

NATURAL FEATURES AND AGRICULTURAL CONSERVATION

Natural features and resources are the components present or produced by the physical and natural environment including geology, soils, hydrology, topography, biology, and botany. It is essential to identify these important natural features, as well as environmentally-sensitive land areas within the Southern Berks Region to guide development towards sustaining and protecting them.

Geology

The geological features underlying the Southern Berks Region have a significant factor in determining the suitability for land use. The geology of a given area has a direct correlation with the soil suitability, topographic constraints, and hydrologic features which play a vital role in determining groundwater quality and quantity. The existing land use patterns within the Southern Berks Region were developed as a result of favorable geological conditions associated with slope, drainage, porosity, permeability, stability, and the supply of groundwater.

The geologic features of the Southern Berks Region are essentially divided into two (2) prominent geographic sectors. For the purposes of this Plan, we shall identify them as the “northern geological sector” and the “southern geological sector”. The northern geological sector extends from the northern municipal border of both Caernarvon Township and New Morgan Borough northward to the Schuylkill River. This area is essentially underlain by geological formations associated with the Triassic Period, which primarily consists of conglomerates, shale, and sandstone. A narrow band of diabase extends through Robeson and Union townships in the vicinity of Gibraltar Hill, Seidel Hill, Sheep Hill, Cedar Hill, Long Mountain, Brush Hill, and Chestnut Hill. In general, the more-resistant diabase, conglomerates, sandstones, and shales underlie the hills, while the less-resistant shales and sandstones underlie the valleys. The southern geological sector extends from the northern municipal border of both Caernarvon Township and New Morgan Borough southward to Lancaster and Chester counties. This area is essentially underlain by geological formations associated with the Cambrian Period, which primarily consists of limestone, dolomites, and quartzite. A narrow band of Triassic Diabase does divide the southern geological sector, as an intrusion after the geological formations of the Cambrian Period were formed. In general, the more-resistant diabase and quartzite features underlie the hills, while the less-resistant limestone, dolomites, and sandstones underlie the valleys.

Soils

Soils form primarily from weathered bedrock and because of this; have characteristics similar to those of the underlying rock formations. The Southern Berks Region is basically covered with shallow to deep, well drained, rolling soils weathered from shale, siltstone limestone, and dolomites.

The developed areas of Birdsboro, Morgantown, Gibraltar, Monocacy, Joanna, Kulptown, and Beckersville have soils associated with slight to moderate limitations for construction and land development activity. These areas have capabilities and infrastructure to support subdivision and land development activity in the future.

The rural villages of Green Hills, Plowville, Unionville, Geigertown, Plowville, Hopewell, and Scarlets Mill have a composition of soils associated with moderate to severe limitations for construction and land development activity. These areas have limited capabilities to support subdivision and land development activity.

Construction, subdivision, and land development activity should be carefully planned and consideration should be provided for soils with severe limitations. Areas that are prone to sinkholes, pinnacles, bedrock, wetness, poor drainage, steep slopes, low structural stability, cemented pan, and frost action should be thoroughly investigated by a certified geotechnical engineer and soil scientist as part of the subdivision and land development application.



Green Hills Preserve Robeson Township

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Prime Agricultural Soils

The capability classification is a grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage to the soils when used, and the way they respond to treatment. The United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) defines and rates the agricultural capabilities of soils as follows:

Capability Class I:	Soils that have few limitations that restrict their use. The Southern Berks Region contains 80 acres of Class I soils representing 0.33 percent of the overall total land area.
Capability Class II:	Soils have some limitations that reduce the choice of plants or require moderate conservation practices, or both. The Southern Berks Region contains 10,713 acres of Class II soils representing 44.37 percent of the overall total land area.
Capability Class III:	Soils have some limitations that reduce the choice of plants or require special conservation practices, or both. The Southern Berks Region contains 8,589 acres of Class III soils representing 35.57 percent of the overall total land area.
Capability Class IV:	Soils have very serious limitations that restrict the choice of plants, require very careful management, or both. The Southern Berks Region contains 4,762 acres of Class IV soils representing 19.72 percent of the overall total land area.
Capability Classes V-VIII:	Soils have little or no erosion hazard, but have other limitations that limit their use. Soils have severe limitations that make them unsuitable for cultivation and limits their use to pasture. Soils have very severe limitations that make them unsuitable for cultivation and limits their use to grazing. Soils have limitations that preclude their use for commercial plant production and restrict their use.

In addition to the classifications supplied by the NRCS, the Pennsylvania Municipalities Planning Code (MPC) identifies and considers Class I, II and III soils as “prime agricultural soils.”

Figure 2 depicts the locations of the “prime” soils within the Southern Berks Region. Significant pockets of “prime agricultural soils” can be found in the following areas of the Southern Berks Region:

- Within the northern portion of Robeson Township in the lowland valleys of Seidel Creek, Indian Corn Creek, and the tributaries to the Schuylkill River. The prime agricultural soils found within this vicinity are associated with the Abbottstown, Birdsboro, Joanna, Penn, and Gibraltar series.
- Within the northern portion of Union Township in the lowland valleys of Six Penny Creek, and the tributaries to the Schuylkill River. The prime agricultural soils found within this vicinity are associated with the Birdsboro, Reaville, Raritan, Readington, Joanna, and Penn series.
- Within the southeastern portion of Union and Robeson townships and northern portion of Caernarvon Township in the upland valleys of Hay Creek, Pine Creek, and French Creek. The prime agricultural soils found within this vicinity are associated with the Joanna, Ladig, Reaville, and Roland series.
- Within the western portion of Robeson Township in the upland valley of the Allegheny Creek. The prime agricultural soils found within this vicinity are associated with the Joanna, Buchanan, and Reaville series.
- Throughout Caernarvon Township in the upland valleys of the Conestoga Creek. The prime agricultural soils found within this vicinity include Duffield, Brecknock, Joanna, Clarksburg, Glenville, and Neshaminy series.

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Birdsboro Borough: 284 acres of land are considered prime agricultural land. The majority of these acres are Class II and III soils.

Caernarvon Township: 3,459 acres of land are considered prime agricultural land. Class II soils are the majority soil class within the Township.

Robeson Township: 9,209 acres of land are considered prime agricultural land. Class III soils are the majority soil class within the Township.

Union Township: 6,428 acres of land are considered prime agricultural land. Class II soils are the majority soil class within the Township.

Agricultural Conservation Easements (ACE)

Berks County has established the Agricultural Conservation Easement (ACE) Program, through which the development rights of prime agricultural land areas are purchased. Since 1988, the County of Berks has purchased easements on a total of 746 farms which totals 73,111 acres of prime farmland through the ACE Program. To date, there have been a total of 1,317 acres of agricultural conservation easements purchased in the Southern Berks Region. The majority of eased acres is found within Caernarvon Township and equals 887 acres. Based upon the amount of prime agricultural land area within the Southern Berks Region, qualified property owners should be encouraged to apply for the ACE Program.

Agricultural Security Districts

Under Pennsylvania Act 43 of 1981 (as amended), local government units may create agricultural security areas consisting of at least 250 acres upon petition of interested landowners. Once an agricultural security area is established, it entitles the participating landowners to special consideration from local and state governments. The local government may neither enact regulations that unreasonably restrict farm structures or practices, nor may normal farming operations be termed a nuisance when carried out properly. State government agencies must modify their administrative regulations and procedures in agricultural security areas and special reviews are required whenever local authorities propose condemning agricultural land. Since its enactment, many communities in Berks County have utilized Act 43, striving to conserve and protect their valuable farmland. These agricultural



Preserved farm in Caernarvon Township

security areas comprise over 164,906 acres within Berks County. Within the Southern Berks Region, there are 6,249 acres of land currently enrolled or are proposed to be included within an agricultural security district. Figure 3 depicts the locations of the existing agricultural security districts.

