ENVIRONMENTAL RESOURCE INVENTORY

ERI

MAY 2017

For the City of:

CAMDEN

Camden County, New Jersey

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New Jersey Department of Environmental Protection

City of Camden New Jersey

Camden County Municipal Utilities Authority

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Live | Work | Invest | Camden

by:

Delaware Valley dvrpc Regional Planning Commission

with:

Partner Organizations:
City of Camden and the Camden Collaborative Initiative

The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals, and the public with a common vision of making a great region even greater. Shaping the way we live, work, and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy.

We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

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

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

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INTRODUCTION

What is an Environmental Resources Inventory?

An Environmental Resource Inventory (ERI) identifies and describes the natural resources of a community. A community's natural resources—its soil, water, air, plants, and animals—are fundamental to its character. The protection and wise use of those resources is essential to the public health, safety, and welfare of current and future residents. The ERI provides a basis for the development of methods and steps to preserve, conserve, and use those resources, although it does not include specific recommendations to those ends. It is, instead, a compendium of existing information that can be found about a community's natural resources, presented in a form that is useful to a broad audience.

The ERI is an important tool for environmental commissions, open space committees, planning boards, and zoning boards of adjustment, enabling these groups to identify and prioritize environmental problems and opportunities. When adopted into the master plan, the ERI can support the development of resource protection ordinances and resource-based land use planning.

City of Camden

Bordered by the Delaware River to the west and north and various inner ring suburbs to the east and south, Camden is a densely developed northeastern seaboard city with a long history of heavy industrial and commercial activity (see **Map 1: Aerial**). As such, most of the city is developed with housing, roads, transportation systems, shops, businesses, cultural destinations, institutions and parking lots. However, within this urban fabric lie numerous pockets of natural vegetation, habitat and unexpected environmental resources that enrich the community and connect its residents to the natural world. Some of these natural features include open water along the Delaware River, tidal creeks and wetlands, riparian forests, former industrial sites transitioning into warm season meadows, and the city's numerous parks. Located in the Inner Coastal Plain, the city contains expanses of flat land with soils that have primarily been compacted by urbanization.

Situated across the Delaware River from Philadelphia, the city has a long and storied history as an economic and industrial powerhouse that helped drive the growth and development of the nation. Like many urban areas in the U.S., in the past half century, the city has experienced post-industrial decline. As a result of this legacy of heavy industry and the economic challenges of post-industrial decline, the city today faces numerous environmental challenges, including water quality impairments, air pollution, combined sewer overflows, illicit dumping and toxic waste.

This ERI documents the city's existing environmental resources as well as on-going challenges (and opportunities) relating to pollution and contamination. The main objective will be to set the stage for the city to take advantage of and strengthen its existing natural assets in concert with on-going efforts to remediate environmental contamination. While the city faces numerous environmental challenges, the opportunities to attract new funding and engage residents in the improvement of their natural resources are significant. This ERI is intended help officials and residents as they engage in this important work moving forward.

CITY OF CAMDEN OVERVIEW

The City of Camden is located along the Delaware River in Camden County. Encompassing 10.34 square miles of land area (6,618 acres) and 1.86 square miles of water area (1,190 acres), Camden is the primary urban center of the greater South Jersey metropolitan region. It has more than 20 generally recognized neighborhoods and is bordered by numerous municipalities including (from north to south) Pennsauken Township, Merchantville Borough, Collingswood Borough, Woodlynne Borough, Haddon Township and Gloucester City. It is also located across the Delaware River from the City of Philadelphia, with which it is linked by the Benjamin Franklin Bridge and has close historical ties.

The City of Camden is well-connected to the north and south by roads, highways and rail. Interstate Route 676 and New Jersey State Highway 30 bisect the city east-west and north-south, respectively. New Jersey State Route 130 runs through the city's southeast corner and several arterials including Broadway and Haddon Ave form major spines serving the city and connecting residents to surrounding communities. Camden is also well served by both the PATCO High Speed Rail Line, with two stations in the city, and NJ Transit's Riverline Light Rail line, which has four stations in the city and terminates at the Camden Entertainment Center. Camden is also a hub of the Circuit Trails Network, with the Cooper River Trail and the Ben Franklin Bridge connecting the city to the wider trail network.

According to the 2015 American Community Survey, approximately 76,904 people live in Camden, which was a slight decrease from its 2010 population of 77,344.[1] [2] The median household income is $25,042 and the poverty rate is 40 percent.[3]

Historically, the city was known as a booming industrial center, employing tens of thousands of people at companies like RCA Victor, the New York Ship Building Corporation, and the Campbell Soup Company—which remains headquartered in the city to this day. Camden is now known for its many diverse neighborhoods, its educational and health care institutions, and its entertainment amenities, particularly along its vibrant waterfront.

Parkside Learning Garden along Haddon Avenue
Source: Jonathan Wetstein, PBCIP

[1] U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates, DP05, Demographic and Housing Estimates.
[2] U.S. Census Bureau, 2010 Census, Summary File 1 P1 – Total Population.
[3] U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates, Table DP03, Selected Economic Characteristics.

Land Use Type	General Land Use/Land Cover Class	Area (Acres)	Percent
Residential, Single Unit, Medium Density	Urban	18.98	0.28%
Stadium, Theaters, Cultural Centers aAnd Zoos	Urban	95.20	1.42%
Stormwater Basin	Urban	5.91	0.09%
Tidal Rivers, Inland Bays, and Other Tidal Waters	Water	964.31	14.40%
Transitional Areas	Barren Land	96.84	1.45%
Transportation/Communication/Utilities	Urban	395.95	5.91%
Total		**6,697.70**	

Source: NJDEP, 2012

These categories are also depicted on **Map 2: Land Use.**

AIR QUALITY

Air quality – both indoors and outdoors – has a major effect on human health. High or prolonged levels of air pollution are associated with increases in morbidity and mortality from illnesses such as asthma, lung cancer, emphysema, heart disease, and other potentially lethal conditions. Air quality is one of the most difficult environmental resources to measure because its sources are diffuse and regional in nature. Common sources of air pollution include industry, cars, trucks, buses, fires, and dust, generated both nearby and over great distances. For example, the burning of coal in electricity generating plants as far away as Ohio and Western Pennsylvania sends pollutants such as sulfur, nitrogen, and particulate matter all the way to the East Coast. Locally produced sources of air pollution include daily roadway traffic and industrial facilities.

Air quality is regulated by the Clean Air Act of 1970 (CAA), which sets limits on certain air pollutants. The CAA identified six criteria pollutants (ozone, particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and lead) that are destructive to human health and the built and natural environment (see explanation of **Air Quality Criteria Pollutants** in the box on the previous page). The United States Environmental Protection Agency (EPA), the federal agency responsible for protecting human health and the environment, sets National Ambient Air Quality Standards

Air Quality Criteria Pollutants

Ground-level ozone (O3) is formed when volatile organic compounds (VOC) and nitrogen oxides react with sunlight and heat. It is produced more in the summer months and is the primary constituent of smog. Ground-level ozone is a pulmonary irritant, which, even in low levels, can be dangerous to sensitive populations such as people with asthma or emphysema and the elderly. It can also affect plant growth and is responsible for hundreds of millions of dollars in lost crop production.

Particulate matter (PM), or particle pollution, is made up of dust, ash, smoke, and other small particles formed from the burning or crushing of materials such as wood, rocks, and oil. When ingested, particulate matter can lodge deep in the lungs and can contribute to serious respiratory illnesses such as asthma or lung disease. Particulate matter also creates haze, reduces visibility, and covers buildings in dirty soot.

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon fuel is not burned completely. It is a component of motor vehicle exhaust; therefore, higher levels of CO generally occur in areas with heavy traffic congestion. The highest levels of CO typically occur during the colder months when air pollution becomes trapped near the ground beneath a layer of rising warm air.

Nitrogen oxides (NOx) are a group of highly reactive gases that contain nitrogen and oxygen in varying amounts. Motor vehicles, electric utilities, and homes and businesses that burn fuels emit nitrogen oxides; they can also be found naturally. Nitrogen oxides are primary components in ground-level ozone (smog), acid precipitation, and other toxic chemicals. Acid precipitation can cause lung ailments in humans, property damage, harm to aquatic life, and other environmental and human health problems.

Sulfur dioxide (SO2) is released into the atmosphere when fuel containing sulfur, such as coal and oil, is burned, and when gasoline is refined from oil. Sulfur dioxide dissolves in water vapor to form acid precipitation.

Lead (Pb) is a pollutant that was historically released by cars and trucks burning leaded fuel, in addition to its historic use in paint. Today, metal processing plants and trash incinerators are the major source of lead emissions. Lead tends to be a localized air pollutant, found in urban or high-traffic areas, and it is deposited in soil and water, harming fish and wildlife.

The City of Camden School District - Charles Summer School	1600 S 8th St	50874
The City of Camden School District - Cooper's Poynt School	201 State St	50878
The City of Camden School District - Creative Arts Morgan	990 Morgan Blvd	50875
The City of Camden School District - Dudley Elementary School	2250 Berwick St	52107
The City of Camden School District - Early Childhood Develop	1602 Pine St	52108
The City of Camden School District - H.B. Wilson Family School	2250 S 8th St	52109
The City of Camden School District - Henry L Bonsall Family	1575 Mt Ephraim Ave	50879
The City of Camden School District - Maintenance Warehouse	901 S 8th St	50883
The City of Camden School District - Octavious V Catto Comm School	3100 Westfield Ave	52106
The City of Camden School District - Riggs Adult Learning Center	3315 Westfield Ave	L5056
The City of Camden School District - R.T. Cream Family School	423 White Horse Pike	51883
The City of Camden School District - Yorkship Family School	130 N Broadway	51884
The City of Camden School District - Camden High School & Voc Tech	1930 So. Sixth Street	50704
The City of Camden School District - Sharp Elementary School	501 Jackson St	51772
The City of Camden School District - Veterans Mem Family	800 N 26th St	
The City of Camden School District - Woodrow Wilson Hs	401 S Broadway	52187
Camden Cleaning Center	1 Cooper Plaza	50078
Camden County College Camden Campus	1380 Federal St	52064
Camden County Energy Recovery Assoc. LP	403 Haddon Ave	52122
Camden County MUA Delaware #1 WPCF	1420 Crestmont Ave.	50277
Camden County Administration Bldg	2615 High St	52027
Camden County Court House	2 Riverside Drive	51000
Camden County Dept. Of Corrections	1815 Federal St	50241
Camden Gulf	631 Market St	52026
Camden Housing Authority	5th &	51527
Camden Housing Authority-Mickle Towers	832 S Fourth St	52057

Riverview Towers Apartments	Cuthbert & Mcarthur St	A5001
Rowan University	1507 State St	50861
Rutgers University Camden Campus	230-238 Liberty St	50556
Salvation Army Kroc Center	1901 Admiral Wilson Blvd	A5265
San Miquel School	2361 Admiral Wilson Blvd	A5717
SFC Nelson V Brittin USARC	1 Aquarium Dr	50822
Shell Service Station	529 South Second Street	50114
SNJLRTS Camden Maintenance Facility	27th St & Buren Ave	50729
South Jersey Health Care Center	Ben Franklin Bridge Plaza	50911
South Jersey Port Corp	Ben Franklin Bridge Plaza	H5079
Speedway #03500	698 Cooper St	A9672
Spray Coat Finishing Co.	601 Broadway	L9050
Standard Merchandising Co.	12 N 7th St	50750
State Metal Industries Inc.	250 Federal St	52099
Sunoco Service Station (Former)	7th & Vine Streets	50872
Texaco Service Station	7th & Erie St	50160
Tri-State Recycling Inc.	1056 Wright Ave	51589
Univar USA Inc.	3rd & Federal St	H8998
Us Postal Service	201 N Front St	50927
Walter Rand Transportation Center	2800 Mickle St	50877
Washington Elementary School	1875 Park Blvd	50712
Waste Management of New Jersey	1701 S 6th St	50870
Weeks Marine	1600 S 8th St	50874
West Jersey Health System	201 State St	50878
Westmont Shell	990 Morgan Blvd	50875
W Hargrove Recycling Inc.	2250 Berwick St	52107
William J Jones & Sons Inc.	1602 Pine St	52108

Source: NJDEP, 2017

Indoor Air Quality and Public Health

Although the Air Quality Index monitors outdoor air quality, and the regulated facilities indicate sources of outdoor air quality pollution, indoor air quality can pose an even more serious risk to public health. Not only do people spend most of their days indoors, but indoor air quality can be much worse than that of the outdoor environment. This problem can be magnified during the winter months when closed windows and doors limit air circulation. Potential sources of indoor air pollution can include heating sources such as oil, gas, kerosene, coal, wood; building materials and furnishings that may contain asbestos, formaldehyde, or other chemicals; household cleaning supplies; or outdoor sources such as pesticides or radon. Many reports and studies indicate that low-income, minority, tribal, and indigenous communities may be disproportionately impacted by indoor asthma triggers, secondhand smoke, mold, radon, and other indoor pollutants.

SURFACE WATER

Surface water is water that is present on the land surfaces, and it includes lakes, ponds, rivers, streams, bogs, wetlands, bays, and oceans.

In Camden, the most significant body of surface water is the Delaware River, which is tidal along its entire border with Camden.

Delaware River *Source: DVRPC*

Another major surface water resource in Camden is the Cooper River, which runs approximately 16 miles northwest from its headwaters in Gibbsboro to the Delaware River in Camden. It is tidal from the Delaware River to the Cooper River Lake dam at Kaighn Avenue in Camden. Bordered by Farnham Park and Gateway Park in Camden, the Cooper River provides many recreational opportunities for area residents.

The third major surface water resource in Camden is Newton Creek. Newton Creek has three branches, the northern most of which runs between Camden's Morgan Village and Fairview neighborhoods to the Delaware River. The middle branch serves as Camden's southern boundary, separating Camden from Gloucester City.

Watersheds

A watershed is all the land that drains to a particular waterway, such as a river, stream, lake, or wetland. The high points in the terrain, such as hills and ridges, define the boundaries of a watershed.

Each watershed corresponds to a hydrological unit code (HUC), as delineated by the U.S. Geological Survey (USGS). The USGS has set up a nested hierarchy of watersheds, with larger watersheds being comprised of successively smaller watersheds, which in turn are themselves comprised of smaller watersheds. For example, a HUC11 watershed (identified by an 11-digit code) contains a number of HUC14 subwatersheds

DOC - St Josephine Bakhita School	821 Memorial Ave	52298
DOC - St Joseph Pro Cathedral - St Joseph School	2001 S 6th St	51765
Dr. Charles Brimm Medical Arts Hs	2021 Watson St	50173
Dr. Ulysses Simpson Wiggins College Prep Lab	1&11 Federal St.	50858
East Coast Gas	1 Harbour Blvd	50980
E Camden Middle School	2225 Admiral Wilson Blvd	A5198
Ecullet Inc.	3rd St & Jefferson Ave	50001
Ed Dudley Elementary School	1543 A Park Blvd	51411
Essroc Cement Corp	Freemont St & Dudley St	50692
Extreme Painting & Powder Coating LLC	551 Spruce St	51409
Fair Share North Ii	400 Cooper St	52124
FCR Inc. Camden	710 Broadway	A5273
Frontier Terminal	350 Newton Ave	50719
F&R Pallets Inc. T/A J&R Pallets	1839 Admiral Wilson Blvd	51682
F W Winter Inc. & Co.	700 Beideman Ave	51722
Georgia-Pacific Gypsum LLC	7th & Linden St.	50376
Gramercy Park Garden Assoc.	1600 Haddon Ave	50379
Greener Cleaner Inc. Dba Tweeds Dry Cleaning	Park Blvd & Vesper Blvd	50994
Greens Texaco Service Station	2109 Howell St	50895
Hall of Justice	1516 River Road	50747
Harleigh Cemetery Assoc.	250 Mechanic St	51680
HB Wilson Elementary School	1031 Kaighn Ave	L8907
Holtec Technology Center	1839 Admiral Wilson Blvd	A5216
Hospital Central Services Inc.- HCSC Laundry	1431 Ferry Ave	50405
LPAK	25 N 5th St	50939
J L Poultry Co Inc.	2nd St & Spruce St	50418
Kennedy Towers	1406 S. Collings Rd.	L5048

L-3 Communication Systems-East	2630 Mt Ephraim Ave	51809
Live Nation - Susquehanna Bank Center	Davis & Copewood Sts	51466
Lukoil Service Station #57200	1301 N 26th St	51593
Mafco Worldwide Corp	130 Mickle Blvd & 2nd St	50592
Magnolia Park Apts	401 Haddon Ave	50694
McGraw School	Pearl St	50850
Mi Casita Day Care Center	1865 Harrison Ave	52243
Mitchell H Cohen Fed Bldg & Us Courthouse	836 S 4th St	51745
Monk's Amoco-Hooper Monk	3911 Federal St	51677
Newton Ave Bus Garage	2361 Admiral Wilson Blvd	A5033
NJILG UST NJ0031 Service Station	700 Beideman Ave	52112
NJ Transit Authority Yard & Shop Maintenance Facility	2 Cooper Plaza	52053
Northgate Apartments	433 N 7th St	
Our Lady Of Lourdes Medical Center	1420 Admiral Wilson Blvd	A5081
Parkside WTP	1125 Kaighn Ave.	50339
Patrick J Kelly Drums Inc.	1125 Wright Ave	51810
Pavonia Diesel Terminal	941 S Second St	50539
Peerless Castings	2150 Admiral Wilson Blvd	51929
Peoples Cleaners	2885 Mt Ephraim Ave	A5380
Pinnacle Petroleum Camden Service Station	1600 Mickle St	50756
Plastic Consulting & Mfg Co.	1 Atlantic Ave	51818
Prosecutors Bldg	401 Market St	52125
PSE&G Camden Gas Plant M&R Station	100 Broadway	52015
Quality Cleaners	27th St & Cambridge St	50584
Reliable Trailer Inc.	1001 Fairview Street	50846
RF Products Inc.	901 Beach St	51770
River Front Recycling & Aggregate LLC	1000 Atlantic Ave	50095

Camden Iron & Metal Inc.	1739 Ferry Ave	52059
Camden Plant Holding LLC	2824 River Rd	51761
Camden Station	1010 Liberty St	52058
Campbell Soup Co.	1400 Collings Rd	51530
Capital Academy	2907 Westfield Ave	51898
Carmeuse Pennsylvania Inc. Pavonia Rail Terminal	1626 Copewood St	50429
Central Metals Inc.	400 Mt Vernon St	50873
Charles Dry Cleaners	2474 Baird Blvd	A9695
Cingular Wireless	3064 Stevens St	50926
Cingular Wireless @ Wilson Bldg	2201 Mt Ephraim Ave	52207
Colonial Processing	23rd St & High St	50888
Comarco Quality Pork Products	595 Morgan Blvd	51588
Container Recyclers Of Camden Inc.	944 Reeves Ave	52269
Cooper Medical School Of Rowan University	500 N 7th St	52293
Cooper University Hospital	2201 Mt Ephraim Ave	51830
Coriell Institute	1800 Carman St	51838
Coriell Institute	1929 S 4th St	52174
Crestmont Enterprises-Foote & Jenks	Delaware Ave & Elm St	50563
Daniels Auto Repair	1101 S Front St	51611
Delaware River Port Authority - One Port Center	2880 Hull Rd	50276
Di Medio Lime Co.	215 S 10th St	L9017
DOC - Diocese Of Camden	7th St & Cooper St	A5022
DOC - Immaculate Conception Holy Name School	5th St & Mickle St	50938
DOC - Immaculate Conception - Mt Carmel	1640 Haddon Avenue	50318
DOC - Sacred Heart School	9th St & Woodland St	50876
DOC - St Anthony Of Padua - School	Broadway & Morgan Blvd	52307
DOC - St Joseph	2224 Broadway	50326

(NAAQS) for these pollutants based on human health effects, as well as environmental and property damage.

Between 1970 and 2007, total emissions of the six criteria air pollutants decreased by more than 50 percent. The industrial sector reduced its toxic air emissions by 70 percent during this time period. Stricter emissions standards in the auto industry have made cars 90 percent "cleaner" since 1970. Cars also pollute less because refineries are required to produce cleaner fuels; leaded gasoline was completely banned in 1996.

In 1990, the CAA was amended and expanded by Congress to include a market approach to reducing air pollution by allowing certain companies to buy and sell emission "allowances," or "credits." Additionally, the 1990 CAA required EPA to regulate an additional 188 hazardous air pollutants, although there are no national air quality standards for these pollutants.

Air Quality Monitoring

As of 2014, NJDEP's Bureau of Air Monitoring maintains a network of 39 ambient air monitoring stations across the state, the majority of which are clustered in North Jersey. These stations continually monitor some or all of the six criteria pollutants. In New Jersey, most of the criteria air pollutants are measured using EPA-approved monitoring methods.

A continuous air monitoring station is located on Spruce Street near Locust Street in Camden. This station measures ground level ozone (O3) and weather data.

Ground-level Ozone

The amount of ozone has decreased greatly in New Jersey since the 1980s, and one-hour concentrations have not exceeded 0.200 parts per million (ppm) since 1988. For ground-level ozone (O3), there are two National Ambient Air Quality Standards (NAAQS): (1) a one-hour concentration of 0.12 ppm, and (2) an eight-hour average concentration of 0.075 ppm. For the national standards, these are the same for both primary and secondary effects. New Jersey, however, has tightened the one-hour concentration standard for secondary effects to 0.08 ppm. In December 2014, the EPA proposed new NAAQS for ground-level ozone that would further tighten the standard, dropping both the primary and secondary eight-hour averages to between 0.065 and 0.07 ppm.

Ozone was monitored at 16 stations throughout the state in 2014, of which 10 operated year round and six operated only during the ozone season (April 1 through October 31). The Camden Spruce St. station did not exceed the NAAQS one-hour primary standard or the eight-hour standard in 2014, as shown in **Table 5: Ozone Data (2014)** below.

Table 5: Ozone Data (2014)

Monitoring Site	1-Hour Average Concentrations		8-Hour Average Concentrations		
	Maximum	4th-Highest	Highest Daily Maximum	4th-Highest Daily Maximum	2012-2014 Average of 4th Highest Daily Max
Camden Spruce St.	0.087	0.084	0.075	0.068	0.073

Source: NJDEP, 2014

Point Source of Air Quality Pollution

Under the CAA, the EPA limits the amount of other air pollutants and toxins that are emitted by point sources, such as chemical plants, industrial factories, power plants, and steel mills. The NJDEP Air Quality Permitting Program issues permits for stationary sources of air pollution, such as power plants, oil refineries, dry cleaners, food processing centers, and manufacturing plants, and regulates and monitors their emissions. As of January 2017, there were 153 facilities with active air quality permits in Camden, listed in **Table 8: Facilities with Active Air Quality Permits**. These are also shown on **Map 7: Point Sources.** For additional information on specific facilities, please visit the NJDEP Data Miner[6], where you can search for sites by location, name, or ID number (all of which are listed in the table below).

Table 8: Facilities with Active Air Quality Permits

Name	Address	PI Number
1901 Admiral Wilson Blvd LLC	1901 Admiral Wilson Blvd	A5265
Admiral Wilson Shell Service Station	2361 Admiral Wilson Blvd	A5717
Adventure Aquarium	1 Aquarium Dr	50822
Art Metalcraft Plating Co.	529 South Second Street	50114
Baldwins Run Pumping Station	27th St & Buren Ave	50729
Ben Franklin Bridge	Ben Franklin Bridge Plaza	50911
Benjamin Franklin Bridge	Ben Franklin Bridge Plaza	H5079
Bill's Gas & Go Inc.	698 Cooper St	A9672
Broadway Cleaners	601 Broadway	L9050
Camden 2 C O #32100	12 N 7th St	50750
Camden Academy Charter High School	250 Federal St	52099
The City of Camden Board Of Education - Molina Annex School	7th & Vine St	50872
The City of Camden Board Of Education - Pyne Poynt School	7th & Erie St	50160
The City of Camden DPW Wright Avenue WTP	1056 Wright Ave	51589
The City of Camden Fire HQ	3rd & Federal St	H8998
The City of Camden School District - Admin Building	201 N Front St	50927
The City of Camden School District - Alfred Cramer College	2800 Mickle St	50877
The City of Camden School District - Big Picture Learning Academy	1875 Park Blvd	50712
The City of Camden School District - The City of Camden Trans Academy	1701 S 6th St	50870

[6] https://www13.state.nj.us/DataMiner

In addition to $PM_{2.5}$, a station in Camden also measures PM_{10}. This is one of only two stations in New Jersey that measures PM_{10}. In 2014, the annual mean concentration of PM_{10} measured at the Camden Resource Recovery Facility (RRF) was 24 $\mu g/m^3$, which is below the annual PM_{10} standard of 50 $\mu g/m^3$. The station also meets the 24-hour standard of 150 $\mu g/m^3$.

Table 7: PM10 Data

Monitoring Site	Number of Samples	Annual Mean Concentration	Highest 24-Hour Concentration	2nd Highest 24-Hour Concentration
Camden RRF	52	24	97	57

Source: NJDEP, 2014

Air Quality Index

The EPA created the Air Quality Index (AQI) to indicate a region's air quality by measuring levels of five of the six criteria pollutants (excluding lead). The AQI is focused on the potential human health hazards experienced by breathing unhealthy air. Scores for the AQI range from 0 to 500 and are divided into six color-coded categories, as shown in **Figure 4: Air Quality Index.** The higher the AQI value, the greater the level of air pollution and associated health concerns.

The daily score is based on the highest individual pollutant score reported. For example, if ozone scored 150 and particulate matter scored 100, the daily AQI would be 150—Unhealthy for Sensitive Groups. The index is used to measure overall air quality by counting the number of days per year when the AQI of each region exceeds 100.

New Jersey is subdivided into nine regions that report their respective AQI. The City of Camden is located in Region 8, which covers Camden and Gloucester counties. The monitoring stations for this region are located at Ancora State Hospital, Spruce St. in Camden, Clarksboro, and South Camden. In 2014 (the most recent year of annual data), Region 8 reported 285 good days; 79 moderate days; one day that was unhealthy for sensitive groups; and no unhealthy, very unhealthy, or hazardous days.

Figure 4: Air Quality Index

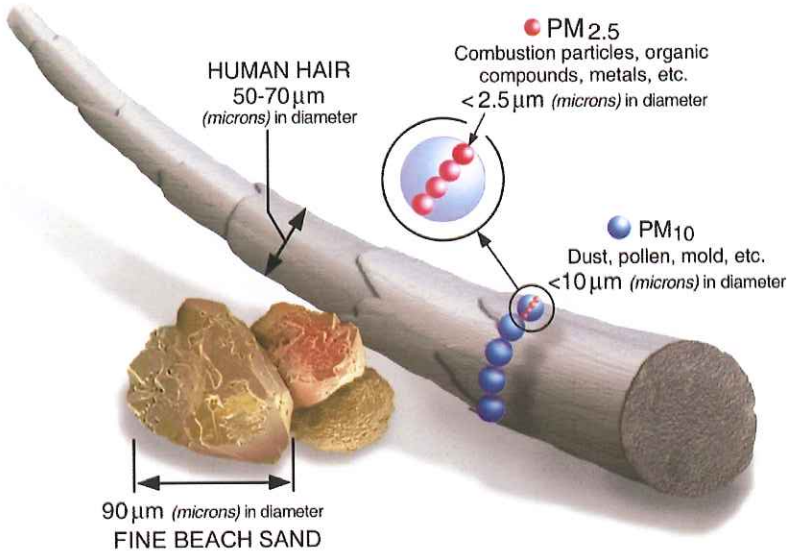
Air Quality Index (AQI) Values	Levels of Health Concern	Meaning
0 to 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk.
51 to 100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of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

Source: EPA

Particulate Matter

Particulate pollution is typically categorized by size. Particles with diameters of 2.5 microns or less are considered to be "fine particulates," also known as $PM_{2.5}$ (see **Figure 3: Particulate Matter**). Particulates with diameters from 2.5 to 10 microns are known as PM_{10}. All particulates smaller than 10 microns are inhalable, and therefore, are a risk to human health. However, all particulates, regardless of size, have an impact on the environment.

