

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 Northern Berks region to guide development towards sustaining and protecting them.

Geology and Soils

The geologic features underlying the Northern Berks region contribute significantly in the determination of the suitability for land use. The geology of a given area has a direct correlation with the soil suitability, topographic constraint and hydrologic features, all of which play a vital role in groundwater quality and quantity. Therefore, trends in the land development of the Northern Berks region show as the result of favorable geological conditions associated with slopes, drainage, porosity, permeability, stability as well as the supply of groundwater.

Two prominent geological sectors exist in the Northern Berks region; for the purposes of this plan, they shall be identified as the “northern geological sector” and the “southern geological sector”. The northern geological sector extends south from the northern border of this region with Schuylkill County. It comprises much of the northern quarter of the region, present in the northernmost lands of Upper Bern, Upper Tulpehocken and Windsor Townships in the Kittatinny Ridge. It is associated with geological formations from the Silurian Period, which primarily is comprised of sandstone, conglomerate and shale. Suitability for land development in this region in general can be poor with problems ranging from cut-slope stability concerns to areas that are difficult to excavate.

The southern geological section extends from this boundary at the foothills of the Kittatinny Ridge south to the region’s border. It comprises much of the previously mentioned Townships as well as the entirety of Hamburg and Shoemakersville Boroughs and Perry Township. A small sliver of it extends west from the northeastern border of Windsor as well. This section is associated with the Ordovician Period, and composed of shale, graywacke, siltstone and some limestone. The ease of excavation varies within a location in this section ranging from easy (areas predominately shale) to difficult (limestone), but the cut-slope stability is fair. These geological sectors are shown on Figure 01, Geology map.

Prime Agricultural Soils

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) defines and rates soils by their agricultural capabilities. The land capability classification generally shows the suitability of soils for most kinds of field crops. They are grouped based on limitations of the soil, the risk of damage to the soils when used and the way they respond to treatment. Capability classes are designated by numbers 1 through 8, indicating progressively greater limitations and narrower choices for practical use as the class number increases:

- Class 1:** Soils that have few limitations that restrict their use. Northern Berks contains 596 acres of Class 1 soils representing 1.7 percent of the overall total land area.
- Class 2:** Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. Northern Berks contains 13,778 acres of Class 2 soils representing 39.2 percent of the overall total land area.
- Class 3:** Soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both. Northern Berks contains 20,782 acres of Class 3 soils representing 59.1 percent of the overall total land area.
- Classes 4-8:** Soils have very severe limitations that reduce the choice of plants or that require very careful management, or both. These soils could be subject to little or no erosion but have other limitations, they are impractical to remove, and could restrict their use mainly to pasture, rangeland, forestland or wildlife habitat. Class 7 and 8 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat. These soils have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Using this classification, the Municipal Planning Code (MPC) defines prime agricultural land as that of which is used for agricultural purposes containing soils rated Classes 1 through 3.

Prime soils contained within the Northern Berks region are displayed in Figure 02. Much of the Northern Berks region has prime agricultural soils present most notably in the portions of Upper Tulpehocken, Upper Bern and Windsor Townships south of the Kittatinny Ridge as well as a significant portion of Perry Township.

Hamburg Borough: Much of the Borough is developed land. However, the Borough contains 544 acres considered prime agricultural land. The majority of these acres are Class 3 soils.

Perry Township: 8,866 acres are considered prime agricultural land. Class 3 soils are the majority within the Township.

Shoemakersville Borough: Much of the Borough is developed land as well. However, the Borough contains 161 acres considered prime agricultural land. Most of these acres are Class 2 soils.

Tilden Township: 5,800 acres are considered prime agricultural land. Class 3 soils are the majority within the Township.

Upper Bern Township: 5,732 acres are considered prime agricultural land. Class 3 soils are the majority within the Township.

Upper Tulpehocken Township: 7,517 acres are considered prime agricultural land. Class 3 soils are the majority within the Township.

Windsor Township: 6,538 acres are considered prime agricultural land. Class 3 soils are the majority within the Township.

Hydric Soils

Hydric soils are those of which formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils pond long enough to support the growth of hydrophytic (or water loving) vegetation. They are poorly draining soils and mapped as such in Figure 02. Areas of hydric soils can overlap areas of wetlands, but the land area they appear on is more extensive than that identified as wetlands. They are generally found around watercourses within the Northern Berks region. Preservation of areas with hydric soils should be encouraged and any development limited as hydric soils act as natural sponge filters absorbing floodwaters as a first defense to limit widespread damage. When coupled with wetlands (discussed later in this chapter), hydric soils then help filter pollutants from the water protecting surface and groundwater.

Agricultural and Natural Preservation

Agricultural and Natural preservation play a vital roll in the Northern Berks region. Local preserved farms provide the region and beyond with a food source, jobs, income and agritourism, but also serves as a connection with the region's cultural history. Natural areas provide a safe home for endangered and threatened wildlife as well as opportunity for both residents and visitors to explore and learn more about the region's offerings. Preservation of appropriate lands can serve as a buffer from the pressures of development, providing balance in a growing community.

Agricultural Conservation Easements

Berks County established its Agricultural Conservation Easement (ACE) Program in 1988. Funded largely by the Commonwealth of Pennsylvania and County of Berks, the program is designed to purchase the development rights of prime agricultural land areas in perpetuity. Landowners submit applications to the Berks County Agricultural Land Preservation Office on a volunteer basis by December 31st of any given year. Farms are ranked based on soil quality, development pressure, productivity of farm and the ability to create clusters of preserved farmland and funding is allocated on a yearly basis. Municipalities may choose to participate in the ACE program along with the County and Commonwealth. The County of Berks has purchased 92,853 acres of prime farmland to date through the ACE program, 15,844 acres of which are located within the Northern Berks Region. The majority of the eased land in the region, 5,109 acres, is found in Perry Township.

Agricultural Security Areas

Under Pennsylvania Act 43 of 1981 (as amended), local governments are authorized to create Agricultural Security Areas (ASAs) on a voluntary basis of land areas consisting of at least 250 acres upon petition of interested landowners. Once established, an ASA is protected from local laws and ordinances that otherwise may unreasonably restrict farm structures or farm practices. Likewise, any political subdivision law or ordinance regarding public nuisance must exclude any agricultural activity conducted using normal farming operations within the ASA as long as the operations do not affect public health and safety. ASAs are largely protected from condemnation and eminent domain of productive agricultural lands; Act 43 requires the Agricultural Lands Condemnation Approval Board to accept the proposal prior to condemnation. Since its enactment 165,564 acres have been designated Agricultural Security Areas. All of the Townships within the Northern Berks region have ASAs as well as Hamburg Borough, and 27,519 acres of land within the region are enrolled in the program. Shoemakersville currently has no preserved land. Figure 03 shows the locations of the existing Agricultural Security Areas.



Effective Agricultural Zoning

Effective agriculture zoning, sometimes called agricultural protection zoning, was first used in Pennsylvania in Berks County, in Lower Heidelberg Township in 1973. Since then, the practice has spread throughout much of rural Berks County and across the Commonwealth. Effective Agriculture Zoning can be used to protect many large tracts of prime farmland all at once quickly, relatively easily and at a relatively low cost. It is easy to modify when needed as well. The agricultural zoning designations help reduce conflict between farms and other uses. However, Effective Agriculture Zoning is an effective tool as preserving farmland, but it is not permanent; a municipality can change zoning in these areas at any time and leave the farmlands open for development. In order for this tool to protect farmland at its maximum potential, it needs both the support of the municipality's elected body and its local farmers. Currently, all five townships in Northern Berks have Effective Agriculture in their zoning ordinances. These zones are largest and most concentrated in Perry, Upper Bern and Upper Tulpehocken Townships.