Natural Resources

A complete inventory of natural features and resources goes beyond studying the geology, soils, hydrology, and topography of a given area. Natural resources provide scenery and important flora and fauna habitat which give the community its own identity.

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Natural Heritage Areas

In 1991, the Pennsylvania Science Office of the Nature Conservancy prepared the Berks County Natural Areas Inventory, a list and mapping of rare and endangered plants, animals and natural habitats in Berks County. In 2014, the Berks County Planning Commission had the inventory updated through the Pennsylvania Natural Heritage Program (PNHP) at the Western Pennsylvania Conservancy. PNHP collects and stores location and baseline ecological information about rare plants, rare animals, unique plant communities, significant habitats, and geologic features in Pennsylvania. The information and maps presented in the inventory provides a useful guide for planning residential or commercial developments, recreational parks or trails, for conserving natural areas, and for setting priorities for the preservation of the most vulnerable habitats.

A Natural Heritage Area (NHA) is an area containing one or more plant or animal species of concern at state or federal levels, exemplary natural communities, or exceptional native biological diversity. NHAs include both the immediate habitat and surrounding lands important in the support of these elements. They are mapped according to their sensitivity to human activities, with designations of Core Habitat and Supporting Landscape areas. The sensitivity of each designation varies significantly according to the particular plant, animal or natural community habitat that the area represents and is discussed in detail in each NHAs Site Description. **Core Habitats** are defined as areas representing critical habitat that cannot absorb significant levels of activity without substantial negative impacts to elements of concern. **Supporting Landscape** are defined as areas directly connected to Core Habitats that maintain vital ecological processes and/or secondary habitat that may be able to withstand some lower level of activity without substantial negative impacts to elements of concern.

There are several core habitats which exist in the planning region. In Union Township there are five core habitats. The largest of these is found along the eastern border with Chester County within the French Creek Watershed. Robeson Township has a linear core habitat along Beaver Run. These Natural Heritage Areas are depicted on the Natural Resources map, Figure 4. These maps do not pinpoint the exact location of the species of concern but rather represent a conservation zone that is critical to the preservation of the site (core habitat), and a zone of potential impacts within the site's watershed (supporting landscape) where applicable.



Hopewell Lake at French Creek State Park

Significant Natural Features

French Creek State Park: Set amidst the old, quaint, and picturesque farmland of southeastern Berks County, French Creek State Park offers two lakes (Hopewell and Scotts Run), extensive forests, and almost 40 miles of hiking trails as shown on Figure 6, Community Facilities and Recreation. The primary purpose of Pennsylvania State Parks is to provide opportunities for enjoying healthful outdoor recreation and serve as outdoor classrooms for environmental education. In meeting these purposes, the conservation of the natural, scenic, aesthetic, and historical values of parks should be given first consideration. Stewardship responsibilities should be carried out in a way that protects the natural outdoor experience for the enjoyment of current and future generations. The heavily-forested scenic hills of French Creek State Park provide habitat for plants and animals in the ever-expanding urban environment of southeastern

Pennsylvania. Large trees (oak, poplar, hickory, maple, and beech) cover much of the park, with a sparse under-story of mountain laurel, rhododendron, and other brushy plants. Wetlands and pristine streams flowing through rich, damp creek valleys offer additional habitats for plants and animals. This large, diverse environment supports many animals that take advantage of the high quality of the resources found at French Creek State Park. Numerous recreation opportunities are provided to the general public, including camping, fishing, boating,

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swimming, picnicking, hiking, biking, disc golfing, and hunting, and an amphitheater is also provided to provide entertainment.

Birdsboro Water/Preserve: This property spans east and west along the border of Union and Robeson Township as shown on Figure 6. Protection of this land is necessary to maintain the quality of water used for residents in Birdsboro Borough. The facility is owned, operated, and maintained by the Birdsboro Municipal Authority.

Green Hills Preserve: Green Hills Preserve is a bucolic mixture of gently rolling farm fields, woodlands, and wetlands. The preserve is situated along the northwest border of Robeson Township and Cumru Township as shown on Figure 3, Protected Lands. A tributary to Allegheny Creek, a state-designated “Cold Water Fishery” stream, bisects the preserve. The Preserve is situated within the Schuylkill Highlands, a region at the nexus of two landscapes that have been prioritized for protection: the Highlands (as defined by the US Congress) and the Schuylkill River watershed. The area’s importance derives from the need to protect water quality, conserve habitat, and develop recreational opportunities in a region set for considerable growth over the next 20 years.

State Game Land 43: Portions of State Game Land 43 are located in the southeastern portion of Robeson and Union townships, and within the northeastern portion of Caernarvon Township as shown on Figure 6, Community Facilities and Recreation. The area provides heavily-forested scenic hills and provides habitat for plants and animals. Hiking, biking, and hunting opportunities are offered to the general public.

State Game Land 52: A small portion of State Games Land 52 are located in the northwestern portion of Caernarvon Township shown on Figure 6, Community Facilities and Recreation. The area provides heavily-forested scenic hills and provides habitat for plants and animals. Hiking, biking, fishing, and hunting opportunities are offered to the general public.

Water Resources

Water is an essential resource within the Southern Berks Region. It is essential to life, shapes our landscape, and has a direct influence on subdivision and land development patterns. Proper management of our hydrologic resources is vital to meet growing demands, while protecting water quality and quantity from degradation and depletion.

A watershed is a regional area bounded peripherally by water parting and ultimately draining into a particular watercourse or body of water. The boundaries of a drainage basin/watershed are defined by natural ridge lines, which separate one drainage basin from another. The Southern Berks Region is located within the Schuylkill River Drainage Basin and the Susquehanna River Basin. The Southern Berks Region is comprised of three (3) major watersheds, which are geographically depicted on Figure 4 of this Plan.

The Hay Creek Watershed is an essential source of drinking water, exceptional wildlife habit and recreational haven for residents and visitors, the 22-square-mile Hay Creek Watershed lies within south central Berks County and includes portions of Brecknock, Caernarvon, Robeson and Union townships, as well as the boroughs of Birdsboro and New Morgan. The watershed drains water to the Schuylkill River from both public and private lands that include a mixture of woodlands, fields, active agriculture, suburban settings and urban areas. The Hay Creek Watershed is a sub-watershed of the larger Schuylkill Watershed, that then enters the Delaware River, which eventually flows into the Atlantic Ocean.

The Conestoga River Watershed is located within Caernarvon Township. The Conestoga River is a major tributary to the Susquehanna River Basin. The Department of Environmental Protection (DEP) has classified the Conestoga River as a Warm Water Fishery.

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The French Creek Watershed is located in the southeastern portion of Union Township and southeastern portion of Robeson Township. French Creek is a major tributary to the Schuylkill River Basin. DEP has classified the French Creek as an Exceptional Value Waterway.

The Schuylkill River Watershed is located in the northern portion of the Robeson, Birdsboro, and Union. The Schuylkill River Drainage Basin consists of numerous named tributaries (Allegheny, Seidel, Indian Corn, Hay, Six Penny, and French) and un-named tributaries. The Schuylkill River has been designated as a Pennsylvania Scenic River, which are considered to be free-flowing and capable of supporting water-based recreation, fish, and aquatic life.

The Pennsylvania Department of Environmental Protection (DEP) develops water quality standards for all surface waters of the state. These standards, which are designed to safeguard Pennsylvania's streams, rivers, and lakes, consist of both use designations and the criteria necessary to protect those uses. As part of the water quality standards program, DEP conducts stream use designation evaluations on an ongoing basis. Evaluations may be conducted on streams or stream segments that are found to be missing from the water quality standards (Title 25, Chapter 93 of the Pennsylvania Code), or on streams or segments DEP considers to be improperly classified. The redesignation of evaluations may also be conducted at the request of the Pennsylvania Fish and Boat Commission (PFBC). In addition, any person, agency, group, organization, municipality, or industry may submit a rulemaking petition to the Environmental Quality Board (EQB) to request a stream redesignation.

