A NATURAL AREAS INVENTORY OF SCHUYLKILL COUNTY, PENNSYLVANIA 2003

Submitted to:
The Schuylkill County Conservation District
1206 Ag Center Drive
Pottsville, PA 17901

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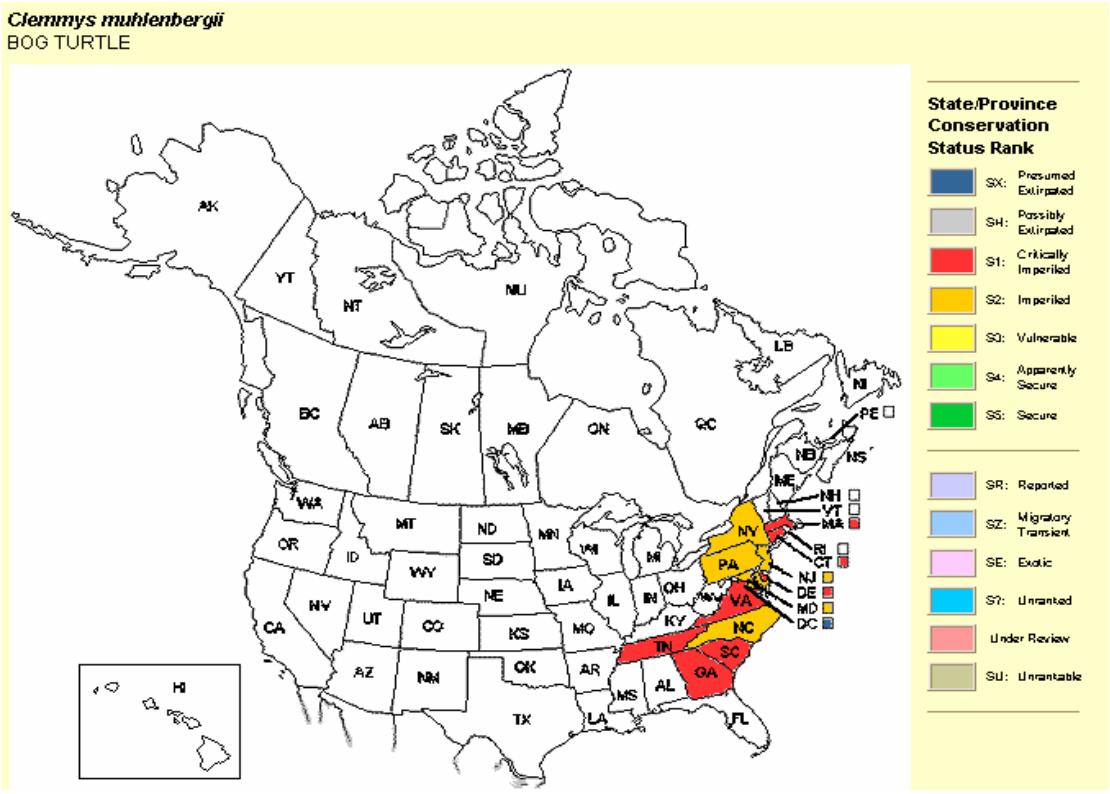
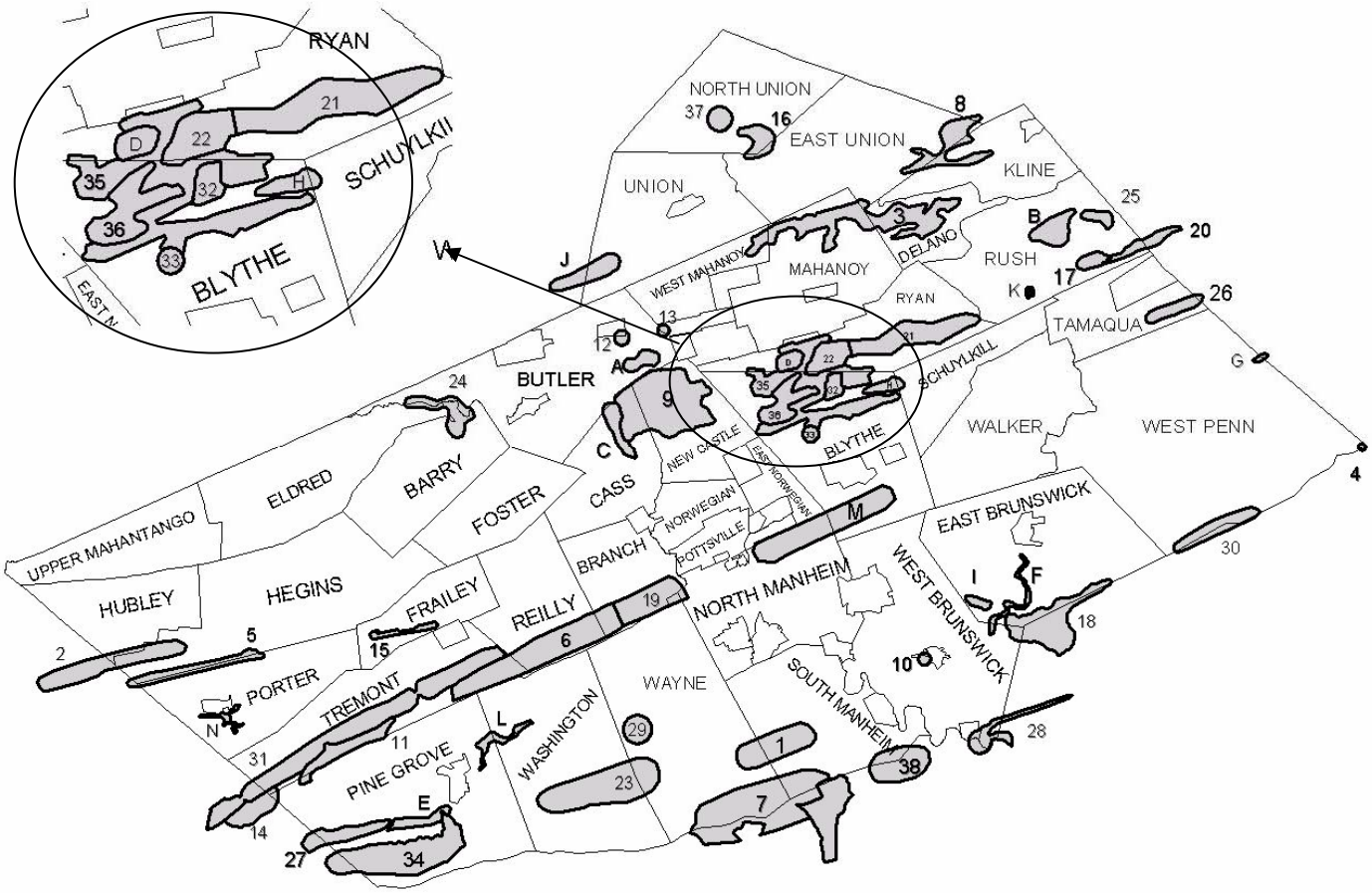
Bog Turtle (*Clemmys muhlenbergii*)

The populations of the Federally-Endangered Bog Turtle (*Clemmys muhlenbergii*), documented in Schuylkill County for the first time as the result of this study, are an essential component in the limited distribution of this species. The loss and degradation of wetland habitats favored by this turtle continues to threaten this species long-term survival.
(Photo by the PA Science Office of The Nature Conservancy)

The map below illustrates the known distribution of the bog turtle in North America. It is considered imperiled or critically imperiled in all the states in which it occurs.



Map provided by NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6 . Arlington, Virginia, USA: NatureServe. Available: http://www.natureserve.org/explorer. (Accessed: June 8, 2003).



Schuylkill County Natural Areas

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PREFACE

The Schuylkill County Natural Areas Inventory is a document compiled and written by the Pennsylvania Science Office of The Nature Conservancy. It contains information on the locations of rare, threatened, and endangered species and of the highest quality natural areas in the county; it is not an inventory of all open space. It is intended as a conservation tool and should in no way be treated or used as a field guide. Each Township section is prepared as a stand-alone document, which could be distributed within each Township. Consequently, the document as a whole may seem repetitive, as a single Natural Area may fall within several Townships. Accompanying each site description are general management recommendations that would help to ensure the protection and continued existence of these rare plants, animals and natural communities. The recommendations are based on the biological needs of these elements (species and communities). The recommendations are strictly those of The Nature Conservancy and do not necessarily reflect the policies of the state or the policies of the county or townships for which the report was prepared.

Managed areas such as federal, state, county and township lands, parks and private preserves are also provided on the maps where that information was available to us. This information is useful in determining where gaps occur in the protection of land with rare species, natural communities and locally significant habitats. The mapped boundaries are approximate and our list of managed areas may be incomplete, as new sites are always being added.

Implementation of the recommendations is up to the discretion of the landowners. However, cooperative efforts to protect the highest quality natural features through the development of site-specific management plans are greatly encouraged. Landowners working on management of or site plans for specific areas described in this document are encouraged to contact the Pennsylvania Science Office of The Nature Conservancy for further information.

Although an attempt was made through advertising, public meetings, research, and informal communications to locate the sites most important to the conservation of biodiversity within the county, it is likely that many sites were missed. Anyone with information on sites that may have been overlooked should contact the Schuylkill County Conservation District (see address on following page). This Natural Areas Inventory will be updated within five years, and additional sites may be included at that time.

ACKNOWLEDGEMENTS

This Natural Areas Inventory was funded in part by a state grant from the DCNR Wild Resource Conservation Fund. Additional support was also provided by the Department of Community & Economic Development, the Schuylkill County Conservation District, the Schuylkill County Conservancy, and six County Watershed Associations (Catawissa Creek, Mahanoy Creek, Northern Swatara Creek, Schuylkill Headwaters, Tri-Valley, & Wiconisco Creek Watershed Associations). Thanks to everyone who provided financial and administrative support for the inventory. Without your help, this study would not have been possible.

The species information utilized in the inventory came from many sources as well as our own field surveys. We wish to acknowledge all of those who carried out botanical and zoological survey work over the years. Without their contributions, this survey would have been far less complete.

The report benefited from the help of local naturalists and conservationists who gave generously of their time. Thanks to all the help and support given by Dave Barber, Laurie Goodrich & Todd Bauman of the Hawk Mountain Sanctuary. Patti Barber provided a compilation of bird records for the county. Craig Morgan of the Schuylkill County Conservation District provided site recommendations, landowner and soil survey information. Roland Bergner of the Pennsylvania Game Commission provided maps, access and site suggestions to Game Commission property, as well as bird and reptile observation records. Rick Koval & Allan Gregory proved to be excellent resources for herpetological sites. David Kruel provided information on bird & bat records in the county. Jay Drasher, Pat McEllenny & Tim Draude all provided excellent professional information on sites of species of concern. The Schuylkill County Tax Office provided us with a GIS layer of property boundaries, which saved us a great amount of time researching property ownership. Thanks to the many other private citizens who contacted our office with information on natural areas.