Figure 3: Particulate Matter



Source: EPA

As of 2014, 26 sites in New Jersey collected data on particulate matter for particles less than 2.5 microns ($PM_{2.5}$), 13 of which continuously measure the concentration of fine particles every minute and transmit the data electronically to the New Jersey Bureau of Air Monitoring. The national standard for annual $PM_{2.5}$ is 12.0 micrograms per cubic meter ($\mu g/m^3$), and the 24-hour average is 35 $\mu g/m^3$.

Two continuous particulate monitoring stations are located in Camden: one at Spruce St. and one in South Camden. A summary of the data from the continuous monitoring sites in Camden can be seen in **Table 6: PM2.5 Continuous Data**. NJDEP publishes regularly updated air quality data on its Air Monitoring website: http://www.njaqinow.net/. Neither of the stations exceeded the NAAQS standard of 12.0 $\mu g/m^3$ or the 24-hour standard of 35 $\mu g/m^3$ in 2014.

Table 6: PM2.5 Continuous Data

Monitoring Site	Annual Mean Concentration	Highest 24-Hour Concentration	Number of Unhealthy Air Quality Days
Spruce St.	11.9	29.6	0
South Camden	8.8	27.4	0

Source: NJDEP, 2014

e The main hazard is the risk of erosion unless close-growing plant cover is maintained.

w Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage).

s Soil is limited mainly because it is shallow, droughty, or stony.

c Chief limitation is climate that is very cold or very dry.

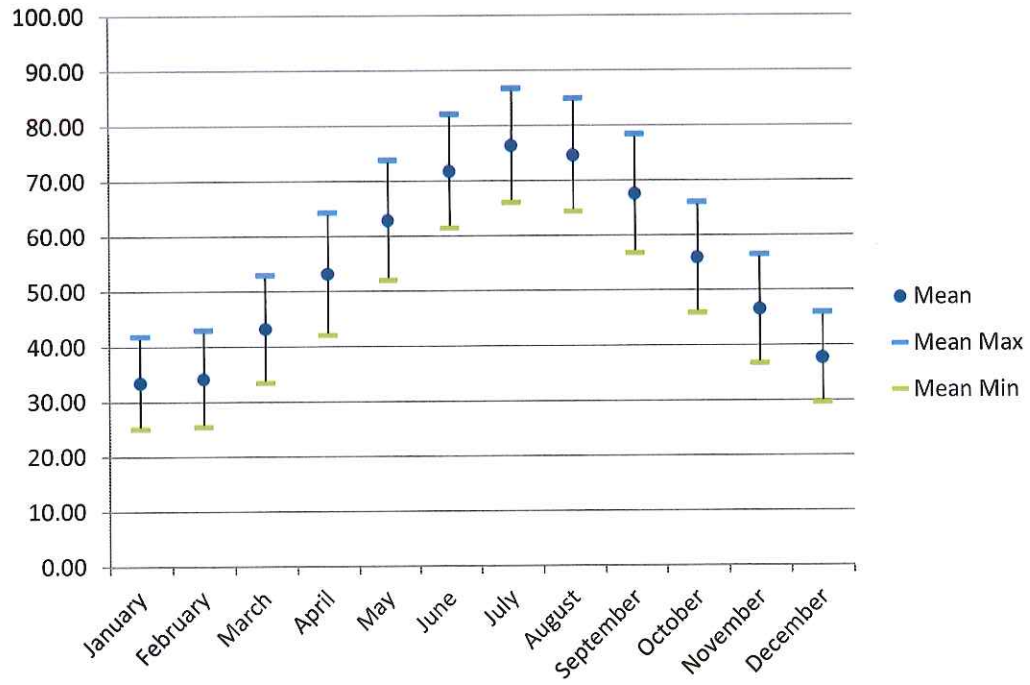
CLIMATE

Climate is a measure of long-term weather patterns and takes into account temperature, precipitation, humidity, atmospheric pressure, wind, and other meteorological variables. Geographically situated midway between the North Pole and the Equator, New Jersey's climate is variable. The state's temperate, continental climate is influenced by both hot and cold, and dry and humid airstreams. From May through September, the state is dominated by moist, tropical air that originates in the Gulf of Mexico and is swept in by prevailing winds from the southwest. In winter, winds generally prevail from the northwest, bringing cold, polar air masses from subarctic Canada.

Although the National Centers for Environmental Information (NCEI) publishes climate data from approximately 19 stations in Camden County, the Mount Holly station in neighboring Burlington County has the most complete set of climate data for the area.

Based on data recorded from 1997 to 2016 by the climate station in Mount Holly, New Jersey, the mean annual temperature is 54.9°F. As shown in **Figure 1: Monthly Temperatures (1997-2016),** January is the coldest month with a mean temperature of 33.3°F, and July is the hottest month with a mean temperature of 76.4°F. Record temperatures for the region are a high of 104°F and a low of–3°F.

Figure 1: Monthly Temperatures (1997-2016)



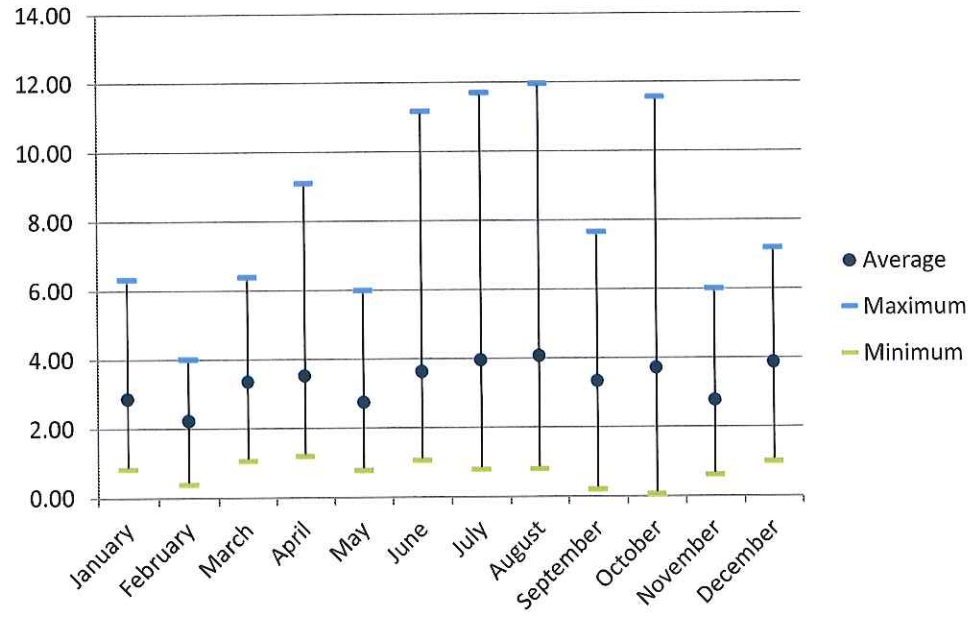
Source: NCEI

Precipitation

The average monthly precipitation in Camden ranges from about two to four inches. Based on data recorded from 1997 to 2016 by the climate station in Mount Holly, New Jersey, the area receives the most precipitation in August with an average of 4.07 inches, and the least precipitation in February with an average of 2.22 inches (see **Figure 2: Monthly Precipitation (1997-2016)**). The rainiest month during this period was

August 2011, when 11.96 inches of precipitation fell. The driest month was February 2009, when just 0.37 inches of precipitation fell.

Figure 2: Monthly Precipitation (1997-2016)



Source: NCEI

Snowfall

Based on data recorded between 1996 and 2016 at the Philadelphia Mount Holly US Weather Station, Camden experiences an average snowfall of 26.68 inches per year. In 2010, Camden received 65.1 inches of snow, far exceeding the yearly average.

Growing Seasons

According to the USDA, Camden lies on the northern edge of Plant Hardiness Zone 7b, where annual minimum temperatures are typically between 5°F and 10°F. Zone 7b covers a small portion of the southwestern edge of the state along the Delaware River. In Camden, the average length of the agricultural growing season is 195 days.[4] The first frost usually occurs in mid-October, and the last frost occurs at the end of April. Temperatures in the winter are usually not low enough to keep the soils frozen for the entire winter season.

Climate Change

Climatologists estimate that from 1880 to 2012, the average global surface temperature rose by 1.5 degrees Fahrenheit and, without additional efforts to constrain emissions, is expected to rise an additional two to nine degrees by 2100. The Office of the New Jersey State Climatologist, which has recorded temperatures in the state since 1895, corroborates this general historic warming trend in New Jersey.

[4] Rutgers, New Jersey Agricultural Experiment Station. "WMA – Length of Growing Season." (Accessed February 2017): http://njvines.rutgers.edu/grape-growing/site-selection/watershed-18-lower-delaware/18-length-of-growing-season/.

In addition to rising temperatures, New Jersey and the City of Camden are expected to experience increases in overall precipitation and intensifying weather extremes by 2100. *Useful Climate Information for Philadelphia: Past and Future* estimates that by 2100 the City of Philadelphia will experience about two to four additional "very heavy" precipitation events and two additional "extremely heavy" precipitation events per year.[5] Given its proximity to Philadelphia, Camden can expect to experience similar increases in extreme weather events. Additionally, there will be more days over 90 degrees in any given year and more frequent and longer heat waves. The climate will become wetter, with more frequent heavy downpours. In addition, sea level is expected to rise 3 to 4 feet by 2100. Such a rise will impact communities along the tidal Delaware River like Camden,

There is an increasing need both to reduce emissions of climate change-causing greenhouse gas and to prepare for the effects of climate change that will occur locally. New Jersey's Global Warming Response Act, enacted in 2007, calls for statewide reduction in greenhouse gas emissions to 1990 levels by 2020 and a reduction to 80 percent below 2006 levels by 2050. New Jersey's 2011 Energy Master Plan pledges to support energy efficiency and backs a renewable energy portfolio standard of 22.5 percent of energy sources from renewable sources by 2021 to help achieve these goals. A draft 2015 update continues to support these goals.

Flooding in Camden *Source: Camden SMART Initiative*

[5] ICF Incorporated, L.L.C. *Useful Climate Information for Philadelphia: Past and Future.* Prepared for Philadelphia Mayor's Office of Sustainability. Philadelphia, Pennsylvania. (August 2014): https://beta.phila.gov/media/20160505145605/Useful-Climate-Science-for-Philadelphia.pdf.

GEOLOGY

The City of Camden contains three underlying geologic formations that run roughly southeast to northwest. They are visible on **Map 3: Geology**. They are also described in **Table 3: Geologic Formations** and are organized from the most recently formed (top of table) to the oldest (bottom of table).

Table 3: Geologic Formations

Geologic Name	Abbreviation	Physiographic Province	Lithology	Geologic Age
Merchantville Formation	Kmv	Coastal Plain	Glauconite sand to quartz-glauconite sand, clayey and silty	Late Cretaceous: Campanian
Magothy Formation	Kmg	Coastal Plain	Quartz sand, fine- to coarse-grained, interbedded with thin-bedded clay or clay-silt	Late Cretaceous: Santonian
Potomac Formation	Kp	Coastal Plain	Sand, fine- to coarse-grained, interbedded with white, red, or yellow clay	Late Cretaceous: Cenomanian

Source: NJGS, 2009

TOPOGRAPHY AND SURFACE LANDSCAPES

Camden's location in the Inner Coastal Plan is reflected in its topography. The topography of the city is relatively mild, with primarily flat areas, and very few naturally-occurring steep slopes. The highest elevation in the city is found in the northeast, at 104 feet above sea level. The lowest elevation is sea level found along the Delaware River and the city's tidal creeks. The city's topography is depicted on **Map 4: Elevation.**

Steep Slopes

The Land Development Ordinance of the City of Camden (LDO) defines steep slopes as those over 15 percent. In general, development of areas with steep slopes is inadvisable as it is likely to result in property damage, erosion, sedimentation of streams, and increased stormwater runoff and flooding.

As seen in **Map 5: Steep Slopes,** the majority of Camden is relatively flat, with very few naturally-occurring steep slopes. Only five percent of land in Camden has slopes of 15 percent or greater. Many of these are in the form of embankments along manmade structures such as highways and railroad tracks. A few naturally-occurring steep slopes can be found along the Delaware and Cooper River waterfronts.

SOILS

Soil is the foundation for all land uses. Soil types vary in their physical, chemical, and biological properties, influencing the vegetation potential of a region.

Surveys conducted by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) provide data on soil types. The Camden County Rutgers Cooperative Extension conducts soil testing for the county. Testing kits are available for purchase, which analyze the fertility level, pH, and other soil properties.

Most soils in Camden are classified as urban land, consisting of land that was cut and filled for development and has lost the properties of its original soil horizon. In other words, the soils of Camden are highly modified and compacted and the soils that existed prior to development are no longer present. Only 14 acres in the easternmost tip of the city are classified as Freehold-Downer-Urban Land, which is a combination of six soil components, listed in the table below.

Table 4: The City of Camden Soils and **Map 6: Soils** describe the soils found in Camden. The Land Capability Class was developed by the USDA to determine the best use of lands by classifying and mapping erosion rates and potential in relation to both physical characteristics and agricultural capacity.

Table 4: The City of Camden Soils

Soil Type	Description	Acres	Land Capability Class*	
FrpB	Freehold-Downer-Urban land complex, 0 to 5 percent slopes	14.13	Freehold: 2s Downer: 2e Urban Land: 8s	Holmdel: 2w Collington: 1 Shrewsbury: 3w
UR	Urban land	5,680.90	Urban land: 8s Udorthents: 3w	
WATER	Water	962.07		
Total		**6,657.10**		

Source: NRCS, Web Soil Survey, 2016

*Capability Class	
1	Slight limitations that restrict their use.
2	Moderate limitations that restrict the choice of plants or that require moderate conservation practices.
3	Severe limitations that restrict the choice of plants or that require special conservation practices, or both.
4	Very severe limitations that restrict the choice of plants or that require very careful management, or both.
5	Subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
6	Severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.
7	Very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.
8	Limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

***Capability Subclasses**

LAND USE AND LAND COVER

Land cover is a description of the landscape on the earth's surface, such as forest, water, wetlands, or developed. Land use is a description of how people use the land, such as commercial or residential. NJDEP analyzes the land use and land cover of the state based on aerial photography every five years. The last completed analysis is based on aerials from 2012.

Camden's land cover/land use reflects its history as a commercial and industrial center as well as its location along the Delaware River. By far the largest land cover type found in Camden is urban, which covers approximately 75 percent of the city. The second-highest land cover category is water, which encompasses 15 percent of the city. Most of the water is accounted for by the Delaware River.

Land Cover Classifications

Urban: The Urban or Built-up Land category is characterized by intensive land use where the landscape has been altered by human activities. Although structures are usually present, this category is not restricted to traditional urban areas.

Barren Land: Barren Land is characterized by thin soil, sand or rocks and a lack of vegetative cover in a non-urban setting. Barren Land is found in nature but also as a result of man's activities. Extraction mining operations, landfills, and other disposal sites compose the majority of man-altered barren lands.

Source: Land Use Land Cover Classification System, NJDEP Modified Anderson System 2002.

As an urban area, Camden has only small amounts of what is typically thought of as natural land cover: forests, meadows, wetlands, etc. Moreover, the city's forest land cover decreased significantly between 2002 and 2012, from 322 to 258 acres (a decrease of approximately 20 percent), though it is not known why this is the case.

Table 1 shows Camden's land cover grouped into general categories based on NJDEP's 2012 and 2002 color infrared imagery. The final column highlights the change in each land use class that occurred over the 10-year period between 2002 and 2012.

Table 1: Land Use/Land Cover

Land Use	2012		2002		Change in Acres, 2012–2002
	Area (Acres)	Percentage	Area (Acres)	Percentage	
Agriculture	3.34	0.05%	1.01	0.02%	2.33
Barren Land	171.32	2.56%	123.39	1.84%	47.93
Wetlands	221.83	3.31%	243.02	3.63%	(21.19)
Forest	258.52	3.86%	322.40	4.81%	(63.88)
Water	1,013.66	15.13%	964.24	14.40%	49.42
Urban	5,029.02	75.09%	5,003.03	74.70%	25.99
TOTAL	**6,697.69**	100.00%	**6,657.09**	99.39%	40.60

Source: NJDEP, 2012

Table 2 breaks down the 2012 general land cover categories into detailed land cover categories.

Table 2: Land Use/Land Cover

Land Use Type	General Land Use/Land Cover Class	Area (Acres)	Percent
Altered Lands	Barren Land	74.49	1.11%
Artificial Lakes	Water	43.38	0.65%
Athletic Fields (Schools)	Urban	17.12	0.26%
Bridge Over Water	Water	5.97	0.09%
Cemetery	Urban	148.27	2.21%
Cemetery on Wetland	Urban	1.20	0.02%
Commercial/Services	Urban	773.81	11.55%
Coniferous Brush/Shrubland	Forest	2.83	0.04%
Cropland and Pastureland	Agriculture	2.33	0.03%
Deciduous Brush/Shrubland	Forest	88.94	1.33%
Deciduous Forest (>50% Crown Closure)	Forest	73.29	1.09%
Deciduous Forest (10-50% Crown Closure)	Forest	36.76	0.55%
Deciduous Scrub/Shrub Wetlands	Wetlands	21.41	0.32%
Deciduous Wooded Wetlands	Wetlands	88.50	1.32%
Disturbed Wetlands (Modified)	Wetlands	8.30	0.12%
Freshwater Tidal Marshes	Wetlands	47.70	0.71%
Herbaceous Wetlands	Wetlands	3.24	0.05%
Industrial	Urban	510.23	7.62%
Major Roadway	Urban	193.00	2.88%
Managed Wetland in Built-Up Maintained Rec Area	Wetlands	2.87	0.04%
Managed Wetland in Maintained Lawn Greenspace	Wetlands	7.43	0.11%
Military Installations	Urban	0.06	0.00%
Mixed Deciduous/Coniferous Brush/Shrubland	Forest	2.81	0.04%
Mixed Transportation Corridor Overlap Area	Urban	1.23	0.02%
Mixed Urban or Built-Up Land	Urban	111.27	1.66%
Old Field (< 25% Brush Covered)	Forest	26.14	0.39%
Other Agriculture	Agriculture	1.01	0.02%
Other Urban or Built-Up Land	Urban	439.85	6.57%
Phragmites Dominate Coastal Wetlands	Wetlands	15.53	0.23%
Phragmites Dominate Interior Wetlands	Wetlands	26.84	0.40%
Phragmites Dominate Old Field	Forest	27.74	0.41%
Railroads	Urban	149.22	2.23%
Recreational Land	Urban	240.64	3.59%
Residential, High Density or Multiple Dwelling	Urban	1,927.08	28.77%

ACKNOWLEDGEMENTS

The City of Camden Environmental Resource Inventory (ERI) was funded through a $20,000 grant administered by Sustainable Jersey and the DVRPC Environmental Planning Work Program.

The Environmental Planning Work Program assists local governments in completing plans and studies that balance the natural resources of communities in our region with transportation and development needs. The program identifies and addresses such local environmental issues as land use, water quality and quantity, flooding, wildlife habitat, natural vegetation, open space, and recreation.

Special thanks to the Camden Collaborative Initiative for their contributions to this document, as well as partners of the Camden Collaborative Initiative who provided deeper insights about environmental matters in Camden.

(identified by a 14-digit code). The state of New Jersey has 152 HUC11 watersheds and over 900 HUC14 subwatersheds. Camden falls into two HUC11 watersheds: the Cooper River and Woodbury/Big Timber/Newton Creek watersheds. There are three HUC14 watersheds in Camden, listed in **Table 9: Watersheds and Subwatersheds** and shown on **Map 8: Watersheds.**

The Cooper River Watershed drains an area of 40 square miles, 6.7 of which are located in the City of Camden. The combined Woodbury/Big Timber/Newton Creek Watershed drains an area of 98.94 square miles, only 3.7 of which are located in Camden. As shown in the table below, approximately 65 percent of the City of Camden falls within the Cooper River Watershed, while the remaining 35 percent falls within the Woodbury/Big Timber/Newton Creek watershed.

Table 9: Watersheds and Subwatersheds

Watershed Name	Subwatershed Name	Stream Classification	HUC14	Acreage within the City of Camden	Percent
Cooper River					
	Cooper River (below Route 130)	FW2-NT	204020211060	2,190.37	32.91%
	Cooper River (Route 130 to Wallworth gage)	FW2-NT	204020211050	2,115.23	31.77%
Woodbury/Big Timber/Newton Creeks					
	Newton Creek (LDRV-Kaighn Ave to LT Creek)	FW2-NT	204020212090	2,351.13	35.32%

Source: NJDEP, 2016

Watershed Associations

Watershed Associations typically advocate for the health of water systems and the environment, as well as protect and restore sensitive habitats, test waterways for pollution, and inspire others to protect their environment. Three watershed associations operate in Camden County: the Cooper River Watershed Association, the Delaware Riverkeeper Network, and the Newton Creek Watershed Association.

Started in 1988, the Delaware Riverkeeper Network (DRN) is a 501(c)(3) nonprofit that works throughout the Delaware River Watershed to protect the water quality and ecosystems of the Delaware River and its watershed. DRN works with local communities through programs like Awareness to Action, which empowers local communities to advocate for their water resources, and Water Watch, which recruits volunteers to monitor streams and identify pollution. DRN also works and the state and federal levels to advocate and litigate for policies, programs, and regulations that will protect the Delaware River Watershed. Additionally, DRN has been an important member of the Camden Collaborative Initiative (CCI).

Camden Collaborative Initiative

Launched in January 2013, the Camden Collaborative Initiative (CCI) is a partnership of over 40 governmental, non-profit, private, and community-based agencies formed to plan and implement innovative strategies to improve the environment and the quality of life of Camden's residents. CCI has grown to encompass seven working groups: Air, Camden SMART, Environmental Education, Green Team, Get Healthy Camden, Land & Brownfields, and Waste & Recycling.

Source: Camden Collaborative Initiative, http://www.camdencollaborative.com/

Wetlands

The term *wetland* is applied to areas where water meets the soil surface and supports a particular biological community, serving as natural filters and incubators for many beneficial species. Wetlands are classified as either tidal or non-tidal and can be either saline or freshwater. There are also special wetland categories to denote saturated areas that have been altered by human activities.

To determine what is and what is not a wetland in New Jersey, NJDEP adopted the 1989 ***Federal Manual for Identifying and Delineating Jurisdictional Wetlands***. The manual uses three parameters to classify wetlands: (1) hydric soils, (2) wetland hydrology, and (3) hydrophytic vegetation. All three parameters must be met to qualify as a wetland.

New Jersey protects freshwater wetlands under the New Jersey Freshwater Wetlands Protection Act Rules: N.J.A.C. A 7:7A. Activities permitted to occur within wetlands are very limited and usually require a permit. Additional information on wetlands rules and permits is available through NJDEP.

Wetlands cover 233 acres within Camden (three percent of the city), the largest category of which is deciduous wooded wetlands (89 acres). The second largest category, freshwater tidal marshes, covers 48 acres. In addition to natural wetlands, Camden also includes 20 acres of modified or disturbed wetlands. Modified wetlands are former wetland areas that have been altered by human activities and no longer support typical wetland vegetation or are not vegetated at all. All categories of wetlands are shown in **Table 10** below.

Table 10: Wetlands

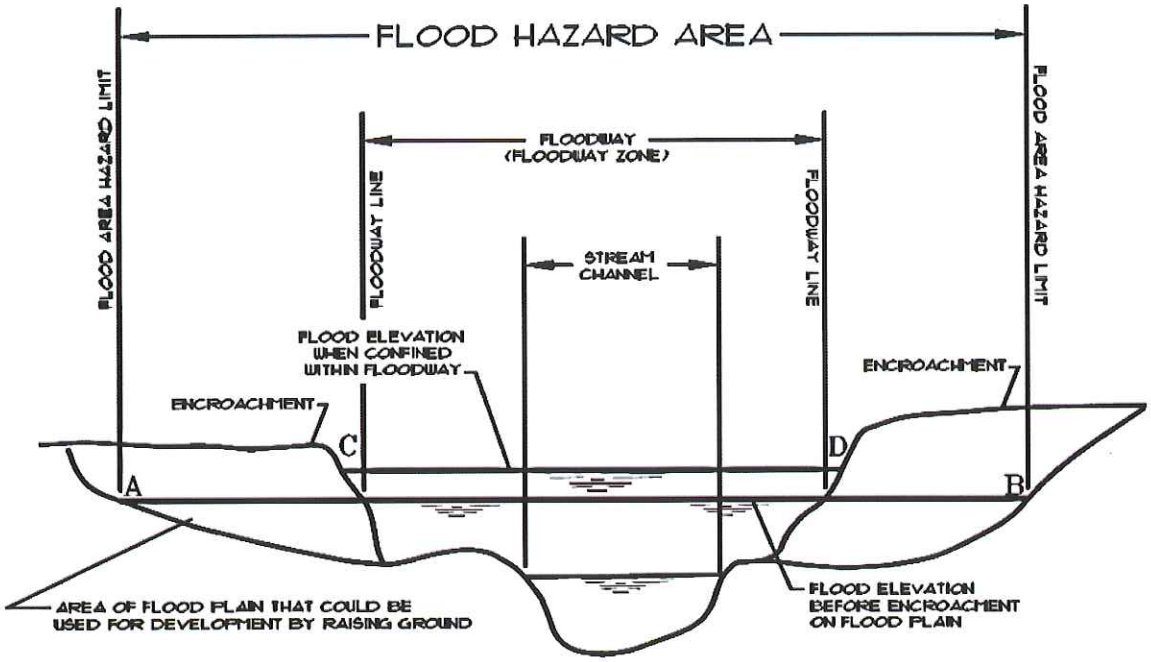
Wetlands	Acres
Cemetery on Wetland (Modified)	1.20
Deciduous Scrub/Shrub Wetlands	21.41
Deciduous Wooded Wetlands	88.50
Disturbed Wetlands (Modified)	8.30
Freshwater Tidal Marshes	47.70
Herbaceous Wetlands	3.24
Managed Wetland in Built-Up Maintained Rec Area (Modified)	2.87
Managed Wetland in Maintained Lawn Greenspace (Modified)	7.43
Phragmites Dominate Coastal Wetlands	15.53
Phragmites Dominate Interior Wetlands	26.84
Total	**223.02**

Source: NJDEP, 2012

Floodplains

Areas naturally subject to flooding are called *floodplains*, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal stream channel. The 100-year floodplain is defined as the land area that will be inundated by the overflow of water resulting from a flood that has a 1 percent chance of occurring in any given year. See **Figure 5: Flood Hazard Area Diagram** for an illustration of the various floodplain terminologies.

Figure 5: Flood Hazard Area Diagram



Source: The Land Use Ordinance of the Township of Lawrence

Floodplains require protection in order to prevent loss and injury, especially within the boundaries of the floodway. Equally important is the preservation and/or restoration of naturally-occurring vegetation in floodplains. These communities are often the first link in the food chain of the aquatic ecosystem. In addition, these vegetated areas serve the function of removing and mitigating various pollutants through the uptake by plant material of excess chemical loads and by the filtering of sediments generally.