All surface waters within the Commonwealth of Pennsylvania are protected for a designated aquatic life use as well as a number of water supply and recreational uses. The use designation shown in the water quality standards is the aquatic life use. These uses are Warm Water Fishes (WWF), Trout Stocking (TSF), Cold Water Fishes (CWF), and Migratory Fishes (MF). In addition, streams with excellent water quality may be designated High Quality Waters (HQ) or Exceptional Value Waters (EV). The water quality in an HQ stream can be lowered only if a discharge is the result of necessary social or economic development, the water quality criteria are met, and all existing uses of the stream are protected. EV waters are to be protected at their existing quality; meaning the water quality shall be maintained as is and shall not deteriorate.

Each major watershed contains several tributaries. The following are the tributaries found within the three major watersheds of the region as depicted on Figure 4:

Allegheny Creek: This tributary is located in the northwestern portion of Robeson Township. The Allegheny Creek is a major tributary to the Schuylkill River Basin. DEP has classified the Allegheny Creek as a Cold Water Fishery.

Beaver Run: This tributary is located within the southern portion of Robeson Township. Beaver Run is a major tributary to the Hay Creek in the Schuylkill River Basin. DEP has classified Beaver Run as a High Quality Cold Water Fishery.

Hay Creek: This tributary is located along Robeson Township's southern border with New Morgan Borough. Hay Creek is a major tributary in the Schuylkill River Basin. DEP has classified Hay Creek as Exceptional Value.

Indian Corn Creek: This tributary is located along the northern portion of Robeson Township. Indian Corn Creek is a tributary in the Schuylkill River Basin. DEP has classified Indian Corn Creek as Cold Water Fishery.

Pine Creek: This tributary is located along the southeastern border of Union Township. Pine Creek is a tributary to the Schuylkill River Basin via French Creek. DEP has classified Pine Creek as Exceptional Value.

Scotts Run: This tributary is principally located in the southeastern portion of Union Township. Scotts Run is a major tributary to Pine Creek which is a major tributary to the French Creek in the Schuylkill River Basin. DEP has classified Scotts Run as Exceptional Value.

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Seidel Creek: This tributary is located in the northcentral portion of Robeson Township. Seidel Creek is a major tributary to the Schuylkill River Basin. DEP has classified Seidel Creek as a Warm Water Fishery.

Six Penny Creek: This tributary is located in the northcentral portion of Union Township. Six Penny Creek is a major tributary to the Schuylkill River Watershed. DEP has classified the Six Penny Creek as a High Quality-Cold Water Fishery.

Lakes and Other Surface Water Features

The Southern Berks Region also contains a number of prominent lakes and other significant surface water features including:

Green Hills Lake: This lake is located within the western portion of Robeson Township east of Interstate 176. Green Hills Lake is formed by two (2) separate tributaries of the Allegheny Creek, formed on lowlands with a dam breast on the north side, and discharges and continues as the Allegheny Creek. Green Hills Lake provides boating and fishing opportunities to the residents of the Green Hills Development.

Birdsboro Reservoir: This reservoir and watershed is located within the western portion of Union Township. The Birdsboro Reservoir is formed by springs and tributaries of Hay Creek. The facility is owned, operated, and maintained by the Birdsboro Municipal Authority, and is intended to be the primary drinking water source for Birdsboro Borough.

Scotts Run Lake: This 22-acre lake is located within the southeastern portion of Union Township in the French Creek State Park. Scotts Run Lake is formed by headwaters of Scotts Run, formed on lowlands with a dam breast on the south side, and discharges and continues as Scotts Run. The Scotts Run Lake provides boating, fishing, camping, and other recreation opportunities to the general public. This cold water lake offers excellent trout and other cold water species fishing. Hatcheryraised trout are stocked pre-season, during the season, and in the winter.

Hopewell Lake: This 68-acre lake is located within the southeastern portion of Union Township in the French Creek State Park. Hopewell Lake is formed by Scotts Run, formed on lowlands with a dam breast on the east side, and discharges and continues as the French Creek. Hopewell Lake provides boating, fishing, camping, and other recreation opportunities to the general public. A wide variety of Pennsylvania warm water species are found at Hopewell Lake, including northern pike, chain pickerel, bass, walleye, muskellunge, and many species of panfish. This lake is designated as a big bass lake and specific regulations apply.

Six Penny Abandoned Quarry Site: This abandoned quarry site is located in the central portion of Union Township near Kulptown. Based upon the geological characteristic (Diabase Formation) of the area, this site was utilized as a quarry until it was abandoned. Subsequently, the groundwater and springs filled the abandoned quarry site and supplies surface water to the Six Penny Creek during overflow conditions. This abandoned quarry site is not utilized for any specific purpose.

Floodplains

Floodplains provide ecological, aesthetic, and recreational benefits, while at the same time imposing constraints to development. The primary function of a floodplain is to provide an area that will accommodate the floodwaters of a given storm. As shown on the Natural Resources map, Figure 4, the 1% floodplain areas are those areas that, on average, have a one in one hundred chance of flooding in a given year, according to the Federal Emergency Management Agency (FEMA). Within the Southern Berks Region the largest area of 1% floodplain is found along the corridor of the Schuylkill river at the northern boundaries of Robeson and Union Township and

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Birdsboro Borough. Besides providing natural habitat, floodplains carry flood waters and help moderate flood heights. Interfering with these natural functions can result in more severe flooding, costly property damage and possibly the loss of life. The 0.2% floodplain is an area that is expected to be covered by water once every 500 years according to FEMA. Similar to the 1% floodplain area, the majority of the 0.2% is found along the corridor of the Schuylkill River.

Wetlands

Wetlands are recognized as being highly productive ecosystems, providing critical wildlife habitats, and important storage areas for surface and groundwater. Wetlands are areas that have vegetation and soil characteristics of a permanently or frequently saturated environment, including swamps, marshes, bogs and similar environments. Wetlands are important groundwater recharge areas that support wildlife, fish and other aquatic life. Wetlands also reduce flooding by detaining storm water. Besides protecting against floods, slowing storm water discharge helps filter impurities that can contribute to surface water and groundwater pollution.

Wetland areas are depicted on the Natural Resources map, Figure 4.

Given the uses and functions of a wetland, it is important that they be conserved and protected from destruction. The knowledge of a wetland's characteristics is important to allow even the most unnoticeable wetland areas to be identified. Another important factor is the type of land use allowable in and around a wetlands area. By enacting regulations, the municipalities of the Southern Berks Region control the land use in and around wetlands. Wetland margins or fringe areas that act as protective buffers should also be established to help protect the function of wetlands.

Stormwater Management

The water that runs off the land into low land, valleys, and surface waters during and immediately following a rainfall event is referred to as stormwater. In a developing watershed, the volume of stormwater resulting from a particular rainfall event increases due to the amount of impervious surface that is required to support the improvements. The conversion of natural land and topography to residential, commercial, industrial, institutional, and even agriculture and recreation, results in decreased infiltrations of rainfall and an increased rate and volume of stormwater.

As subdivision and land development activity occurs, the increased quantity of stormwater must be properly addressed. Failure to do so can result in greater flooding, stream channel erosion, sedimentation, and reduced groundwater recharge. Provisions for stormwater management must be addressed in every subdivision and land development application within the Southern Berks Region. Past efforts to manage stormwater have usually focused upon controlling the rate of discharge on a municipal basis. This focus is changing to consider stormwater impacts on a watershed-wide basis.

Individual subdivision and land development projects are often viewed as separate incidents, and not necessarily as part of the bigger picture. Even if a municipality takes a comprehensive review of the proposed subdivision or land development plan application, its focus usually does not extend beyond municipal borders. However, the cumulative nature of individual subdivision and land development applications dramatically affects flooding conditions. This cumulative effect includes flooding, stream bank erosion, sedimentation, and property damage, which sometimes result in expensive repairs or even loss of life. Therefore, given the disturbed and cumulative impacts of development, a regional comprehensive approach must be taken if a reasonable management approach is to be successfully implemented for the Southern Berks Region.

