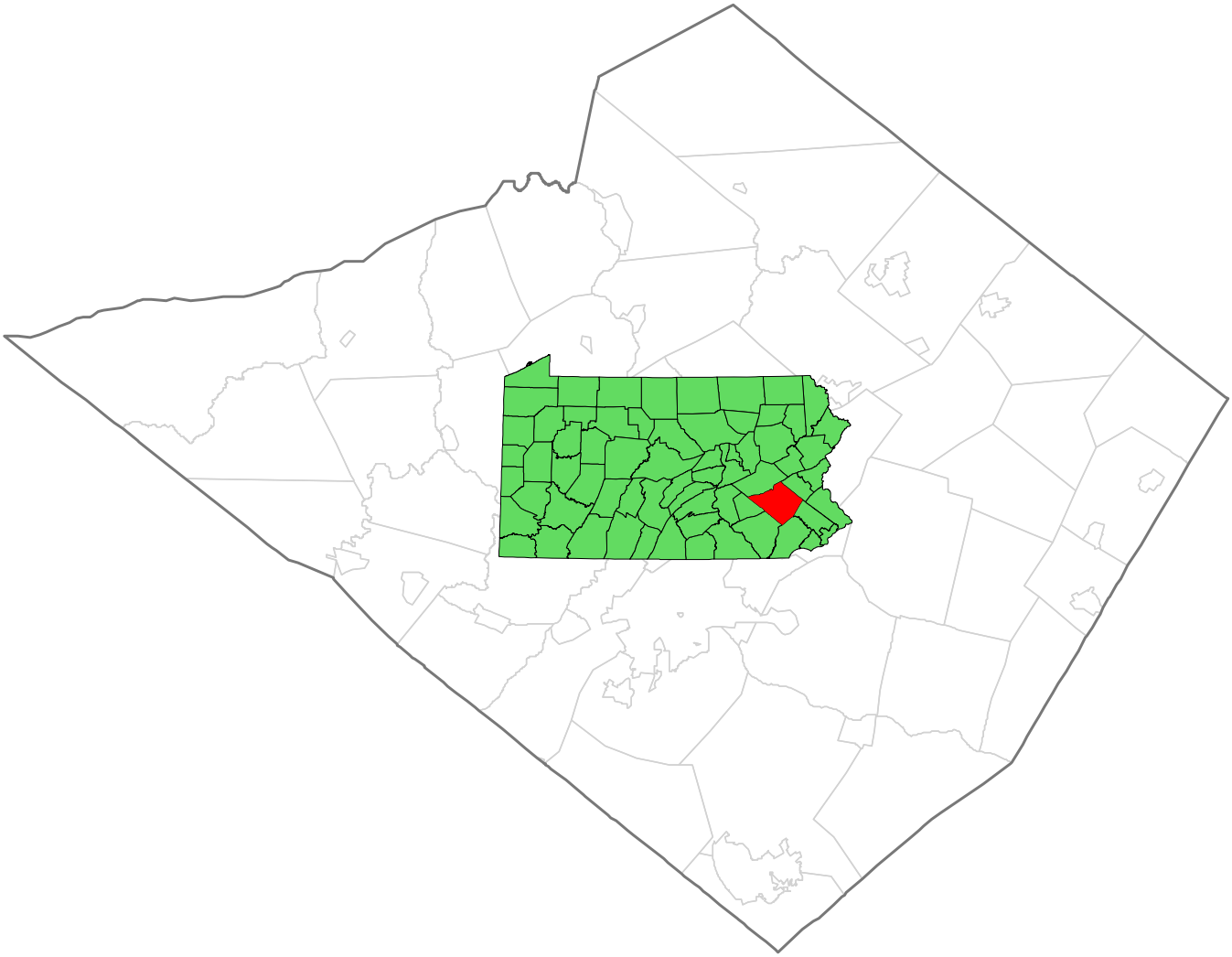
A Natural Areas Inventory of Berks County, Pennsylvania



Document includes the original 1991 full report
followed by the 2003 update addendum.

This Natural Areas Inventory was conducted by
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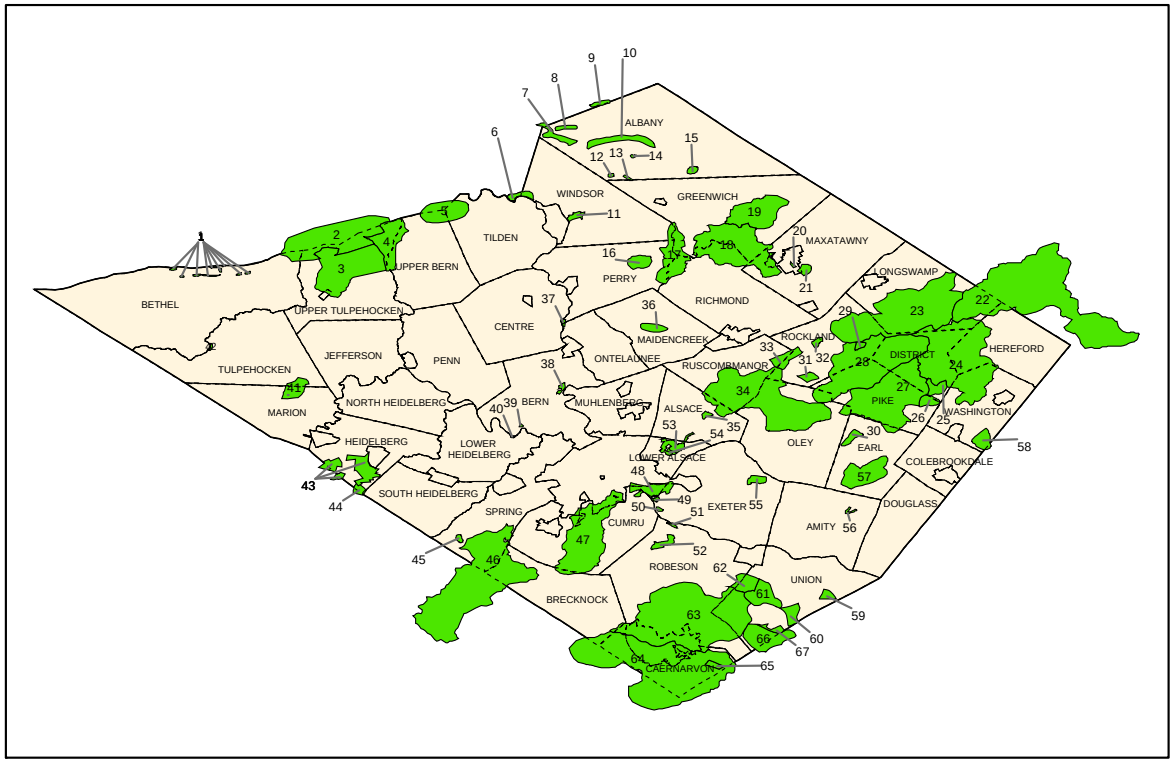
ACKNOWLEDGMENTS

This study was developed in part with financial assistance through the Recreational Improvement and Rehabilitation Grant Program (RIRA-ST-5-12) as administered by the Pennsylvania Department of Community Affairs, Bureau of Recreation and Conservation. Additional funding came from the Berks County Community Development Block Grant Program.

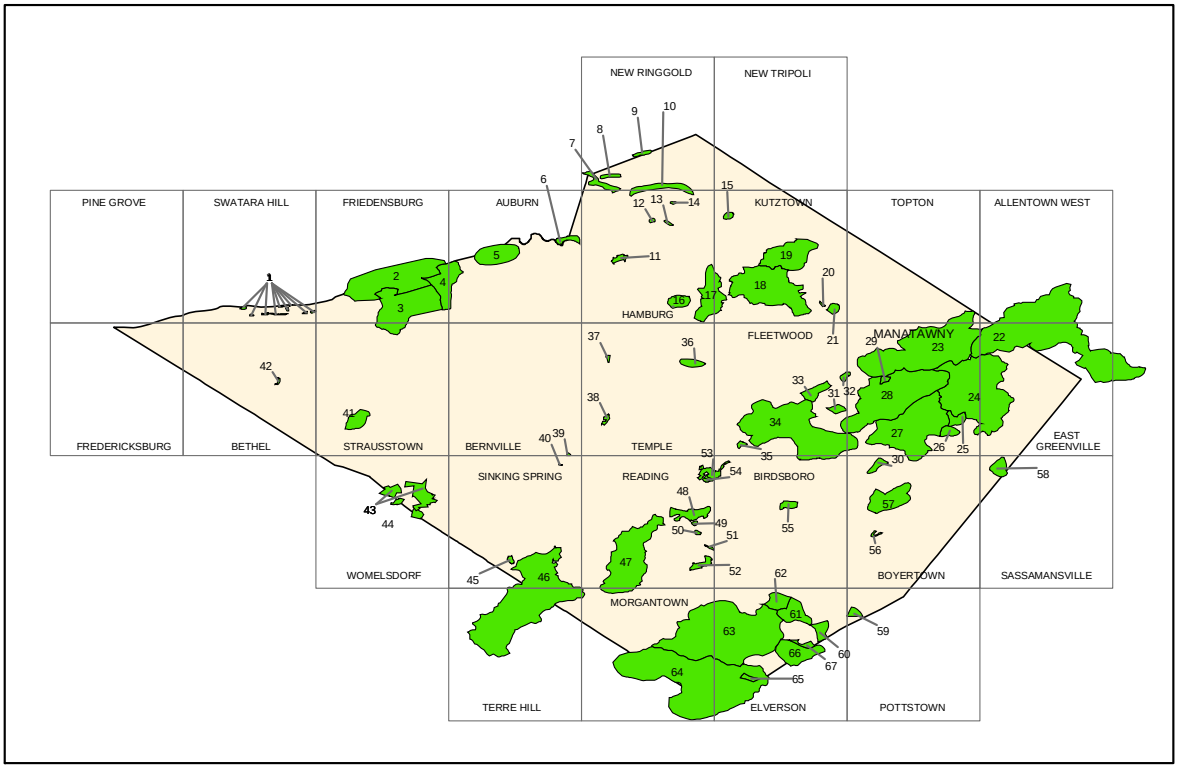
The project was initiated and supported by John T. Ravert of the Berks County Environmental Office. Further support was provided by the Berks County Planning Commission.

The Pennsylvania Science Office (PSO) of The Nature Conservancy thanks the members of the agencies noted above and all the individuals who have contributed time and expertise to the study. We especially thank Steven Boyer of the Berks County Planning Commission for his time and effort. Eugenie B. Drayton and Molly Docherty, former data managers at the Pennsylvania Natural Diversity Inventory (PNDI), contributed to the study by providing information on Berks County from the PNDI database in a usable format. JoAnn Stanosz, ecology intern, provided much of the graphics work. Susan Munch of Albright College and Jack Holt of the Philadelphia Botanical Club did much of the botanical survey work for the study. John Hall of Albright College contributed greatly through his survey of small mammals of special concern.

The species information utilized in the inventory came from many sources as well as our own field surveys. Ms. Patricia Pingel, formerly with the Berks County Conservancy has done much botanical survey work in Berks County. Biologists from institutions and agencies such as the Academy of Natural Sciences in Philadelphia, the Morris Arboretum of the University of Pennsylvania, Albright College, the Pennsylvania Game Commission, and the Pennsylvania Fish Commission were among the contributors. In addition, innumerable private citizens contributed valuable information that was incorporated into the study. The task of inventorying the natural heritage of Berks County would have been far more difficult without this tremendous pool of information gathered by many people over many years.



Site locations relative to Townships.



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GLOSSARY

Alluvium - sediment deposited by rivers; includes gravels, sands, silts, and clays.

ATC - Appalachian Trail Conference.

ATV - all-terrain-vehicle.

Barrens - areas that are naturally infertile as a consequence of nutrient-poor soils; often form on resistant rock such as quartz, sandstone or highly weathered and leached glacial material.

Drawdown - lowering of the water table due to natural causes such as a drought or human activities such as excessive pumping of well water.

Effluent - waste water from septic systems or from stormwater sewers.

Ericaceous - members of the heath family including blueberries, huckleberries, rhododendrons, and azaleas; these plants are adapted to living in acid soils.

Exceptional Value - stream designation used by the Department of Environmental Resources to indicate high water quality.

Exotic - non-native; used to describe plant or animal species that were introduced by humans; examples include Japanese honeysuckle and garlic mustard; in some cases, exotics present a problem because they may be more competitive than native species.

Forb - non-grass herbaceous plant such as goldenrod.

Graminoid - grass-like plant such as a sedge or a rush.

High-Quality Coldwater Fishery - excellent quality water and other features that require special protection to maintain it as a trout stream.

Hydrology - water system of an area including both surface water and ground water.

NPS - National Park Service.

Non-Point - refers to diffuse sources of pollution such as stormwater runoff contaminated with oil or pesticides.

Potential Natural Area - area that may have desirable environmental characteristics, but needs a field survey to confirm; a preliminary category given to sites prior to field survey.

Raptor - Birds of prey including hawks, falcons, eagles, and owls.

Seeps - springs; where water flows from the ground and saturates the soil; lush herbaceous vegetation often grows in these wet areas.

Succession - natural process of vegetation change through time; over time, the plant species of a site will change in composition and structure as light and soil conditions change.

Talus - slope formed of loose rock and gravel that accumulates at the base of mountains or cliffs.

Test Pit - small excavation for testing the suitability of soils for on-site waste disposal (i.e., septic tanks).

Understory - layer of shrubs and small trees between the herbaceous layer and the canopy.

INTRODUCTION

Berks is a county rich in history, and scenic and natural resources. However, its rural character, natural resources, and farmland are all seriously threatened by the influx of people from more urban areas, a trend common throughout southeastern Pennsylvania. Major interstate highways linking Berks County to metropolitan centers have made commuting to Philadelphia and New Jersey feasible. As a result, Berks is now one of the fastest growing counties in Pennsylvania.

The scenic and natural environments that have attracted so many people to the county are quickly being lost because of increased development. Wise planning can maintain these natural environments and the plants and animals associated with them. A balance between growth and preservation of scenic and natural resources can be achieved by guiding development away from the most environmentally sensitive areas.

In order to plan development and ensure protection of critical natural areas, county and municipal governments, the public, and developers must know the location and importance of these sites. This knowledge can help prevent conflicts over land use and direct protection efforts and limited conservation dollars to the most vulnerable areas. The Pennsylvania Science Office of The Nature Conservancy, under contract to the Berks County Planning Commission, has undertaken to provide a document and maps that will aid in the identification of the most environmentally sensitive areas.

The inventory provides maps of the best known natural areas (natural communities) in the county and the locations of all known animal and plant species of special concern (endangered, threatened, or rare). A written description and a summary table of the most important sites, including quality, degree of rarity, and last-observed date, accompany each map. Any potential threats and some suggestions for protection are also included in the individual site descriptions. The inventory also includes the locations of areas that are not deemed natural communities because of past disturbance, but are significant because they are good examples of habitat types that are relatively rare in the county, or provide wildlife habitat and open space at the county or local level. An overall summary of the highest quality sites provides suggestions for maintaining these important sites as natural areas. The information and maps presented in the Berks County Natural Areas Inventory report afford a useful guide for planning development and parks, conserving natural areas, and for prioritizing the protection needs of vulnerable natural areas in the county.

The Natural Areas Inventory of Berks County will be provided to each local Environmental Advisory Council (EAC) in Berks County. The information will also be provided to the Berks County municipalities that currently do not have an EAC as an impetus for the municipalities to form these important bodies. The inventory is one part of the county's effort to provide an overall comprehensive land-use plan.

COUNTY OVERVIEW

The climate, geology, topography, and soils of Berks County have been important in the development of the forests, wetlands, and other natural features located there. The vegetation that exists and the impact of man on that vegetation provide the framework for locating and identifying natural communities within the county. A brief review of some important environmental factors sets the stage for the rest of this report.

Geology

Bedrock geology is an important factor in the formation of soils, natural vegetation, and land-use patterns in Berks County. The county has four physiographic sections. A narrow band of the Appalachian Mountain section of the Valley and Ridge province extends across the northern margin of the county. Immediately south, the Great Valley section of the Valley and Ridge province extends across the middle of the county. The Reading Prong section of the New England province juts into the county from the east. To the south, the remaining area of the county lies in the Triassic Lowland section of the Piedmont province.

The rocks associated with each of the physiographic sections are distinctive (Geyer and Bolles, 1979). Blue Mountain underlain by resistant quartz conglomerate and sandstone represents the small portion of the Appalachian Mountain section in Berks County. The Great Valley has shales and siltstones in its northern part and limestones and dolomites to the south. Weathering of these folded and faulted sedimentary rocks has produced the undulating topography typical of the broad valley. Metamorphic and igneous rocks underlie the mountainous terrain of the Reading Prong, which bounds the southern side of the Great Valley. The Triassic Lowland has steep-sided ridges of diabase and rolling hills underlain by conglomerates, sandstones, and shales.

Soils

Soil patterns in Berks County reflect the bedrock geology, topography, and moisture conditions. These soil patterns have given rise to distinctive patterns of vegetation, settlement, and land use within the county. Ackerman (1970) recognizes eleven soil associations within the county. A soil association consists of one or more major soil types (series) and at least one minor soil series occurring in a distinctive landscape pattern.

The Edgemont-Dekalb and Laidig-Buchanan-Andover associations occur in the Appalachian Mountain section. The former occurs on Blue Mountain and consists of deep and moderately deep, well-drained soils forming in quartz conglomerate and sandstone. The latter consists of deep soils developing in colluvium on the lower slopes of Blue Mountain.

The Berks-Weikert-Bedington association extends across the northern portion of the Great Valley. Here, shallow to deep, well-drained, rolling soils form in shale and siltstone. The Ryder-Fogelsville and Duffield-Washington associations develop in the southern part of the Great Valley. The former consists of moderately deep and deep, well-drained, silty soils derived from cement rock. The latter limestone-based soils are deep and well-drained.

A narrow band of the Murrill association, deep, well-drained soils, develops in colluvium on the foot slopes of South Mountain. The Chester-Glenville-Brandywine association characterizes the Reading Prong. These deep and moderately deep, well-drained and moderately well-drained, rolling to hilly soils form in granitic gneiss and assorted igneous and metamorphic rocks comprising the Reading Hills and South Mountain.

The Triassic Lowland has four soil associations. The Penn-Reaville-Croton association forms in red shale and soft sandstone and has moderately deep and deep, well-drained to poorly drained soils. The Lewisberry-Penn association consists of deep and moderately deep, well-drained, rolling to hilly soils derived from red sandstone, conglomerate, and shale. Deep, well-drained soils of the Neshaminy-Brecknock association characterize diabase ridges. Lastly, the Athol association forms in calcareous conglomerate and consists of deep, well-drained, reddish soils that are undulating or rolling.

Vegetation

The vegetation of Berks County reflects the environmental conditions (geology, topography, soils, climate) associated with the physiographic sections, and disturbance history, both natural and anthropogenic. In Berks County the Mixed Oak Forest Region (Oplinger and Halma, 1988; Monk et al., 1990) is the major forest cover. This region extends from northern Georgia to southern New England and encompasses the three physiographic provinces that fall within the county - Appalachian Mountain and Great Valley sections of the Valley and Ridge province, the Reading Prong section of the New England province, and the Triassic Lowlands of the Piedmont province.

Little to none of the original forest cover still exists in Berks County. The Mixed Oak Forest was formerly called the Oak-Chestnut region (Braun 1950). However, the introduction of the chestnut blight in 1904 obliterated a dominant species of the forest-type. Much of the forest on the valley floors was cleared for agriculture and development and the forests that remain have been logged one or more times for fuel and lumber (Keever 1972). These factors have changed the extent and species composition of the forest. For example, the tulip poplar was considered to be a minor component of this forest region but has now become a co-dominant with the oaks in many places. Species composition in the understory has shifted as well with native spicebush and viburnums becoming more dominant in some areas and exotic species such as Japanese honeysuckle and garlic mustard becoming established in other areas. In many smaller woodlands, these exotics tend to crowd out the native species and reduce the overall biological diversity of the flora. In turn, this reduction in the diversity of the flora also leads to a reduced fauna.

Although the original forest is gone, there are still plant communities that reflect the patterns of the forest that were prevalent in the county. These plant communities occur in response to variations in local climate, topographic position and exposure, bedrock, soils, and hydrology. The ridgetops of Blue Mountain support a chestnut oak-dominated forest that is often stunted because of poor, well-drained soils and, to a lesser degree, wind and fire. Additional oak species, sassafras, red maple, black gum, pitch pine, and hickories are other minor tree species. Huckleberries, blueberries, and mountain laurel are dominant shrub species while xeric grasses and sedges comprise much of

the herb layer.

The lower slopes of Blue Mountain and the other hills within the county are often covered with a mix of oak, tulip poplar, black birch, and maple with varying amounts of beech and hickory. Viburnum species are prevalent shrub components.

The cooler north-facing slopes and ravines are often distinctive because they are dominated by hemlock and white pine. White oak, red maple, and beech are also common canopy species. Rosebay rhododendron is an abundant shrub while a variety of ferns are common herbaceous plants.

Two notable but limited plant communities within the county are the floodplain forests and wetlands. The floodplain forests were best developed along the major creeks and rivers, but only remnants still exist. Sycamore, maples, red oak, and pin oak are common tree components. Because of variations in microtopography, a wide assortment of shrubs and herbs may be found in the least disturbed examples of this community. Wetlands are found throughout the county and range from wooded with red maple as the dominant tree, to marshes with cattails, to wet meadows with a variety of grasses and sedges. The type of wetland depends on disturbance, soils, and hydrology (depth and length of time of flooding). All of these types of plant communities were investigated during the course of this study. Good examples of many of these types have been located and are presented in this report.

PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to plan the wise use of Berks County's natural features, the Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by Berks County to provide environmental data for use in site evaluations throughout the county. The Pennsylvania Natural Diversity Inventory (PNDI) data base was established in 1982 as a joint venture of PSO/TNC, the Pennsylvania Department of Environmental Resources, and the Western Pennsylvania Conservancy. In its nine years of operation, the PNDI data base has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (called natural communities in PNDI terminology), sensitive plant and animal species, heron rookeries, and several other noteworthy natural features. Over 9,000 detailed occurrence records, largely the result of field surveys, are stored in computer files and denoted on topographic maps. Additional data are stored in extensive manual files set up for over 150 natural community types, over 800 plant and animal species, about 650 managed areas, and for each of Pennsylvania's 881 7½° USGS topographic quadrangle maps.

Beginning in 1982, PSO collected primarily existing data on occurrences of elements of concern, drawing from publications, herbarium and museum specimens, and the knowledge of expert botanists, zoologists, ecologists, and naturalists. From this foundation, PSO has focused its efforts on, and begun systematic inventories for, the best occurrences of the priority elements.

The PSO has used this systematic inventory approach to identify the areas of highest natural integrity in Berks County. These areas, comprised of natural communities with their characteristic

species, represent an estimated 85-90 percent of the biological diversity of an area (The Nature Conservancy, 1988); the other 10-15 percent consists of sensitive plant and animal species that occur both within and outside these natural communities. The full range of biological diversity in Berks County can be conserved by protecting sites with the best occurrences of the county's natural communities and by protecting populations of the county's sensitive plants and animal species. The natural community and sensitive species data are the basis for judging the biological values of sites within the county.

NATURAL AREAS INVENTORY METHODS

Methods used in the Berks County Natural Areas Inventory followed PNDI procedures, and those developed in Illinois (White, 1978) and Indiana (Anonymous, 1985). The inventory proceeds in three stages: 1) information is gathered from the PNDI data-base files, local experts, and map and air photo interpretation; 2) ground survey; and 3) reconnaissance by aircraft.

Map and Air Photo Interpretation

A list of natural features found in Berks County was prepared from the PNDI data base, and information was volunteered by local individuals and organizations familiar with the county. Photo interpreters familiarized themselves with the air photo characteristics of high quality natural communities already documented by PSO. Additional data such as vegetation maps, field surveys, and soil-survey maps were consulted to increase our understanding of the county's environment. Because vegetation in many instances must be classified at an ecosystem level, it was critical that an ecologist or person with similar training interpret the maps and air photos.

Work progressed systematically within the area encompassed by each USGS topographic map and the natural area potential of all parcels of land was assessed using aerial photographs. Areas spilling into adjacent counties were examined in their entirety. Topographic maps for use during field surveys were marked to indicate locations and types of potential natural areas based on characteristics observed on the photos. For example, maturity of forests was assumed to correlate with crown size and height of canopy trees; concentric rings of conifer forest surrounding an area of low shrubs, surrounding a body of open water could indicate a glacial bog community.

Once some photo interpretation was done, field surveys were conducted to determine what was actually on the ground to improve the accuracy and consistency of interpretation. Biologists finding minimally disturbed natural vegetation or species of special concern at a site outlined the site on a field map for future reference. In the lab, the photo signatures (characteristic patterns, texture, tone of vegetation, and other features on the photos) of these sites could be used to identify similar plant communities to be checked during future surveys. Biologists consistently finding poor quality sites associated with particular photo signatures could eliminate similar areas seen on the photos without field surveys.

Field Work

Experienced PSO biologists did the field work to evaluate the naturalness of habitats and search for sensitive species.

Workers categorized the vegetation by natural community type for each Potential Natural Area visited. An evaluation of quality was made for each natural community, care being taken to give reasons for the quality rank. Boundaries of the community types were redrawn, if needed, based on new field information. The Potential Natural Area Inventory Form (Appendix III) was completed for each community with a quality-rank of "C" and above. Community information recorded included the dominant, common, and other species as well as disturbances to the community. The

presence of sensitive plants and animals was noted and marked on USGS topographic quadrangle maps.

Data Analysis

To organize the natural features data and set conservation priorities, each natural community or species (elements) is ranked using factors of rarity and threat on a state-wide (state element ranking) and range-wide (global element ranking) basis (see Appendix I). Each location of an element (an element occurrence) is ranked according to naturalness, its potential for future survival or recovery, its extent or population size, and any threats to it. An explanation of the four PNDI quality ranks is given in Appendix II. The element-ranking and element occurrence-ranking systems help PSO personnel to simultaneously gauge the singular importance of each occurrence of, for example, Mixed Graminoid Marsh, Bog Turtle, and Pennells Speedwell occurring in the county, as well as the state-wide or world-wide importance of these natural features. Obviously, sites with several highly ranked occurrences of high-ranked elements merit more immediate attention than sites with a few low-ranked occurrences of lower ranked elements.

Field data for natural communities of C-rank or better, and for all plant and animal species of concern found were synthesized with existing data and summarized on PNDI Element Occurrence Records for mapping and computerization. Mapped locations of natural features, including approximate watershed boundaries, were then transcribed on to acetate map overlays for presentation to the county planners for their use and distribution.

Priorities for Protection

A table with a priority listing of the county's natural community and species locations is presented in the Summary and Recommendations section. The table ranks sites from the most important and threatened to the least. The table lists the site name, topographic map, and pertinent information on importance, threats, management needs, and recommendations for protection.

Some sites of potential local significance are indicated on the maps and briefly discussed in the text accompanying each map. These secondary sites are arranged in a separate table in the Summary and Recommendations section and ranked in approximate order of importance. They have been given qualitative ranks (high, medium, or low) according to size, level of disturbance, proximity to other open-space lands, and potential for sustaining a diversity of plant and animal life. These secondary-site ranks must be viewed as very approximate.

SUMMARY AND RECOMMENDATIONS

A meeting of TNC personnel and state experts on endangered species and significant habitats was held to discuss the most important sites for protection in Pennsylvania. This meeting consisted of a review of all sites within the state and then ranking them in terms of biological diversity (the rarity and abundance of the species or habitats), potential threats, and protection needs.

The following Berks County sites (Table 1) are regarded as being significant for natural communities and species of special concern and contain some of the best natural areas in the state.

Since there is only limited money and personnel time that can be devoted to the pursuit of land conservation, two tables are presented to direct protection efforts towards the most important sites first. Table 1 lists all the known sites where exemplary natural communities and species of special concern are located in approximate order of importance for the protection of biological diversity. The table also summarizes their significance, any potential threats, and some recommendations for protection. Table 2 is a list of secondary sites that may be important locally as sites for county or township parks or natural areas and passive recreation. The sites in Table 1 should be actively pursued for protection in order of importance while those in the second table might be targeted once protection of the Table 1 sites has been accomplished or as opportunities arise.

The following four sites from Table 1 are the most critical in Berks County for maintaining biological diversity into the future (see individual map summaries for additional information). Each site is followed by its USGS topographic quadrangle map location. Figure 1 indicates the approximate locations of these four sites in the county.

Blue Mountain (Friedensburg, Fredericksburg, Pine Grove, Swatara Hill, Bethel, Hamburg, Auburn, New Ringgold): This first ridge of the Valley and Ridge Province is the northernmost area in Berks County. It represents the largest, nearly continuous tract of
forest in the county and currently provides habitat for several rare species. Blue Mountain also is the headwaters for several creeks that course through the county and provides the water supply for at least one borough. This area may also be the most important outdoor recreational resource in the county. State game lands and state forest provide hunting and fishing opportunities while the Appalachian Trail is probably the most famous hiking trail in the country. Hawk Mountain Sanctuary is an educational and research facility for raptors and offers recreational bird watching for the public.

Much of the land is already protected by a variety of public and private agencies but many areas, especially toward the bottom of the slopes, remain unprotected from encroachment. Wildlands and Berks County Conservancies have worked toward protecting portions of the mountain and should be encouraged to continue these efforts.

Neversink Mountain (Reading): This mountain, located so close to Reading, provides open space in an urban setting and provides habitat for three rare species. Although there is a small residential development on the mountain, it does not appear to be influencing the species of special concern there. What is of concern is the use of herbicides and pesticides to control plants on the powerline right-of-way and for gypsy moth control in the surrounding woods. Herbicide use should be limited to control of tree saplings to ensure survival of the food plants used by two rare butterflies. The electric utility company and Berks County Conservancy have made progress toward this end. Aerial spray for gypsy moths should be avoided because the two butterflies are susceptible to the same chemicals.

It will be important to manage habitat on the mountain to limit the further spread of exotic plant species and maintain the small dry, rocky openings on the south slope that are important for the rare plant limited to this habitat. No logging has occurred recently but it should be completely discouraged in the future.

There is potential for Neversink to be a low-impact recreational asset to Reading and surrounding towns. The former trolley line offers opportunities for environmental education and nature observation, and walking and horseback riding.

Pine Swamp (Elverson): This is the largest wetland in Berks County (extending into Chester County) but only a small part of it is protected within French Creek State Park. This Acidic Broadleaf Swamp natural community harbors several rare plants and numerous species of wildlife dependent on wetlands. The Nature Conservancy has contacted the landowners to discuss the importance of this swamp but far more work by local, state and national organizations is necessary to completely protect this site.

Sacony Creek Marsh (Kutztown): Although the relative importance of this marsh is not as high as the three previous sites, it is important for its rare plants and in the context of its surroundings. The marsh is one of the few relatively large wetlands left in the county, provides flood protection to Kutztown, provides water to the creek, and helps cleanse water as it travels through the marsh. The location of the marsh adjacent to a high school and near Kutztown University makes it an ideal site for environmental education and natural history classes and has potential as an outdoor laboratory for students and researchers.

General Summary and Recommendations

Berks County is fortunate to have so much of Blue Mountain protected from development as state or federal lands. In addition there are other state lands within the county and the Berks County Conservancy is actively pursuing protection of sites within the county.

All privately-owned sites that are ranked 1 or 2 (Table 1) should be targeted immediately for protection of the site and the surrounding lands through a combination of acquisition and conservation easements to encourage current land use. All sites with good to excellent populations of species of special concern or good natural communities should receive protection too, but conservation easement or some type of tax incentive may be more appropriate until the highest priority sites have been protected. Sites that may be high in terms of biological diversity but are on government land are given lower priority because they are not currently in need of protection. Some of these protected sites may be in need of management, however.

There are sites in the county (Table 2) that do not have rare species or good natural communities but could be excellent sites for county or township parks or natural areas, especially those that can serve more than one purpose - recreation, wildlife habitat, flood and sediment control, water supply, etc. Natural communities and species of special concern found in these areas will fit into any plan for a county park or preserve. Creating county or township natural areas around municipal water supply watersheds can serve the purposes of providing an additional protective buffer around the water supply and provide low-impact recreation opportunities. In addition, larger

open-space areas are created for wildlife than can be achieved through either the watershed land or the natural area alone. Fee title, easements, tax incentives, and agreements with and among landowners are all tools that can be used to create these conservation lands.

There are many small parks and conservation lands in the county. If possible, more land should be added or agreements worked out with abutting landowners to minimize encroachments that detract from the appearance of these areas.

The importance of water bodies to biodiversity is illustrated by the number of rare species in the county associated with water. Protection of the reservoirs, wetlands, rivers, and creeks of Berks County is vital, especially those that protect biodiversity, supply drinking water, and are attractive recreational resources.

Table 1. The sites of statewide significance for the protection of biological diversity in Berks County in approximate order of priority from the most important to the least.

County Rank[1]	Site Name	USGS Topo. Map	TNC and State Ranks[2] Importance, Recommendations
1	Blue Mountain	Fredericksburg Pine Grove Swatara Hill Bethel Friedensburg Hamburg Auburn New Ringgold	Largest forested area in county; important recreational resource; four animal species of special concern including a globally-imperiled moth; much of the land is protected, but many tracts in need of protection agreements.
1	Neversink Mountain	Reading	Site for 2 rare butterflies and 1 rare plant; open space and low-impact recreation in urban area.
1	Pine Swamp	Elverson	A good-quality natural community with excellent (A) populations of PE and PR plants, a good (B) population of a PE plant; only small portion is protected legally but needs complete protection and cooperation from landowners.
2	Sacony Creek Marsh	Kutztown	Relatively large marsh with 3 plants of special concern; excellent site for natural history and environmental education classes; recommend acquisition.
3	NC507	Womelsdorf	Rich plant diversity in mature woodland and Spring Run community; protect as part of municipal water supply.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank[1]	Site Name	USGS Topo. Map	TNC and State Ranks[2] Importance, Recommendations
3	NC510/Trout Run	Boyertown	Exceptional Value stream; limit development in watershed and maintain and create vegetated buffer zone along creek.
3	NC511/Sacony Creek	Manatawny	Exceptional Value stream; limit development in watershed and maintain and create vegetated buffer zone along creek.
3	NC512/Pine Creek	Manatawny	Exceptional Value stream; limit development in watershed and maintain and create vegetated buffer zone along creek.
3	NC520/ Northkill Creek	Auburn Friedensburg	Exceptional Value stream; protect water quality by limiting development; maintain and establish, where necessary, a vegetated buffer along stream.
3	SP520 SP524 SP525	Temple	3 aquatic plant species - 1 in reservoir and 2 in nearby ponds; include protection in watershed management plan.
3	SP502	Manatawny	PA Vulnerable plant; maintain wooded habitat; good protection potential for Pine Creek woodland.
3	SP509	Kutztown	Fair population of a PE plant; protect with easement on site and buffer around it; threatened by invasion of agressive, weedy plants.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank[1]	Site Name	USGS Topo. Map	TNC and State Ranks[2] Importance, Recommendations
3	SP552	Reading	Good population of a G5S2S3 aquatic plant; protect water quality of Allegheny Creek below dam by restricting development.
4	NC524/Goose Lane Seep	Sinking Spring	Potential for rare plants in and around this natural spring; seek easement on wetland.
4	SA507	Manatawny	Fair site for a PE animal; maintain water quality and quantity in wetland; prevent further encroachment.
4	SP503	Fleetwood	Poor (D) population of a globally-rare, PE plant; maintain wooded wetland; seek protection agreement with landowner.
4	SP503	Kutztown	Fair population of a PT rush; protect Sacony Creek and its floodplain; monitor population.
4	SP525	Reading Birdsboro	G5S3, PR plant; protected within municipal watershed lands; monitor population.
4	SP529/ Birdsboro Seeps	Elverson	Fair (C) population of globally-rare, PE plant; protect as part of management plan for municipal watershed.
4	SP535, SP553	Elverson	Fair and poor populations of 2 plants of uncertain status in PA; maintain open habitat; limit development in Hay Creek corridor.

Table 1 (Concluded, next page.)

Table 1 (Concluded.)

County Rank[1]	Site Name	USGS Topo. Map	TNC and State Ranks[2] Importance, Recommendations
4	SP552	Elverson	Fair population of a G5S3 plant; maintain present open habitat along tributary of Hay Creek.
5	SA501	Reading	Remnant population of a PE animal; protect stream corridor to prevent further erosion/sedimentation in wetlands.
5	SA506	Manatawny East Greenville	Nesting site for G5S2 bird; maintain woods as open space and wildlife habitat.
5	SP503	Sassamansville	PA Vulnerable plant; maintain woodland along Middle Creek.
5	SP504	Fleetwood	Very poor population of globally-rare, PE plant; protect water quality and wooded wetland and upland buffer along Andstadt Hill.
5	SP510	Manatawny	Fair population of a PT sedge on Bieber Creek floodplain; maintain current wet meadow habitat by mowing.
5	SP528	Reading	Poor population of a TU plant within a cemetery; notify owner and manager of location.
5	SP541	Elverson	Fair population of G5S3 plant within state park; include protection in management plans.
5	SP557	Reading	Poor site for a PR plant; highly disturbed area; monitor only.

[1] Sites are ranked from 1 to 5 with 1 being the highest priority sites for protection with state or national significance, and 5 being the lowest state-wide priority sites with species or communities of special concern; ranks include potential threat and management needs.

[2] See Appendix I for explanation of Global and State vulnerability ranks.

Protection of the critical watersheds is the only way to ensure that the water in the reservoirs, streams and wetlands will always be good quality. A cooperative effort must be made by town, county, state, and federal agencies, developers, and residents to lessen the impact of housing development on the watersheds and plant communities of the county. Certainly, new housing and commercial development should be discouraged or given close scrutiny before it is allowed in the watersheds outlined in this report and careful review should be required within any watershed in the county. Townships should require minimum setbacks from all water bodies to help protect water quality. Landowners within any particular watershed can act on their own to protect water by forming watershed associations to voluntarily monitor and screen proposals in their localities.

County and township officials should encourage landowners whose land includes waterways to plant vegetated buffer zones along shorelines. These buffers will help reduce erosion and sedimentation and will help to shade and cool the water. These buffers will also provide habitat for wildlife and eventually create a diversity of habitats along the creek or stream.

Where development is to occur, plans should provide for creating natural buffers between the development and wetland or water body. Care should be taken to ensure that protected natural areas do not become "islands" surrounded by development. When a wetland or woodland is completely surrounded by development, even though there are no direct impacts, the site is effectively isolated and reduces its value for wildlife. Cluster development could be used to allow the same amount of development but on much less land in such areas but, most importantly, leave much of the land intact as corridors for wildlife and native plants. For example, instead of a development with 200 homes on 1-acre lots, the same number of units could be placed on 50 acres and the rest dedicated as open space to its current use or allowed to revert to a wilder state. This open space would be owned collectively by the 200 homeowners but deed restrictions and a conservation easement would ensure its remaining undeveloped.

Much of the work that needs to be done to protect land in Berks County can be done by county and township governments and groups like the Berks County Conservancy or The Nature Conservancy. However, these organizations will not be able to do all of the work because of limited resources and personnel. There will be need for grassroots organizations like watershed associations to help with land protection. These groups can assist with the identification of landowners who wish to protect their land, provide information about easements to landowners, acquire land, and provide management and stewardship once the land is protected.

TABLE 2. Areas of local significance in Berks County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential.

County Rank*	Site Name	USGS Topo. map	Importance
High	Appalachian Trail	Fredericksburg Pine Grove Swatara Hill Bethel Friedensburg Hamburg Auburn New Ringgold	Important site for open space recreation[1]; mostly protected but some areas still in need of permanent restrictions on development and landuse.
High	French Creek	Elverson	High-quality Coldwater Fishery; limit development in watershed and maintain vegetated buffer along banks.
High	Little Lehigh Creek	Topton Manatawny East Greenville	High-quality Coldwater Fishery; limit development in watershed and maintain vegetated buffer along banks.
High	Pine Creek	New Ringgold Hamburg	High-quality Coldwater Fishery; limit development in watershed and maintain vegetated buffer along banks.
High	Schuylkill River	Pottstown Auburn Hamburg Temple Reading Birdsboro Boyertown	Preserve as much open space as possible along river and all islands; excellent recreational resource.
High	Sixpenny Creek	Elverson	High-quality Coldwater Fishery; limit development in watershed and maintain vegetated buffer along banks.

Table 2 (Continued, next page.)

Table 2 (Continued.)

County Rank*	Site Name	USGS Topo. map	Importance	
Medium	Chapel Hill Forest	Fleetwood	Mature woodland with seeps and floodplain forest; amphibian breeding area; complete protection recommended.	
Medium	Rock Church Swamp	Elverson	Waterfowl and amphibian breeding habitat; flood control; water quality improvement; conservation easement recommended.	
Medium	Little Swatara Floodplain Forest	Bethel	High vegetative diversity in small area; flood control and bank stabilization.	
Medium	Lobachsville Floodplain Forest	Fleetwood Manatawny	Mature floodplain woodland with good diversity; poor forest regeneration because of deer; recommend against future logging.	
Medium	Shenkel Hill Forest	Boyertown	Diversity of plant life in fairly large woodland; open space and wildlife habitat; logging is a threat; recommend easement.	
Medium	Unionville Creek	Pottstown	Large forested tract adjacent to French Creek S.P.; hiking and passive recreation; forested corridor nearly to Schuylkill River.	
Medium	West Branch Creek Seeps	Manatawny	Mature trees with fairly high diversity; a source of water for West Branch.	Pine

Table 2 (Concluded, next page.)

Table 2 (Concluded.)

County Rank*	Site Name	USGS Topo. map	Importance
Low	GE514/ Spitzenberg Hill	Kutztown	Geologic feature and scenic views; fairly diverse flora.
Low	Amityville Floodplain Forest	Boyertown	Floodplain islands and north-facing slope; diverse flora and wildlife habitat; water quality protection; maintain in present condition.
Low	Cold Run Seeps	Elverson	Fairly mature woodland; open space for wildlife; water source for Cold Run; work with landowner to protect site.
Low	Rebers Bridge Mesic Forest	Sinking Spring	Mature hemlock forest; protection of steep slopes and Tulpehocken Creek; litter appears to be only problem.
Low	Swamp Creek Seeps	Manatawny	Water flow and quality maintenance for Swamp Creek; wildlife habitat.
Low	Vinemont Dale	Sinking Spring	Scenic ravine with bedrock outcrops mostly within SGL 274; seek protection of adjacent land.
Low	Weller Cemetery Seeps	Manatawny	Water flow and quality maintenance for Swamp Creek; wildlife habitat.

* These sites are ranked from high to low as an indication of their importance at the county or municipal level. These sites must be viewed as of lower rank in terms of biodiversity than those in Table 1.

[1] Several sites along the Appalachian Trail are important at the state or national level in terms of biodiversity (see Table 1).

In this report, we have outlined the watersheds where the natural communities and species of special concern occur. The core areas where the species and communities occur need to be given the most attention, and fee title acquisition is encouraged. Ideally, all of the land within the watersheds outlined in this report should receive some form of protection, but there are not sufficient financial resources to protect all of the land nor will all landowners be interested in land protection. Not all of this land can receive the same amount of protection nor do all activities need to be excluded. Current land uses that are not impacting these important sites should be encouraged to continue. There are forested tracts in the county that have been logged in the past or are currently being logged. Most of these are undistinguished except as open space. Logging provides income to the landowner while maintaining the land as open space. By encouraging proper management practices, long term rotations and selective cutting these woodlands can be enhanced for wildlife, maintained as open space, and continue to provide income into the future.