Activities occurring in the floodplain are regulated at the state and local level. At the state level, activities in the floodplain are regulated under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq., and its implementing rules at N.J.A.C. 7:13.

In 2011, the Camden City Council adopted the Land Development Ordinance of the City of Camden (LDO) as Chapter 577 of the Code of the City of Camden. The Floodplain Management section of the LDO (§577-258) describes the design standards that apply to developments within a flood hazard area in Camden.

The Federal Emergency Management Agency (FEMA) issued preliminary Flood Insurance Rate Maps (FIRMs) for Camden County on September 19, 2014. These maps show that 1,650 acres, or approximately 25 percent of the city, falls within the 100-year floodplain. In addition, 1,116 acres (17 percent) of the city falls within the 500-year floodplain. Most of Camden's floodplain areas are located along the Delaware and Cooper rivers, as well as along Newton Creek. See **Map 9: Floodplains** and **Table 11: Floodplains**.

Table 11: Floodplains

NJDEP Land Use/Land Cover Classification	Acres in 100 Year Floodplain	Acres in 500 Year Floodplain
Agricultural	2.33	-
Barren	68.01	40.14

Forest	132.97	47.54
Urban	1,248.71	1,015.97
Water	982.71	0.01
Wetlands	197.94	12.35
Total Land Acres (excludes water)	1,649.96	1,115.99

Source: FEMA, 2014; NJDEP, 2012

WATER QUALITY

Surface Water

Surface water quality standards are established by federal and state governments to ensure that water is suitable for its intended use. This is done through an analysis of certain surface water quality parameters, including fecal coliform, dissolved oxygen, pH, phosphorous, toxic substances, and aquatic macroinvertebrate life. NJDEP reports water quality data on a HUC14 subwatershed basis, as opposed to reporting it for individual water bodies and streams. In other words, the water quality for all the streams and surface waters within a given HUC14 watershed are effectively assigned the same grade for water quality.

The determination of whether or not water quality is sufficient to meet a waterbody's designated use(s) is based on whether the waterbody is within established limits for certain surface water quality parameters. Some examples of surface water quality parameters include fecal coliform, dissolved oxygen, pH, phosphorous, and toxic substances. NJDEP also evaluates water quality by examining the health of aquatic life in a stream.

Delaware River and Petty Island from Pyne Poynt Park *Source: DVRPC*

According to NJDEP's 2014 Integrated Water Quality Report all three of Camden's subwatersheds (or "assessment units"), along with the Delaware River itself, are characterized as Not Supporting (NS) for aquatic life, the most telling parameter of water quality. These subwatersheds are also Not Supporting for fish consumption and water supply. The Delaware River is the only assessment unit that was deemed Fully Supporting for recreational uses. See **Table 12.**

Table 12: Water Quality Monitoring and Assessment Report (2014)

Assessment Unit Name	Assessment Unit ID	Aquatic Life – General	Recreation	Water Supply	Fish Consumption
Cooper River (below Rt 130)	02040202110060-01	Not Supporting	Not Supporting	Not Supporting	Not Supporting
Cooper River (Rt 130 to Wallworth gage)	02040202110050-01	Not Supporting	Not Supporting	Not Supporting	Not Supporting
Newton Creek (LDRV-Kaighn Ave to LT Ck)	02040202120090-01	Not Supporting	Not Supporting	Not Supporting	Not Supporting
Delaware River 3	Delaware River 16	Not Supporting	Fully Supporting	Not Supporting	Not Supporting

Source: NJDEP, 2015

If one or more designated uses are assessed as "Not Supporting," the pollutant(s) causing the non-supporting status is/are identified on the "303(d) List of Water Quality Limited Waters." **Table 13: New Jersey's 2014 303(d) List of Water Quality Limited Waters** shows the pollutants responsible for impairments in Camden's subwatersheds. When the pollutant causing non-supporting designation is not known, the pollutant is listed as "pollutant unknown."

Table 13: New Jersey's 2014 303(d) List of Water Quality Limited Waters

Assessment Unit Name	Assessment Unit ID	Parameter	Ranking	Source
Cooper River (below Rt 130)	02040202110060-01	Arsenic	Low	Natural Sources
		DDT and its metabolites in Fish Tissue	Low	Contaminated Sediments
		Escherichia coli	Medium	
		PCB in Fish Tissue	Low	Contaminated Sediments
		Tetrachloroethylene	Low	Landfill
		Trichloroethylene	Low	Landfill
Cooper River (Rt 130 to Wallworth gage)	02040202110050-01	Arsenic	Low	Natural Sources
		Chlordane in Fish Tissue	Low	Contaminated Sediments
		Escherichia coli	Medium	
		Lead	Low	Urban Runoff/Storm Sewers
		PCB in Fish Tissue	Low	Contaminated Sediments
		pH	Medium	Urban Runoff/Storm Sewers
		Tetrachloroethylene	Low	Landfill
		Trichloroethylene	Low	Landfill
Newton Creek (LDRV-Kaighn Ave to LT Ck)	02040202120090-01	Arsenic	Low	Industrial Point Source Discharge
		Chlordane in Fish Tissue	Low	Contaminated Sediments
		DDT and its metabolites in Fish Tissue	Low	Contaminated Sediments

		Escherichia coli	Medium	Combined Sewer Overflows; Urban Runoff/Storm Sewers
		PCB in Fish tissue	Low	Contaminated Sediments
		Phosphorus (Total)	Medium	
		DDT and its metabolites in Fish Tissue	Low	Contaminated Sediments
Delaware River 3	Delaware River 16	Mercury in Fish Tissue	Low	Atmospheric Deposition – Toxics; Industrial Point Source Discharge
		Temperature, water	Medium	
		Turbidity	Medium	

Source: NJDEP, 2015

In 2014, all of Camden's subwatersheds were identified on the 303(d) list. Some of the most common pollutants were arsenic, DDT, and PCBs. More information on these common pollutants can be found in the box on the following page.

Water Quality Monitoring Networks

Water quality analysis is based on data collected at water quality monitoring stations. The NJDEP oversees the operation of the primary water quality monitoring networks for the state. Monitoring strategies employed by the Department consist of multiple water quality assessment techniques, including habitat assessments, in-stream biological monitoring, collection of physical/chemical data, identifying pollution sources in the coastal and freshwater environment, and sediment toxicity testing.

Delaware River near Camden County Municipal Utilities Authority Facility *Source: DVRPC*

Common Pollutants

Arsenic is a toxic metalloid formerly used as a component in pesticides and for treating wood. In addition to industrial pollution, waterbodies can accumulate arsenic from natural sources, as some rocks have naturally high levels of the element. Ingesting or breathing arsenic can cause irritation of the lungs and "corns" or "warts" in the skin. High levels of arsenic exposure are fatal. Arsenic accumulates in the tissues of fish and shellfish, although mostly as a component of the less toxic organic compound arsenobetaine. Arsenic contamination primarily affects a waterbody's attainment level for use as drinking water.

DDT (dichloro-diphenyl-trichloroethane) was developed as a synthetic insecticide in the 1940s to combat insect-borne human diseases like malaria and typhus, and was also broadly used as a pesticide in farms, homes, and gardens. The EPA issued a cancellation order for DDT in 1972 as a result of its harmful effects to both humans and the environment. In addition to being classified as a probable human carcinogen, DDT is known to be very persistent in the environment, will accumulate in fatty tissues, and can travel long distances in the upper atmosphere. In an aquatic environment, DDT has a half-life of approximately 150 years. Additionally, DDT is highly toxic to aquatic animals and fish.

PCBs (Polychlorinated Biphenyls) are a group of man-made organic chemicals consisting of carbon, hydrogen, and chlorine atoms. PCBs were manufactured in the US from 1929 until 1979, when manufacturing was banned. PCBs were used in hundreds of industrial and commercial applications including plastics, oil-based paints, adhesives, electrical equipment like transformers and switches, and thermal insulation like fiberglass. PCBs exist for long periods of time in the environment and can travel great distances. They are easily absorbed into the leaves of plants and food crops, as can be easily ingested by fish and other small organisms. PCBs can pose serious health risks to people who consume a lot of contaminated fish. PCBs are especially risky for pregnant and nursing mothers, as the PCBs can be passed from the mother to the baby, leading to low birth weight and possible learning defects.

Fish Consumption Advisories

Certain fish may contain toxic chemicals, such as polychlorinated biphenyls (PCBs), dioxins, or mercury, which accumulate in water and aquatic life. Chemical contaminants, such as dioxin and PCBs, are classified by the EPA as probable cancer-causing substances in humans. Elevated levels of mercury can pose health risks to the human nervous system. The greatest bioaccumulation of mercury in fish is found in larger fish. Infants, children, pregnant women, nursing mothers, and women of childbearing age are considered to be at higher risk from contaminants in fish than other members of the general public. Since 1982, NJDEP has been catching fish at numerous sampling stations throughout the state and testing for contaminant levels and adopting advisories to guide residents on safe consumption practices. The consumption advisories for fish caught in general freshwater bodies in the state are listed in **Table 14: Fish Consumption Advisories**.

Table 14: Fish Consumption Advisories

Species	General Population Eat No More Than:	High Risk Population Eat No More Than:
General Freshwater Advisories		
Trout	One Meal per Week	One Meal per Week
Smallmouth Bass		
Chain Pickerel	No Restrictions	One Meal per Month
Yellow Bullhead		
Brown Bullhead		
Sunfish		One Meal per Week
Common Carp	One Meal per Month	Do Not Eat
Inland – Statewide Freshwater Advisories		
American Lobster	One Meal per Week	One Meal per Month
Chain Pickerel		
Smallmouth Bass		
Sunfish	No Restrictions	
Yellow Bullhead		
Brown Bullhead	No Restrictions	One Meal per Week
Common Carp	One Meal per Month	Do Not Eat
Statewide Estuarine and Marine Waters Advisory		
Striped Bass	One Meal per Month	Do Not Eat
Bluefish (greater than 6 lbs/24 inches)	Six Meals per Year	
Bluefish (less than 6 lbs/24 inches)	One Meal per Month	
American Eel	Four Meals per Year	
American Lobster	Do Not Eat the Green Gland	
Lower Delaware River – Tidal Section Advisories		
Largemouth Bass	One Meal per Month	Do Not Eat
Hybrid Striped Bass	No Restrictions	One Meal per Week
American Eel	One Meal per Year	Do Not Eat
Channel Catfish		
White Catfish	One Meal per Month	
Striped Bass	Four Meals per Year	
White Perch		
Cooper River Park Lake at Collingswood		
Largemouth Bass	One Meal per Month	Do Not Eat
Black Crappie	No Restrictions	One Meal per Week
Bluegill Sunfish	One Meal per Week	One Meal per Month
Brown Bullhead	One Meal per Month	Do Not Eat
Common Carp	Four Meals per Year	
Newton Lake at Collingswood		
Largemouth Bass	One Meal per Week	One Meal per Month
Black Crappie		
Bluegill Sunfish		
Brown Bullhead		
Common Carp	Four Meals per Year	Do Not Eat

Source: NJDEP, 2016

Potential Causes of Water Quality Impairments

Point Sources

Point sources of discharge, which come from a single source or "point," such as an industrial pipe discharge, are regulated by NJDEP through the New Jersey Pollution Discharge Elimination System (NJPDES). New Jersey created NJPDES in response to the Federal Clean Water Act of 1972, which mandated that each state develop water quality standards and regulate the amount of pollution entering waterbodies. The act classified all water pollution into one of two categories: point source pollution and nonpoint source pollution, which comes from many diffuse sources. Although the Federal Clean Water Act only required states to regulate point sources, New Jersey also regulates nonpoint sources through the authority of the NJPDES rules (see **Nonpoint Sources on page 37**).

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program (N.J.A.C. 7:14A). Under NJPDES, any facility discharging domestic or industrial wastewater directly into surface water or groundwater (usually through a subsurface disposal system) must apply for and obtain a permit for discharging. NJDEP enforces the terms of NJPDES permits by visiting discharging facilities and requiring facilities to periodically conduct water quality, biological and toxicological analyses, and thermal impact and cooling water assessments.

As of February 2016, 67 NJPDES permits for point source discharge were issued to facilities in Camden (including 28 5G3 permits for construction activities not shown). They are shown in **Table 15: NJPDES Permits for Point Source Discharges** and on **Map 7: Point Sources**. For additional information on specific facilities, please visit the **NJDEP Data Miner,** where you can search for sites by location, name, or ID number (all of which are listed in the table below).

Table 15: NJPDES Permits for Point Source Discharges

NJPDES Permit Number	PI Number	Facility Name	Facility Address	Effective Start Date	Expiration Date	Discharge Category Code
NJ0004090	46567	MAFCO Worldwide Corp	300 Jefferson St	04/01/16	03/31/21	B
NJ0026182	46168	Delaware #1 Water Pollution Control Facility	2nd & Jackson St	07/01/15	06/30/20	A
NJ0026182	46168	Delaware #1 Water Pollution Control Facility	2nd & Jackson St	07/01/15	06/30/20	CSM
NJ0063355	46169	Camden County Resource Recovery Facility	600 Morgan Blvd	09/01/16	01/31/21	RF
NJ0108812	47220	The City of Camden	City Hall 4th Floor	07/01/15	06/30/20	CSM
NJ0129917	49408	Georgia Pacific Gypsum LLC	1101 S Front St	08/01/16	07/31/21	RF
NJ0136441	52824	Camden Grancem Facility	595 Morgan Blvd	11/01/08	10/31/13	GW
NJ0136441	52824	Camden Grancem Facility	595 Morgan Blvd	11/01/08	10/31/13	RF
NJ0169285	447593	Riverfront Recycling & Aggregate LLC Camden	1301 N 26th St	08/01/16	07/31/21	RF

NJG0100722	46567	MAFCO Worldwide Corp	300 Jefferson St	07/01/16	06/30/21	EG
NJG0101524	46169	Camden County Resource Recovery Facility	600 Morgan Blvd	07/11/14	04/30/19	LSI
NJG0104485	47519	South Jersey Port Corporation	Beckett St	02/01/13	01/31/18	5G2
NJG0104574	47524	Broadway Terminal	Broadway And Morgan Blvd	02/01/13	01/31/18	5G2
NJG0106372	47616	Camden Iron & Metal Inc.	1500 S Sixth St	07/01/16	09/30/18	SM2
NJG0106381	47617	Eastern Metal Recycling Terminal - Camden	Front St & Atlantic Ave	02/01/05	01/31/10	SM
NJG0106534	47626	Camden Iron & Metal Inc.	Front & Pine St	07/01/16	09/30/18	SM2
NJG0117145	48381	Express Marine Inc.	2851 Adams Ave	02/01/13	01/31/18	5G2
NJG0119300	48561	F W Winter Inc. and Company	Delaware Avenue & Elm St	02/01/13	01/31/18	5G2
NJG0120090	46567	MAFCO Worldwide Corp	300 Jefferson St	02/01/13	01/31/18	5G2
NJG0141941	165302	R Fanelle & Sons Inc.	1466 Ferry Ave	10/01/13	09/30/18	SM2
NJG0141984	165243	Sims Metal Management Camden Facility	1900 Federal St	07/01/16	09/30/18	SM2
NJG0142824	191010	Camden Aggregate Depot	24th And Sherman Ave	02/01/13	01/31/18	5G2
NJG0144363	196337	Pyne Poynt Marine Services	N 7th St & Delaware River	02/01/13	01/31/18	5G2
NJG0145289	165392	Patrick J Kelly Drums Inc.	1810 River Rd	02/01/13	01/31/18	5G2
NJG0155233	227187	Jersey Core Supply Inc.	635 Jackson St	10/01/12	09/30/17	RVR
NJG0155799	231204	St Hill's Auto Parts	270 Atlantic Ave	10/01/13	09/30/18	SM2
NJG0158101	46168	Delaware #1 Water Pollution Control Facility	2nd & Jackson St	02/01/13	01/31/18	5G2
NJG0159697	253515	Magnetic Metals Corp	1900 Hayes Ave	02/01/13	01/31/18	5G2
NJG0159875	165293	Central Metals Inc.	1054 S 2nd St	02/01/13	01/31/18	5G2
NJG0161713	270453	Harris Camden Terminal Co	2201 Mt Ephraim Ave	02/01/13	01/31/18	5G2
NJG0163562	165324	Stech Trucking	961 Sylvan St	02/01/13	01/31/18	5G2
NJG0166596	293679	Camden Iron & Metal Inc. - Staging Facility	Front St & Atlantic Ave	10/01/06	01/31/10	SM
NJG0166651	294271	ABC Companies	1421 & 1521 Admiral Wilson Blvd	02/01/13	01/31/18	5G2
NJG0169871	455698	Coastal Product Salt	2500 Broadway	02/01/13	01/31/18	5G2

		Co Inc.	St			
NJG0198421	46168	Delaware #1 Water Pollution Control Facility	2nd & Jackson St	01/01/17	12/31/21	S4G
NJG0214892	604338	Ace Used Auto Parts	1999 Cooper St	10/01/13	09/30/17	RVR
NJG0242896	694345	Former Camden Coke Site- Blk-213 Lts-13&29	1101 South Front St	08/01/16	03/31/17	BGR

Source: NJDEP, 2017

Discharge Category Code	Discharge Category Description
A	Sanitary Wastewater: Issued to facilities that discharge primarily domestic sewage from residential and commercial properties.
B	Industrial Wastewater: Issued to facilities that discharge treated and non-treated wastewater derived from, but not limited to, process and non-process wastewater, contact and non-contact cooling water, and stormwater runoff.
BGR	General Remediation Clean-up General Permit:
CG	Gen Non-Contact Cooling Water: Authorizes the discharge of non-contact cooling water. Noncontact cooling water is used to cool down various types of industrial and manufacturing equipment without directly coming into contact with facility processes.
CSM	Combined Sewer Management
EG	Land Application Food Processing
GW	Discharge to Groundwater
L	Significant Indirect User: Some wastewater dischargers do not discharge their wastewater directly into a surface waterbody like a stream or river, and instead discharge into a sanitary sewer system/sewage treatment plant. These dischargers are known as "indirect users." The wastewater is treated at local agency's treatment plant and usually discharged into a river or stream.
LSI	Lined Surface Impoundment
RF	Stormwater
R7	Wood Recyclers (GP): Provides an alternative to an individual NJPDES stormwater permit for regulating wood recycling facility operators that are classified as Solid Waste Class B Wood Recyclers.
RVR	Vehicle Recycling
5G2	Basic Industrial Stormwater GP: Available to regulated industrial facilities that have eliminated or can eliminate within six months of authorization, all exposure of industrial materials or activities to stormwater discharges (rainfall and snowmelt waters). Exposure may be eliminated by covering the materials or activities or by moving materials or activities indoors.
S4G	Sludge Quality Category 4 (GP): Implement the provisions of the Sludge Quality Assurance Regulations for residual quality and quantity monitoring for Domestic Treatment Works and industrial and public water treatment systems with permitted flow > 5.0 million gallons per day (MGD).
S1G	Sludge Quality Category 1 (GP): Implement the provisions of the Sludge Quality Assurance

	Regulations for residual quality and quantity monitoring for Domestic Treatment Works and industrial and public water treatment systems with permitted flow between 0.02 and 0.099 MGD.
SM	Scrap Metal Processing/Auto Recycling GP
SM2	Scrap Metal Processing

Nonpoint Sources

Nonpoint sources of discharge, or stormwater runoff, have the largest effect on the water quality and channel health of streams in the City of Camden. According to the EPA, about half the pollution in New Jersey's surface water comes from nonpoint sources. Development dramatically increases nonpoint source pollution by increasing the volume of water and the level of pollutants in the runoff. Increased runoff causes erosion and sediment buildup in streams, carries nutrients from fertilizers, and washes toxins, bacterial contamination, road salt, motor oils, and litter into streams.

The sources of polluted stormwater runoff are the most difficult to identify and remediate because they are diffuse, widespread, and cumulative. Most nonpoint source pollution in Camden is generated by stormwater runoff from impervious surfaces such as streets and highways, parking lots, commercial/industrial areas, and residential sites (with and without detention basins). Additionally, the waterways in Camden are affected by stormwater runoff from within the city and from upstream municipalities.

NJDEP's Stormwater Management Rules focus on reducing and controlling nonpoint sources of water pollution. New Jersey regulates stormwater and nonpoint source pollution through the NJPDES, which requires all municipalities to obtain a permit for their stormwater collection systems (comprised of pipes, inlets, grates, outfall, etc.). The permit requires municipalities to implement Statewide Basic Requirements (SBRs) to address stormwater issues related to development, redevelopment, and existing development (see **callout on page 38**). Similar to municipalities across the state, Camden's permit was issued on March 1, 2009 and expired on February 28, 2014. Although the expiration date has already passed, NJDEP notes that the permits will remain in full force and effect until renewal permits are issued, meaning that the City of Camden is still bound to comply with the requirements of the 2009–2014 permits. NJDEP is in the process of drafting a renewal permit. A preliminary draft of the Renewal Tier A Municipal Stormwater General Permit can be found on the NJDEP Division of Water Quality website[7].

[7] www.nj.gov/dep/dwq/tier_a_draft.htm

Stormwater Management Statewide Basic Requirements

1. Control post-construction stormwater management in new development and redevelopment through:
    - Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.;
    - Adoption and implementation of a stormwater control ordinance in accordance with N.J.A.C. 7:8.
    - (This ordinance requires retention on site of 100 percent of preconstruction recharge, and use of
    - low-impact design in stormwater facilities, among other features.);
    - Ensuring compliance with Residential Site Improvement Standards for stormwater management.
    - (The RSIS has been revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.);
    - Ensuring long-term operation and maintenance of BMPs on municipal property; and
    - Requiring that new storm drain inlets meet new design standards.
2. Conduct local public education:
    - Distribute educational information (about stormwater requirements, nonpoint source pollution, and stewardship) annually to residents and businesses and conduct a yearly "event" (such as a booth with these messages at a community day).
    - Have all municipal storm drain inlets labeled with some type of "don't dump" message.
    - Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives and regarding proper identification, handling, and disposal of wastes, including pet waste and litter.
    - Adopt specific ordinances to control waste disposal and other nonpoint sources.
    - Control improper disposal of waste through improved yard waste collection and through adoption of ordinances (pet waste, litter, improper dumping, and wildlife feeding).
3. Control solids and floatables through increased street sweeping, retrofitting storm drain inlets during road repairs, and instituting programs for stormwater facility management, for roadside erosion control, and for outfall pipe scouring/erosion.
4. Improve maintenance yard operations, specifically for de-icing material storage, fueling operations, vehicle maintenance, and housekeeping operations.
5. Increase employee training for all of the above.

In addition to the NJPDES rules for stormwater facilities, New Jersey's Stormwater Management rules (N.J.A.C. 7:8) require municipalities to prepare and adopt stormwater management plans that include stormwater management design and performance standards for new (proposed) development. The City of Camden adopted its Municipal Stormwater Management Plan[8] in November 2010 to document the city's strategy for addressing stormwater related impacts. In accordance with N.J.A.C.7:8, the plan addresses groundwater recharge, stormwater quantity, and stormwater quality by incorporating stormwater design and

[8] http://www.ci.camden.nj.us/wp-content/uploads/2013/04/zoning_code.pdf

performance standards into new major development. It also describes long-term operation and maintenance measures for existing and future stormwater facilities.

Combined Sewer Overflows

While the City of Camden has a NJPDES permit for stormwater, the city is different than most communities in New Jersey in that it relies primarily on a Combined Sewer Overflow (CSO) system (see **Figure 6** for an illustration of Camden's CSO catchment area). In a CSO system, stormwater flows off streets, parking lots, and buildings and into the same pipes that carry sewage and industrial wastes (wastewater) to a wastewater treatment plant. All of this water is then cleaned and processed by the treatment plant. CSO systems are found in many older urban areas in New Jersey, like Camden. They are an effective method to manage wastewater and stormwater during relatively dry periods. However, during downpours or heavy rain events, treatment plants are unable to process the large amounts of stormwater suddenly entering the system. When this occurs, the combined stormwater and wastewater in the system's pipes "overflow" into local rivers and streams. The system is designed to do this so that the treatment plant does not flood or become otherwise overwhelmed.

In Camden, storms that drop an inch or more of rain (which happens 10 to 20 times a year on average), regularly cause the CSO system to overflow via outfalls into the Cooper and Delaware Rivers. Making matters worse, back-ups, leaks, and pressure differentials in the system cause sewage to overflow into the basements of homes as well as into streets and parks (by flowing up and out of inlets that stormwater is supposed to flow into). Such overflows are serious and imminent human health problems and a major nuisance for city residents.