Recognizing the need to resolve serious problems associated with flooding, the Pennsylvania General Assembly enacted Act 167, the Pennsylvania Stormwater Management Act.

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Act 167 changed the local stormwater management theories to a watershed-based comprehensive program of regional stormwater management. Act 167 requires all counties within Pennsylvania to prepare and adopt stormwater management plans for each watershed within the county, as designated by the Pennsylvania Department of Environmental Protection (DEP). Most importantly, these plans are to be prepared in consultation with municipalities within the watershed, working through a Watershed Plan Advisory Committee. The plans are to contain stormwater controls to manage stormwater runoff from proposed subdivision and land development applications.

All proposed watershed management plans within the Southern Berks Region should be developed in accordance with the following criteria:

1. They should be consistent with the Southern Berks Regional Comprehensive Plan;
2. They should conduct a comprehensive evaluation of the local and regional hydrological conditions of the watershed;
3. The standards and criteria should be developed from sound technical evaluations performed in the planning process; and
4. The standards and criteria should be adopted by each municipality once completed.

The final product of the Act 167 watershed planning process is to be comprehensive, practical, and developed considering the overall needs of the municipalities within the watershed.

In October of 1999, the National Pollution Discharge Elimination System (NPDES) Phase II Stormwater Permitting Regulations were signed into law. The Environmental Protection Agency's objective in Phase II regulations include:

1. Provide a comprehensive stormwater program that designates and controls additional sources of stormwater discharges to protect water quality.
2. Address discharges of stormwater activities not addressed in Part I, including:
 - Construction activities disturbing between 1 and 5 acres;
 - Light industrial activities not exposed to stormwater;
 - Municipal separate storm sewer systems (MS4s); and
 - Municipally-owned industrial facilities previously exempt under Phase I.
3. Facilitate and promote watershed planning as a framework for implementing water quality programs whenever possible.

While certain activities and facilities are easily defined, MS4s are defined as stormwater conveyance or a system of conveyances owned by a state, county, or municipality that discharges into the waters of the United States of America and is not a combined sewer or part of a publicly-owned treatment system. Townships and Boroughs are determined to be an MS4 based on census data which uses urbanized area populations. As shown on Figure 5, MS4 Areas in Union and Robeson Township as well as Birdsboro Borough have been identified as municipal MS4s. The three municipalities are required to address the following six (6) minimum control measures:

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1. Public education and outreach to the general public concerning stormwater impacts;
2. Public participation in the development of the stormwater management program;
3. Detection and elimination of illicit discharges, including the development of storm sewer map showing the location of all facilities and topographic features;
4. Management of stormwater runoff from subdivision and land development sites;
5. Management of post-construction stormwater runoff from new subdivision and land development sites; and
6. Pollution prevention and good housekeeping practices at municipal operations.

Best Management Practices (BMPs) are techniques that have been shown to be most effective for stormwater management associated with subdivision and land development activity, in a manner that is more consistent with the natural characteristics of the receiving watershed resources. BMPs are a broad series of land and water management strategies designed to minimize the adverse impacts of subdivision and land development activity. These BMPs provide varying levels of watershed protection and are becoming more widely utilized within southeastern Pennsylvania. Stormwater and watershed management is fundamentally concerned with developing programs to protect the natural resources in order to sustain the diverse needs of our community. BMPs provide opportunities to reduce impacts associated with subdivision and land development activity in a manner that endorses conservation management.

BMPs can be “structural” or “non-structural”. Structural BMPs are measures that require the design and physical constructions of a facility to assist with reducing or eliminating a non-point source of pollution and control stormwater. Structural BMPs are most often applied to agricultural operations and stormwater management. Non-structural BMPs are approaches to planning, site design, or regulations that positively affect water quality and reduce stormwater runoff. Non-structural BMPs are generally implemented through the enactment of municipal ordinances that specify site design and construction activities for all subdivision and land development plan applications.

In addition to the discussion above regarding minimum control measures and BMPs, municipalities which have High Quality or Exceptional Value streams have even more requirements to fulfill. Some municipalities may have a Total Maximum Daily Load or a Pollution Reduction Plan as part of their MS4 permit. Both of these additional requirements set limits on the amount of nutrients and sediment which enter the waterbody via the stormwater system as well as how much needs to be removed from the system before entering the water body. Within the Southern Berks Region, both Birdsboro Borough and Robeson Township have to fulfill these additional requirements.

Woodlands

Woodlands are wildlife habitats that, if destroyed, take decades to replace. The root systems of trees and other vegetation stabilize the soil against erosion, particularly in steep areas. Woodlands are also a scenic resource that provides visual relief from the built environment. Woodlands are the largest riparian buffers for the local water resources. Groundwater and surface water benefits that woodlands provide include cooling of water, saturation of pollutants which would otherwise be carried to the waterways.

Woodlands account for 25,250 acres in the Southern Berks Planning Region. These areas are primarily located on areas of steep slopes, floodplains, and other areas that are unsuited for agriculture, subdivision, and land development activity. Woodlands are a vital resource and provide a number of community benefits, including:

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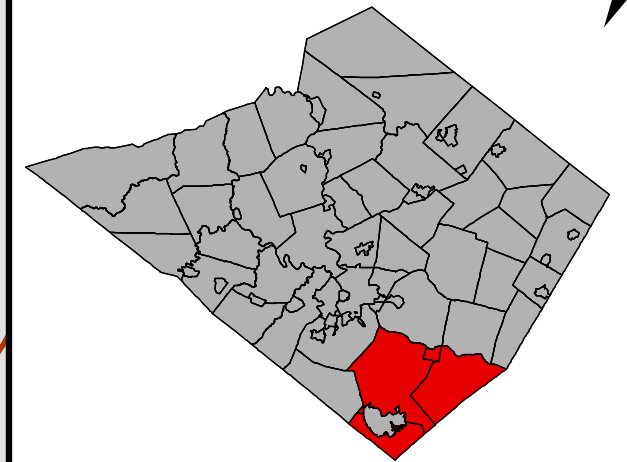
1. Minimize erosion on areas of steep slopes and stream banks;
2. Improve groundwater quality and quantity by filtering out pollution and sediment;
3. Provide wildlife habitats for plants and animals;
4. Provide effective stormwater management and erosion control;
5. Provide shade from direct sunlight and reduce temperatures;
6. Stabilize adverse climate conditions by providing buffer and wind breaks;
7. Provide active and passive recreation opportunities;
8. Enhance the scenic characteristics; and
9. Absorb pollutants that may be found in ambient air.

Hopewell Big Woods

The largest area of woodlands in the Southern Berks Region is the Hopewell Big Woods. This area contains the largest contiguous block of forest in southeastern Pennsylvania (the “big woods”). This conservation area encircles French Creek State Park and the Hopewell Furnace National Historic Site, and is greatly valued as an asset for public recreation. An expanse of over 73,000 acres, or 110 square miles, Hopewell Big Woods is a rarity in our landscape. The Hopewell Big Woods Partnership, led by Natural Lands Trust, is a group of over 30 government agencies, private non-profits, and municipal entities which maintain the area. The Partnership is seeking to conserve at least 4,000 acres of old growth, 15,000 acres of unbroken forest, and the watersheds supported by this forest. The Partnership aims to attain the following conservation goals:

1. The permanent protection and stewardship of at least 15,000 acres of unbroken forest in and around French Creek State Park.
2. The conservation of water quality and quantity in the watershed of the Upper reaches of French Creek, the entirety of Hay Creek and the smaller watershed within the Hopewell Big Woods. The primary indicator for watershed conservation is retaining impervious cover below 6% in these watersheds.
3. The conservation of state and federally listed as well as other species, occurring within the Hopewell Big Woods.
4. The promotion of recreational resources located in and around the Woods.
5. The encouragement of compatible economic development within the Hopewell big woods that is consistent with the other conservation goals.
6. The protection of historic and cultural resources occurring within and nearby the Woods.