Conservation easements are designed to allow landowners the current use of their land while protecting the owner and the resource from outside development pressure. Where easements are not possible any proposals for significant land use changes should be closely scrutinized by county and township planners. If there are any questions about the impact of the proposed development, we suggest that our office, Pennsylvania Science Office of The Nature Conservancy, be consulted.

We wish to emphasize that this Natural Areas Inventory is only a beginning, new sites with good natural communities and species of special concern wait to be discovered. Plant communities and plant and animal populations are dynamic, constantly changing with time and conditions. As this information is received and updated in the PNDI data base, so too will the Berks County Natural Areas Inventory.

RESULTS

The Berks County Inventory began in the spring of 1990 and continued through the summer and fall field season. A few field surveys in the spring of 1991 completed the study. Knowledgeable local individuals were invited to submit information about sites and three local biologists conducted field surveys for selected species of special concern.

On 20 October 1990, a reconnaissance flight was taken over the entire county to look at sites that were not easily accessible on foot and to eliminate disturbed areas.

Site Summaries by USGS Topographic Maps

Portions of Berks County are found on 28 USGS 7½° topographic quadrangle maps (Figure 2). Communities, species of special concern, significant geologic features, managed open space lands such as state game lands, and some unprotected areas that may be of local importance for wildlife and open space have been located on these base maps. The most important areas are

represented on the maps in bold print. Natural communities and the most critical sites for species of concern have been given site names in upper case bold type, such as **SACONY CREEK MARSH**, and are followed by natural community and species map codes (e.g., **NC501**, **SA502**, **SP503**). Lesser quality sites with poor representations of communities or species of special concern have been outlined and noted with the map code number in bold type only. The area outlined represents the species' location and the watershed or subwatershed area where the elements (species or natural communities) are located. Development activities proposed within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess these impacts.

Some sites have been mapped that do not appear to have species of special concern and are labeled with a site name in plain type, e.g., LITTLE SWATARA CREEK FLOODPLAIN FOREST. At these sites, the vegetation has been disturbed enough that they cannot be considered natural, but they do hold potential for parks or passive recreation/open space areas.

Finally, managed areas are indicated with names in bold upper and lower case type, e.g., **State Game Lands 106**.

Each topographic map is accompanied by a table that lists all of the exemplary natural communities and species of special concern located on the map. The communities and species are identified by a PNDI map code unique to each element on that map. Following each of these elements is its global and state ranks (Appendix I), federal and state protection status (Appendix I), the date last observed, and its quality rank (Appendix II). In addition, sites of local significance, geologic features, managed lands, and natural communities and species that are located primarily on adjacent maps are listed within the "Other" category.

USGS QUADRANGLE MAP: Allentown West

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

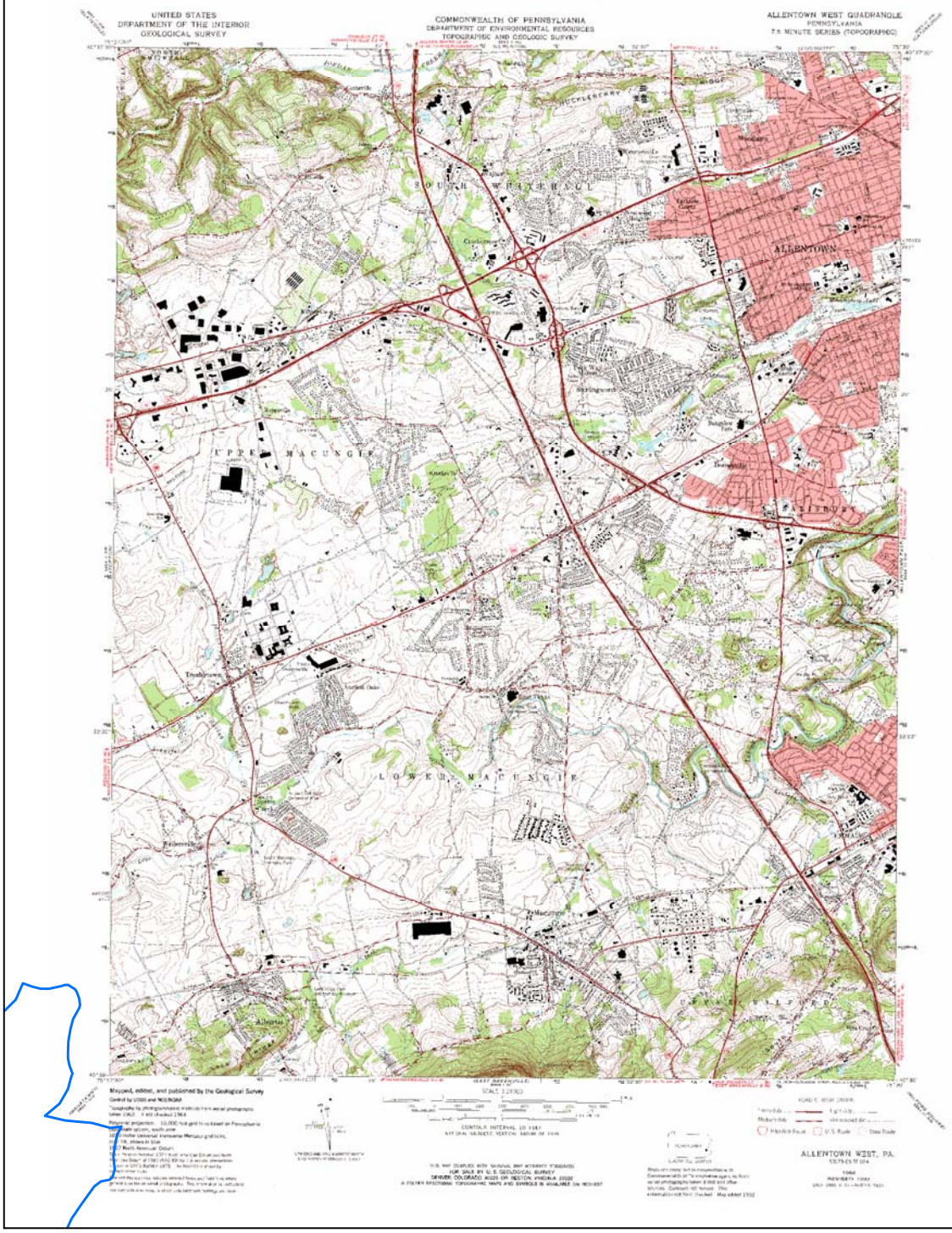
SPECIAL ANIMALS: None identified.

OTHER: None identified.

Allentown West Quadrangle:

Only a very small portion of Berks County extends onto the extreme southwest corner of the Allentown West quadrangle. PSO staff did not find natural communities or species of special concern in this area.

Allentown West Quadrangle



USGS QUADRANGLE MAP: Auburn

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	520	G?	S3	N	-	E

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

GEOLOGICAL FEATURES:	516	-	-	-	1990	-

OTHER: Weiser State Forest, State Game Lands 110,
State Game Lands 106, Appalachian Trail.

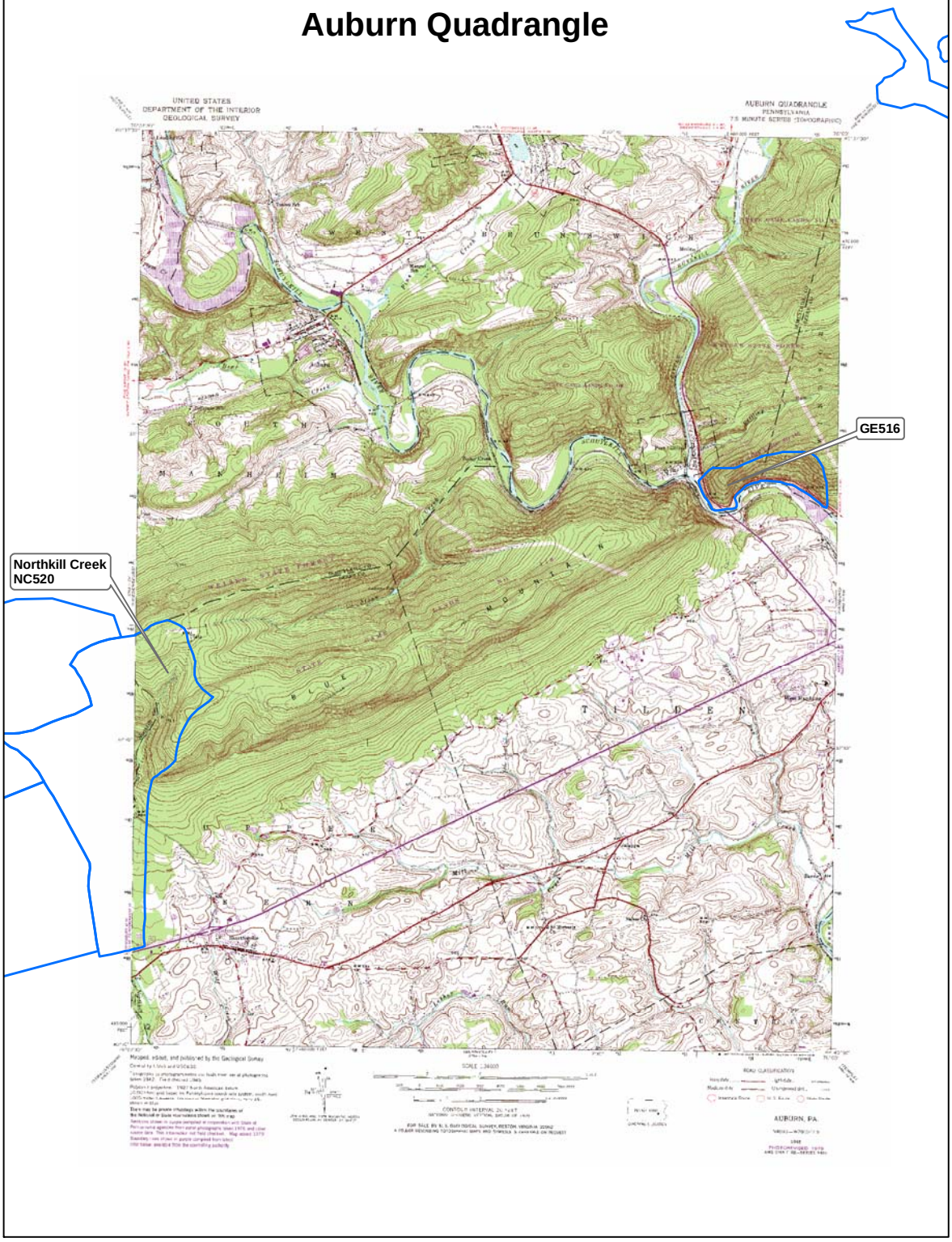
Auburn Quadrangle:

Berks County extends across the southern half of the Auburn quadrangle. The county boundary is located along the broad ridgetop of Blue Mountain.

GE516 provides an outstanding example of a water gap where the Schuylkill River cuts through Blue Mountain exposing the underlying quartzite (Geyer and Bolles, 1979).

Northkill Creek (**NC520**), from its source to the I-78 bridge, is a High-gradient Clearwater Creek community and designated as an Exceptional Value stream by PA DER. The creek is also shown on the adjoining Friedensburg quadrangle. The creek's location on **State Game Lands 110** affords it some protection. This area is listed for avoidance of large-scale logging activities, although selective logging is permitted to enhance wildlife habitat. Appropriate sediment and erosion control measures are utilized in these habitat management activities to protect surface water quality.

Auburn Quadrangle



USGS QUADRANGLE MAP: Bernville

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

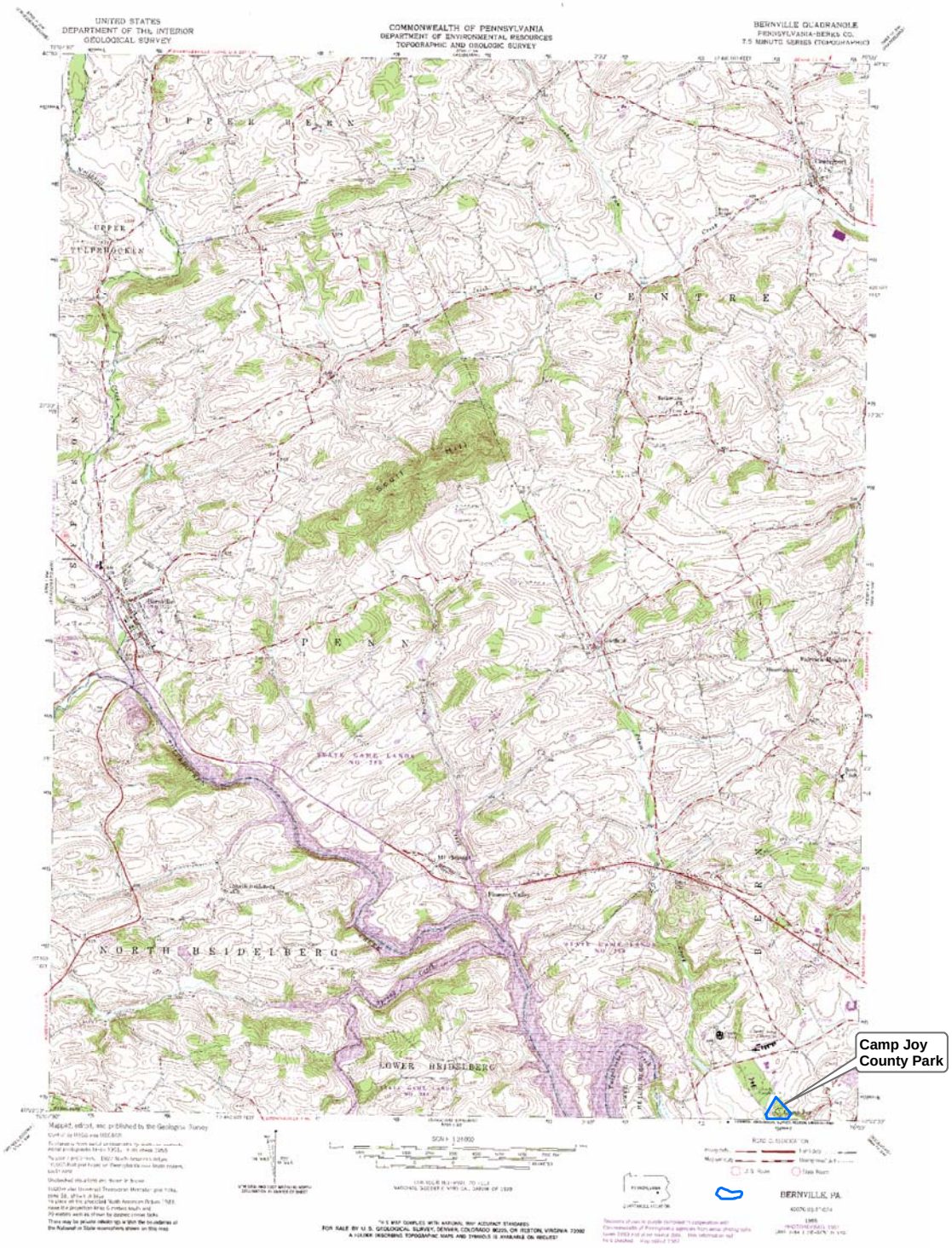
OTHER: State Game Lands 280, Camp Joy County Park, Blue Marsh Lake.

Bernville:

Berks County covers the Bernville quadrangle, which lies in the Great Valley. PSO staff did not find natural communities or species of special concern on the Bernville quadrangle. They recognize three managed areas of local significance: **State Game Lands 280**, **Camp Joy County Park**, and **Blue Marsh Lake**. Where possible, encroachment on these managed areas should be discouraged.

Scull Hill (not mapped) is the largest forested patch on the quadrangle. The most outstanding feature of the hill is the view of Blue Mountain and the surrounding Great Valley afforded from the summit. The mixed oak forest cloaking the hill is typical of the region and shows evidence of heavy disturbance including extensive logging and invasion of exotic species. The forest provides some habitat for wildlife and open space for human recreation. Given the lack of large forested tracts in this part of the county, the township might wish to maintain the hill as forested open space in cooperation with the landowners or possibly set it aside as a park.

Bernville Quadrangle



USGS QUADRANGLE MAP: Bethel

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

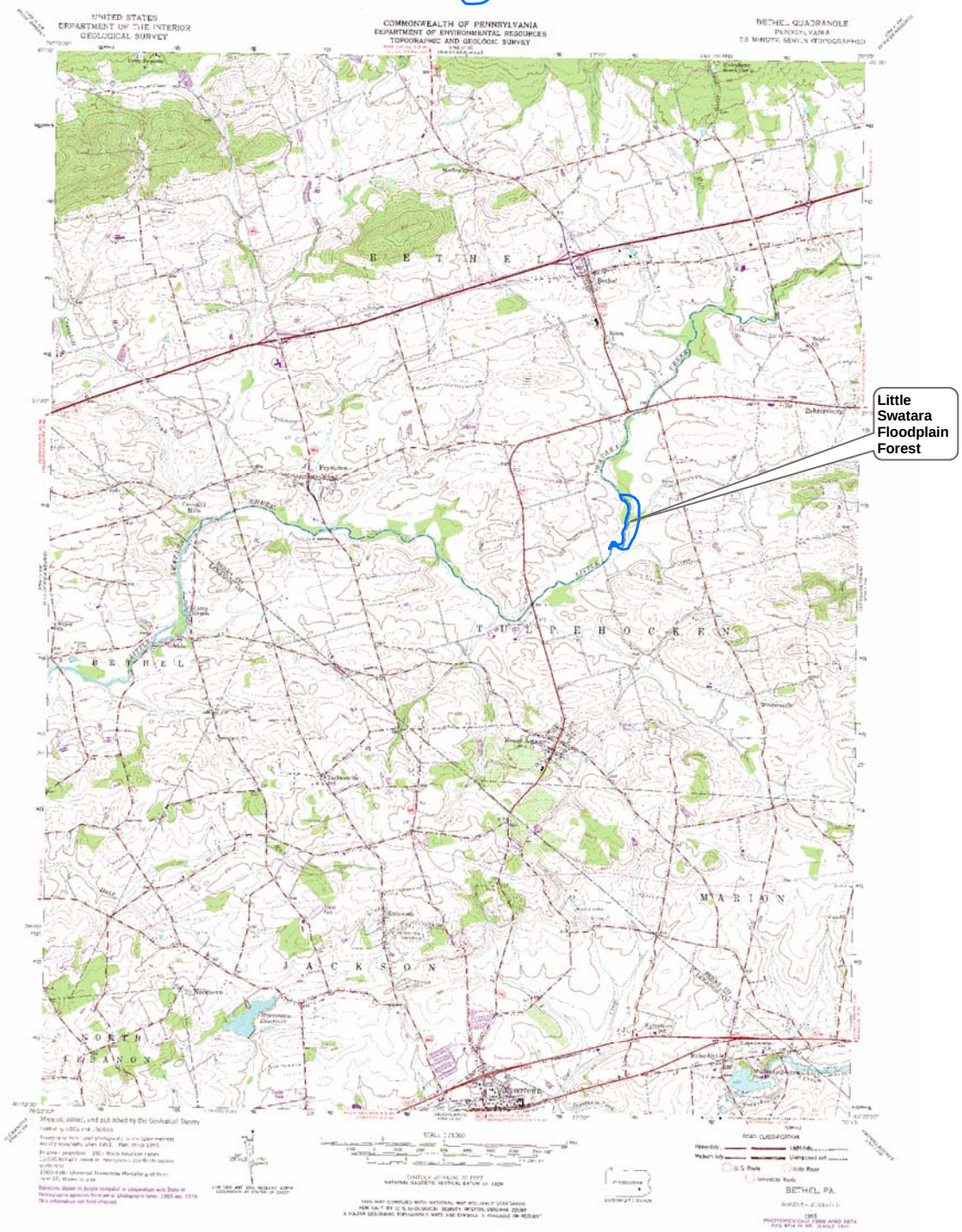
OTHER: Little Swatara Floodplain Forest.

Bethel Quadrangle:

Berks County extends across the northern two-thirds of the Bethel quadrangle. Except for the southern slope of Blue Mountain, most of the area is within the Great Valley. PSO staff did not find natural communities or species of special concern here.

The **LITTLE SWATARA FLOODPLAIN FOREST** due south of Bethel in Bethel and Tulpehocken Townships is a good natural area of local significance because of its diverse assemblage of plants and birds. A mixture of tree species includes slippery elm (Ulmus rubra), red maple (Acer rubrum), white oak (Quercus alba), and beech (Fagus grandifolia) among others. A rich herbaceous layer consists of wood nettle (Laportea canadensis), spotted touch-me-not (Impatiens capensis), and a host of spring-ephemerals - Virginia spring beauty (Claytonia virginica), yellow trout-lily (Erythronium americanum), mayapple (Podophyllum peltatum), and dwarf ginseng (Panax trifolium). Meander scars, wet depressions wherein the creek once flowed, support skunk cabbage (Symplocarpus foetidus), bulbous cress (Cardamine bulbosa), halberd-leaved tearthumb (Polygonum arifolium), golden saxifrage (Chrysosplenium americanum), and other wetland species. A number of bird species inhabit the forest and its openings, as well. Logging and other disruptive activities should be avoided within and near the forest to protect the avifauna that rely on the few wooded patches remaining in the agricultural and increasingly suburbanized landscape of eastern Pennsylvania.

Bethel Quadrangle



USGS QUADRANGLE MAP: Birdsboro

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified						
SPECIAL PLANTS:	514	G5	S2	TU	09-21-92	C
SPECIAL ANIMALS: None identified						

OTHER: Antietam Reservoir Watershed, Schuylkill River. See adjacent map for sp525. sp529 & sa533; see SP529 & SA533, Fleetwood quadrangle

Birdsboro Quadrangle:

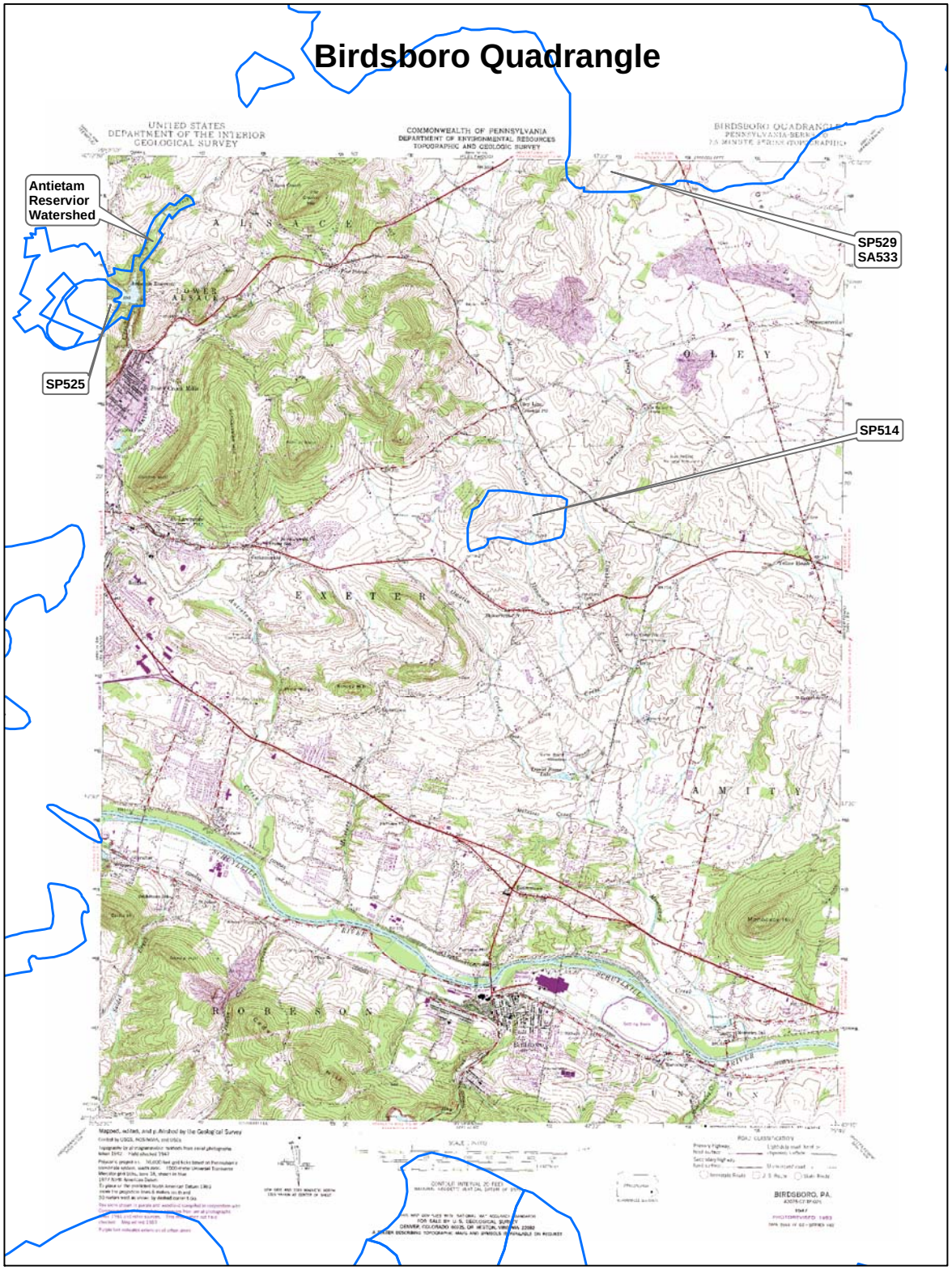
Berks County covers the Birdsboro quadrangle. PSO staff did not find natural communities or species of special concern here. A state-rare plant (**sp525**) is found within **Antietam Reservoir Watershed** on the adjacent Reading quadrangle. This species appears to be adequately protected.

SP514 -NEW (1998 update)- (Exeter Twp.) "Monocacy Creek Meadow" This site is a wet meadow located along Monocacy Creek, currently being used as a cattle pasture. Black willow, reed-canary grass, goldenrods, asters, jewelweed, boneset, monkey flower, and sedges and rushes are common species. A fair population of a plant species of concern was found here in 1992. This species requires open habitat and likely benefits from light grazing under its current land use. The owner is aware of the plant, and intends to keep the site as it is. Heavy grazing and succession are potential threats. No special management is recommended.

sp529, sa533 A portion of the buffer area for this site overlaps onto this quadrangle; see Fleetwood **SP529** and **SA533** for a site description (1998 update).

The section of the **Schuylkill River** occurring on the Birdsboro quadrangle is designated as a Pennsylvania-Scenic River.

Birdsboro Quadrangle



USGS QUADRANGLE MAP: Boyertown

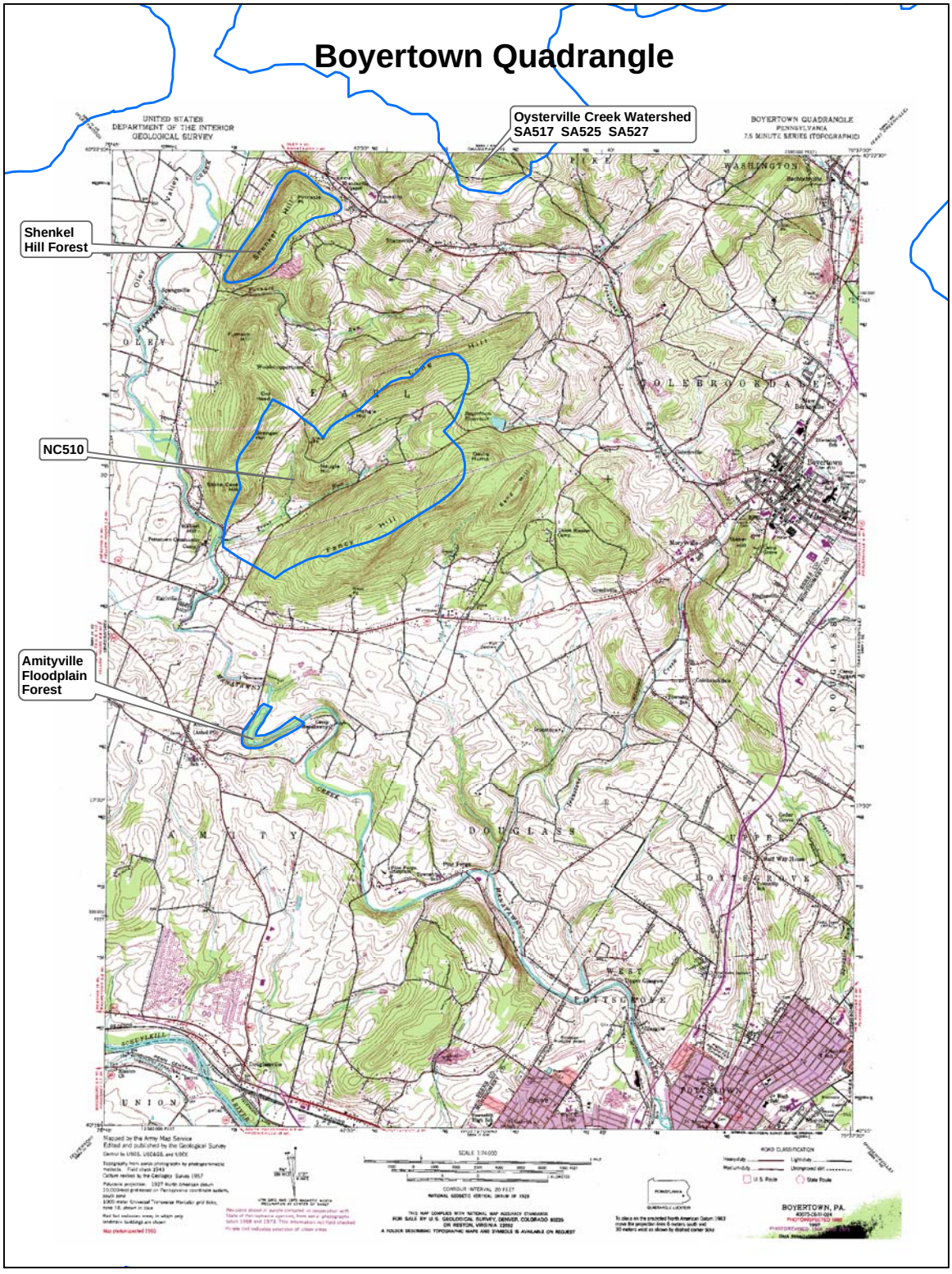
	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	510	G?	S3	N	1990	E

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: Amityville Floodplain and Slope, Shenkel Hill Forest, Schuylkill River.

Boyertown Quadrangle



Boyertown Quadrangle:

Berks County covers the northern and western parts of the Boyertown quadrangle. The Reading Prong juts onto the north-central part of the map. Most of the remaining map area is in the Triassic Lowlands.

Trout Run is a High-gradient Clearwater Creek community (**NC510**) and designated Exceptional Value Stream located in Earl Township that flows off the uplands of the Reading Prong. Logging and development within the watershed of Trout Run should be minimized to protect the stream and its biota.

The AMITYVILLE FLOODPLAIN, includes a large island and steep northwest-facing slope on Manatawny Creek east of Amityville. The floodplain and island have similar plant species composition. Trees include sycamore (Platanus occidentalis), beech (Fagus grandifolia), tulip tree (Liriodendron tulipifera), red maple (Acer rubrum) and several others. Spicebush (Lindera benzoin), hornbeam (Ostrya virginiana) and ironwood (Carpinus caroliniana) as well as some weedy species are prominent in the shrub layer. A high diversity of herb species (more than 30 species were identified during one site visit) reflects the abundance of microhabitats associated with floodplain areas. Virginia cowslip (Mertensia virginica) was very abundant in late April.

The slope above the creek faces north. This cool, mesic slope has a plant community dominated by a 60-70' canopy of beech, hemlock (Tsuga canadensis), tulip tree, with some black birch (Betula lenta), white ash (Fraxinus americana), and red oak (Quercus rubra). Witch hazel (Hamamelis virginiana) and maple-leaf viburnum (Viburnum acerifolium) are dominant shrubs with small patches of American yew (Taxus canadensis) growing atop rock outcrops.

PINNACLE POINT SLOPE is a steep, rocky, northwest-facing slope developed on quartzose/feldspathic sandstone and conglomerate. The forest covering the slope is locally significant because it offers a reasonable representation of the native dry oak woods. It is mature enough to have a well-developed structure with distinct canopy, shrub, and herb layers and contains at least two orchids -pink lady's slipper (Cypripedium acaule) and rattlesnake plantain (Goodyera pubescens). The woodland provides habitat for a variety of birds including the pileated woodpecker whose distinctive oblong holes were observed. Chestnut oak (Quercus montana), red oak, and black birch dominate the 50 to 60-foot canopy of 80% cover. The shrub layer of 50% cover consists of witch hazel, maple-leaf viburnum, huckleberry (Gaylussacia sp.), mountain laurel (Kalmia latifolia), and pinxter flower (Rhododendron nudiflorum). A sparse herb layer includes wild sarsparilla (Aralia nudicaulis), smooth Solomon's seal (Polygonatum biflorum,) and assorted ferns such as wood fern (Dryopteris sp.) and rock-cap fern (Polypodium virginianum). The slope should be protected from logging.

The stretch of the **Schuylkill River** that flows across the southwestern corner of the quadrangle is designated as a Pennsylvania-Scenic River.

USGS QUADRANGLE MAP: East Greenville

Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: See adjacent map for sa506, Little Lehigh Creek.
sa526; see Manatawny quadrangle

East Greenville Quadrangle:

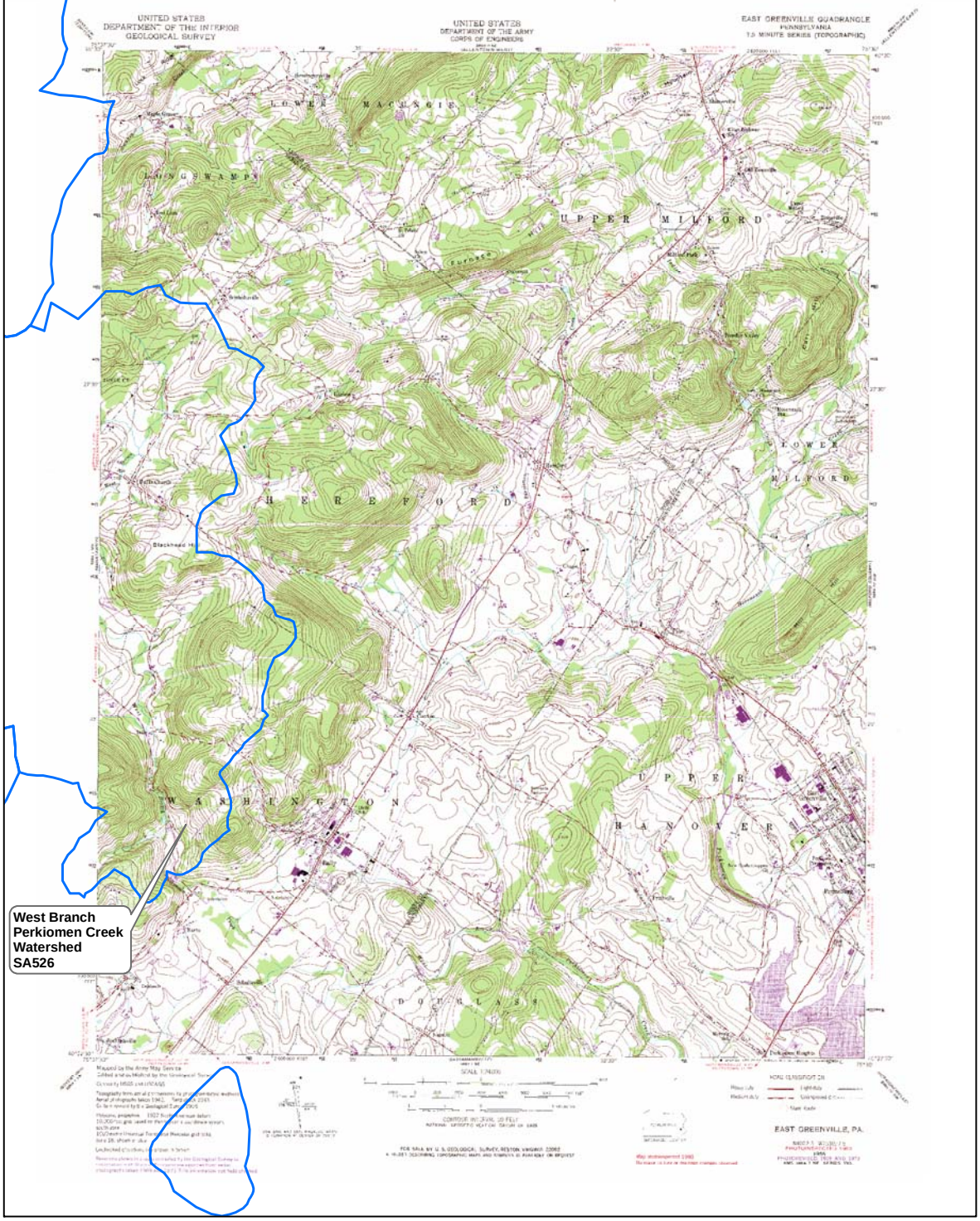
Berks County extends onto the western portion of the East Greenville quadrangle. PSO staff did not find natural communities or species of special concern in this area. However, **SA506**, a bird species imperiled in Pennsylvania (S2), was observed nesting among boulder and rock outcrops in a tulip poplar, ash, and maple woodlot on the adjacent Manatawny quadrangle.

SA506 has been delisted (2003 update).

Little Lehigh Creek is designated as a High-Quality Coldwater Fishery by PA DER. Its watershed continues onto this map from the adjacent Manatawny quadrangle.

SA526 (Twp.) "West Branch Perkiomen Creek Watershed" see Manatawny quadrangle for species descriptions (2003 update).

East Greenville Quadrangle

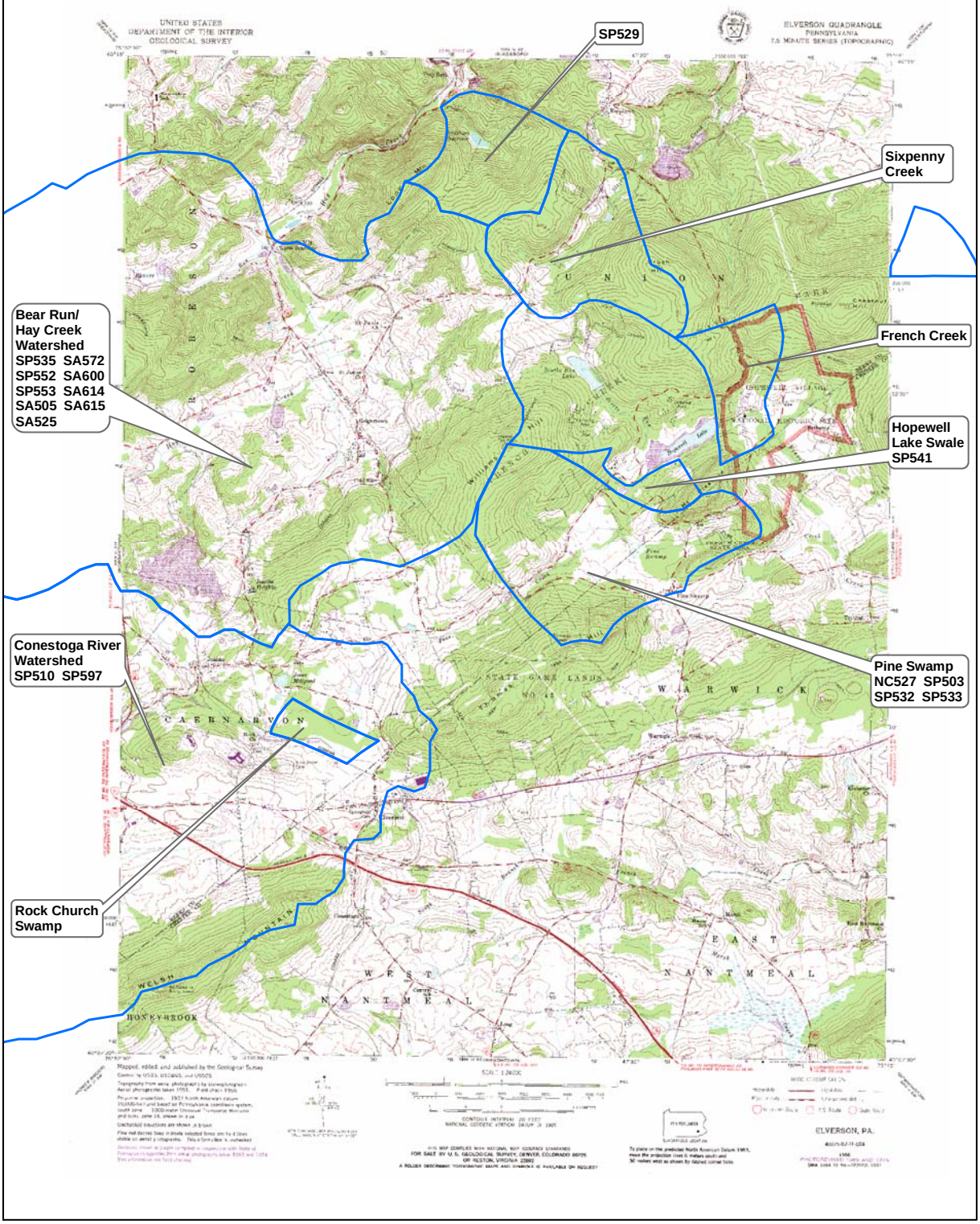


USGS QUADRANGLE MAP: Elverson

		TNC Ranks*		State	Last	
	Code	Global	State	Status	Seen	Quality**
NATURAL COMMUNITIES:	527	G5	S1S2	N	6-03-1987	B
SPECIAL PLANTS:	503	G3	S2	PE	6-03-1987	A
	510	G5	QS3	PR	03-27-03	CD
	529	G3	S2	PE	6-03-1988	C
	532	G5	S2	PR	9-21-1987	A
	533	G5	S1	PR	9-21-1987	B
	535	G5	S2	PE	8-12-1990	C
	540	G5	S2	N	09-18-00	C
	541	G5	S3	N	9-09-1990	D
	552	G5	S3	N	9-09-1990	C
	553	G5	S?	N	8-12-1990	D
	558	G?	S1	TU	07-18-92	BC
	559	G5	SU	PT	07-18-92	CD
	560	G5	S3	TU	07-18-92	BC
	561	G5	S3	TU	9-20-93	D
	563	G5	S	PT	10-07-94	C
	570	G5	S1	PE	10-07-94	CD
SPECIAL ANIMALS:	505	G4	S2	N	07-12-97	E
	525	G4	S3	N	07-12-97	E
	572	G3	S2	PE	09-20-95	E
	597	G3	S2	PE	06-17-00	CD
	600	G3	S2	PE	07-29-97	E
	614	G3	S2	PE	07-09-00	E
	615	G3	S2	PE	07-09-00	E

OTHER: French Creek State Park, Birdsboro Reservoir Watershed, State Game Lands 43, Hopewell Village National Historic Site, Rock Church Swamp, Cold Run Seeps, French Creek, Sixpenny Creek.

Elverson Quadrangle



Elverson Quadrangle:

Berks County extends across the northwestern half of the Elverson quadrangle. Most of this area is in the Triassic Lowlands, however, Mt. Pleasure in French Creek State Park and Thomas Hill in State Game Lands 43 are underlain by the resistant Chickies quartzite of the Piedmont Uplands. Pine Swamp, which lies between the two hills, is underlain by the less resistant sandstones and shales of the Stockton Formation of Triassic age.