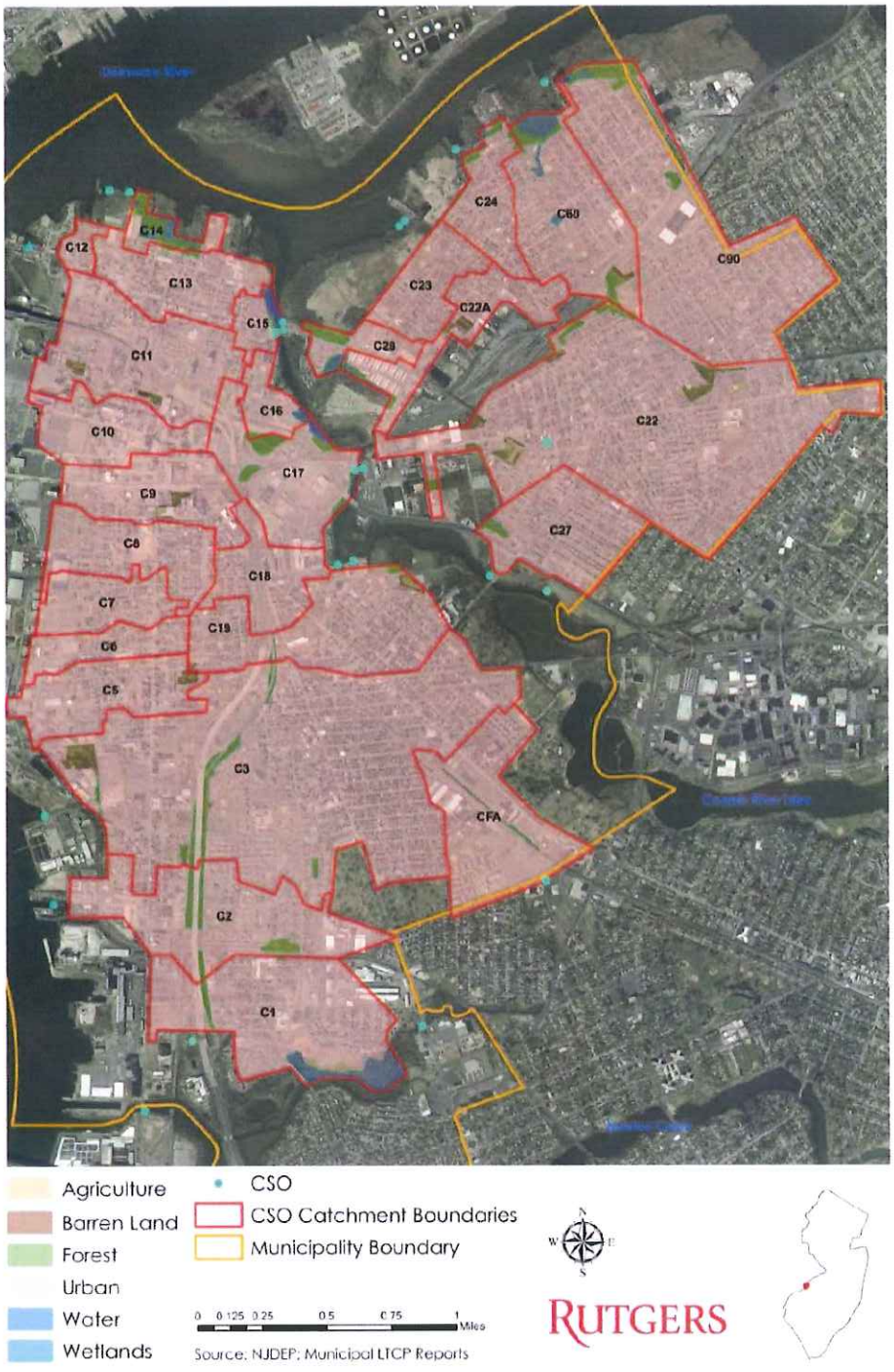
The CSO problem in both the City of Camden and in other communities across the state has been well understood for some time. However, since it involves modifying large underground infrastructure systems that were installed mostly over 100 years ago, solving the problem is neither quick nor easy. As a result of actions taken by the U.S. EPA and NJDEP, a process has been put in place to begin addressing Camden's CSO challenges. The City of Camden and the Camden County Municipal Utilities Authority (CCMUA) were issued CSO permits in March, 2015 which became effective on July 1, 2015. According to NJDEP, "the goal of the CSO permits is to meet the requirements of the Clean Water Act and the National CSO Policy by reducing or eliminating the remaining CSO outfalls in New Jersey. In order to achieve the reduction or elimination of outfalls, CSO permittees [including the City of Camden] will need to reduce flooding, ensure proper operation, maintenance, and management of existing infrastructure, and provide opportunities for green infrastructure. These permits reinforce the importance of properly operated and maintained water infrastructure systems in protecting public health and the environment and supporting economic redevelopment. A major emphasis of the permit process is the development of regional strategies to reduce the amount of stormwater that flows into combined sewer systems, through the development and implementation of a "Long Term Control Plan."[9]

Strategies for correcting combined sewer overflows include the following three primary approaches: 1) separating the stormsewer and wasterwater pipes; 2) installing large underground tanks and basins to hold and store combined wasterwater during storm events so that it can be treated gradually after the storm abates; and 3) utilizing green stormwater infrastructure techniques to absorb stormwater into the ground thereby diverting it from the CSO system entirely. While all three approaches can be effective independently or in combination, they are expensive. The EPA estimates that it will cost $10 billion to fix the CSO problem statewide. The purpose of the "Long Term Control Plan" mentioned above is to determine which strategies to implement and how to use them collectively to correct the problem while bringing the whole stormwater and wastewater system into a state of good repair. The City of Camden's and the CCMUA's Long Term Control

[9] http://www.nj.gov/dep/dwq/cso-longtermplans.htm

Plan is required to be completed and submitted to NJDEP by June 2020. NJDEP has pledged to assist permittees in meeting their permit obligations by providing technical assistance, guidance, and training.

Figure 6: CSO Catchment Areas, CCMUA & Camden City, New Jersey



Source: Daniel J. Van Abs, Water Infrastructure in New Jersey's CSO Cities

Current Camden Green Stormwater Initiatives

Recognizing the seriousness of its sewer overflow and stormwater problems, the City and the CCMUA undertook projects to address the problem well prior to the issuance of its CSO permit from NJDEP in 2015. Primary among these has been the implementation of Green Stormwater Infrastructure (GSI) through the Camden SMART (Stormwater Management and Resource Training) initiative. This project, which consists of numerous partners, including the CCMUA, the Rutgers Cooperative Extension Water Resources Program, the New Jersey Tree Foundation (NJTF), Cooper's Ferry Partnership (CFP), and NJDEP, aims to develop a comprehensive network of green infrastructure programs and projects for the City of Camden. Camden SMART members chose to focus on GSI because it not only addresses stormwater problems, but also creates important co-benefits such as improving air, water and climate quality; increasing property values; providing economic development opportunities; adding recreational amenities and open space; and beautifying neighborhoods.

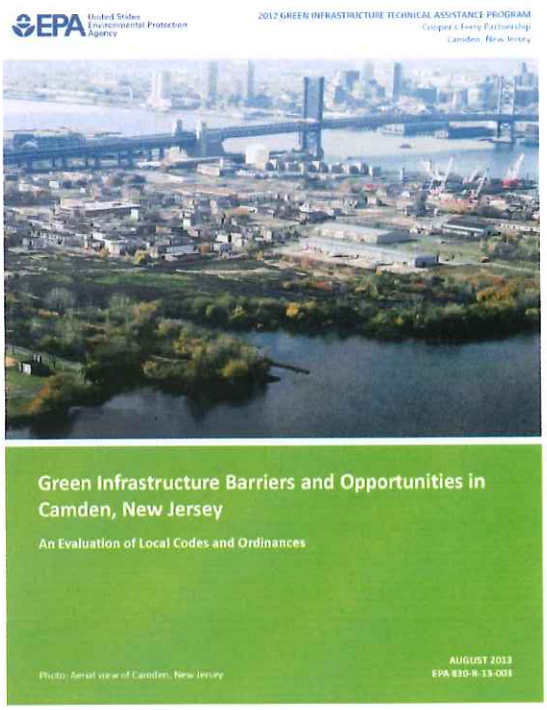
Over the last six years, the Camden SMART Initiative has completed more than 50 green stormwater infrastructure projects throughout the city. Combined, the projects capture and infiltrate more than 60 million gallons of stormwater per year[10]. And while this is impressive, to put it into perspective, a single heavy rain event can deluge the city with 50 million gallons of excess water. So even though a tremendous amount of work has been completed, it is only the tip of the iceberg in terms of the on-going effort to fully resolve the city's CSO issues.

Camden SMART Rain Garden *Source: Camden SMART*

[10] Cooper's Ferry Partnership. *Camden Rising: 2016 Annual Report.* Camden, NJ. http://www.coopersferry.com/files/reports/CFP_2016AnnualReport_FINAL[1].pdf.

Camden's 2010 update of its Land Development Code[11] included provisions to drive the creation of green infrastructure. §577-299 Stormwater Collection and Management-Sanitary/Combined Sewer details standards that stormwater management and collection facilities must follow, including standards for grass swales, detention basins, and retention systems. §577-299 also contains the city's stormwater control ordinance, which establishes minimum stormwater management requirements and controls for major development projects.

Figure 7: Green Infrastructure Barriers and Opportunities in Camden, New Jersey



In August 2013, the EPA, in conjunction with Cooper's Ferry Partnership (CFP), published *Green Infrastructure Barriers and Opportunities in Camden, New Jersey: An Evaluation of Local Codes and Ordinances*.[12] This report, which was the result of a technical assistance grant that CFP received from the EPA, reviews Camden's codes, identifies code barriers to green infrastructure, and recommends actions that the city and its partners could take to develop a network of green infrastructure and improve water quality throughout the city. It suggests a few additional improvements to the Land Development Code, including revising §577-299 to require a Stormwater Observation Report be submitted prior to the issuance of the Certificate of Occupancy, especially on complex projects. This change, which would clarify existing stormwater inspection requirements, is noted as a high priority. Additionally, the *Green Infrastructure Barriers and Opportunities in Camden, New Jersey* notes that while the 2010 LDO includes provisions for stream buffers, the language of the ordinance may lead to confusion. The updated 2010 LDO eliminated the Stream and River Corridor Protection and Management Overlay Zone section; however references to the overlay zone still appear throughout the LDO. The *Green Infrastructure Barriers and Opportunities in Camden, New Jersey* recommends that the City revise its stormwater control ordinance included as part of the 2010 LDO to ensure consistent nomenclature throughout.[13]

As part of the same grant, the EPA, in conjunction with CFP, also published the *City of Camden Green Infrastructure Design Handbook*.[14] This handbook provides examples of how various green stormwater infrastructure practices can be implemented in Camden.

The City of Camden, working with a number of partners including Cooper's Ferry Partnership, CCMUA, NJDEP, USEPA, and neighborhood organizations like the Cramer Hill CDC, recently completed a number of large scale GSI projects.

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[11] City of Camden. *Land Development Ordinance of the City of Camden.* (Approved by City Council 2011): http://www.ci.camden.nj.us/wp-content/uploads/2013/04/zoning_code.pdf.
[12] USEPA, *Green Infrastructure Barriers and Opportunities in Camden, New Jersey: An Evaluation of Local Codes and Ordinances.* (August 2013): https://www.epa.gov/sites/production/files/2015-10/documents/camden_gi_evaluation.pdf.
[13] Ibid.
[14] USEPA, *City of Camden Green Infrastructure Design Handbook: Integrating Stormwater Management into Sustainable Urban Design.* (August 2013): https://www.epa.gov/sites/production/files/2015-10/documents/camden_gi_handbook.pdf.

Von Nieda Park

Named for a former Camden Mayor, Von Nieda Park is one of the city's largest greenspaces. Located in the center of Camden's Cramer Hill neighborhood, the park and surrounding neighborhoods have experienced significant, reoccurring flooding due in part to the city's CSO problems as well as the park's low-lying topography. In 2014, the City of Camden, CFP, CCMUA, Camden County, and the Cramer Hill CDC began work on phase one of the Von Nieda Park Stormwater Management and Park Improvement Project. Funded by the EPA, NJDEP Green Acres and Recreational Trails Programs, New Jersey Environmental Infrastructure Trust, Neighborhood Revitalization Tax Credit Program, and New Jersey American Water, the project separated and upgraded both storm and sewer pipe infrastructure in and around the park. Work also included relocating and constructing new baseball fields, creating a 134,376 square foot detention basin, daylighting the historic Baldwin's Run streambed, constructing a 192 foot long boardwalk, and restoring wetlands and other natural habitats.

Von Nieda Park *Source: DVRPC*

Phoenix Park

Located on the site of an abandoned industrial property, Phoenix Park is now five acres of riverfront greenspace in Camden's Waterfront South neighborhood. Using Federal, State, and County funding, the CCMUA purchased the property, remediated the site, and constructed a new park that provides residents that had been cut off from the waterfront with highly desired access to greenspace and the Delaware River. The

park, which features a walking trail and native meadows, is expected to manage over 5 million gallons of stormwater annually.[15]

Phoenix Park *Source: DVRPC*

Impervious Coverage

The volume of stormwater runoff that is carried to a stream impacts stream channel condition. Increased volume usually results from increased impervious surface within a subwatershed. In general, scientists have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to increased stormwater runoff, enlargement of stream channels, increased stream bank erosion, lower dry weather flows, higher stream temperatures, lower water quality, and declines in aquatic wildlife diversity. When impervious cover reaches 25 percent to 30 percent within a subwatershed, streams can become

[15] Delaware Valley Green Building Council. *Exceeding Intent: A Precedent Library of Examples of Green Stormwater Infrastructure Projects.*(December 2016): https://dvgbc.org/sites/default/files/images/policyflipbook/index.html?page=8.

severely degraded. Not surprisingly, due to its developed nature, impervious cover is a major issue in Camden. All three of Camden's subwatersheds exceed the 10 percent threshold for impairment. See **Table 16: Acreage of Impervious Surface** and **Map 10: Impervious Surfaces**.

Table 16: Acreage of Impervious Surface

HUC14	Subwatershed Name	Total Acres in Subwatershed	Acres of Impervious Surface	Percent Impervious Surface
204020211060	Cooper River (below Route 130)	4,570.45	886.36	19.4%
204020211050	Cooper River (Route 130 to Wallworth gage)	7,882.11	958.90	12.2%
204020212090	Newton Creek (LDRV-Kaighn Ave to LT Creek)	8,687.84	1,022.00	11.8%

Source: NJDEP, 2012

Maintained Vacant Lot in North Camden *Source: DVRPC*

DRINKING WATER SUPPLY

The City of Camden receives its drinking water from three water-supply systems: American Water, Merchantville Pennsauken Water, and New Jersey American Water – Western Division. Starting on February 1, 2016, the City contracted with American Water to provide water service to residents previously served by the City of Camden. Approximately two-thirds of Camden residents receive their water from American Water, which obtains its water from 19 wells that draw from the lower Potomac-Raritan-Magothy Aquifer. One-third of Camden residents receive their water from New Jersey American Water – Western Division, which obtains their water from 71 wells that draw from the Potamac-Raritan-Magothy, Mount Laurel-Wenonah, and Englishtown Aquifers, as well as one surface water intake along the Delaware River. Merchantville Pennsauken Water primarily uses water purchased from New Jersey American Water.

As required by state and federal regulations, the drinking water quality of all utilities is regularly monitored for a variety of chemical and biological parameters. Monitored chemical contaminants include inorganics; radionuclides; and synthetic organic chemicals, including volatile organic chemicals, pesticides, herbicides, and disinfection by-products. Biological contaminants that are monitored include coliform and Legionella bacteria, as well as parasites such as Giardia and Cryptosporidium. Other factors tested include turbidity (or cloudiness). Lead and copper are also tested at a sample number of household taps. Drinking water utilities are required to notify their customers if the levels of any monitored chemicals exceed the regulated standards.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was passed by the U.S. Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Act was amended in 1986 and 1996 to increase protections, monitoring requirements, enforcement, and reporting standards. Private drinking water wells, however, are exempt from the Act. The SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. In New Jersey, NJDEP assumes responsibility for enforcing the SDWA. The SDWA requires public water suppliers to provide their customers with an annual Consumer Confidence Report. The report provides information on the source of the water supply, the level of any regulated contaminants detected in the water, the health effects of contaminants detected above federal health-based standards, and the water system's compliance with other drinking water regulations.

Drinking water supplies are rated for their susceptibility to contamination by different parameters. This rating reflects the potential for contamination, not the existence of contamination. Like all surface water sources in the state, the New Jersey American Water Company is highly susceptible to contamination by pathogens, nutrients, inorganics, and disinfection by-product precursors. The New Jersey American Water Company surface water sources also have medium susceptibility to pesticide contamination and volatile organic compounds. As noted above, the New Jersey American Water Company and American Water primarily draw their water from wells, which vary greatly in their susceptibility to the contaminants listed above.

NATURAL VEGETATION

Land classified as natural vegetation includes those areas where plants exist spontaneously without regular management or maintenance. Natural vegetation types in New Jersey fall into three broad categories: wetlands, upland forests, and grasslands. NJDEP's 2012 land cover analysis tabulated and mapped Camden's natural vegetation types. This analysis, based on infrared aerial photography, is the most recent available. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the United State Geological Survey.

Not surprisingly, as a built-up urban community, very little of Camden's land area is covered by natural vegetation. A total of 480 acres, or slightly less than seven percent, of Camden is covered by natural vegetation. The largest types are deciduous bursh/shrubland and deciduous wooded wetlands, covering approximately 89 and 88 acres, respectively. The largest areas of natural vegetation in Camden can be found along the banks of the Cooper and Delaware Rivers. See **Table 17: Natural Vegetation** and **Map 11: Natural Vegetation** for additional details on Camden's natural vegetation.

Table 17: Natural Vegetation

Type of Vegetation	Acres	Percentage of Total Land Area
Deciduous Scrub/Shrub Wetlands	21.41	0.3%
Deciduous Wooded Wetlands	88.50	1.3%
Disturbed Wetlands (Modified)	8.30	0.1%
Freshwater Tidal Marshes	47.70	0.7%
Herbaceous Wetlands	3.24	0.0%
Managed Wetland In Built-Up Maintained Rec Area	2.87	0.0%
Managed Wetland In Maintained Lawn Greenspace	7.43	0.1%
Phragmites Dominate Coastal Wetlands	15.53	0.2%
Phragmites Dominate Interior Wetlands	26.84	0.4%
Coniferous Brush/Shrubland	2.83	0.0%
Deciduous Brush/Shrubland	88.94	1.3%
Deciduous Forest (>50% Crown Closure)	73.29	1.1%
Deciduous Forest (10-50% Crown Closure)	36.76	0.5%
Mixed Deciduous/Coniferous Brush/Shrubland	2.81	0.0%
Old Field (< 25% Brush Covered)	26.14	0.4%
Phragmites Dominate Old Field	27.74	0.4%
TOTAL NATURAL VEGETATION	**480.35**	**7.2%**
All Other Land Cover *(Urban, Water, Barren Land, and Agricultural)*	6,217.34	92.8%
TOTAL	**6,697.69**	**100.0%**

Source: NJDEP, 2012

Landscape Project

Started in 1994 by the New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program, the Landscape Project was created to protect biological diversity by maintaining and enhancing habitat that supports imperiled wildlife species in New Jersey. The Landscape Project identifies species-specific habitat in the state based on a combination of two factors: (1) land use/land cover patches specific for each species, and (2) species occurrence records from the Biotics database. The resulting species-specific habitat patches are classified according to a scale of five ranks based on the status of each species as follows:

- Rank 5: Assigned to species-specific habitat patches containing one or more occurrences of wildlife listed as endangered and threatened pursuant to the Federal Endangered Species Act of 1973.
- Rank 4: Assigned to species-specific habitat patches with one or more occurrences of state endangered species.
- Rank 3: Assigned to species-specific patches containing one or more occurrences of state threatened species.
- Rank 2: Assigned to species-specific habitat patches containing one or more occurrences of species considered to be species of special concern.
- Rank 1: Assigned to species-specific habitat patches that meet habitat-specific suitability requirements such as minimum size or core area criteria for endangered, threatened, or special concern wildlife species, but that do not intersect with any confirmed occurrences of such species.

Map 12: Landscape Project Priority Habitat illustrates the Landscape Project habitats identified in the City of Camden. Within Camden, important habitats for rare species are predominantly located within and along the banks of the Delaware River, Cooper River, and Newton Creek. More specifically, areas

Threatened and Endangered Wildlife Species

The Bald Eagle (Haliaeetus leucocephalus) is a member of the Accipitride family and can be found throughout North America. The bald eagle generally nests in areas with concentrations of old-growth and mature trees near large bodies of water. In the 1970s, New Jersey's bald eagle population had been reduced to one nest pair; however, with the ban of DDT and NJDEP's other restoration efforts, the population of bald eagles in New Jersey rebounded. In 2014, 146 active pairs of bald eagles were recorded.

The Peregrine Falcon (Falco peregrinus) is both the largest falcon in New Jersey and the world's fastest bird, attaining speeds of up to 200 miles per hour during dives. Historically, peregrine falcons nested on the cliffs and rock outcroppings of the Palisades and the Delaware River. As humans began to inhabit these spaces, peregrines started to nest on manmade structures like buildings and bridges. Today peregrine falcon nests can be found on buildings in cities along the Atlantic Coast and on bridges spanning the Delaware and Hudson rivers.

The Shortnose Sturgeon is a diadramous fish, which means that it migrates between fresh and saltwater. As such, tidal rivers like the Delaware River, serve a prime habitat for these fish. Most Delaware River Shortnose sturgeon overwinter and spawn in the upper tidal portion of the river and travel downstream towards Camden in the late Spring. The shortnose sturgeon has been on the list of federally endangered species since the Endangered Species Act was created in 1973. Overfishing and water pollution were serious threats to the sturgeon and contributed to its decline in the early 20th century. Today, river dredging and pollution continue to threated sturgeon populations.

identified as Rank 5 species habitats are located along the Cooper River and along the Delaware River back channel on Camden's northern border. Three endangered species (the bald eagle, peregrine falcon, and shortnose sturgeon), two state threatened species (the bald eagle and the tidewater mucket), and one species of special concern (the great blue heron) are found in Camden. See **Table 18: Rare Wildlife Species**.

It is important to preserve all ranks of habitat, whether or not species are actively present, in order to maintain and improve the diversity of species that exist in the city and to improve the likelihood of survival for endangered and threatened species across the state and beyond.

Baldwin's Run in Cramer Hill *Source: DVRPC*

Table 18: Rare Wildlife Species

Common Name	Scientific Name	Rank	Federal Status	State Status	State Rank	Sighting
Bald Eagle	Haliaeetus leucocephalus	4	Delisted due to Recovery	State Endangered	S1B, S2N	Foraging; Nest
Bald Eagle	Haliaeetus leucocephalus	3	Delisted due to Recovery	State Threatened	S1B, S2N	Wintering
Great Blue Heron	Ardea herodias	2	Not Listed	Special Concern	S3B, S4N	Foraging
Peregrine Falcon	Falco peregrinus	4	Not Listed	State Endangered	S1B, S3N	Urban Nest

Shortnose Sturgeon	Acipenser brevirostrum	5	Federally Listed Endangered	State Endangered	S1	Migration Corridor–Adult Sighting; Summering Area–Adult Sighting
Tidewater Mucket	Leptodea ochracea	3	Not Listed	State Threatened	S2	Occupied Habitat

Source: NJDEP, 2016

State Rank	
S1	Critically imperiled in New Jersey (>5 occurrences)
S2	Imperiled in New Jersey (6-20 occurrences)
S3	Rare in state (21-100 occurrences)
S4	Apparently secure in state
S5	Demonstrably secure in state
B	Refers to the breeding population of the element in state
N	Refers to the nonbreeding population of the element in state
NA	Data not available

Peregrine Falcon
Source: Flickr User Ron Knight

Great Blue Heron
Source: Flickr User Kenneth Cole Schneider

Rare Plant Species

In addition to maintaining data on the rare, threatened, and endangered animal species listed above, the New Jersey Natural Heritage Database also compiles information on rare and endangered plant species and natural communities. According to the database, one rare terrestrial plant community and two rare plant species have been observed in Camden City. As seen below in **Table 19: Rare Plant Species and Ecological Communities**, the two plant species were last observed in 2009.

Table 19: Rare Plant Species and Ecological Communities

Common Name	Scientific Name	State Rank	Last Observed	Location
Freshwater Tidal Marsh Complex	Freshwater tidal marsh complex	S3?	11/10/1999	Tidal mudflats in cove off Delaware River immediately northeast of Petty Island.
Estuary Burr-marigold	Bidens bidentoides	S2	07/13/2009	Located on the south side of Petty Island, 0.3 miles north-northeast of Pyne Poynt Park, 0.8 mile north-northwest of East State Street and Harrison Avenue.
American Waterwort	Elatine Americana	S2	07/13/2009	

Source: NJDEP, 2016

PARKS AND TRAILS

The City of Camden has a variety of parks and recreation facilities, ranging from sports fields and playgrounds to multi-use trails, all of which offer important opportunities for Camden residents to engage in outdoor recreation and interact with the natural world. Some of Camden's larger parks are highlighted below. See **Map 13: Trails and Parks** for additional information on the location of these amenities.

Pyne Poynt Park

Located along the Delaware River in North Camden, this recently renovated 15-acre park features baseball fields, soccer fields, basketball courts, and playground equipment. The renovations, which were completed in 2014 and funded by the Camden County Open Space Trust Fund, the NJDEP Green Acres Program, the Wells Fargo Regional Foundation, and the William Penn Foundation, helped to create a new home for the increasingly popular North Camden Little League as well as new play spaces for the neighboring Pyne Poynt Middle School.

Pyne Poynt Park *Source: DVRPC*

Farnham Park

Located along the Cooper River in Camden's Parkside neighborhood, Farnham Park is the largest park in the City of Camden. This 71-acre park, originally named Forest Hill Park, was renamed Farnham Park in 1927 after Levi Farnham, a longtime Camden resident who served as the City Engineer for 30 years. Farnham Park has recently undergone significant renovations, including implementing a number of stormwater management improvements, creating connections to the Camden Greenway, and updating the spray pool and recreational equipment. The $1 million revitalization project was funded by the EPA, the NJDEP Green

Acres Program, NJDEP Recreational Trails Program, the Camden County Open Space Trust, and the Trust for Public Land.

Farnham Park *Source: Cooper's Ferry Partnership*

Liney Ditch Park

Liney Ditch Park is located in Camden's Waterfront South neighborhood, adjacent to the Camden County Municipal Utilities Authority (CCMUA)'s wastewater treatment plant. Liney Ditch Park serves as an important green space in a neighborhood that is home to the Port of Camden, a major freeway, and numerous active industrial facilities. Many organizations, including the New Jersey Tree Foundation, the Center for Environmental Transformation (CFET), Heart of Camden, the CCMUA, TD Bank, and the City of Camden, have helped to reinvigorate Liney Ditch Park in recent years. In 2013, over 90 volunteers planted 117 new trees in the park to help absorb odors, manage stormwater, improve air quality, provide wildlife habitat, and beautify the park. Today, Liney Ditch Park features open green space, playground equipment, and basketball courts. It is also home to one of CFET's urban farms.

Liney Ditch Park *Source: DVRPC*

Other neighborhood parks include Whitman Park, Judge Robert Johnson Park, Staley Park, Elijah Perry Park, Reverend Evers Park, Point Street Park, Stockton Station Park, New Camden Park, and Dudley Grange Park. These parks offer residents a number of active and passive recreational amenities including baseball and soccer fields, basketball and tennis courts, playground equipment, pools, splash pads, and walking paths. In April 2017, Camden County announced that it planned to spend up to $5 million to renovate three Camden parks—Whitman Park, Reverend Evers Park, and Alberta Woods—and develop a new park in the Lanning Square neighborhood.[16] The county, which will assume management of the land, will host a number of community meetings to learn more about what improvements residents would like to see.

Cramer Hill Nature Preserve

The future home of the Cramer Hill Nature Preserve sits in the northwestern corner of Camden, across the Delaware River back channel from Petty Island. Once the site of a CCMUA sewage treatment plant, this 30 acre lot has sat vacant since 1990 when the facility was demolished. Since then, the site has often been used for illegal dumping. Moving forward, the site, which is still owned by the CCMUA, will be protected by a conservation easement. In addition to restoring and preserving the natural resources, CCMUA will construct a walking path and install lighting, signage, and security cameras. The work is financed by a zero interest loan from the New Jersey Environmental Infrastructure Trust. Expected to open in 2017, the nature preserve will provide Camden residents with much needed access to green space and the river.

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[16] Allison Steele, "Building Better Parks for Camden's Kids: Big Changes are Coming to Four Camden Parks," *Philly.com,* April 21, 2017: http://www.philly.com/philly/news/new_jersey/camden/Camden-parks-county-youth-sports-million.html?mc_cid=591f373f45&mc_eid=c8b6b83a6e.

The Camden GreenWay

The Camden GreenWay is a network of existing and proposed off-road trails, bike lanes, high-quality sidewalks, and wayfinding signs that provides residents and visitors with opportunities to walk and bike throughout Camden. The Camden GreenWay connects Camden residents to other trails in the South Jersey suburbs throughout the Greater Philadelphia region, including the Cooper River Park Trail and the Circuit Trails—Greater Philadelphia's 800-mile network of existing and proposed multi-use trails. Recent additions to the Camden GreenWay include the Merchantville Bike Path connecting Stockton Station Park to Dudley Grange Park, and the construction of buffered bike lanes on Jersey Joe Wolcott Boulevard.

In 2016, Camden City released the Camden Circuit Trails Plan as an update to the 2010 GreenWay Trail Location Study. The Camden Circuit Trails Plan, which was supported by the New Jersey Department of Transportation's Office of Bicycle and Pedestrian Programs Local Technical Assistance Program, illustrates the existing and planned trails in Camden and identifies connections between the Camden GreenWay and the Circuit Trails. See **Appendix A: Circuit Trails Plan** for additional details.

Neighboring Parks

Petty Island

Petty Island, also referred to as Petty's Island, is located in the Delaware River, in neighboring Pennsauken Township. Named after one of the island's past owners—Philadelphia merchant John Petty—Petty Island has gone by many names throughout its history, including Aequikenaska, Shackamaxon Island, Fairman's Island, and Treaty Island.