Clean & Green

The Clean & Green Act of 1974 is a tax assessment program by the Commonwealth that was enacted as a tool for encouraging the protection of valuable farmland, forestland and open spaces. A land assessed using the Clean & Green program is assessed at its use value rather than fair market value. This typically amounts to tax savings for the average landowner. Generally, the property must be 10 or more acres, the exception being agriculture producing at least \$2,000 of farm income annually. This designation is not permanent. However, if a landowner breaches the covenant, the landowner is subject to seven years rollback taxes, the difference in use and fair market value, plus interest. Limited subdivision, land development and non-agricultural activities are still allowed on the property while enrolled in this program.

Conservation Easements

Land can also be protected through a conservation easement. A conservation easement is a legal agreement between the landowner and a land trust or government agency that permanently limits the uses of the land in order to protect its conservation values. Conserved land can still be utilized by the property owner as well as sold or passed down to heirs. However, the easement will bind all future landowners as well. The landowner decides how the land is conserved; Some owners will restrict the ability to build upon the land while allowing farming practices for example. Conservation easements can be sold or donated. The total acreage of conservation easements in the Northern Berks region is 826 acres. The easements can be held by various entities, however in this region, nearly all the conservation easements are held by Berks Nature, the exception being a portion of an easement in Upper Bern township of a property primarily in Centre Township of which the easement is held by Centre Township as well. Conservation easements are mapped on Figure 03.

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 and animals and the best natural habitats for them in Berks County. Most recently, the Pennsylvania Natural Heritage Program (PNHP) through the Western Pennsylvania Conservancy on behalf of the Berks County Planning Commission updated this inventory in 2014. The Berks County Natural Heritage Inventory (CNHI) can be used to steer development away from these environmentally sensitive areas, to plan appropriate recreational parks and trails, or to conserve and preserve areas for the region's most vulnerable habitats, providing a balance between economic growth and environmental conservation.

According to PNHP, 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. They are mapped according to their sensitivity to human activities, with designations of Core Habitat and Supporting Landscape. *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 Landscapes* 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. 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 NHA's Site Description.

There are nine core habitats within the Northern Berks planning region. Kittatinny Ridge-Hawk Mountain in Windsor Township and Kittatinny Ridge in Tilden, Upper Bern and Upper Tulpehocken Townships are the largest NHAs, both of which are located along the northern borders of the Townships with Schuylkill County. Five of the NHAs are located along water bodies: Lake Ontelaunee and Pigeon Creek in Perry Township, Maiden Creek in Perry and Windsor Townships, and Birch Creek-Jackson Creek and Little Northkill Creek in Upper Tulpehocken Township. Sunday Road Grasslands in Windsor are open agricultural lands that support a population of sensitive species and Onyx Cave in Perry is a subterranean habitat identified as an NHA. These Natural Heritage Areas are shown on the Natural Resources Map in Figure 04. The maps display a conservation zone that is critical to the preservation of the site (Core Habitat) rather than pinpoint an exact location of a species of concern.

Parks, Preservation and Public Lands

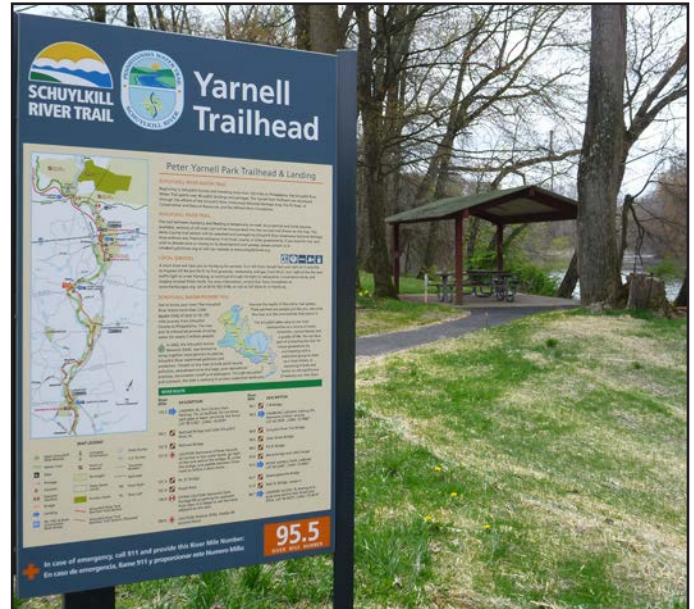
State Game Lands 106: These game lands extend from Windsor and Albany Townships in Berks County to East Brunswick and West Brunswick Townships in Schuylkill County. The property totals approximately 9,720 acres. The Schuylkill River borders the Game Lands and several headwaters begin here including Rattling Run and Pine Creek. The Appalachian Trail runs through these lands. This area is used extensively by the public for hunting, trapping, fishing, hiking, biking, horseback riding and bird watching. Deer, black bear, turkey, grouse, rabbits, pheasants, squirrels, gray fox, racoons, opossums, ducks and geese are frequently harvested on Game Lands 106.

Weiser State Forest: Portions of Weiser State Forest are located within Windsor, Tilden and Upper Bern Townships in Berks County. However, the forest is extensive, covering almost 30,000 acres on 16 tracts throughout Dauphin, Carbon, Columbia, Lebanon, Montour, Northumberland and Schuylkill Counties as well. The Pennsylvania Department of Conservation and Natural Resources (DCNR) manages the land for pure water,

recreation, scenic beauty, plant and animal habitat, sustainable timber and natural gas, among other programs. In the Northern Berks region, the Weiser State Forest's most notable attractions including the Pinnacle Trail in Windsor Township, and the Eagles Nest Shelter on the Appalachian Trail just across Upper Bern Township's boundary in Schuylkill County as well as the Appalachian Trail itself. The forest is open to hunting, fishing and general recreating.

Kaercher Creek Park: Located primarily in Windsor Township with a small portion in Hamburg Borough, Kaercher Creek Park is a 183-acre passive recreation park surrounded by a 35-acre manmade lake managed by the Pennsylvania Fish and Boat Commission. Visitors can hike, boat, kayak and canoe on the lake.

Kernsville Dam and Desilting Basin: This 263-acre preserve is located in Tilden Township and Hamburg Borough along the Schuylkill River. The northern portion of the recreation area is no longer accessible to the public; however, the southern portion contains a trailhead to the Bartram Trail that is still available for public use. The Kernsville Dam area has become an important wilderness area, attracting many fishers and birders alike. The Appalachian Trail cuts through its northernmost reaches as well. Blue Mountain Wildlife, Incorporated are the stewards of the Kernsville Dam and nearby Bartram Trail. Formed in 2001 to protect the area from development, this volunteer group sponsors educational programs and aids other like-minded groups in the region with preserving, protecting and maintaining wildlife areas locally. Annually the group holds the BMW Trail Race Series to raise both awareness and funding for the area.



State Game Lands 110: Located along the Kittatinny Ridge in Tilden, Upper Bern, Upper Tulpehocken and Bethel Townships and in Schuylkill County in Wayne and West Brunswick Townships, the State Game Lands 110 stretches over 10,130 acres. The Appalachian Trail runs through the length of the game lands. Ducks, geese, deer, black bear, turkey, grouse, rabbits and squirrels are hunted, and coyotes, foxes, opossums, racoons, muskrat and mink trapped within the property. Fishing, raptor watching, and snowmobiling are also popular.