SP535, SP552, SP553, SA505, SA525, SA572, SA600, SA614, SA615 (Scarlets Mill, Robeson, and Caernarvon Twps.) "Beaver Run/Hay Creek Watershed" Three plant species of special concern grow in this watershed. **SP535** and **SP553** mark fair and poor populations, respectively, of two wildflower species under consideration for state-listing that grow along an abandoned railroad track in dry, open conditions. **SP553** grows at the base of a rock outcrop in association with orange-grass (Hypericum gentianoides), bird's-foot violet (Viola pedata), frostweed (Helianthemum canadense), beard grass (Schizachyrium scoparium), and hair-like bulbostylis (Bulbostylis capillaris). **SP535** grows in three open areas adjacent to the tracks in association with wild sensitive plant (Cassia nictitans), smooth tick-trefoil (Desmodium laevigatum), dwarf sumac (Rhus copallina), Queen Anne's-lace (Daucus carota), Canada goldenrod (Solidago canadense), and others. For the time being, the plants appear secure. **SP552**, a fair population of a wildflower under consideration for state-listing, grows in an abandoned cow pasture along a branch of Hay Creek with beardgrass (Andropogon glomeratus), short-hairy goldenrod (Solidago puberula), and bastard toadflax (Comandra umbellata) among others. The wildflower, capable of surviving grazing, could be threatened by succession unless the field is periodically mowed.
Several PA-Endangered animal species (**SA572, SA600, SA614, SA615**) have been observed in this watershed from 1995 - 2000. Suitable habitat is available throughout this watershed but little is known about the status of this species in this habitat. Further surveys are needed to locate the most suitable habitat and to look for more individuals. The greatest current threat to these populations is housing developments. Many of the current landowners are selling their properties and developments are planned. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. This species is also threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of the creeks, and illegal filling of the marshes present threats.
Two other animal species of concern (**SA505, SA525**) were identified in this watershed in 1997. These animals prefer wet meadow habitats and are associated with species such as (Wallengrenia otho), (W. egeremet), (Euphydryas phaeton), (Satyrodes appalachia), (Euphyes conspicuus), (Pompeius verna), and (Speyeria cybele). Yearly mowing at the site maintains habitat for these species. In 1997, the site was up for sale and a change in ownership may lead to less favorable habitat conditions for these animals (2003 update).

SP510, SA597 (Caernervon, Brecknock, Honeybrook Twps.) "Conestoga River Watershed" An PA Endangered animals species (**SA597**) was discovered here in 2000. This species was found in a wetland with tussock sedge (Carex stricta), cattails (Typha latifolia), watercress (Nasturtium officinale), grasses and forbs. More surveys must be completed to determine the extent of the

population. This site is threatened by a proposed shopping center complex. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. A plant species of concern (**SP510**) was discovered in State Game Lands #52. Though this plant is actually located on the Morgantown Quad, it falls within the Conestoga River Watershed. This Pennsylvania rare plant requires moist, shaded conditions and is easily overlooked.

PINE SWAMP located in Union Township provides a good example of an Acidic Broadleaf Swamp (**NC527**) in which an excellent population of a state-endangered grass (**SP503**) grows. This large (200-acre) acidic to weakly circumneutral seepage swamp on mucky soils is dominated by red maple (Acer rubrum), black ash (Fraxinus nigra), and swamp white oak (Quercus bicolor) with southern arrow-wood (Viburnum dentatum) and spicebush (Lindera benzoin) as common shrubs and skunk cabbage (Symplocarpus foetidus) an abundant herb. Vegetated hummocks and mucky channels are characteristic features. Nearby, a boggy, somewhat hummocky pasture with dense herbaceous vegetation supports a good population of a state-endangered nutrush (**SP533**) and an excellent population of a state-rare wildflower (**SP532**).

A diverse fauna inhabits the large swampy area. During one five and a half hour period in July of 1985, over 25 bird species were casually heard or seen in Pine Swamp and adjacent areas where they were probably breeding. In addition, at least four fish species, one species of water snake, and three frog species were sighted or captured in Pine Creek. The swamp also supports a large number of white-tailed deer.

The large, relatively undisturbed nature of Pine Swamp in combination with the occurrence of three plant species of special concern and numerous animal species within its borders make the extensive wetland a top priority for protection. While the northwestern part of the swamp is protected by **French Creek State Park**, the remaining acres are privately-held. Efforts should be made to preserve as much land as possible.

In the vicinity of Scarlets Mill in Robeson Township, three plant species of special concern grow. **SP535** and **SP553** mark fair and poor populations, respectively, of two wildflower species under consideration for state-listing that grow along an abandoned railroad track in dry, open conditions. **SP553** grows at the base of a rock outcrop in association with orange-grass (Hypericum gentianoides), bird's-foot violet (Viola pedata), frostweed (Helianthemum canadense), beard grass (Schizachyrium scoparium), and hair-like bulbostylis (Bulbostylis capillaris). **SP535** grows in three open areas adjacent to the tracks in association with wild sensitive plant (Cassia nictitans), smooth tick-trefoil (Desmodium laevigatum), dwarf sumac (Rhus copallina), Queen Anne's-lace (Daucus carota), Canada goldenrod (Solidago canadense), and others. For the time being, the plants appear secure. **SP552**, a fair population of a wildflower under consideration for state-listing, grows in an abandoned cow pasture along a branch of Hay Creek in Robeson Township with beardgrass (Andropogon glomeratus), short-hairy goldenrod (Solidago puberula), and bastard toadflax (Comandra umbellata) among others. The wildflower, capable of surviving grazing, could be threatened by succession unless the field is periodically mowed.

SP529 (Twp.) "Birdsboro Seeps" A fair population (**SP529**) of a state-endangered grass grows with cinnamon fern, skunk cabbage, and scattered spicebush in the numerous seeps and streamlets that

flow north into the Birdsboro Reservoir in Robeson and Union Townships. Restrictions on logging and other activities that would degrade the water quality of the reservoir will double as protection for the grass species. A new subpopulation for this PA-Endangered grass species was found at this site in 1993. The quality of the population has been upgraded to good, and continued protection of the Birdsboro Reservoir Watershed should help to protect this species as well (2003 update).

A small population of a rush (**SP541**) whose status is currently under consideration grows in two ditches at the upper end of Hopewell Lake in French Creek State Park in Union Township. These man-made wet areas provide suitable habitat for this Coastal Plain species and an assortment of wetland plants including sallow sedge (Carex lurida), wool-grass (Scirpus cyperinus), seedbox (Ludwigia alternifolia), beggar-ticks (Bidens frondosa), sharp-fruited rush (Juncus acuminatus), and small-headed beaked rush (Rhynchospora capitellata). Over-mowing of the ditch bank could harm the plant species of concern. On the other hand, some mowing is needed to prevent succession. This should occur one to two times a year before the plant has begun to grow or after it has set seed.
SP559 (Union Twp.) "Sixpenny Creek" "Sixpenny Lake" A PA-Threatened plant species was discovered in July 1992 growing on the drained sandy lakebed of Sixpenny Lake. Sedges, rushes, and bulrushes are the dominant vegetation. The viability of the habitat for this species will be affected by changes in the lake level. No map is included, as this site falls within the existing boundaries of the Sixpenny Creek Watershed.

SP541 (Twp.) "Hopewell Lake Swale" A small population of a rush (**SP541**) whose status is currently under consideration grows in two ditches at the upper end of Hopewell Lake in French Creek State Park in Union Township. These man-made wet areas provide suitable habitat for this Coastal Plain species and an assortment of wetland plants including sallow sedge (Carex lurida), wool-grass (Scirpus cyperinus), seedbox (Ludwigia alternifolia), beggar-ticks (Bidens frondosa), sharp-fruited rush (Juncus acuminatus), and small-headed beaked rush (Rhynchospora capitellata). Over-mowing of the ditch bank could harm the plant species of concern. On the other hand, some mowing is needed to prevent succession. This should occur one to two times a year before the plant has begun to grow or after it has set seed.

NC527, SP503, SP532, SP533, SP540, SP558, SP560, SP561, SP563, SP570 (Union Twp.) "Pine Swamp" PINE SWAMP provides a good example of an Acidic Broadleaf Swamp (**NC527**) in which an excellent population of a state-endangered grass (**SP503**) grows. This large (200-acre) acidic to weakly circumneutral seepage swamp on mucky soils is dominated by red maple (Acer rubrum), black ash (Fraxinus nigra), and swamp white oak (Quercus bicolor) with southern arrow-wood (Viburnum dentatum) and spicebush (Lindera benzoin) as common shrubs and skunk cabbage (Symplocarpus foetidus) an abundant herb. Vegetated hummocks and mucky channels are characteristic features. Nearby, a boggy, somewhat hummocky pasture with dense herbaceous vegetation supports a good population of a state-endangered nutrush (**SP533**) and an excellent population of a state-rare wildflower (**SP532**). The plant species of concern, **SP532** was revisited in 1993. Fewer individuals were observed and the quality ranking was changed from excellent to good. A small population of **SP561** was discovered at this site for the first time. No immediate threats to either species are apparent.
Several other plant species of concern are located at this site. **SP540** and **SP560** are rush and sedge

species that thrive in the wet conditions of the marsh. **SP558** is a grass species growing in the area. **SP563** and **SP570** are two woody species that are threatened and endangered in Pennsylvania.
A diverse fauna inhabits the large swampy area. During one five and a half hour period in July of 1985, over 25 bird species were casually heard or seen in Pine Swamp and adjacent areas where they were probably breeding. In addition, at least four fish species, one species of water snake, and three frog species were sighted or captured in Pine Creek. The swamp also supports a large number of white-tailed deer.
The large, relatively undisturbed nature of Pine Swamp in combination with the occurrence of nine plant species of special concern and numerous animal species within its borders make the extensive wetland a top priority for protection. While the northwestern part of the swamp is protected by **French Creek State Park**, the remaining acres are privately-held. Efforts should be made to preserve as much land as possible.

ROCK CHURCH SWAMP is a large wetland of local significance. The wetland occurs in a broad flat area underlain by diabase southwest of Thomas Hill. The waters influencing the vegetation are enriched as a result of the mineral composition of the underlying bedrock. A 50' canopy of mature red maple, swamp white oak, green ash, and pin oak and a diverse shrub layer of spicebush, southern arrow-wood, winterberry (Ilex verticillata), high-bush blueberry (Vaccinium corymbosum), alder (Alnus serrulata), and silky dogwood (Cornus amomum) characterize the swamp. The herb layer is diverse with assorted grasses (Cinna arundinacea, Glyceria sp.), sedges (Carex stricta), skunk cabbage, and bog hemp (Boehmeria cylindrica) forming tussocks or growing on hummocks. Aquatics such as spatterdock (Nuphar lutea), bur reed (Sparganium sp.), and starwort (Callitriche sp.) are common. The area may harbor rare plants but further searching is necessary. The swamp provides excellent habitat for a diversity of birds. During a spring visit, several wood ducks were observed. The once-extensive wetland has been reduced in size because of draining. A large ditch and several smaller ditches occur towards the eastern end of the swamp. We encourage local landowners, county or township government, and the Berks Conservancy to work towards protecting the swamp.

COLD RUN SEEPS refers to a series of small springs emanating from a northwest-facing slope underlain by conglomerate southwest of Cold Run. The surrounding forest is typical of the region consisting of a 70' canopy of mature beech (Fagus grandifolia), tulip tree (Liriodendron tulipifera), black birch (Betula lenta), red maple, and white oak (Quercus alba). The seeps are small, discrete wetlands fed by groundwater. Spicebush and elderberry (Sambucus canadensis) are dominant shrubs. Skunk cabbage, golden saxifrage (Chrysosplenium americanum), and mosses cover the mucky substrate. The seeps are significant for the biological diversity they add to the communities of the region and for scenic value.

In Union Township, Sixpenny Creek and its basin from its source to, and including, the unnamed tributary at RM 1.28 are designated as High Quality - Cold Water Fisheries. In addition, French Creek is a High Quality - Cold Water Fishery from its source to the Chester County line.

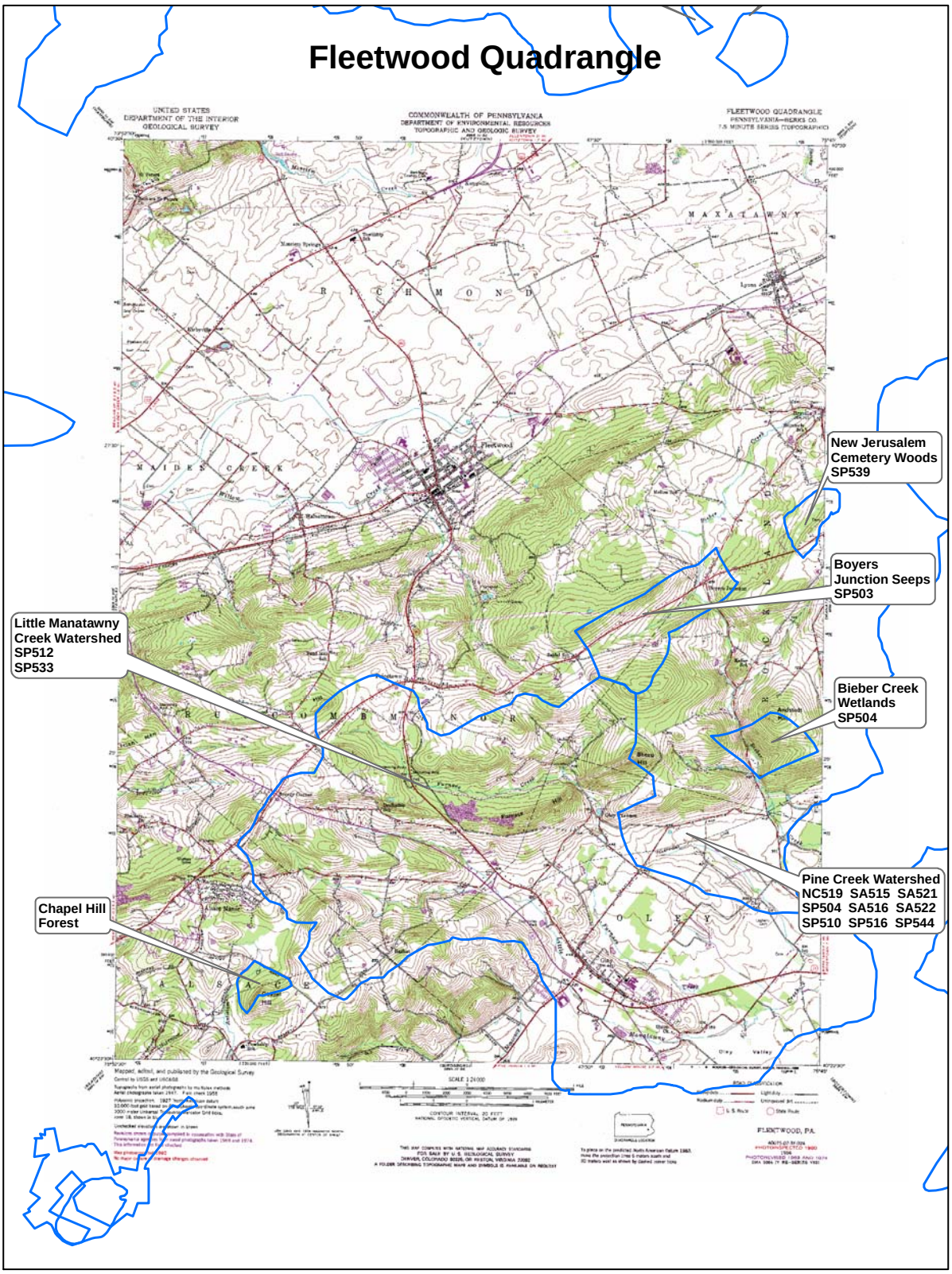
Managed areas include **Hopewell Village National Historical Site**, **French Creek State Park**, **Birdsboro Reservoir Watershed**, and **State Game Lands 43**.

USGS QUADRANGLE MAP: Fleetwood

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified						
SPECIAL PLANTS:	503	G3	S3	PT	05-21-93	CD
	504	G3	S3	PT	06-19-89	D
	512	G5	S2	PE	10-12-94	E
	539	G5	S1	PE	09-07-95	D
SPECIAL ANIMALS:	533	G3	S2	PE	10-12-94	E

OTHER: Lobachsville Floodplain Forest, Chapel Hill Forest.
sp504, sp510, sp516, sp544, sa515, sa516, sa521, sa522, & nc519; see Manatawny quadrangle SP504, SP510, SP516, SP544, SA515, SA516, SA521, SA522, & NC519

Fleetwood Quadrangle



Fleetwood Quadrangle:

Berks County covers the Fleetwood quadrangle which extends across the Great Valley to the north and the Reading Prong to the south. **SP503** and **SP504** both mark populations of a state-endangered grass. The former population grows in a seepage wetland near the village of Boyer's Junction in Rockland and Ruscombmanor Townships. The seep occurs along a stream flowing through a closed-canopy forest of red maple (Acer rubrum), common alder (Alnus serrulata), and skunk cabbage (Symplocarpus foetidus). If roads and ditches in the woods were made more extensive, the resulting change in hydrology could threaten the plant. Otherwise, the plant appears relatively secure. The population of **SP504** occurs in a similar circumstance along the east side of Bieber Creek in Rockland Township. The grass grows with skunk cabbage in a wooded wetland characterized by scattered streamlets and seeps, mossy hummocks, and rocks. Although the population is small, the site is little disturbed and there are no apparent threats to the grass at present.

SP503 (Rockland Twp.) "Boyers Junction Seeps" This small population of a PA-Endangered plant was revisited in 1993. This population continues to persist at this site although ongoing invasion by multiflora rose is a threat (1998 update).

SP512, SA533 (Oley, Alsace, Roscombmanor, and Rockland Twps.) "Little Manatawny Creek Watershed" An animal species of concern was found here in 1994, in an extensive wetland area. Additional survey work is needed. A good population of a plant species of concern was found nearby in 1996. The population occurs in an alluvial bottomland woods. The open canopy includes sugar maple, bitternut hickory, red maple, ash, and beech. The population is healthy but possibly threatened by woody, exotic species. Disturbances at this site include exotic species invasion and dirt bike trails (2003 update).

SP539 (Rockland Twp.) "New Jerusalem Cemetery Woods" This site is a moist woods at the base of a forested NW-facing slope. The forest is dominated by red maple, black birch, tulip-tree, and black-gum. A poor quality population of a PA-Endangered shrub species was found here in 1995. It was growing adjacent to several small ponds, associated with other shrubs including highbush blueberry, winterberry, chokeberry, and serviceberry. Disturbance of the pools by development or logging are potential threats to the species of concern.

LOBACHSVILLE FLOODPLAIN FOREST, which extends onto the Manatawny quadrangle, is a natural area of local significance. Although PSO staff do not deem this forest a "natural" community, they consider its older trees and extensive wetlands of importance. Beech (Fagus grandifolia) dominates parts of the forest with white ash (Fraxinus americana), tulip poplar (Liriodendron tulipifera), and sugar maple (Acer saccharum) fairly common throughout. Spicebush (Lindera benzoin), the most common shrub, grows amid a diverse herbaceous layer. Natural disturbances include deer browse and flood scouring which have allowed some exotic species to become established. Deer may also be suppressing natural regeneration of the floodplain forest. Although development of the forest is unlikely, other disruptive activities such as logging pose a threat. Human disturbance should be minimized so that the forest can continue to provide open space, as habitat for wildlife, flood storage capacity, and water quality protection.

CHAPEL HILL FOREST is a mature mesic forest with an 80-foot canopy of red oak (Quercus rubra), beech, shagbark hickory (Carya ovata), black birch (Betula lenta), white oak (Quercus alba), basswood (Tilia americana), tulip tree, red maple, and sour gum (Nyssa sylvatica). A patchy shrub layer of spicebush and an herbaceous layer of Christmas fern (Polystichum acrostichoides) and spring ephemerals including yellow trout-lily (Erythronium americanum) and spring beauty (Claytonia virginica) cover the boulder-strewn forest floor. Near Mexico Road, along Antietam Creek the forest shifts to a predominance of pin oak (Quercus palustris), red maple, and swamp white oak (Quercus bicolor) with a dense spicebush layer. A diversity of birds live in the woods while salamanders and frogs utilize the scattered ephemeral ponds for breeding. The woodland should be protected from logging and development.

nc512, sp520, sa516 A portion of the buffer for this site extends onto the Fleetwood quadrangle; see the Manatawny quadrangle for a site description.

sp504, sp510, sp516, sp544, sa515, sa516, sa521, sa522, & nc519 see Manatawny Quad for species descriptions.

USGS QUADRANGLE MAP: Fredericksburg

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

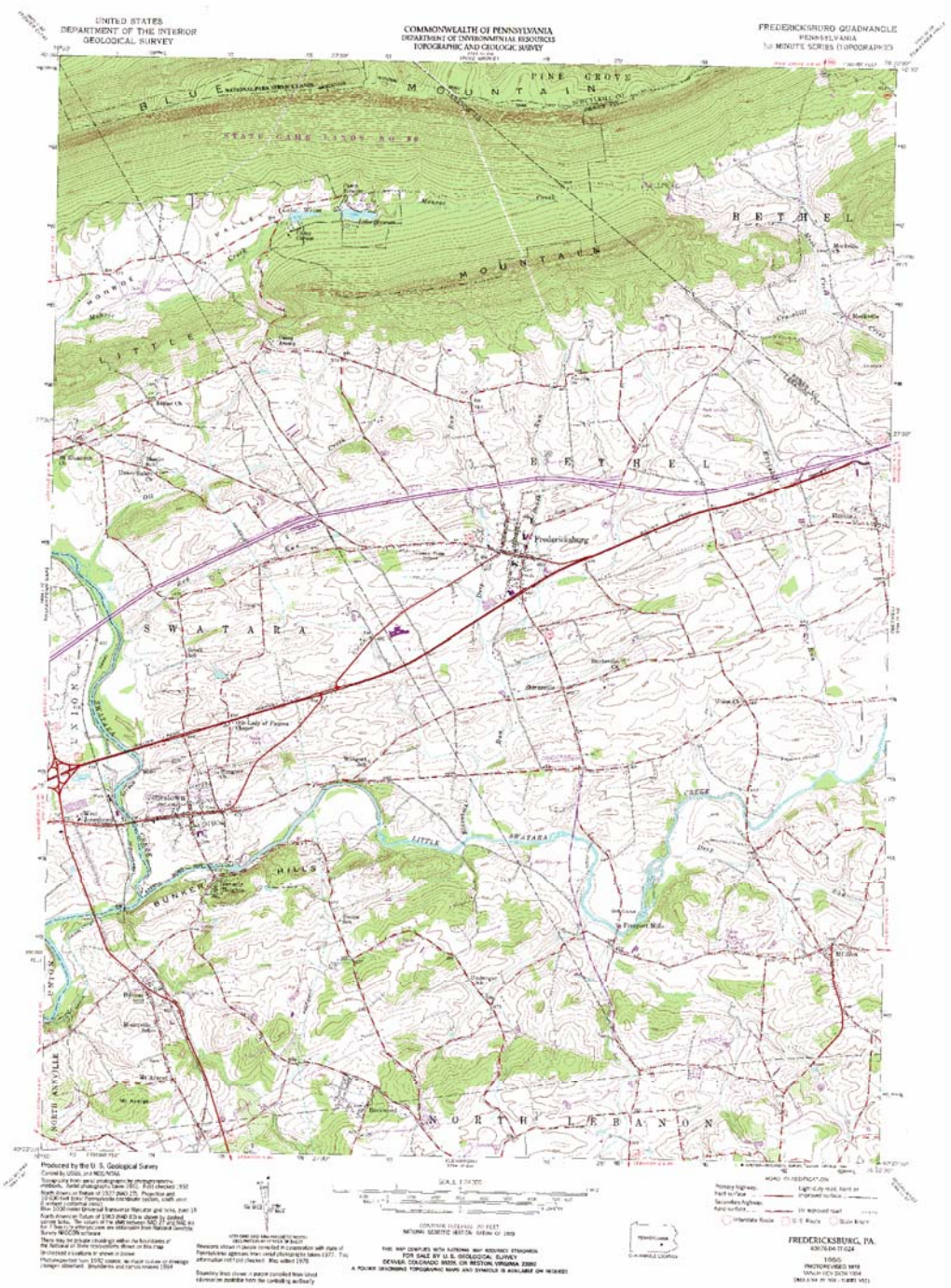
SPECIAL ANIMALS: None identified.

OTHER: State Game Lands 80, Appalachian Trail.

Fredericksburg:

A small part of Berks County extends onto the northeast corner of the Fredericksburg quadrangle, which covers the Appalachian Mountain section to the north and the Great Valley to the south. PSO staff did not find natural communities or species of special concern in this area. However, the Blue Mountain area including **State Game Lands 80**, the **Appalachian Trail**, and surrounding federally-owned land is of great importance. The large continuous forest covering Blue Mountain provides habitat for wildlife and recreational open space. Government and the private sector should work together to secure this land from development so that it can continue to provide a haven for all.

Fredericksburg Quadrangle

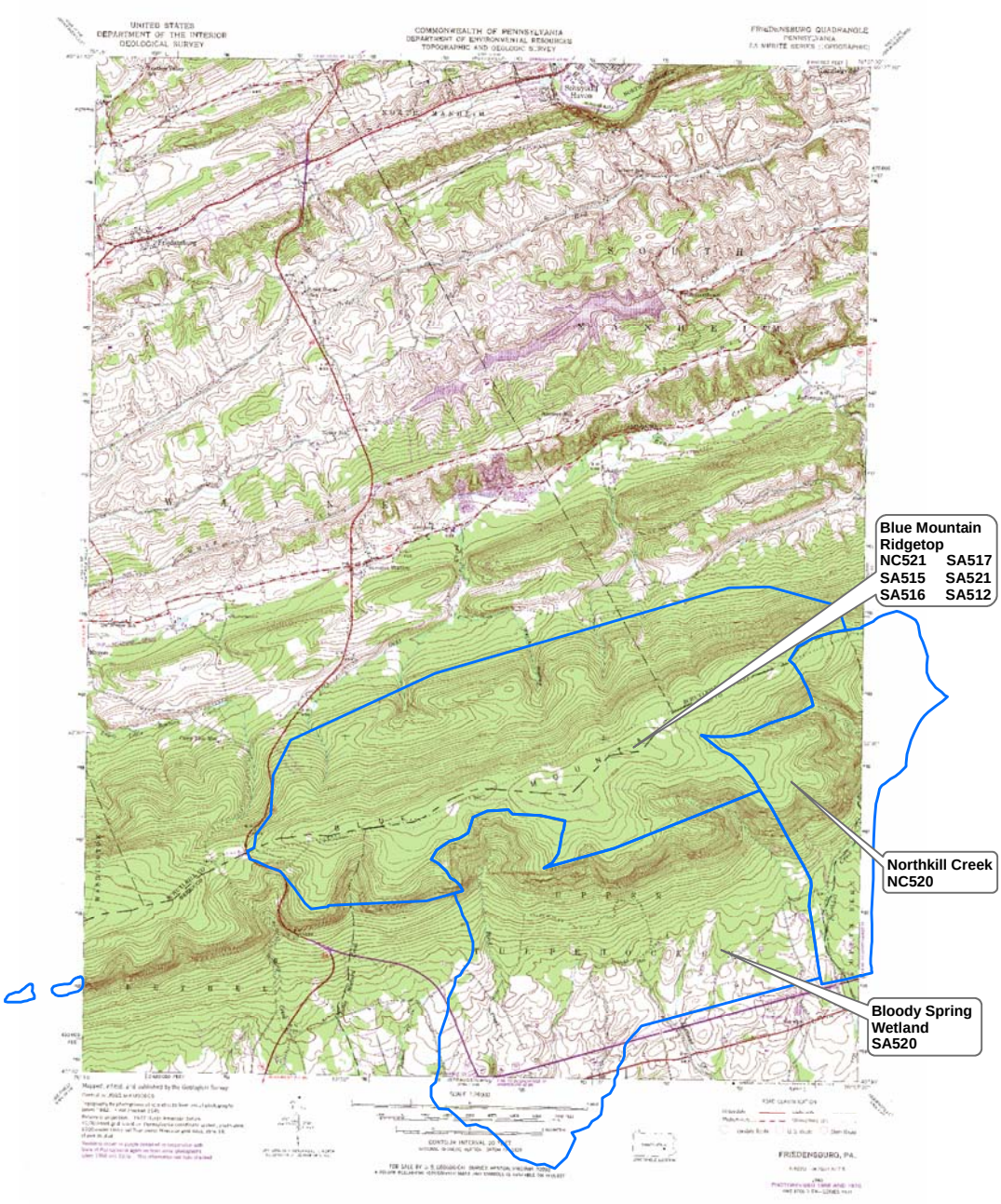


USGS QUADRANGLE MAP: Friedensburg

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	520	G3	S2	PE	06-18-96	E
	521	G?	S3	N	-	E
SPECIAL PLANTS: None identified						
SPECIAL ANIMALS:	512	G4	S2	N	6-1977	A?
	515	G4	S3	N	197-	E
	516	G2G3	S2	N	10-03-89	B
	517	G5	S2	N	197-	E
	520	G3	S2	PE	06-18-96	E
	521	G2G3	S2	N	09-24-98	B

OTHER: State Game Lands 80, Appalachian Trail, State Game Lands 110, Weiser State Forest; See adjacent map for nc520.

Friedensburg Quadrangle



Friedensburg Quadrangle:

Berks County runs across the southern third of the Friedensburg quadrangle. The northern boundary of the county traces the summit of Blue Mountain.

SA512, located in Upper Tulpehocken Township, marks the population of a moth imperiled at the state level (S2). The moth was observed at a small, acid mountain-top wetland containing scattered highbush blueberry (Vaccinium corymbosum) with a groundcover of large cranberry (Vaccinium macrocarpon), soft rush (Juncus effusus), sedges (Carex sp.), and bullrush (Scirpus sp.). Searchers in 1989 were unable to relocate the species but the habitat is still intact (therefore the uncertainty of the rank) and is located on state land. A buffer zone should be maintained around the site and logging should be restricted near the wetland. **SA515** and **SA517** are two butterflies that have not been seen at this site since the mid-1970's but the preferred habitat is still available and it is presumed that the species still occur here.

SA516, also located in Upper Tulpehocken Township, marks the location of a good population of a moth that is both globally- (G2) and state-imperiled (S2). The moth inhabits the acidic ridgetop of Blue Mountain characterized by a mixed oak (scrub, white, and chestnut)/black gum/sassafras canopy and an ericaceous shrub layer of mountain laurel, sheep laurel, and blueberry. Fly poison (Amianthium muscaetoxicum), the food plant of the moth, is abundant in the area. Protection of this showy flowering plant would encourage the moth to continue to inhabit the site.

SA521 –NEW(1998 update)- (Upper Tulpehocken Twp.) **SA521** is a population of the same moth species as **SP516**, occurring along the top of the Blue Ridge in a dry oak-heath woods. A good to fair-quality population of this species was found, along with an abundance of its food plant (fly-poison), to the west of **SP516**. It is likely that this species is present elsewhere along the top of the ridge as well.

SA520 -NEW (1998 update)- Upper Tulpehocken Twp.) "Bloody Spring Wetland" This site consists of a 1-2 acre wet meadow dissected by a small braided stream. The vegetation is dominated by sedges, grasses, and other emergents. A single individual of a PA-Endangered animal species was found at this site in 1996. The meadow is lightly grazed, which may help maintain the open habitat required by this species. Heavy grazing and trampling are potential threats. Additional survey work should be done to determine the size of the population (2003 update).

NC520 (Upper Tulpehocken and Upper Bern Twps.) "Northkill Creek" Northkill Creek is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek (2003 update).

NC521, SA515, SA516, SA517, SA521 (Upper Tulpehocken, Wayne and South Manheim Twps.) "Blue Mountain Ridgetop" **SA516** marks the location of a good population of a moth that is both globally- (G2) and state-imperiled (S2). The moth inhabits the acidic ridgetop of Blue Mountain characterized by a mixed oak (scrub, white, and chestnut)/black gum/sassafras canopy and an

ericaceous shrub layer of mountain laurel, sheep laurel, and blueberry. Fly poison (Amianthium muscaetoxicum), the food plant of the moth, is abundant in the area. Protection of this showy flowering plant would encourage the moth to continue to inhabit the site. **SA21** is a population of the same moth species as **SP516**, occurring along the top of the Blue Ridge in a dry oak-heath woods. A good to fair-quality population of this species was found, along with an abundance of its food plant (fly-poison), to the west of **SP516**. It is likely that this species is present elsewhere along the top of the ridge as well. **SA515** and **SA517** are two butterflies that have not been seen at this site since the mid-1970's but the preferred habitat is still available and it is presumed that the species still occur here.

Blue Mountain Ridgetop is also home to a natural community **NC521**. This community is in the same area as a historic record for a moth imperiled at the state level (S2). The moth was observed at a small, acid mountain-top wetland containing scattered highbush blueberry (Vaccinium corymbosum) with a groundcover of large cranberry (Vaccinium macrocarpon), soft rush (Juncus effusus), sedges (Carex sp.), and bullrush (Scirpus sp.). Searchers in 1989 were unable to relocate the species but the habitat is still intact (therefore the historic ranking) and is located on state land. A buffer zone should be maintained around the site and logging should be restricted near the wetland.

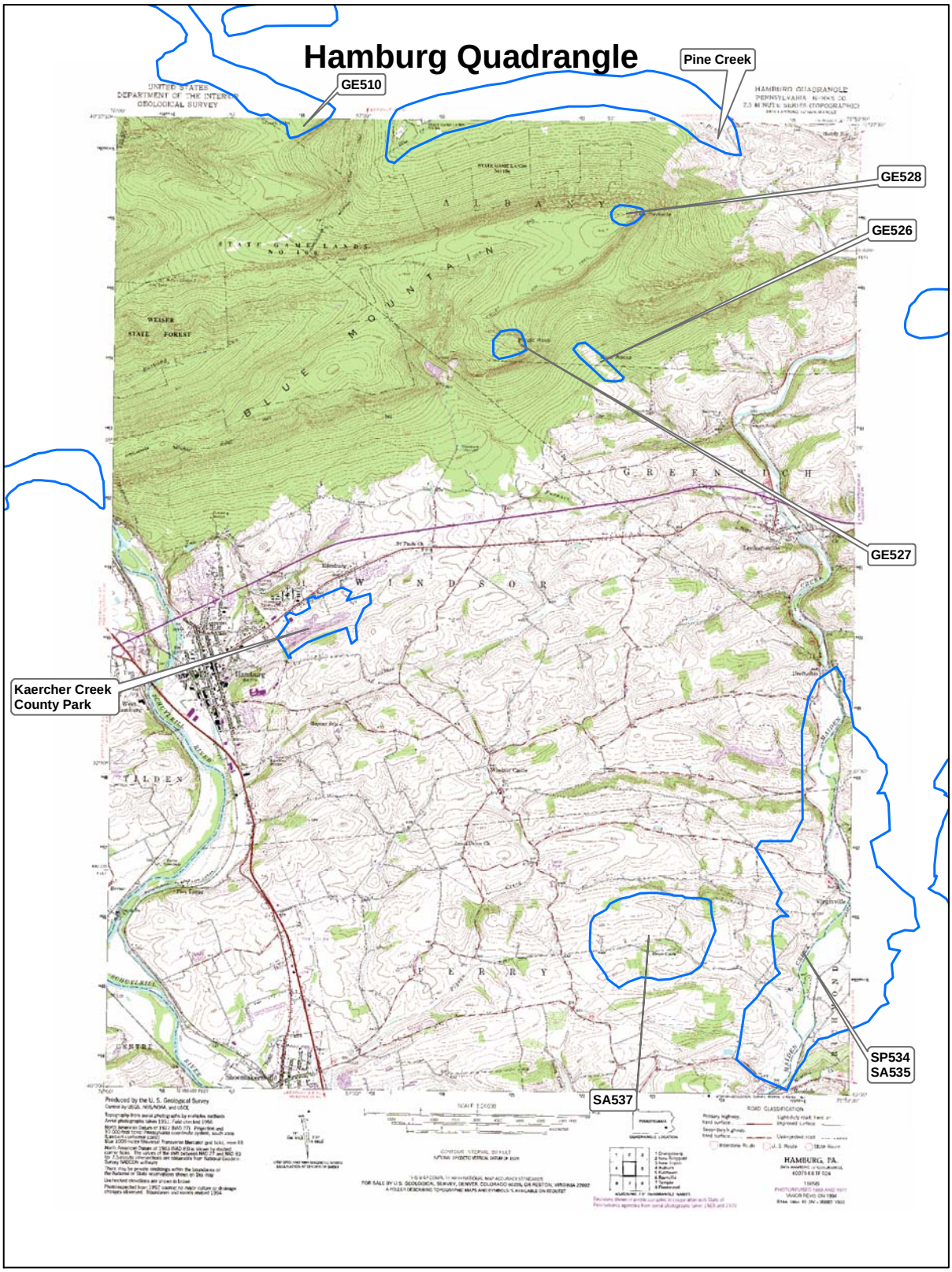
No alteration of the wetland resources of the mountain top should be implemented and aerial spray programs for gypsy moth control are strongly discouraged in this area (PA Science Office, The Nature Conservancy 1990).

The importance of preserving Blue Mountain as a forested corridor cannot be overemphasized. There are historical reports of different plants and animals such as the eastern hognose snake (Heterodon platyrhinos) considered rare (S3S4) at the state-level inhabiting the summit of Blue Mountain on the Friedensburg quadrangle. Although the snake species has not been seen recently, it is important to preserve habitat in case the animal still occurs in the area. Furthermore, the Blue Mountain forest provides important habitat for many animals, a migration corridor for hawks, and open space for human recreation. The **Appalachian Trail** follows the crest of the mountain passing through **Weiser State Forest** and **State Game Lands 80** and **110**. Additional lands adjacent to these managed areas should be protected from development to maintain the large wooded tract mantling the mountain.

USGS QUADRANGLE MAP: Hamburg

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified						
SPECIAL PLANTS:	534	G5	S3	N	09-20-94	CD
SPECIAL ANIMALS:	535	G5	S2	PT	05-94	E
	537	G3	S2S3	N	10-27-96	E
GEOLOGICAL FEATURES:	526	-	-	-	1990	-
	527	-	-	-	1990	-
	528	-	-	-	1990	-

OTHER: State Game Lands 106, Weiser State Forest, Hawk Mountain Sanctuary, Kaercher Creek County Park, Lake Ontelaunee Watershed, Appalachian Trail, Pine Creek, Schuylkill River.


Hamburg Quadrangle
Pine Creek
GE510
GE528
GE526
GE527
Kaercher Creek
County Park
SP534
SA535
SA537
ALBANY
BLUE MOUNTAIN
WINDSOR
GREENWICH
TILDEN
PERRY
HAMBURG, PA.

Hamburg Quadrangle:

Berks County covers most of the Hamburg quadrangle. Although PSO staff did not find natural communities or species of special concern, there are several significant geologic features (Geyer and Bolles, 1979) and managed areas.

The Blue Mountain area is one of the most important areas in Berks County for the preservation of wildlife habitat, especially for species that require large unbroken tracts of land. The rocky outcrops and boulder fields such as Blue Rocks Boulder Field (**GE526**) were once sites for the eastern woodrat (Neotoma floridana magister), a state-threatened species. If the woodrat is ever to be re-introduced to east-central PA, it is important that these sites and the adjacent talus-slope forests remain intact.

SP534, SA535 -NEW- (Richmond Twp.) "Maiden Creek Corridor" This site is an alluvial bottomland woods occurring along the east bank of Maiden Creek. The forest is dominated by typical floodplain tree species including sycamore, cottonwood, box elder, black locust, bitternut hickory, ash, and black walnut. The herb layer is dense and includes wood-nettle, jewelweed, jumpseed, and ragweed. A small population of a tree species of concern was found here in 1994. The trees appeared healthy and were reproducing. This small patch of forest should be protected from encroachment by the surrounding residential and agricultural lands. A PA-Threatened animal species was found in a marshy portion of a 20-30 acre wetland occurring along Maiden Creek. This species has been known to occur at this site for at least 15 years. Further surveys are needed to determine the extent of this population (1998 update).

SA537 -NEW- (Richmond Twp.) "Onyx Cave" This site supports a population of a globally rare animal species. This species was discovered in the cave in 1996. It was found in a seasonally flooded passage in this formerly commercially operated cave. Further work is needed to verify and evaluate the extent of this population (1998 update).

The geologic features of Blue Mountain including Pulpit Rock (**GE527**) and the Pinnacle (**GE528**) are important as scenic overlooks and areas for recreation. The **Appalachian Trail** and associated smaller trails are recreational assets of Blue Mountain. It is important that the lands bordering the trails remain as natural as possible to provide an aesthetically pleasing experience for hikers. A narrow corridor of land along the trail is protected but government officials at all levels should work toward protecting additional land in the area.

Hawk Mountain Sanctuary is a private area dedicated to the conservation of migrating hawks. Thousands of migrating raptors pass by the sanctuary each year offering opportunities for observation, natural history education, and wildlife research.

Kaercher Creek County Park provides recreation, fishing, and open space for county residents. It is important that water quality be protected and improved through protection of the entire watershed of Kaercher Creek. Protection and revegetation with native plants will do much to improve water quality by arresting erosion and uptaking nutrients. The value of the park habitat for

wildlife is limited at this time.

Lake Ontelaunee Watershed needs protection from additional intrusion by housing and other forms of development. Farmers should be encouraged to use best management practices to minimize soil erosion and fertilizer and pesticide run-off.

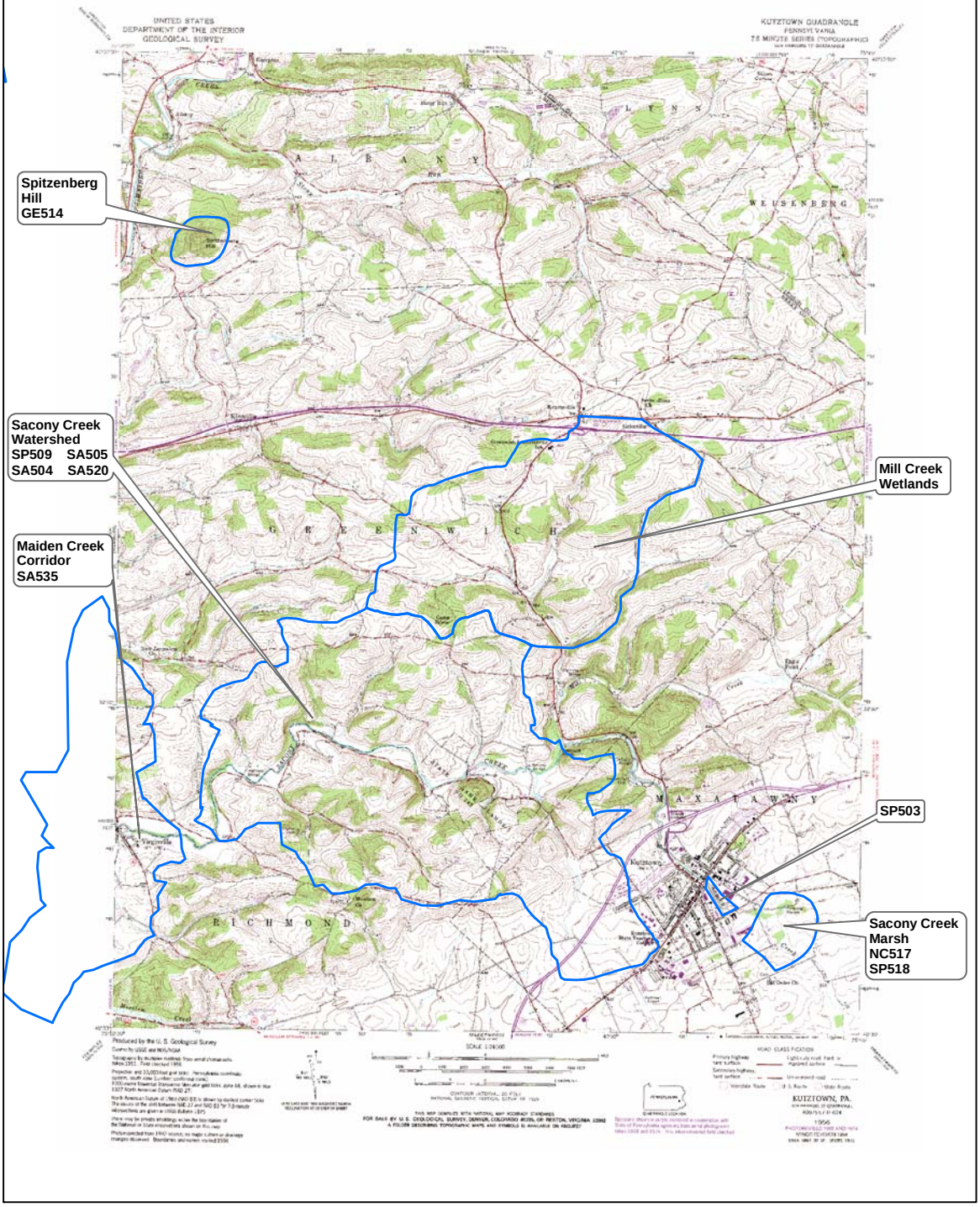
Pine Creek, located in Albany Township, is designated as a High Quality-Cold Water Fishery. In order to maintain the water quality of this creek, housing should be minimized in the watershed and no new housing should be allowed near the creek. Native vegetation should be encouraged along the creek and its floodplain. Trees and shrubs will help stabilize soil, prevent sediments from reaching the creek and, by shading the creek, help to maintain cool temperatures and a high oxygen content in the water.