Petty Island has also experienced many different uses, from agricultural uses like fishing and farming in the 17th and 18th centuries to manufacturing uses like shipbuilding and lumber processing in the 19th century. More recently, in the 20th century, industrial uses, specifically oil refining and storage, dominated the island. In the 1930s, Cities Service (later rebranded as Citgo) stored approximately 100 million gallons of oil on the island. In the 1980s, Crowley Maritime Corporation, which leased a portion of Petty Island from Citgo, constructed and operated a marine terminal on the island's western shore.

Citgo continued to use Petty Island for its oil operations until the beginning of the 21st century. Around that time, two Citgo employees discovered a pair of bald eagles nesting on the island (see **Appendix B: 2010 Petty's Island Plant and Animal Inventory** for additional information regarding species found on Petty Island). A battle over the future of Petty Island ensued, with Citgo and environmental activists advocating for the preservation the island's environmental resources and Pennsauken Township, the New Jersey Governor, and developers pushing for redevelopment. After a number of setbacks for the developer, including the recession of 2008, the State of New Jersey, through the Natural Lands Trust, accepted Citgo's offer of a conservation easement for Petty Island. As part of the easement, Citgo agreed to remove all structures associated with its petroleum operations and clean up any contamination on the island. Additionally, Citgo committed $3 million to help the Natural Lands Trust manage the stewardship of the island and establish a cultural and education center.[17] [18]

Today, the 392 acre island sits largely vacant, except for the Crowley Maritime terminal, which will cease operations by the end of 2017. The state will take ownership in 2020. In the meantime, Natural Lands Trust is working with stakeholders to develop a long-term vision for the restoration of Petty Island. They've

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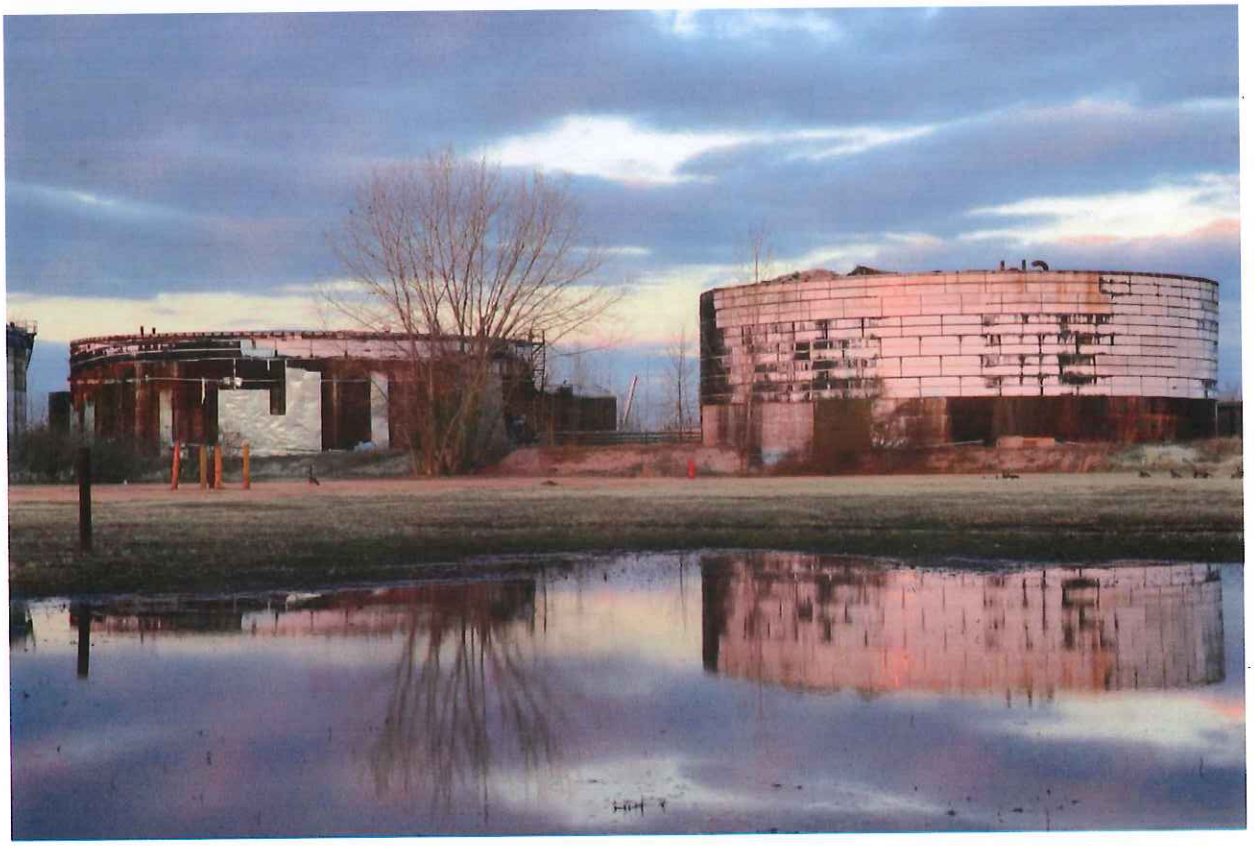
[17] Robert A. Shinn, "Petty Island," *The Encyclopedia of Greater Philadelphia,* 2016. http://philadelphiaencyclopedia.org/archive/petty-island/#20618

[18] Robert Shinn, *Petty's Island—Timeline of its History,* New Jersey Natural Lands Trust, http://www.njaudubon.org/Portals/10/Centers/PettysIsland/PDF/RevisedTimeline_complete.pdf.

contracted with the New Jersey Audubon Society to provide educational programming and stewardship on the island. Limited public access is currently available through scheduled programs like the Petty's Island History Hike and Shoreline Clean Up Days; however once the state assumes ownership, Petty Island will be open to all as a wildlife preserve.[19]



Petty Island *Source: Natural Lands Trust*

Cooper River Park

Located on either side of the Cooper River, Cooper River Park is a 346 acre linear park that spans five municipalities in Camden County—Pennsauken, Cherry Hill, Collingswood, and Haddon Townships. Named a "Great Public Space" by the American Planning Association's New Jersey Chapter in 2013, Cooper River Park was developed by the county between 1925 and 1940. Today the park is home to many recreational amenities including playgrounds, softball fields, trails, volleyball courts, fishing, picnic areas, and pavilions. It also features the Camden County Boathouse, which is home to many local rowing clubs and the Cooper River Yacht Club, which offers sailing classes to both children and adults during the summer. In addition, the City of Camden is actively working to close gaps in its Camden Greenway Trail, which would provide a seamless off-road trail connection from downtown Camden to Cooper River Park.

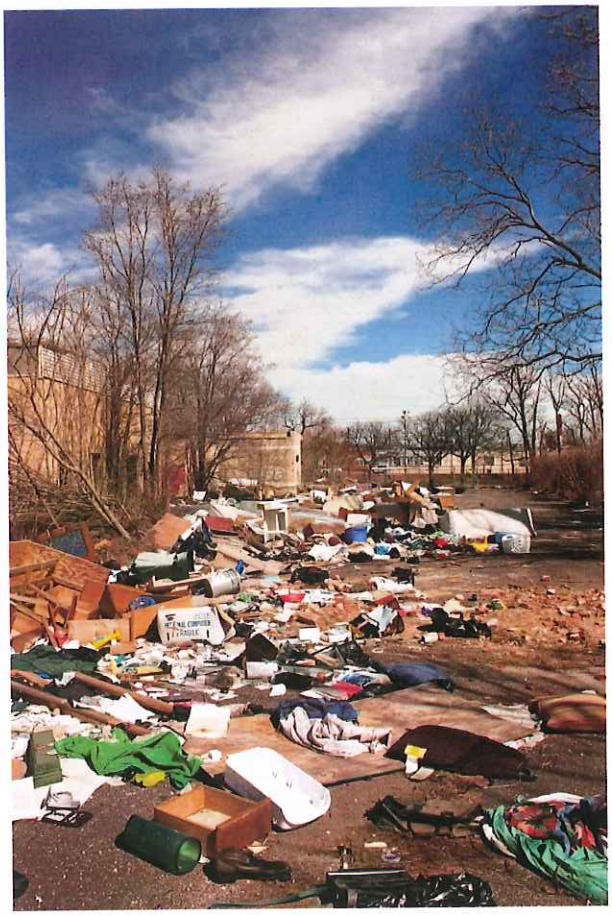
[19] New Jersey Natural Lands Trust. "Petty's Island Preserve." (Accessed April 2017): http://nj.gov/dep/njnlt/pettysisland.htm.

CONTAMINATED SITES, POLLUTION, ILLEGAL DUMPING AND ENVIRONMENTAL JUSTICE

As a former and current industrial and manufacturing hub, Camden has a legacy of contaminated sites that poses many challenges for the city and its residents. Additionally, over the past half century or more Camden has been targeted as a dumping ground for both legal and illegal toxic substances and dirty waste. The past and current activities related to these sites can lead to significant environmental and health problems by damaging air quality, polluting soils, and contaminating groundwater and surface water. People that come in contact with toxic materials from contaminated sites—whether it's through breathing polluted air, drinking contaminated water, eating plants and animals grown in areas with contaminated soils, or physically coming in contact with harmful materials and soils—can suffer a wide array of detrimental health effects, from asthma to kidney disease to cancers, depending on the contaminants present.

Often communities like Camden that have a high percentage of low-income and minority residents, have a disproportionately high number of contaminated sites, and as a result, suffer disproportionately high health burdens. The prevalence of blighted industrial areas combined with the barriers that poor and minority communities encounter in contesting polluting industries and illegal dumpers have made Camden a target for businesses that would find it more difficult to operate in other, more affluent localities. At the same time, industries are sometimes encouraged to locate in struggling communities because community leaders and decision makers welcome the prospect of additional tax revenue and job opportunities that new industries promise.

These circumstances have placed an unfair burden upon Camden's residents. They are a classic example the struggle for environmental justice, which the EPA defines as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[20] The City of Camden played an important role in the history of the environmental justice movement (see ***South Camden Citizens in Action v. New Jersey Department of Environmental Protection*** **callout** on page 58). Although policies are in place today to protect communities from bearing a disproportionate share of harmful facilities, communities are still living with the industrial development and related contamination of the past.



Illegal Dumping at Camden Laboratories
Source: DVRPC

[20] USEPA. "Environmental Justice." (Accessed April 2017): https://www.epa.gov/environmentaljustice.

South Camden Citizens in Action v. New Jersey Department of Environmental Protection

In 1999, the St. Lawrence Cement Company proposed the construction of a cement grinding facility on state-owned land in Camden's Waterfront South neighborhood. The facility, which would grind blast furnace slag—the by-product of iron and steel-making—into a fine powder, was estimated to generate "more than 77,000 truck trips and emit 100 tons of pollutants per year. Almost 60 tons would be made up of fine inhalable particulate, also known as soot, or PM-10. A significant amount would be composed of the very smallest and therefore most dangerous particulates, PM-2.5."[1]

South Camden Citizens in Action (SCCIA), a group of concerned Waterfront South residents, opposed the development of the St. Lawrence facility. After official complaints to both NJDEP and the EPA went unanswered, SCCIA pursued legal action. In 2001, SCCIA brought a case against NJDEP, claiming that by permitting the St. Lawrence Cement Company to operate in the Waterfront South neighborhood, NJDEP violated the EPA's Title VI discriminatory impact regulations (Title VI of the 1964 Civil Rights Act prohibits recipients of federal funding from discriminating based on race, color, or national origin in any program or activity).

A federal district judge first ruled in favor of SCCIA, noting that by relying exclusively on environmental standards, NJDEP failed to determine whether the permit would adversely and disproportionately impact residents based on race. This was the first time that an environmental justice case based on civil rights claims, rather than environmental claims, had succeeded. However, five days later in *Alexander v. Sandoval*, the Supreme Court ruled that private parties do not have the right to bring a lawsuit to enforce Title VI violations, undermining the legal basis of the SCCIA case. Given this ruling, a federal appeals court reversed the decision, allowing the St. Lawrence Cement Company to begin operating its facilities.

Although, SCCIA was not successful at preventing St. Lawrence from operating in Waterfront South, the case garnered a lot of media attention and helped raise awareness of the environmental issues that communities like Waterfront South had been forced to live with for decades.

Sources: Sheila Foster, Challenge of Environmental Justice, The , 1 Rutgers J. L. & Urb. Pol'y 1 (2004): http://ir.lawnet.fordham.edu/faculty_scholarship/231

Olga D. Pomar and Luke W. Cole, Camden, New Jersey, and the Struggle for Environmental Justice, Clearinghouse Review Journal of Poverty Law and Policy (May–June 2002): http://povertylaw.org/files/docs/article/chr_2002_may_june_pomar.pdf.

The first step in mounting a defense to the environmental injustices suffered by Camden residents is to identify and describe the toxins and contaminants to which residents are exposed. The New Jersey Known Contaminated Sites List includes former factory sites, landfills, locations of current or former leaking underground storage tanks, sites where chemicals or wastes were once routinely discharged, and places where accidents have resulted in spills and pollution. Contamination may have affected soil, groundwater, surface water, or a combination of site conditions.

As of March 2017, there were 171 active known contaminated sites within Camden City, listed in **Table 20: Known Contaminated Sites** and shown on **Map 14: Active Known Contaminated Sites**. These are active sites with confirmed contamination of the soil, groundwater, and/or surface water. Among the known

contaminated sites in Camden are gas stations, industrial sites, auto businesses, municipal facilities, and private residences. Addresses of private residences have been removed from the list for confidentiality.

Known Contaminated Sites are regulated by NJDEP's Site Remediation Program in accordance with state laws. A contaminant can be a discharged hazardous substance, hazardous waste, or pollutant. The most common types of pollutants found at contaminated sites are petroleum hydrocarbons, polynuclear aromatic hydrocarbons (such as naphthalene), solvents, pesticides, and heavy metals.

Sites are categorized based on their remedial level, which reflects the overall degree of contamination at a site. The B level is associated with simple removal activities of contamination with no impact to soil or groundwater. The C1 level is associated with simple sites with one or two contaminants located in the soil and the immediate spill or discharge area. The C2 level is associated with more complicated contaminant discharges or multiple site spills and discharges with impacts to both soil and groundwater. The C3 level is associated with highly complex and threatening sites involving multiple contaminants at high concentrations with impacts to not only soils and groundwater, but also potentially surface waters and drinking water resources. The D level has the same conditions as the C3 level, but these sites are also typically designated as Federal "Superfund" sites on the National Priorities List (NPL). These sites are eligible for federal cleanup funds. Other sites are handled by state or individual programs or through private funds.

More information on each site can be found through the NJDEP Data Miner website by searching the Program Interest (PI) identification number.

RF Products at Davis and Copewood Streets *Source: DVRPC*

Table 20: Known Contaminated Sites

Name	Address	PI Number	Remediation Level	Lead Agency
1155 Federal St	1155 Federal St	G000038768	C1	LSRP
116 180 N 2nd St	116 120 N 2nd St	561722	C2	LSRP
1895 Federal St	1895 Federal St	439400	C2	LSRP
1 Hr Quality Cleaners	1406 Collings Rd	4428	C2	LSRP
320 N Second St	320 N 2nd St	711337	B	LSRP
3rd St Fire Station	3rd St & Washington St	171914	C1	LSRP
415-425 North 8th St	415 425 N 8th St	732371	N/A	N/A
Action Port A Pot	E River Rd & N E Federal St	G000027674	C1	UHOT
Adams Oil Inc.	1435 River Ave	9413	C2	LSRP
Admiral Wilson Dba Camden Citgo	1901 Admiral Wilson Blvd	1608	C2	LSRP
Adventure Aquarium	1 Aquarium Dr	G000037346	C3	LSRP
Air Products & Chemicals Inc.	2710 Broadway	9739	C2	LSRP
Aisling Properties LLC	2885 Mt Ephraim Ave	25691	C1	LSRP
American Minerals	Jefferson Ave	2771	C1	LSRP
Art Metalcraft Plating Co	529 S 2nd St	27349	C2	LSRP
AWB Associates	1501 Admiral Wilson Blvd	31284	C1	LSRP
Barry Bronze Bearing Co	2204 7th St	22443	C1	LSRP
Basketball Court At Northgate II Park	533 539 Elm St	693104	B	LSRP
Benjamin Franklin Bridge	5th St & Elm St	24459	C2	LSRP
Bills Gas & Go	698 Cooper St	23437	C2	LSRP
Block 189 - Lot 9 - Rowan University	402 S 5th St	698565	C2	LSRP
Bonteglio & Sons Paper Company	259 Division St	G000028773	C2	LSRP
Borden Chemical Printing	1625 Federal St	G000003602	C1	LSRP
BPUM Knox Industrial Site	2nd St & Erie St & Segal St	G000037343	C3	LSRP
Branch Village	Central Ave & 9th St	610819	B	LSRP
Broadway Redevelopment	1600 1618 Broadway	G000061460	C1	LSRP
Broadway Terminal	2500 Broadway	18241	C1	LSRP
Camden Amphitheater	Clinton St	G000000001	D	POST-REM
Camden City BOE Dudley Elementary	2250 Berwick Ave	440055	C1	LSRP
Camden City Reverend Evers Park	Morgan Blvd & Olive St	528616	C1	LSRP
Camden City Vacant Land	27th St & Dupont St	157633	C1	LSRP
Camden County Von Neida Park	29th St & Harrison St	660846	B	LSRP

Camden Cogeneration Facility	522 Chelton Ave	23591	C2	POST-REM
Camden County Community Charter School	415 N 9th St	662174	B	LSRP
Camden County Complex	520 Market St	11134	C1	LSRP
Camden County Complex	600 Market St	11134	C1	LSRP
Camden County Energy Recovery Associates, L.P	600 Morgan Blvd	27125	C2	LSRP
Camden Fuels	1033 Kaighn Ave	7621	C2	LSRP
Camden Gas Plant Former	2nd St & Spruce St	G000005452	C3	LSRP
Camden Gateway Redevelopment	29 151 Mt Ephraim St	718947	B	LSRP
Camden Iron & Metal Incorporated	1500 6th St	10173	C1	LSRP
Camden Iron & Metal Inc. (Pier)	Pine St @ Delaware River Pier	33141	C1	LSRP
Camden Laboratories	Copewood St	16718	C1	LSRP
Camden Lutheran Housing Corp	Front St & Elm St	22233	C1	POST-REM
Camden Parking Authority	5th St & Federal St	422874	C2	LSRP
Camden Parking Authority	1 Broadway	422874	C2	LSRP
Camden Properties	1600 River Ave	24225	C3	LSRP
Camden Ship Repair Company Incorporated	Point St & Erie St	G000012273	C3	LSRP
Camden Rosedale Academy	3098 Pleasant Ave	707160	B	LSRP
Camden Town Center	Cooper St & Riverside Dr	745842	N/A	N/A
Camden Truck Parts	109 Rt 130	747097	N/A	N/A
Camden Waterfront New Roads	Aquarium Riverside Dr	609877	B	LSRP
Camden Waterfront South Ws0015	Woodland Ave & Lester Ave	G000061293	C1	LSRP
Camden Waterfront Urban Park	4 Aquarium Dr	608426	B	LSRP
Campbell's Field	401 N Delaware Ave	G000004365	C3	POST-REM
Campbell Soup Company Warehouse	1433 Pine St	720133	C2	POST-REM
Carl Miller Homes	Carl Miller Blvd	461554	C1	LSRP
Centerville Revitalization	Bulson Ave & 7th & 8th & 9th St	489610	C1	LSRP
Central Metals Inc.	1054 S 2nd St	24998	C2	LSRP
Charlie & Son Service Center LLC	1503 Haddon Ave	195048	C1	LSRP
Clement Coverall Company Former	619 Carl Miller Blvd	3460	C3	LSRP
Concord Chemical Company Inc.	1650 Federal St	2734	C2	Publicly Funded
Concord Chemical Company Inc. Former	17th St & Mickle St	203376	C1	LSRP

Conrail Property (Former)	State St	G000027439	C1	LSRP
Cooper Medical School Of Rowan University	429 Broadway	542100	C2	LSRP
Cooper River	Rt 30 & Cooper St	G000032199	N/A	N/A
Coopers Poynt Elementary School	201 State St	27194	C2	LSRP
CRA Ws0012 New Homes	6th St & Railroad Ave	G000061155	C1	LSRP
Crystal Cleaners & Dyers Inc.	1012 Broadway	25492	C2	LSRP
Cutler Metals	1025 Line St	G000001801	C1	Publicly Funded
CWS Industries, Inc.	726 Kaighn Ave	171844	C2	LSRP
DiStasio Chevrolet	1759 Haddon Ave	G000028852	C1	LSRP
DRPA Parking Lot	Riverside Dr	609416	N/A	N/A
Engine Worldspot A Potty	1311 1325 Admiral Wilson Blvd	G000027675	C1	LSRP
Estate Of Joseph Saitta	531 541 S 5th St	263737	C2	LSRP
Evergreen Products	948 N Front St	G000027296	C2	Publicly Funded
Express Marine Inc.	2851 Adams Ave	237054	B	LSRP
Farragut Sportsman Marina	Ns Farragut 24th & 25th	157627	C1	Brownfield
Ferry Manor	2101 Ferry Ave	252015	B	POST-REM
Ferry Terminal Building	2 Aquarium Dr	608425	B	LSRP
Former Exxon Service Station #3-0056	245 Marlton Ave	26699	C2	LSRP
Francis Metal Fabricators Incorporated	813 Princess Ave	G000012872	N/A	N/A
Front St Warehouse	1229 S Front St	513185	B	LSRP
Gateway Park Properties Parcels S30 S31 & S32	2248 2350 Admiral Wilson Blvd	709880	B	LSRP
Gateway Park Properties Parcel S16	1836 Admiral Wilson Blvd	3760	C2	LSRP
Gateway Park Properties Parcel S17	1950 Admiral Wilson Blvd	34041	C2	LSRP
Gateway Park Properties Parcels S18 & S19	2004 Admiral Wilson Blvd	709868	B	LSRP
Gateway Park Properties Parcels S26 & S27	SE Baird Blvd Adjacent To Cooper Creek	731662	N/A	N/A
General Electric Building 2	Front St & Cooper St	16126	C3	LSRP
General Electric Building 8	Front St & Cooper St	280258	D	Brownfield
General Electric Victor Bldg #17	1 Market St	G000012945	C2	LSRP
GenStar Gypsum Products Company	1101 Front St	G000005604	C3	LSRP
Goodwill Industries	100 S 17th St	20632	C2	POST-REM
Harrison Avenue Landfill	Harrison Ave & State St	G000004459	D	LSRP
Harry Pape & Sons	1427 Haddon Ave	G000028777	C1	LSRP

H B Wilson School	Florence St & 9th St	23855	C1	LSRP
J E Brenneman & Co	800 Hudson Square	5146	C2	LSRP
John DiNaso & Sons Inc. Building Supply	2180 2182 Mt Ephraim Ave	G000044907	C1	POST-REM
Kaighn Ave Fire Station	1204 1220 Kaighn Ave	171896	C1	LSRP
Kaighn Avenue And South Front St	S Front St & Kaighn Ave	726208	C2	LSRP
Kaplan & Zubrin	146 Kaighn Ave	32704	C2	LSRP
Kelbro Incorporated	537 S 2nd St	G000004684	C2	LSRP
Kramer Chemicals Incorporated	Atlantic Ave & Delaware River	G000003900	D	LSRP
Kroc Center	1865 Harrison Ave	732780	C2	LSRP
L-3 Communications	100 Market St	2568	C2	LSRP
Lanning Square Elementary School	525 Clinton St	24563	C2	LSRP
Lanning Square Elementary School	446 Williams St	24563	C2	LSRP
Larry's Professional Service Center	1799 River Ave	11355	C2	LSRP
Lectronic Research Labs Inc.	1423 Ferry Ave	20964	C2	POST-REM
Liedtka Trucking Inc.	1535 S Broadway	9558	C2	POST-REM
Magnetic Metals	21st St & Hayes Ave	25906	C2	LSRP
Martin Aaron Incorporated/Rhodes Drum Co	1542 Broadway	25488	C1	Traditional
Mcguire Gardens	2140 Westminster Ave	G000036263	C1	LSRP
Monk's Gulf	710 Broadway	2313	C2	LSRP
Neeff Machine Co Inc.	2827 Buren Ave	237058	C1	LSRP
Ne State & 7th Sts	State St & 7th St	265220	C1	LSRP
New Jersey American Water Co Wells 51 52	29th St & Cleveland Ave	16904	C3	Unknown Source
Newton Avenue Bus Facility	350 Newton Ave	24734	C2	LSRP
NJ DOT Delaware Ave North	Delaware Ave	G000039611	N/A	N/A
NJ DOT I-676 & Atlantic Avenue Project	I-676 & Atlantic Ave	264473	C1	Linear Construction
NJ Transit River Line	Various Locations	G000026873	C3	Brownfield
NJ Transit River Line Camden County	31st St & Lemuel Ave	569857	C3	POST-REM
NJ Transit River Line Camden County	5th St & Federal St	569857	C3	POST-REM
NJ Transit River Line Camden County	1625 Federal St	569857	C3	POST-REM
NJ Transit River Line Camden County	4th St & Arch St	569857	C3	POST-REM
NJ Transit River Line Camden County	2005 High St	569857	C3	POST-REM
NJ Transit River Line Camden County	Various Locations	569857	C3	POST-REM

NJ Transit River Line Camden County	703 Van Rossum Ave	569857	C3	POST-REM
NJ Transit River Line Camden County	Mickle Blvd & Haddon Ave	569857	C3	POST-REM
North Camden Waterfront Park	N 6th St & Park Ave	623803	C1	LSRP
North Front St Associates (Former)	308 322 Front St	6594	C2	LSRP
Northgate II Apartment Buildings	5th St & Elm St	255323	C2	UHOT
Northwest 5th & Berkley St	5th St & Berkley St	709663	C2	LSRP
North West East State St & River Avenue	E State St NW & River Ave	G000027514	C2	LSRP
Oasis Hotel Former	2000 Admiral Wilson Blvd	34040	C2	LSRP
Our Lady Of Lourdes	1600 Haddon Ave	10867	C3	LSRP
Palko Designs & Mfg Inc.	17 Linden St	20942	C2	LSRP
Pavonia Yard Diesel Terminal	1516 River Rd	5879	D	LSRP
Pearlye Park View Apartments	1617 - 1655 Park Blvd	197127	C1	UHOT
P H C Industries Inc.	1643 Haddon Ave	32952	C1	LSRP
Philadelphia 76ers Practice Facility	55 Harbour Blvd	674985	B	LSRP
Pinnacle Petroleum Camden	1839 Admiral Wilson Blvd	7825	C2	LSRP
Pyne Poynt Middle School	7th St & Erie St	25207	B	LSRP
Reldon Enterprises	2881 Mt Ephraim Ave	G000024766	C2	POST-REM
Remtech Environmental	1800 Carmen St	14271	C3	LSRP
RF Products Incorporated	Davis St & Copewood St	15474	C3	LSRP
Riverfront State Prison	Delaware Ave & Elm St	15986	C2	LSRP
R M H Automotive (Former)	WS 17th St 160 N Admiral Wilson Blvd	G000030484	C1	LSRP
Royden & 5th St Groundwater Contamination	Royden St & 5th St	681111	C3	Unknown Source
Rutgers - Camden Nursing & Science Bldg	530 Federal St	723622	B	LSRP
Sears Building Former	1300 Admiral Wilson Blvd	496240	C1	LSRP
Sears Tire & Battery Former	1350 Admiral Wilson Blvd	443892	C2	LSRP
Seventh And Linden St	7th St & Linden St	297284	C1	LSRP
SJPC Wetlands Mitigation	Harrison Ave	158952	N/A	N/A
SI Surface Technologies Inc.	1416 6th St	208356	D	LSRP
Speedway 3500	1420 Admiral Wilson Blvd	9130	C2	LSRP
State St Bridge	E State St	329312	C2	LSRP
Stech Transportation Co	961 Sylvan St	108	C1	LSRP
Steed Scrap Paper & Metal	1115 N 6th St	G000027436	C1	LSRP
Sunoco 0004-5542 Former	2150 Admiral Wilson Blvd	14556	C2	LSRP
Swisco	200 210 Kaighn Ave	20101	C2	LSRP
Thomas & Muller Company	1929 S 4th St	G000030943	C1	POST-REM

Incorporated				
Trailways Inc.	17th St & Admiral Wilson Blvd	6432	C2	LSRP
Underwater Technics Incorporated	2735 Buren Ave	G000002760	C2	LSRP
Village Of Hope Phase 2 Project 2	Carl Miller Blvd & 6th St	G000061150	C1	LSRP
Waterfront South Service Station	2048 Broadway	64	C2	LSRP
Waterfront Technical Center	200 Federal St	237088	C2	LSRP
Weinstein Supply	1687 1689 Haddon Ave	593746	C1	LSRP
Welsbach & General Gas Mantle Contamination	Various Locations	G000008478	C1	Publicly Funded
Welsbach & General Gas Mantle Contamination	404 Jefferson Ave	G000008478	C1	Publicly Funded

Source: NJDEP, 2017

Explanation of Remedial Level	
B	A single phase remedial action with a single contaminant affecting only the soil.
C1	A remedial action with simple sites; one or two contaminants localized to soil and the immediate spill or discharge area.
C2	A remedial action with more complicated contaminant discharges; multiple site spills and discharges; more than one contaminant, with both soil and groundwater impacted or threatened.
C3	A multiphase remedial action with high complexity and threatening sites. Multiple contaminants, some at high concentrations with unknown sources continuing to impact soils, groundwater, and possibly surface waters and potable water resources. Dangers for direct contact with contaminated soils.
D	Same conditions as C3 except that D levels are also usually designated federal "Superfund Sites".
U	Not Yet Determined
N/A	Data not available

Lead Agency	
LSRP	Case under the Licensed Site Remediation Professional program.
POST-REM	Sites where a "No Further Action" or "Response Action Outcome" with limited restricted use and/or restricted use (institutional control) has been issued.
Publicly Funded	Sites where targeted remediation is undertaken by the Department's Publicly Funded Element for situations where the responsible entity is unknown, unwilling or unable to perform the necessary remediation to ensure that the health and safety of the public and/or the environment are not jeopardized.
Brownfield	Cases that qualify as a Brownfield and are being handled by the SRP Bureau of Brownfield Reuse.
Traditional	Traditional Department oversight is maintained for CERCLA sites where EPA is the lead agency and at Federal Facilities under Federal agreements. Traditional oversight is also applicable at CERCLA sites where the Department is the lead agency. All traditional oversight cases are handled by the Bureau of Case Management (BCM).
UHOT	Unregulated Heating Oil Tank Program - Homeowner heating oil UST discharge cases.
Linear Construction	Contaminated sites associated linear construction projects (construction and

	development to create, maintain or alter a roadway, railroad or utility that includes one or more contaminated properties).
Unknown Source	Case where contamination from an unknown source has been identified.
N/A	Data not available

Superfund Sites

Two sites within Camden City, Welsbach & General Gas Mantle and Martin Aaron, Inc., are on the NPL, which indicates that the EPA determined that they pose a real or potential threat to human health and the environment. These sites are both listed as remedial level C1 on New Jersey's Known Contaminated Sites List.