Many thanks to everyone who participated in the Technical Advisory Committee by reviewing the draft Natural Areas Inventory report. Finally, we especially wish to thank the many landowners that granted us permission to conduct inventories on their lands. The task of inventorying the natural heritage of Schuylkill County would have been far more difficult without this tremendous pool of information gathered by many people over many years.

Copies of this document may be obtained from:

The Schuylkill County Conservation District
1206 Ag Center Drive
Pottsville, PA 17901

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Maps are not provided for those Townships where no species of concern, exceptional natural communities, or locally significant sites were identified.

Above: Ridgetop Dwarf-tree Forest on Bears Head, Blythe Township, one of the top priority sites for conservation of biological diversity in Schuylkill County.

Below: The tall white spires of fly-poison (*Amianthemum muscaetoxicum*), a member of the lily family, are a frequent component of this habitat. Though not rare itself, this plant is the host for the larval stage of the fly-poison borer moth (*Papaipema species #1)*, currently only known to occur in Pennsylvania.
(Photos by the PA Science Office of The Nature Conservancy)

INTRODUCTION

Schuylkill County, which comprises nearly half a million acres, was named for the Schuylkill River, and formed in 1811 from parts of Berks and Northampton Counties (Schuylkill County Cooperative Extension 2002). While approximately 20% of the county's lands are in agricultural production, the landscape has been dominated by the extraction of anthracite coal found in abundance in two broad bands trending through the center of the county. The coal industry provided jobs and opportunity to new European immigrants eager to better their lives and those of their children, but left a highly disturbed landscape in its wake. Tailings and spoils from mining operations cover vast expanses of the county, many of which were abandoned before the establishment of regulations requiring reclamation of surface mines. Although coal mining as an industry has been in decline in recent decades, Schuylkill County remains the repository of a large anthracite coal reserve (Schuylkill County Cooperative Extension 2002).

Despite the obvious disturbance of the landscape by two centuries of resource extraction, several large, high-quality environments remain virtually undisturbed in Schuylkill County. Early community planners showed great insight by securing large, undeveloped mountain slopes and valleys that were undisturbed by mining activities for the watershed resources within the county. Many of these watersheds now represent Schuylkill County's best natural areas. Several of these watersheds are in a near pristine condition with relatively little disturbance from invasive species, past logging operations, or inroad fragmentation. Recent regulations regarding the mandatory treatment of drinking water has prompted some water companies to view their large watershed lands as unnecessary. In the event that any of these lands are considered for sale, every effort should be made to secure for conservation purposes those sites with the best ecological integrity.

The natural areas of Schuylkill County are used for boating, hunting, fishing, hiking, biking, birdwatching, and other activities that make the region an attractive place to live. The same pieces of the landscape that provide scenic and recreational opportunities also function as habitat for a great diversity of plants and animals, including rare, threatened and endangered species. This Natural Areas Inventory documents examples of intact natural communities and sites for species rarely found in the state or the world.

Schuylkill County's population fell from 200,577 in 1950 to 150,336 in 2000 (US Bureau of Census 2000). Despite the overall decline in population, there has been an increase in the amount of land altered by human activities, with a marked increase of development pressure in scenic and rural areas. Ironically, as the footprint of human altered landscape increases, the scenic and remote nature of these areas may make them prime targets for residential developments. The natural areas that comprise the natural heritage of Schuylkill County can be easily lost without careful planning of growth and development. Protecting the integrity of these natural systems provides benefits to humans as well as providing for the survival of wildlife, rare and otherwise. Careful planning can maintain open space, including natural environments and the plants and animals associated with them. A balance between growth and the conservation of scenic and natural resources can be achieved by guiding development away from the most environmentally sensitive areas. The reclamation of previously disturbed areas for commercial, residential and industrial development

presents a logical way to accommodate economic growth while allowing ecologically sensitive areas to remain undisturbed.

In order to achieve such a balance and ensure protection of critical natural areas, county and municipal governments, the public, and developers must know the locations and importance of these sites. This knowledge can help prevent conflicts over land use as well as help to direct conservation efforts and limited conservation dollars to the most vulnerable areas. The Pennsylvania Science Office of The Nature Conservancy, under contract with the Schuylkill County Conservation District, has undertaken this project to provide a document and maps that will aid in the identification of these important areas.

The Natural Areas Inventory report presents the known outstanding natural features—floral, faunal and geologic in Schuylkill County. The Inventory provides maps of the best natural communities (habitats) and all the known locations of animal and plant species of special concern (endangered, threatened, or rare) in Schuylkill County. The maps do not pinpoint the site of the species of concern but rather represent a zone of potential impacts within the site's watershed. A written description and a summary table of the sites, including quality, degree of rarity, and last-observed date, accompany each map. Potential threats and some suggestions for protection of the rare plants or animals at the site are included in many of the individual site descriptions.

Particular species names, common and scientific, are provided in coordination with the appropriate jurisdictional agency. Plants and terrestrial invertebrate animals are under the jurisdiction of the PA Department of Conservation and Natural Resources (DCNR). Mammals and birds are under the jurisdiction of the PA Game Commission (PGC). Aquatic animals are under the jurisdiction of the PA Fish and Boat Commission (PFBC), and are subject to unauthorized collection. They are therefore not identified in the text of this report in order to provide some measure of protection for the species.

Selected geologic features of statewide significance are also noted. In addition, the inventory describes locations of areas that are significant on a county-wide scale, but were not recognized as exemplary natural communities since no species of concern are known from recent survey efforts. These "Locally Significant" sites represent good examples of habitats that are relatively rare in the county, support an uncommon diversity of plant species, and/or provide valuable wildlife habitat on a local level.

The information and maps presented in this report provide a useful guide for planning development and parks, for conserving natural areas, and for setting priorities for the preservation of the most vulnerable natural areas. An overall summary identifies the highest quality sites in the county. All of the sites in this report were evaluated for their importance in protecting biological diversity on a state and local level, but many also have scenic value, provide water quality protection, and are potential sites for low-impact passive recreation, nature observation and/or environmental education.

The Natural Areas Inventory will be provided to each municipality through the Schuylkill County Conservation District. The inventory is one tool that will aid in the creation of municipal and county and comprehensive plans, and the emphasis on biological diversity should inform county and regional open space plans already underway. Schuylkill County, its municipalities, land trusts,

and other organizations can also use the Natural Areas Inventory to identify potential protection projects that may be eligible for funding through state or community grant programs such as Growing Greener. Landowners will also find this inventory useful in managing and planning for the use of their land; it gives them the opportunity to explore alternatives that will provide for their needs and still protect the species and habitats that occur on their land. For example, the Forest Stewardship program, coordinated by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, assists landowners in creating management plans. This plan is developed based on landowner objectives (e.g., wildlife or timber management). Land managers may wish to consult this report and the Pennsylvania Natural Diversity Inventory (PNDI) in an effort to avoid potential conflicts in areas with species of special concern and/or identify ways of enhancing or protecting this resource. Users of this document are encouraged to contact the Pennsylvania Science Office of The Nature Conservancy for additional information (717) 948-3962.

Questions regarding potential conflicts between proposed projects and species of concern mentioned in this report should be directed to the Environmental Review Specialist at the PNDI Office in Harrisburg (717) 772-0258.

NATURAL HISTORY OVERVIEW OF THE COUNTY

The climate, geology, topography, and soils have been important in the development of the ecosystems (forests, wetlands, etc) as well as other natural features (e.g., streams and geologic features) in Schuylkill County. Both natural and human disturbances have played an important role in the development and alteration of these ecosystems and have caused the extirpation of some species and the introduction of others. These combined factors provide the framework for locating and identifying exemplary natural communities and species of special concern in the county. The following sections provide a brief overview of the physiography, geology, soils, surface water, and vegetation of Schuylkill County.

• Physiography and Geology

The characteristic landscapes and distinctive geologic formations classify Physiographic Provinces. Physiography relates in part to a region's topography and climate. These two factors, along with bedrock type, significantly influence soil development, hydrology, and land use patterns of an area. Additionally, both physiography and geology are important to the patterns of plant community distribution, which in turn influences animal distribution. Because of the differences in climate, soils, and moisture regime, certain plant communities would be expected to occur within some provinces and not in others. Physiographic and geologic information was obtained from many sources including *Ground Water in Northeastern Pennsylvania* (Lohman 1957), *The Geology of Pennsylvania* (PA Geological Survey and Pittsburgh Geological Survey 1999), and *Physiographic Provinces of Pennsylvania* (Sevan 2000).

Schuylkill County is situated within the Ridge and Valley Physiographic Province, and is divided into the Anthracite Upland Section, the Blue Mountain Section & the Susquehanna Lowland Section (Sevan 2000). The Ridge and Valley Province has characteristic rock formations and topography. Historical geological events have repeatedly folded and eroded the land, resulting in a parallel series of relatively narrow valleys and even-topped ridges. The Southern Anthracite Coal Field trends northeast to southwest in two broad bands through the county. Tailings and spoils from mining operations cover vast expanses of the county, many of which were abandoned before the establishment of regulations requiring reclamation of surface mines. Water quality in the county has been severely impacted by these activities. Acid mine drainage and streams that disappear into underground mines bear visible evidence of this widespread pollution. Once streams enter mine openings, they seep into large underground pools, and force large volumes of acid mine drainage out other mine openings. Acid mine drainage (AMD) has severely impacted many of the waterways in the county, rendering them virtually sterile of life. Although coal mining as an industry has been in decline in recent decades, Schuylkill County remains the repository of a large anthracite coal reserve (Schuylkill County Cooperative Extension 2002).

The most striking physiographic features within the county are the plateau-like crest of Broad Mountain, which covers nearly 80 square miles in the center of the county (Wagner 1943), and Blue Mountain, which forms the boundary between Schuylkill County and it's neighbors to the south, Berks and Lehigh Counties. The wide crest of Broad Mountain spans from Tremont in the western part of the county, trending northeast towards Tamaqua and continuing into Carbon County, roughly coinciding with the course of Interstate I-81. This plateau includes Bears Head, the

county's highest peak. The rivers and creeks of Schuylkill County flow into two different drainage basins. Broad Mountain straddles the boundary between the Delaware and Susquehanna River drainage basins, supplying water to both. The eastern part of the county falls into the Delaware River drainage basin, while the western portion is in the Susquehanna drainage basin. This divide further influences the distribution of plants and animals that occur in the various areas of the county.

Blue Mountain forms part of the continuous Kittatinny Ridge, which trends southwesterly from southern New York and northwestern New Jersey, continuing through southeastern Pennsylvania and terminating near the Maryland border. The ridge is world renowned as a transportation corridor for migrating raptors and songbirds as well as for the movement of other biota in the northeastern United States. The ridge functions as an interstate greenway, linking many of southeastern Pennsylvania's most biologically important areas with each other. Without this resulting connectivity, these biologically rich areas would become functional islands in a sea of farmland, suburban development and other lands modified by human activity, effectively severing modes of reproductive mingling and dispersal for many species of plants and animals.