Pinnacle Trail and Pulpit Rock: This is a 9.2 mile hike round trip, but the views are worth every step taken. Because of the picturesque scenery, it is considered to be one of the best hikes and one of the most popular in the Region.

Hamburg Reservoir: Located on Furnace Creek at the site of the old Windsor Furnace. This area is the starting point for hiking the Appalachian Trail, Pulpit Rock, and the Pinnacle.

Blue Rocks: The formation of this unique glacial rock field occurred during the last ice age and has been dated to be approximately 350 million years old. The formation covers 15 acres and is said to have a stream that still runs beneath the field.

Water Resources

As is the case throughout the planet, water is one of the most essential resources within the Northern Berks region. It is critical to all forms of life and shapes the landscape, but also has a direct influence on subdivision and land development patterns. Proper management of hydrologic resources is vital to meet growing demands, while protecting water quality and quantity from degradation and depletion.

Watersheds

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 Northern Berks region is located within the Schuylkill

River Drainage Basin and the Susquehanna River Basin. The Northern Berks region is comprised of five (5) major watersheds, which are geographically depicted on Figure 05 of this Plan.

Little Schuylkill River: Located in northern Windsor Township within the Kittatinny Ridge, the Little Schuylkill drains to the Schuylkill and ultimately the Delaware watershed. The Pennsylvania Department of Environmental Protection (DEP) classifies the Little Schuylkill River as a cold water fishery (CSF).

Maiden Creek: The Maiden Creek river basin runs on the eastern edge of Windsor and Perry Townships. The Creek forms as the confluence of the Ontelaunee and Kistler creeks upstream of the Northern Berks Region and is dammed to form Lake Ontelaunee which is located partially within Perry Township. It too drains into the Delaware River. The Maiden Creek is designated a trout stocking fishery (TSF) by DEP.

Schuylkill River: The largest in Northern Berks, this watershed is located within a majority of Perry, Tilden, Upper Bern and Windsor Townships as well as Hamburg and Shoemakersville Borough. The Schuylkill River Basin consists of numerous named (Stony, Mill, Hassler Run, Plum, Leshner Run, Irish, Pigeon) and unnamed tributaries within the Region. The Schuylkill River is designated a Scenic River by the Commonwealth.

Tulpehocken Creek: Much of Upper Tulpehocken as well as the western boundary of Upper Bern Township houses the Tulpehocken Creek watershed. Tributaries of the Tulpehocken include Birch, Mollhead, Bear, Northkill, Wolf and Spring. The Tulpehocken Creek is a major tributary to the Schuylkill River. It is also designated a Scenic River by the Commonwealth.

Swatara Creek: The Swatara is the only watershed whose creeks do not drain to the Delaware, instead contributing to the Susquehanna River Basin. The Swatara Creek Watershed makes up the western border of Upper Tulpehocken Township. The Swatara Creek is a designated cold water fishery (CWF).

Surface Water Features

Surface water features in the region have a wide range of functions such as wildlife habitat, public drinking water supply, and recreation. Types found in the Northern Berks region include rivers, streams, lakes, ponds, reservoirs, and other various smaller bodies of water.

The Pennsylvania Department of Environmental Protection (DEP) develops water quality standards for all surface waters of the Commonwealth. 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. These uses include aquatic life habitat, water supply and recreation. 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.

A number of prominent surface water features exist here including those described below.

Schuylkill River: Running northwest to southeast, the Schuylkill River flows for 135 miles from headwaters in Pottsville to where it joins the Delaware River in Philadelphia as one of its largest tributaries. In the Northern Berks region, the Schuylkill roughly designates the borders of Hamburg and Shoemakersville Boroughs and Perry, Tilden and Windsor Townships. The river is a hotspot for the region's recreation. Hikers, bikers, and kayakers often visit the region to recreate at the river. Fishing is also popular with anglers catching a variety of species such as brook trout, rainbow trout, bluegill, smallmouth bass, largemouth bass and muskellunge. The Schuylkill River is also popular with hikers and bikers utilizing the trails that line the river and is a significant draw for tourism in the region.

Lake Ontelaunee: Located primarily in Maiden Creek and Ontelaunee Townships, Lake Ontelaunee is a 1031-acre lake whose northernmost tip is located in Perry Township. Lake Ontelaunee is the main public water source owned by Reading Area Water Authority (RAWA). The dam was constructed in 1926, and the resulting lake has a capacity of 3.88 billion gallons of water. Next to Blue Marsh lake, also a reservoir, it is the second largest lake

in Berks County. It was created by damming the Maiden Creek. Aside from providing water, Lake Ontelaunee offers local recreation for hunters, hikers and fishermen. It contains an assortment of warm water fish species including various panfish, bass, trout, pike, pickerel, perch, crappie and muskellunge. It is an important migratory stopover in spring and fall for many waterfowl and shorebirds; Snow Geese have been observed in the tens of thousands during periods of migration. A parking area with access to the lake is located in Perry Township off of Moselem Spring Road (S.R. 662).

Kaercher Creek Lake: A 35-acre lake is located in Windsor Township and was created in a federal, state and local joint effort flood control project to harness the Kaercher and Mill Creeks. The lake and park surrounding it is popular with fishing, kayaking, canoeing and boating as well as hiking and birding. The lake has been stocked historically by the Pennsylvania Fish Commission with muskellunge and trout, but also contains panfish, bass, channel catfish, among other species of warm water fish.

Blue Heron Lake: Formerly Christman Lake, this 25-acre lake is located in Windsor Township. It is a reservoir located within a private residential community. It is fed by springs and tributaries of the Maiden Creek. It is used for recreation by the surrounding Blue Heron Village community.

Exceptional Value and High Quality Streams

The Pennsylvania Department of Environmental Protection (DEP) develops water quality standards for each of the streams in the Northern Berks region. They are labeled as per the aquatic life use of the stream: Warm Water Fishes (WWF), Trout Stocking (TSF), Cold Water Fishes (CWF) and Migratory Fishes (MF). In addition to these use-based designations, streams with excellent water quality may be labelled as High Quality Waters (HQ) or Exceptional Value Waters (EV). The water quality in an HQ stream, according to DEP, 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, however, are protected at their existing quality; water quality shall not be lowered. Streams within Northern Berks with an EV/HQ designation are:

Furnace Creek: Windsor Township, HQ

Rattling Run: Windsor Township, EV

Tributaries of Northkill Creek: Upper Bern and Upper Tulpehocken Townships, EV

Tributary of Little Schuylkill River: Windsor Township, HQ

These Exceptional Value and High Quality streams are mapped on the Natural Resources map in Figure 04.

Floodplains

Floodplains can provide ecological, aesthetic and recreational benefits, but also impose constraints to development within them. The primary function of a floodplain is to provide an area that will accommodate the floodwaters during periods of high discharge. They are a natural defense against destructive flooding in developed areas. However, unchecked development of floodplains can lead to more frequent and severe flooding as the water is displaced elsewhere. Consequences of excessive alteration of a floodplain can include loss of property and loss of life in a major storm event. Floodplains also provide habitat for many species that would otherwise be displaced by development as well. Mapped in Figure 04, the 1% floodplain areas are those that on average have a 1 in 100 (or 1%) chance of flooding in any given year as defined by the Federal Emergency Management Agency (FEMA). Similarly, FEMA has defined the 0.2% floodplain that has a 1 in 500 chance of flooding. The majority of both the 100-year and 500-year floodplains are found along the banks of the Schuylkill River and its tributaries.