Geology



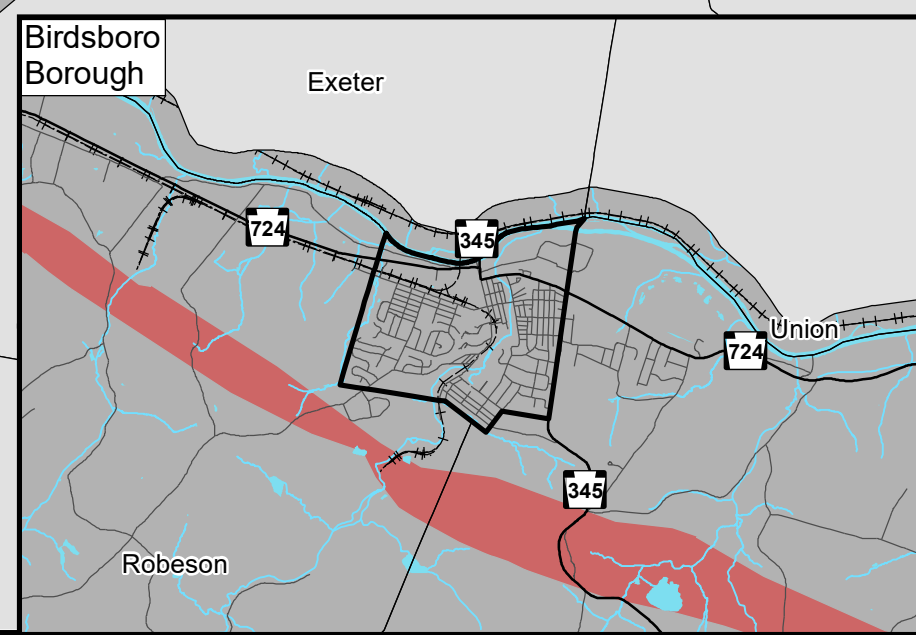
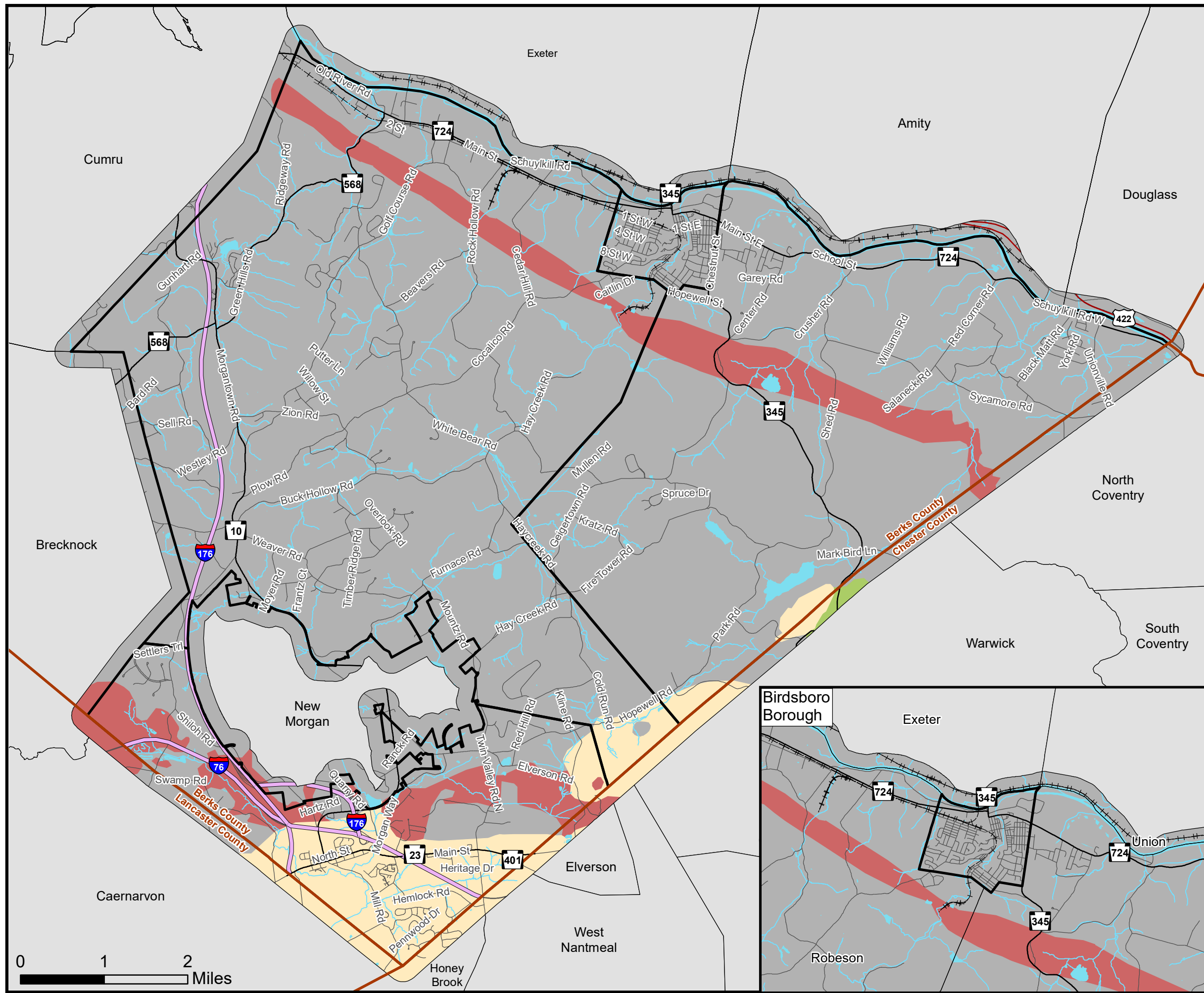
Geologic Period

- Precambrian
- Cambrian
- Ordovician
- Triassic
- Jurassic
- Roads
- Railroads
- Streams and Water Bodies
- Municipal Boundaries
- County Boundaries

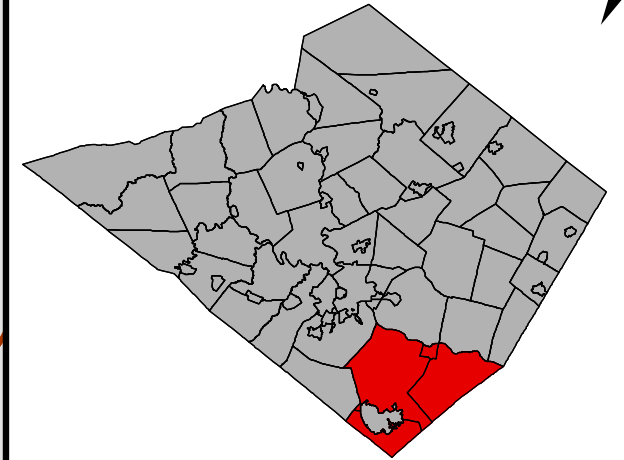
Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES, USDA NRCS

