❒ Blue Grosbeak | U |
| ❒ Indigo Bunting | C |
| ❒ Painted Bunting | R |
| ❒ Dickcissel | O |
| ❒ Bobolink | U |
| ❒ Red-winged Blackbird | C |
| ❒ Eastern Meadowlark | U |
| ❒ Western Meadowlark | R |
| ❒ Yellow-headed Blackbird | R |
| ❒ Rusty Blackbird | U |
| ❒ Brewer's Blackbird | R |
| ❒ Common Grackle | C |
| ❒ Boat-tailed Grackle | U |
| ❒ Brown-headed Cowbird | C |
| ❒ Orchard Oriole | U |
| ❒ Baltimore Oriole | C |
| ❒ Pine Grosbeak | R |
| ❒ Purple Finch | U |
| ❒ House Finch | C |
| ❒ Red Crossbill | O |
| ❒ White-winged Crossbill | O |
| ❒ Common Redpoll | O |
| ❒ Pine Siskin | U |
| ❒ American Goldfinch | C |
| ❒ Evening Grosbeak | R |
| ❒ House Sparrow | C |

Total Species _____

Field Notes _____

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- ❒ Cattle Egret R
- ❒ Green Heron C
- ❒ Black-crowned Night-Heron C
- ❒ Yellow-crowned Night-Heron U
- ❒ White Ibis R
- ❒ Glossy Ibis U
- ❒ Black Vulture C
- ❒ Turkey Vulture C
- ❒ Osprey C
- ❒ Swallow-tailed Kite R
- ❒ Mississippi Kite R
- ❒ Bald Eagle U
- ❒ Northern Harrier U
- ❒ Sharp-shinned Hawk C
- ❒ Cooper's Hawk C
- ❒ Northern Goshawk R
- ❒ Red-shouldered Hawk U
- ❒ Broad-winged Hawk U
- ❒ Swainson's Hawk R
- ❒ Red-tailed Hawk C
- ❒ Rough-legged Hawk O
- ❒ Golden Eagle R
- ❒ Yellow Rail R
- ❒ Black Rail R
- ❒ Clapper Rail C
- ❒ King Rail O
- ❒ Virginia Rail U
- ❒ Sora U
- ❒ Purple Gallinule R
- ❒ Common Gallinule U
- ❒ American Coot C
- ❒ Sandhill Crane R
- ❒ Black-bellied Plover C
- ❒ American Golden-Plover O
- ❒ Wilson's Plover R
- ❒ Semipalmated Plover C
- ❒ Piping Plover U
- ❒ Killdeer C
- ❒ American Oystercatcher U
- ❒ Black-necked Stilt R
- ❒ American Avocet R
- ❒ Spotted Sandpiper C
- ❒ Solitary Sandpiper C
- ❒ Greater Yellowlegs C
- ❒ Willet C
- ❒ Lesser Yellowlegs C
- ❒ Upland Sandpiper R
- ❒ Whimbrel U
- ❒ Hudsonian Godwit R
- ❒ Marbled Godwit R
- ❒ Ruddy Turnstone C
- ❒ Red Knot U
- ❒ Sanderling C
- ❒ Semipalmated Sandpiper C
- ❒ Western Sandpiper U
- ❒ Least Sandpiper C
- ❒ White-rumped Sandpiper U
- ❒ Baird's Sandpiper O
- ❒ Pectoral Sandpiper U
- ❒ Purple Sandpiper U
- ❒ Dunlin C
- ❒ Curlew Sandpiper R
- ❒ Stilt Sandpiper O
- ❒ Buff-breasted Sandpiper O
- ❒ Ruff R
- ❒ Short-billed Dowitcher U
- ❒ Long-billed Dowitcher O
- ❒ Wilson's Snipe C
- ❒ American Woodcock U
- ❒ Wilson's Phalarope R p
- ❒ Red-necked Phalarope O p
- ❒ Red Phalarope O p
- ❒ Black-legged Kittiwake O
- ❒ Ivory Gull R•
- ❒ Sabine's Gull R
- ❒ Bonaparte's Gull C
- ❒ Black-headed Gull O
- ❒ Little Gull O
- ❒ Laughing Gull C
- ❒ Franklin's Gull R
- ❒ Ring-billed Gull C
- ❒ California Gull R
- ❒ Herring Gull C
- ❒ Thayer's Gull R
- ❒ Iceland Gull U
- ❒ Lesser Black-backed Gull U
- ❒ Glaucous Gull U
- ❒ Great Black-backed Gull C
- ❒ Sooty Tern R p
- ❒ Bridled Tern R p
- ❒ Least Tern C
- ❒ Gull-billed Tern R
- ❒ Caspian Tern U
- ❒ Black Tern O
- ❒ Elegant Tern R•
- ❒ Roseate Tern O
- ❒ Common Tern C
- ❒ Arctic Tern R p
- ❒ Forster's Tern C
- ❒ Royal Tern U