Wetlands

Wetlands are areas where water covers the soil or is present at or near the surface for a portion or more of the year. They are among the most productive ecosystems in the world, fostering aquatic and/or terrestrial species of flora and fauna depending on the hydrology or saturation levels of the water present in the wetland. In Northern Berks, they can include floodplains, swamps, marshes, and bogs as well as river, stream, lake and pond banks. Some wetlands are wooded while others are wet meadow. Wetlands serve a dual function, providing enormous amounts of food for the basis of the food web while filtering impurities that normally would contribute to surface and groundwater pollution. They absorb and detain water from flooding and recharge groundwater as well. Given their important role within the region, it is vital that they are preserved and protected from destruction as

much as possible. Wetland margins or fringe areas should be considered for preservation as well. By carefully regulating wetlands and the lands surrounding them, the Northern Berks municipalities can control the land use in these fragile ecosystems. Mapped on Figure 04 are the Northern Berks wetland areas.

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 Northern 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 Northern Berks region.

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

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 Northern Berks region should be developed in accordance with the following criteria:

1. They should be consistent with the Northern 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 05, MS4 Areas in Tilden Township as well as Hamburg and Shoemakersville Borough have been identified as municipal MS4s. Additionally, Windsor and Perry Townships have MS4 waivers currently. Tilden, Hamburg and Shoemakersville are required to address the following six (6) minimum control measures:

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 a 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 construction 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 Northern Berks region, Upper Tulpehocken, Upper Bern and Windsor Townships must fulfill these additional requirements protecting these HQ and EV streams as designated by DEP.

Woodlands

Pennsylvania is among the most forested states in the nation, containing some of the most intact hardwood forest lands in the temperate world. The woodlands provide clean air and water, filtering oxygen with their leaves and water with their roots. Trees and other vegetation in the woodlands also provide stabilization from erosion, especially within areas of steep slopes and streambanks. They protect surrounding areas of adverse climate conditions, buffering the wind and filtering direct sunlight. Woodlands provide scenic views and places for passive and active recreation as well. Woodlands account for 24,863 acres in the Northern Berks region. Much of the woodland area is located in areas unsuited for residential, commercial or agricultural development, situated in areas of steep slopes, floodplains and other limitations.

Kittatinny Ridge

The Kittatinny Ridge, also known as the Blue Mountains, forms the northern border of the Northern Berks Region with neighboring Schuylkill County. Beyond, it spans for 185 miles and more than 360,000 acres from the Delaware River to the Mason-Dixon Line. It contains much of the unbroken woodlands in the Northern Berks region. A number of public and preserved lands are also located here including State Game Lands 110 and 106, Weiser State Forest as well as Hawk Mountain in neighboring Albany Township. The Hamburg Reservoir is also located within the Kittatinny Ridge. It is home to both the Appalachian Trail and Pennsylvania's largest Important Bird Area (IBA) as designated by Audubon. Various species of hawks, eagles and falcons migrate using this important ridge and valley. Hiking, hunting, and fishing tourism generate \$223 million in Berks County alone. Despite its value, the Kittatinny Ridge is constantly under threat of habitat loss as over two thirds of its lands are privately owned and divided amongst thousands of property owners.

Recognizing a need to protect such a valuable resource, the Kittatinny Ridge Coalition formed in 2002 as a partnership alliance between organizations, agencies and academic institutions working with local municipal officials and private landowners. Local partners include Berks Nature, Hawk Mountain Sanctuary, Blue Mountain Eagle Climbing Club and Berks County Planning Commission. The Coalition identifies and helps protect priority places, promotes collaborative science-based research along the corridor to inform management practices and conservation recommendations, fosters effective local stewardship, promotes the sustainable use of natural resources, and increases public awareness and appreciation of the importance of the Kittatinny Ridge and Corridor.

Scenic Resources and Tourism

Scenic tourism helps stimulate the local economy while protecting and promoting the beauty of the natural surroundings in a community.

Appalachian National Scenic Trail (Appalachian Trail)

The Appalachian Trail is the longest hiking-only trail in the world, beginning in Maine and travelling southwest 2193 miles through fourteen states to Georgia. The Appalachian Trail meanders through northern Berks County for approximately 52 miles generally east to west, with roughly 15 miles located through the Kittatinny Ridge in the Northern Berks region. Attracting over 3 million visitors each year, it is also among the most famous and popular hikes in the world, and a major tourist draw to the Northern Berks region. It offers some of the best views of the scenic Northern Berks region.

The trail is managed, protected and advocated for by the Appalachian Trail Conservancy with the cooperation with the National Park Service, the US Forest Service, dozens of state agencies and 31 local trail-maintaining clubs among county and local community partnerships. In Berks County, The Blue Mountain Eagle Climbing Club

(BMECC) maintains and advocates for the Appalachian Trail. Berks County and the BMECC played a pivotal role in the creation of the trail from its beginning. Formed in 1916, BMECC was among the first organizations that advocated for the formation of the Appalachian Trail. They finished creating the Berks portion of the trail in 1931, and today there are seven monuments erected to honor those who made significant contributions to the development of the Appalachian Trail and the BMECC. In 1945 the club's president, Daniel K. Hoch, also a US Congressman, introduced the first bill calling for an authorized national system of foot trails. While that bill did not advance, it set in motion for the formation of what is now the Appalachian National Scenic Trail. BMECC continues to advocate for preservation, acquire new lands and maintain and construct shelters, arboretums, and other public facilities along the trail in Berks County.

Schuylkill River Trail (SRT)/Bartram Trail

The Schuylkill River Trail is a multiuse path that generally follows the Schuylkill River north to south from Frackville, Schuylkill County to Philadelphia. Once completed, it will be 120 miles in length, and ranges from crush stone, paved and on road trails travelling through rural, agricultural, suburban, urban and industrial landscapes. Built mainly on abandoned rail lines from Pennsylvania's heavy industrial past, trail users can see historical evidence of industrial development, canal navigation, railroad transportation, quarrying and iron and steel production. It also offers many scenic views of the Schuylkill River and its wildlife. In 2015 in a USA Today Readers' Choice poll, SRT was awarded first place as the Best Urban Trail.

The SRT is managed by the Schuylkill River Greenways National Heritage Area. Formed in 1974 as the Schuylkill River Greenway Association (SRGA), Schuylkill River Greenways has always considered the SRT their signature project. SRGA worked closely with state officials and in 1995 Governor Tom Ridge designated the Schuylkill Heritage Corridor as an official Pennsylvania Heritage Park which then allowed the group to receive state funding for projects and studies. Similarly, in 2000 SRGA worked successfully towards the Schuylkill River Valley to be designated a National Heritage Area for its historical ties to the American, Industrial and Environmental Revolutions as well as a diverse portfolio of natural and recreational resources. To date SRGA has completed dozens of projects focusing on recreation, education, conservation and historic preservation, much of which has benefited communities along the river.



In upper Berks County and Schuylkill Counties, a seven mile stretch of trail running along the Blue Mountains from Hamburg Borough to Auburn (Schuylkill County) has been completed. Also known as the John B. Bartram trail, this section is a well-groomed gravel trail. There are three trailheads for the SRT in Northern Berks: Hamburg Community Park on State Street, Reading Railroad Heritage Museum on South Third Street in Hamburg Borough and Kernsville Recreation Area in Tilden Township. This section intersects the Appalachian Trail as well providing even more opportunity for tourism in the surrounding communities.

Schuylkill River Scenic Waterway

The Schuylkill River Watershed is the most densely populated region in Pennsylvania with over 3.2 million people living, working and recreating within its 1.2 million acres. Additionally, nearly a quarter of US population lives within a five-hour drive of the Schuylkill River opening tourism opportunities to a significant portion of the country.