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Soils



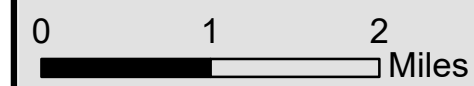
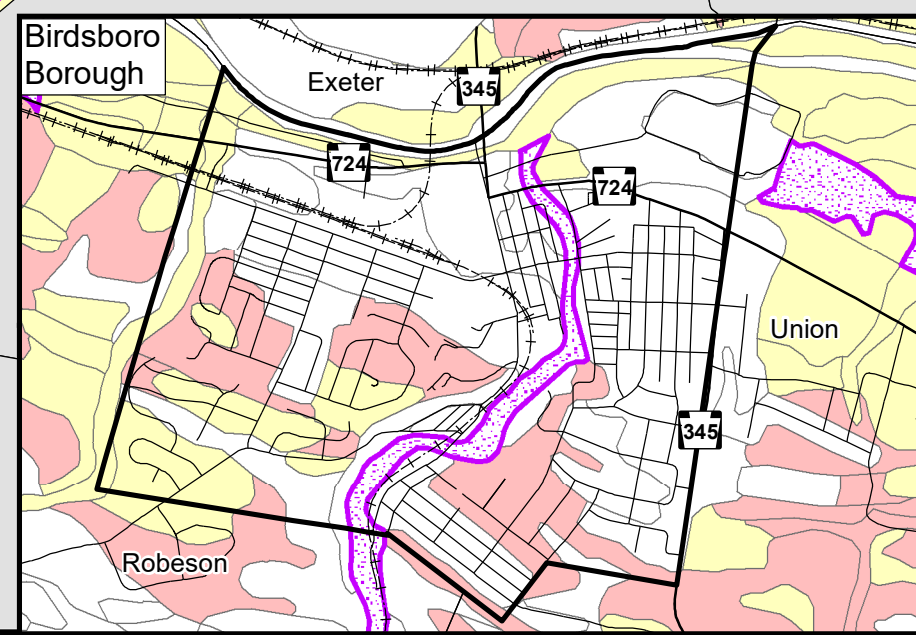
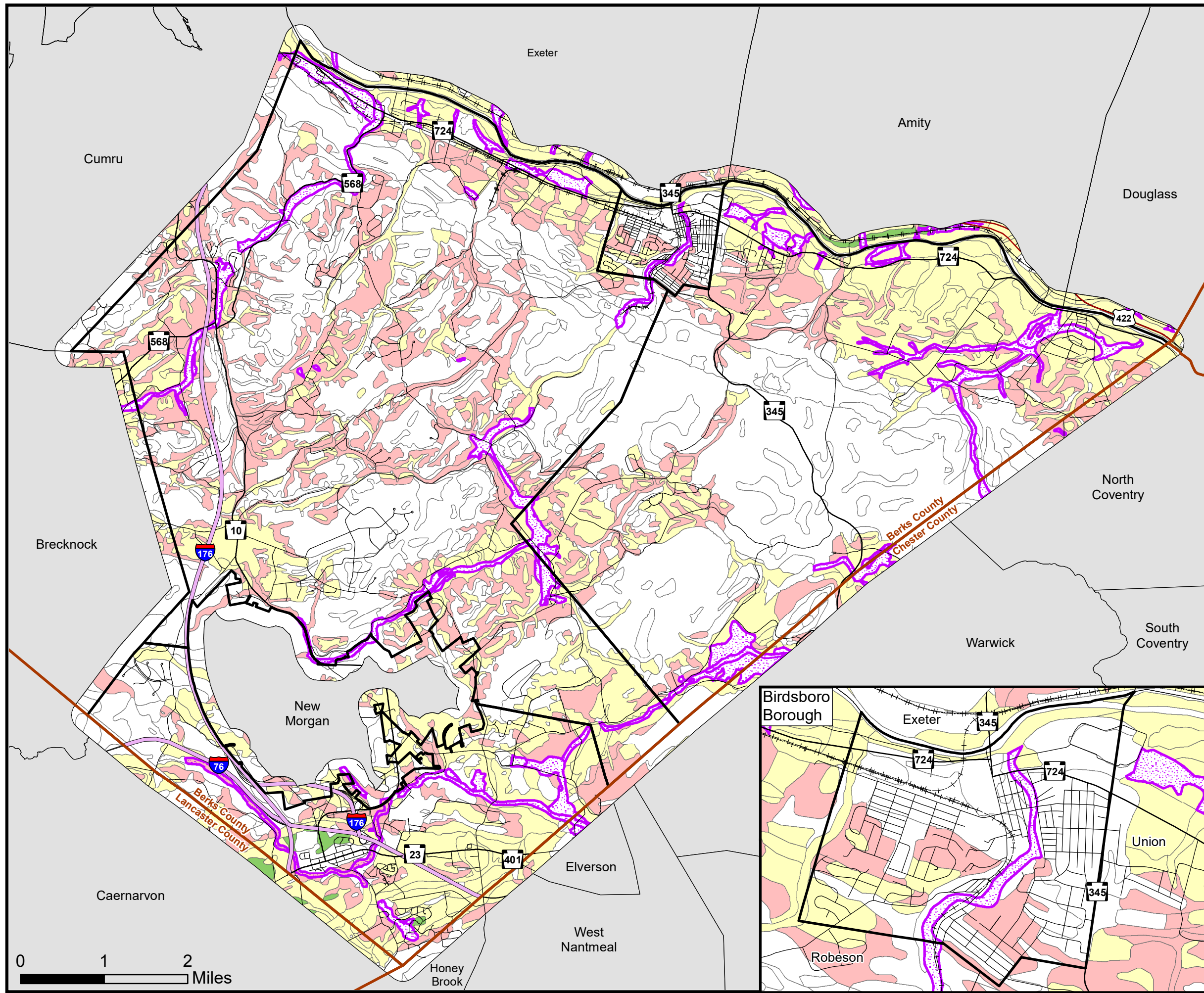
Legend

- Class 1 Soil
- Class 2 Soil
- Class 3 Soil
- Class 4-8 Soils
- Poorly Drained Soils
- Roads
- Interstate
- US Route
- State Route
- Railroads
- Municipal Boundaries
- County Boundaries