- **Soils**

A soil association is a group of soils with a distinctive, proportional pattern of occurrence in the landscape (USDA 1985). The soil associations for Schuylkill County have been described in *The Soil Survey of Schuylkill County* (USDA, 1982). There are five soil associations mapped for Schuylkill County. These include: **1**) The Leck Kill – Meckesville - Calvin Association, **2**) The Berks – Hartleton - Weikert Association, **3**) The Dekalb – Buchanan - Hazleton Association, **4**) The Udorthents – Dekalb - Hazleton Association, and **5**) Hartleton – Udorthents - Udults Association. Table 1 provides a more detailed description for each of the soil associations. More detailed information for each of the associations can be obtained by consulting the *Soil Survey*.

Table 1. Soil associations found in Schuylkill County.

Soil Association	Description	Percentage of County	Land Use
Leck Kill – Meckesville - Calvin Association	Gently sloping to moderately steep well-drained soils on uplands; formed from colluvial materials; underlain by sandstone, siltstone and shale.	25	Primarily used for farming and urban development. Some areas remain in woodland.
Berks – Hartleton - Weikert Association	Gently slopping to very steep well-drained soils on uplands; formed in residual material on uplands; underlain by sandstone, siltstone and shale.	18	Primarily used for farming and urban development.

Soil Association	Description	Percentage of County	Land Use
Dekalb – Buchanan - Hazleton Association	Gently slopping to very steep well-drained soils on uplands; formed in residual and colluvial materials on uplands; underlain by sandstone, conglomerate, siltstone and shale.	32	Primarily used as woodland, large stones limit many other uses.
Udorthents – Dekalb - Hazleton Association	Formed from sandstone, quartzite, conglomerate, shale and slate, and from materials stripped for coal mining.	20	Primarily used as woodland, large stones limit many other uses. Some small areas are used for urban development.
Hartleton – Udorthents - Udults Association	Formed from sandstone, siltstone, quartzite, conglomerate, shale and slate, and from materials stripped for coal mining.	5	Primarily used as woodland, large stones limit many other uses. Some small areas are used for urban development.

- **Vegetation**

Upland Forest Communities

The American chestnut (*Castanea dentata*) was once a dominant feature of the forests of Pennsylvania, but was virtually eliminated with the introduction to North America of the chestnut blight fungus (*Cryphonectria parasitica*) in 1904. Today, the intact second and third growth forest communities of Schuylkill County are described as the Appalachian Oak Forest (Bailey 1980 and D.J.Cuff et al 1989). This forest type is dominated by white oak (*Quercus alba*) and northern red oak (*Quercus rubra*). Additional dominant tree species include chestnut oak (*Quercus montana*), black oak (*Quercus velutina*), tulip poplar (*Liriodendron tulipifera*), beech (*Fagus grandifolia*), hickory (*Carya sp*.), sweet birch (*Betula lenta*), and white pine (*Pinus strobus*). Red maple (*Acer rubrum*) is becoming a dominant tree species in areas that have been recently disturbed. In Schuylkill County, examples of the Appalachian Oak Forest can be seen on Blue Mountain, Second Mountain, and Mahantango Mountain.

Broad Mountain and several adjacent ridges in north-central Schuylkill County are vegetated in a distinct "Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest". This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry

soils, high winds, repeated cutting and frequent fires limit the growth of trees. This forest type tends to grade into the more typical Appalachian Oak Forest as the elevation declines.

Though covering many ridgetop plateaus in the county and this part of the state, the Ridgetop Dwarf-tree forest is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus ilicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Pitch pine underlain by scrub oak is the dominant association on the higher elevations of Broad Mountain. Pitch pine is a very fire tolerant species of tree. When fire has killed the existing foliage, new growth is readily generated from lateral buds on the branches, giving trees exposed to repeated fires a 'bearded' appearance (Little 1979). Pitch pine seeds frequently remain firmly encased in the cones on the tree branches until the heat of fire releases them (Elias 1980). The seeds of pitch pine have been documented as much less likely to germinate within thick leaf and needle litter as on sites where the ground was cleared of litter by recent fire activity (Schopmeyer 1974).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered moth species that is (as of this writing) found only in Pennsylvania, and solely in these environments. This moth is dependent on the fly-poison plant during its larval stage of development, where it feeds on the roots of the plant.

The pitch pine - scrub oak woodland may have been more prevalent in this area of Pennsylvania before the advent of modern fire suppression techniques. These are disturbance-dependent ecosystems. Without periodic fires the scrub habitat would succeed to other hardwood species. Though other hardwood species may represent greater potential income as harvestable timber, these trees would not likely become economically large enough due to the harsh, droughty conditions of these sites. Naturally occurring fires should be allowed to burn on these remote ridge-top plateaus. Controlled burns may be prescribed in areas where the potential exists for property damage. To avoid potential conflict between property damage and an ecosystem adapted to periodic fire disturbance, it is recommended that wide conservation buffer zones be placed between the Ridgetop Dwarf-Tree Natural Communities and potential economic development areas. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now.

Hemlock (*Tsuga canadensis*) typically represents a major component of many habitats that include steep, north-facing slopes and cool, shaded ravines. The hemlocks cast a dense shade canopy that limits competition from species not adapted to these conditions. These habitats frequently have a thick understory of rhododendron (*Rhododendron maximum*) and also contain a variety of northern hardwoods and oaks including black birch (*Betula lenta*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), tuliptree (*Liriodendron tulipifera*), red oak (*Quercus rubra*) and black oak (*Q. velutina*). The ground is also frequently dense with a lush layer of mosses and shade tolerant herbaceous vegetation including Canada mayflower (*Maianthemum canadense*), Indian cucumber root (*Medeola virginiana*) and partridgeberry (*Mitchella repens*) (Fike 1999). The accidental introduction of the hemlock wooly adelgid (*Adelges tsugae*) to the United States from Asia represents a significant pest of hemlocks in Pennsylvania. Many of these trees may succumb due to defoliation by these insect pests. The character of these hemlock-dominated habitats will likely change dramatically if continued defoliation occurs. The removal of the hemlock canopy would likely result in a marked decrease in these shade-adapted species and an increase in shade intolerant species, including many species considered invasive. It is difficult to predict the future consequences of the loss of mature stands of hemlock in these habitats.

Wetland Communities

Wetlands include vegetation types important for the area, providing essential habitat for many plant and animal species. The type of wetland depends on soil type, disturbance, and length and duration of flooding. In Schuylkill County many of the wetlands are associated with streams or rivers and include floodplain forests, forested swamps, shrub swamps, and graminoid marshes. Two other wetland types known from the region are seepage swamps and vernal pools.

Floodplain forests occur along rivers and streams in low-lying areas. These locations are periodically inundated by floodwaters of spring runoff or runoff from intense storm events. In central Pennsylvania these forests are characterized by a canopy containing some combination of silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), tulip poplar *(Liriodendron tulipifera*), river birch (*Betula nigra*), black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), or box-elder (*Acer negundo*). Shrubs and vines common to these forests include spicebush (*Lindera benzoin*), ninebark (*Physocarpus opulifolius*), silky dogwood *(Cornus amomum*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). Floodplain forest communities receive severe disturbances from floodwaters including erosion and scouring by water, ice, and debris and/or deposition of massive quantities of sediments and debris. Only species with adaptations or tolerance for these kinds of conditions can survive here.

Floodplains on smaller waterways receive less intense disturbances but are still periodically flooded which limits the kinds of vegetation that can occur on them. Pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), silver maple, red maple, ash, sycamore, and black walnut (*Juglans nigra*) are frequent on wetter bottomland soils associated with smaller creeks. Understory species include spicebush, violets (*Viola spp.*), nettles (*Urtica dioica, Laportea canadensis*), cut-leaved coneflower (*Rudbeckia laciniata*), golden alexanders (*Zizea aurea*) and many other wildflowers. Several species of special concern are frequently found in these habitats. In addition, floodplain

forests also serve as a protective buffer against erosion; help provide cooling shade to the waterway; filter pollutants and excessive nutrients from runoff; and help alleviate flood damage along many of the area's creeks. Areas that have a history of flooding are poor choices for building sites, and are best left as natural floodplain.

Graminoid marshes are wetlands dominated by grasslike plants such as cattails (*Typha latifolia*), sedges (*Carex spp.*), and grasses. These wetlands may be found in association with streams or in areas with ground water seepages. Graminoid marshes in the county are frequently formed as successional communities following beaver dams or other impoundments. These wetlands are frequently rich in species diversity, and provide important breeding habitat for numerous amphibians, reptiles and birds.

Seepage swamps are relatively small forested or shrub-dominated wetlands found on lower slopes where water emerges at the surface in a diffuse flow. These seep areas are frequently dominated by hemlock, yellow birch and red maple, with a thick understory of rhododendron, swamp azalea (*Rhododendron viscosum*), spicebush, and/or highbush blueberry (*Vaccinium corymbosum*). Common herbs in these seepage wetlands include skunk cabbage (*Symplocarpus foetidus*), violets, manna grass (*Glyceria spp.*), various sedges (*Carex spp.*), and ferns, including cinnamon fern *(Osmunda cinnamomea*), royal fern (*O. regalis*), and sensitive fern (*Onoclea sensibilis*). Sphagnum (*Sphagnum spp.)* and other mosses typically form a thick mat in these wetlands.

Of particular interest in Schuylkill County is the prevalence of Coville's rush (*Juncus gymnocarpus*) in many of these forested seeps. Once considered globally rare, Coville's rush was found in so many locations in Schuylkill County during the 1990's that it has been removed from the state list of rare plants. Though widespread in this county, Coville's rush is known in few other locations in the state (Rhoads and Kline 1993). Besides Schuylkill County, Coville's rush is found scattered sparingly from Florida to Tennessee, Pennsylvania being the northernmost limit of its range (*Flora of North America* 2000). All of the states where this plant occurs, with the exception of Pennsylvania, list Coville's rush as a species of special concern (NatureServe). The global distribution of Coville's rush is so concentrated in Schuylkill County that it would make a logical choice as the Official County Plant.

Ephemeral/fluctuating or vernal pools are wetlands that fill annually from precipitation, surface water runoff, and rising groundwater (Kenney and Burne, 2000). The pools typically become completely dry through evaporation by late spring or summer. Since these ponds dry up during a portion of the year, they cannot support fish populations. During the brief time the pools contain water, and in the absence of fish, they become important breeding areas for a multitude of amphibian species (e.g., spotted salamanders, *Ambystoma maculatum*), many of which breed solely in vernal pools. In Schuylkill County, vernal pool communities can be found along the ridge of Blue Mountain, and in the Owl Creek headwaters.

Because wetlands are relatively rare in central Pennsylvania, they are an important refuge for plants as well as important habitat for nesting and migrating birds. Many other animals groups such as amphibians, reptiles, dragonflies, damselflies, moths, and butterflies also depend on specific wetland habitats for all or a portion of their life cycles.