USGS QUADRANGLE MAP: Kutztown

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	519	G?	S2S3	N	9-06-1990	C
	514	G?	S?	N	1979	E
	517	G?	S2S	N	09-06-90	C
SPECIAL PLANTS:	503	G5	S2	PT	7-07-1987	C
	509	G5	S1	PE	9-27-1991	C
	515	G5T?	S2	delisted	7-27-1990	BC
	517	G5	S3	N	9-06-1990	C
	518	G5	S2	TU	7-27-1990	B
SPECIAL ANIMALS:	504	G3G4	S2S3	N	06-17-93	A
	505	G4	S2S3	N	06-17-93	AB
	520	G3	S2	PE	05-94	E
GEOLOGICAL FEATURES:	514	-	-	-	1990	-

OTHER: State Game Lands 182.
sa535; see Hamburg quadrangle SA535

Kutztown Quadrangle



Kutztown Quadrangle:

Berks County covers all but the northeastern corner of Kutztown quadrangle which is in the Great Valley. Spitzenberg Hill (**GE514**) is a striking feature of the Great Valley. Geyer and Bolles (1979) report that geologists continue to debate the possibility that the bedrock of the prominent knob is a limestone conglomerate of substantially younger Triassic age occurring as an outlier of the Triassic Lowland section of the Piedmont province. Although the vegetation on the hill has been disturbed and exotic plants are common, there are a variety of plants and habitats. The north-facing slope is predominatly hemlock and other conifers while the trees of the south-facing slope and crest of the hill are mostly oak and other deciduous species. Scrub pine (Pinus virginiana) is common near the bottom of the hill. The woodland and rock outcrops provide food and shelter for wildlife and the hilltop offers an excellent scenic overlook of the surrounding valleys and of Blue Mountain. The combination of geologic, wildlife, and scenic values makes Spitzenberg Hill a good site for a township or county natural area and park.

SACONY CREEK MARSH located southeast of Kutztown in Maxatawny Township is a twenty-acre wetland complex comprised of a medium-size creek bordered by a fair quality Mixed Graminoid-Robust Emergent Marsh (**NC519**) which grades into a small remnant floodplain forest. Broad-leaved cattail (Typha latifolia), spotted touch-me-not (Impatiens capensis), and arrow-leaved tearthumb (Polygonum sagittatum) co-dominate the marsh with reed canary grass (Phalaris arundinacea), hairy-fruited sedge (Carex trichocarpa), and tussock sedge (Carex stricta). **SP515** indicates a good to fair population of a plant imperiled (S2) in Pennsylvania. **SP517** indicates a fair population of a submerged aquatic, considered rare (S3) at the state-level, growing in Sacony Creek with water purslane (Ludwigia palustris) and waterwort (Elatine minima). A good population (**SP518**) of a plant imperiled (S2) in Pennsylvania grows in Sacony Creek and in a nearby plant-choked spring-fed tributary. The Sacony Marsh has been disturbed by ditching, filling, and some invasion of exotic species. Filling, wetland encroachment, illegal dumping, and pollution should be avoided in the future. In close proximity to a university and local high school, the marsh provides an excellent outdoor lab for natural history classes.

SP515- This species has been delisted, and is no longer on the map in Sacony Creek Marsh

SP509 indicates a fair population of a state-endangered plant growing on a dry, open, south-facing shale slope above Sacony Creek east of Virginville in Greenwich Township. This is the only site for the species in Berks County. The plant grows on a sparsely-vegetated shale slope in association with grasses, whorled milkweed (Asclepias verticillata), American dittany (Cunila origanoides), Solomon's-seal (Polygonatum sp.), rose (Rosa sp.), thin-leaved purple aster (Aster patens), and false boneset (Brickellia eupatorioides). The plants are threatened by agressive weedy species, such as spotted knapweed (Centauria maculosa), and a closing canopy of oaks and other trees. The owners, who have been contacted by both the Berks County Conservancy and The Nature Conservancy, should be encouraged to manage and protect the site through a conservation easement.

SP509, SA504, SA505, SA520 (Maxatawny, Richmond and Greenwich Twps.) "Sacony Creek Watershed" This site consists of a small but intact shale barren on a steep south-facing slope above Sacony Creek. The only known PA population of a PA-Endangered plant (**SP509**) occurs here. This

fair quality population was found still intact when revisited in fall of 1991. Development or other disturbance on the slope or the field above are potential threats to this occurrence.

SA504, SA505 NEW (1998 update)Schofer Cave is located on State Game Lands # 182. Two animal species of concern were found in pools within the cave in 1993. Over a thousand individuals of the globally rare **SA504** and one individual of **SA505** were observed. The cave has been used for recreation. Trash, especially discarded batteries, is a potential threat to these species and needs to be cleaned up. The Game Commission has been contacted regarding the installation of a gate to protect the cave from further pollution.
An animal species of concern (**SP520**) was observed at this site in 1991. Additional surveys are needed to assess the size and quality of this population (2003 update).

SP503 in Kutztown Borough indicates a fair population of a state-threatened wetland plant growing along Sacony Creek between Main Street and Normal Road Bridge. The plant grows in seeps with box elder (Acer negundo), swamp rose (Rosa palustris), sensitive fern (Onoclea sensibilis), and broad-leaved cattail (Typha latifolia). This stretch of stream flows through a populated, well-traveled area and receives runoff from roads and adjacent properties. The future of the plant is uncertain given the surrounding land-use. A local botanist should verify the full extent of the population and monitor its health over the next few years.

SA520 -NEW- (Maxatawny, Richmond, Greenwich Twps.) "Sacony Wetland" A PA-Endangered animal species was observed at this site in 1991. Additional surveys are needed to assess the size and quality of this population(1998 update).

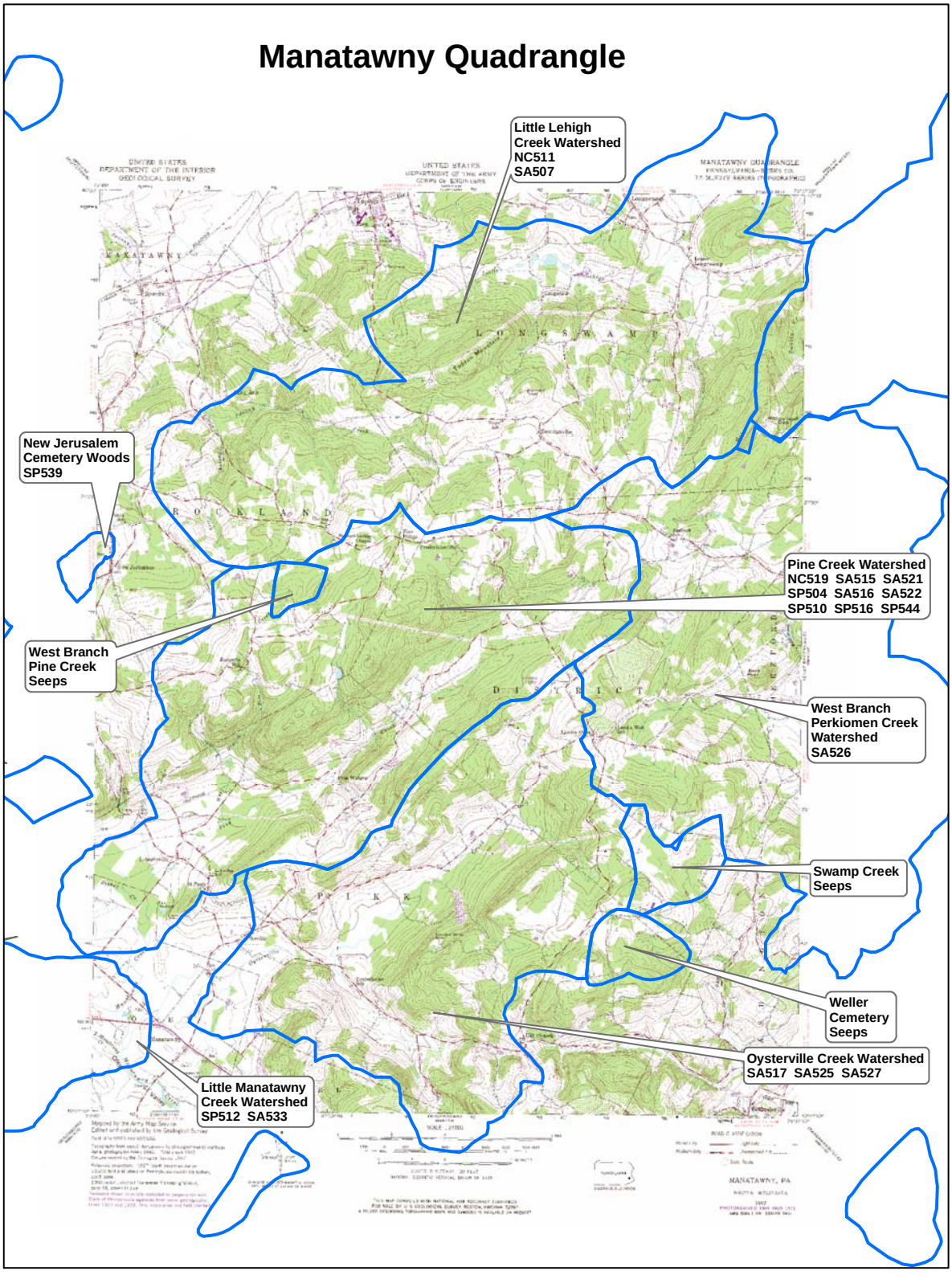
SP534, SA535 A portion of the buffer for this site extends onto the Kutztown quadrangle. See the Hamburg quadrangle for a description of this site (1998 update).

USGS QUADRANGLE MAP: Manatawny

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	511	G?	S3	-	-	E
	512	G?	S3	-	-	E
	519	G?	S3			E
SPECIAL PLANTS:	502	G4	S4	PV	5-28-1982	AB
	504	G5	S1S2	PE	09-10-94	B
	510	G4G5	S2	PT	06-20-89	D
	516	G5	S3	TU	06-13-95	CD
	544	G5	SU		07-21-96	E
SPECIAL ANIMALS:	506	G5	S2	N	7-12-1985	E
	507	G3	S2	PE	07-27-86	D
	515	G3	S2	PE	06-1991	E
	516	G3	S2	PE	05-23-96	A
	517	G3	S2	PE	07-19-91	E
	521	G3	S2	PE	06-01-00	E
	522	G3	S2	PE	1994	E
	525	G3	S2	PE	1996	E
	526	G3	S2	PE	07-14-96	E
	527	G3	S2	PE	1980	E

OTHER: Lobachsville Floodplain Forest, West Branch Pine Creek Seeps, Swamp Creek Seeps, Weller Cemetery Seeps, Little Lehigh Creek. sp512, sp539, & sa533; see Fleetwood quadrangle SP512, SP539 and SA533.

Manatawny Quadrangle



Manatawny Quadrangle:

Berks County covers the Manatawny quadrangle, which mostly occurs on the Reading Prong with the southeast corner in the Triassic Lowlands.

SP502, located in District Township, marks a good population of a Pennsylvania-Vulnerable (PV) plant, so designated because of excessive collection in the past. The plant grows in a botanically diverse woodland that offers excellent habitat for the species, although only a few stems were found. Landowners have protected land north of Long Lane in hopes of donating the property to a conservation group in the future. This land would be an excellent county natural area and would help to protect the water quality of Pine Creek (**NC512**).

SA506 located in District and Hereford Townships marks the nesting location of a bird species imperiled at the state level (S2). It was observed nesting among boulders and rock outcrops in a tulip poplar, ash, and maple woodlot. This rare bird and a more common species will continue to use the site if the surrounding area remains undisturbed. The bird's status should be verified since there has been no survey work since 1985.

Near Henningsville, in Longswamp and District Townships, a fair population of a state-endangered animal (**SA507)** resides in a small marsh dominated by cattail, sweetflag, and sedges. The marsh and surrounding uplands were probably used as pasture in the past. Today, the owners are protecting the habitat for the animal. A conservation easement on this portion of the land should be pursued (2003 update).

A fair population of a state-threatened sedge (**SP510**) grows in a wet meadow south of Lobachsville, in Pike and Oley Townships, within the area designated as LOBACHSVILLE FLOODPLAIN FOREST. Periodic mowing of the meadow should be continued as it appears to benefit the sedge species by eliminating competing woody plants. At present, the population is not threatened. The Lobachsville Floodplain Forest does not contain any known species of special concern or constitute a "natural" community, but is significant at the local level because of its mature trees and extensive wetlands. Beech dominates some parts of the forest with white ash, tulip poplar, and sugar maple fairly common throughout. Spicebush, the most common shrub, grows amid numerous herbaceous species. Natural disturbances include deer browse and flood scouring which has created the necessary growing conditions for some exotic species. Although development is unlikely, the forest should be protected from other disruptive activities such as logging. This protection will ensure that the forest continues to provide open space for humans, wildlife habitat, flood storage capacity, and water quality protection of Bieber Creek.

SP510, SP504, SP516, SP544, SA515, SA516, SA521, SA522, NC519 (District, Pike and Rockland Twps.) "Pine Creek Watershed" Three other plant species of concern were found in the Pine Creek Watershed from 1994 to 1996. **SP516** is a plant species of concern that is sometimes found in swamps and wet meadows. **SP504** is a species that is parasitic on the roots of other plants. This species in uncommon in swamps, boggy meadows and swales. **SP544** is a rare species occasionally found in wet woods and meadows.
An animal species of concern (**SA521**) was found in a forested wetland along Pine Creek in 1994.

More surveys are needed to evaluate the habitat and the population. Another animal species of concern (**SA522**) was found here in 1994, in a wetland adjacent to Pine Creek. Additional survey work is needed.
There are series of connected wetlands throughout this watershed. The wetlands are open with varied vegetation including cattail marshes, sedge marshes, and some shrubby areas. Several sub-populations (**SA515, SA516**) of an animal species have been found within this site, including an excellent quality breeding population. All of the wetlands within this site provide potential migration or breeding habitat for this species. Protection of the Pine Creek watershed is very important for this species in PA.
Pine Creek (**NC519**), a High-gradient Clearwater Creek, and its watershed is designated as Exceptional Value by DER.

SP510, SP504, SP516, SP544, SA515, SA516, SA521, SA522, NC519 SA 526 (Twp.) "West Branch Perkiomen Creek Watershed" This site consists of several emergent wetlands. The vegetation is dominated by cattails, sweetflag, jewelweed, sensitive fern, and sedges. An animal species of concern was found here in 1996. There is more potential habitat, and further surveys are recommended to determine the extent of the population (2003 update)

SA507, NC511 - (Longswamp and District and Rockland Twps.) "Little Lehigh Creek Watershed" A fair population of an animal species of concern (**SA507**) resides in a small marsh dominated by cattail, sweetflag, and sedges. The marsh and surrounding uplands were probably used as pasture in the past. Today, the owners are protecting the habitat for the animal. A conservation easement on this portion of the land should be pursued.
Sacony Creek (**NC511**) from its source to the SR1029 bridge in Rockland Township, is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek.

SA527, SA517, SA525 (Pike and District Twps.) "Oysterville Creek Watershed" This site consists of several emergent wetlands. The vegetation is dominated by cattails, sweetflag, jewelweed, sensitive fern, and sedges. Animal species of concern (**SA525**, **SA527**) were found here in 1980 and 1996. There is more potential habitat, and further surveys are recommended to determine the extent of the population. A breeding population of a G3, animal species of concern (**SA517**) was also identified at this site in 1991. Additional site visits are needed to assess the quality of and to monitor this population. Threats include changes in the hydrology of the site (e.g., beaver, development), shading of the wetland by woody plant species, and water quality changes. Development in the Oysterville Creek watershed should be closely monitored and regulated. Oysterville Creek is a tributary of Pine Creek and other open, wet meadow habitats along the creek should be considered potential habitat for this species of concern.

The WEST BRANCH PINE CREEK SEEPS area, the headwaters of the West Branch of Pine Creek located in Rockland Township, supports a forest of mature tulip poplar. Although logged in the past, the forest maintains a high diversity of plant species because of the various wet and dry micro-habitats. The area does not contain natural communities or species of special concern, but is significant at the county level and should be preserved in order to protect the water quality of Pine Creek. Pine Creek (**NC512**), a High-gradient Clearwater Creek, and its watershed located in

District, Rockland, and Pike Townships is designated as Exceptional Value by DER.

SWAMP CREEK SEEPS is a wooded wetland dominated by young red maple (Acer rubrum) in the canopy, spicebush (Lindera benzoin) in the shrub layer, and a variety of species in the herb layer. This seepage wetland represents the headwaters of Swamp Creek and is, therefore, important to the maintenance of stream flow and water quality. Because it is a wetland, development is unlikely but encroachment on the adjacent uplands of the watershed should be minimized to protect the quality of the wetland.

The WELLER CEMETERY SEEPS is another headwater feeder wetland for Swamp Creek. The trees here are older (40 to 50 years old) than at Swamp Creek Seeps but there is also more of a mosaic of uplands and wetlands at this site. The uplands are dominated by tulip poplar (Liriodendron tulipifera) and yellow birch (Betula allegheniensis) while the wetland pockets are dominated by red maple. Dead stems of black locust (Robinia pseudoacacia) indicate that the site had been cleared at one time and has only reverted to forest relatively recently. The upland forest appears to be succeeding to a red oak (Quercus rubra) forest since the saplings are predominantly that species. Together, the upland and wetland areas provide a fairly diverse habitat for plants and animals. The presence of yellow birch and red oak give the site a more northern feel than the nearby Swamp Creek Seeps. Protection should include maintaining a buffer zone around the seeps and zoning to minimize new housing in the watershed.

Sacony Creek (**NC511**) from its source to the SR1029 bridge in Rockland Township, is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek.

Little Lehigh Creek is designated as a High-Quality Coldwater Fishery by PA DER.

sa522, sp512, (Twp.) "Little Manatawny Creek Watershed" see Fleetwood quad for species descriptions. sp539 (Twp.) "New Jerusalem Cemetery Woods" see Fleetwood quad for species descriptions.

USGS QUADRANGLE MAP: Morgantown

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified						
SPECIAL PLANTS:	510	G5	QS3	PR	03-27-03	CD
	535	G5	S2	TU	07-15-90	C
	552	G5	S2	TU	09-09-90	C
	553	G5	S1S2	TU	07-15-90	D
SPECIAL ANIMALS:	505	G4	S2	N	07-12-97	E
	525	G4	S3	N	07-12-97	E
	572	G3	S2	PE	09-20-95	E
	597	G3	S2	PE	06-17-00	CD
	600	G3	S2	PE	07-29-97	E
	614	G3	S2	PE	07-09-00	E
	615	G3	S2	PE	07-09-00	E

OTHER: State Game Lands 52.

Morgantown Quadrangle:

Berks County covers the northeastern half of the Morgantown quadrangle. The area north of Morgantown is in the Triassic Lowlands while Morgantown sits in the Conestoga Valley. PSO staff did not find natural communities or species of special concern in this part of Berks County. However, **State Game Lands 52** and surrounding privately-held areas are important forested areas that provide open space for recreation and habitat for wildlife. SGL 52 is managed according to the Forest Wildlife Habitat Management Plan which allows for habitat improvement activities such as selective logging to provide diverse forest habitat for all wildlife species. Carefully conducted logging, either selective or on a long rotation, on private land can provide an income to the landowner while still maintaining a variety of wildlife habitat. Even though these forests are not "natural", open space is maintained instead of lost to development in an area that is developing quickly.

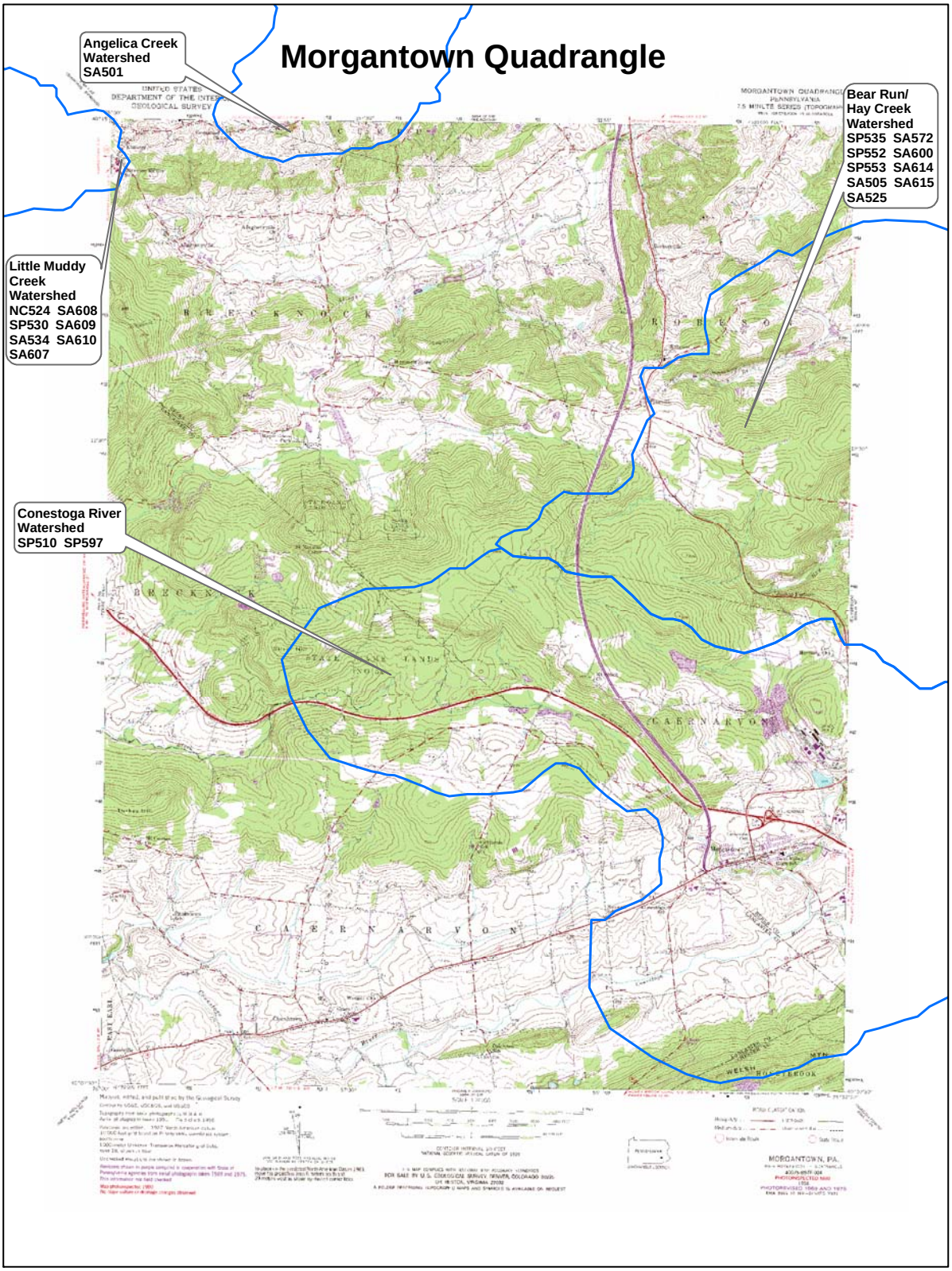
SP535, SP552, SP553, SA505, SA525, SA572, SA600, SA614, SA615 (Scarlets Mill, Robeson, and Caernarvon Twps.) "Beaver Run/Hay Creek Watershed" Three plant species of special concern grow in this watershed. **SP535** and **SP553** mark fair and poor populations, respectively, of two wildflower species under consideration for state-listing that grow along an abandoned railroad track in dry, open conditions. **SP553** grows at the base of a rock outcrop in association with orange-grass (Hypericum gentianoides), bird's-foot violet (Viola pedata), frostweed (Helianthemum canadense), beard grass (Schizachyrium scoparium), and hair-like bulbostylis (Bulbostylis capillaris). **SP535** grows in three open areas adjacent to the tracks in association with wild sensitive plant (Cassia

nictitans), smooth tick-trefoil (Desmodium laevigatum), dwarf sumac (Rhus copallina), Queen Anne's-lace (Daucus carota), Canada goldenrod (Solidago canadense), and others. For the time being, the plants appear secure. **SP552**, a fair population of a wildflower under consideration for state-listing, grows in an abandoned cow pasture along a branch of Hay Creek with beardgrass (Andropogon glomeratus), short-hairy goldenrod (Solidago puberula), and bastard toadflax (Comandra umbellata) among others. The wildflower, capable of surviving grazing, could be threatened by succession unless the field is periodically mowed.

Several PA-Endangered animal species (**SA572, SA600, SA614, SA615**) have been observed in this watershed from 1995 - 2000. Suitable habitat is available throughout this watershed but little is known about the status of this species in this habitat. Further surveys are needed to locate the most suitable habitat and to look for more individuals. The greatest current threat to these populations is housing developments. Many of the current landowners are selling their properties and developments are planned. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. This species is also threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of the creeks, and illegal filling of the marshes present threats.

Two other animal species of concern (**SA505, SA525**) were identified in this watershed in 1997. These animals prefer wet meadow habitats and are associated with species such as (Wallengrenia otho), (W. egeremet), (Euphydryas phaeton), (Satyrodes appalachia), (Euphyes conspicuus), (Pompeius verna), and (Speyeria cybele). Yearly mowing at the site maintains habitat for these species. In 1997, the site was up for sale and a change in ownership may lead to less favorable habitat conditions for these animals.

SP510, SA597 (Caernervon, Brecknock, Honeybrook Twps.) "Conestoga River Watershed" An PA Endangered animal species (**SA597**) was discovered here in 2000. This species was found in a wetland with tussock sedge (Carex stricta), cattails (Typha latifolia), watercress (Nasturtium officinale), grasses and forbs. More surveys must be completed to determine the extent of the population. This site is threatened by a proposed shopping center complex. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. A plant species of concern (**SP510**) was also discovered in State Game Lands #52. This Pennsylvania rare plant requires moist, shaded conditions and is easily overlooked.

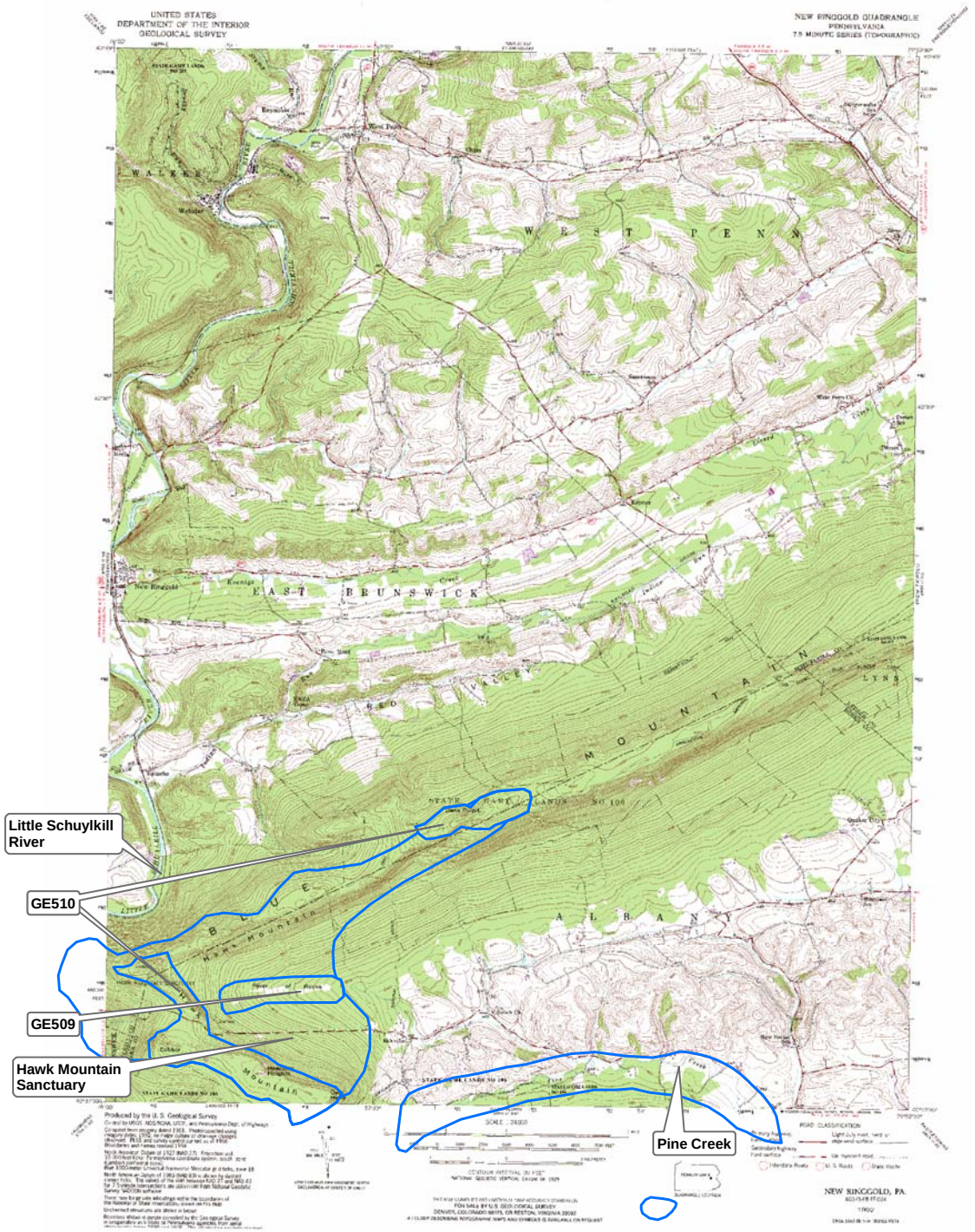

Morgantown Quadrangle
Angelica Creek Watershed SA501
Bear Run/ Hay Creek Watershed SP535 SA572 SP552 SA600 SP553 SA614 SA505 SA615 SA525
Little Muddy Creek Watershed NC524 SA608 SP530 SA609 SA534 SA610 SA607
Conestoga River Watershed SP510 SP597
CAERNARVON
MORGANTOWN, PA.

USGS QUADRANGLE MAP: New Ringgold

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified.						
SPECIAL PLANTS: None identified.						
SPECIAL ANIMALS: None identified.						
GEOLOGIC FEATURES:	509	-	-	-	1979	-
	510	-	-	-	1979	-

OTHER: State Game Lands 106, Hawk Mountain Sanctuary, Pine Creek, Appalachian Trail.

New Ringgold Quadrangle



New Ringgold Quadrangle:

A portion of Berks County covers the southern third of the New Ringgold quadrangle. PSO staff did not find natural communities or species of special concern in the area. However, notable geologic features and managed areas do occur here.

Blue Mountain, which marks the boundary between the Appalachian Mountain and Great Valley sections of the Valley and Ridge province, dominates the landscape. **GE509**, the River of Rocks, and **GE510**, the Hawk Mountain lookouts, are outstanding scenic geologic features (Geyer and Bolles, 1979) where one can see outcrops of quartzite and sandstone. Historically, much of this area was inhabited by the eastern woodrat (Neotoma floridana magister). However, the species has declined throughout its range and is currently found at only one site east of the Susquehanna River (Hall, 1988). It will be important to protect all of the mountain against further encroachment, if the species is ever to be re-introduced to eastern Pennsylvania.

Almost all of this section of Blue Mountain is protected as either public land or as part of **Hawk Mountain Sanctuary**, a private non-profit refuge established to protect migrating birds of prey. Thousands of migrating raptors pass by the sanctuary each year offering opportunities for recreational birdwatching, natural history education, and wildlife research.

The **Appalachian Trail** is found primarily on **State Game Lands (SGL) 106**. The portion of the trail near Eckville is either federally-owned or protected under easement and, thus, secure.

The watershed of Pine Creek, ranked by the PA Department of Environmental Resources (DER) as a High Quality-Cold Water Fishery from its source to T803 and LR06129, is located on State Game Lands 106 and within Albany Township. Some logging is permitted on state game lands to enhance wildlife habitat. On private lands, landowners should be encouraged to promote a vegetated buffer zone along the creek to lessen erosion and provide cooling shade. Development within the watershed should be controlled to ensure good water quality into the future.

USGS QUADRANGLE MAP: New Tripoli

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

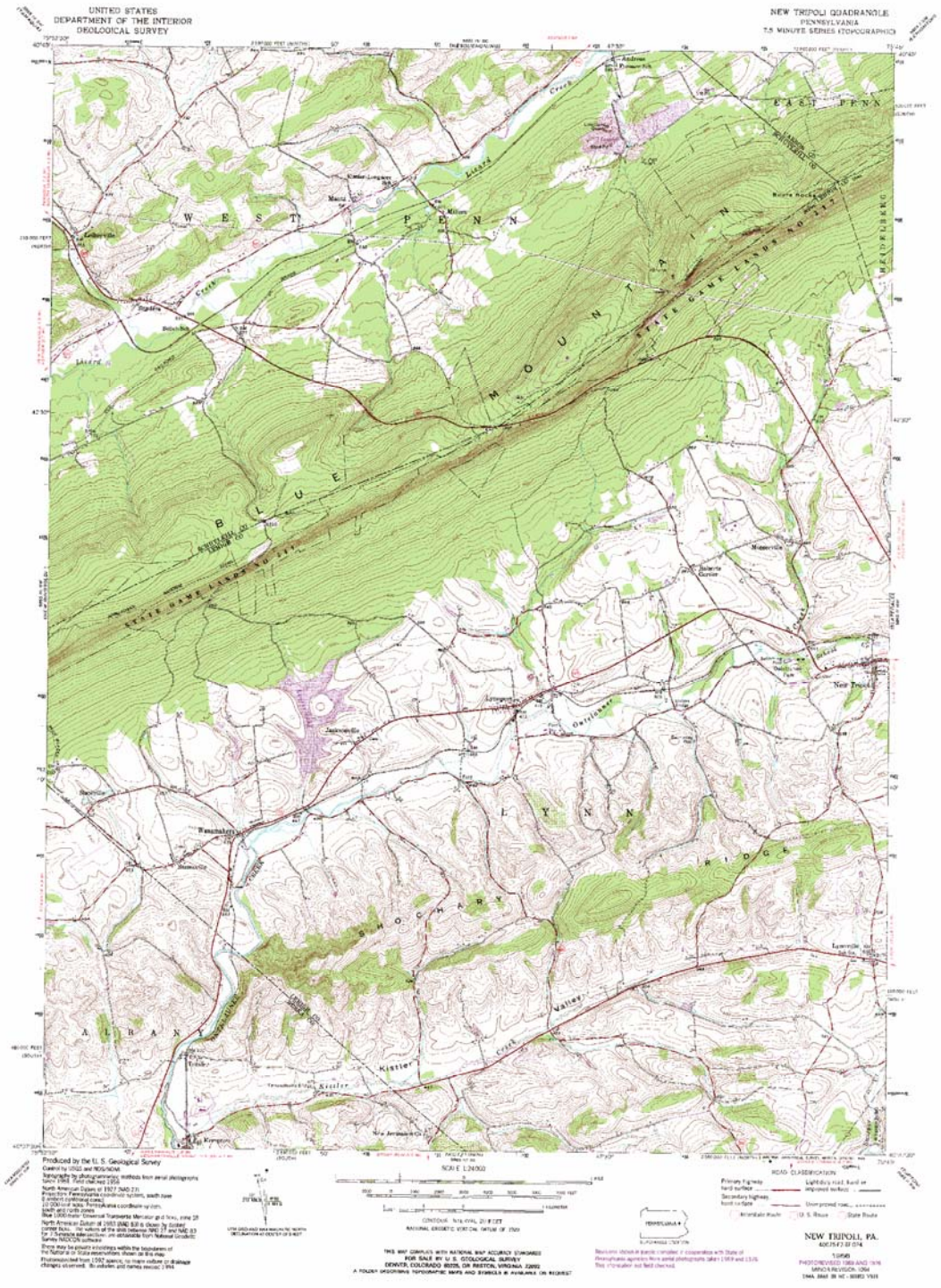
SPECIAL ANIMALS: None identified.

OTHER: None identified.

New Tripoli Quadrangle:

A small portion of Berks County extends onto the southwest corner of the New Tripoli quadrangle. PSO staff did not find natural communities or species of special concern in this area.

New Tripoli Quadrangle



USGS QUADRANGLE MAP: Pine Grove

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

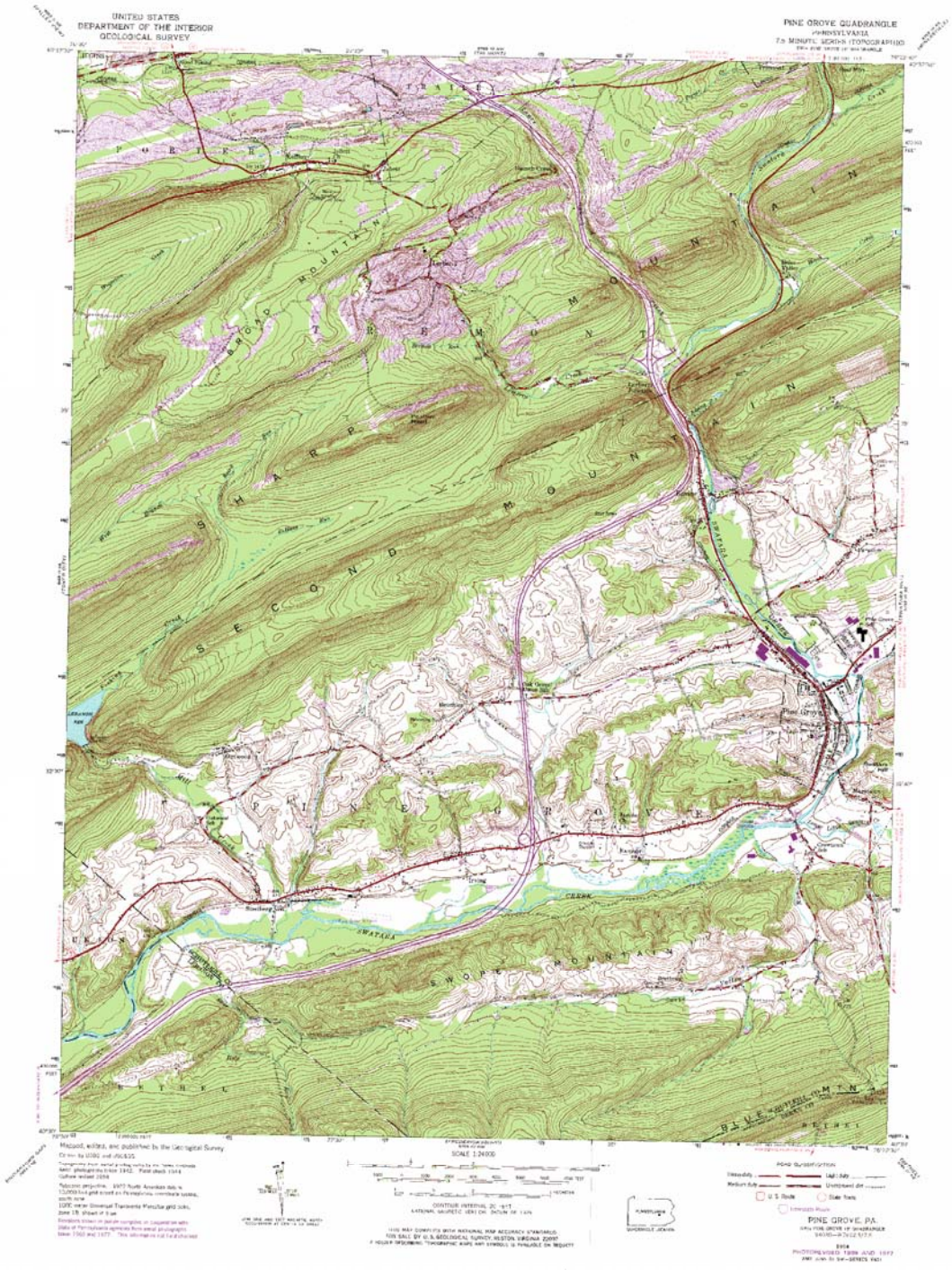
SPECIAL ANIMALS: None identified.

OTHER: Appalachian Trail, State Game Lands 80.

Pine Grove Quadrangle:

A small portion of Berks County is located on the southeast corner of the Pine Grove quadrangle. PSO staff did not find natural communities or species of special concern in this area. However, the **Appalachian Trail**, which runs along the ridgetop of Blue Mountain in Berks County, is an important recreational resource. This section of the trail runs across **State Game Lands (SGL) 80** and National Park Service land. Areas of Blue Mountain not owned by the state or federal government, should be protected from future development to preserve the largest continuous forest in Berks County. Berks County and Bethel Township governments along with the Berks and Wildlands Conservancies should work in concert to secure conservation easements and, where possible, fee title to the land.

Pine Grove Quadrangle



USGS QUADRANGLE MAP: Pottstown

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: French Creek State Park, Unionville Creek, Schuylkill River.