Welsbach & General Gas Mantle (Camden Radiation)

Gas mantles, sometimes known as Welsbach mantles, are mesh pouches used to generate a bright white light when heated by a flame. They were commonly used in street lights in the late 19th and early 20th centuries and are still used in portable camping lanterns today. Thorium, a radioactive metal, was often used in the production of gas mantles to make them glow more brightly.

The Welsbach and General Gas Mantle Companies manufactured gas mantles at sites in both Camden and Gloucester City throughout the late 19th and early 20th centuries. In fact, "In the early 1900s, Welsbach was the largest producer of gas mantles and lamps in the United States, making up to 250,000 mantles per day."[21] Both facilities closed in the early 1940s as many street lamps switched from gas to electrical lamps. After these facilities closed, waste materials from the production process as well as building debris from the two sites were used as fill throughout both Gloucester City and Camden.

Remediation of the site that would become the home of the South Camden Theater Company

Source: EPA

In 1981, an EPA-sponsored aerial survey revealed elevated levels of gamma radiation around the former Welsbach and General Gas Mantle facilities. Subsequent tests in the early 1990s discovered radiological contamination not only at the two manufacturing sites but also at about 100 surrounding residential and municipal properties. Although NJDEP implemented short-term clean up measures, such as installing gamma radiation shielding, the EPA placed both the Welsbach and General Gas Mantle sites on the NPL in 1996, making them eligible

[21] EPA, *Reuse and the Benefit to Community: Welsbach and General Gas Mantle,* November 2015: https://semspub.epa.gov/work/02/451957.pdf.

for federal remediation actions and funding. To date, the EPA has removed more than 350,000 tons of radiologically contaminated soils and waste materials, including more than 55,000 tons from the General Gas Mantle site in Camden. The EPA has also investigated approximately 950 properties in both Gloucester City and Camden for contamination, completing the remediation of 163 of the 175 properties identified as contaminated.

Although cleanup activities are still ongoing, new businesses and organizations have moved back to remediated areas. In Camden, the South Camden Theater Company, a nonprofit theater company, worked with Heart of Camden, a local community development organization to construct a 99-seat theater on a formerly contaminated site. The theater is opened in 2010 and is still very active in the community today.

Martin Aaron, Inc.

Located in Camden's Waterfront South neighborhood, the Martin Aaron superfund site has been the home of various light industrial activities since the late 19th century. Some of the first activities at this location were leather working operations, like tanning and glazing. However, in more recent years, the site was used largely for steel drum reconditioning. Steel drum reconditioning involves draining the drums of their original contents; washing the drums using a high-pressure alkaline-based solution and steam; rinsing and drying the drums; and finally repainting the drums.

From 1968 to 1987, Martin Aaron, Inc. operated a drum recycling business on the site. Westfall Ace Drum Company and Rhodes Drums, Inc. also operated drum recycling businesses on site from 1985 to 1994 and 1999, respectively. During this time, both the EPA and NJDEP issued numerous violations including the improper storage of drums of hazardous wastes and the illegal discharge of effluent into the ground. In 1987, NJDEP obtained a search warrant from the New Jersey Department of Law and Public Safety to allow them to conduct a site inspection and collect samples. This visit confirmed the presence of hundreds of improperly stored drums as well as elevated levels of metal and volatile organic compounds (VOCs) in the soil. Although Martin Aaron, Inc.'s president and site operators were convicted for the improper disposal of hazardous wastes, site operators filed to respond to NJDEP orders to clean up the site, eventually abandoning the facility and filing for bankruptcy.

Between 1995 and 1999, NJDEP's Remedial Response Element implemented several interim remedial measures, removing approximately 700 drums of chemical wastes, 10,000 empty drums, and 33 dumpsters of mixed waste. NJDEP also drilled over 160 soil borings to identify the extent of soil and groundwater contamination. The borings revealed widespread contamination on the Martin Aaron property and beyond. In 1999, the EPA placed the Marin Aaron, Inc. site on the NPL, taking control of remediation activities on site. The EPA removed 68 drums of hazardous waste and hundreds of empty drums. Additionally, the EPA identified Martin Aaron, Inc. and Rhodes Drums as potentially responsible parties; however both companies lacked the funds to pay for past or future remedial actions. In 2005, the EPA held a number of community meetings to discuss their plan for remediation. The EPA chose to excavate contaminated soils and either treat them on-site or safely dispose of them off-site. A 2016 EPA Community Update Bulletin noted that soil cleanup was scheduled to begin in the winter of 2017 and continue through early 2018. After the EPA has completed the removal of contaminated soils, it plans to backfill and cap the site, and ultimately restrict future use.

Lead

The types of contaminants found at contaminated sites vary widely. However, one of the most common and harmful sources of contamination is lead. As of 2007, lead had been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA). Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust and can be found in all parts of the

environment. Historically, lead was used for the manufacture of batteries, ammunition, metal products, medical devices, and other products. Lead was banned from household paint in 1978 and from gasoline in 1996. Its presence in other products, such as ceramics and pipe solder, has also been dramatically reduced.

Lead can be found in many sources. Lead-based paint and the dust produces as it deteriorates, found mostly in older homes built before 1978, are major contributors of lead exposure in children. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can also be found in some water pipes inside the home or pipes that connect homes to the main water supply pipe. Lead found in tap water usually comes from the decay of old lead-based pipes, fixtures, or from leaded solder that connects drinking water pipes. EPA limits lead in drinking water to 15 µg per liter. The presence of lead in household drinking water is monitored by samples taken at households. According to its regular monitoring, the City of Camden/American Water has not detected a violation for lead since 1994. NJ American Water has not detected a violation for lead since 1988. Lead can also be found in the soils at and surrounding former manufacturing facilities.

Ways to Reduce Lead Contamination

- Avoid exposure to sources of lead.
- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children.
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil and regularly clean the house of dust and tracked-in soil.

Lead can damage the nervous system, kidneys, and reproductive system. Exposure to lead can cause behavior problems and learning disabilities in young children and can also affect the health of adults. No safe blood level has been identified, and all sources of lead exposure for children should be controlled or eliminated. According to the Centers for Disease Control (CDC), experts now use a reference level of 5 micrograms per deciliter (µg/dL) to identify children with blood lead levels that are much higher than most (97.5 percent) children's levels. Children require chelation (therapy to remove heavy metals from the body) once their blood lead level reaches 45 µg/dL.

As has been seen across the country, the presence of lead in drinking water is common in older buildings with lead pipes. Over half of Camden City schools were built before 1928. All but five of Camden City's public schools turned off their drinking water fountains due to elevated lead levels found during testing in 2002. Instead of replacing the older pipes, the school district has installed water coolers and provided paper cups to offer students and teachers with clean drinking water.

Underground Storage Tanks

There are a number of businesses and organizations in Camden with underground storage tanks (USTs) commonly used to store fuel oil, or in the case of service stations, gasoline or diesel fuel. Corrosion and leakage of USTs can become a serious threat to the groundwater and soil surrounding them. In 1998, NJDEP required all existing tanks to be closed, replaced, or upgraded to meet new safety standards. NJDEP's Bureau of Underground Storage Tanks (BUST) regulates these replaced and upgraded tanks, requiring that they be registered, permitted, and monitored for leaks at regular intervals. As of March 2017,

there were 21 active and compliant sites in Camden City with regulated USTs that contained hazardous substances, pursuant to N.J.A.C. 7:14B et seq. They are listed in **Table 21: Underground Storage Tanks**. If there is a known release to soil and/or groundwater, a site will also be listed in **Table 20: Known Contaminated Sites**. There may also be private residences in Camden with USTs, used primarily to hold home heating oil. As these tanks age and rust, they often begin to leak as well, which becomes a serious threat to the groundwater below them. However, tanks used for home heating oil or any heating oil tank under 2,000 gallons, are exempt from the UST regulations and are not required to be permitted by NJDEP.

Table 21: Underground Storage Tanks

Facility ID	Facility Name	Street Address
1608	Admiral Wilson Dba Camden Citgo	1901 Admiral Wilson Blvd
25691	Aisling Properties LLC	2885 Mt Ephraim Ave
129463	Baird East Coast	2474 Baird Blvd
24266	Camden City Fire Department	Third & Federal St
32883	Camden Cleaning Center	2201 Federal St
7622	Camden Shell	2361 Admiral Wilson Blvd
2473	Campbell Soup Company	One Campbell Pl
20162	Center City Texaco	700 Cooper St
24998	Central Metals Inc.	1054 S 2nd St
15078	City Of Camden Board Of Education Warehouse	8th & Spruce Sts
2721	Cooper University Hospital	1 Cooper Plaza
24223	Education & Research	401 Haddon Ave
3758	Lukoil #57200	2225 Admiral Wilson Blvd
30924	Newton Avenue Bus Garage	350 Newton Ave
10867	Our Lady Of Lourdes	1600 Haddon Ave
7825	Pinnacle Petroleum Camden	1839 Admiral Wilson Blvd
4010	Public Works Service Center-Camden	1056 Wright Ave
9205	Rutgers The State University Of NJ	4th & Penn Sts
9130	Speedway 3500	1420 Admiral Wilson Blvd
2211	State Metal Industries Inc.	941 S 2nd St
108	Stech Transportation Co	961 Sylan St

Source: NJDEP, 2017

Historic Landfills

Camden is home to six former landfills as shown in **Table 22: Historic Landfills**. Landfills pose a number of potential environmental issues, including groundwater contamination and harmful air emissions. Current EPA landfill regulations mandate at least 30 years of post-closure care and monitoring to ensure that the landfill's leachate is properly removed and treated so that it does not leak into its surroundings and contaminate soil and groundwater. Although the Camden landfills listed below are no longer operating, all six of the landfills were not properly closed in accordance with NJDEP's Division of Solid and Hazardous Waste's Solid Waste Regulations.

Table 22: Historic Landfills

Name	Address	Operator Type	Commercial or Sole Source	Solid Waste PI #
Camden Aquarium	Aquarium Dr.	Government		666677
Colony III Corp.		Private	S	
Harrison Ave	Harrison Ave.	Government		133513
Knox Gelatin Inc.	Erie St.	Industrial	S	132006
Monsanto	1500 Pine St.	Industrial	S	536078
Poets Row	1000 5th St.	Government		536083

Source: NJDEP, 2014

The Harrison Avenue Landfill may be Camden's most well-known landfill. This 85-acre municipal landfill was located in Camden's Cramer Hill neighborhood at the confluence of the Delaware and Cooper Rivers. In operation from 1952 to 1971, the Harrison Avenue Landfill processed household, commercial, institutional, and vegetative waste. Although it ceased operations in 1971, cleanup actions did not begin until the late 2000s when the Salvation Army expressed interest in the site for the construction of the Camden Kroc Center. In 2006, NJDEP and the New Jersey Economic Development Agency awarded $5 million in Hazardous Discharge Site Remediation Funds to the Camden Redevelopment Agency to perform remedial activities at the Harrison Avenue Landfill site. Site investigations found an area of industrial chemical waste saturated with chlorobenzene and dichlorobenzenes (see callout) on the southeast portion of the site. To address the most pressing contamination, NJDEP excavated and disposed of 14,000 cubic yards of contaminated soil, replacing it with fill that was dredged from the Delaware River. Additional remediation occurred in phases, with work to clear and cover the landfill beginning in 2010.

The Salvation Army Kroc Center, which occupies 24 acres in the northern section of the former landfill, opened in October 2014. The $90 million, 120,000 square foot community center features a pool, baskball court, baseball fields, chapel, theater, fitness center, classrooms, indoor water park, and food pantry.

The remaining 61 acres of the former Harrison Avenue Landfill site is being developed as the Cramer Hill Waterfront Park. Cooper's Ferry Partnership and the Cramer Hill Community

Contaminants

Chlorobenzene: Chlorobenzene is a colorless, flammable liquid with an aromatic, almond-like odor. It is used as a solvent for some pesticides and as a degreaser for automobile parts. People living near a site containing chlorobenzene may be exposed by drinking contaminated groundwater or breathing vapors released into the air. High levels of chlorobenzene can damage the liver and kidneys and affect the central nervous system. Central nervous system effects include unconsciousness, tremors, restlessness, and death.

Dichlorobenzenes: There are three types of dichlorobenzenes (DCBs), the most important of which is 1,4-DCB. 1,4-DCB is a colorless to white solid with a strong, pungent odor that is used in mothballs and toilet-deodorizer blocks. When exposed to air, it slowly changes from a solid to a vapor. Exposure to dichlorobenzenes mostly occurs from breathing indoor air or workplace air. Exposure to high levels may be very irritating to your eyes and nose and cause difficulty breathing and an upset stomach.

Source: U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry.

Development Corporation, with support from the William Penn Foundation, worked with many stakeholders to develop a schematic design for the park. CCI obtained Hazardous Discharge Site Remediation funding and Natural Resources Damages settlement funding to complete both interim and final remediation in stages. NJDEP's Office of Natural Resource Restoration is leading the final design and construction phases of the project. The park will include significant environmental features like restored shoreline and uplands, new tidal wetlands, green stormwater infrastructure, and segment of the greenway trail. It will also provide habitat for animal species like bald eagles and freshwater mussels that returned to the site after the landfill closed.

Kendzierski Brothers

Kendzierski Brothers is a recycling and scrap yard located on Tioga Street in Camden's Liberty Park neighborhood. In a city with many nuisance industries, Kendzierski Brothers is a model business that acts as a good neighbor by maintaining a clean facility and upgrading their streetscape with new sidewalks and fencing. At the 2016 Camden SMART Forum, CFP and Mayor Redd presented Kendzierski Brothers with the Environmental Hero award in recognition of their efforts to positively contribute to their neighborhood.

Illegal Dumping

In addition to the Known Contaminated Sites in NJDEP's database, there are numerous locations in the city where illegal dumping is currently occurring, or where industries operate that produce dirt, noise, odors, pollutants, and/or unsightly visual conditions that impact the surrounding community. While not always technically "contaminated" or currently "listed" as contaminated in terms of soil and water contamination, these sites degrade the conditions of communities and surrounding homes and are deleterious to both public health and quality of life.

CCI's Waste and Recycling working group focuses on reducing illegal dumping in Camden. In August 2015, NJDEP selected Camden as one of three cities to pilot NJDEP's Don't Waste Our Open Space program, which seeks to combat unlawful dumping in state parks and wildlife management areas, as well as in selected cities. NJDEP selected Camden because many organizations were already collaborating through CCI to address a range of environmental issues, including illegal dumping. As part of the pilot program NJDEP provided Camden with a motion-sensor camera that was installed on the Camden Laboratories site. The camera captured the license plate numbers of individuals illegally dumping waste on the site, who were then reported to the Camden County Police Department for further prosecution.

As a result of the successful implementation of the pilot program, the New Jersey Clean Communities Council presented CFP and the CCI Waste and Recycling working group with the "Open Space" Award in June 2016. Additionally, both the city's public works department and the county's police department installed additional cameras throughout the city to identify and prosecute individuals guilty of violating the state's illegal dumping laws.

Camden Laboratories

The former Camden Laboratories site, which is listed on NJDEP's Active Known Contaminated Sites List, has been a target for illegal dumping for a number of years. Located adjacent to Whitman Park in Camden's Whitman Park neighborhood, the site was originally developed as the Camden Municipal Hospital for Contagious Diseases in the early 1920s and later became the home of the Coriell Institute for Medical Research in the 1950s. Camden Laboratories bought the site in 1989, operating various medical labs on site until 2007. Since that time, the 3.56-acre site has remained vacant. Without any regular maintenance, the

buildings on site deteriorated and the surrounding land became overgrown. The dilapidated conditions made the site subject to prolific vandalism and illegal dumping.

Despite the vast quantity of debris, the Camden Redevelopment Authority (CRA) identified the Camden Laboratories site as a prime redevelopment site in the Whitman Park Redevelopment Plan, due in large part to its prime location near a transit station, commercial corridor, and a park. Before the city could redevelop the site, it needed to address significant contamination issues. In 2015, the CRA received $344,710 in EPA brownfield grants to determine the nature and extent of environmental contamination on the site. However, in order for the city to assess the contamination, the site had to be cleared of the debris. In 2016, the city conducted an extensive cleanup of the site, placing a physical barrier at the entrance of the site to prevent further dumping. The city is currently in the process of acquiring the property through tax foreclosure for eventual redevelopment as an extension of Whitman Park.

Illegal Dumping at the Former Camden Laboratories *Source: DVRPC*

ENVIRONMENTAL PROTECTION

The resources and issues documented in this environmental resource inventory are both significant contributors and detractors to Camden's quality of life. Documentation of the resources provides a foundation for their care, protection, and enhancement; while a record of the extent of the environmental challenges allows for the development and prioritization of strategies to address them. Both preserving Camden's natural resources and addressing Camden's environmental hazards will require further planning and policy making. Fortunately, many organizations and community residents are working to preserve and restore Camden's natural resources.

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APPENDIX

Appendix A: Circuit Trails Plan

Appendix B: 2010 Petty's Island Plant and Animal Inventory

Reptiles, Amphibians, and Mammals

Common Name	Scientific Name
Snakes	
Northern Brown Snake	*Storeria d. dekayi*
Eastern Garter Snake	*Thamnophis s. sirtalis*
Turtles	
Common Snapping Turtle	*Chelydra s. serpentina*
Red-Eared Slider	*Trachemys scripta elegans*
Redbelly Turtle	*Pseudemys rubriventris*
Eastern Painted Turtle	*Chrysemys p. picta*
Frogs and toads	
Fowler's Toad	*Bufo fowleri*
Bullfrog	*Rana catesbeiana*
Green Frog	*Rana clamitans melanota*
Coastal Plain Leopard Frog	*Rana sphenocephala*
Mammals	
White-Footed Mouse	*Peromyscus leucopus*
Red Fox	*Vulpes fulva*
White Tailed Deer	*Odocoileus virginianus*

Birds

Common Name	Scientific Name
Common Loon	*Gavia immer*
Double-Crested Cormorant	*Phalacrocorax auritus*
Great Cormorant	*Phalacrocorax carbo*
Great Blue Heron (SC)	*Ardea herodias*
Green Heron	*Butorides virescens*
Snow Goose	*Chen caerulescens*
Canada Goose	*Branta canadensis*
Wood Duck	*Aix sponsa*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Blue-Winged Teal	*Anas discors*
Green-Winged Teal	*Anas crecca*
Bufflehead	*Bucephala albeola*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*

Ruddy Duck	*Oxyura jamaicensis*
Black Vulture	*Coragyps atratus*
Turkey Vulture	*Carthartes aura*
Osprey (T)	*Pandion haliaetus*
Bald Eagle (E)	*Haliaeetus leucocephalus*
Sharp-Shinned Hawk	*Accipiter striatus*
Cooper's Hawk (T)	*Accipiter cooperii*
Red-Tailed Hawk	*Buteo jamaicensis*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrinus*
Northern Bobwhite	*Colinus virginianus*
Killdeer	*Charadrius vociferus*
Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Killdeer	*Charadrius vociferus*
Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitis macularia*
Semipalmated Sandpiper	*Calidris pusilla*
Least Sandpiper	*Calidris minutilla*
Wilson's Snipe	*Gallinago gallinago*
American Woodcock	*Scolopax minor*
Laughing Gull	*Larus atricilla*
Ring-Billed Gull	*Larus delawarensis*
Herring Gull	*Larus argentatus*
Iceland Gull	*Larus glaucoides*
Great Black-Backed Gull	*Larus marinus*
Caspian Tern	*Sterna caspia*
Forster's Tern	*Sterna forsteri*
Rock Dove	*Columba livea*
Mourning Dove	*Zenaida macroura*
Yellow-Billed Cuckoo	*Coccyzus americanus*
Great-Horned Owl	*Bubo virginianus*
Chimney Swift	*Chaetura pelagica*
Ruby-Throated Hummingbird	*Archilochus colubris*
Belted Kingfisher	*Ceryle alcyon*
Red-Bellied Woodpecker	*Melanerpes carolinus*

Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Eastern Wood Pewee	*Contopus virens*
Yellow-Bellied Flycatcher	*Empidonax flaviventris*
Alder Flycatcher	*Empidonax alnorum*
Willow Flycatcher	*Empidonax traillii*
Least Flycatcher	*Empidonax minimus*
Eastern Phoebe	*Sayornis phoebe*
Great-Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*
White-Eyed Vireo	*Vireo griseus*
Yellow-Throated Vireo	*Vireo flavifrons*
Blue-Headed Vireo	*Vireo solitarius*
Warbling Vireo	*Vireo gilvus*
Red-Eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhyncos*
Fish Crow	*Corvus ossifragus*
Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*
Bank Swallow	*Riparia riparia*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Carolina Chickadee	*Poecile carolinensis*
Tufted Titmouse	*Baeolophus bicolor*
Carolina Wren	*Thryothorus ludovicianus*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Golden-Crowned Kinglet	*Regulus satrapa*
Ruby-Crowned Kinglet	*Regulus calendula*
Blue-Gray Gnatcatcher	*Polioptila caerulea*
Veery	*Catharus fuscescens*
Gray-Cheeked Thrush	*Catharus minimus*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*

Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*
Tennessee Warbler	*Vermivora perigrina*
Nashville Warbler	*Vermivora ruficapilla*
Northern Parula	*Parula americana*
Yellow Warbler	*Dendroica petechia*
Chestnut-Sided Warbler	*Dendroica pensylvanica*
Magnolia Warbler	*Dendroica magnolia*
Black-Throated Blue Warbler	*Dendroica caerulescens*
Yellow-Rumped Warbler	*Dendroica coronata*
Black-Throated Green Warbler	*Dendroica virens*
Blackburnian Warbler	*Dendroica fusca*
Pine Warbler	*Dendroica pinus*
Prairie Warbler	*Dendroica discolor*
Palm Warbler	*Dendroica palmarum*
Bay-Breasted Warbler	*Dendroica castanea*
Blackpoll Warbler	*Dendroica striata*
Black-And-White Warbler	*Mniotilta varia*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Northern Waterthrush	*Seiurus noveboracensis*
Mourning Warbler	*Oporornis philadelphia*
Common Yellowthroat	*Geothlypis trichas*
Wilson's Warbler	*Wilsonia pusilla*
Canada Warbler	*Wilsonia canadensis*
Scarlet Tanager	*Piranga olivacea*
Eastern Towhee	*Pipilo erythrophthalmus*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Savannah Sparrow (T)	*Passerculus sandwichensis*
Grasshopper Sparrow (T)	*Ammodramus savannarum*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	Melospiza lincolnii
Swamp Sparrow	Melospiza georgiana
White-Throated Sparrow	Zonotrichia albicollis
Dark-Eyed Junco	Junco hyemalis

Northern Cardinal	Cardinalis cardinalis
Rose-Breasted Grosbeak	Pheucticus ludovicianus
Indigo Bunting	Passerina cyanea
Bobolink (T)	Dolichonyx oryzivorus
Red-Winged Blackbird	Agelaius phoeniceus
Rusty Blackbird	Euphagus carolinus
Common Grackle	Quiscalus quiscula
Brown-Headed Cowbird	Molothrus ater
Orchard Oriole	Icterus spurius
Baltimore Oriole	Icterus galbula
House Finch	Carpodacus mexicanus
American Goldfinch	Carduelis tristis
House Sparrow	Passer domesticus

NJ State Status Designations: "E" = Endangered, "T" = Threatened, "SC" = Species of Special Concern