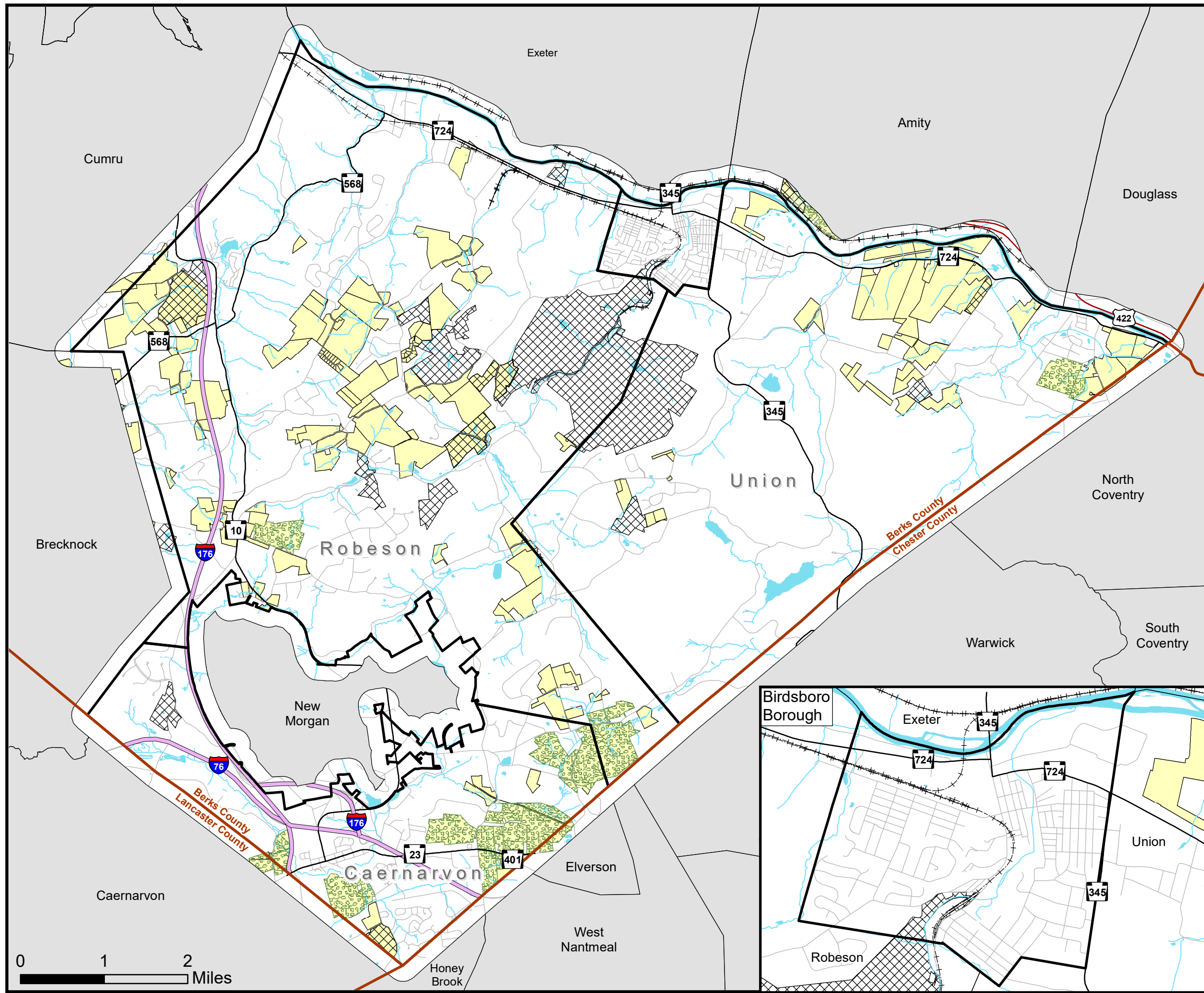
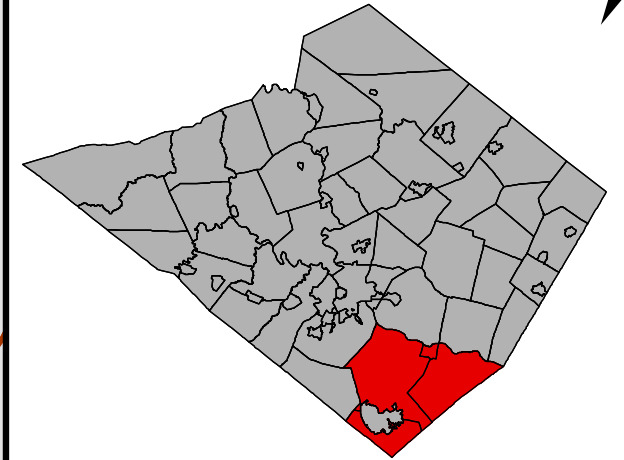
Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES, USDA NRCS

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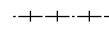
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Protected Lands



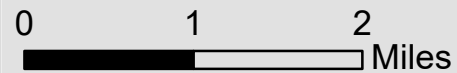
Legend

-  Berks County Agricultural Conservation Easements
-  Conservation Easements
-  Agricultural Security Areas
-  Roads
-  Railroads
-  Streams and Water Bodies
-  Municipal Boundaries
-  County Boundaries

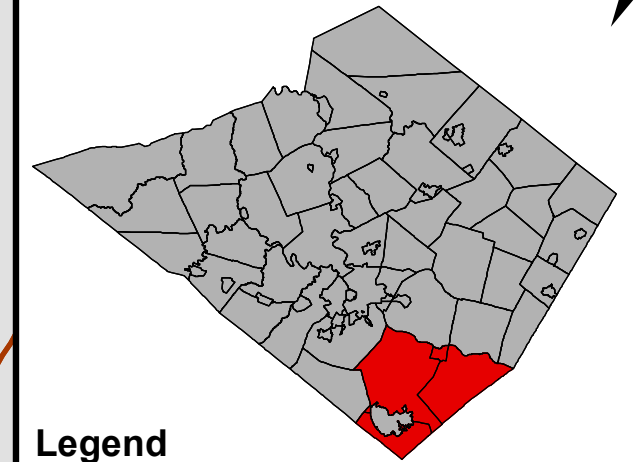
Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES

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Natural Resources



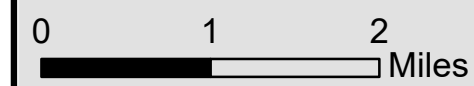
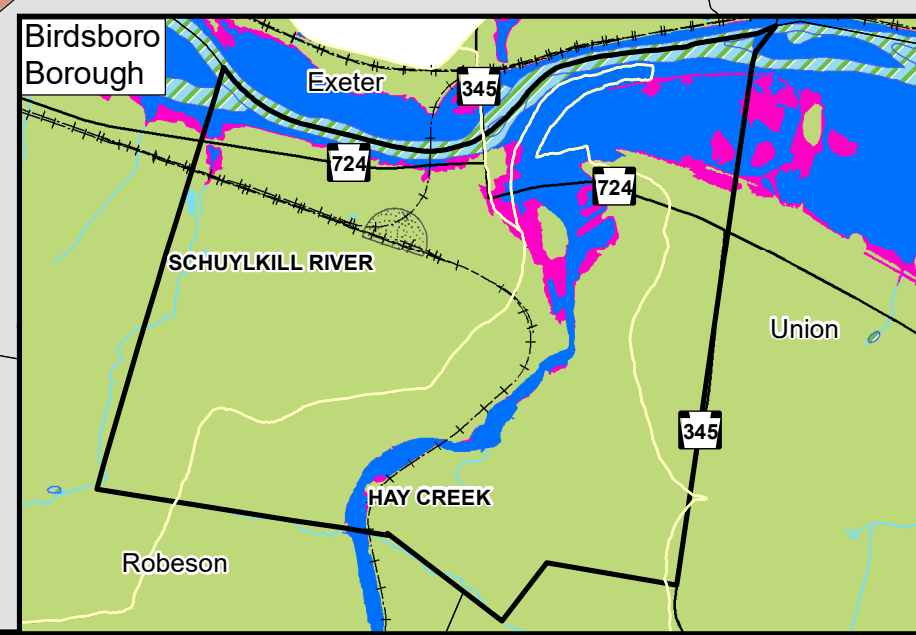
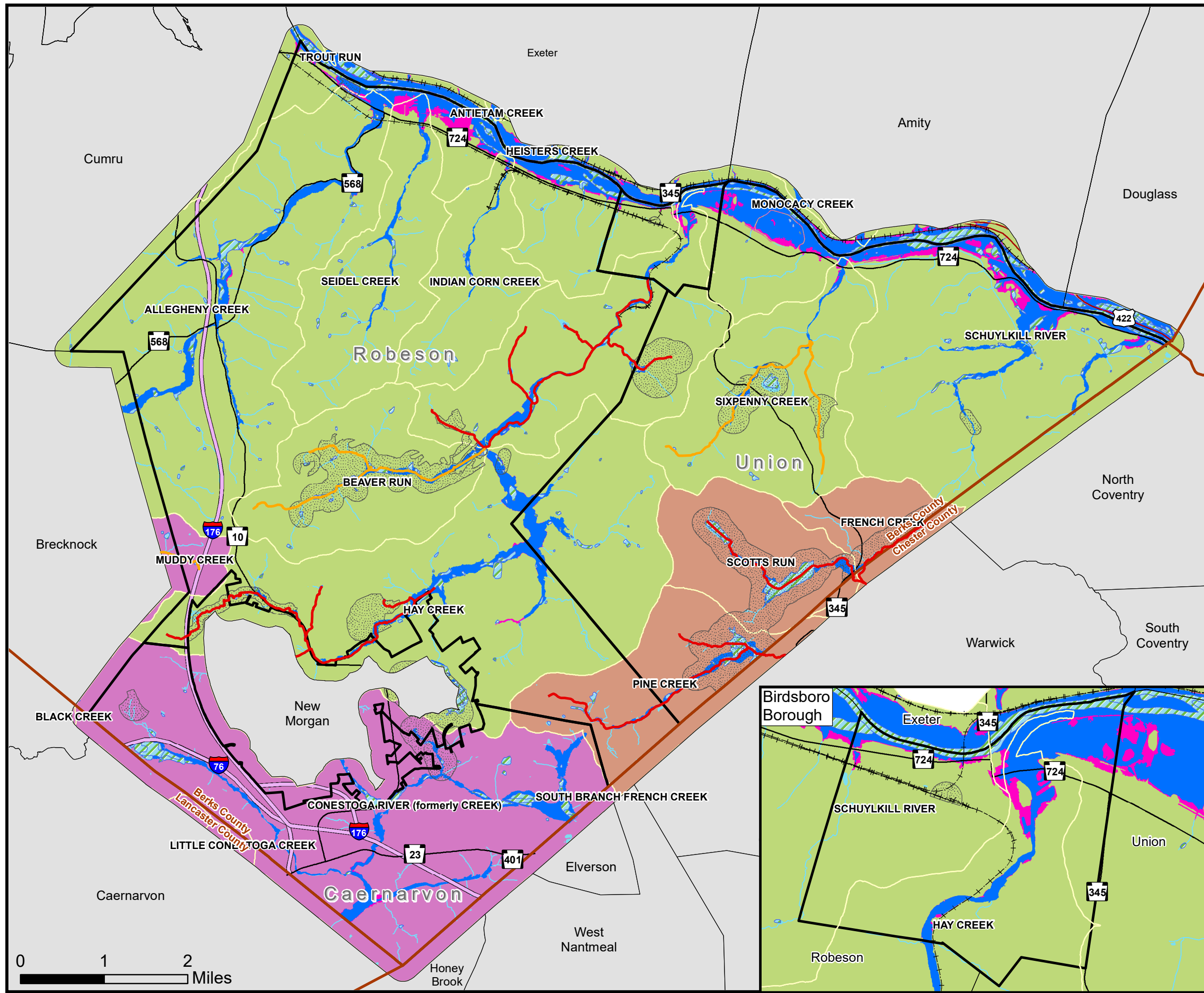
Legend