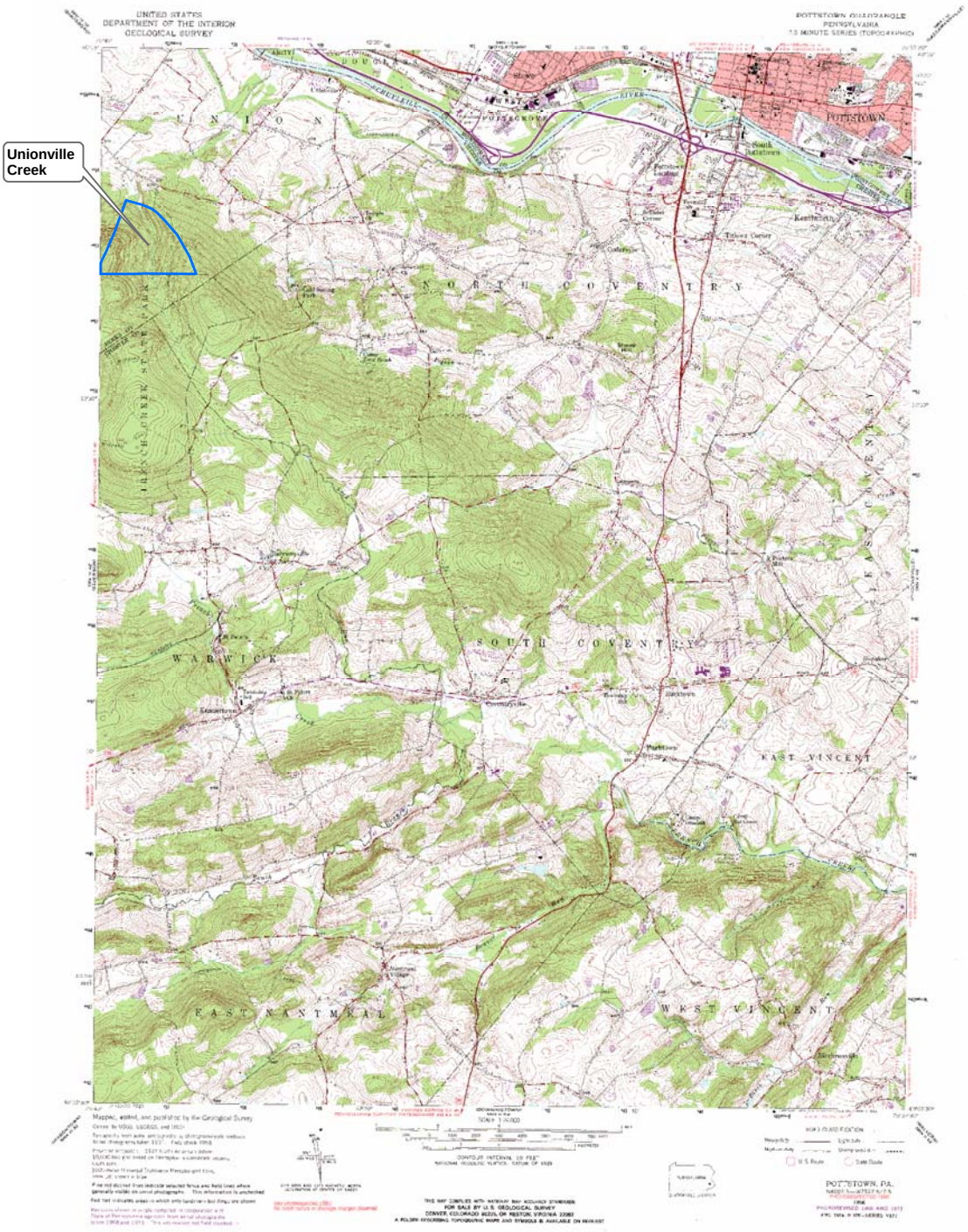
Pottstown Quadrangle:

Only a small portion of Berks County extends onto the northwest corner of the Pottstown quadrangle. PSO staff did not find natural communities or species of special concern in this area

PSO staff encourage annexing parcels of land to existing park land. For example, establishing a county or township park adjacent to the northern side of **French Creek State Park** along UNIONVILLE CREEK would effectively create a very much larger area of open space and would help protect the water quality of the unnamed creek flowing north through the park. Ideally, the preserve would extend along the creek to where it joins the Schuylkill River, thus linking different plant communities and providing a wildlife corridor from the river to the park.

The **Schuylkill River** is designated as a Pennsylvania-Scenic River.

Pottstown Quadrangle

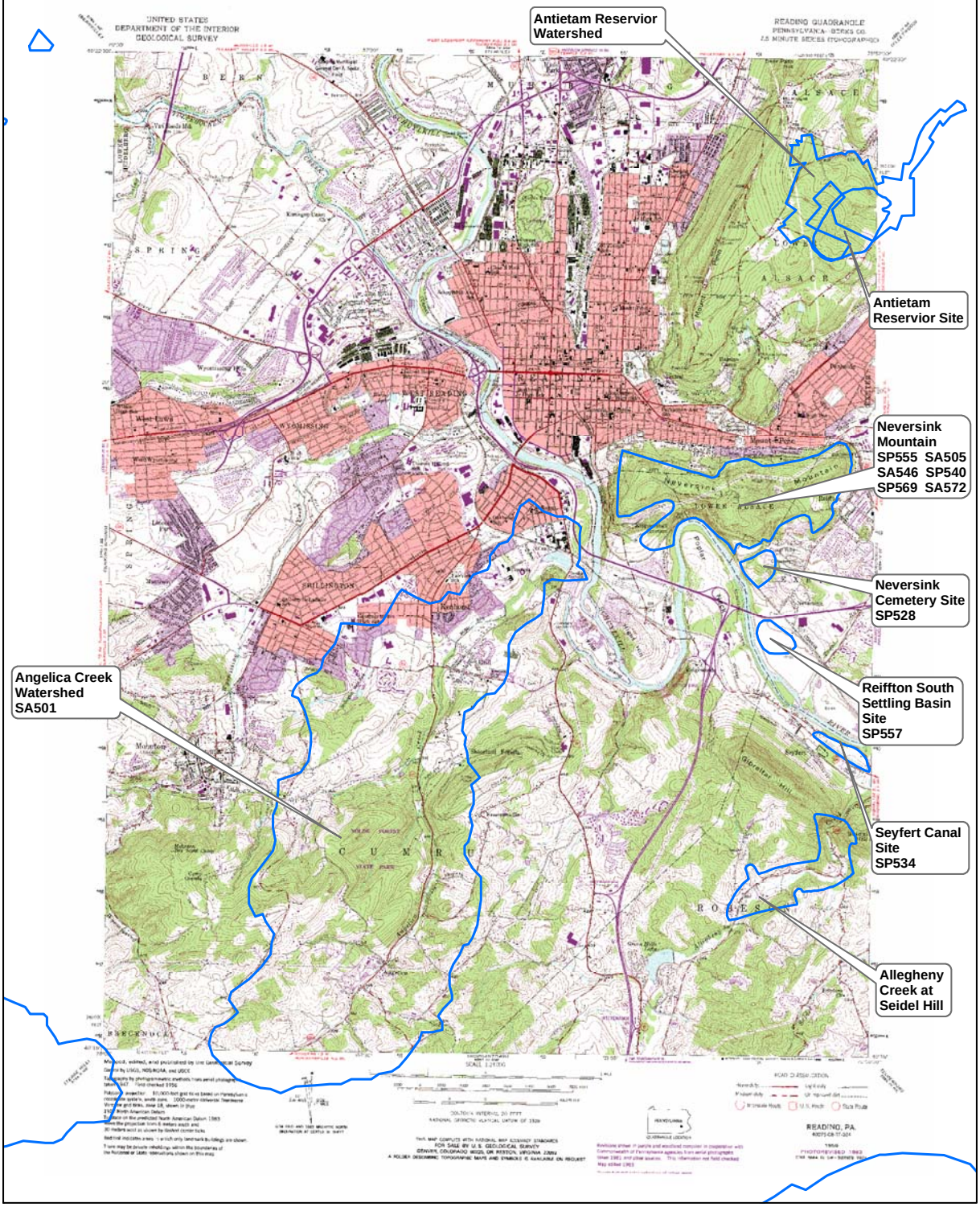


USGS QUADRANGLE MAP: Reading

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified.						
SPECIAL PLANTS:	525	G5	S3	PR	6-05-1987	C
	528	G5	S3	TU	5-30-1989	C
	534	G5	S1	PE	08-07-91	D
	540	G5	S1	PE	09-05-93	BC
	552	G5	S2S3	N	7-25-1990	B
	555	G5	S2	PT	9-07-1989	B
	557	G5	S3	PR	8-19-1990	D
	569	G5	S1	TU	05-09-95	E
SPECIAL ANIMALS:	501	G4	S2	PE	7-19-1990	E
	505	G4	S2	N	5-22-1987	B
	546	G4	S3	N	5-22-1987	B
	572	G4G5	S2S3	N	05-10-96	E

OTHER: Tulpehocken Creek Valley County Park, Antietam Reservoir Watershed, Nolde Forest State Park, Schuylkill River.

Reading Quadrangle



Reading Quadrangle:

The heart of Berks County is covered by the Reading quadrangle. The Reading Prong extends onto the northeast corner of the map. The remaining northern half of the map is in the Great Valley and the southern half is in the Triassic Lowlands.

SA501 marks a small remnant population of a Pennsylvania-Endangered animal surviving in the drainage area of a small tributary of Angelica Creek in Cumru Township. Most of the watershed to the south is protected as a part of **Nolde Forest State Park**. The animal has been known from this site since the 1950's and, even with the encroachment of housing, has managed to maintain a foothold. Further development along the creek threatens to diminish the small amount of remaining suitable habitat. At present, there is little or no natural buffer vegetation between the stream and bordering lawns and gardens. We suggest that the Berks County Conservation District and Nolde Forest State Park personnel launch a program to inform residents along the creek of the importance of the species and to encourage planting of a vegetation buffer zone between the creek and adjacent yards.

NEVERSINK MOUNTAIN located in the City of Reading, the Boroughs of St. Lawrence and Mt. Penn, and the Townships of Cumru, Lower Alsace, and Exeter, provides habitat for two rare butterflies (**SA505** and **SA546**). While in the larval form, these two species feed on wild indigo (Baptisia tinctoria) and beardgrass (Schizachyrium scoparium), respectively. These plants thrive in the numerous dry openings on the mountain. The coincidental larval stages of the gypsy moth and the butterflies render all three species vulnerable to the same control measures. Therefore, it is extremely important that gypsy moth spray programs avoid the powerline corridor where the butterflies and the food plants occur and that control measures be confined to the oak woodlands. In addition, clearings must be kept open to promote the food plants but the use of herbicides should be minimized and mechanical control encouraged.

SP555, a state-threatened plant, has only been found at one site, a dry, open southwest-facing slope on Neversink Mountain in Lower Alsace Towhship. This species thrives in open areas dominated by herbaceous vegetation and low shrubs. These small openings can be kept open by mowing and brush clearing. Logging of the steep slopes where the plant grows should be avoided.

SP528, a species currently under review to determine its status in Pennsylvania, grows in Forest Hills Cemetery in Exeter Township. The very small C-ranked population occurs in a small limestone woodland on the cemetery property. The woodland harbors small patches of native vegetation despite rampant exotic species invasion. Careful control and removal of exotic species may ensure the continued existence of **SP528** at the site.

SP525 marks a fair population of a state-rare plant growing near Antietam Reservoir in Lower Alsace Township on property owned by the city of Reading. Although the area is safe from development, trampling by hikers who use a nearby nature trail could be a problem. To avoid this unnecessary disturbance, trail-maintenance crews should avoid re-routing the trail through the population and cutting trees and brush in the area. The land manager is aware of the population and working to protect it.

SP534 (Robeson Twp.) "Seyfert Canal Site" A new Pennsylvania endangered plant species of concern (SP534) was found along the canal in 1991. This plant is found in wet areas along the canal and is associated with other species such as *Sparganium eurycarpum, Lemna spp., Ludwigia palustris, Eleocharis acicularis and Boehmeria cylindrica*. Disturbances to this site include a nearby ATV trail. Moist conditions should be maintained for the benefit this species (2003 update).

A small aquatic plant (**SP552**) is found on the rocks in Allegheny Creek in Robeson Township where it was first reported in the 1940's and relocated in 1990. The plant is under consideration for listing as a species of special concern. The creek, below the Green Hills Reservoir in Robeson Township, is a high-quality creek with clear, clean water. Robeson Township should avoid over-development of the watershed which will jeopardize the creek and its biota. Planting a buffer zone of native trees and shrubs along the creek can provide shade to the creek, trap sediments, and prevent bank erosion.

SP557 marks a small population of a state-rare sedge growing on the dry gravel slope of an old coal siltation basin in Exeter Township with slender cottonweed (Froelichia gracillis), buttonweed (Diodia teres), large crabgrass (Digitaria sanguinalis), few-flowered burgrass (Cenchrus pauciflorus), and yellowish wild bean (Strophostyles helvola). Protecting a species in such a highly-disturbed setting is problematic. At this time, PSO staff recommend that a local botanist monitor the population.

SP569, SP540 SA505, SA572 - UPDATE, NEW (1998 update) - (City of Reading, St. Lawrence and Mt. Penn Boroughs, Cumru, Lower Alsace, and Exeter Twps.) "Neversink Mountain" A new plant species of concern, **SP569**, was found here in 1995. This species was found growing on an abandoned quarry now occupied by an open woodland of small trees and shrubs, including chestnut oak, sweet birch, sassafras, sugar maple, white pine, mountain laurel, and blueberry. The site has been burned repeatedly in the past. The top of the quarry has a good view of Reading to the north, and the site is crossed by hiking and motorbike trails. Limiting use of the area to foot traffic would preserve the scenic qualities of the site as well as help stop the erosion which threatens the species of concern. A good to fair-quality population of another PA- Endangered plant, **SP540**, was found in 1993 on a disturbed south-facing slope of Neversink Mountain, overlooking the Schuylkill River. The plant occurs along a roadside, and shading from the exotic tree species Tree-of-Heaven (Ailanthus altissima) is a potential threat.

SP540, SP555, SP569, SA505, SA546, SA572 (City of Reading, St. Lawrence and Mt. Penn Boroughs, Cumru, Lower Alsace, and Exeter Twps.) "Neversink Mountain" NEVERSINK MOUNTAIN provides habitat for two rare butterflies (**SA505** and **SA546**). While in the larval form, these two species feed on wild indigo (Baptisia tinctoria) and beardgrass (Schizachyrium scoparium), respectively. These plants thrive in the numerous dry openings on the mountain. The coincidental larval stages of the gypsy moth and the butterflies render all three species vulnerable to the same control measures. Therefore, it is extremely important that gypsy moth spray programs avoid the powerline corridor where the butterflies and the food plants occur and that control measures be confined to the oak woodlands. In addition, clearings must be kept open to promote the food plants but the use of herbicides should be minimized and mechanical control encouraged.

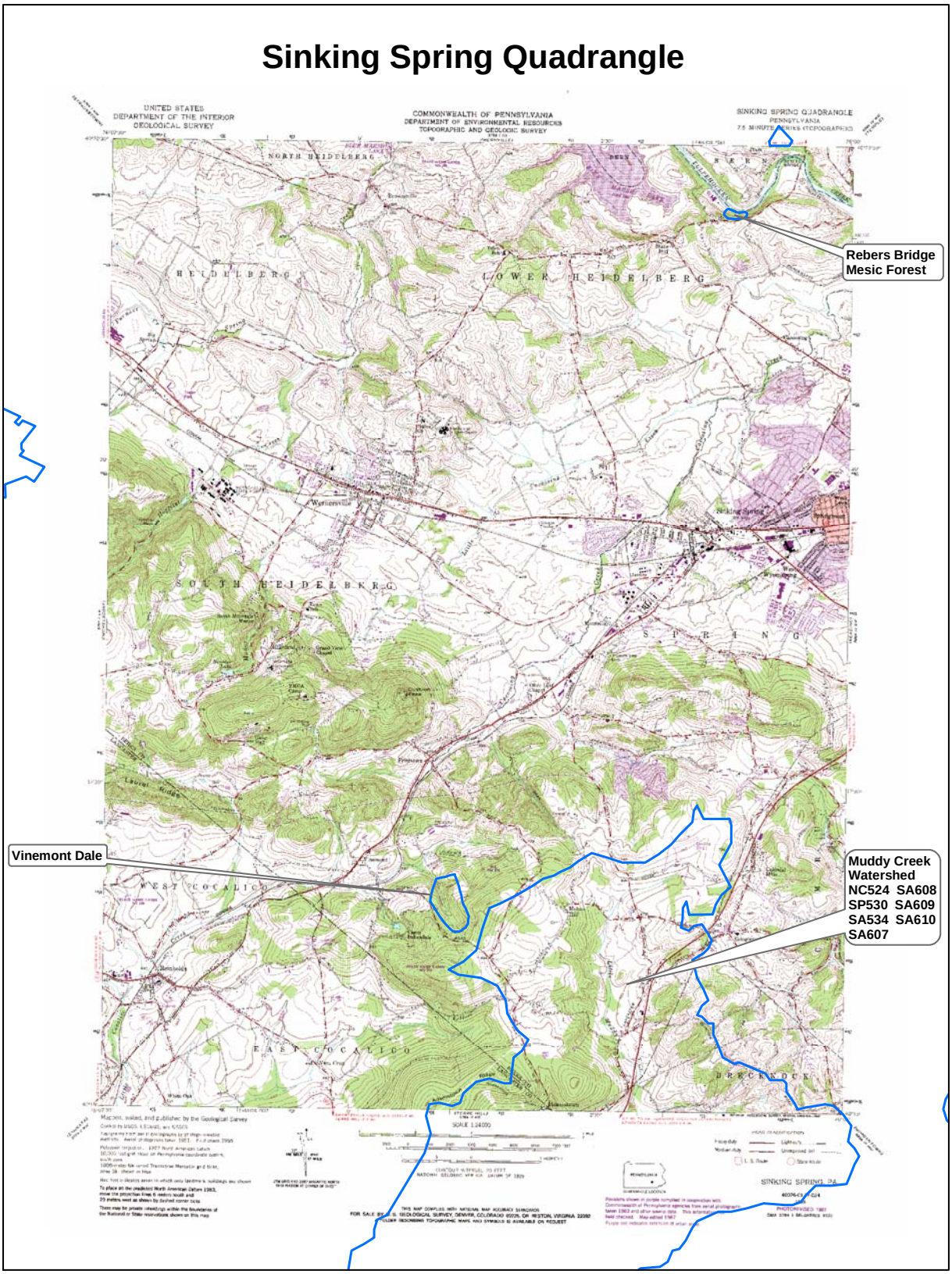
SP555, a state-threatened plant, has only been found at one site, a dry, open southwest-facing slope on Neversink Mountain in Lower Alsace Towhship. This species thrives in open areas dominated by herbaceous vegetation and low shrubs. These small openings can be kept open by mowing and brush clearing. Logging of the steep slopes where the plant grows should be avoided.
Another portion of Neversink Mountain was revisited in 1996. An animal species, **SA505**, which has been known from the site for over forty years, was still present. A second animal species of concern, **SA572**, was observed for the first time during this survey. These species are dependent on open habitat maintained by the powerline R.O.W. Invasion by exotic shrub species is ongoing and a potential threat (2003 update).

The **Tulpehocken Creek Valley County Park** is an important managed area for open space recreation.

USGS QUADRANGLE MAP: Sinking Spring

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	524	G?	S3?	N	06-02-93	C
SPECIAL PLANTS:	530	G5	S2	PT	06-02-93	B
SPECIAL ANIMALS:	534	G5	S2	PE	05-21-92	BC
	607	G5	S2	PE	05-14-98	C
	608	G5	S2	PE	05-22-98	C
	609	G5	S2	PE	05-26-98	BC
	610	G5	S2	PE	05-22-98	BC

Sinking Spring Quadrangle



Sinking Spring Quadrangle:

Berks County covers all but the southwestern corner of the Sinking Spring quadrangle. **NC524** marks a fair quality Circumneutral Seep community south of Goose Lane in Spring Township. The bedrock underlying the area is diabase, or traprock, which is high in magnesium and iron. The nutrient-rich waters and soils associated with diabase bedrock give rise to a diverse wetland flora and at least two rare plants have been reported from the area in the past. Swamp dewberry (Rubus hispidus), sedges (Carex spp.), marsh fern (Thelypteris palustris), jewelweed (Impatiens capensis), and peat moss (Sphagnum spp.) dominate the seep with clammy azalea (Rhododendron viscosum), silky dogwood (Cornus amomum), swamp rose (Rosa palustris), poison sumac (Toxicodendron vernix), and red chokeberry (Aronia arbutifolia) forming a shrubby border. A red maple (Acer rubrum)/skunk cabbage (Symplocarpus foetidus) swamp surrounds part of the seep. Although the seep is in relatively good shape, the surrounding areas are badly degraded. The landowner appears to be amenable to protecting the seep and should be encouraged.

NC524, SP530 -UPDATE, NEW (1998 update)- (Spring Twp.) "Goose Lane Seep" The community remains intact and as previously described. A new plant species of concern, **SP530,** was also discovered. This is a large population with many fertile individuals. No special management is recommended for the seep community or the species of concern.

NC524, SP530, SA534, SA607, SA608, SA609, SA610 (Spring, East Cocalico and Brecknock Twp.) "Little Muddy Creek Watershed" NC524 marks a fair quality Circumneutral Seep community south of Goose Lane in Spring Township. Goose lane seep was revisited in June 1993. The community remains intact and as previously described. A new plant species of concern, **SP530**, was also discovered. This is a large population with many fertile individuals. No special management is recommended for the seep community or the species of concern.
Several Pennsylvania endangered animal species of concern were found in this watershed in 1992 and 1998 (**SA534, SA607, SA608, SA609, SA610**). These animals were found in marshes with associated vegetation such as skunk cabbage (Symplocarpus foetidus), reed canary grass (Phalaris arundinacea), sensitive fern (Onoclea sensibilis), cattails (Typha latifolia), tussock sedge (Carex stricta), and jewelweed (Impatiens capensis). This species is threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of Muddy Creek, and illegal filling of the marshes present threats. Possibly the greatest current threat is housing developments. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here.

The REBERS BRIDGE MESIC FOREST is located on a steep north-facing slope along Tulpehocken Creek less than a mile east of State Hill, in Lower Heidelberg Township. This woodland is a good local natural feature illustrating the type of forest found on cool shaded slopes. The site is dominated by 100-year old hemlocks (Tsuga canadensis) and an herb layer with abundant ferns. The woodland located between the road and the creek is a buffer against road salts, oil and grease and other potential pollutants. Deer browse and some trash along the road appear to be the

primary disturbances affecting the site. Logging of the steep slope should not be allowed to prevent erosion and sedimentation.

VINEMONT DALE is a stream valley of local significance for its geologic features. On the northern side of this valley are large conglomeratic boulders covered with mosses and lichens. Large cobbles protrude from the surface of the boulders. The forest in the vicinity of the boulders is typical of the region. A fairly mature 60-foot canopy of chestnut oak (Quercus montana), black birch (Betula lenta), and hickory (Carya sp.) and a dense shrub layer of mountain laurel (Kalmia angustifolia), azalea (Rhododendron sp.), low-bush blueberry (Vaccinium sp.), and huckleberry (Gaylussacia sp.) grow near the boulders. The setting is very pleasant and would be an excellent spot for a geologic or natural history field trip.

State Game Lands 274 and **280**, **Tulpehocken Creek Valley County Park**, and **Blue Marsh Lake** are important managed areas that can be enhanced by additions of adjacent lands.

USGS QUADRANGLE MAP: Sassamansville

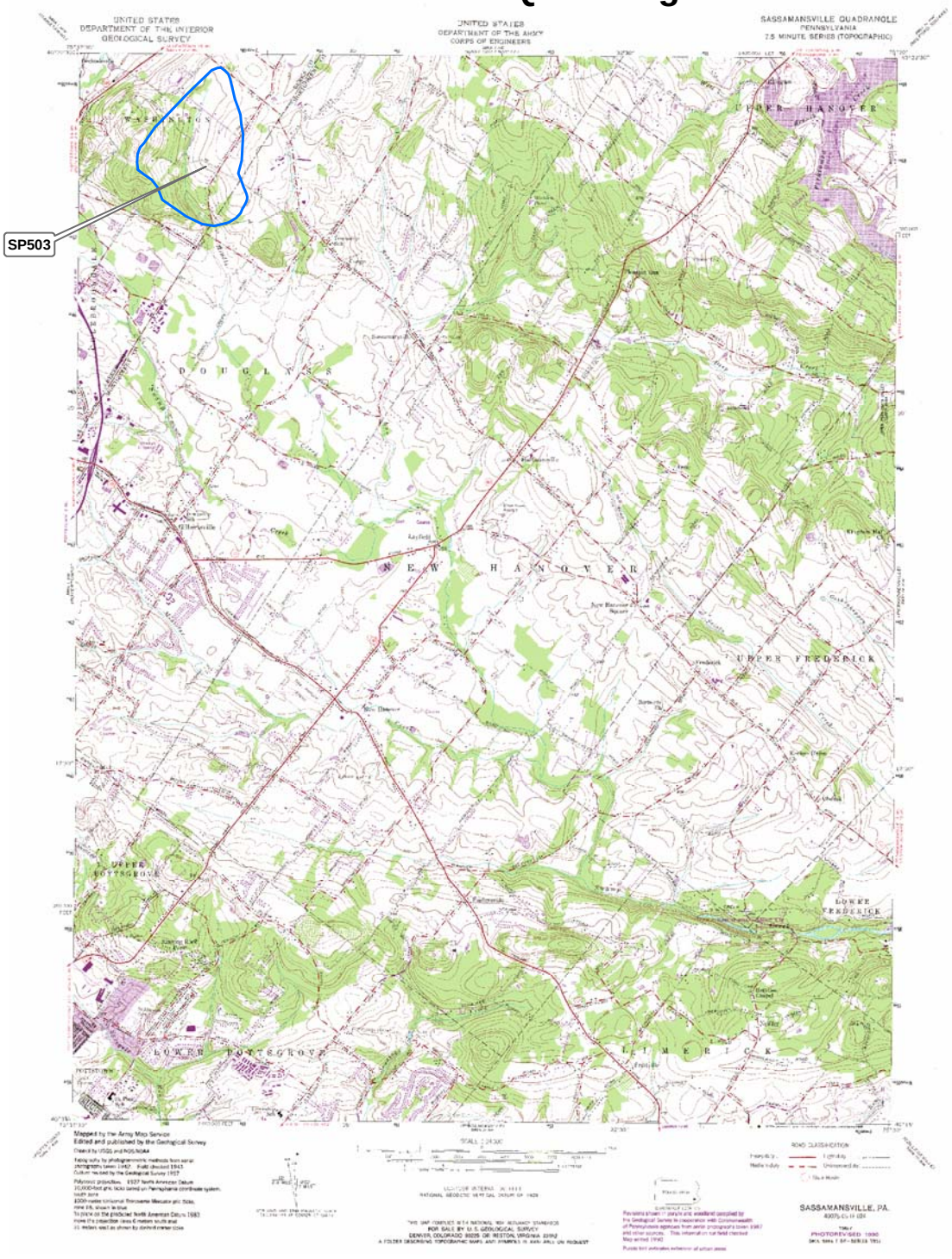
	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified.						
SPECIAL PLANTS:	503	G4	S4	PV	5-09-1982	E
SPECIAL ANIMALS: None identified.						

OTHER: None identified.

Sassamansville Quadrangle:

Only a small portion of Berks County extends onto the northwest corner of the Sassamansville quadrangle. **SP503** is designated as a Pennsylvania-Vulnerable plant species because of widespread collecting in the past. It grows on private property owned by a famous local botanist who is dedicated to the preservation of the native flora. The site should be secure into the forseeable future.

Sassmansville Quadrangle



USGS QUADRANGLE MAP: Strausstown

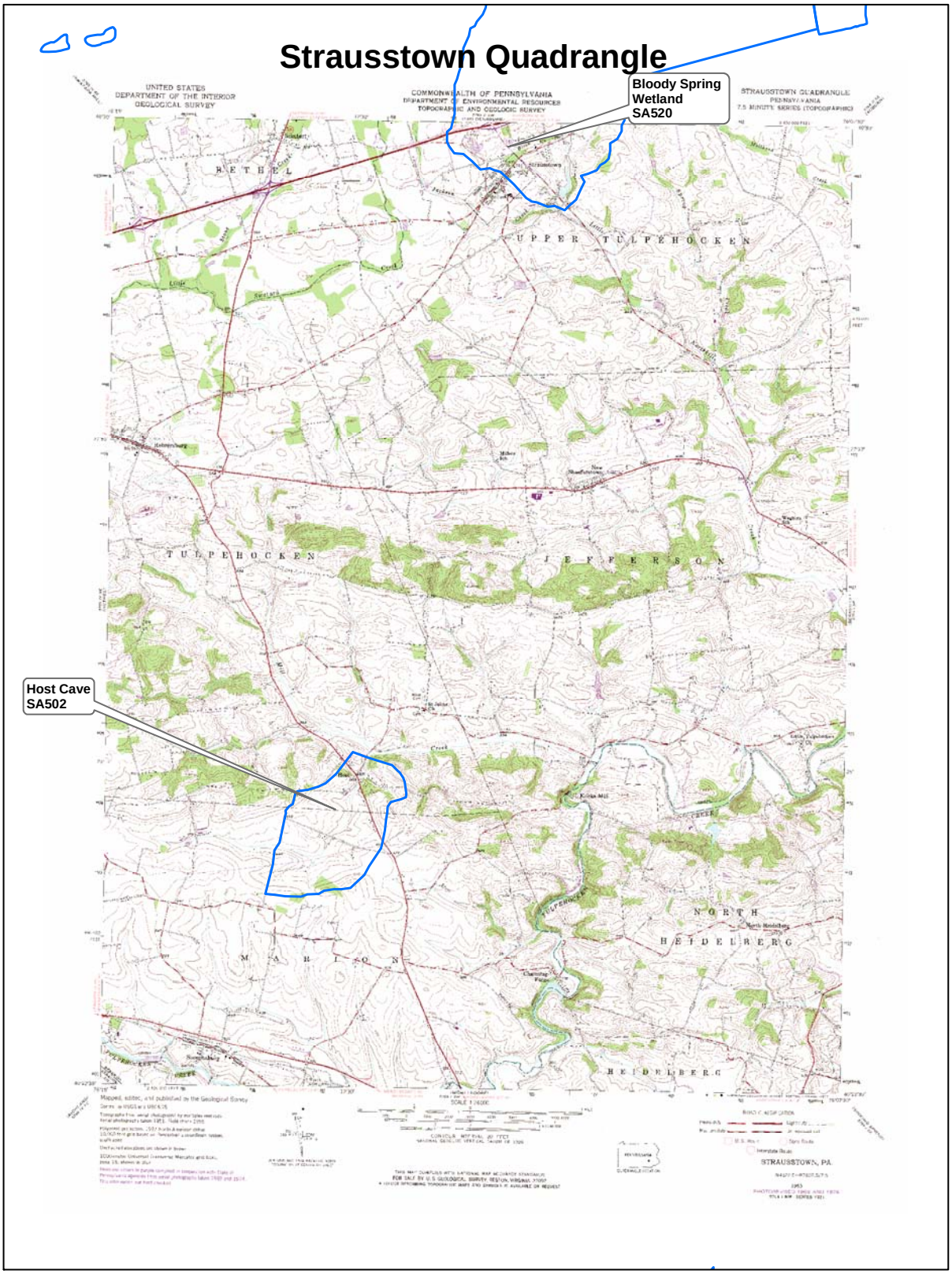
	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified						
SPECIAL PLANTS: None identified						
SPECIAL ANIMALS:	502	G3	S2S3	N	12-15-95	C
OTHER: sa520; see Friedensburg quad SA520						

Strausstown Quadrangle:

Berks County extends across the Strausstown quadrangle which lies in the Great Valley. PSO staff did not find natural communities or species of special concern here.

SA502 -NEW (1998 update)- (Marion, Tulpehocken Twps.) "Host Cave" Host Cave is a small cave with deep pools in its lower-most passages. The pools are sandy-bottomed, with some woody debris, and may be connected to the adjacent tributary of Tulpehocken Creek. Several individuals of a globally rare animal species were found here in December 1995. The cave is also used as a hibernaculum for bats. Degradation of the water quality from surrounding agriculture is a potential threat (2003 update).

Strausstown Quadrangle



USGS QUADRANGLE MAP: Swatara Hill

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

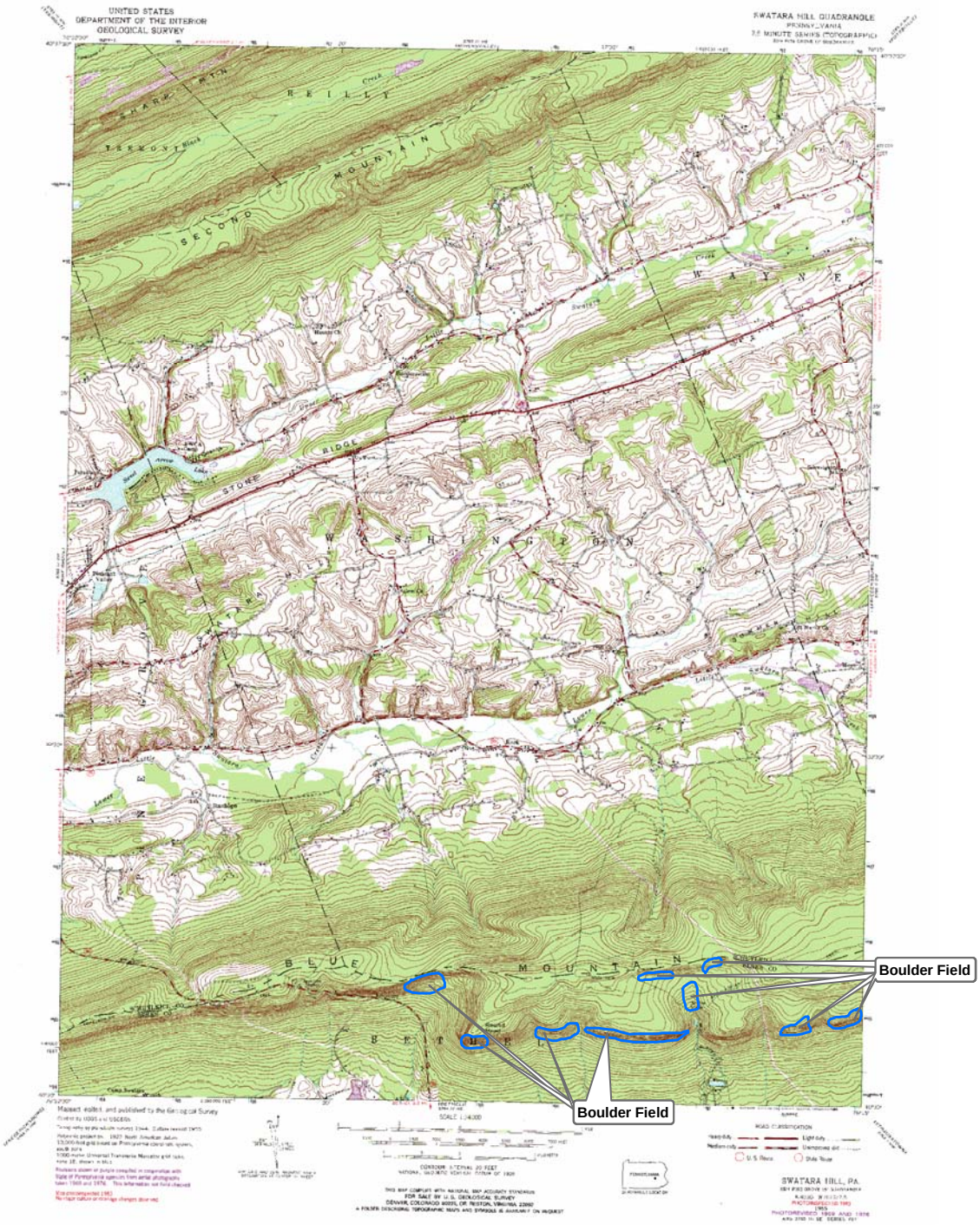
SPECIAL ANIMALS: None identified.

OTHER: Appalachian Trail, State Game Lands 80, Boulder Fields.

Swatara Hill Quadrangle:

A small part of Berks County runs across the southern margin of the Swatara Hill quadrangle. PSO staff did not find natural communities or species of special concern here. However, the **Appalachian Trail** and **State Game Lands (SGL) 80** which extend across Blue Mountain are important managed areas. As noted in previous descriptions, it is imperative that all of Blue Mountain be secured from development since the largest continuous forest in the region covers its flanks and summit. Private lands southeast of White Horse and west of Hertline shelter should be secured against future encroachment. The forest provides a haven and corridor for wildlife. The BOULDER FIELDS and the surrounding talus-slope forest, located in Bethel Township, are of local significance for geologic study and because they, historically, provided habitat for the eastern woodrat (Neotoma floridana magister), a species in decline throughout its range. These areas should be left undisturbed in the event that the eastern woodrat is re-introduced to eastern Pennsylvania.

Swatara Hill Quadrangle



USGS QUADRANGLE MAP: Temple

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES: None identified.						
SPECIAL PLANTS:	520	G5T?	S2	N	7-20-1990	C
	524	G5	S1	N	7-26-1990	B
	525	G5	SU	TU	8-12-1990	B

SPECIAL ANIMALS: None identified.

OTHER: Lake Ontelaunee Watershed, The Orchard, Ontelaunee Township Tract, Schuylkill River.

Temple Quadrangle:

Berks County covers the Temple quadrangle which lies mostly in the Great Valley except for the southeast corner which is on the Reading Prong.

SP520 is a fair population of an aquatic plant found in one cove of Lake Ontelaunee. This variety of a more common plant is listed as Tentatively Undetermined in Pennsylvania and considered imperiled in the state (S2) by The Nature Conservancy. Since the lake is part of the Reading water supply, there are few threats except for chemical and mechanical control of aquatic plants. However, the population is small and unlikely to pose any problems to water management operations.

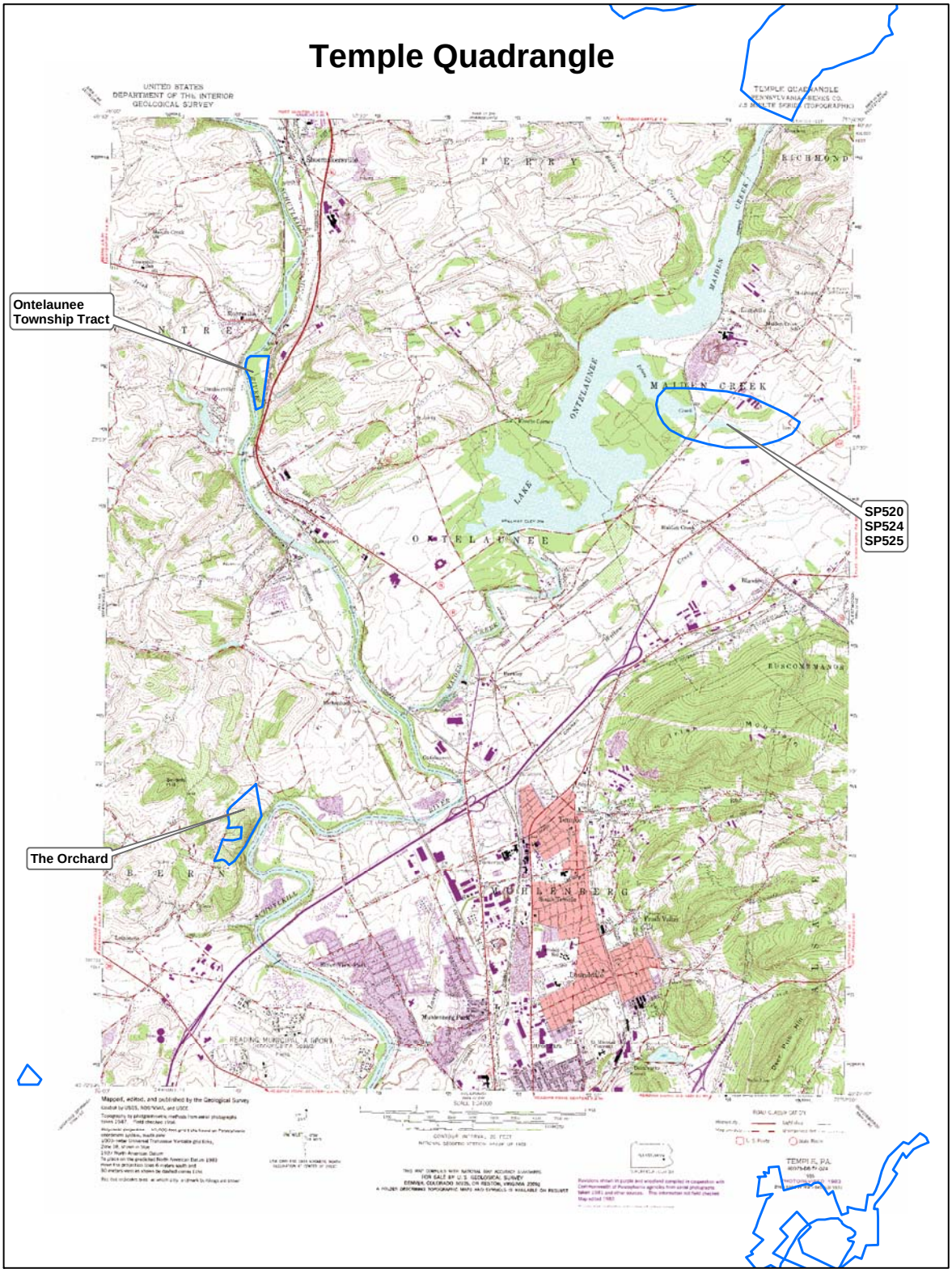
SP524 and **SP525** represent good populations of two very small free-floating aquatic plants that grow in limestone-enriched waters. The plants occur in ponds along Peters Creek which is fed by a limestone spring. The ponds are part of Reading's water supply and should remain protected.

Development should be limited within the **Lake Ontelaunee Watershed** because of associated erosion and nutrient runoff problems. Already, sedimentation is evident in the northern end of the reservoir. Limiting development and providing farmers with incentives to control soil erosion will help avoid more costly remedies in the future.

The Orchard and **Ontelaunee Township Tract** are managed by the Berks County Conservancy.

The **Schuylkill River** is a PA-Scenic river and should be protected from increased pollution and excessive sedimentation. More sites along major waterways, such as the Ontelaunee Township Tract, should be secured by easement or fee title to prevent encroachment.

Temple Quadrangle



USGS QUADRANGLE MAP: Terre Hill

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	524	G?	S3?	N	06-02-93	C
SPECIAL PLANTS:	530	G5	S2	PT	06-02-93	B
SPECIAL ANIMALS:	534	G5	S2	PE	05-21-92	BC
	607	G5	S2	PE	05-14-98	C
	608	G5	S2	PE	05-22-98	C
	609	G5	S2	PE	05-26-98	BC
	610	G5	S2	PE	05-22-98	BC

OTHER: None identified

Terre Hill Quadrangle:

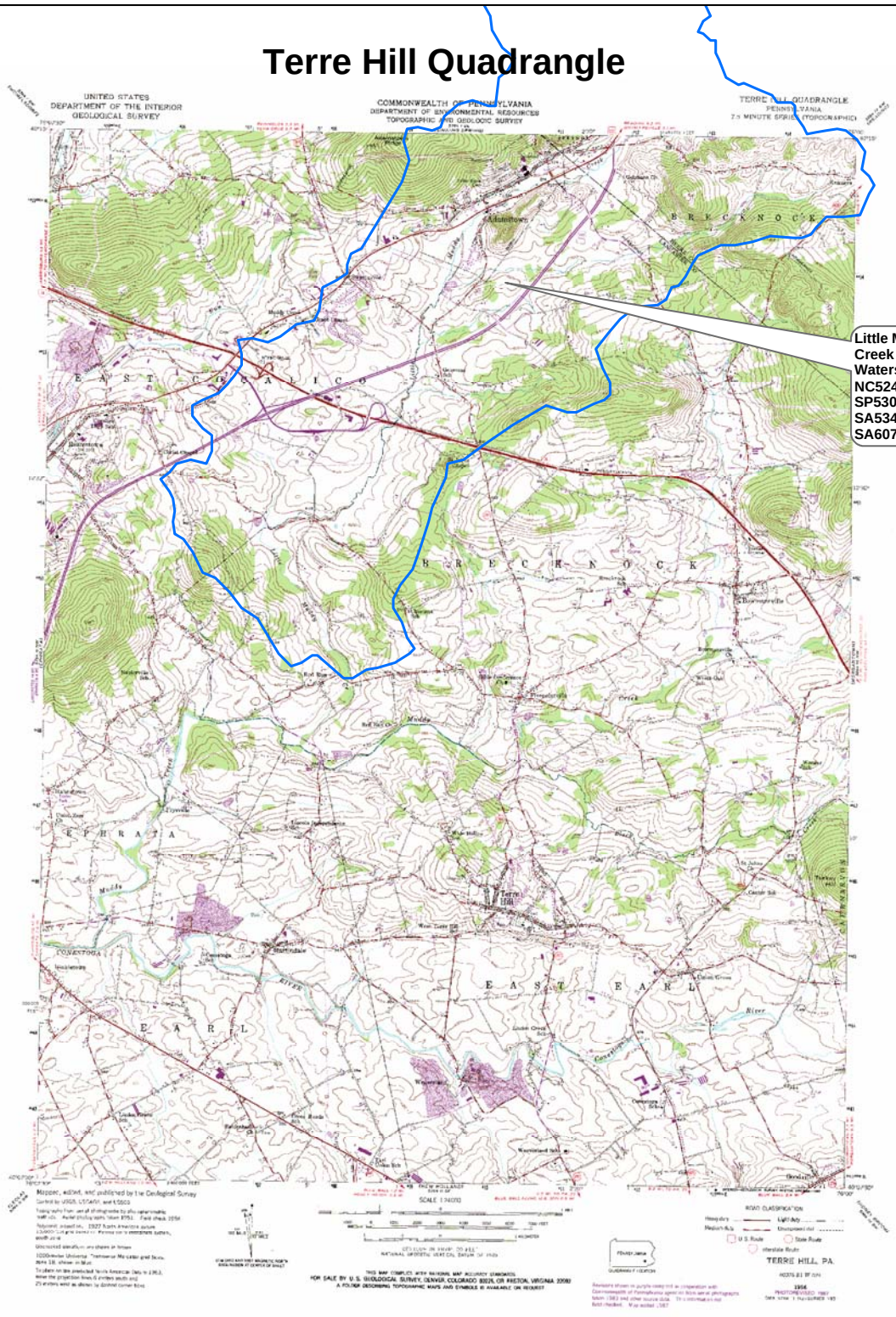
Only a small portion of Berks County extends onto the northeast corner of the Terre Hill quadrangle. PSO staff did not find natural communities or species of special concern in this area.