Butterflies, Dragonflies, and Damselflies

Common Name	Scientific Name
Butterflies	
Black Swallowtail	*Papilio polyxenes*
Eastern Tiger Swallowtail	*Papilio glaucus*
Spicebush Swallowtail	*Papilio troilus*
Cabbage White	*Pieris rapae*
Falcate Orangetip	*Anthocharis midea*
Clouded Sulphur	*Colias philodice*
Orange Sulphur	*Colias eurytheme*
American Copper	*Lycaena phlaeas*
Red-Banded Hairstreak	*Calycopus cecrops*
Eastern Tailed Blue	*Everes comyntas*
"Spring" Spring Azure	*Celastrina ladon*
"Summer" Spring Azure	*Celastrina ladon*
American Snout	*Libytheana carinenta*
Variegated Fritillary	*Euptoieta claudia*
Pearl Crescent	*Phyciodes tharos*
Question Mark	*Polygonia interrogationis*
Eastern Comma	*Polygonia comma*
Mourning Cloak	*Nymphalis antiopa*
American Lady	*Vanessa virginiensis*
Red Admiral	*Vanessa atalanta*
Common Buckeye	*Junonia coenia*

Red-Spotted Purple	*Limenitis arthemis astyanax*
Viceroy	*Limenitis archippus*
Little Wood-Satyr	*Megisto cymela*
Silver-Spotted Skipper	*Epargyreus clarus*
Juvenal's Duskywing	*Erynnis juvenalis*
Wild Indigo Duskywing	*Erynnis baptisiae*
Sachem	*Atalopedes campestris*
Zabulon Skipper	*Poanes zabulon*
Dragonflies	
Common Green Darner	*Anax junius*
Swamp Darner	*Epiaeschna heros*
Eastern Pondhawk	*Erythemis simplicicollis*
Painted Skimmer	*Libellula semifasciata*
Pied Skimmer	*Libellula luctuosa*
Blue Dasher	*Pachydiplax longipennis*
Spot-Winged Glider	*Pantala hymenaea*
Common Whitetail	*Plathemis lydia*
Violet-Masked Glider	*Tramea carolina*
Black-Mantled Glider	*Tramea lacerata*
Damselflies	
Slender Spreadwing	*Lestes rectangularis*
Familiar Bluet	*Enallagma civile*
Big Bluet	*Enallagma durum*
Fragile Forktail	*Ischnura posita*

Trees

Common Name	Scientific Name
Box Elder	Acer negundo
Red Maple	Acer rubrum
Silver Maple	Acer saccharinum
Tree Of Heaven	Ailanthus altissima
European Alder	Alnus glutinosa
River Birch	Betula nigra
Gray Birch	Betula populifolia
Southern Catalpa	Catalpa bignonioides
A Hickory	Carya sp.
Northern Hackberry	Celtis occidentalis
Green Ash	Fraxinus pensylvanica
American Holly	Ilex opaca

Eastern Red Cedar	Juniperus virginiana
Sweet Gum	Liquidambar styraciflua
Tulip-Tree	Liriodendron tulipifera
White Mulberry	Morus alba
Red Mulberry	Morus rubran
Empress Tree	Paulownia tomentosa
White Pine	Pinus strobus
Sycamore	Platinus occindentalis
White Poplar	Populus alba
Eastern Cottonwood	Populus deltoides
Large-Toothed Aspen	Populus grandidentata
Quaking Aspen	Populus tremuloides
Wild Black Cherry	Prunus serotina
Southern Red Oak	Quercus falcata
Pin Oak	Quercus palustrus
Willow Oak	Quercus phellos
Winged Sumac	Rhus copallinum
Staghorn Sumac	Rhus typhina
Black Locust	Robinia pseudoacacia
Weeping Willow	*Salix babylonica
Black Willow	Salix nigra
Silky Willow	Salix sericea

Shrubs

Common Name	Scientific Name
False Indigo	Amorpha fruticosa
Japanese Barberry	*Berberis thunbergii
Trumpet Creeper	Campsis radicans
Asiatic Bittersweet	*Celastrus obiculatus
Buttonbush	Cephalanthus occidentalis
Red Osier Dogwood	Cornus sericea
Japanese Honeysuckle	*Lonicera japonica
Bayberry	Myrica (Morella) pensylvanica
Virginia Creeper	Parthenocissus quinquefolia
Japanese Knotweed	*Polygonum cuspidatum
Common Blackberry	Rubus allegheniensis
Bullbrier	Smilax rotundifolia
Poison Ivy	Toxicodendron radicans
Arrowwood	Viburnum dentatum

Herbs

Common Name	Scientific Name
Yarrow	*Achillea millefolium
Garlic Mustard	*Alliaria officionalis
Field Garlic	*Allium vineale
Common Ragweed	Ambrosia artemisiifolia
Common Mugwort	*Artemisia vulgaris
Butterfly Weed	Asclepias tuberosa
Common Milkweed	Asclepias syriaca
FALSE Nettle	Boehmeria cylindrica
Nodding Thistle	*Carduus nutans
Spotted Knapweed	*Centaurea biebersteinii
Lamb's Quarter	*Chenopodium album
Chickory	*Cichorium intybus
Canada Thistle	*Cirsium arvense
Enchanter's Nightshade	Circaea quadrisulcata
Var. Canadensis	Conyza canadensis
Queen Ann's	*Daucus carota
Deptford Pink	*Dianthus armeria
Nuttal's Waterweed	Elodea nuttallii
Hyssop-Leaved Boneset	Eupatorium hyssopifolium
White Snakeroot	Eupatorium rugosum
Common Boneset	Eupatorium perfoliatum
Late-Flowering Boneset	Eupatorium serotinum
Ground Ivy	*Glechoma hederacea
Cow Parsnip	Heracleum maximum
Henbit	*Lamium amplexicaulis
Round-Headed Bushclover	Lespedeza capitata
Chinese Lespedeza	*Lespedeza cuneata
Purple Loosestrife	*Lythrum salicaria
Canada Mayflower	Maianthemum canadense
White Sweet	*Melilotus alba
Yellow Sweet	*Melilotus officionalis
Ssp. Advena	Nuphar lutea
Childing Pink	*Petrorhagia prolifera
Clearweed	Pilea pumula
Pokeweed	Phytolacca americana
Bracted Plantain	Plantago aristata
English Plantain	*Plantago lanceolata

Mild Water	Polygonum hydropiper
Sheep Sorrel	*Rumex acetosella
Curled Dock	*Rumex crispus
Spring Ladies'	Spiranthes vernalis
American Germander	Teucrium canadense
Rabbit-Foot Clover	*Trifolium arvense
Common Cattail	Typha latifolia
Stinging Nettle	*Urtica dioica
Moth Mullein	*Verbascum blattaria
Common Mullein	*Verbascum thapsus
Blue Vervain	Verbena hastata

Ferns

Common Name	Scientific Name
Sensitive Fern	Onoclea sensibilis
Bracken Fern	Pteridium aquilinum

Grasses

Common Name	Scientific Name
Virginia Beardgrass	Andropogon virginicus
Sweet Vernal	*Anthoxanthum odoratum
Smooth Brome	*Bromus inermis
Orchard Grass	*Dactylis glomerata
Rice Cutgrass	Leersia oryzoides
Fall Witch-Grass	Leptoloma cognatum
Nepalese Stiltgrass	*Microstegium vimineum
Deer Tongue	Panicum clandestinum
Switchgrass	Panicum virgatum
Common Reed	*Phragmites australis

Sedges

Common Name	Scientific Name
Sallow Sedge	Carex lurida
Pennsylvania Sedge	Carex pensylvanica
Pointed Broom Sedge	Carex scoparia
Fox Sedge	Carex vulpinoidea
Common Threesquare	Schoenoplectus pungens
Dark-Green Bulrush	Scirpus atrovirens

Rushes

Common Name	Scientific Name
Juncus acuminatus	sharp-fruited rush
Juncus effusus	soft rush
Juncus tenuis	path rush

Species preceded by an asterisk (*) is an exotic.

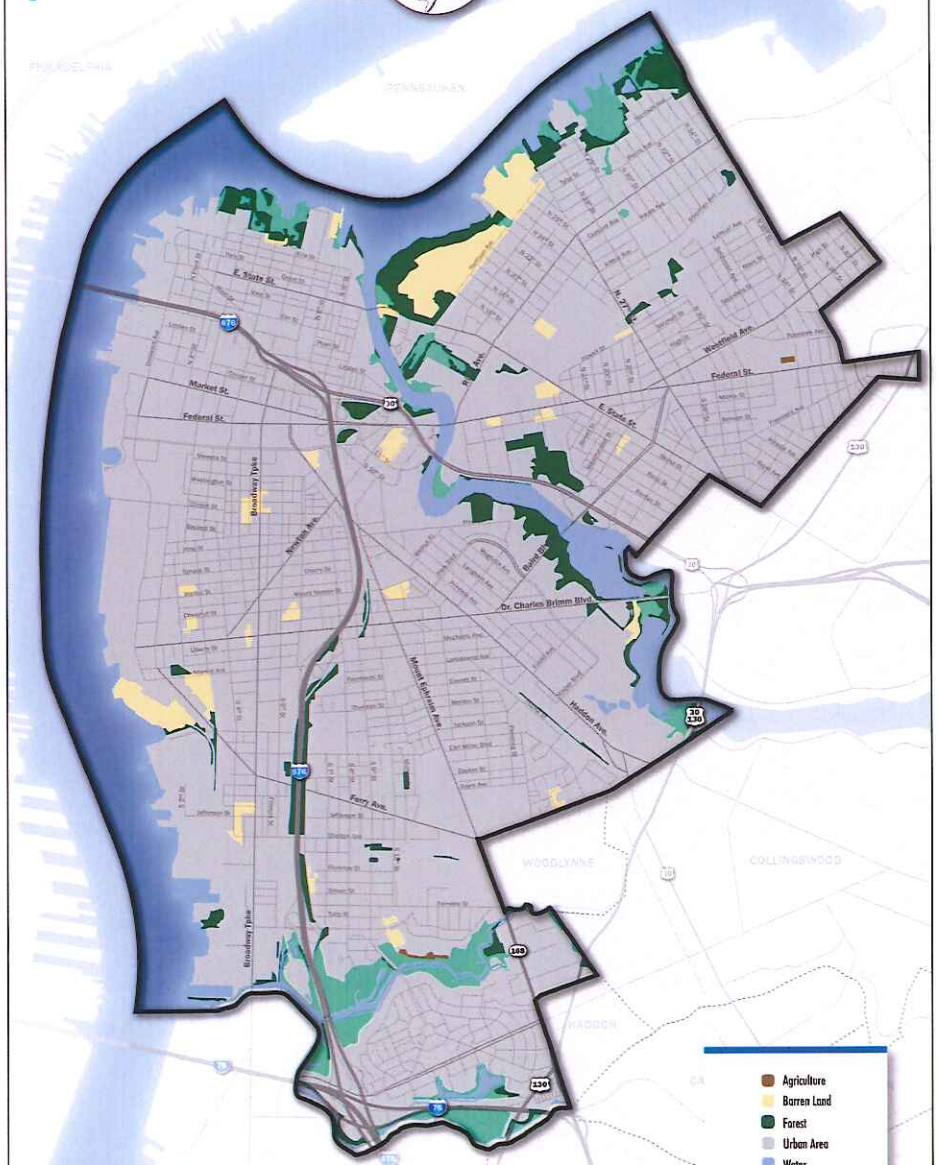
Source: 2010 Petty's Island Plant and Animal Inventory

Appendix C: Maps


City of Camden
Map 1: Aerial
PHILADELPHIA
PENNSAUREN
WOODLYNNE
COLLINGSWOOD
HADDON
OAKLYN
HADDON
AUDUBON PARK
HADDON
MOUNT EPHRAIM
dvrpc
Sources: NJDEP, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
North
SCALE 1:25,100
1 inch = 0.50 mile
0
0.5 Kilometers
0
0.5 Miles