PENNSYLVANIA NATURAL DIVERSITY INVENTORY
PLANTS OF PENNSYLVANIA
County: Schuylkill

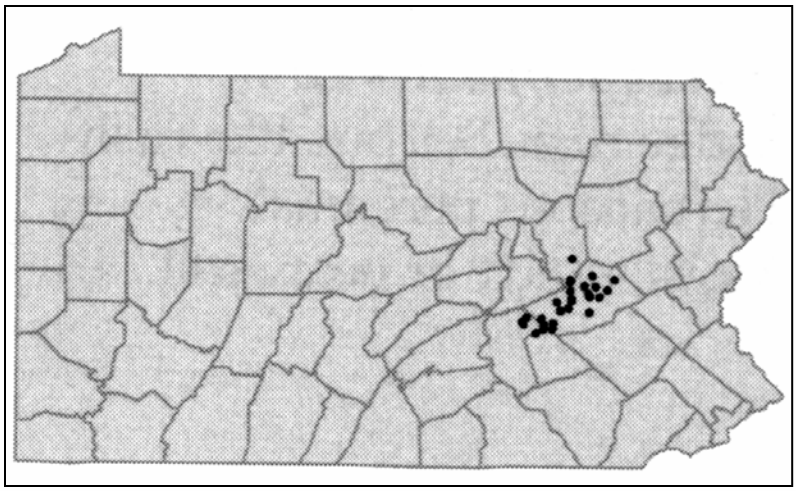
Juncus gymnocarpus Coville

Abundant and forming dense mats, with Osmunda regalis, Rubus hispidus, Thelypteris palustris and Carex folliculata, in wet sphagnum in opening of shrub and small tree wetland in the headwaters of an unnamed tributary of Lorberry Creek, between Second Mountain and Sharp Mountain, State Game Lands # 229, ca 1.85 air miles W by slightly NW of Ravine. Elevation ca 900 feet. LAT 40.57789 x LON 76.43958.

J. R. Kunsman 15767 2001 July 26

Coville's Rush (*Juncus gymnocarpus*)

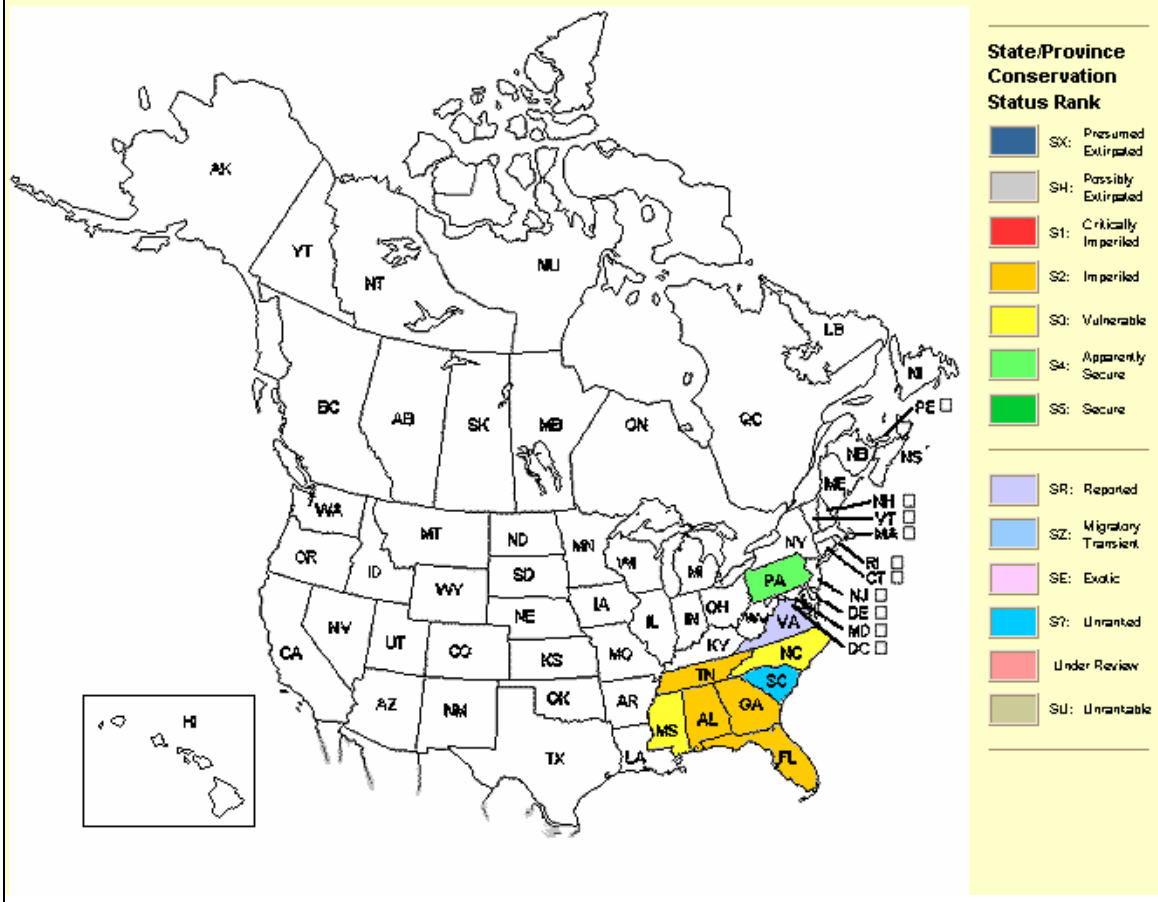
The importance of the populations of Coville's rush (*Juncus gymnocarpus*) in Schuylkill County, also called the Naked-fruited rush and Pennsylvania rush, becomes clear when maps of its known distribution reveal that the majority of the global populations of this species occur in Schuylkill County. Coville's rush is so common in Schuylkill County that it has been removed from the Pennsylvania species of concern list.



Left: The known distribution of Coville's rush (*Juncus gymnocarpus*) in Pennsylvania is restricted to Schuylkill and some of its bordering counties. (Map from: The Vascular Flora of Pennsylvania, Rhoads & Klein 1993)

Below: Currently known populations of Coville's Rush are considered secure only in Pennsylvania, while it is considered vulnerable in North Carolina and Mississippi, and imperiled in Tennessee, Georgia, Alabama and Florida.

Juncus gymnocarpus
NAKED-FRUITED RUSH



Map provided by NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6 . Arlington, Virginia, USA: NatureServe. Available: http://www.natureserve.org/explorer. (Accessed: June 8, 2003).

Disturbance

The nature, scale and frequency of disturbance are influential in the evolution and appearance of natural communities and associated rare species. Disturbance has played a major role in forming the current vegetation of Schuylkill County.

Some examples of natural disturbances are flooding, fire, and deer browsing. While often regarded as a detrimental impact, both fire and small-scale flooding can be beneficial to certain communities or rare species. Floodplain forests benefit from the periodic scouring and deposition of sediments as streams overtop their banks. At the same time, streamside wetland communities hold excess water, thus reducing the scale of flooding downstream.

In contrast, deer have been blamed for a number of negative impacts on Pennsylvania flora and fauna (Rhoads and Klein 1993): a reduction in the amount of understory, poor regeneration of some species, decreased songbird diversity, and direct loss of rare plants. For example, some areas that were once dominated by oak are now converting to red maple because of deer pressure (The Pennsylvania State Cooperative Extension Service). Private landowners can help to control the deer population by allowing hunting to occur on their properties.

In many cases, human disturbance has been clearly destructive to natural habitats and species associated with them. In Schuylkill County, logging and mining have played a major role in changing the landscape. For example, old-growth forests are all but non-existent although occasional old trees may be encountered. Mining, which has altered topography and vegetation, is not as active in the county as it once was. Old mined lands can still provide valuable habitat, especially for birds, by reclaiming the land with grasses and shrubs. For instance, reclaimed mined lands that were surveyed near Pittsburgh were found to provide nesting and wintering habitat for grassland bird species including ring-necked pheasant (*Phasianus colchicus*), short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), eastern meadowlark (*Sturnella magna*), and Henslow's sparrow (*Ammodramus henslowii*).

Additionally, many wetland habitats have been filled or altered resulting in the loss of some of the native plants and animals of these sites. Although some species, including several rare species, are aided by on-site disturbance (e.g. clearing or mowing), human disturbance is detrimental to most species. With wide-ranging human disturbance, some plant and animal species may be completely eradicated from an area because they cannot compete or survive under newly created conditions. Human disturbances are a permanent part of landscape, but decisions about the type, timing, and extent of future disturbances are important to the natural ecological diversity that remains.

An increasing threat to these communities and natural habitats is the introduction and spread of exotic (i.e., non-native), invasive species across the landscape. These include, among others, the chestnut blight fungus that dramatically changed the composition of our forests; the hemlock wooly adelgid that threatens to do the same; the grass carp that can disrupt native aquatic life; and a long list of plants that out-compete native species. Non-native plants such as Japanese honeysuckle (*Lonicera japonica*), tree-of-heaven (*Ailanthus altissima*), Oriental bittersweet (*Celastrus*

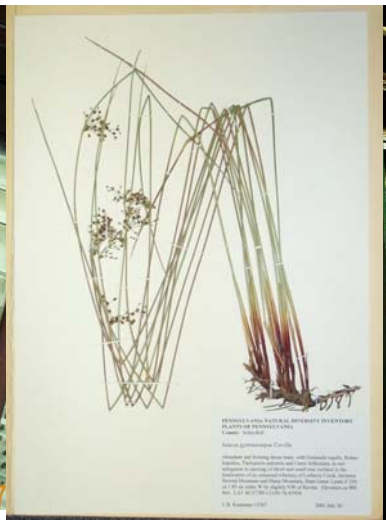
orbiculatus), Japanese stiltgrass (*Microstegium vimineum*) and garlic mustard (*Alliaria petiolata*) have become commonplace in disturbed woodlands, often to the point of excluding some of the native plants. In wetlands and along streams, purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), and mile-a-minute weed (*Polygonum perfoliatum*) are aggressive, weedy species that follow in the wake of disturbance and crowd out native species. The natural disturbances of flooding and scouring that occur along the county's rivers and creeks have helped to facilitate the invasion and colonization of many exotic species. There are few, if any, plant communities along the major river corridors that do not have significant components of exotic species. The species with the greatest impact in these communities tend to be robust herbs such as purple loosestrife and Japanese knotweed, although vines such as Japanese hops *(Humulus japonicus)* are also serious problems. Aquatic habitats of the rivers, streams, and lakes are also vulnerable to invasion by exotics. Curly pondweed (*Potamogeton crispus*), a native of Europe, has become the dominant plant species in some of the regions waterways, and the Asiatic clam (*Corbicula fluminea*) has become the most common mussel in some of the streams in the region.