Schuylkill River Greenways also has advocated, promoted and protected the Schuylkill River Scenic Waterway. In 1978, Pennsylvania state legislature designated the Schuylkill River as the Commonwealth's first Scenic River. It has also since been designated a National Recreation Trail. The Schuylkill River Water Trail, 126 miles long with over 40 public access points, is mainly used by paddlers, particularly in the Northern Berks region, but

there are opportunities for recreational motorboaters, water skiers and rowers in many places along the river. The river is considered a Class I-II+ river; Class I denotes moving water with a few riffles and small waves, few or not obstructions, and Class II denotes easy rapids with small waves and clear channels that are obvious without scouting. There are two public access points for the river trail in the Region maintained by the Schuylkill River Greenways: Hamburg Park in Hamburg Borough and Peter Yarnell Park in Perry Township. Additionally, in the Schuylkill River Water Trail Access Project Priorities 2019 document, two other access points have been proposed on land owned by Shoemakersville Borough and Perry Township.

Natural Features and Agricultural Conservation Goals

The goal of this plan is to conserve natural features and farmland for future generations to experience, view, farm and enjoy. Programs should be encouraged and continued so that conservation of natural resources and farming, not just the preservation of farmland, occurs in order to preserve the quality of life and rural character deemed so valuable to residents in the region. Continuation of preservation efforts and farming can help to slow the upward pressure on taxes as well as take advantage of the burgeoning ecotourism industry.

It is essential to maintain vegetation along streams and creek corridors to protect the water quality and fish habitats. Where this vegetation does not exist, property owners should be encouraged to plant along the creek beds so that they may help the individual municipalities of the region fulfill requirements of the municipal separate storm sewer (MS4) permit.

As part of new developments in wooded areas, developers should be required to designate areas of trees that will be removed or preserved. Then suitable measures should be put into place to protect the trees from damage during construction.

Most steeply sloped lands are along the Kittatinny Ridge along the northern borders of Upper Tulpehocken, Upper Bern, Tilden and Windsor Townships with Schuylkill County and along creek valleys within the region. A 15 percent slope would have a rise of 15 feet for every 100 feet horizontal distance. Moderately steeply sloped lands (15 to 25 percent) are generally only suitable for low density development. Very steep lands (over 25 percent) are generally not suitable for any development. It is important to limit development on steep slopes to avoid the following: erosion problems, excessive stormwater runoff, overly steep roads and driveways, excessive costs to construct and maintain roads and utilities, and destruction of scenic natural resources.

Zoning regulations should control development on steeply sloped lands. For example, if a new principal building would be proposed on steep slopes, large lot sizes could be required.

The total percentage of a lot that is covered by buildings and paving should be limited to make sure that there are areas available for absorption of stormwater. For parking areas that are not used on-a-daily-basis, alternative surfaces and materials should be considered that encourage groundwater recharge.

Ordinance provisions should be reviewed to make sure that they do not unintentionally increase the amount of land covered by paving. For example, sidewalks should only be required where they are needed. Front yard setbacks should be modest so that long driveways are not needed. Where cul-de-sac streets are used, a landscaped island should be considered in the middle of the cul-de-sac. Excessive amounts of parking should be avoided. Where there is a question about the amount of parking that may be needed, a developer can be allowed to reserve land for parking that would only be paved if the municipality determines it is actually needed after the use has been in operation. Adjacent businesses should be encouraged to share parking, which can reduce the total amount that is needed.

Protect important natural resources, with a special emphasis upon the Kittatinny Ridge, Furnace Creek, Rattling Run and tributaries to the Northkill Creek and Little Schuylkill River, other creek valleys, wetlands and steeply sloped woodlands.

Control development on steeply sloped lands

Maximize groundwater recharge

Seek to maintain interconnected corridors for wildlife

Work to conserve Outstanding Natural Areas

Carefully manage wooded areas and avoid clear-cutting

Seek to maintain agricultural activities in the Region

Permit a range of farm-based businesses

Continue to seek agricultural easements to preserve farmland

The municipalities within the region should consider participating with the Berks County Source Water protection program to continue the education of the importance of our water resources. The recharge of groundwater and surface water and the protection of that recharge are a necessity to the regional water suppliers.

Ideally, corridors along steeply sloped areas and along creeks would be permanently preserved as interconnected open space. In addition to the benefits of preserving natural features, these inter-connected corridors also provide cover for wildlife to move throughout the region. It is particularly important to have areas with woods or other thick natural vegetation that connect large areas that have been preserved. Too often, land preservation involves fragmented areas that do not allow for wildlife travel.

As previously stated in this chapter there are nine core habitats within the region that contain one or more plant or animal species of concern at state or federal levels, exemplary natural communities, or exceptional native biological diversity. Efforts should be made to preserve and protect these environmentally sensitive areas from negative impacts that could be associated with future residential or commercial development.

The woodlands in the region add character to the landscape, help preserve the water quality of creeks and provide important wildlife habitats. Trees also are important to providing clean air and control erosion caused by stormwater runoff. Forestry must be allowed under State law. However, clear-cutting of woods should be prohibited, proper erosion controls should be in place for any large-scale tree-cutting, and other appropriate forest management practices should be used.

In development plans, developers should be required to show that they have minimized the removal of stabilized mature trees as part of their project. Great care should be used during construction to minimize the number of trees that are removed. Trees can add substantial value to a residential lot.

As seen on the Protected Lands map, Figure 02, the region has consistently embraced the agricultural community and what it means to the people of the Northern Berks region. However, it is still important to encourage farmers to continue to farm. New homes should be located as far from intensive farming operations as is practical. If a portion of a farm is developed, the homes should be located where they will have the least impact upon farming operations.

The municipalities should continue to promote the preservation of agricultural areas within the Townships through conservation development, agricultural security areas, purchase and donation of development rights, and conservation easements.