City of Camden

Map 2: Land Use - 2012



dvrpc

Sources: NJDEP, NJDOT, DVRPC

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

- Agriculture
- Barren Land
- Forest
- Urban Area
- Water
- Wetlands

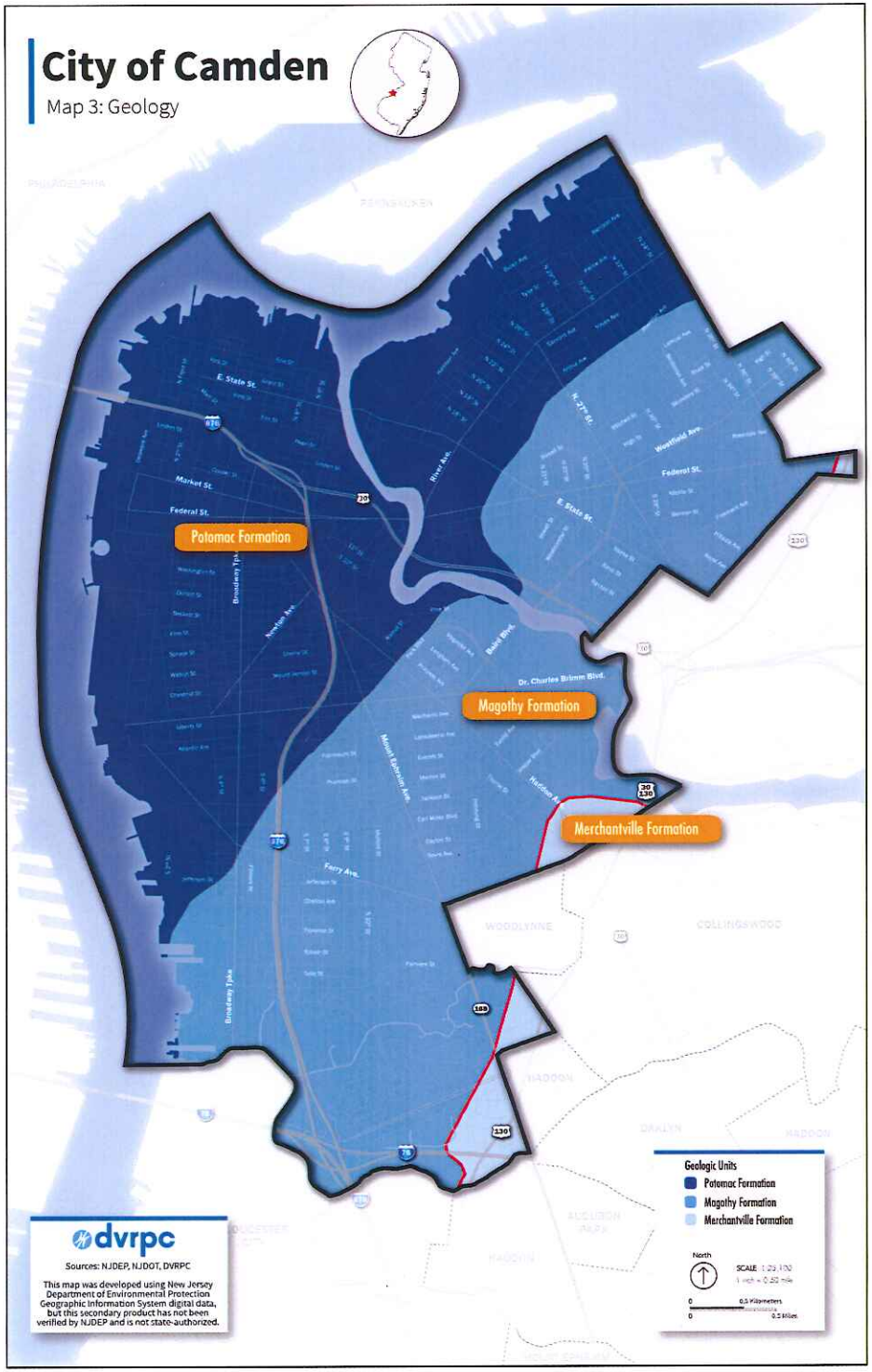
North

SCALE 1:25,000
1 inch = 0.50 mile

0 0.5 Kilometers
0 0.5 Miles

City of Camden

Map 3: Geology



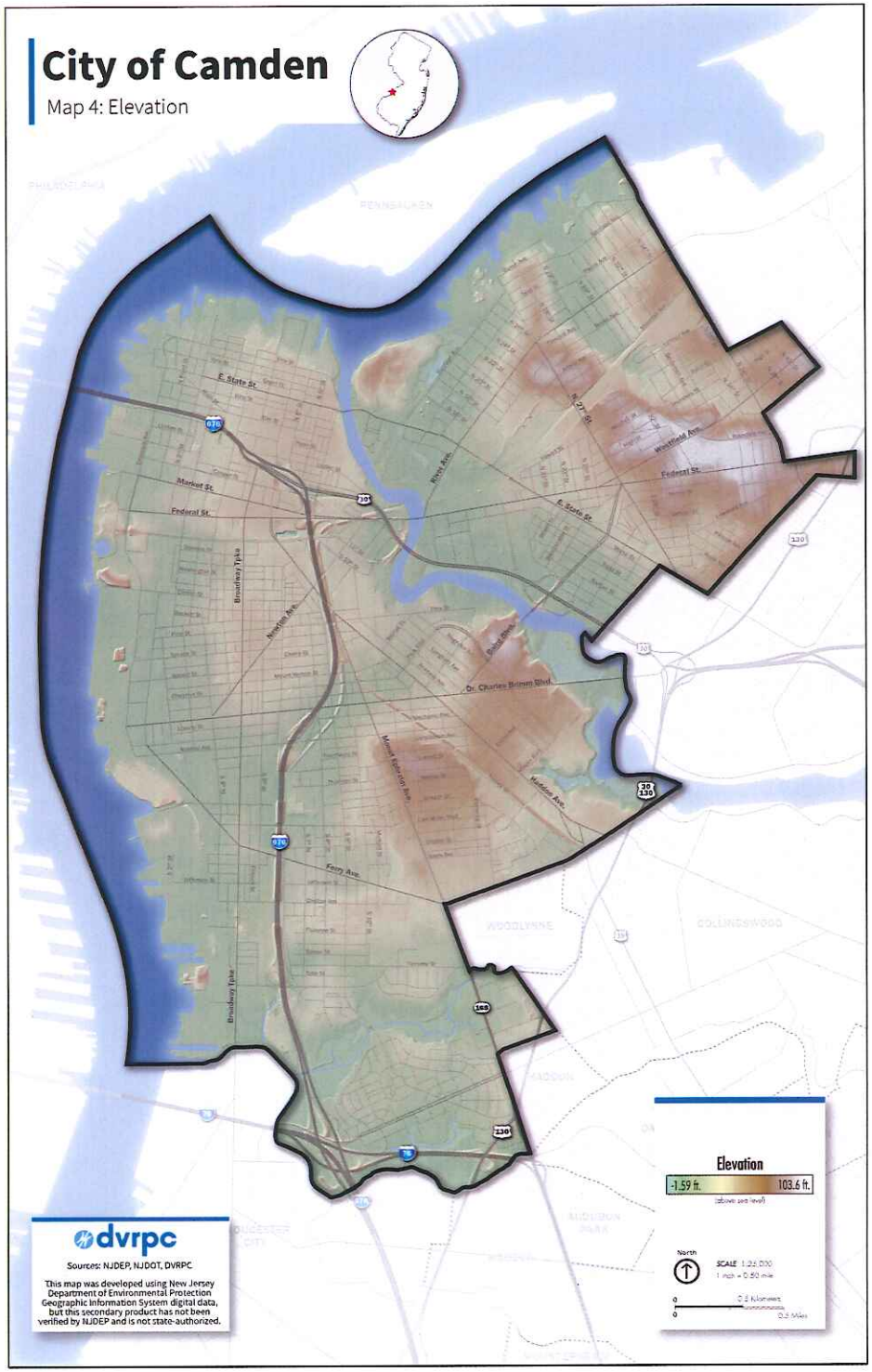
dvrpc

Sources: NJDEP, NJDOT, DVRPC

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

City of Camden

Map 4: Elevation



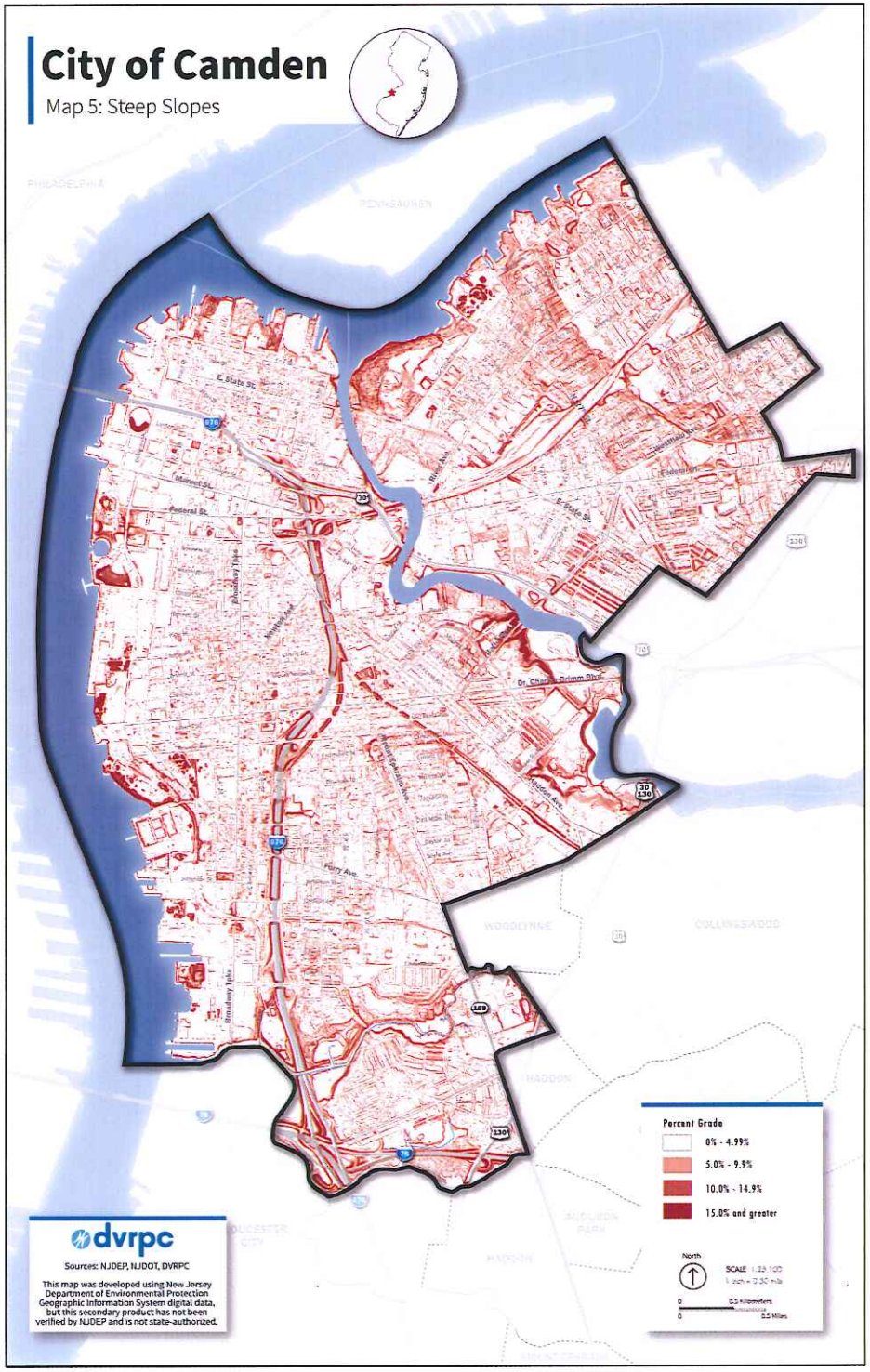
dvrpc

Sources: NJDEP, NJDOT, DVRPC

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

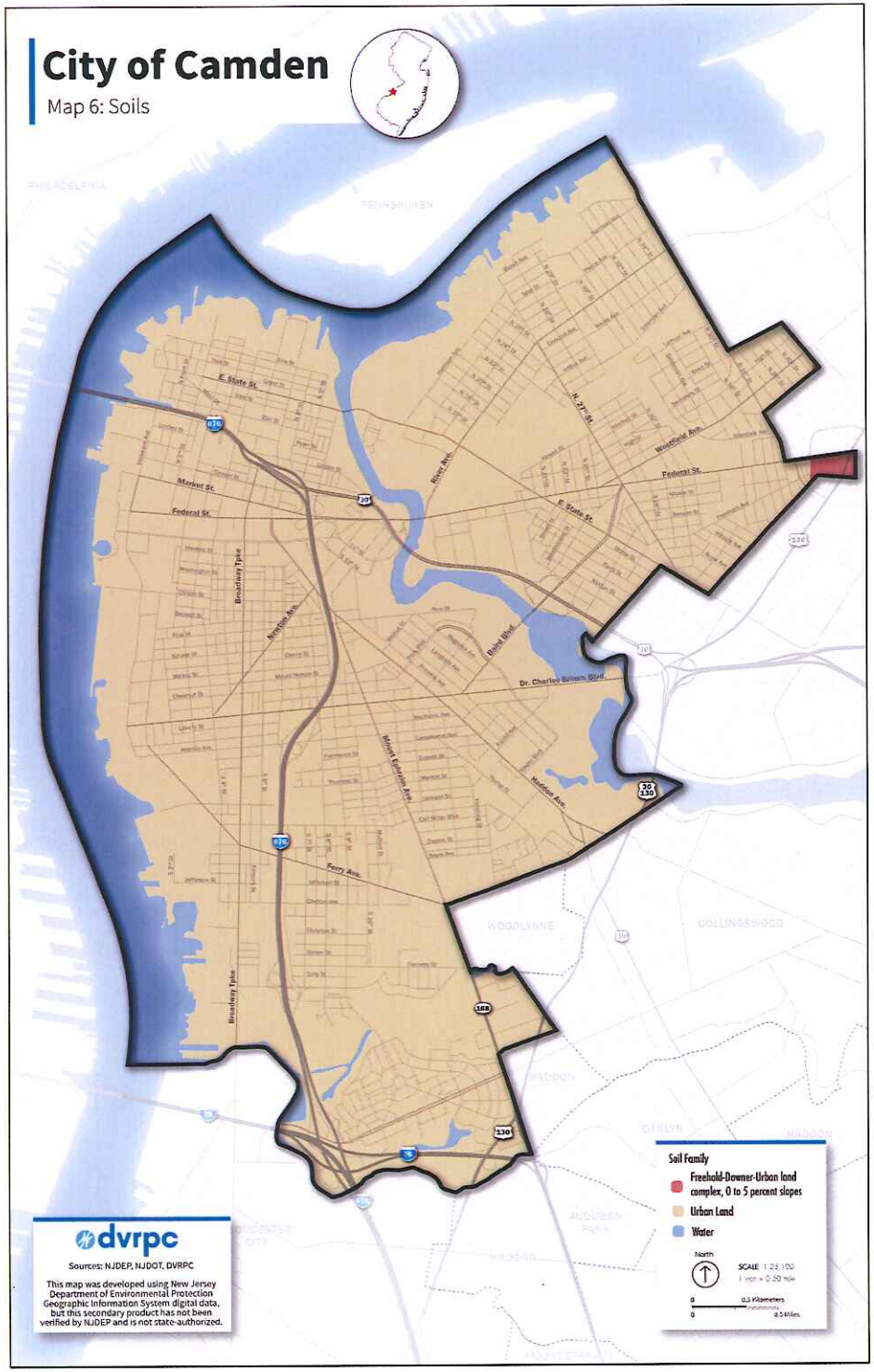
City of Camden

Map 5: Steep Slopes



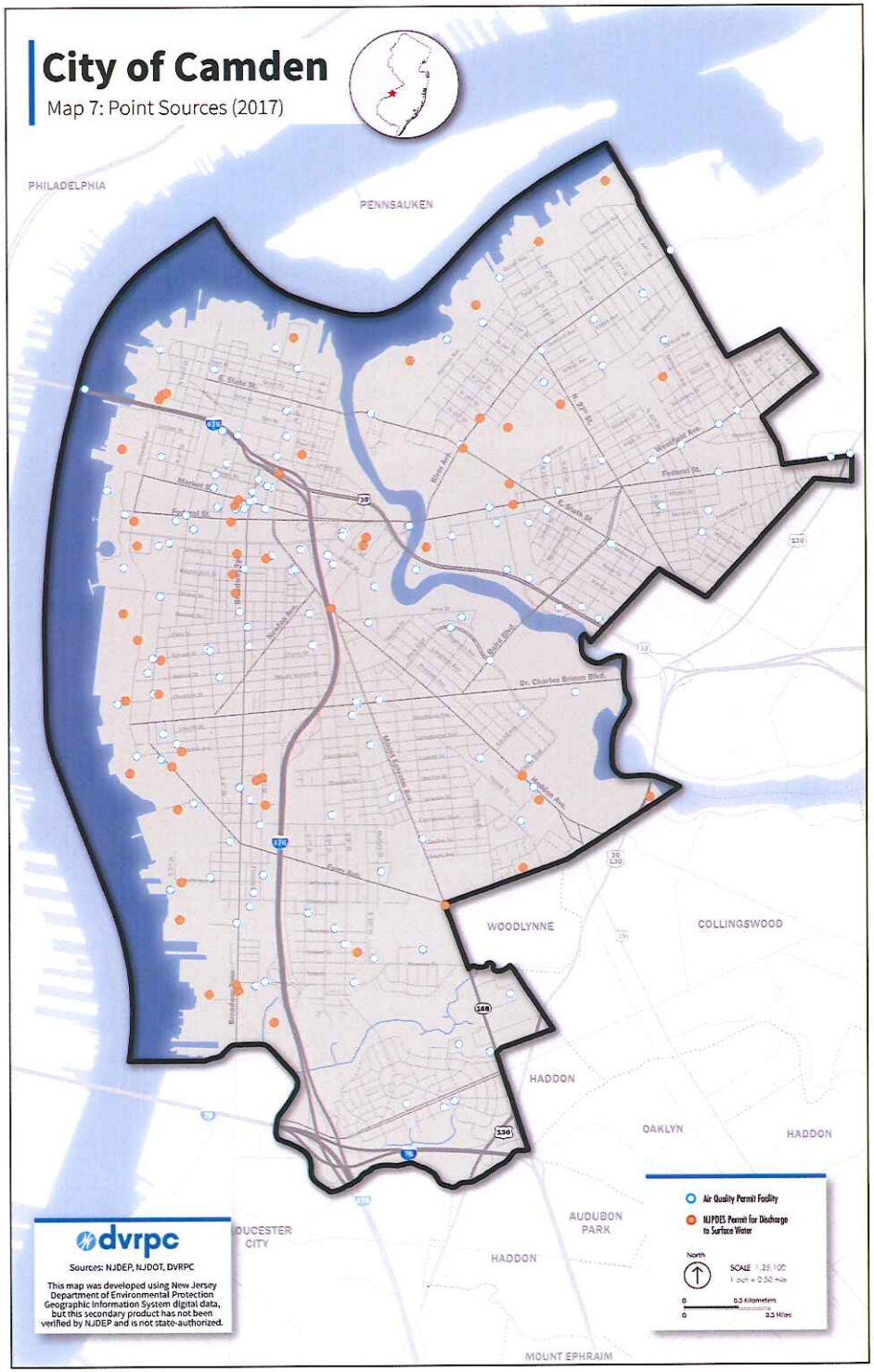
City of Camden

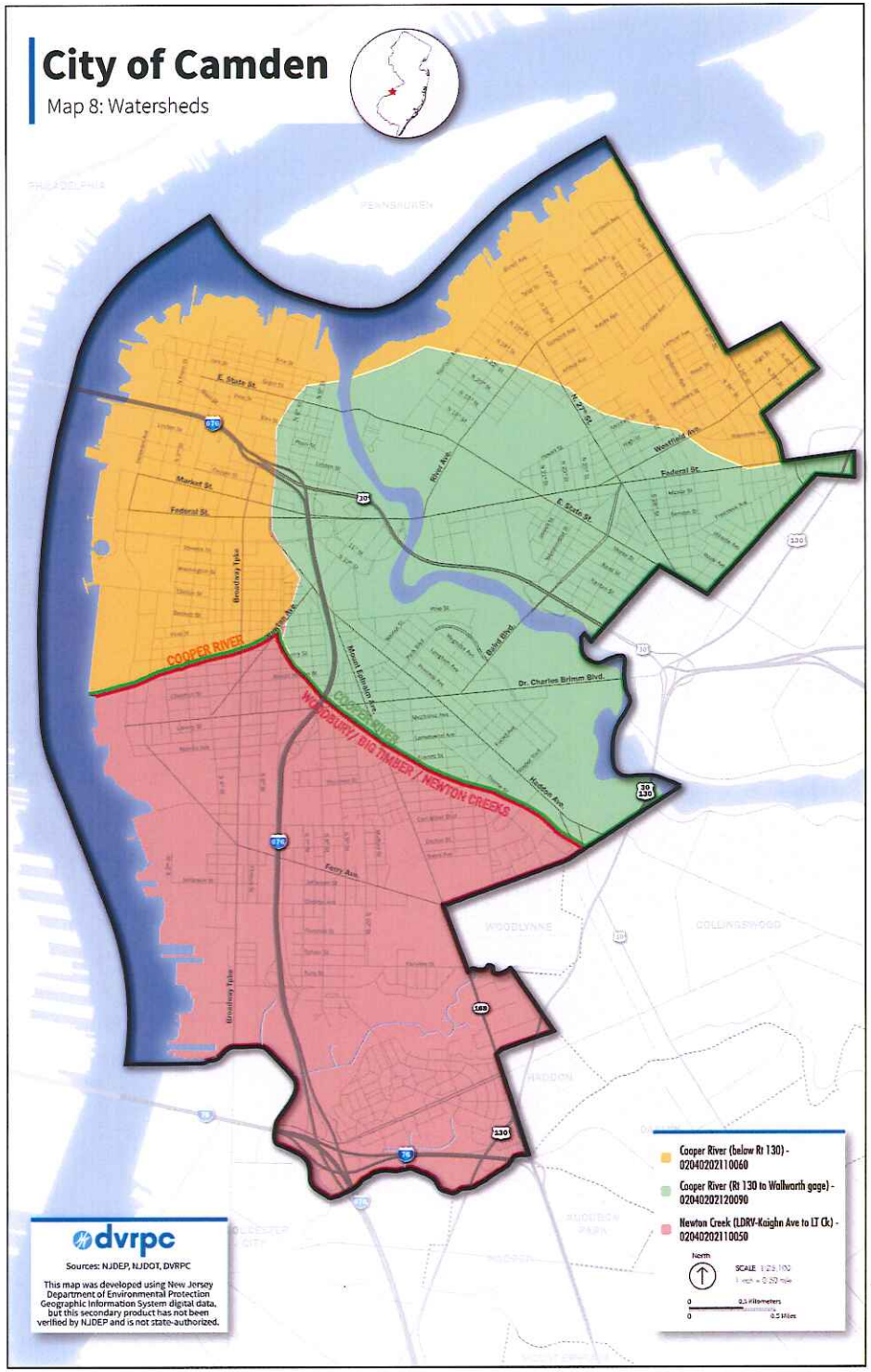
Map 6: Soils



City of Camden

Map 7: Point Sources (2017)




City of Camden
Map 8: Watersheds
COOPER RIVER
WOODBURY / BIG TIMBER / NEWTON CREEKS
Cooper River (below Rt 130) - 02040202110060
Cooper River (Rt 130 to Wallworth gage) - 02040202120090
Newton Creek (LDRV-Kaighn Ave to LT Ck) - 02040202110050
North
SCALE
dvrpc
Sources: NJDEP, NJDOT, DVRPC
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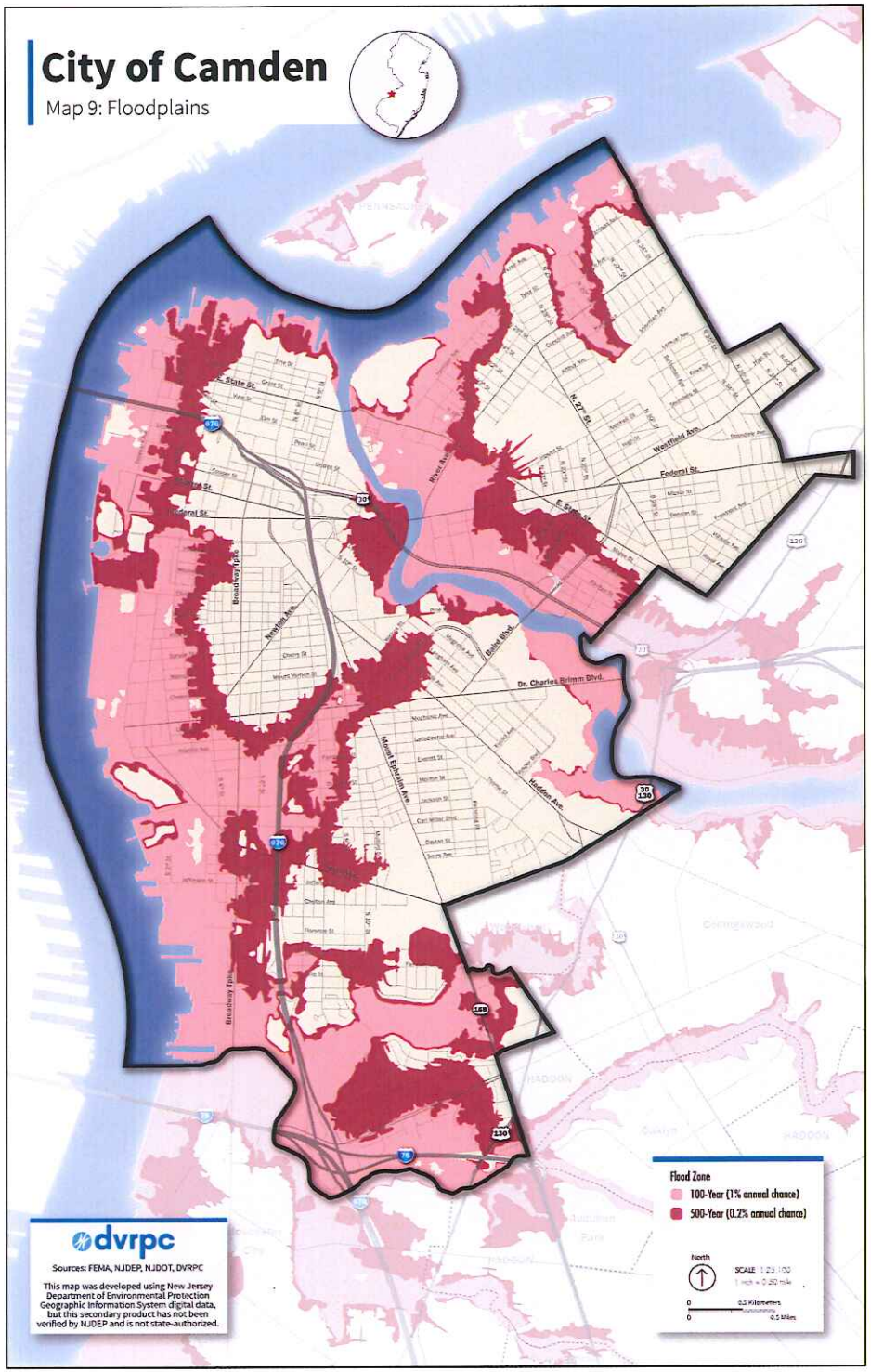
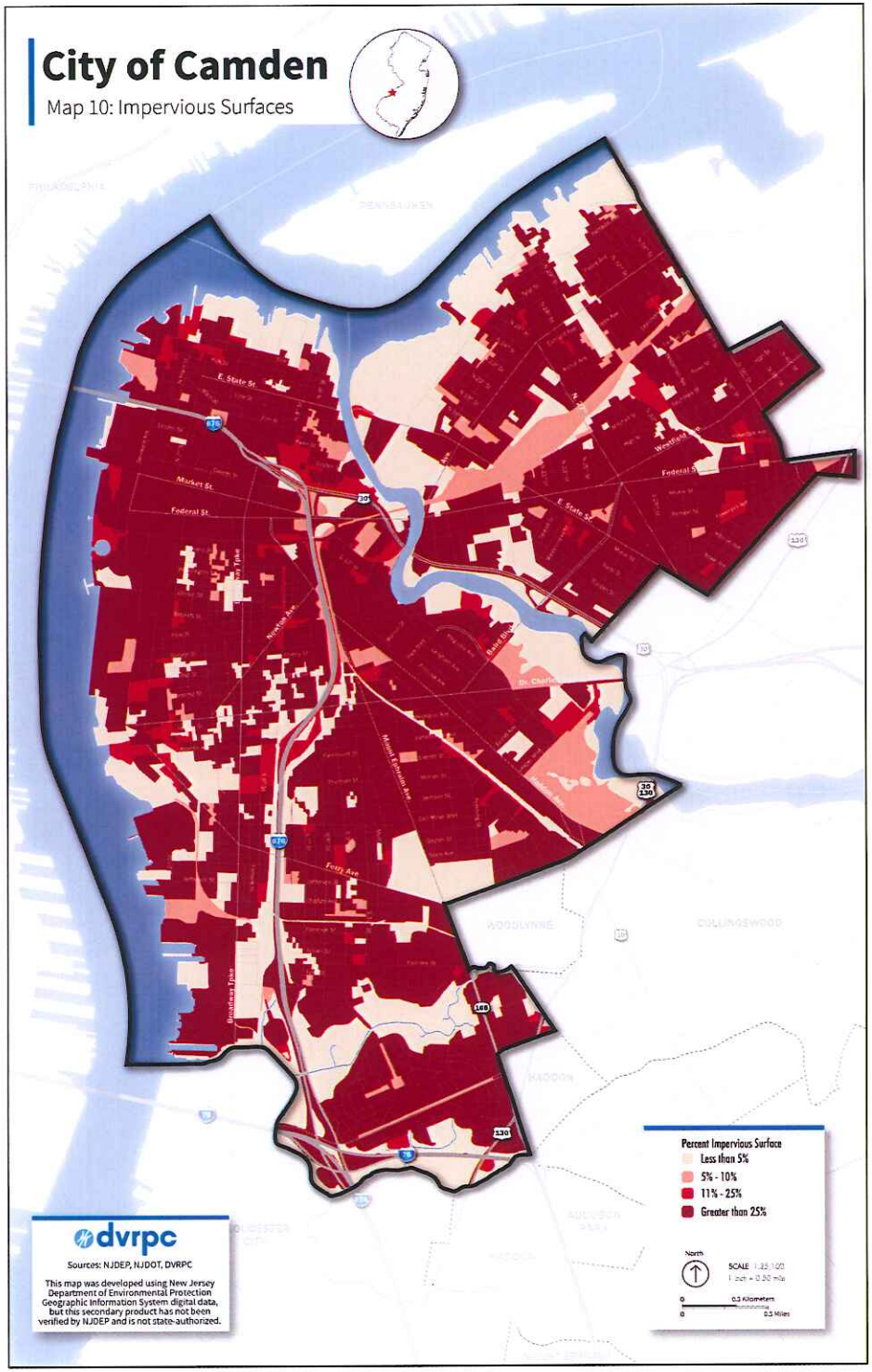

City of Camden
Map 9: Floodplains
Flood Zone
100-Year (1% annual chance)
500-Year (0.2% annual chance)
dvrpc
Sources: FEMA, NJDEP, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.
North
SCALE 1:23,100
1 inch = 0.365 mile
0
0.5 Kilometers
0
0.5 Miles

City of Camden

Map 10: Impervious Surfaces



dvrpc

Sources: NJDEP, NJDOT, DVRPC

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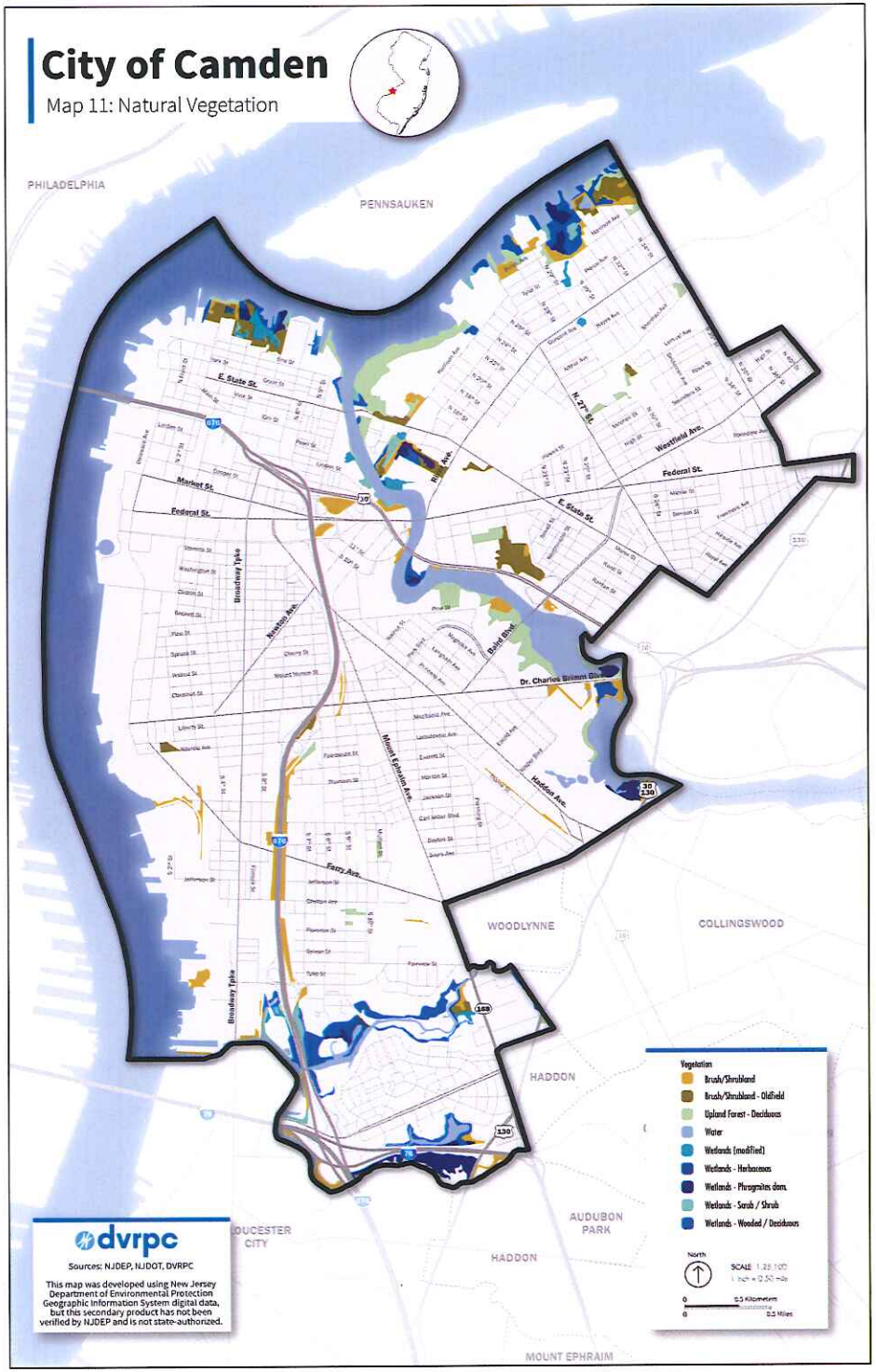
City of Camden

Map 11: Natural Vegetation



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Sources: NJDEP, NJDOT, DVRPC

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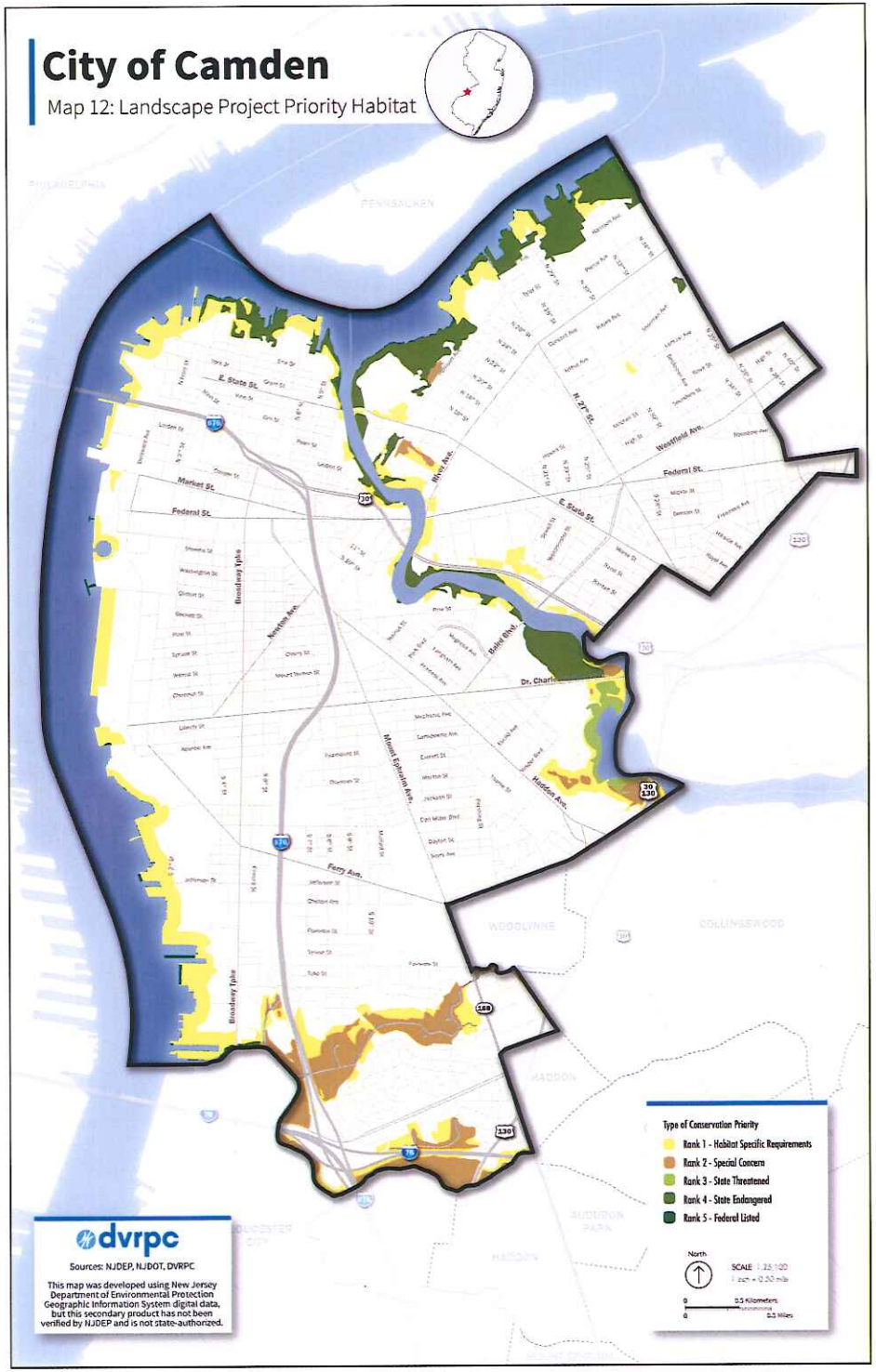
City of Camden

Map 12: Landscape Project Priority Habitat

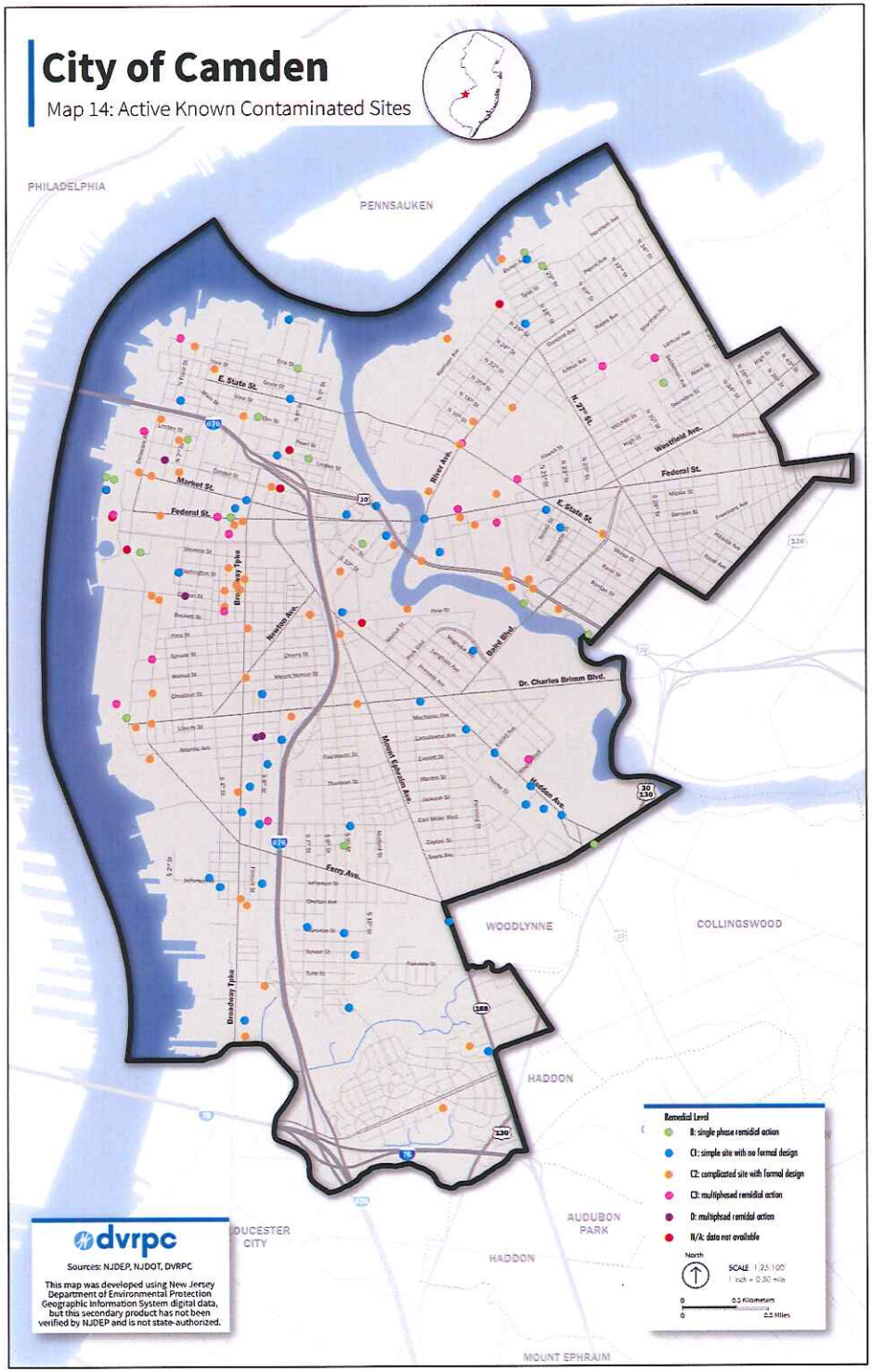


City of Camden

Map 13: Trails and Parks

City of Camden

Map 14: Active Known Contaminated Sites



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Sources: NJDEP, NJDOT, DVRPC

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190 N Independence Mall West
8th Floor
Philadelphia, PA 19106-1520
215-592-1800
www.dvrpc.org