Control of these problematic, non-native species is necessary for the long-term maintenance of high quality natural systems. Discouraging the use of these and other potentially weedy exotics in and around natural areas can help to prevent further encroachment. Some nurseries now carry a selection of tree, shrub and herbaceous species that are native to Pennsylvania, and these are recommended where plantings are necessary in, or adjacent to, natural areas. Prevention is the best avenue of defense against invasive species, and land managers must be vigilant inspectors of the landscape to spot new outbreaks of species harmful to the natural habitat. It is much more cost effective to halt an invasive species outbreak early in its colonization than to try to remove long established infestations. *The Vascular Flora of Pennsylvania* (Rhodes and Klein 1993) is a helpful reference for determining whether a plant species is native to the state or not. Additional references include two PA Department of Conservation and Natural Resources publications*: Invasive Plants in Pennsylvania* and *Landscaping with Native Plants in Pennsylvania*.

PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to conduct an inventory of significant flora, fauna, and natural communities in the county, scientists from The Nature Conservancy PA Science Office (PSO) first consulted the Pennsylvania Natural Diversity Inventory (PNDI) database. PNDI was established in 1982 as a joint venture of The Pennsylvania Science Office (PSO), and the Western Pennsylvania Conservancy (WPC). In its 20 years of operation, the PNDI database has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (natural communities), sensitive plants and animals (species of special concern). Several other noteworthy natural features are also mapped including DEP designated Exceptional Value Streams (Shertzer 1992), and outstanding geologic features (based on recommendations from Geyer and Bolles (1979 and 1987)).

PNDI has collected existing data on occurrences of species and communities (elements) of special concern, drawing from publications, herbarium and museum specimens, and the knowledge of expert botanists, zoologists, ecologists, and naturalists. From this foundation, PNDI has focused its efforts on, and conducts systematic inventories for, the best occurrences of the priority species and natural communities.



PNDI has recorded over 15,000-detailed occurrences of species and communities of special concern, largely the result of field surveys. These are stored in computer and manual files and denoted on topographic maps. Additional data are stored in extensive manual and digital files set up for over 200 natural community types, 1400 animals, and 3500 plants. These files are organized by each of Pennsylvania's 881 7½ USGS topographic quadrangle maps using a Geographic Information System (GIS).

The PA Science Office has used this systematic inventory approach to identify the areas of highest natural integrity in Schuylkill County. The natural community and sensitive species data are the basis for judging the biological values of sites within the County. Protecting the sites with the best occurrences of the County's natural communities, and good populations of sensitive plant and animal species can help to insure that a full range of biological diversity in Schuylkill County is preserved for the future.

NATURAL AREAS INVENTORY METHODS

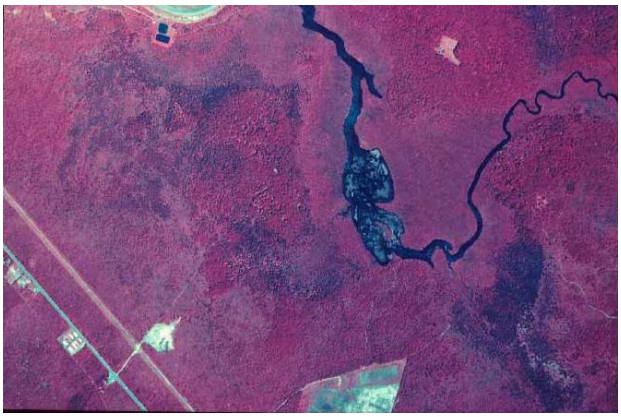
Methods used in the Schuylkill County Natural Areas Inventory followed PNDI procedures, and those developed in Illinois (White 1978) and Indiana (Anonymous 1985). The inventory proceeds in three stages: 1) information is gathered from the PNDI data-base files, local experts, and map and air photo interpretation;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

- **Information Gathering**

A list of natural features found in the county was prepared from the PNDI database and supplemented with information volunteered by local individuals and organizations familiar with Schuylkill County. In January of 2002, a public meeting was held and recommended Natural Area Survey Forms (Appendix I) were distributed to facilitate public input. TNC staff solicited information about potential natural communities, plant species of special concern and important wildlife breeding areas from knowledgeable individuals and local conservation groups. A number of potential natural areas were identified by audience members and scheduled for field surveys.

- **Map and Air Photo Interpretation**

PSO ecologists familiarized themselves with the air photo characteristics of high quality natural communities already documented (Appendix II). Additional data from vegetation maps, soil survey maps, field survey records and other sources were consulted to gain familiarity with Schuylkill County's natural systems. This information, along with references on physiography, geology, and soils, was used to interpret photos and designate probable vegetation types and potential locations for exemplary communities and rare species. In many instances, vegetation was classified at an ecosystem level, where an ecologist, or person with similar training, interpreted the maps and aerial photos.



Work progressed systematically within the area encompassed by each USGS topographic map. The natural area potential of all parcels of land was assessed using aerial photographs. Areas continuing into adjacent counties were examined in their entirety. Topographic maps used during field surveys were marked to indicate locations and types of potential natural areas based on characteristics observed on the photos. For example, an uneven canopy with tall canopy trees could indicate an

older forest. A forest opening, combined with information from geology and soils maps, could indicate a seepage swamp community with potential for several rare plant species. Baseline information on sites appearing to have good quality communities or potential for rare species was compiled to help prioritize field work.

After an initial round of photo interpretation, field surveys were conducted to evaluate the potential natural areas that were actually on the ground. Locations with minimally disturbed natural communities or with species of special concern were outlined on topographic quadrangle maps. The photo signatures (characteristic patterns, texture, tone of vegetation, and other features on the photos) of these sites were then used as a guide for continued photo interpretation and future field surveys. Photo signatures with poor quality sites led to the elimination of further field work on other sites with similar visual signatures.

- **Field Work**

Experienced PSO biologists and contractors conducted numerous field surveys throughout Schuylkill County during 2001 & 2002. Biologists evaluated the degree of naturalness of habitats (including assessment of percent of native vs. non-native plant species, degree of human disturbance, age of trees, etc.) and searched for plant and animal species of special concern. Workers categorized the vegetation of each potential natural area visited. An evaluation of quality was made for each potential natural community element, care being taken to give reasons for the quality rank. Boundaries of the community types were redrawn, if needed, based on new field information. Community information recorded included the dominant, common, and other species, as well as disturbances to the community. Field forms were completed for all occurrences of sensitive plant and animal species, and natural communities (see sample Plant & Animal Survey Form, Appendix III), the quality of each population or community was assessed, and locations were marked on USGS topographic quadrangle maps.

In early spring of 2002, one low altitude reconnaissance flight was flown over the county to provide a more accurate overview of the current condition and extent of known natural areas and to assess the potential of any additional areas. Photos were taken during this flight, and these were used in further site analysis. These photos also helped navigate through areas of difficult and complex terrain.

- **Data Analysis**

To organize the natural features data and set conservation priorities, each natural community or species (element) is ranked using factors of rarity and threat on a state-wide (state element ranking) and range-wide (global element ranking) basis (see Appendix IV). Each location of a species (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 five element occurrence quality ranks is given in Appendix V. The element-ranking and element occurrence-ranking systems help PSO personnel to simultaneously gauge the singular importance of each occurrence of, for example, an Ephemeral/Fluctuating Pool Natural Community, or minniebush (*Menziesia pilosa*) occurrence in Schuylkill County, as well as the state-wide or world-wide importance of these natural features. Obviously, sites with a greater number of highly-ranked elements merit more

immediate attention than sites with a smaller number of lower ranked elements (1 = highest, 5 = lowest).

Field data for natural communities of C-rank or better, and for all plant and animal species of concern found were combined with existing data and summarized on PNDI Element Occurrence Records for mapping and computerization. Mapped locations of natural features, including approximate watershed or subwatershed boundaries, were then created and added electronically to PNDI's Geographical Information System (GIS) layer.

Information on the needs of the rare species in this report has come from a variety of sources, including field guides and research publications. For reptiles and amphibians, the major sources are Hulse et al. (2001) and DeGraaf and Rudis (1981); for birds, Barber (2002) and Brauning (1992); for moths, Covell (1984); for butterflies, Opler and Krizek (1984) and Opler and Malikul (1992); Schweitzer (1981) provided much of the information on rare moth and butterfly species in Pennsylvania. A list of Plant and Animal Species of Special Concern in Schuylkill County is provided in Appendix VI.

- **Priorities for Protection**

Table 2 presented in the Summary and Recommendations section prioritizes sites with natural communities and rare species in Schuylkill County. This table ranks sites from the most important (rank = 1) and threatened to the least (rank = 5). Ranks are based on rarity, quality, and threats or management needs of the elements at the site. Table 2 lists the site name, municipality, and pertinent information about the site. A more detailed description for each of the sites is included in the text of the report.

"Locally Significant" sites are also indicated on the maps, and are briefly discussed in the text accompanying each map. These are sites in which no recent species of special concern, or high-quality natural communities have been found, but may be important at the county level. Examples would include relatively intact forested areas, large wetlands, and other areas significant for maintaining local biodiversity. Future surveyors of these areas may discover species of concern unobserved by past inventory biologists. These secondary sites are arranged in Table 3 in the Summary and Recommendations. 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.

RESULTS

The natural areas for Schuylkill County were evaluated by PA Science Office staff (e.g., botanists, wildlife biologists, and ecologists) and ranked in order of importance for conservation of biodiversity at the statewide level. The size and quality, condition, landscape context, and rarity of the species or natural community were factors used to assign ranks for each site.

The Natural Areas Inventory recognizes sites at two primary levels of significance for the protection of biological diversity: 1) sites of statewide importance and 2) sites of local significance. Sites of statewide importance support species of special concern, or have exemplary natural communities. These sites are listed in Table 2. Sites in this category that are ranked 1 or 2 may contain some of the best natural areas in the state. Locally significant sites are presented in Table 3. These areas provide locally significant habitat and may be suitable for environmental education, parks or preserves; no species of special concern or exemplary natural communities were identified at the sites listed in Table 3 during this inventory.

Thirty-five sites that have species of special concern, exemplary natural communities, or important geologic features were identified in Schuylkill County (Table 2). A total of fifteen animal species of concern, ten plant species of concern, two exemplary natural community types, and seven geologic features occur in the county (Appendix VI). Thirteen sites with local significance were mapped during field surveys (Table 3).

Maps showing the natural areas are included for each municipality. **In order to protect the resource, the exact locations for species of special concern are not provided. Instead, a buffer for the site has been drawn; usually at the subwatershed level. It is not the intention of this report to exclude all proposed development from within the site buffers. Rather, any proposed development within these buffers should be carefully considered and the PNDI environmental review process should be followed.**

Exceptional Natural Features:

• Blue Mountain - part of the Kittatinny Ridge

In considering the value of specific sites for the preservation of biological diversity it is important to note that these sites are dependent on the integrity of the larger scale of these systems. The forested ridge and slopes of Blue Mountain are part of the contiguous Kittatinny Ridge, which trends southwesterly from southern New York and northwestern New Jersey, continuing through southeastern Pennsylvania and terminating near the Maryland border. The ridge is world renowned as a transportation corridor for migrating raptors and songbirds as well as for the movement of other biota in the northeastern United States. The ridge functions as an interstate greenway, linking many of southeastern Pennsylvania's most biologically important areas with each other. Without this resulting connectivity, these biologically rich areas would become functional islands in a sea of farmland, suburban development and other lands modified by human activity, effectively severing modes of reproductive mingling and dispersal for many species of plants and animals. Conservation of Schuylkill County's portion of this continuously forested interstate greenway corridor should be a priority in future land use planning recommendations.