NC524, SP530, SA534, SA607, SA608, SA609, SA610 (Spring, East Cocalico and Brecknock Twp.) "Little Muddy Creek Watershed" **NC524** marks a fair quality Circumneutral Seep community south of Goose Lane in Spring Township. The bedrock underlying the area is diabase, or traprock, which is high in magnesium and iron. The nutrient-rich waters and soils associated with diabase bedrock give rise to a diverse wetland flora and at least two rare plants have been reported from the area in the past. Swamp dewberry (Rubus hispidus), sedges (Carex spp.), marsh fern (Thelypteris palustris), jewelweed (Impatiens capensis), and peat moss (Sphagnum spp.) dominate the seep with clammy azalea (Rhododendron viscosum), silky dogwood (Cornus amomum), swamp rose (Rosa palustris), poison sumac (Toxicodendron vernix), and red chokeberry (Aronia arbutifolia) forming a shrubby border. A red maple (Acer rubrum)/skunk cabbage (Symplocarpus foetidus) swamp surrounds part of the seep. Although the seep is in relatively good shape, the surrounding areas are badly degraded. The landowner appears to be amenable to protecting the seep and should be encouraged (2003 update).

Goose lane seep was revisited in June 1993. The community remains intact and as previously described. A new plant species of concern, **SP530**, was also discovered. This is a large population with many fertile individuals. No special management is recommended for the seep community or the species of concern.
Several Pennsylvania endangered animal species of concern were found in this watershed in 1992 and 1998 (**SA534, SA607, SA608, SA609, SA610**). These animals were found in marshes with

associated vegetation such as skunk cabbage (Symplocarpus foetidus), reed canary grass (Phalaris arundinacea), sensitive fern (Onoclea sensibilis), cattails (Typha latifolia), tussock sedge (Carex stricta), and jewelweed (Impatiens capensis). This species is threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of Muddy Creek, and illegal filling of the marshes present threats. Possibly the greatest current threat is housing developments. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here (2003 update).

Terre Hill Quadrangle



USGS QUADRANGLE MAP: Topton

	TNC Ranks*		State	Last	
Code	Global	State	Status	Seen	Quality**

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

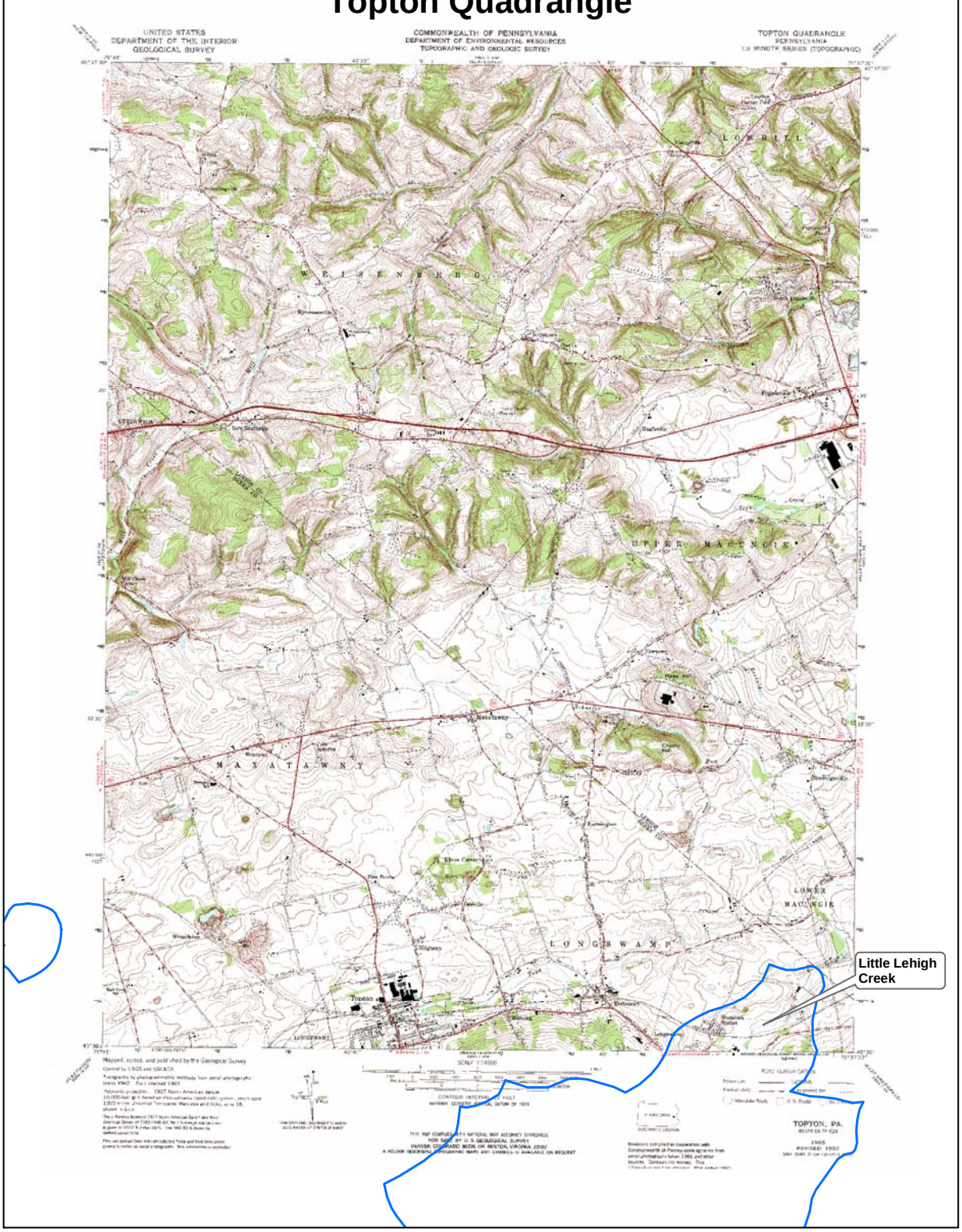
OTHER: Little Lehigh Creek.

Topton Quadrangle:

Berks County extends onto the southwestern corner of the Topton quadrangle, which lies, for the most part, in the Great Valley. PSO staff did not find natural communities or species of special concern here.

The basin of the Little Lehigh Creek located in Longswamp Township is a High Quality - Cold Water Fishery.

Topton Quadrangle



USGS QUADRANGLE MAP: Womelsdorf

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	507	G?	S1S2	N	6-26-1990	C

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: Womelsdorf-Robesonia Watershed.

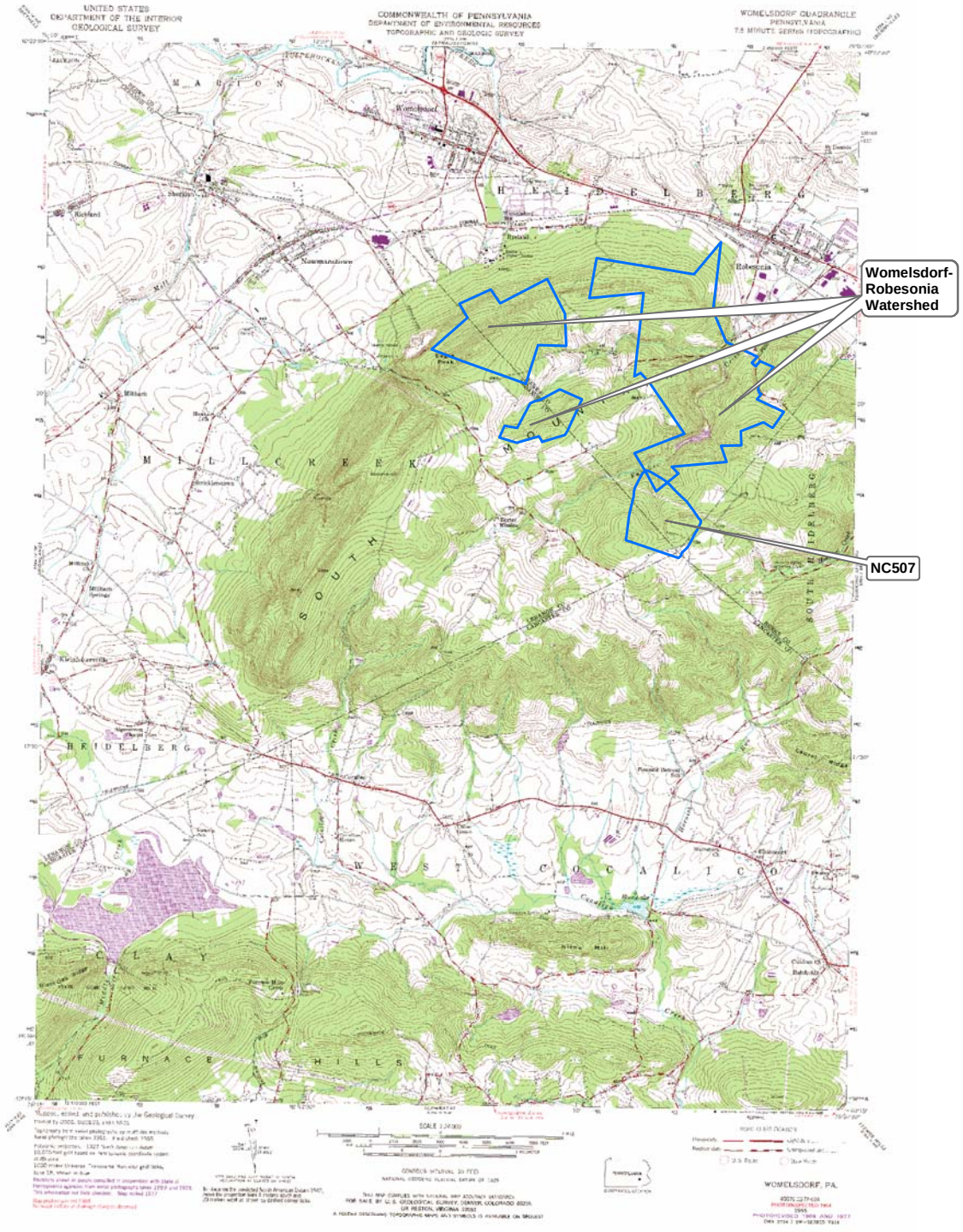
Womelsdorf Quadrangle:

Berks County covers the northeast corner of the Womelsdorf quadrangle. South Mountain, a part of the Reading Prong, extends across the southern portion of this area. The northern section lies in the Great Valley.

NC507 marks a fair Spring Run community developed in a relatively steep narrow ravine along a spring-fed tributary to Furnace Creek in Heidelberg Township. Water flows over and beneath boulders between which pockets of soil have accumulated. The spring head defines the upper limit of the community while a power line crossing defines the lower limit. The diverse community covering less than an acre consists of smooth winterberry (Ilex laevigata), awl-fruited sedge (Carex stipata), rough sedge (Carex scabrata), evergreen wood fern (Dryopteris intermedia), bearded short-husk grass (Brachyeletrum erectum), sensitive fern (Onoclea sensibilis), smooth turtlehead (Chelone glabra), and others. The surrounding mature forest includes white ash (Fraxinus americana), witch-hazel (Hamamelis virginiana), wild-raisin (Viburnum cassinoides), and assorted herbaceous species. Soil erosion and nutrient runoff from logging activities and a housing development upslope of the spring run community are potential threats. A buffer zone of vegetation should be maintained around the spring run community to protect it. The spring waters contribute to the water supply of the Womelsdorf-Robesonia Watershed.

The Womelsdorf-Robesonia Watershed consists of three tracts, the largest of which is in Berks County. Two additional tracts straddle the county line. These three managed tracts are important for water quality protection, wildlife habitat, and open space.

Womelsdorf Quadrangle



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APPENDICES

APPENDIX I.

FEDERAL AND STATE STATUS, AND NATURE CONSERVANCY RANKS

FEDERAL STATUS

U.S. FISH AND WILDLIFE SERVICE CATEGORIES OF ENDANGERED AND THREATENED PLANTS AND ANIMALS

The following definitions are extracted from the September 27, 1985 U.S. Fish and Wildlife Service notice in the Federal Register:

LE--Taxa formally listed as endangered.

LT--Taxa formally listed as threatened.

PE--Taxa proposed to be formally listed as endangered.

PT--Taxa proposed to be formally listed as threatened.

S--Synonyms.

C1--Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

C2--Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

C3--Taxa that are no longer being considered for listing as threatened or endangered species. Such taxa are further coded to indicate three categories, depending on the reason(s) for removal from consideration.

3A--Taxa for which the Service has persuasive evidence of extinction.

3B--Names that, on the basis of current taxonomic understanding, usually as represented in published revisions and monographs, do not represent taxa

meeting the Act's definition of "species".

3C--Taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat.

Appendix I (Continued.)

STATE STATUS

PE - Pennsylvania Endangered - A classification of plant species which are in danger of extinction throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.

PX - Pennsylvania Extirpated - A classification of plant species believed by the Department to be extinct within this Commonwealth. These plant species may or may not be in existence outside this Commonwealth. If plant species classified as Pennsylvania Extirpated are found to exist, the species automatically will be considered to be classified as Pennsylvania Endangered.

PR - Pennsylvania Rare - A classification of plant species which are uncommon within this Commonwealth. All species of native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

PT - Pennsylvania Threatened - A classification of plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent further decline in this Commonwealth, or if the species is greatly exploited by man.

PV - Pennsylvania Vulnerable - A classification of plant species which are in danger of population decline within Pennsylvania because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.

TU - Tentatively Undetermined - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.

N - None - A classification of plant species which are believed to be endangered, rare, or threatened, but which have not yet been included within another classification due to delays created by required regulatory review processes.

Appendix I (Continued.)

The following state statuses are used by the Pennsylvania Game Commission and the Pennsylvania Fish Commission for animal species. The definitions for these statuses are presently being re-evaluated.

LE - Listed Endangered

Game Commission - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation for the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public law 93-205 (87 Stat. 884), as amended.

Fish Commission - Endangered Species are all species and subspecies of fish[1] which: (1) have been declared by the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species list published in the Federal Register; or, (2) have been declared by the executive director (PaFC) to be threatened with extinction and appear on the Pennsylvania Endangered Species List published in the Pennsylvania Bulletin.

LT - Listed Threatened

Game Commission - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the causal factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; or 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public law 93-205 (87-Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".

Fish Commission - Threatened Species are all species and subspecies of fish[1] which: (1) have been declared by the Secretary

Appendix I (Continued.)

of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on a Threatened Species

List published in the Federal Register; or, (2) have been declared by the executive director (PaFC) to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin.

[1] The word "fish" when used as a noun includes all game fish, fish bait, bait fish, amphibians, reptiles, and aquatic organisms.

GLOBAL ELEMENT RANKS

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH = Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the expectation that it may be rediscovered (e.g., Bachman's Warbler).

GU = Possibly in peril range wide but status uncertain; need more information.

GX = Believed to be extinct throughout its range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered.

Appendix I (Concluded.)

STATE ELEMENT RANKS

S1 = Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.

S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences.

S4 = Apparently secure in state, with many occurrences.

S5 = Demonstrably secure in state and essentially in eradicable under present conditions.

SA = Accidental in state, including species which only sporadically breed in the state.

SE = An exotic established in state; may be native elsewhere in North America (e.g., house finch).

SH = Of historical occurrence in the state with the expectation that it may be rediscovered.

SN = Regularly occurring, usually migratory and typically nonbreeding species for which no significant or effective habitat conservation measures can be taken in the state.

SR = Reported from the state, but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.

SRF = Reported falsely (in error) from the state but this error persisting in the literature.

SU = Possibly in peril in state but status uncertain; need more information.

SX = Apparently extirpated from the state.

APPENDIX II

Pennsylvania Natural Diversity

Element Occurrence Quality-Ranks

Quality Rank*	Explanation
A	Excellent occurrence: all A-rank occurrences of an element merit quick, strong protection. An A-rank community is nearly undisturbed by humans, or has nearly recovered from early human disturbance; it is further distinguished by being an extensive, well-buffered, etc. occurrence. An A-rank population of a sensitive species is large in area and number of individuals, stable, it not growing, shows good reproduction, and exists in natural habitat.
B	Good occurrence: protection of the occurrence is important to the survival of the element in Pennsylvania, especially if very few or no A-rank occurrences exist. A B-rank community is still recovering from early disturbance or recent light disturbance but eventually will reach A-rank, or it is nearly undisturbed or nearly recovered from disturbance but is less than A-rank because of significantly smaller size, poorer buffer, etc. A B-rank population of a sensitive species is at lease stable, in a minimally disturbed habitat, and of moderate size and number.
C	Fair occurrence: protection of the occurrence helps conserve the diversity of a region's or county's biota and is important to state-wide conservation if no higher-ranked occurrences exist. A C-rank community is in an early stage of recovery from disturbance, or its structure and composition have been altered such that the original vegetation of the site will never rejuvenate, yet with management and time partial restoration of the community is possible. A C-rank population of a sensitive species is in a clearly disturbed habitat, small in size and/or number, and possibly declining.

D Poor occurrence: protection of the occurrence may be worthwhile for historical reasons or only if no higher ranked occurrences exist. A D-rank community is severely disturbed, its structure and composition been greatly altered, and recovery to original conditions, despite management and time, essentially will not take place. A D-rank population of a sensitive species is very small with a high likelihood

Appendix II (Concluded.)

of dying out or being destroyed, and exists in a highly disturbed and vulnerable habitat.

E Verified as extant, but has not been given a rank.

I Species has been reintroduced by man to an area historically occupied by that species.

---

* Intermediate ranks may also be assigned

APPENDIX III

THE NATURE CONSERVANCY

POTENTIAL NATURAL AREA SURVEY FORM

COUNTY_____ NO.____

QUAD NAME/CODE:_____

Site Name:_____ PHOTO NO./DATE: _____
Location:_____ Township:_____

Air Survey Surveyors:_____ Date:_____

FOREST AGE			CUTTING			GRAZING			RECVRY POT			PRIORITY*		
yng	mat	old	lt	hvy	clr	lt	mod	hvy	gd	fr	pr	hi	med	lo
Wetland														
Marsh														
Meadow														
Shrub														
Seep														
Fen														
Bog														
Pond Shore														
Conifer														
Hdw-Cnfr														
Hardwood														
Floodpln														
Upland														
Ser Barr														
Gras Land														
Lim Barr														
Rck Glade														
Pine Sav														
Oak Sav														
Pine For														
Oak For														
Hdw For														
Hdw-Cnfr														
Cliff														

*E=Eliminate

Ground Survey Surveyors:_____ Date:_____

Community Type	Eliminate	Notable	Natural	Quality-Rank

_____ _____ _____ _____ _____

Comment:

Appendix III (Concluded.)

THE NATURE CONSERVANCY

POTENTIAL NATURAL AREAS SURVEY FORM--NATURAL COMMUNITY

NATURAL COMMUNITY (C rank or better)_____
Map the exact boundary around ranked portions of natural community.
EO-RANK:_____WHY?_____
_____
COMMON PLANTS (or attach species list):_____
_____
_____
_____
_____
_____
_____

OTHER PLANTS:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

DOMINANTS OF THE PLANT COMMUNITIES (PC) IN THE NATURAL COMMUNITY:
1._____
2._____
3._____
4._____
SIGNS OF DISTURBANCE:_____
_____
_____
_____

SPECIAL PLANT (map) FREQUENCY/HOW MANY? IN HOW MUCH AREA PC#

_____
_____
_____
_____
_____
_____

ANIMALS:_____
_____
_____

APPENDIX IV

RECOMMENDED NATURAL AREA FIELD SURVEY FORM

Surveyor:_____ Address & Phone_____
_____
Date of Observation_____Site Name_____

Quadrangle Name_____ Exact Location of
Site (please be specific & include a map or sketch)_____
_____
_____
Owner:_____
Owners Attitude Toward Conservation:_____
_____

Site Elevation:_____ Size of Site (acres):____

Source of Lead:_____

Current Land Use:_____
_____
Type of Area: _Old Growth Forest; __Marsh; __Shrub Swamp;
_Forested Swamp; __Bog; __Natural Pond.
Written Description: Try to convey a mental image of the site
features (including vegetation, significant animals & plants,
aquatic features, land forms, geologic substrata, scenic
qualities, etc.):_____
_____
_____
_____
_____
_____

Evidence of Disturbance:_____
_____
Site Condition Compared to Your Last Visit:_____
_____

Please attach any additional information, species list, etc.
Please send completed report forms to Pennsylvania Science Office
of The Nature Conservancy, 34 Airport Drive, Middletown, PA 17057
(717)948-3962. Additional forms may be obtained from this

office. Thank you for your contribution.

APPENDIX V.

CLASSIFICATION OF NATURAL COMMUNITIES

IN PENNSYLVANIA
(DRAFT)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
ESTUARINE COMMUNITIES			
DEEPWATER SUBTIDAL COMMUNITY	EAA	G?	S1
SHALLOW-WATER SUBTIDAL COMMUNITY	EAB	G?	S1
FRESHWATER INTERTIDAL MUDFLAT	EBA	G3G4	S1
FRESHWATER INTERTIDAL MARSH	ECA	G3G4	S1
RIVERINE COMMUNITIES			
LOW-GRADIENT EPHEMERAL/INTERMITTENT CREEK	RAA	G?	S5
LOW-GRADIENT CLEARWATER CREEK	RAB	G?	S3S4
LOW-GRADIENT CLEARWATER RIVER	RAC	G?	S2S3
LOW-GRADIENT BROWNWATER CREEK	RAD	G?	S2S3
MEDIUM-GRADIENT EPHEMERAL/INTERMITTENT CREEK	RBA	G?	S5
MEDIUM-GRADIENT CLEARWATER CREEK	RBB	G?	S3
MEDIUM-GRADIENT CLEARWATER RIVER	RBC	G?	S?
MEDIUM-GRADIENT BROWNWATER CREEK	RBD	G?	S3
HIGH-GRADIENT EPHEMERAL/INTERMITTENT CREEK	RCA	G?	S5
HIGH-GRADIENT CLEARWATER CREEK	RCB	G?	S3
HIGH-GRADIENT CLEARWATER RIVER	RCC	G?	S?
HIGH-GRADIENT BROWNWATER CREEK	RCD	G?	S?
WATERFALL AND PLUNGEPOOL	RDA	G?	S3S4
SPRING COMMUNITY	REA	G?	S1S2
SPRING RUN COMMUNITY	REB	G?	S1S2
LACUSTRINE			
GLACIAL LAKE	LAA	G?	S1
NONGLACIAL LAKE	LAB	G?	S2
ARTIFICIAL LAKE	LAC	--	--
NATURAL POND	LBA	G?	S2S3
ARTIFICIAL POND	LBB	--	--

STABLE NATURAL POOL	LCA	G?	S?	
EPHEMERAL/FLUCTUATING NATURAL POOL	LCB	G?		S1
ARTIFICIAL POOL	LCC	--		--
EPHEMERAL/FLUCTUATING LIMESTONE SINKHOLE	LCD	G?		S1

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
PALUSTRINE COMMUNITIES			
ACIDIC BROADLEAF SWAMP	PAA	G5	S1S2
CIRCUMNEUTRAL BROADLEAF SWAMP	PAB	G?	S2S3
BOREAL CONIFER SWAMP	PAC	G?	S2
NORTHERN CONIFER SWAMP	PAD	G?	S3S4
BROADLEAF-CONIFER SWAMP	PAE	G?	S3S4
FLOODPLAIN SWAMP	PAF	G?	S1
CALCAREOUS SEEPAGE SWAMP	PAG	G?	S1
ACIDIC SHRUB SWAMP	PAH	G5	S3
CIRCUMNEUTRAL SHRUB SWAMP	PAJ	G?	S3
GRAMINOID MARSH	PBA	G?	S3
ROBUST EMERGENT MARSH	PBB	G?	S2
MIXED GRAMINOID-ROBUST EMERGENT MARSH	PBC	G?	S2S3
CALCAREOUS MARSH	PBD	G?	S1
GLACIAL BOG	PCA	G?	S2S3
NONGLACIAL BOG	PCB	G?	S3
RECONSTITUTED BOG	PCC	--	--
SHRUB FEN	PDA	G2G3	S1
BASIN GRAMINOID-FORB FEN	PDB	G?	S1
HILLSIDE GRAMINOID-FORB FEN	PDC	G?	S1
CIRCUMNEUTRAL SEEP COMMUNITY	PEA	G?	S3?
CALCAREOUS SEEP COMMUNITY	PEB	G?	S1
ACIDIC SEEP COMMUNITY	PEC	G?	S3?
RIVERSIDE SEEP COMMUNITY	PED	G?	S2?
TERRESTRIAL COMMUNITIES			
BOREAL FOREST	TAA	G?	S?
NORTHERN CONIFER FOREST	TBA	G5	S3S4
NORTHERN HARDWOOD FOREST	TBB	G?	S3S4
NORTHERN HARDWOOD-CONIFER FOREST	TBC	G?	S3
XERIC CENTRAL HARDWOOD FOREST	TCA	G?	S5
XERIC CENTRAL CONIFER FOREST	TCB	G?	S3S4
XERIC CENTRAL HARDWOOD-CONIFER FOREST	TCC	G?	S3
PITCH PINE-SCRUB OAK BARRENS	TCD	G2G3	S1S2
DRY-MESIC ACIDIC CENTRAL FOREST	TCE	G?	S5
DRY-MESIC CALCAREOUS CENTRAL FOREST	TCF	G?	S2S3
MESIC CENTRAL FOREST	TCG	G?	S2

TALUS SLOPE FOREST	TCH	G?	S2?
COASTAL PLAIN FOREST	TEA	G?	S1
FLOODPLAIN FOREST	TFA	G?	S2
RIVER GRAVEL COMMUNITY	TGA	G?	S4S5
EASTERN SERPENTINE BARRENS	THA	G2	S1
APPALACHIAN SHALE BARREN	THB	G?	S1

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
APPALACHIAN SAND BARREN	THC	G? S?	
BOULDER FIELD	THD	G?	S5
CALCAREOUS CLIFF COMMUNITY	THE	G?	S2
ACIDIC CLIFF COMMUNITY	THF	G?	S5
SHALE CLIFF COMMUNITY	THG	G?	S2
RIVERSIDE OUTCROP COMMUNITY	THJ	G?	S1S2
CALCAREOUS RIVERSIDE OUTCROP COMMUNITY	THJA	G?	S1
ACIDIC ROCKY SUMMIT COMMUNITY	THK	G?	S1S2
CALCAREOUS ROCKY SUMMIT COMMUNITY	THM	G?	S1
SUBTERRANEAN COMMUNITIES			
SOLUTION CAVE TERRESTRIAL COMMUNITY	SAA	G?	S3
SOLUTION CAVE AQUATIC COMMUNITY	SAB	G?	S3
TECTONIC CAVE COMMUNITY	SAC	G?	S3S4
TALUS CAVE COMMUNITY	SAD	G?	S2S4
DISTURBED COMMUNITIES			
BARE SOIL	DAA	--	--
MEADOW/PASTURELAND	DAB	--	--
CULTIVATED LAND	DAC	--	--
SUCCESSIONAL FIELD	DAD	--	--
YOUNG MICELLANEOUS FOREST	DAE	--	--
CONIFER PLANTATION	DAF	--	--

* Not all natural communities have been assigned a global or state rank; disturbed or artificial communities are not assigned ranks.

Appendix V (Continued.)

The following is a brief description and list of species typically found in the natural communities of Berks County, Pennsylvania.

Acidic Broadleaf Swamp (PAA): Broadleaf deciduous trees dominate this forested community that is permanently or semi-permanently wet and influenced by acidic water (ph < 5.0).

Red Maple (Acer rubrum)
Black Gum (Nyssa sylvatica)
Yellow Birch (Betula allegheniensis)
Hemlock (Tsuga canadensis)
White Pine (Pinus strobus)
Swamp White Oak (Quercus bicolor)
Winterberry (Ilex verticillata)
Common Alder (Alnus serrulata)
Highbush Blueberry (Vaccinium corymbosum)
Cinnamon Fern (Osmunda cinnamomea)
Sedges (Carex spp.)
Peat Moss (Sphagnum spp.)
Tearthumb (Polygonum spp.)

Circumneutral Seep (PEA): This community inhabits areas with saturated soils influenced by circumneutral waters (pH 5.0 - 7.0). A diffuse, as opposed to concentrated, flow of water influences areas generally < 0.1 acre in size. Little peat accumulates in this environment.

Sedges (Carex spp.)
Red Maple (Acer rubrum)
Silky Dogwood (Cornus amomum)
Green-osier Dogwood (Cornus alternifolia)
Fowl-meadow Grass (Glyceria striata)
Jewelweed (Impatiens capensis)
Skunk Cabbage (Symplocarpus foetidus)

High-gradient Clearwater Creek (RCC): This stream community drains a watershed of less than 200 square miles, is less than 50 feet wide, and has a drop of more than 10 feet per mile. The substrate is composed of bedrock, boulders, and alluvial deposits of sand and gravel; riffles and pools are common. The water is generally highly oxygenated and relatively cold.

Brook Trout (Salvelinus fontinalis)
Mayflies (order Ephemeroptera)

Mixed Graminoid-Robust Emergent Marsh (PBC): A wetland community with water near or

above the surface for much of the year and co-dominated by tall robust emergents and graminoid species. Circumneutral to acid waters influence the community.

Appendix V (Concluded.)

Common Cattail (Typha latifolia)
Wool-grass (Scirpus cyperinus)
Lake Sedge (Carex lacustris)
Shining Cyperus (Cyperus rivularis)
Blue-joint Grass (Calamagrostis canadensis)
Duck-potato (Sagittaria latifolia)
Soft Rush (Juncus effusus)
Sensitive Fern (Onoclea sensibilis)
St. John's-wort (Hypericum spp.)

Spring Run (REB): A community bounded by a spring at its head and the point of encounter with a body of water not directly influenced by the spring. A relatively constant flow, temperature, and water chemsitry characterize the community.

Watercress (Nasturtium officinale)
Golden Saxifrage (Chrysosplenium americanum)

APPENDIX VI

SPECIAL PLANTS AND ANIMALS OF BERKS COUNTY

PLANTS

SCIENTIFIC NAME	COMMON NAME
APLECTRUM HYEMALE	PUTTYROOT
ASTER DUMOSUS	BUSHY ASTER
CAREX TETANICA	WOOD'S SEDGE
CORALLORHIZA WISTERIANA	SPRING CORAL-ROOT
CYPERUS SCHWEINITZII	SCHWEINITZ'S FLATSEDGE
DESMODIUM NUTTALLII	NUTTALLS' TICK-TREFOIL
ELEOCHARIS INTERMEDIA	MATTED SPIKE-RUSH
HELIANTHEMUM BICKNELLII	BICKNELL'S HOARY ROCKROSE
JUNCUS BIFLORUS	GRASS-LEAVED RUSH
PANAX QUINQUEFOLIA	GINSENG
POA PALUDIGENA	BOG BLUEGRASS
PODOSTEMUM CERATOPHYLLUM	RIVERWEED
POLYGALA CRUCIATA	CROSS-LEAVED MILKWORT
POLYGALA POLYGAMA	RACEMED MILKWORT
POLYGONUM AMPHIBIUM VAR. STIPULACEUM	a WATER SMARTWEED
SCLERIA RETICULARIS VAR. PUBESCENS	RETICULATED NUTRUSH
TRICHOSTEMA SETACEUM	BLUE-CURLS
VERONICA CATENATA	PENNELL'S SPEEDWELL
WOLFFIA BRASILIENSIS	POINTED WATER-MEAL
WOLFFIA PUNCTATA	DOTTED WATER-MEAL
ZANNICHELLIA PALUSTRIS	HORNED PONDWEED

Appendix VI (Continued.)

ANIMALS

SCIENTIFIC NAME	COMMON NAME
APLECTOIDES CONDITA	a NOCTUID MOTH
ATYRTONOPSIS HIANNA	DUSTED SKIPPER
CLEMMYS MUHLENBERGII	BOG TURTLE
CORAGYPS ATRATUS	BLACK VULTURE
INCISALIA IRUS	FROSTED ELFIN
PAPAIPEMA SP. 1	AMIANTHIUM BULB BORER

Appendix VI (Concluded.)

Vertebrate Characterization Abstracts

Clemmys muhlenbergii (bog turtle)

The bog turtle has a discontinuous range from New York, western Massachusetts, and western Connecticut to western and central North Carolina. In Pennsylvania, it mostly occurs in the southeastern part of the state with some populations known from the northeastern region.

The bog turtle inhabits slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows. In spring and early summer, it commonly basks on tussocks in the morning. During the winter, it hibernates underground in rivulet or seepage areas. In some areas, it may migrate between the winter hibernation site and the summer range. The turtle is most active from April to October. It may aestivate during dry summer periods. Daily, it is most active during the warmer parts of the day. The turtle feeds opportunistically on insects, worms, slugs, crayfish, snails, other small invertebrates, amphibian larvae, and fruits.

The bog turtle breeds between late April and early June. It lays eggs in sedge tussocks or on peat moss (Sphagnum spp.) in open sunny areas.

Coragyps atratus (black vulture)

Within North America, the black vulture is broadly distributed from southern Arizona east to southern Florida and north through central Ohio and Pennsylvania to southern Canada. The black vulture occurs throughout Middle and South America, as well. In Pennsylvania, the bird is an uncommon year-round resident in the southern part of the state.

The black vulture prefers lowland to highland habitats. It mostly eats carrion, although sometimes it may kill and eat vertebrates. It may also eat ripe and rotten fruits and vegetables. The black vulture forms large communal roosts at night throughout the year. The immediate family members maintain close contact throughout the year.

In Pennsylvania, the black vulture breeds in the southeast and south-central parts of the state. The black vulture lays its eggs in a variety of circumstances including bare ground at the bottom of a stump, in a hollow log, in dense thickets, under large boulders, and in caves. The clutch size ranges from one to three and is usually two. Incubation ranges from 28 to 41 days and is done by both sexes. Young are tended by the parents and first fly at about nine to ten weeks.

A NATURAL AREAS INVENTORY OF BERKS COUNTY, PENNSYLVANIA

Update -- 2003

Submitted to:
The Berks County Planning Commission
Berks County Services Center
633 Court Street, 14th Floor
Reading, PA 19601-3509

Pennsylvania Science Office
of
The Nature Conservancy
208 Airport Drive
Middletown, Pennsylvania 17057

These data are a supplement to the Berks County Natural Areas Inventory (NAI) completed in 1991 and the update completed in 1998. Included are new findings of species of special concern and natural communities in the county since the time of the NAI. There are also updates on species and communities (elements) reported in the original document. Many of the Natural Areas polygons on the updated maps have changed. The format follows that of the Berks County NAI. There are tables for each USGS quadrangle map listing all new or updated elements by their PA Natural Diversity Inventory code, which can be substituted for the tables in the original Berks County NAI. The corresponding page number from the original NAI is given for each USGS quadrangle table. Each table provides the global and state rarity ranks, state legal status, site quality, and the date last observed for each element. Following the table is a complete narrative for each site, which can be substituted for the text in the original Berks County NAI.

USGS maps accompany the text, showing all Natural Areas and species of concern in each quadrangle. The area outlined on the maps represents the species' locations as well as the watershed or subwatershed area where the elements (species or natural communities) are located. Information from previous reports should be replaced with new tables, text and maps and the new information should be used for planning in the county. Proposed development activities within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess potential impacts.

The new site boundaries are also included in GIS format on the enclosed disk. These boundaries are included as polygons in an Arc-View file (UTM projection NAD27, Zone 18) titled "berks polys 2003.shp". The USGS quadrangle, township, and associated elements for each polygon are included in this file. The text of this report is saved to an MS-Word file titled "Berks Update 2003.doc". JPEG images of each updated quadrangle are also included under the individual quadrangle names. Questions about this supplement or the original NAI and update can be directed to either William Gleason, NAI coordinator, or Katrina Morris, assistant ecologist, at (717) 948-3962or through the address on the title page.

USGS QUADRANGLE MAP: Friedensburg (37)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	520	G3	S2	PE	06-18-96	E
	521	G?	S3	N	-	E
SPECIAL PLANTS:						
SPECIAL ANIMALS:	515	G4	S3	N	197-	E
	516	G2G3	S2	N	10-03-89	B
	517	G5	S2	N	197-	E
	520	G3	S2	PE	06-18-96	E
	521	G2G3	S2	N	09-24-98	B
OTHER:						

Friedensburg Quadrangle:

SA520 (Upper Tulpehocken Twp.) "Bloody Spring Wetland" This site consists of a 1-2 acre wet meadow dissected by a small braided stream. The vegetation is dominated by sedges, grasses, and other emergents. A single individual of a PA-Endangered animal species was found at this site in 1996. The meadow is lightly grazed, which may help maintain the open habitat required by this species. Heavy grazing and trampling are potential threats. Additional survey work should be done to determine the size of the population.

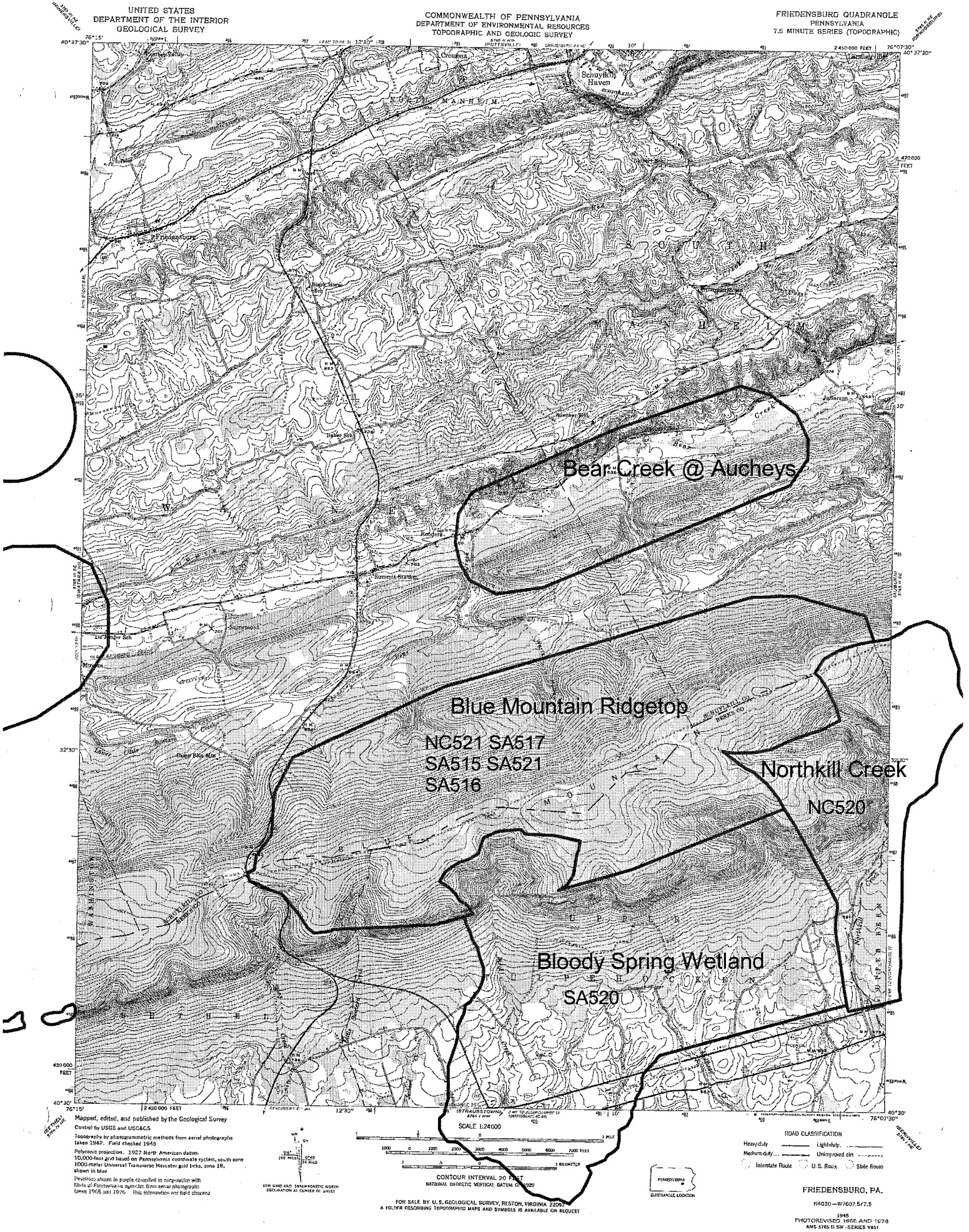
NC520 (Upper Tulpehocken and Upper Bern Twps.) "Northkill Creek" Northkill Creek is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek.

NC521, SA515, SA516, SA517, SA521 (Upper Tulpehocken, Wayne and South Manheim Twps.) "Blue Mountain Ridgetop" SA516 marks the location of a good population of a moth that is both globally- (G2) and state-imperiled (S2). The moth inhabits the acidic ridgetop of Blue Mountain characterized by a mixed oak (scrub, white, and chestnut)/black gum/sassafras canopy and an ericaceous shrub layer of mountain laurel, sheep laurel, and blueberry. Fly poison (Amianthium muscaetoxicum), the food plant of the moth, is abundant in the area. Protection of this showy flowering plant would encourage the moth to continue to inhabit the site. SA21 is a population of the same moth species as SP516, occurring along the top of the Blue Ridge in a dry oak-heath woods. A good to fair-quality population of this species was found, along with an abundance of its food plant (fly-poison), to the west of SP516. It is likely that this species is present elsewhere along the top of the ridge as well. SA515 and SA517 are two butterflies that have not been seen at this site since the mid-1970's but the preferred habitat is still available and it is presumed that the species still occur here.