- ❒ Sandwich Tern R
- ❒ Black Skimmer U
- ❒ Great Skua R p
- ❒ South Polar Skua R p
- ❒ Pomarine Jaeger U p
- ❒ Parasitic Jaeger U p
- ❒ Long-tailed Jaeger O p
- ❒ Dovekie R p
- ❒ Common Murre R p
- ❒ Thick-billed Murre R p
- ❒ Razorbill O p
- ❒ Black Guillemot R p
- ❒ Long-billed Murrelet R p
- ❒ Atlantic Puffin R p
- ❒ Rock Pigeon C
- ❒ Eurasian Collared-Dove R
- ❒ White-winged Dove R
- ❒ Mourning Dove C
- ❒ Yellow-billed Cuckoo C
- ❒ Black-billed Cuckoo U
- ❒ Groove-billed Ani R
- ❒ Barn Owl O
- ❒ Eastern Screech-Owl C
- ❒ Great Horned Owl C
- ❒ Snowy Owl O
- ❒ Barred Owl U
- ❒ Long-eared Owl O
- ❒ Short-eared Owl O
- ❒ Northern Saw-whet Owl O
- ❒ Common Nighthawk U
- ❒ Chuck-will's-widow O
- ❒ Eastern Whip-poor-will U
- ❒ Chimney Swift C
- ❒ Green Violetear R•
- ❒ Ruby-throated Hummingbird C
- ❒ Rufous Hummingbird R
- ❒ Belted Kingfisher C
- ❒ Red-headed Woodpecker O
- ❒ Red-bellied Woodpecker C
- ❒ Yellow-bellied Sapsucker U
- ❒ Downy Woodpecker C
- ❒ Hairy Woodpecker U
- ❒ Northern Flicker C
- ❒ Pileated Woodpecker O
- ❒ American Kestrel U
- ❒ Merlin U
- ❒ Gyrfalcon R
- ❒ Peregrine Falcon U
- ❒ Monk Parakeet R
- ❒ Olive-sided Flycatcher O
- ❒ Eastern Wood-Pewee C
- ❒ Yellow-bellied Flycatcher U
- ❒ Acadian Flycatcher C
- ❒ Alder Flycatcher O
- ❒ Willow Flycatcher C
- ❒ Least Flycatcher U
- ❒ Eastern Phoebe C
- ❒ Say's Phoebe R•
- ❒ Ash-throated Flycatcher R
- ❒ Great Crested Flycatcher C
- ❒ Western Kingbird R
- ❒ Eastern Kingbird C
- ❒ Gray Kingbird R
- ❒ Scissor-tailed Flycatcher R
- ❒ Loggerhead Shrike R
- ❒ Northern Shrike R
- ❒ White-eyed Vireo C
- ❒ Bell's Vireo R
- ❒ Yellow-throated Vireo U
- ❒ Blue-headed Vireo U
- ❒ Warbling Vireo C
- ❒ Philadelphia Vireo O
- ❒ Red-eyed Vireo C
- ❒ Blue Jay C
- ❒ American Crow C
- ❒ Fish Crow C
- ❒ Common Raven R
- ❒ Horned Lark U
- ❒ Purple Martin C
- ❒ Tree Swallow C
- ❒ No. Rough-Winged Swallow C
- ❒ Bank Swallow C
- ❒ Cliff Swallow O
- ❒ Cave Swallow R
- ❒ Barn Swallow C
- ❒ Carolina Chickadee C
- ❒ Black-capped Chickadee U
- ❒ Tufted Titmouse C
- ❒ Red-breasted Nuthatch U
- ❒ White-breasted Nuthatch C
- ❒ Brown Creeper U
- ❒ House Wren C
- ❒ Winter Wren U
- ❒ Sedge Wren R
- ❒ Marsh Wren U
- ❒ Carolina Wren C
- ❒ Blue-gray Gnatcatcher C
- ❒ Golden-crowned Kinglet C
- ❒ Ruby-crowned Kinglet C
- ❒ Northern Wheatear R
- ❒ Eastern Bluebird C
- ❒ Townsend's Solitaire R
- ❒ Veery C
- ❒ Gray-cheeked Thrush U
- ❒ Bicknell's Thrush R
- ❒ Swainson's Thrush C
- ❒ Hermit Thrush C
- ❒ Wood Thrush C
- ❒ American Robin C
- ❒ Varied Thrush R
- ❒ Gray Catbird C
- ❒ Northern Mockingbird C
- ❒ Sage Thrasher R•
- ❒ Brown Thrasher C
- ❒ European Starling C
- ❒ American Pipit O
- ❒ Bohemian Waxwing R
- ❒ Cedar Waxwing C
- ❒ Lapland Longspur R
- ❒ Chestnut-collared Longspur R•
- ❒ Snow Bunting U
- ❒ Ovenbird C
- ❒ Worm-eating Warbler U
- ❒ Louisiana Waterthrush U
- ❒ Northern Waterthrush C
- ❒ Golden-winged Warbler R
- ❒ Blue-winged Warbler U
- ❒ Black-and-white Warbler C