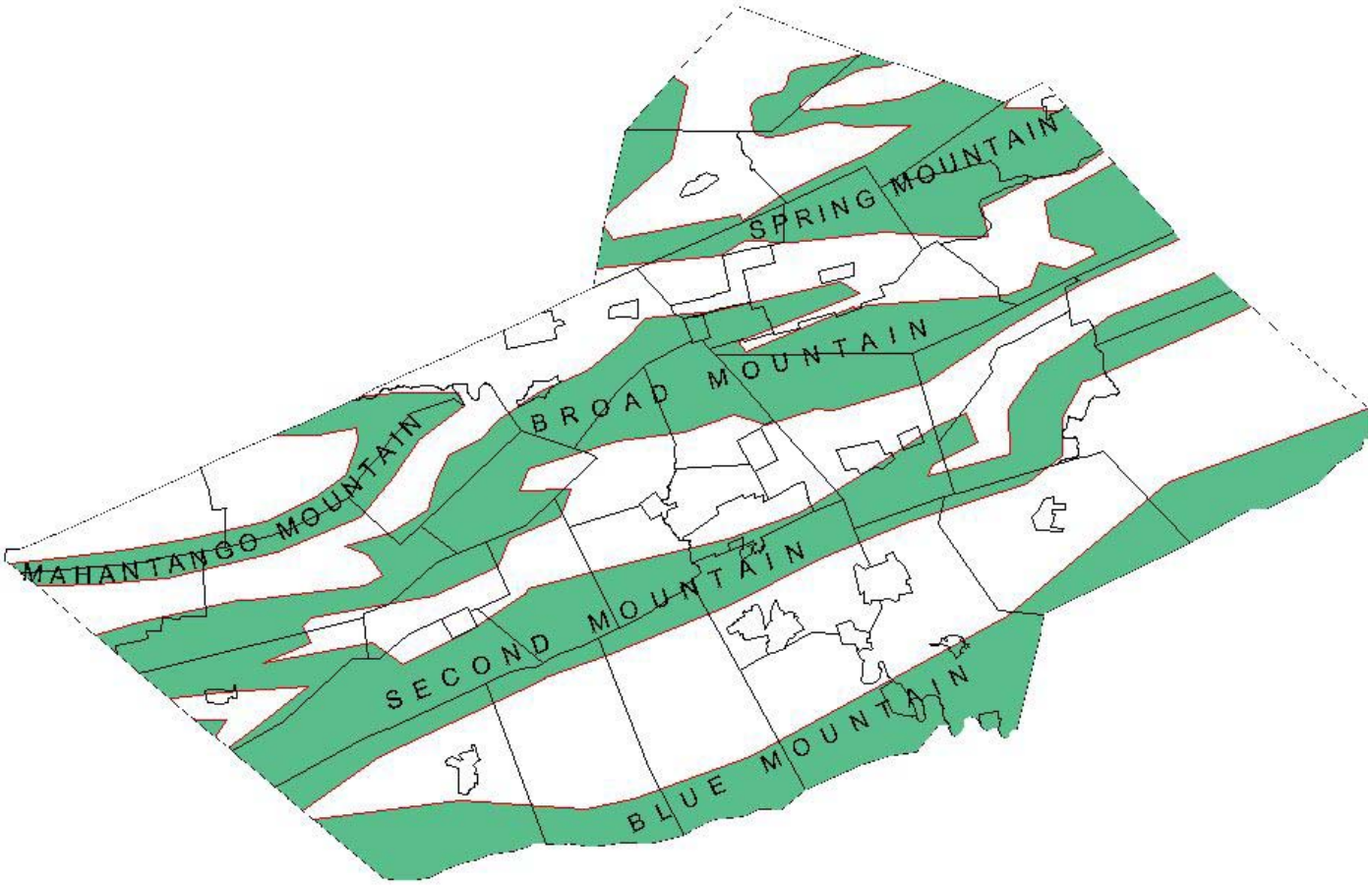
• Broad Mountain Plateau

The large flat expanses of Broad Mountain represent another large-scale ecosystem. The Ridgetop Dwarf-tree Natural Communities that occur on the higher elevations of this ridgeline extend through Schuylkill County into Carbon, Columbia, Luzerne & Lackawanna Counties. Though covering many ridgetop plateaus in the county and this part of the state, the Ridgetop Dwarf-tree forest is considered uncommon on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, fire-prone, nutrient poor soils, where other species cannot survive. The forested corridors of Blue Mountain and Broad Mountain provide the habitat for resident species, the habitat required for migrating birds on a biannual basis, the habitat needed for the long term survival of plant species, and more.

In reviewing the report it is evident that many natural sites within the County are along these two ridge systems. Along with these sites are areas that were beyond the scope of this project to fully investigate. Any intact natural areas in or adjacent to these mountains should be considered potential important habitat. The development of a comprehensive conservation plan for areas adjacent to these two mountain systems, conducted in conjunction with other counties, may be the best tool for conserving these important natural resources.

Above: Blue Mountain, part of the Kittatinny Ridge, provides habitat and a migration corridor for many species of plants and animals, both common and rare. Conservation of large forested tracts such as these will help keep rare species from becoming extinct, as well as help common species from becoming rare.
Below: A portion of the Ridgetop Dwarf-tree Forest natural community that occurs on Broad Mountain. Though occurring frequently in Schuylkill County and several other northeastern Pennsylvania counties, this community type is uncommon at the global level. These fire-prone environments occur on thin, dry soil at high elevations in Schuylkill County. Photos by the PA Science Office of The Nature Conservancy.

Forested Ridges as Migration Corridors



Several relatively undisturbed and unfragmented continuously forested ridges cross Schuylkill County. These large forested blocks create necessary habitat corridors between areas of high natural diversity, allowing the movement of animal and plant species, and provide habitat for many common species. Without these connective greenways, the natural areas of Schuylkill County would become virtual islands in a sea of land dominated by human activity. The primary threat to these areas is the fragmentation of these large forested blocks by the construction of roads. Fragmentation decreases the quality of these natural areas in two ways; as the size of a natural area diminishes, so does the number of species that can occupy the area (Wilson 2002); and secondly, as roads cut through natural areas, they create avenues of access for introduced species, further decreasing the area available to native plants and animals. Most of Schuylkill County's publicly managed lands occur along these ridges.

Top Priority Natural Areas in Schuylkill County:

All of the natural areas in the county are important for maintaining biodiversity in the region and the state. However, the following sites from Table 2 are the most critical at present for maintaining Schuylkill County's biological diversity into the future (see Figure 1 for approximate locations of these sites). More detailed descriptions and mapped locations of all sites are included in the Results section that follows.

• **BEARS HEAD RIDGETOP DWARF-TREE FOREST (Delano, East Union, Mahanoy & West Mahanoy Townships) -** This Natural Community occupies the higher elevations of Locust Mountain north of Shenandoah and Delano, and is bounded on the east by Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex",** also known as a **"Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, and frequent fires limit the growth of trees. Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered uncommon on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive.

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered moth species that is currently only known to occur in Pennsylvania and found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

• **BLACK CREEK / INDIAN RUN WATERSHED (Branch & Reilly Townships) -** The large, contiguous forest within this relatively undisturbed valley contains a beautiful mosaic of hemlock palustrine forest, alder-sphagnum wetland with graminoid openings, and an extensive blueberry/ meadowsweet shrub swamp. In conjunction with the Indian Run watershed to the east, this area represents an intact palustrine ecosystem of rare quality and size in Schuylkill and many neighboring Counties. It is the contiguous and relatively undisturbed nature of these watersheds

and excellent water quality of the streams that make this area one of the top sites in the county for conservation. This is an example of a landscape-scale ecosystem that if left intact, can be expected to be viable well into the future.

The hemlock-palustrine forest, the surrounding alder-sphagnum wetland and the meadowsweet/ blueberry shrub swamp provide excellent quality habitat for many neo-tropical migrant songbirds and a high diversity of other animal and plant life. Many uncommon northern affinity bird species were noted in this area. Observed disturbances include clear-cut logging in some areas. Fragmentation of this habitat by roads and logging operations, which are avenues of access for introduced species, would greatly diminish this habitat. In the event that these watersheds are considered unnecessary for the water filtration needs of the governing water authorities, this valley should be considered a top priority for acquisition for conservation purposes.

• **SWOPE VALLEY RUN (Pine Grove Township & Lebanon County)** - In 2002, a good-quality population of a G3, S2 PA-Endangered animal species and a small population of a G5, S3 plant species were found in a wetland dominated by reed canary grass (*Phalaris arundinacea*) and surrounded by multiflora rose (*Rosa multiflora*). This animal species has been under great pressure due to wetland modification and draining throughout the state and its range. Though the wetland has been ecologically degraded by the proliferation of introduced plant species at this site, the animal population appears to be viable. Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat. This site includes private land and a portion of SGL#80.

• **WOLF CREEK WATERSHED (Blythe Township)** – Several good to excellent-quality populations of three different plant species of concern were found growing in shrub-swamp thickets along Wolf Creek. These isolated wetlands contain excellent reproducing populations of Collin's sedge (*Carex collinsii*), a species of more Atlantic coastal distribution. These inland populations represent a very rare occurrence for this plant species. Collin's sedge was found growing in conjunction with Coville's rush (*Juncus gymnocarpus*), a highly unusual plant association that probably does not occur in many other locations in the world. This site also includes a "sphagnum-sedge wetland" of excellent quality. This community type lacks a canopy of trees or shrubs, and is characterized by a thick layer of sphagnum moss, various graminoids including cotton grass (*Eriophorum virginicum*), Collin's sedge, Coville's rush, and ferns including cinnamon fern. Stunted-growth shrubs ring the graminoid opening.