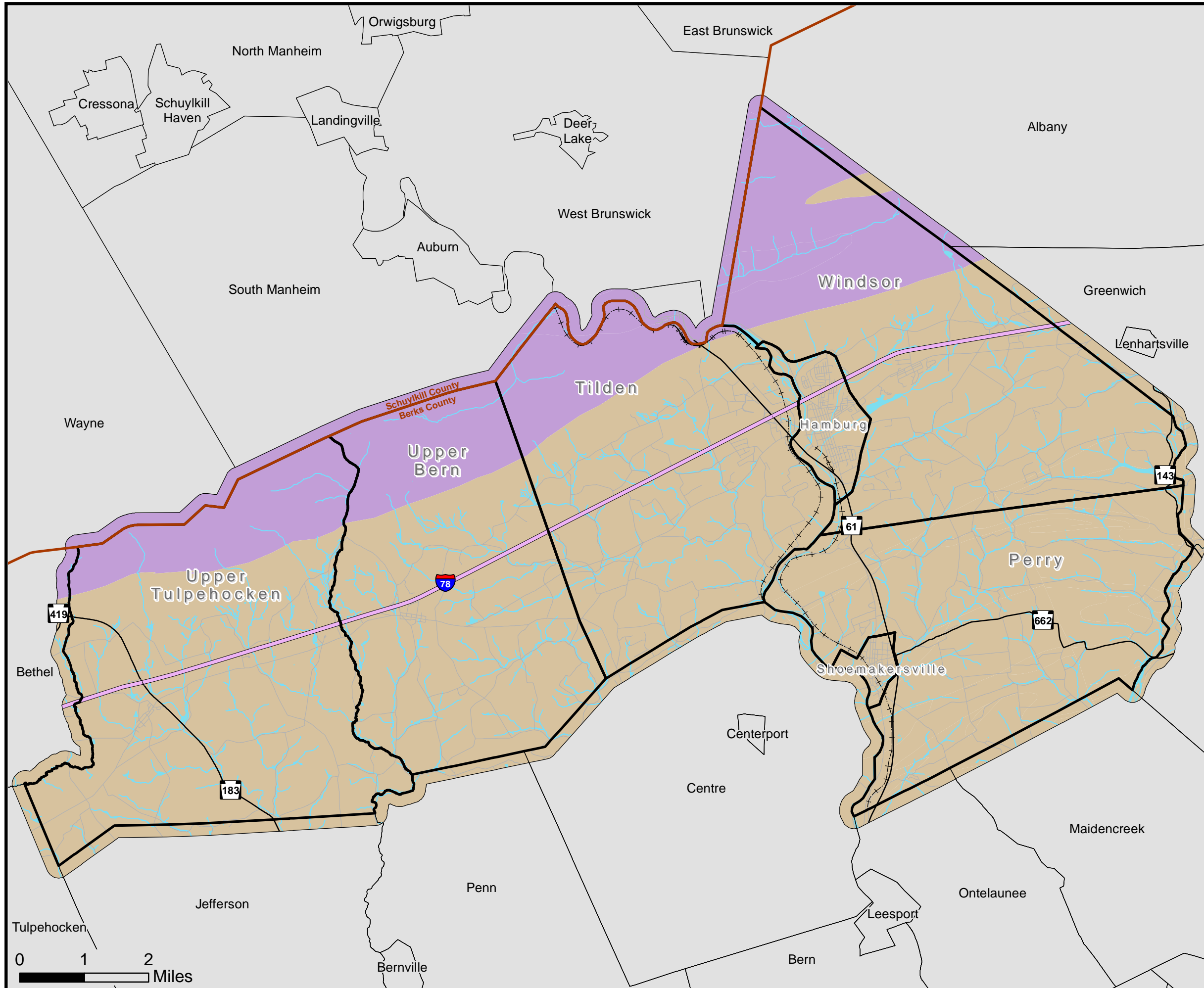
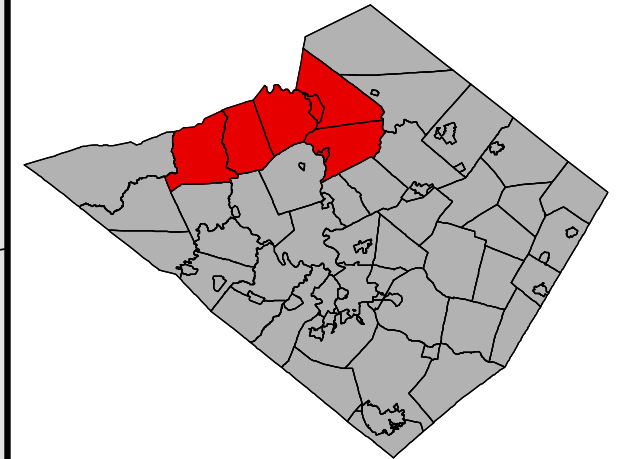
Many farmers cannot earn a full-time living on their farm work. Instead, many farmers need supplemental jobs. To encourage the continuation of farming, the Township Zoning Ordinances should offer reasonable flexibility to farmers on larger tracts to have small businesses. These businesses could include small engine repair, sharpening services, wood crafting, farm equipment repair, sale of seeds and fertilizers and similar activities. The number of employees and the sizes of the businesses should be limited to prevent it from becoming a major commercial business. These activities can also be useful to encourage the repair and reuse of old barns.

The most effective method to permanently preserve farmland is through purchasing the “development rights” of the land. This program uses funds from the State and the County to pay property owners to preserve their land. Property owners voluntarily apply to the County for consideration. The farms are then ranked according to a set of standards, such as the quality of the soils for crops and the proximity to other farms that have been preserved. If selected, the landowner is paid the difference between the market value and the land and the value as farmland. A permanent “conservation easement” is then placed on the land that permanently prevents its use for non-agricultural uses. The land remains privately owned and can be sold to another farmer.

Hamburg, Perry, Shoemakersville, Tilden, Upper Bern, Upper Tulpehocken, Windsor
Joint Comprehensive Plan Update: June 2022



Geology



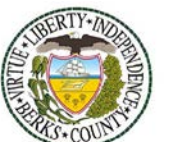
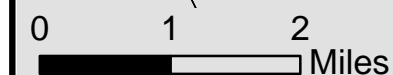
Geologic Period

- Ordovician
- Silurian
- 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

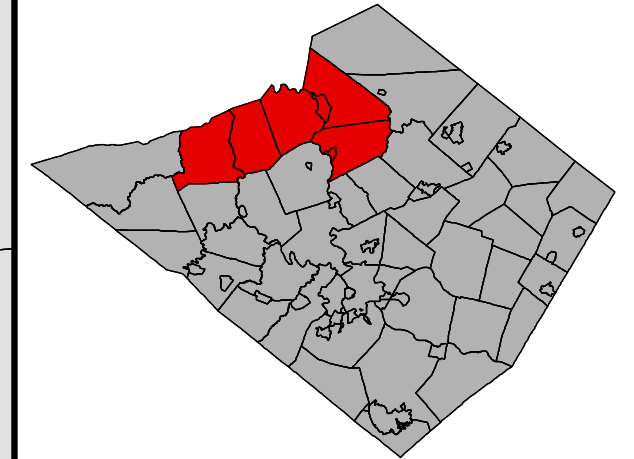
Published by the Berks County Planning Commission