Blue Mountain Ridgetop is also home to a natural community NC521. This community is in the same area as a historic record for a moth imperiled at the state level (S2). The moth was observed at a small, acid mountain-top wetland containing scattered highbush blueberry (Vaccinium corymbosum) with a groundcover of large cranberry (Vaccinium macrocarpon), soft rush (Juncus effusus), sedges (Carex sp.), and bullrush (Scirpus sp.). Searchers in 1989 were unable to relocate the species but the habitat is still

intact (therefore the historic ranking) and is located on state land. A buffer zone should be maintained around the site and logging should be restricted near the wetland. No alteration of the wetland resources of the mountain top should be implemented and aerial spray programs for gypsy moth control are strongly discouraged in this area (PA Science Office, The Nature Conservancy 1990).

The importance of preserving Blue Mountain as a forested corridor cannot be overemphasized. There are historical reports of different plants and animals such as the eastern hognose snake (Heterodon platyrhinos) considered rare (S3S4) at the state-level inhabiting the summit of Blue Mountain on the Friedensburg quadrangle. Although the snake species has not been seen recently, it is important to preserve habitat in case the animal still occurs in the area. Furthermore, the Blue Mountain forest provides important habitat for many animals, a migration corridor for hawks, and open space for human recreation. The **Appalachian Trail** follows the crest of the mountain passing through **Weiser State Forest** and **State Game Lands 80** and **110**. Additional lands adjacent to these managed areas should be protected from development to maintain the large wooded tract mantling the mountain.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY

FRIEDENSBURG QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1942. Field checked 1945

Polyconic projection. 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

Revision shown in purple compiled in cooperation with State of Pennsylvania from aerial photographs taken 1965 and 1976. This information not field checked

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt - - - - -
Interstate Route ⬡ U.S. Route ⬡ State Route

FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

FRIEDENSBURG, PA.

N4030—W7607.5/7.5

1945
PHOTOREVISED 1966 AND 1976
AMS 5765 II SW.-SERIES V851

USGS QUADRANGLE MAP: Kutztown (47)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	514	G?	S?	N	1979	E
	517	G?	S2S3	N	09-06-90	C
SPECIAL PLANTS:	503	G5	S2	PT	07-07-87	C
	509	G5	S1	PE	09-24-98	C
	518	G5	S1	TU	08-03-90	BC
SPECIAL ANIMALS:	504	G3G4	S2S3	N	06-17-93	A
	505	G4	S2S3	N	06-17-93	AB
	520	G3	S2	PE	05-94	E
OTHER:	sa535; see Hamburg quadrangle SA535					

Kutztown Quadrangle:

SP509, SA504, SA505, SA520 (Maxatawny, Richmond and Greenwich Twps.) "Sacony Creek Watershed" This site consists of a small but intact shale barren on a steep south-facing slope above Sacony Creek. The only known PA population of a PA-Endangered plant (SP509) occurs here. The plant grows on a sparsely-vegetated shale slope in association with grasses, whorled milkweed (Asclepias verticillata), American dittany (Cunila origanoides), Solomon's-seal (Polygonatum sp.), rose (Rosa sp.), thin-leaved purple aster (Aster patens), and false boneset (Brickellia eupatorioides). The plants are threatened by agressive weedy species, such as spotted knapweed (Centauria maculosa), and a closing canopy of oaks and other trees. The owners, who have been contacted by both the Berks County Conservancy and The Nature Conservancy, should be encouraged to manage and protect the site through a conservation easement. This fair quality population was found still intact when revisited in fall of 1991. Development or other disturbance on the slope or the field above are potential threats to this occurrence.
Schofer Cave is located on State Game Lands # 182. Two animal species of concern were found in pools within the cave in 1993. Over a thousand individuals of the globally rare SA504 and one individual of SA505 were observed. The cave has been used for recreation. Trash, especially discarded batteries, is a potential threat to these species and needs to be cleaned up. The Game Commission has been contacted regarding the installation of a gate to protect the cave from further pollution.
An animal species of concern (SP520) was observed at this site in 1991. Additional surveys are needed to assess the size and quality of this population.

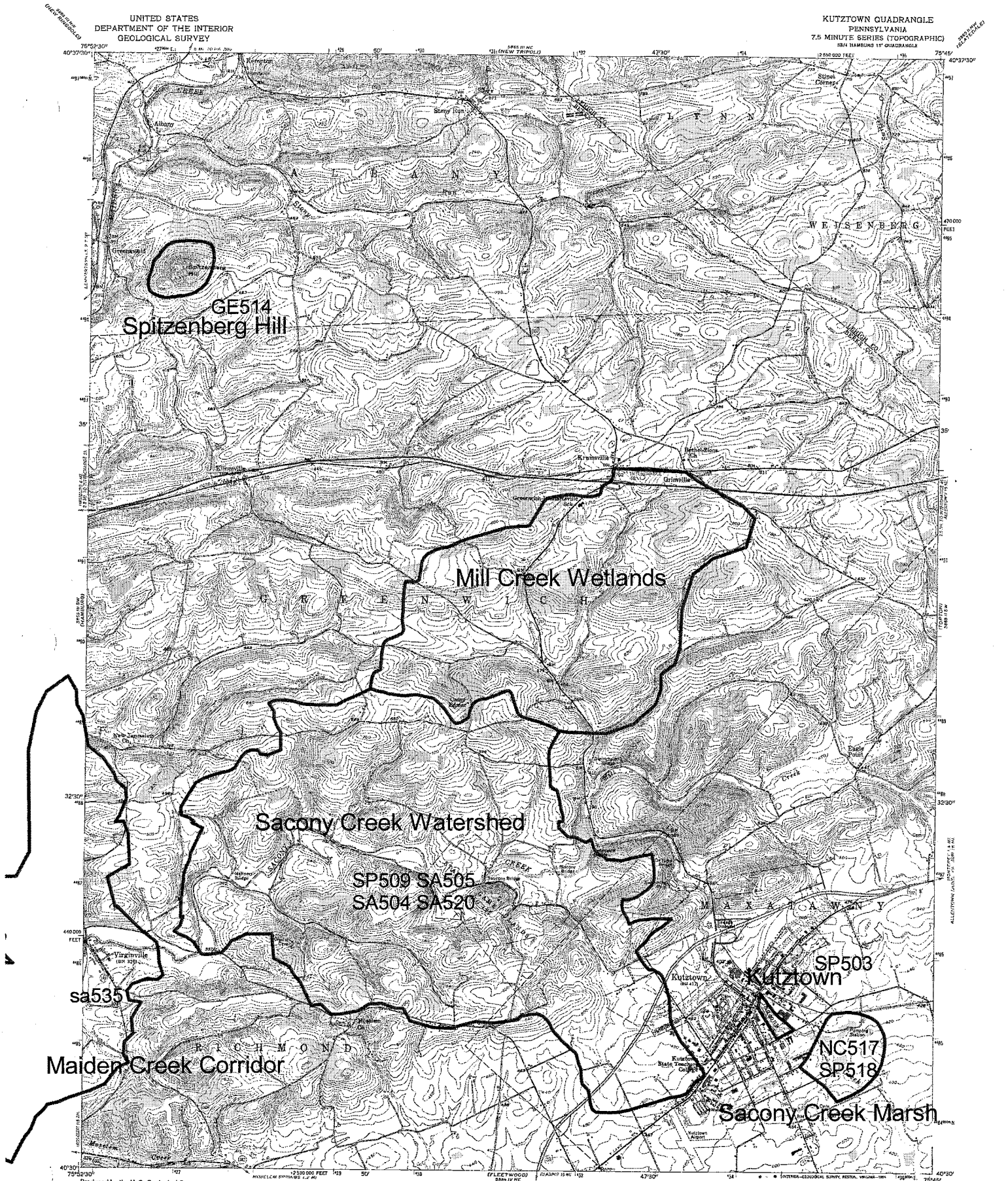
NC517, SP518 (Maxatawny Twp.) "Sacony Creek Marsh" located southeast of Kutztown in Maxatawny Township is a twenty-acre wetland complex comprised of a medium-size creek bordered by a fair quality Mixed Graminoid-Robust Emergent Marsh (NC517) which grades into a small remnant floodplain forest. Broad-leaved cattail (Typha latifolia), spotted touch-me-not (Impatiens capensis), and arrow-leaved tearthumb (Polygonum sagittatum) co-dominate the marsh with reed canary grass (Phalaris arundinacea), hairy-fruited sedge (Carex trichocarpa), and tussock sedge (Carex stricta). A good population (SP518) of a plant imperiled (S2) in Pennsylvania grows in Sacony Creek and in a nearby plant-choked spring-fed tributary. The Sacony Marsh has been disturbed by ditching, filling, and some invasion of exotic species. Filling, wetland encroachment, illegal dumping, and pollution should be avoided in the future. In close

proximity to a university and local high school, the marsh provides an excellent outdoor lab for natural history classes.

SP503 (Maxatawny Twp.) "Kutztown" SP503 in Kutztown Borough indicates a fair population of a state-threatened wetland plant growing along Sacony Creek between Main Street and Normal Road Bridge. The plant grows in seeps with box elder (Acer negundo), swamp rose (Rosa palustris), sensitive fern (Onoclea sensibilis), and broad-leaved cattail (Typha latifolia). This stretch of stream flows through a populated, well-traveled area and receives runoff from roads and adjacent properties. The future of the plant is uncertain given the surrounding land-use. A local botanist should verify the full extent of the population and monitor its health over the next few years.

GE514 (Albany Twp.) "Spitzenberg Hill" Berks County covers all but the northeastern corner of Kutztown quadrangle which is in the Great Valley. Spitzenberg Hill (GE514) is a striking feature of the Great Valley. Geyer and Bolles (1979) report that geologists continue to debate the possibility that the bedrock of the prominent knob is a limestone conglomerate of substantially younger Triassic age occurring as an outlier of the Triassic Lowland section of the Piedmont province. Although the vegetation on the hill has been disturbed and exotic plants are common, there are a variety of plants and habitats. The north-facing slope is predominatly hemlock and other conifers while the trees of the south-facing slope and crest of the hill are mostly oak and other deciduous species. Scrub pine (Pinus virginiana) is common near the bottom of the hill. The woodland and rock outcrops provide food and shelter for wildlife and the hilltop offers an excellent scenic overlook of the surrounding valleys and of Blue Mountain. The combination of geologic, wildlife, and scenic values makes Spitzenberg Hill a good site for a township or county natural area and park.

sa535 see Hamburg quad for species descriptions.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

KUTZTOWN QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 HAMBURG 15' QUADRANGLE

Produced by the U. S. Geological Survey
Control by USGS and NOS/NOAA
Topography by multiplex methods from aerial photographs taken 1951. Field checked 1956
Projection and 10,000-foot grid ticks: Pennsylvania coordinate system, south zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue
1927 North American Datum (NAD 27)
North American Datum of 1983 (NAD 83) is shown by dashed corner ticks
The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are given in USGS Bulletin 1675
There may be private inholding's within the boundaries of the National or State reservations shown on this map
Photoinspected from 1992 source; no major culture or drainage changes observed. Boundaries and names revised 1994

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple compiled in cooperation with State of Pennsylvania agencies from aerial photographs taken 1992 and 1994. This information not field checked

ROAD CLASSIFICATION
Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route — U.S. Route — State Route

KUTZTOWN, PA.
SW/4 HAMBURG 15' QUADRANGLE
40075-E7-TF-024

1956
PHOTOREVISED 1992 AND 1994
MINOR REVISION 1994
DMA 5865 III SE - SERIES V831

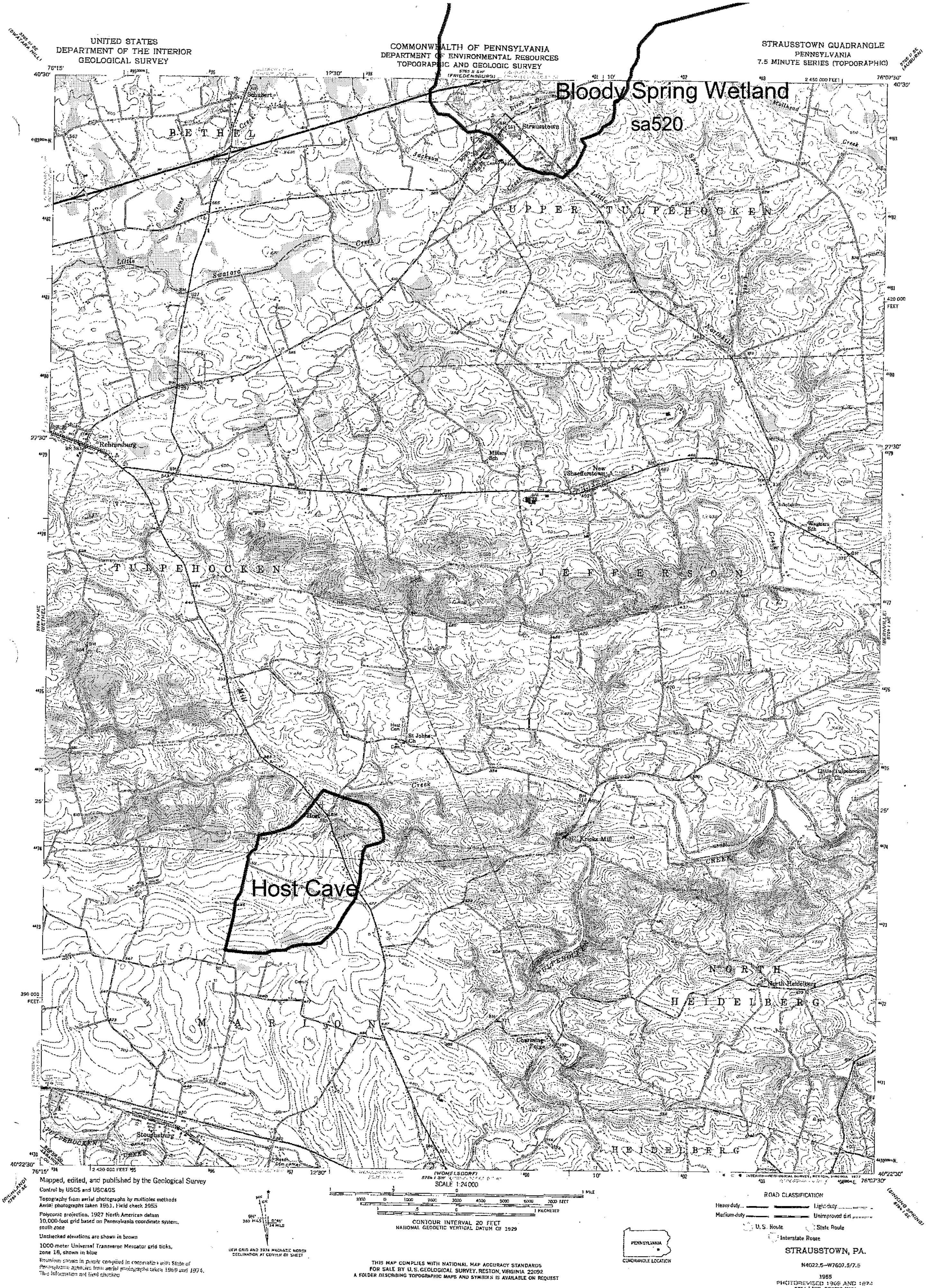
USGS QUADRANGLE MAP: Strausstown (59)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:	502	G3	S2S3	N	12-15-95	C
OTHER:	sa520; see Friedensburg quad SA520					

Strausstown Quadrangle:

SA502 (Marion, Tulpehocken Twps.) "Host Cave" Host Cave is a small cave with deep pools in its lower-most passages. The pools are sandy-bottomed, with some woody debris, and may be connected to the adjacent tributary of Tulpehocken Creek. Several individuals of a globally rare animal species were found here in December 1995. The cave is also used as a hibernaculum for bats. Degradation of the water quality from surrounding agriculture is a potential threat.

sa520; see Friedensburg quadrangle for species descriptions.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY
STRAUSSTOWN QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
Bloody Spring Wetland
sa520
Strausstown
BETHEL
UPPER TULPEHOCKEN
Little Swatara Creek
Rehrersburg
New Schaefferstown
TULPEHOCKEN
JEFFERSON
St Johns Ch
Little Tulpehocken Ch
Host Cave
Host
Kricks Mill
NORTH HEIDELBERG
North Heidelberg
MARION
Charming Forge
Stouchsburg
HEIDELBERG
Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
ROAD CLASSIFICATION
QUADRANGLE LOCATION
STRAUSSTOWN, PA.
N4022.5—W7607.5/7.5
1955
PHOTOREVISED 1969 AND 1974

USGS QUADRANGLE MAP: Fleetwood (67)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	503	G3	S3	PT	05-21-93	CD
	504	G3	S3	PT	06-19-89	D
	512	G5	S2	PE	10-12-94	E
	539	G5	S1	PE	09-07-95	D
SPECIAL ANIMALS:	533	G3	S2	PE	10-12-94	E

OTHER: sp504, sp510, sp516, sp544, sa515, sa516, sa521, sa522, & nc519; see Manatawny quadrangle SP504, SP510, SP516, SP544, SA515, SA516, SA521, SA522, & NC519

Fleetwood Quadrangle:

SP512, SA533 (Oley, Alsace, Roscombmanor, and Rockland Twps.) "Little Manatawny Creek Watershed" An animal species of concern was found here in 1994, in an extensive wetland area. Additional survey work is needed. A good population of a plant species of concern was found nearby in 1996. The population occurs in an alluvial bottomland woods. The open canopy includes sugar maple, bitternut hickory, red maple, ash, and beech. The population is healthy but possibly threatened by woody, exotic species. Disturbances at this site include exotic species invasion and dirt bike trails.

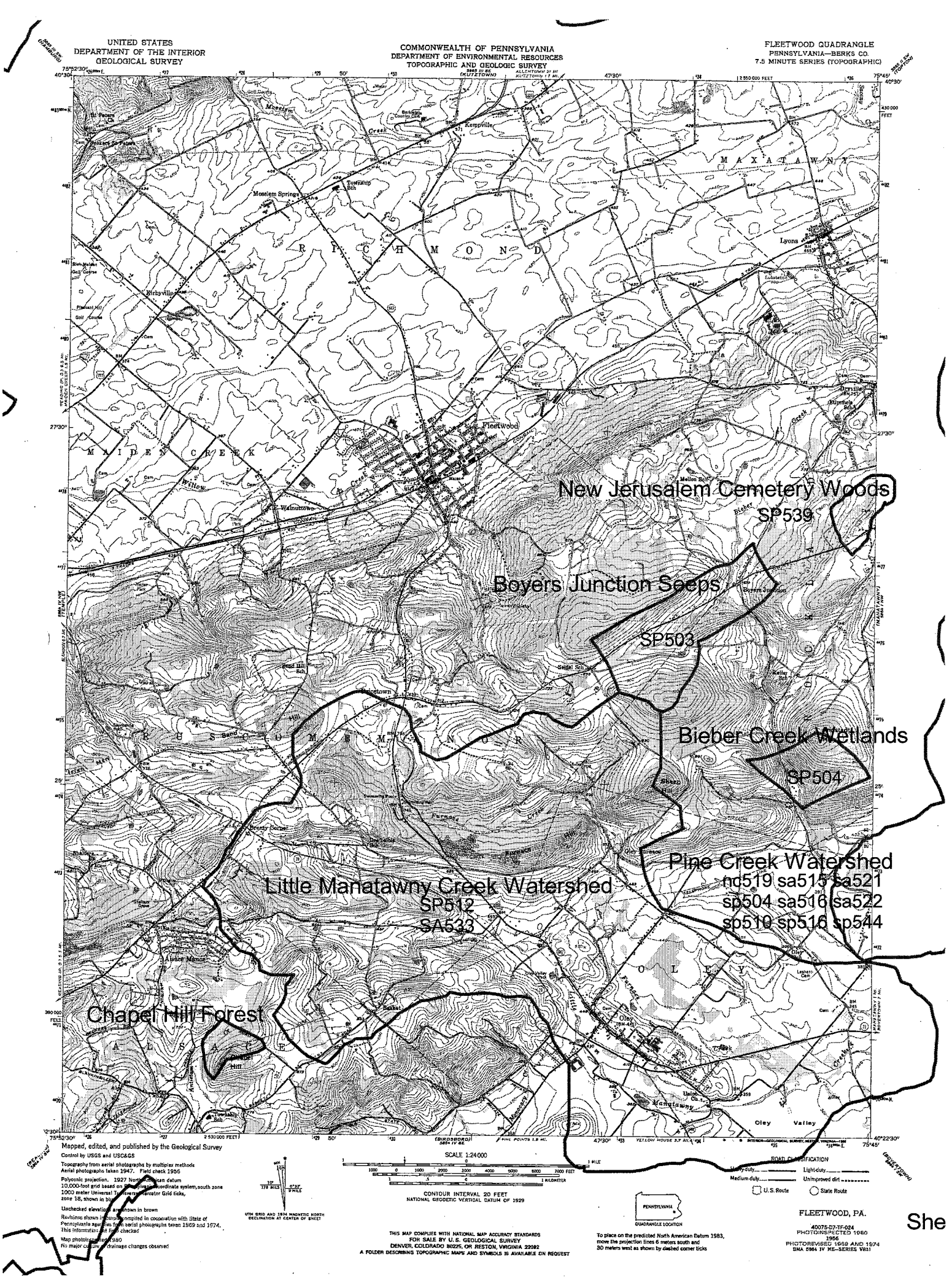
SP503 - (Rockland Twp.) “Boyers Junction Seeps” This small population of a PA-Endangered plant was revisited in 1993. This population continues to persist at this site although ongoing invasion by multiflora rose is a threat. It grows in a seepage wetland along a stream flowing through a closed-canopy forest of red maple (Acer rubrum), common alder (Alnus serrulata), and skunk cabbage (Symplocarpus foetidus). If roads and ditches in the woods were made more extensive, the resulting change in hydrology could threaten the plant. Otherwise, the plant appears relatively secure.

SP504 - (Rockland Twp.) "Bieber Creek Wetlands" The population of SP504 also occurs in a seepage wetland along a stream. The grass grows with skunk cabbage in a wooded wetland characterized by scattered streamlets and seeps, mossy hummocks, and rocks. Although the population is small, the site is little disturbed and there are no apparent threats to the grass at present.

SP539 (Rockland Twp.) “New Jerusalem Cemetery Woods” This site is a moist woods at the base of a forested NW-facing slope. The forest is dominated by red maple, black birch, tulip-tree, and black-gum. A poor quality population of a PA-Endangered shrub species was found here in 1995. It was growing adjacent to several small ponds, associated with other shrubs including highbush blueberry, winterberry, chokeberry, and serviceberry. Disturbance of the pools by development or logging are potential threats to the species of concern.

sp504, sp510, sp516, sp544, sa515, sa516, sa521, sa522, & nc519 see Manatawny Quad for species descriptions.

CHAPEL HILL FOREST is a mature mesic forest with an 80-foot canopy of red oak (Quercus rubra), beech, shagbark hickory (Carya ovata), black birch (Betula lenta), white oak (Quercus alba), basswood (Tilia americana), tulip tree, red maple, and sour gum (Nyssa sylvatica). A patchy shrub layer of spicebush and an herbaceous layer of Christmas fern (Polystichum acrostichoides) and spring ephemerals including yellow trout-lily (Erythronium americanum) and spring beauty (Claytonia virginica) cover the boulder-strewn forest floor. Near Mexico Road, along Antietam Creek the forest shifts to a predominance of pin oak (Quercus palustris), red maple, and swamp white oak (Quercus bicolor) with a dense spicebush layer. A diversity of birds live in the woods while salamanders and frogs utilize the scattered ephemeral ponds for breeding. The woodland should be protected from logging and development.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY
FLEETWOOD QUADRANGLE
PENNSYLVANIA—BERKS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
New Jerusalem Cemetery Woods
SP539
Boyers Junction Seeps
SP503
Bieber Creek Wetlands
SP504
Pine Creek Watershed
nc519 sa515 sa521
sp504 sa516 sa522
sp510 sp516 sp544
Little Manatawny Creek Watershed
SP512
SA533
Chapel Hill Forest
Mapped, edited, and published by the Geological Survey
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
FLEETWOOD, PA.
40075-D7-TF-024
PHOTOINSPECTED 1980
1956
PHOTOREVISED 1968 AND 1974
DMA 5964 IV NE—SERIES V831
She

USGS QUADRANGLE MAP: Manatawny (71)

	Code	TNC Ranks* Global	TNC Ranks* State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	511	G?	S3	-	-	E
	519	G?	S3			E
SPECIAL PLANTS:	504	G5	S1S2	PE	09-10-94	B
	510	G4G5	S2	PT	06-20-89	D
	516	G5	S3	TU	06-13-95	CD
	544	G5	SU		07-21-96	E
SPECIAL ANIMALS:	507	G3	S2	PE	07-27-86	D
	515	G3	S2	PE	06-1991	E
	516	G3	S2	PE	05-23-96	A
	517	G3	S2	PE	07-19-91	E
	521	G3	S2	PE	06-01-00	E
	522	G3	S2	PE	1994	E
	525	G3	S2	PE	1996	E
	526	G3	S2	PE	07-14-96	E
	527	G3	S2	PE	1980	E
OTHER:	sp512, sp539, & sa533; see Fleetwood quadrangle SP512, SP539 and SA533.					

Manatawny Quadrangle:

SA507, NC 511 - (Longswamp and District and Rockland Twps.) "Little Lehigh Creek Watershed" A fair population of an animal species of concern (SA507) resides in a small marsh dominated by cattail, sweetflag, and sedges. The marsh and surrounding uplands were probably used as pasture in the past. Today, the owners are protecting the habitat for the animal. A conservation easement on this portion of the land should be pursued.
Sacony Creek (NC511) from its source to the SR1029 bridge in Rockland Township, is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek.

SP510, SP504, SP516, SP544, SA515, SA516, SA521, SA522, NC519 (District, Pike and Rockland Twps.) "Pine Creek Watershed" A fair population of a state-threatened sedge (SP510) grows in a wet meadow in the Pine Creek Watershed. Periodic mowing of the meadow should be continued as it appears to benefit the sedge species by eliminating competing woody plants. At present, the population is not threatened. The forested habitat near the species of concern is significant at the because of its mature trees and extensive wetlands. Beech dominates some parts of the forest with white ash, tulip poplar, and sugar maple fairly common throughout. Spicebush, the most common shrub, grows amid numerous herbaceous species. Natural disturbances include deer browse and flood scouring which has created the necessary growing conditions for some exotic species. Although development is unlikely, the forest should be protected from other disruptive activities such as logging. This protection will ensure that the forest continues to provide open space for humans, wildlife habitat, flood storage capacity, and water quality protection of Bieber Creek.

Three other plant species of concern were found in the Pine Creek Watershed from 1994 to 1996. SP516 is a plant species of concern that is sometimes found in swamps and wet meadows. SP504 is a species that is parasitic on the roots of other plants. This species in uncommon in swamps, boggy meadows and swales. SP544 is a rare species occasionally found in wet woods and meadows.
An animal species of concern (SA521) was found in a forested wetland along Pine Creek in 1994. More surveys are needed to evaluate the habitat and the population. Another animal species of concern (SA522) was found here in 1994, in a wetland adjacent to Pine Creek. Additional survey work is needed.
There are series of connected wetlands throughout this watershed. The wetlands are open with varied vegetation including cattail marshes, sedge marshes, and some shrubby areas. Several sub-populations (SA515, SA516) of an animal species have been found within this site, including an excellent quality breeding population. All of the wetlands within this site provide potential migration or breeding habitat for this species. Protection of the Pine Creek watershed is very important for this species in PA.
Pine Creek (NC519), a High-gradient Clearwater Creek, and its watershed is designated as Exceptional Value by DER.

SA 526 (Twp.) "West Branch Perkiomen Creek Watershed" This site consists of several emergent wetlands. The vegetation is dominated by cattails, sweetflag, jewelweed, sensitive fern, and sedges. An animal species of concern was found here in 1996. There is more potential habitat, and further surveys are recommended to determine the extent of the population.

SA527, SA517, SA525 (Pike and District Twps.) "Oysterville Creek Watershed" This site consists of several emergent wetlands. The vegetation is dominated by cattails, sweetflag, jewelweed, sensitive fern, and sedges. Animal species of concern (SA525, SA527) were found here in 1980 and 1996. There is more potential habitat, and further surveys are recommended to determine the extent of the population. A breeding population of a G3, animal species of concern (SA517) was also identified at this site in 1991. Additional site visits are needed to assess the quality of and to monitor this population. Threats include changes in the hydrology of the site (e.g., beaver, development), shading of the wetland by woody plant species, and water quality changes. Development in the Oysterville Creek watershed should be closely monitored and regulated. Oysterville Creek is a tributary of Pine Creek and other open, wet meadow habitats along the creek should be considered potential habitat for this species of concern.

sa522, sp512, (Twp.) "Little Manatawny Creek Watershed" see Fleetwood quad for species descriptions.
sp539 (Twp.) "New Jerusalem Cemetery Woods" see Fleetwood quad for species descriptions.

The WEST BRANCH PINE CREEK SEEPS area, the headwaters of the West Branch of Pine Creek located in Rockland Township, supports a forest of mature tulip poplar. Although logged in the past, the forest maintains a high diversity of plant species because of the various wet and dry micro-habitats. The area does not contain natural communities or species of special concern, but is significant at the county level and should be preserved in order to protect the water quality of Pine Creek. Pine Creek (NC512), a High-gradient Clearwater Creek, and its watershed located in District, Rockland, and Pike Townships is designated as Exceptional Value by DER.

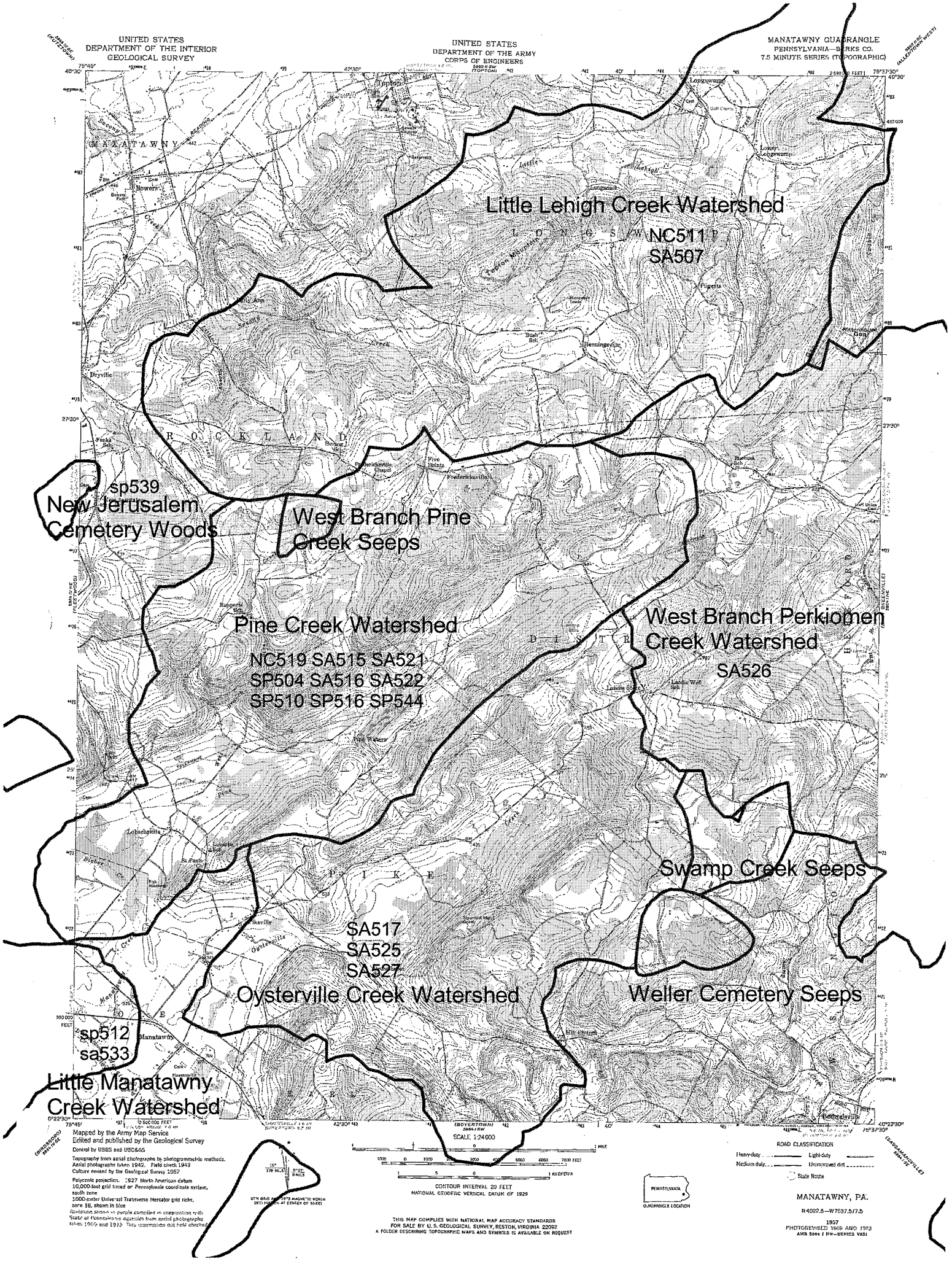
SWAMP CREEK SEEPS is a wooded wetland dominated by young red maple (Acer rubrum) in the canopy, spicebush (Lindera benzoin) in the shrub layer, and a variety of species in the herb layer. This seepage wetland represents the headwaters of Swamp Creek and is, therefore, important to the maintenance of stream flow and water quality. Because it is a wetland, development is unlikely but

encroachment on the adjacent uplands of the watershed should be minimized to protect the quality of the wetland.

The WELLER CEMETERY SEEPS is another headwater feeder wetland for Swamp Creek. The trees here are older (40 to 50 years old) than at Swamp Creek Seeps but there is also more of a mosaic of uplands and wetlands at this site. The uplands are dominated by tulip poplar (Liriodendron tulipifera) and yellow birch (Betula allegheniensis) while the wetland pockets are dominated by red maple. Dead stems of black locust (Robinia pseudoacacia) indicate that the site had been cleared at one time and has only reverted to forest relatively recently. The upland forest appears to be succeeding to a red oak (Quercus rubra) forest since the saplings are predominantly that species. Together, the upland and wetland areas provide a fairly diverse habitat for plants and animals. The presence of yellow birch and red oak give the site a more northern feel than the nearby Swamp Creek Seeps. Protection should include maintaining a buffer zone around the seeps and zoning to minimize new housing in the watershed.

Sacony Creek from its source to the SR1029 bridge in Rockland Township, is designated as an Exceptional Value Stream by the PA DER. Any development plans within the watershed need to be carefully reviewed for impacts to the quality of the creek.

Little Lehigh Creek is designated as a High-Quality Coldwater Fishery by PA DER.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

MANATAWNY QUADRANGLE
PENNSYLVANIA—BERKS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped by the Army Map Service
Edited and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by photogrammetric methods.
Aerial photographs taken 1942. Field check 1943
Culture revised by the Geological Survey 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

Revisions shown in purple compiled in cooperation with State of Pennsylvania agencies from aerial photographs taken 1969 and 1973. This information not field checked

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium duty ——— Unimproved dirt - - - - -
State Route

MANATAWNY, PA.
N4022.5—W7537.5/7.5

1957
PHOTOREVISED 1969 AND 1973
AMS 5864 I NW—SERIES V851

USGS QUADRANGLE MAP: Morgantown (99)

	Code	TNC Ranks* Global	TNC Ranks* State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	510	G5	QS3	PR	03-27-03	CD
	535	G5	S2	TU	07-15-90	C
	552	G5	S2	TU	09-09-90	C
	553	G5	S1S2	TU	07-15-90	D
SPECIAL ANIMALS:	505	G4	S2	N	07-12-97	E
	525	G4	S3	N	07-12-97	E
	572	G3	S2	PE	09-20-95	E
	597	G3	S2	PE	06-17-00	CD
	600	G3	S2	PE	07-29-97	E
	614	G3	S2	PE	07-09-00	E
	615	G3	S2	PE	07-09-00	E
OTHER:						

Morgantown Quadrangle:

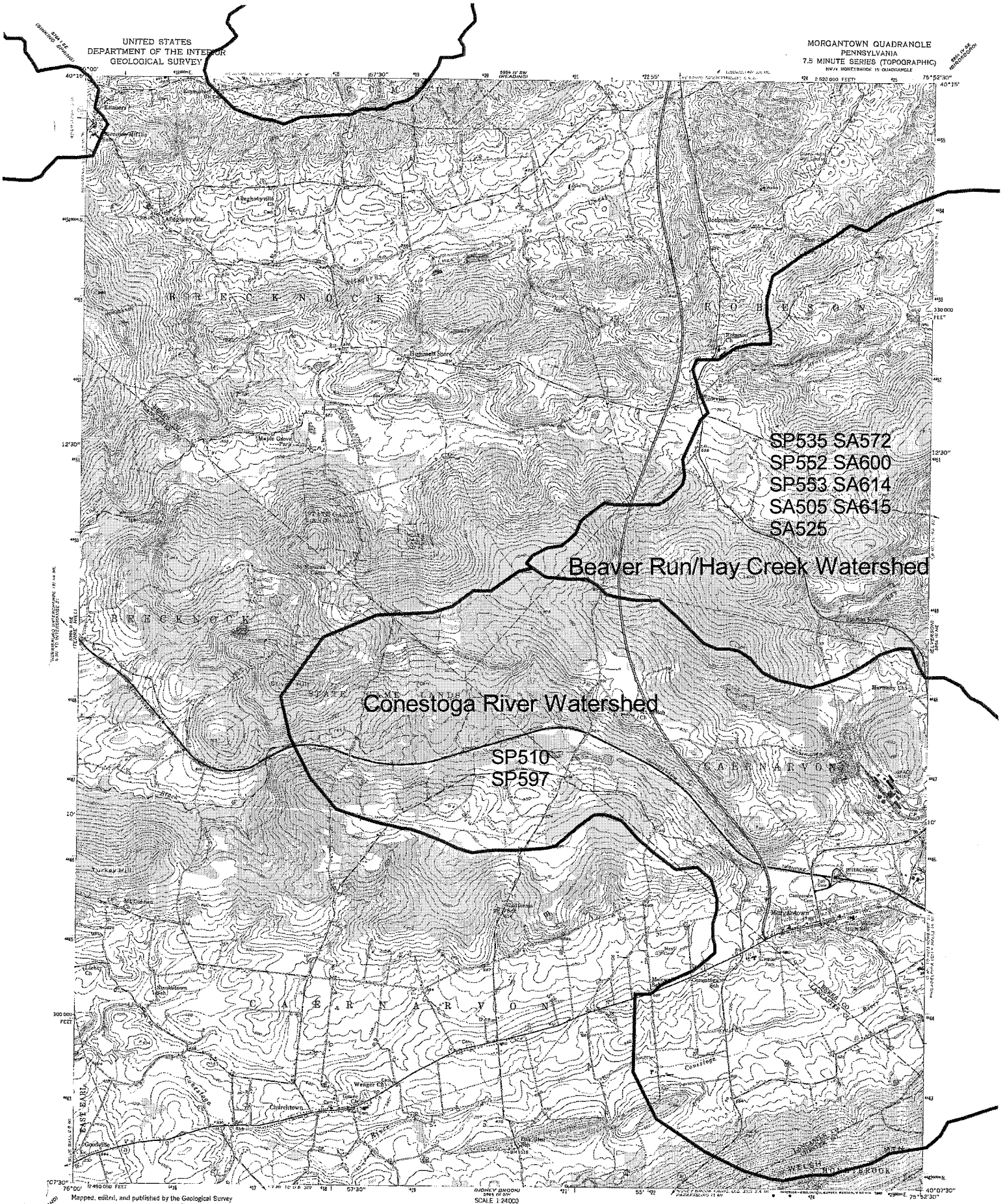
Berks County covers the northeastern half of the Morgantown quadrangle. The area north of Morgantown is in the Triassic Lowlands while Morgantown sits in the Conestoga Valley.

SP535, SP552, SP553, SA505, SA525, SA572, SA600, SA614, SA615 (Scarlets Mill, Robeson, and Caernarvon Twps.) "Beaver Run/Hay Creek Watershed" Three plant species of special concern grow in this watershed. SP535 and SP553 mark fair and poor populations, respectively, of two wildflower species under consideration for state-listing that grow along an abandoned railroad track in dry, open conditions. SP553 grows at the base of a rock outcrop in association with orange-grass (Hypericum gentianoides), bird's-foot violet (Viola pedata), frostweed (Helianthemum canadense), beard grass (Schizachyrium scoparium), and hair-like bulbostylis (Bulbostylis capillaris). SP535 grows in three open areas adjacent to the tracks in association with wild sensitive plant (Cassia nictitans), smooth tick-trefoil (Desmodium laevigatum), dwarf sumac (Rhus copallina), Queen Anne's-lace (Daucus carota), Canada goldenrod (Solidago canadense), and others. For the time being, the plants appear secure. SP552, a fair population of a wildflower under consideration for state-listing, grows in an abandoned cow pasture along a branch of Hay Creek with beardgrass (Andropogon glomeratus), short-hairy goldenrod (Solidago puberula), and bastard toadflax (Comandra umbellata) among others. The wildflower, capable of surviving grazing, could be threatened by succession unless the field is periodically mowed.
Several PA-Endangered animal species (SA572, SA600, SA614, SA615) have been observed in this watershed from 1995 - 2000. Suitable habitat is available throughout this watershed but little is known about the status of this species in this habitat. Further surveys are needed to locate the most suitable habitat and to look for more individuals. The greatest current threat to these populations is housing developments. Many of the current landowners are selling their properties and developments are planned. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. This species is also threatened by natural succession that could dramatically change the

small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of the creeks, and illegal filling of the marshes present threats.
Two other animal species of concern (SA505, SA525) were identified in this watershed in 1997. These animals prefer wet meadow habitats and are associated with species such as (Wallengrenia otho), (W. egeremet), (Euphydryas phaeton), (Satyrodes appalachia), (Euphyes conspicuus), (Pompeius verna), and (Speyeria cybele). Yearly mowing at the site maintains habitat for these species. In 1997, the site was up for sale and a change in ownership may lead to less favorable habitat conditions for these animals.

SP510, SA597 (Caernervon, Brecknock, Honeybrook Twps.) "Conestoga River Watershed" An PA Endangered animals species (SA597) was discovered here in 2000. This species was found in a wetland with tussock sedge (Carex stricta), cattails (Typha latifolia), watercress (Nasturtium officinale), grasses and forbs. More surveys must be completed to determine the extent of the population. This site is threatened by a proposed shopping center complex. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. A plant species of concern (SP510) was also discovered in State Game Lands #52. This Pennsylvania rare plant requires moist, shaded conditions and is easily overlooked.