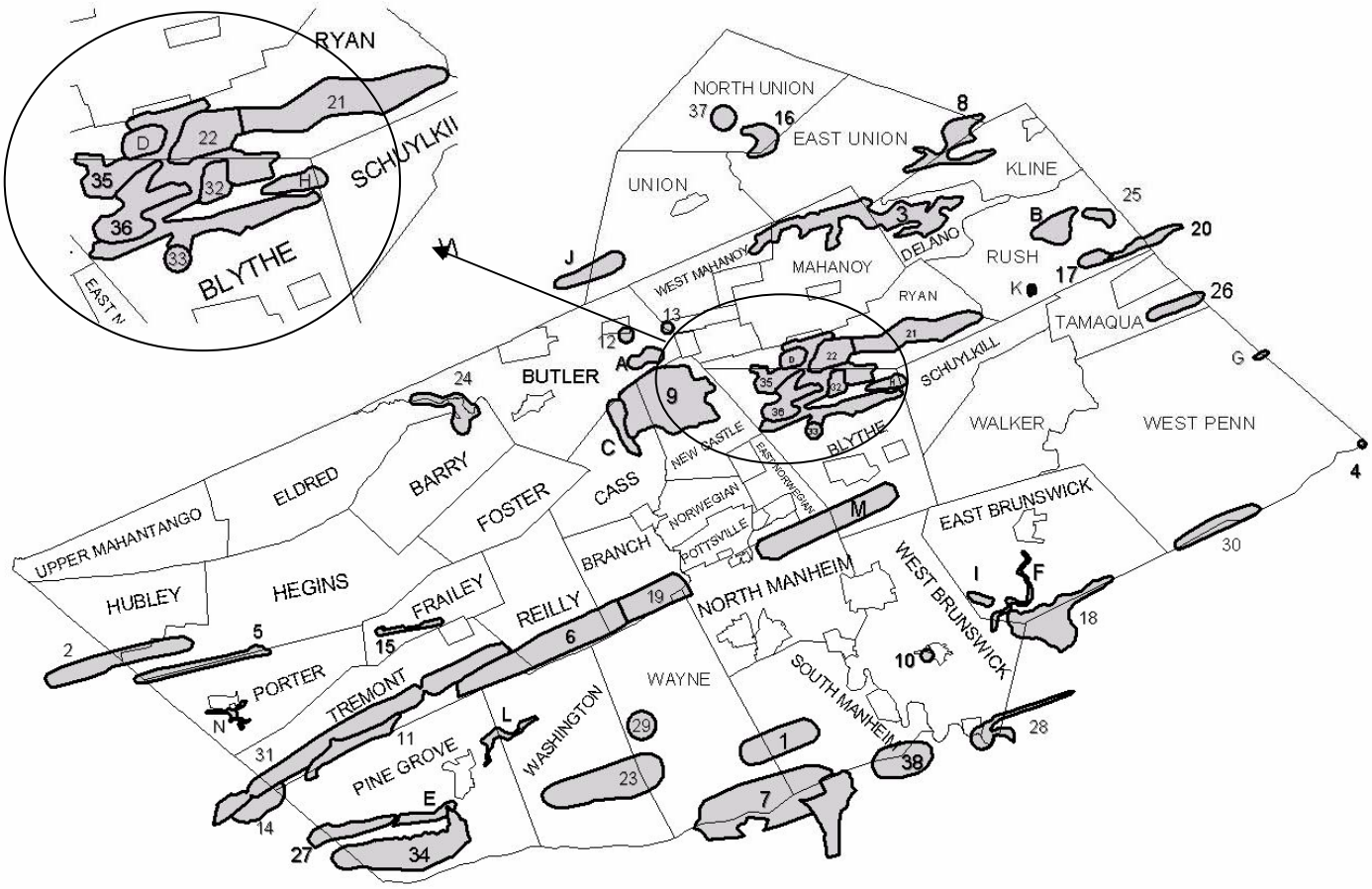
No threats were reported from this creek, however, beaver activity & competition from other plant species could be problems in the future. This site and the surrounding area are primarily on Municipal Watershed Property. Recent regulations regarding the mandatory treatment of drinking water has led some water companies to consider selling-off large tracts of watershed property deemed unnecessary for water purification. In the event that this property is considered for sale, concerted efforts should be made to purchase this land or a conservation easement for the protection of the unique habitat at this site. The PA Department of Environmental Protection designates Wolf Creek as a High-Quality Stream.

Ephemeral / Fluctuating Pool Natural Communities

Ephemeral/fluctuating or vernal pools are wetlands that fill annually from precipitation, surface water runoff, and rising groundwater, to appear pond-like during the winter and spring months.

These pools typically become completely dry through evaporation by late spring or summer. Since these ponds dry up during a portion of the year, they cannot support fish populations.

During the brief time the pools contain water, and in the absence of fish, they become important breeding areas for a variety of amphibian species such as wood frogs and spotted salamanders, many of which breed solely in vernal pools. (Photos by the PA Science Office of The Nature Conservancy)



Schuylkill County Natural Areas

Statewide Significance

1. BEAR CREEK AT AUCHEYS (pg. 136,161)
2. BEAR MOUNTAIN (pg. 83, 86)
3. BEARS HEAD RIDGETOP - DWARF-TREE FOREST (pg. 57, 90, 173)
4. BEARS ROCKS EROSIONAL REMNANT (pg. 178)
5. BIG LICK MOUNTAIN (pg. 79, 113)
6. BLACK CREEK WATERSHED (pg. 43, 117, 145)
7. BLUE MOUNTAIN RIDGETOP (pg. 136, 161)
8. BLUE NOB DWARF-TREE FOREST (pg. 67, 86)
9. BUCK RUN DWARF-TREE FOREST (pg. 52, 94)
10. DEER LAKE FOSSIL SITE (pg. 167)
11. DEHAAS RUN WETLANDS (pg. 107, 145)
12. EAST GIRARDVILLE MINE OPENING (pg. 48)
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14. GOLD MINE WETLANDS (pg. 107)
15. GOOD SPRING CREEK WOODS (pg. 75)
16. GREEN MOUNTAIN (pg. 67, 103)
17. GREENWOOD LAKE WETLAND (pg. 121)
18. HAWK MOUNTAIN / SGL #106 (pg. 61,167)
19. INDIAN RUN WATERSHED (pg. 43, 98, 161)
20. LAKE HAUTO (pg. 121)
21. LOCUST CREEK (pg. 127)
22. LOCUST LAKE FOREST (pg. 127)
23. LOWER LITTLE SWATARA WETLAND (pg. 157)
24. MAHANOY CREEK AT TAYLORVILLE (pg. 33, 48)
25. NESQUEHONING HEADWATERS- VERNAL POOLS (pg. 121)
26. OWL CREEK WETLANDS (pg. 140)
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28. RATTLING RUN/ SCHUYLKILL GAP (pg. 167)
29. SCHWEIGERTS SCHOOL (pg. 161)
30. SGL #217 AND APPALACHIAN TRAIL (pg. 178)
31. SHARP MOUNTAIN (pg. 145)
32. SILVER CREEK WATERSHED (pg. 37)
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35. WOLF CREEK RIDGETOP- DWARF-TREE FOREST (pg. 37, 127)
36. WOLF CREEK WATERSHED (pg. 37)
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Local Significance

A. Ashland Watershed (pg. 48)
B. Hometown Ridgetop- Dwarf- tree Forest (pg. 121)
C. Dyer Run (pg. 52)
D. Eisenhuth Seeps (pg. 37)
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F. Little Schuylkill River (pg. 61, 167)
G. Mahoning Creek Wetland (pg. 178)
H. Moss Glen watershed (pg. 37)
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J. Shenandoah Municipal- Authority (pg. 151)
L. Sweet Arrow Lake (pg. 107, 157)
M. Tumbling Run (pg. 37, 98)

TABLE 2. Summary of the sites of statewide significance for the protection of biological diversity in Schuylkill County in approximate order of priority from the most important (rank = 1) to the least (rank = 5). The presence of species of special concern and/or exemplary natural communities has been documented at these sites. More in-depth information on each site including detailed site descriptions and management recommendations where appropriate can be found in the text of the report following the maps for each municipality.

County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
1	BEARS HEAD RIDGETOP DWARF-TREE FOREST	Delano, East Union, Mahanoy & West Mahanoy Twps.	This site represents one of five expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in Schuylkill County, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.
1	BLACK CREEK WATERSHED	Branch & Reilly Twps.	A single occurrence of a G5, S3B-S4N PA-Candidate rare animal species of concern the **Pied-billed Grebe (*Podilymbus posiceps*),** was observed during a visit to the headwaters of Black Creek in 2002. A variety of wetland types occur in this relatively undisturbed watershed providing a great diversity of plant and animal life. Observed disturbances include logging and possible acid mine drainage. Undisturbed forested buffers should be maintained around the open wetlands and along the seeps and creek in this site.
1	SWOPE VALLEY RUN	Pine Grove Twp. & Lebanon Co.	A good population of **a G3, S2 PA-Endangered animal species,** and a small population of the G5, S3 plant species **screw-stem (*Bartonia paniculata*)** were found at this site during surveys in 2001 & 2002. Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat. This site includes private land and a portion of SGL#80.

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[2] For definitions of Global & State ranks please refer to Appendix IV

County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
1	WOLF CREEK WATERSHED	Blythe Twp.	Field visits to Wolf Creek reservoir in 1991, 1997 and 2002 revealed three plant species of concern. Several good-quality populations of **Collin's sedge (*Carex Collinsii*),** a good-quality population of the **yellow-fringed orchid (*Platanthera ciliaris*)**, and a small population of **screwstem (*Bartonia paniculata*)** were located in this area. No threats were reported from these creeks, however, beaver activity & competition from other plant species could be problems in the future. The surrounding area is municipal watershed property. Wolf Creek is designated as a High-Quality Stream by the PA Department of Environmental Protection.
2	BLUE NOB RIDGETOP DWARF-TREE FOREST	East Union & Kline Twps.	This site represents one of five expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in Schuylkill County, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.
2	BUCK RUN RIDGETOP DWARF-TREE FOREST	Cass, Foster & Newcastle Twps.	This site represents one of five expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in Schuylkill County, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
2	DEHAAS RUN WETLANDS	Pine Grove & Tremont Twps.	This site includes two large, excellent-quality, **shrub-graminoid swamps** and the DeHaas Run connecting them. **An ephemeral / fluctuating pool natural community** exists along the run. The ephemeral pools provide important habitat for breeding amphibians and wetland plant species. A forested buffer should be maintained around this pond community. Also at this site is a marginal-quality population of the **netted chain fern (*Woodwardia areolata*)**, a PA-Candidate threatened plant species. No disturbances or threats were observed. This site falls primarily within State Game Lands #211 & #229.
2	GREENWOOD LAKE WETLAND	Rush Twp.	This site consists of the wetlands along the banks of Greenwood Lake. A site visit in 2002 revealed a good-quality population of a G4G5, S3 plant species of concern the **water bulrush *(Schoenoplectus subterminalis)*.** Balsam fir (*Abies balsamea*), though not a listed species of concern, was also found at this site. The northwestern edge of Greenwood Lake was noted as an exceptional sphagnum-sedge wetland. The surrounding land is used primarily for recreation and wildlife conservation purposes. No threats were observed and no special management appears to be needed.
2	HAWK MOUNTAIN LOOKOUT	East Brunswick & West Brunswick Twps. & Berks County	Besides being a world-renowned raptor migration corridor, **four different invertebrate species of concern** were found at this site between 1996-1998. Invasive plant species control and restriction of pesticide use for gypsy moth infestations will help the continuation of these species at this site. **Two outstanding Geologic Features** are also located within this site, a massive outcrop of Tuscarora sandstone, and Tuscarora quartzite standing in vertical columns. The area has been designated a National Natural Landmark. This site falls primarily within Hawk Mountain Sanctuary, SGL #106, Weiser State Forest, and includes a portion of the Appalachian Trail.
2	INDIAN RUN WATERSHED	Branch, North Manheim & Wayne Twps.	The headwaters and drainage divide of Indian Run were surveyed in July 2002, and found to contain an unknown-quality population of an animal species of concern and a good population of the plant species of concern, **mountain starwort (*Stellaria borealis*)**. Intensive logging or changes in the hydrology would detrimentally impact this site.