- Schuylkill Watershed*
 - French Creek Watershed*
 - Conestoga River Watershed**
 - Subwatersheds
 - 1% Floodplain
 - 0.2% Floodplain
 - Wetlands
 - Natural Heritage Area- Core Habitat
 - Exceptional Value Streams
 - High Quality Streams
 - Streams and Water Bodies
 - Interstate
 - US Route
 - State Route
 - Railroads
 - Municipal Boundaries
 - County Boundaries
- * Drains to Delaware River
** Drains to Susquehanna River

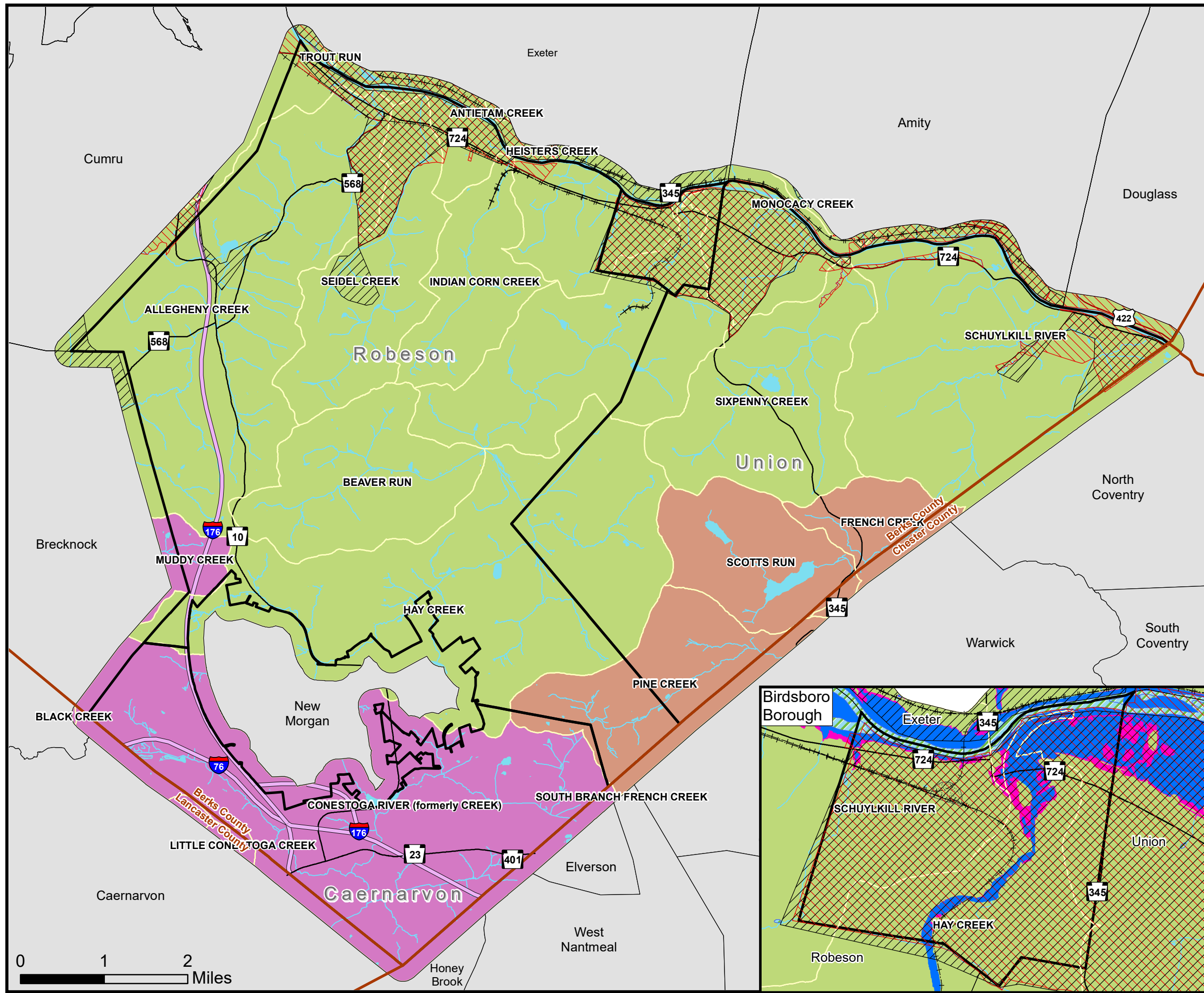
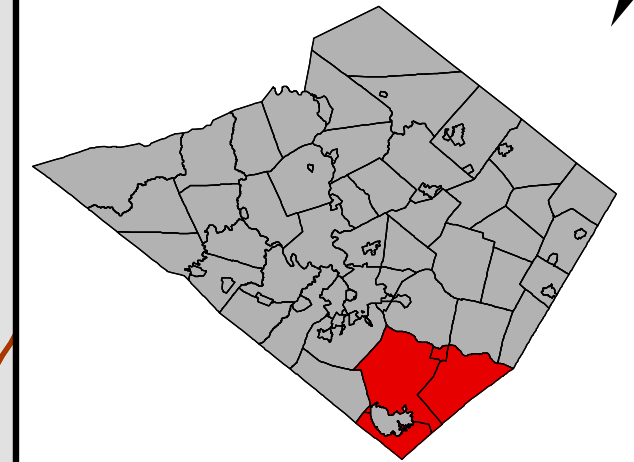
Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES

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MS4 Areas



Legend

- Urbanized Area 2000
 - Urbanized Area 2010
 - Schuylkill Watershed*
 - French Creek Watershed*
 - Conestoga River Watershed**
 - Subwatersheds
 - Streams and Water Bodies
 - Interstate
 - US Route
 - State Route
 - Railroads
 - Municipal Boundaries
 - County Boundaries
- * Drains to Delaware River
** Drains to Susquehanna River

Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES, U.S. Census Bureau
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