State Game Lands 52 and surrounding privately-held areas are important forested areas that provide open space for recreation and habitat for wildlife. SGL 52 is managed according to the Forest Wildlife Habitat Management Plan which allows for habitat improvement activities such as selective logging to provide diverse forest habitat for all wildlife species. Carefully conducted logging, either selective or on a long rotation, on private land can provide an income to the landowner while still maintaining a variety of wildlife habitat. Even though these forests are not "natural", open space is maintained instead of lost to development in an area that is developing quickly.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MORGANTOWN QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SP535 SA572
SP552 SA600
SP553 SA614
SA505 SA615
SA525
Beaver Run/Hay Creek Watershed
Conestoga River Watershed
SP510
SP597
Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and USGS
Topography from aerial photographs by Wild A-6
Aerial photographs taken 1951. Field check 1956
Polyconic projection. 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue
Unchecked elevations are shown in brown
Revisions shown in purple compiled in cooperation with State of Pennsylvania agencies from aerial photographs taken 1969 and 1976. Title information not field checked
Map photoinspected 1980
No major culture or drainage changes observed
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
ROAD CLASSIFICATION
Heavy-duty
Medium-duty
Light-duty
Unimproved dirt
Interstate Route
State Route
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
PENNSYLVANIA
QUADRANGLE LOCATION
MORGANTOWN, PA.
NW/4 HONEYBROOK 15 QUADRANGLE
40075-88-T-024
PHOTOINSPECTED 1980
1956
PHOTOREVISED 1988 AND 1975
DMA 5864 III NW—SERIES V881

USGS QUADRANGLE MAP: Sinking Spring (81)

	Code	TNC Ranks* Global	TNC Ranks* State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	524	G?	S3?	N	06-02-93	C
SPECIAL PLANTS:	530	G5	S2	PT	06-02-93	B
SPECIAL ANIMALS:	534	G5	S2	PE	05-21-92	BC
	607	G5	S2	PE	05-14-98	C
	608	G5	S2	PE	05-22-98	C
	609	G5	S2	PE	05-26-98	BC
	610	G5	S2	PE	05-22-98	BC

OTHER:

Sinking Spring Quadrangle:

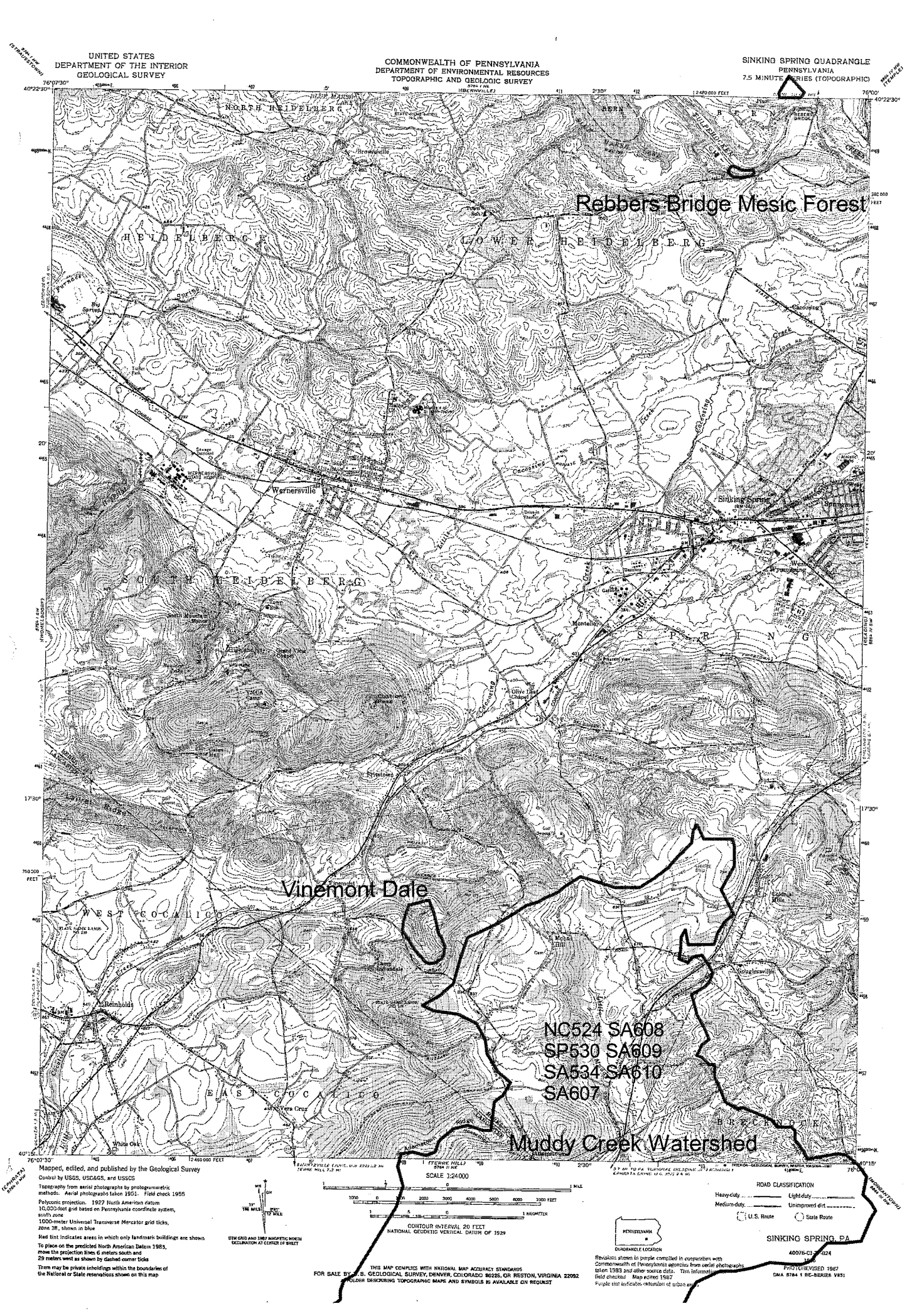
NC524, SP530, SA534, SA607, SA608, SA609, SA610 (Spring, East Cocalico and Brecknock Twp.) "Little Muddy Creek Watershed" NC524 marks a fair quality Circumneutral Seep community south of Goose Lane in Spring Township. The bedrock underlying the area is diabase, or traprock, which is high in magnesium and iron. The nutrient-rich waters and soils associated with diabase bedrock give rise to a diverse wetland flora and at least two rare plants have been reported from the area in the past. Swamp dewberry (Rubus hispidus), sedges (Carex spp.), marsh fern (Thelypteris palustris), jewelweed (Impatiens capensis), and peat moss (Sphagnum spp.) dominate the seep with clammy azalea (Rhododendron viscosum), silky dogwood (Cornus amomum), swamp rose (Rosa palustris), poison sumac (Toxicodendron vernix), and red chokeberry (Aronia arbutifolia) forming a shrubby border. A red maple (Acer rubrum)/skunk cabbage (Symplocarpus foetidus) swamp surrounds part of the seep. Although the seep is in relatively good shape, the surrounding areas are badly degraded. The landowner appears to be amenable to protecting the seep and should be encouraged.
Goose lane seep was revisited in June 1993. The community remains intact and as previously described. A new plant species of concern, SP530, was also discovered. This is a large population with many fertile individuals. No special management is recommended for the seep community or the species of concern.
Several Pennsylvania endangered animal species of concern were found in this watershed in 1992 and 1998 (SA534, SA607, SA608, SA609, SA610). These animals were found in marshes with associated vegetation such as skunk cabbage (Symplocarpus foetidus), reed canary grass (Phalaris arundinacea), sensitive fern (Onoclea sensibilis), cattails (Typha latifolia), tussock sedge (Carex stricta), and jewelweed (Impatiens capensis). This species is threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of Muddy Creek, and illegal filling of the marshes present threats. Possibly the greatest current threat is housing developments. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here.

The REBERS BRIDGE MESIC FOREST is located on a steep north-facing slope along Tulpehocken Creek less than a mile east of State Hill, in Lower Heidelberg Township. This woodland is a good local natural feature illustrating the type of forest found on cool shaded slopes. The site is dominated by 100-year old hemlocks (Tsuga canadensis) and an herb layer with abundant ferns. The woodland located

between the road and the creek is a buffer against road salts, oil and grease and other potential pollutants. Deer browse and some trash along the road appear to be the primary disturbances affecting the site. Logging of the steep slope should not be allowed to prevent erosion and sedimentation.

VINEMONT DALE is a stream valley of local significance for its geologic features. On the northern side of this valley are large conglomeratic boulders covered with mosses and lichens. Large cobbles protrude from the surface of the boulders. The forest in the vicinity of the boulders is typical of the region. A fairly mature 60-foot canopy of chestnut oak (Quercus montana), black birch (Betula lenta), and hickory (Carya sp.) and a dense shrub layer of mountain laurel (Kalmia angustifolia), azalea (Rhododendron sp.), low-bush blueberry (Vaccinium sp.), and huckleberry (Gaylussacia sp.) grow near the boulders. The setting is very pleasant and would be an excellent spot for a geologic or natural history field trip.

State Game Lands 274 and **280**, **Tulpehocken Creek Valley County Park**, and **Blue Marsh Lake** are important managed areas that can be enhanced by additions of adjacent lands.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY
SINKING SPRING QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
Rebbers Bridge Mesic Forest
Vinemont Dale
NC524 SA608
SP530 SA609
SA534 SA610
SA607
Muddy Creek Watershed
NORTH HEIDELBERG
HEIDELBERG
LOWER HEIDELBERG
SOUTH HEIDELBERG
SPRING
WEST COCALICO
EAST COCALICO
BERN
BRECKNOCK
Wernersville
Sinking Spring
Reinholds
Mapped, edited, and published by the Geological Survey
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
ROAD CLASSIFICATION
SINKING SPRING, PA.
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

USGS QUADRANGLE MAP: Reading (85)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	525	G5	S3	PR	06-05-87	C
	528	G5	S1	TU	05-22-87	B
	534	G5	S1	PE	08-07-91	D
	540	G5	S1	PE	09-05-93	BC
	555	G5	S2	PE	09-07-89	B
	557	G5	S2	PR	08-19-90	D
	569	G5	S1	TU	05-09-95	E
SPECIAL ANIMALS:	501	G3	S2	PE	07-19-90	E
	505	G3G4	S1S2	N	05-10-96	B
	546	G4G5	S2S3	N	05-22-87	B
	572	G4G5	S2S3	N	05-10-96	E
OTHER:						

Reading Quadrangle:

The heart of Berks County is covered by the Reading quadrangle. The Reading Prong extends onto the northeast corner of the map. The remaining northern half of the map is in the Great Valley and the southern half is in the Triassic Lowlands.

SP525 (Lower Alsace Twp.) "Antietam Reservoir Site" SP525 marks a fair population of a state-rare plant growing near Antietam Reservoir in Lower Alsace Township on property owned by the city of Reading. Although the area is safe from development, trampling by hikers who use a nearby nature trail could be a problem. To avoid this unnecessary disturbance, trail-maintenance crews should avoid re-routing the trail through the population and cutting trees and brush in the area. The land manager is aware of the population and working to protect it.

SP540, SP555, SP569, SA505, SA546, SA572 (City of Reading, St. Lawrence and Mt. Penn Boroughs, Cumru, Lower Alsace, and Exeter Twps.) "Neversink Mountain" NEVERSINK MOUNTAIN located in the City of Reading, the Boroughs of St. Lawrence and Mt. Penn, and the Townships of Cumru, Lower Alsace, and Exeter, provides habitat for two rare butterflies (SA505 and SA546). While in the larval form, these two species feed on wild indigo (Baptisia tinctoria) and beardgrass (Schizachyrium scoparium), respectively. These plants thrive in the numerous dry openings on the mountain. The coincidental larval stages of the gypsy moth and the butterflies render all three species vulnerable to the same control measures. Therefore, it is extremely important that gypsy moth spray programs avoid the powerline corridor where the butterflies and the food plants occur and that control measures be confined to the oak woodlands. In addition, clearings must be kept open to promote the food plants but the use of herbicides should be minimized and mechanical control encouraged.
SP555, a state-threatened plant, has only been found at one site, a dry, open southwest-facing slope on Neversink Mountain in Lower Alsace Towhship. This species thrives in open areas dominated by

herbaceous vegetation and low shrubs. These small openings can be kept open by mowing and brush clearing. Logging of the steep slopes where the plant grows should be avoided.
A new plant species of concern, SP569, was found here in 1995. This species was found growing on an abandoned quarry now occupied by an open woodland of small trees and shrubs, including chestnut oak, sweet birch, sassafras, sugar maple, white pine, mountain laurel, and blueberry. The site has been burned repeatedly in the past. The top of the quarry has a good view of Reading to the north, and the site is crossed by hiking and motorbike trails. Limiting use of the area to foot traffic would preserve the scenic qualities of the site as well as help stop the erosion which threatens the species of concern. A good to fair-quality population of another PA- Endangered plant, SP540, was found in 1993 on a disturbed south-facing slope of Neversink Mountain, overlooking the Schuylkill River. The plant occurs along a roadside, and shading from the exotic tree species Tree-of-Heaven (Ailanthus altissima) is a potential threat.
Another portion of Neversink Mountain was revisited in 1996. An animal species, SA505, which has been known from the site for over forty years, was still present. A second animal species of concern, SA572, was observed for the first time during this survey. These species are dependent on open habitat maintained by the powerline R.O.W. Invasion by exotic shrub species is ongoing and a potential threat.

SP534 (Robeson Twp.) "Seyfert Canal Site" A new Pennsylvania endangered plant species of concern (SP534) was found along the canal in 1991. This plant is found in wet areas along the canal and is associated with other species such as *Sparganium eurycarpum, Lemna spp., Ludwigia palustris, Eleocharis acicularis and Boehmeria cylindrica*. Disturbances to this site include a nearby ATV trail. Moist conditions should be maintained for the benefit this species.

SA501 (Cumru Twp.) "Angelica Creek Watershed" SA501 marks a small remnant population of a Pennsylvania-Endangered animal surviving in the drainage area of a small tributary of Angelica Creek. Most of the watershed to the south is protected as a part of **Nolde Forest State Park**. The animal has been known from this site since the 1950's and, even with the encroachment of housing, has managed to maintain a foothold. Further development along the creek threatens to diminish the small amount of remaining suitable habitat. At present, there is little or no natural buffer vegetation between the stream and bordering lawns and gardens. We suggest that the Berks County Conservation District and Nolde Forest State Park personnel launch a program to inform residents along the creek of the importance of the species and to encourage planting of a vegetation buffer zone between the creek and adjacent yards.

SP528 (Exeter Twp.) "Neversink Cemetary Site" SP528, a species currently under review to determine its status in Pennsylvania, grows in Forest Hills Cemetery in Exeter Township. The very small C-ranked population occurs in a small limestone woodland on the cemetery property. The woodland harbors small patches of native vegetation despite rampant exotic species invasion. Careful control and removal of exotic species may ensure the continued existence of SP528 at the site.

SP557 (Exeter Twp.) "Feiffton South Settling Basin Site" SP557 marks a small population of a state-rare sedge growing on the dry gravel slope of an old coal siltation basin in Exeter Township with slender cottonweed (Froelichia gracillis), buttonweed (Diodia teres), large crabgrass (Digitaria sanguinalis), few-flowered burgrass (Cenchrus pauciflorus), and yellowish wild bean (Strophostyles helvola). Protecting a species in such a highly-disturbed setting is problematic. At this time, PSO staff recommend that a local botanist monitor the population.

A small aquatic plant (SP552) is found on the rocks in Allegheny Creek in Robeson Township where it was first reported in the 1940's and relocated in 1990. The plant is under consideration for listing as a species of special concern. The creek, below the Green Hills Reservoir in Robeson Township, is a high-

quality creek with clear, clean water. Robeson Township should avoid over-development of the watershed which will jeopardize the creek and its biota. Planting a buffer zone of native trees and shrubs along the creek can provide shade to the creek, trap sediments, and prevent bank erosion.

The **Tulpehocken Creek Valley County Park** is an important managed area for open space recreation.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
READING QUADRANGLE
PENNSYLVANIA—BERKS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
Antietam Reservoir Watershed
Antietam Reservoir Site
SP525
Neversink Mountain
SP540 SP569 SP555
SA505 SA546 SA572
SP528
Neversink Cemetery Site
SP557
Reiffton South
Settling Basin Site
SP534
Seyfert Canal Site
Angelica Creek Watershed
SA501
Allegheny Creek At Seidel Hill
Mapped, edited, and published by the Geological Survey
Control by USGS, NOS/NOAA, and USCE
Topography by photogrammetric methods from aerial photographs taken 1947. Field checked 1955
Polyconic projection. 10,000-foot grid ticks based on Pennsylvania coordinate system, south zone. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue
1927 North American Datum
Vertical datum on the predicted North American Datum 1983
To obtain the projection lines 6 meters south and 30 meters west as shown by dashed corner ticks
Red tint indicates areas in which only landmark buildings are shown
There may be private inholdings within the boundaries of the National or State reservations shown on this map
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
ROAD CLASSIFICATION
Heavy duty
Light duty
Medium-duty
Unimproved dirt
Interstate Route
U.S. Route
State Route
PENNSYLVANIA
QUADRANGLE LOCATION
READING, PA.
40075-C8-TF-024
1956
PHOTOREVISED 1983
DMA 5864 IV SW—SERIES V851

USGS QUADRANGLE MAP: Elverson (101)

	Code	TNC Ranks* Global	TNC Ranks* State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	527	G5	S3	N	06-03-87	B
SPECIAL PLANTS:	503	G3	S3	PT	06-03-02	AB
	510	G5	QS3	PR	03-27-03	CD
	529	G3	S2	PT	05-21-93	B
	532	G5	S1	PE	09-20-93	B
	533	G5	S2	N	09-18-00	C
	535	G5	S2	TU	07-15-90	C
	540	G5	S2	N	09-18-00	C
	541	G5	S2	TU	09-09-90	D
	552	G5	S2	TU	09-09-90	C
	553	G5	S1S2	TU	07-15-90	D
	558	G?	S1	TU	07-18-92	BC
	559	G5	S2	PT	07-18-92	CD
	560	G5	S3	TU	07-18-92	BC
	561	G5	S3	TU	09-20-93	C
	563	G5	S2	PT	10-07-94	C
	570	G5	S1	PE	10-07-94	CD
SPECIAL ANIMALS:	505	G4	S2	N	07-12-97	E
	525	G4	S3	N	07-12-97	E
	572	G3	S2	PE	09-20-95	E
	597	G3	S2	PE	06-17-00	CD
	600	G3	S2	PE	07-29-97	E
	614	G3	S2	PE	07-09-00	E
	615	G3	S2	PE	07-09-00	E

OTHER: French Creek State Park, Birdsboro Reservoir Watershed, State Game Lands 43, Hopewell Village National Historic Site, Rock Church Swamp, Cold Run Seeps, French Creek, Sixpenny Creek.

Elverson Quadrangle:

Berks County extends across the northwestern half of the Elverson quadrangle. Most of this area is in the Triassic Lowlands, however, Mt. Pleasure in French Creek State Park and Thomas Hill in State Game Lands 43 are underlain by the resistant Chickies quartzite of the Piedmont Uplands. Pine Swamp which lies between the two hills is underlain by the less resistant sandstones and shales of the Stockton Formation of Triassic age.

SP535, SP552, SP553, SA505, SA525, SA572, SA600, SA614, SA615 (Scarlets Mill, Robeson, and Caernarvon Twps.) "Beaver Run/Hay Creek Watershed" Three plant species of special concern grow in this watershed. SP535 and SP553 mark fair and poor populations, respectively, of two wildflower species under consideration for state-listing that grow along an abandoned railroad track in dry, open conditions. SP553 grows at the base of a rock outcrop in association with orange-grass (Hypericum gentianoides), bird's-foot violet (Viola pedata), frostweed (Helianthemum canadense), beard grass (Schizachyrium scoparium), and hair-like bulbostylis (Bulbostylis capillaris). SP535 grows in three open areas adjacent to the tracks in association with wild sensitive plant (Cassia nictitans), smooth tick-trefoil (Desmodium

laevigatum), dwarf sumac (Rhus copallina), Queen Anne's-lace (Daucus carota), Canada goldenrod (Solidago canadense), and others. For the time being, the plants appear secure. SP552, a fair population of a wildflower under consideration for state-listing, grows in an abandoned cow pasture along a branch of Hay Creek with beardgrass (Andropogon glomeratus), short-hairy goldenrod (Solidago puberula), and bastard toadflax (Comandra umbellata) among others. The wildflower, capable of surviving grazing, could be threatened by succession unless the field is periodically mowed.

Several PA-Endangered animal species (SA572, SA600, SA614, SA615) have been observed in this watershed from 1995 - 2000. Suitable habitat is available throughout this watershed but little is known about the status of this species in this habitat. Further surveys are needed to locate the most suitable habitat and to look for more individuals. The greatest current threat to these populations is housing developments. Many of the current landowners are selling their properties and developments are planned. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here. This species is also threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of the creeks, and illegal filling of the marshes present threats.

Two other animal species of concern (SA505, SA525) were identified in this watershed in 1997. These animals prefer wet meadow habitats and are associated with species such as (Wallengrenia otho), (W. egeremet), (Euphydryas phaeton), (Satyrodes appalachia), (Euphyes conspicuus), (Pompeius verna), and (Speyeria cybele). Yearly mowing at the site maintains habitat for these species. In 1997, the site was up for sale and a change in ownership may lead to less favorable habitat conditions for these animals.

SP510, SA597 (Caernervon, Brecknock, Honeybrook Twps.) "Conestoga River Watershed" An PA Endangered animals species (SA597) was discovered here in 2000. This species was found in a wetland with tussock sedge (Carex stricta), cattails (Typha latifolia), watercress (Nasturtium officinale), grasses and forbs. More surveys must be completed to determine the extent of the population. This site is threatened by a proposed shopping center complex. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here.

A plant species of concern (SP510) was discovered in State Game Lands #52. Though this plant is actually located on the Morgantown Quad, it falls within the Conestoga River Watershed. This Pennsylvania rare plant requires moist, shaded conditions and is easily overlooked.

SP529 (Twp.) "Birdsboro Seeps" A fair population (SP529) of a state-endangered grass grows with cinnamon fern, skunk cabbage, and scattered spicebush in the numerous seeps and streamlets that flow north into the Birdsboro Reservoir in Robeson and Union Townships. Restrictions on logging and other activities that would degrade the water quality of the reservoir will double as protection for the grass species. A new subpopulation for this PA-Endangered grass species was found at this site in 1993. The quality of the population has been upgraded to good, and continued protection of the Birdsboro Reservoir Watershed should help to protect this species as well.

SP559 (Union Twp.) "Sixpenny Creek" “Sixpenny Lake” A PA-Threatened plant species was discovered in July 1992 growing on the drained sandy lakebed of Sixpenny Lake. Sedges, rushes, and bulrushes are the dominant vegetation. The viability of the habitat for this species will be affected by changes in the lake level. No map is included, as this site falls within the existing boundaries of the Sixpenny Creek Watershed.

SP541 (Twp.) "Hopewell Lake Swale" A small population of a rush (SP541) whose status is currently under consideration grows in two ditches at the upper end of Hopewell Lake in French Creek State Park in

Union Township. These man-made wet areas provide suitable habitat for this Coastal Plain species and an assortment of wetland plants including sallow sedge (Carex lurida), wool-grass (Scirpus cyperinus), seedbox (Ludwigia alternifolia), beggar-ticks (Bidens frondosa), sharp-fruited rush (Juncus acuminatus), and small-headed beaked rush (Rhynchospora capitellata). Over-mowing of the ditch bank could harm the plant species of concern. On the other hand, some mowing is needed to prevent succession. This should occur one to two times a year before the plant has begun to grow or after it has set seed.

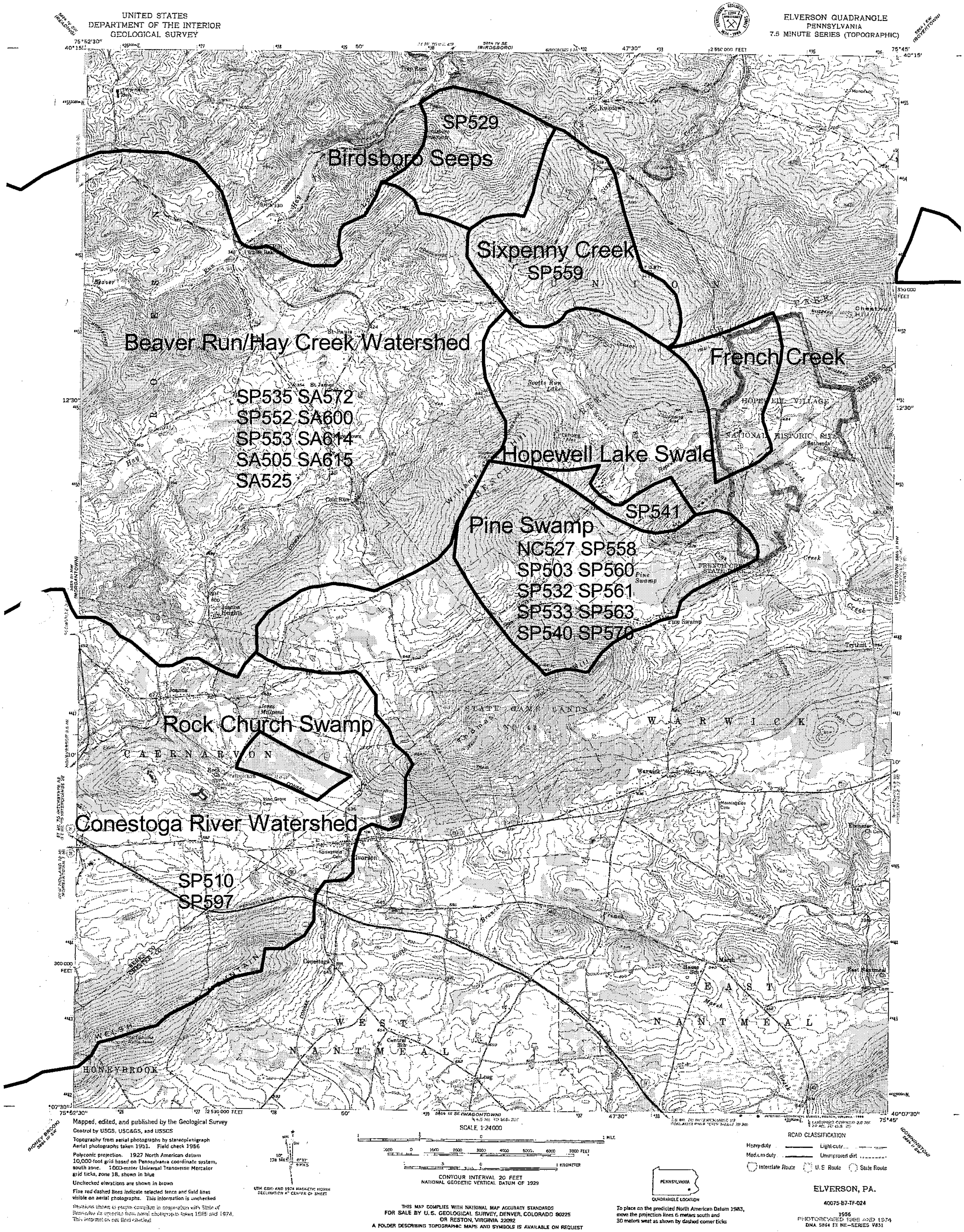
NC527, SP503, SP532, SP533, SP540, SP558, SP560, SP561, SP563, SP570 (Union Twp.) "Pine Swamp" PINE SWAMP provides a good example of an Acidic Broadleaf Swamp (NC527) in which an excellent population of a state-endangered grass (SP503) grows. This large (200-acre) acidic to weakly circumneutral seepage swamp on mucky soils is dominated by red maple (Acer rubrum), black ash (Fraxinus nigra), and swamp white oak (Quercus bicolor) with southern arrow-wood (Viburnum dentatum) and spicebush (Lindera benzoin) as common shrubs and skunk cabbage (Symplocarpus foetidus) an abundant herb. Vegetated hummocks and mucky channels are characteristic features. Nearby, a boggy, somewhat hummocky pasture with dense herbaceous vegetation supports a good population of a state-endangered nutrush (SP533) and an excellent population of a state-rare wildflower (SP532). The plant species of concern, SP532 was revisited in 1993. Fewer individuals were observed and the quality ranking was changed from excellent to good. A small population of SP561 was discovered at this site for the first time. No immediate threats to either species are apparent.
Several other plant species of concern are located at this site. SP540 and SP560 are rush and sedge species that thrive in the wet conditions of the marsh. SP558 is a grass species growing in the area. SP563 and SP570 are two woody species that are threatened and endangered in Pennsylvania.
A diverse fauna inhabits the large swampy area. During one five and a half hour period in July of 1985, over 25 bird species were casually heard or seen in Pine Swamp and adjacent areas where they were probably breeding. In addition, at least four fish species, one species of water snake, and three frog species were sighted or captured in Pine Creek. The swamp also supports a large number of white-tailed deer.
The large, relatively undisturbed nature of Pine Swamp in combination with the occurrence of nine plant species of special concern and numerous animal species within its borders make the extensive wetland a top priority for protection. While the northwestern part of the swamp is protected by **French Creek State Park**, the remaining acres are privately-held. Efforts should be made to preserve as much land as possible.

ROCK CHURCH SWAMP is a large wetland of local significance. The wetland occurs in a broad flat area underlain by diabase southwest of Thomas Hill. The waters influencing the vegetation are enriched as a result of the mineral composition of the underlying bedrock. A 50' canopy of mature red maple, swamp white oak, green ash, and pin oak and a diverse shrub layer of spicebush, southern arrow-wood, winterberry (Ilex verticillata), high-bush blueberry (Vaccinium corymbosum), alder (Alnus serrulata), and silky dogwood (Cornus amomum) characterize the swamp. The herb layer is diverse with assorted grasses (Cinna arundinacea, Glyceria sp.), sedges (Carex stricta), skunk cabbage, and bog hemp (Boehmeria cylindrica) forming tussocks or growing on hummocks. Aquatics such as spatterdock (Nuphar lutea), bur reed (Sparganium sp.), and starwort (Callitriche sp.) are common. The area may harbor rare plants but further searching is necessary. The swamp provides excellent habitat for a diversity of birds. During a spring visit, several wood ducks were observed. The once-extensive wetland has been reduced in size because of draining. A large ditch and several smaller ditches occur towards the eastern end of the swamp. We encourage local landowners, county or township government, and the Berks Conservancy to work towards protecting the swamp.

COLD RUN SEEPS refers to a series of small springs emanating from a northwest-facing slope underlain by conglomerate southwest of Cold Run. The surrounding forest is typical of the region consisting of a 70' canopy of mature beech (Fagus grandifolia), tulip tree (Liriodendron tulipifera), black birch (Betula lenta), red maple, and white oak (Quercus alba). The seeps are small, discrete wetlands fed by groundwater. Spicebush and elderberry (Sambucus canadensis) are dominant shrubs. Skunk cabbage, golden saxifrage (Chrysosplenium americanum), and mosses cover the mucky substrate. The seeps are significant for the biological diversity they add to the communities of the region and for scenic value.

In Union Township, Sixpenny Creek and its basin from its source to, and including, the unnamed tributary at RM 1.28 are designated as High Quality - Cold Water Fisheries. In addition, French Creek is a High Quality - Cold Water Fishery from its source to the Chester County line.

Managed areas include **Hopewell Village National Historical Site**, **French Creek State Park**, **Birdsboro Reservoir Watershed**, and **State Game Lands 43**.



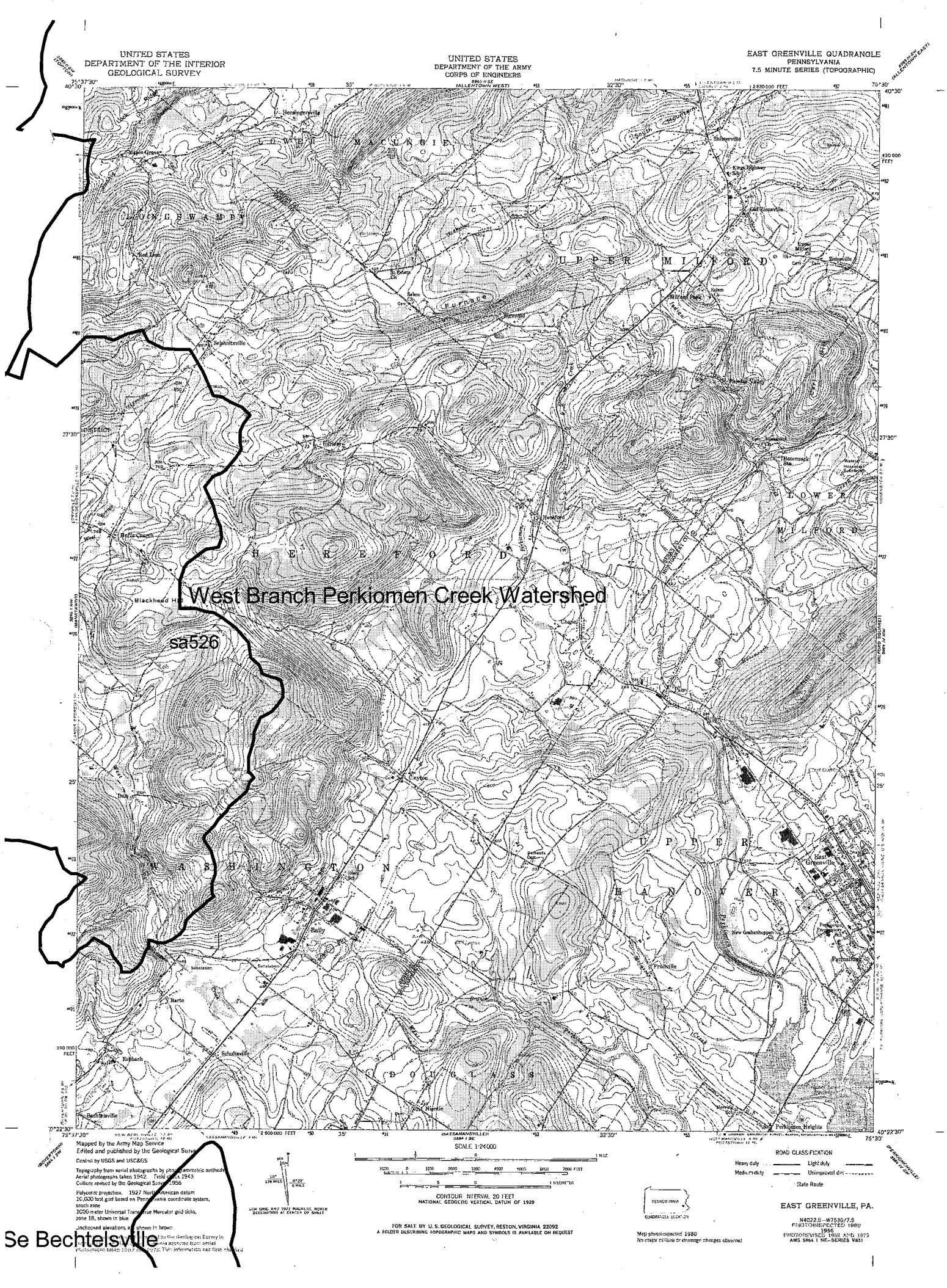
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
ELVERSON QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SP529
Birdsboro Seeps
Sixpenny Creek
SP559
Beaver Run/Hay Creek Watershed
French Creek
SP535 SA572
SP552 SA600
SP553 SA614
SA505 SA615
SA525
Hopewell Lake Swale
SP541
Pine Swamp
NC527 SP558
SP503 SP560
SP532 SP561
SP533 SP563
SP540 SP570
Rock Church Swamp
Conestoga River Watershed
SP510
SP597
Mapped, edited, and published by the Geological Survey
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
ROAD CLASSIFICATION
ELVERSON, PA.

USGS QUADRANGLE MAP: East Greenville (75)

	Code	TNC Ranks* Global	State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	None identified					
SPECIAL PLANTS:	None identified					
SPECIAL ANIMALS:	None identified					
OTHER:	sa526; see Manatawny quadrangle					

East Greenville Quadrangle:
sa526 (Twp.) "West Branch Perkiomen Creek Watershed" see Manatawny quadrangle for species descriptions.

Little Lehigh Creek is designated as a High-Quality Coldwater Fishery by PA DER. Its watershed continues onto this map from the adjacent Manatawny quadrangle.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
EAST GREENVILLE QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
LOWER MACUNGIE
UPPER MILFORD
LOWER MILFORD
HEREFORD
WASHINGTON
UPPER HANOVER
DOUGLASS
West Branch Perkiomen Creek Watershed
sa526
Se Bechtelsville
Mapped by the Army Map Service
Edited and published by the Geological Survey
Control by USGS and USC&GS
Topography from aerial photographs by photogrammetric methods
Aerial photographs taken 1942. Field check 1943
Culture revised by the Geological Survey 1956
Polyconic projection. 1927 North American datum
10,000 foot grid based on Pennsylvania coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue
Unchecked elevations are shown in brown
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
ROAD CLASSIFICATION
Heavy duty
Light duty
Medium duty
Unimproved dirt
State Route
EAST GREENVILLE, PA.
N4022.5—W7530/7.5
PHOTOINSPECTED 1980
1956
PHOTOREVISED 1968 AND 1973
AMS 5864 I NE—SERIES V881
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
Map photoinspected 1980
No major culture or drainage changes observed

USGS QUADRANGLE MAP: Terre Hill (97)

	Code	TNC Ranks* Global	TNC Ranks* State	State Status	Last Seen	Quality**
NATURAL COMMUNITIES:	524	G?	S3?	N	06-02-93	C
SPECIAL PLANTS:	530	G5	S2	PT	06-02-93	B
SPECIAL ANIMALS:	534	G5	S2	PE	05-21-92	BC
	607	G5	S2	PE	05-14-98	C
	608	G5	S2	PE	05-22-98	C
	609	G5	S2	PE	05-26-98	BC
	610	G5	S2	PE	05-22-98	BC

OTHER:

Terre Hill Quadrangle:

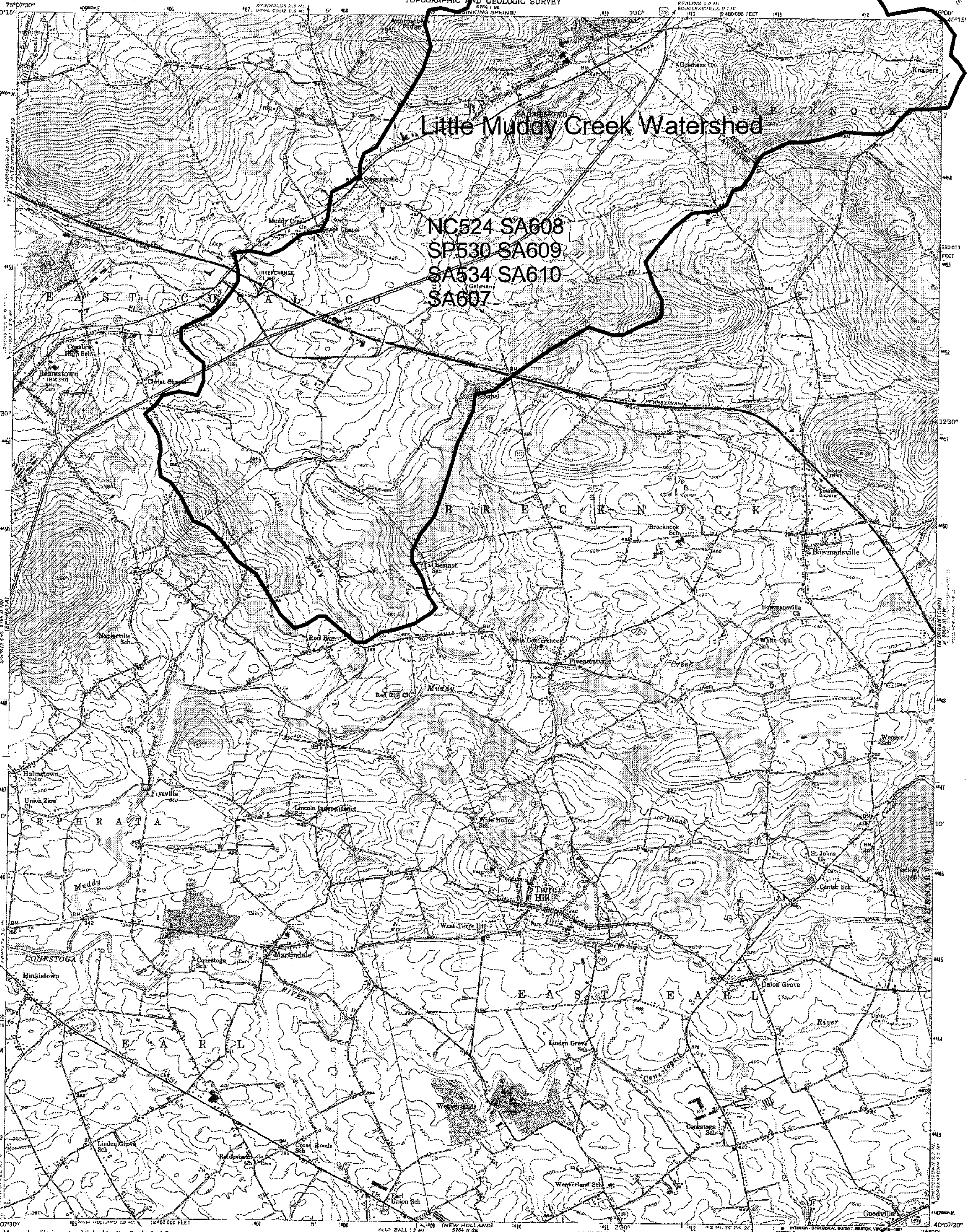
NC524, SP530, SA534, SA607, SA608, SA609, SA610 (Spring, East Cocalico and Brecknock Twp.) "Little Muddy Creek Watershed" NC524 marks a fair quality Circumneutral Seep community south of Goose Lane in Spring Township. The bedrock underlying the area is diabase, or traprock, which is high in magnesium and iron. The nutrient-rich waters and soils associated with diabase bedrock give rise to a diverse wetland flora and at least two rare plants have been reported from the area in the past. Swamp dewberry (Rubus hispidus), sedges (Carex spp.), marsh fern (Thelypteris palustris), jewelweed (Impatiens capensis), and peat moss (Sphagnum spp.) dominate the seep with clammy azalea (Rhododendron viscosum), silky dogwood (Cornus amomum), swamp rose (Rosa palustris), poison sumac (Toxicodendron vernix), and red chokeberry (Aronia arbutifolia) forming a shrubby border. A red maple (Acer rubrum)/skunk cabbage (Symplocarpus foetidus) swamp surrounds part of the seep. Although the seep is in relatively good shape, the surrounding areas are badly degraded. The landowner appears to be amenable to protecting the seep and should be encouraged.

Goose lane seep was revisited in June 1993. The community remains intact and as previously described. A new plant species of concern, SP530, was also discovered. This is a large population with many fertile individuals. No special management is recommended for the seep community or the species of concern.
Several Pennsylvania endangered animal species of concern were found in this watershed in 1992 and 1998 (SA534, SA607, SA608, SA609, SA610). These animals were found in marshes with associated vegetation such as skunk cabbage (Symplocarpus foetidus), reed canary grass (Phalaris arundinacea), sensitive fern (Onoclea sensibilis), cattails (Typha latifolia), tussock sedge (Carex stricta), and jewelweed (Impatiens capensis). This species is threatened by natural succession that could dramatically change the small habitat areas. Annual monitoring is necessary to track vegetation changes and population trends. Pollution of the watershed from distant sources or local road and storm sewer runoff, ditching of the marsh for drainage, channelization of Muddy Creek, and illegal filling of the marshes present threats. Possibly the greatest current threat is housing developments. An adequate buffer zone between the wetland and any development is needed to ensure the survival of the species here.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY

TERRE HILL QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USSCS

Topography from aerial photographs by photogrammetric methods. Aerial photographs taken 1951. Field check 1956

Polyconic projection. 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, south zone

Unchecked elevations are shown in brown

1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

To place on the predicted North American Datum 1983, move the projection lines 6 meters south and 29 meters west as shown by dashed corner ticks

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty — Light-duty

Medium-duty — Unimproved dirt

U.S. Route — State Route

Interstate Route

TERRE HILL, PA.

40076-B1-TF-024

1956
PHOTOREVISED 1987
DMA 5764 II NE-SERIES V831

Revisions shown in purple compiled in cooperation with Commonwealth of Pennsylvania agencies from aerial photographs taken 1983 and other source data. This information not field checked. Map edited 1987