BAB 6/22


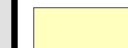




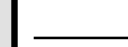

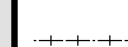






Soils



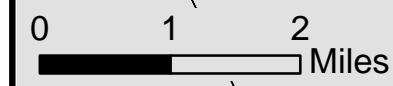
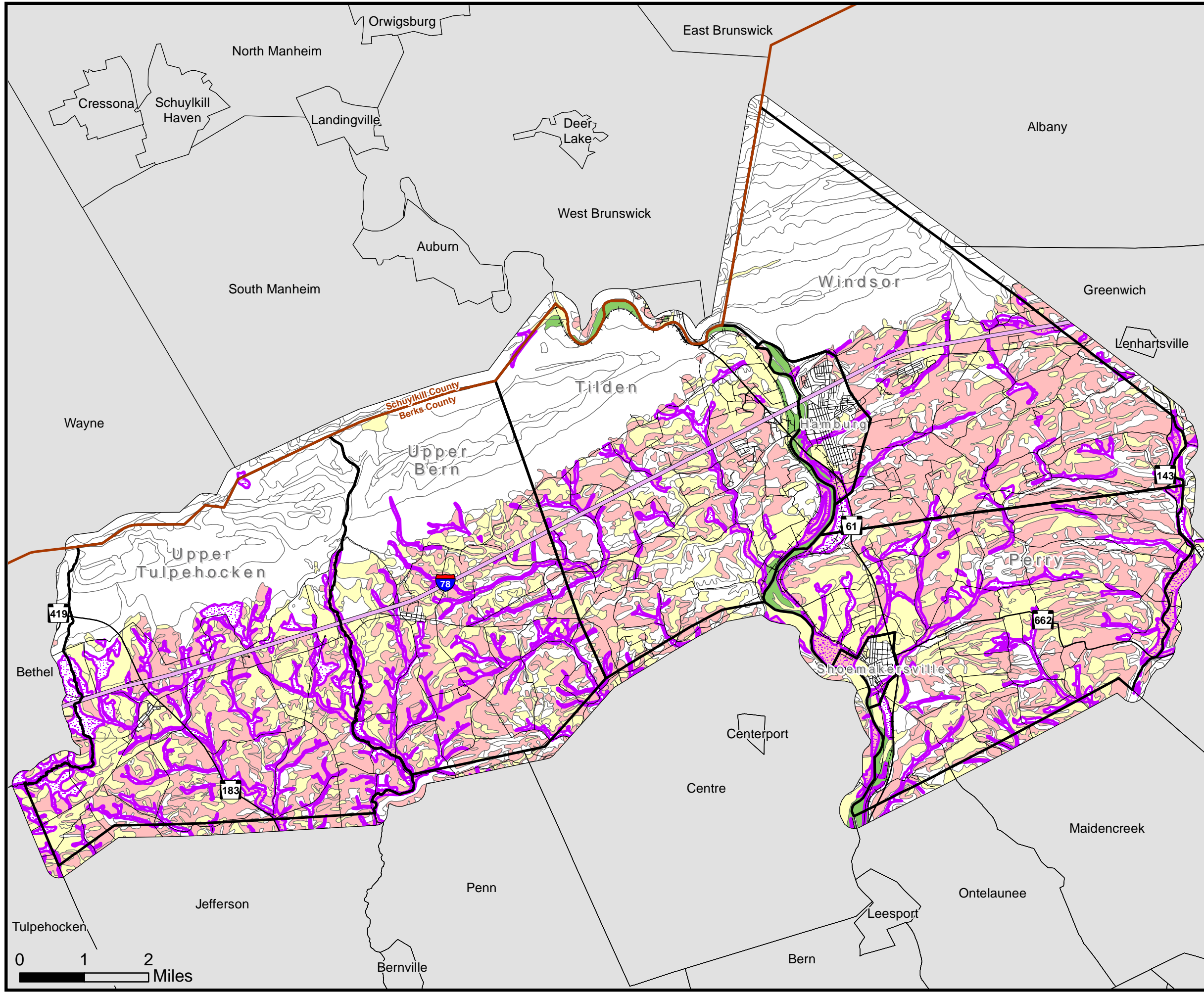
Legend

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

Source data: Berks County Planning Commission GIS, Berks County GIS/IS, Berks County Mapping, Berks DES, USDA NRCS September 2019

Published by the Berks County Planning Commission

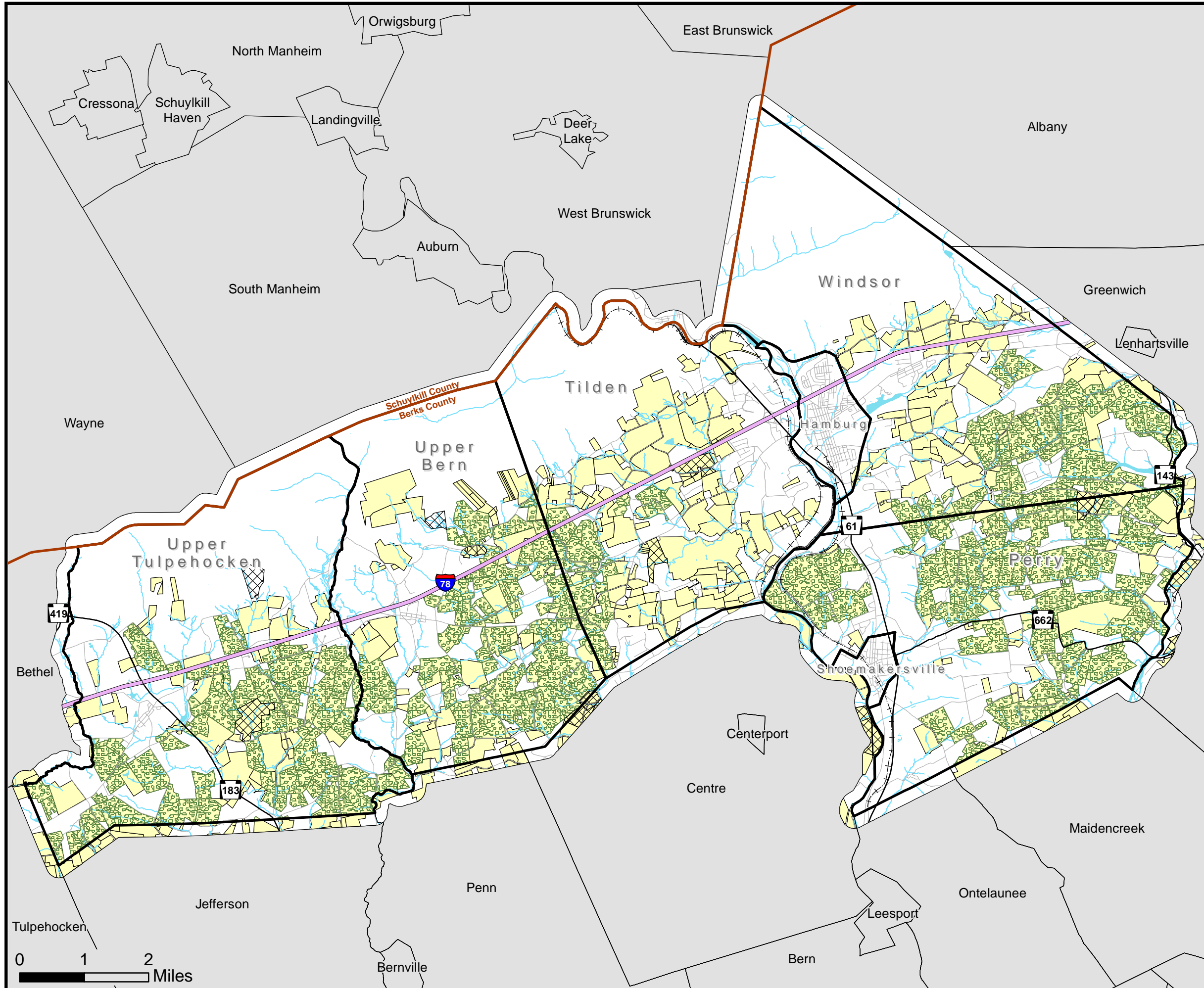
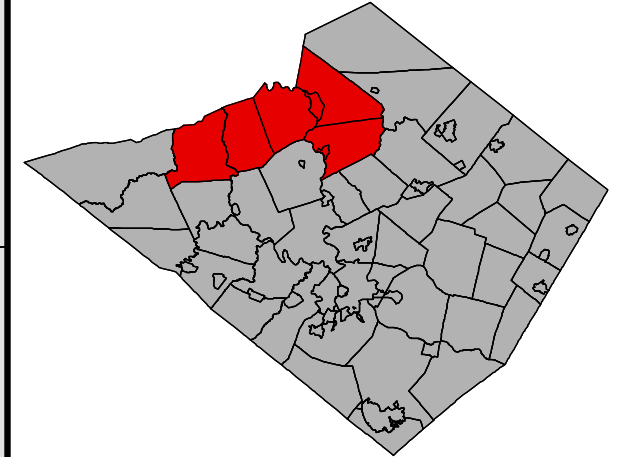
BAB 6/22




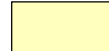




Hamburg, Perry, Shoemakersville, Tilden, Upper Bern, Upper Tulpehocken, Windsor
Joint Comprehensive Plan Update: June 2022



Protected Lands



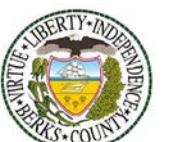
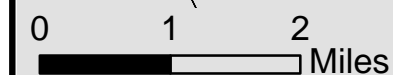
Legend

-  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

Published by the Berks County Planning Commission

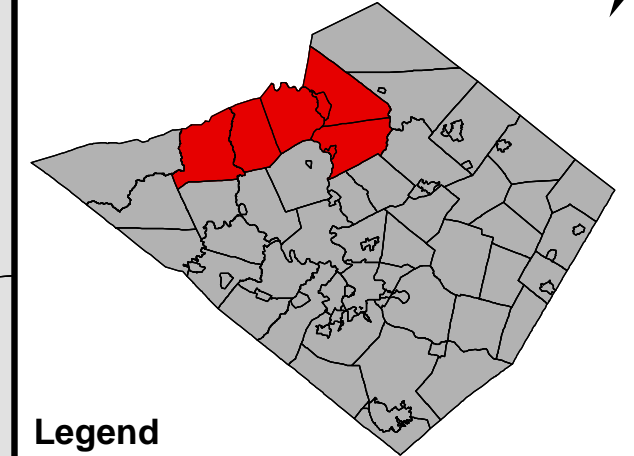
BAB 6/22



Hamburg, Perry, Shoemakersville, Tilden, Upper Bern, Upper Tulpehocken, Windsor
Joint Comprehensive Plan Update: June 2022



Natural Resources

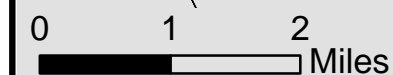
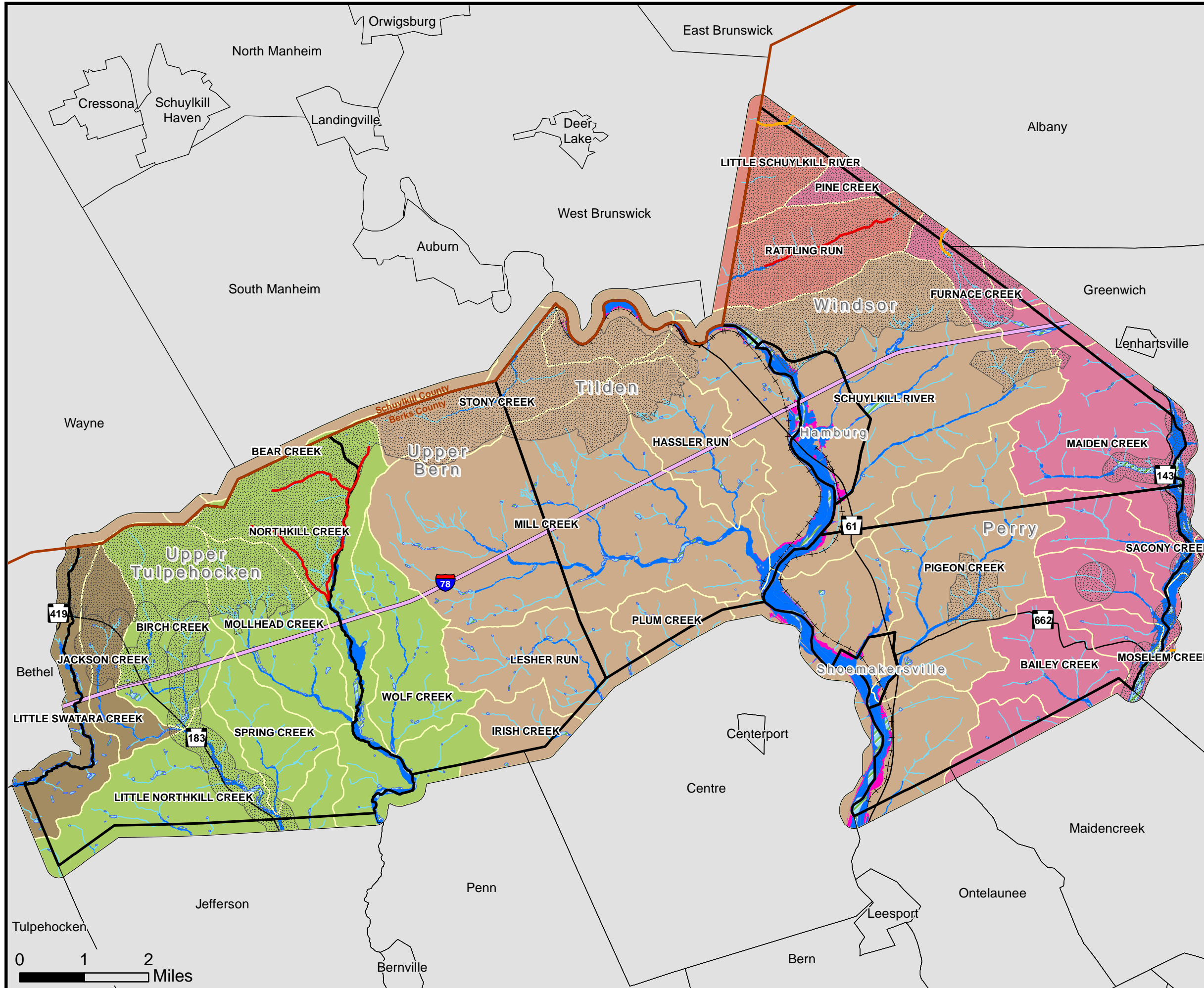


Legend

- Little Schuylkill River*
 - Maiden Creek*
 - Schuylkill River*
 - Tulpehocken Creek*
 - Swatara Creek**
 - Subwatersheds
 - 1% Floodplain
 - 0.2% Floodplain
 - Wetlands
 - Natural Heritage Area- Core Habitat
 - Exceptional Value Streams
 - High Quality Streams
 - Streams and Water Bodies
 - Interstate
 - 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, FEMA, PSU, NWI, Eastern PA Coalition for Abandoned Mine Reclamation
Published by the Berks County Planning Commission

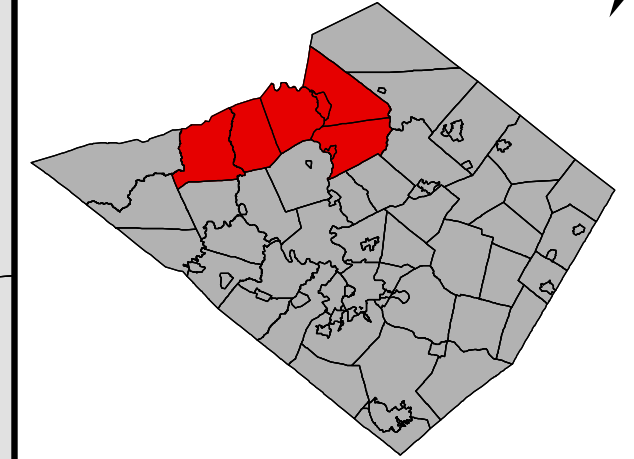
BAB 6/22



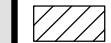








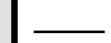
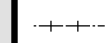


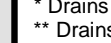
Hamburg, Perry, Shoemakersville, Tilden, Upper Bern, Upper Tulpehocken, Windsor
Joint Comprehensive Plan Update: June 2022



MS4 Areas



Legend

-  Urbanized Area 2000
 -  Urbanized Area 2010
 -  Little Schuylkill River*
 -  Maiden Creek*
 -  Schuylkill River*
 -  Tulpehocken Creek*
 -  Swatara Creek**
 -  Subwatersheds
 -  Streams and Water Bodies
 -  Interstate
 -  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, Eastern PA Coalition for Abandoned Mine Reclamation, U.S. Census Bureau

Published by the Berks County Planning Commission

BAB 6/22