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[2] For definitions of Global & State ranks please refer to Appendix IV

County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
2	LOWER LITTLE SWATARA WETLAND	Washington & Wayne Twps.	A fair population of **a G3, S2 PA-Endangered animal species** was observed at this open marsh in 2002. Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat. Also at this site, a nest of a G5, PA-Candidate at risk animal species the **Barn Owl (Tyto alba)**, was observed in a hollow tree in 1999. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania.
2	OWL CREEK WETLANDS	Tamaqua Borough	Fifteen vernal pools were documented in 2002 in the drainage divide between Owl Creek and White Bear Creek. This series of vernal pools makes up an **Ephemeral/Fluctuating Pool Natural Community**. The ephemeral pools provide important habitat for breeding amphibians and wetland plant species. The ponds are within a hemlock – mixed hardwood forest matrix. Extensive plantations of Norway spruce (*Picea abies*), scots pine (*Pinus sylvestris*) and red pine (*P. resinosa*) detract from the otherwise natural character of this watershed. A forested buffer should be maintained around this pond community. No disturbances or threats were observed. Owl Creek is designated as a High Quality Stream by the PA Department of Environmental Protection, and as a Class A trout water by the PA Fish & Boat Commission.
2	SGL #217 AND APPALACHIAN TRAIL	West Penn Twp. & Lehigh Co.	In 2002, a graminoid-dominated vernal pond was located along the ridge of Blue Mountain. A good-quality population of a Federally Endangered plant species, the **northeastern bulrush *(Scirpus ancistrochaetus)*** was located in this pond. The pond is also important as an amphibian breeding site. A wide forested buffer should be maintained around this site. No disturbances were observed at this pond. Nearby disturbances include the creation of food plots and logging. This site falls primarily within SGL #217.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
2	SHARP MOUNTAIN	Reilly & Tremont Twps., & Lebanon Co.	Evidence of several fair-quality populations of a G3G4, S3 PA-Threatened animal species of concern **the eastern woodrat (*Neotoma magister*),** were found along the ridge of Sharp Mountain during visits in 1990-1993. The site consists of a series of conglomerate outcrops and talus slopes between Lorberry Junction and the Lebanon County line. Past and present mining activity was the only observed disturbance. Chinese Wall is a **Geologic feature** consisting of a spectacular outcrop of Sharp Mountain quartz-pebble conglomerate. Litter and vandalism detract from the natural beauty of this site. This site falls primarily within State Game Lands #211 & #229.
2	WOLF CREEK RIDGETOP DWARF-TREE FOREST	Blythe & Ryan Twps.	This site represents one of five expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in Schuylkill County, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.
3	BLUE MOUNTAIN RIDGETOP	South Manheim, Wayne Twps. & Berks Co.	This site includes a series of vernal pools that makeup **an Ephemeral/Fluctuating Pool Natural Community and two animal species of concern**. The ephemeral pools provide important habitat for breeding amphibians. Forested buffers should be maintained around these ponds. No threats or disturbances were observed. In 1999, a single juvenile animal species of concern was observed on this forested ridgetop. This species is associated with large contiguous stands of mature northern hardwood forest. Protection recommendations include providing a 300 meter-radius undisturbed buffer around all active and inactive nest sites. An invertebrate animal species of concern has also been found at this site throughout the 1970's and as recently as 1998. This species is currently only known to occur in Pennsylvania. The use of *Bacillus thuringiensis* (BT) to control gypsy moths should not harm this species, but the spraying of Dimlin would pose a serious threat to the larvae. This site falls primarily within SGL #110 and includes a portion of the Appalachian Trail.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
3	GREEN MOUNTAIN	North Union Twp.	This site is a ridgetop sandstone/conglomerate rock outcrop within a dry oak-heath forest matrix. In 2001, a good-quality population of **a G4, S3S4 PA-Candidate animal species of concern** was mapped at this site. No disturbances were noted at the time of the field visit. Any logging near the site should only occur during the winter months. This site should continue to be monitored on a regular basis. Threats to this site include pressure from the encroaching nearby development, or the potential selection as a communication tower site. An intact forested buffer needs to be maintained around this site.
3	MAHANOY CREEK AT TAYLORVILLE	Barry, Butler & Eldred Twps.	This site hosts the only known **Great Blue Heron (*Ardea herodias*)** nesting site in Schuylkill County. Disturbance or destruction of this woodland rookery by logging operations poses the greatest threat to this site. A wide, undisturbed forested buffer should be maintained around this site. This site includes a portion of Weiser State Forest and private property.
3	SILVER CREEK WATERSHED	Blythe Twp.	This site was found to contain two plant species of concern. A good-quality population of **Collin's sedge (*Carex collinsii*),** and a small population of **the yellow-fringed orchid (*Platanthera ciliaris*)** were found along this creek. Observed disturbances include abandoned strip mines, dirt roads & exotic planted conifers. The surrounding land is municipal watershed property.
3	SWATARA CREEK FLOODPLAIN	Pine Grove Twp. & Lebanon Co.	This site is a dense shrub wetland along the floodplain of the Swatara Creek. **Three plant species of concern and an invertebrate animal species of concern** were found at this location during field visits in 1999 & 2000. No recent disturbances or threats were noted. The site lies partially within Swatara State Park.
3	ST. CLAIR FERN FOSSIL SITE	Blythe Twp.	The **chalk-white fossil ferns** on black shale from this site are world-renowned. Mining activity brings these fossils to the surface (Geyer and Bolles 1979). This site should be conserved for its excellent educational opportunities. This site is private property.
4	BEAR CREEK AT AUCHEYS	South Manheim & Wayne Twps.	A nesting pair of a **G5, PA-Candidate rare animal species of concern** was located at this site in 1996. The habitat is the forested creek bottom in the vicinity of Auchys. This species is associated with large contiguous stands of mature northern hardwood forest. Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
4	BEAR MOUNTAIN	Hegins Twp.	Evidence of several fair-quality populations of a G3G4, S3 PA-Threatened animal species of concern **the eastern woodrat (*Neotoma magister*),** were found along the slopes of Bear Mountain during surveys in 2001. This site also contains a large population of a G4G5, S3 PA-Rare plant species, **minnie-bush (*Menziesia pilosa*)** on several acres along the roads and slopes of Bear Mountain. Disturbances include past mining activity, logging, woods roads and exotic species. No threats are evident and no special management appears to be needed. This site includes private property and a portion of SGL #264.
4	BIG LICK MOUNTAIN	Hegins & Porter Twps.	In 1991 and again in 2001 a good-quality population of a G4G5, S3 PA-Rare plant species, **minnie-bush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Big Lick Mountain. Disturbances include strip mining, logging, woods roads and exotic species. No threats are evident and no special management appears to be needed. This site includes private property and a portion of SGL #264.
4	LOCUST CREEK	Ryan Twp.	In 1988, a good-quality population of a **G4, S1 PA-Endangered animal species of concern** was documented in Locust Creek between Tuscarora Lake and Locust Lake. Enrichment of the water, particularly nitrate runoff, changes in the creek hydrology, and landscape disturbances such as intensive agriculture and development may be responsible for the decline of this species. For these reasons, wide forested buffers should be created and preserved along Locust Creek for the long-term future of this species. This site includes portions of Tuscarora State Park, Locust Lake State Park and private property.
4	LOCUST LAKE FOREST	Blythe & Ryan Twps.	In 1999, a nesting pair with young of a **G5, PA-Candidate rare animal species of concern** was located in Locust Creek State Park. This species is associated with large contiguous stands of mature northern hardwood forest. Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
4	ZION GROVE	North Union Twp.	A nesting pair of a G5, PA-Candidate at risk animal species **the Barn Owl (*Tyto alba*)**, has been observed here seasonally since 1995. Successful breeding was noted on 2 of the last 6 years. This species requires open meadows for feeding and tree cavities or human made structures for nesting. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania.
5	BEARS ROCKS EROSIONAL REMNANT	West Penn Twp. & Lehigh County	**An outcrop of the Tuscarora quartzite** (Silurian age) forms three large blocks standing in a row (Geyer and Bolles 1979). This site falls primarily within SGL #217 and includes a section of the Appalachian Trail.
5	DEER LAKE FOSSIL SITE	West Brunswick Twp. & Deer Lake Borough	The site has **one of the most varied fossil assemblages in PA**. This Mahantango Formation of the Devonian age contains brachiopods, gastropods, pelecypods, cephalopods, trilobites, coelenterates and plants (Geyer and Bolles 1979). This site is on private property.
5	EAST GIRARDVILLE MINE OPENING	Butler Twp.	A single individual of a G4 PA-Candidate rare animal species, **the northern long-eared bat *(Myotis septentrionalis),*** was found in association with an abandoned mine opening in 1994.
5	FRACKVILLE MINE OPENING	Butler Twp. & Gilberton Boro	In 1994, two individuals of a G4 PA-Candidate rare animal species, **the northern long-eared bat *(Myotis septentrionalis),*** were found in association with an abandoned mine opening.
5	GOOD SPRING CREEK WOODS	Frailey Twp.	In 1991, a fair-quality population of a G4G5, S3 PA-rare plant species, **minniebush (*Menziesia pilosa*)**, was found in an acidic, sandstone woods and roadsides along Good Spring Creek. Disturbances include coal mine drainage, utility line R-O-W and exotic species. Strip mining in this area poses a threat to this species.
5	LAKE HAUTO	Rush Twp. & Carbon Co.	In 1984, a poor-quality population of a G4, S3 PA-Rare plant species, the **climbing fern *(Lygodium palmatum)***, was documented as occupying a small portion of the margin of Hauto Lake. The surrounding land is a housing development. No disturbances were noted, though clearing and /or draining were listed as potential threats. Runoff from the development could detrimentally impact this site. A forested buffer should be maintained around this lake and the adjacent wetlands. Additional surveys are recommend to determine the current population status of this species at this site.

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County Rank[1]	Site Name	Municipality(s)	TNC and Ranks[2] and Site Importance
5	NESQUEHONING HEADWATERS VERNAL POOLS	Rush Twp.	An Ephemeral / Fluctuating Pool natural community was documented from this site in the fall of 2002. The pools and headwater seeps of the Nesquehoning Creek are perched on Broad Mountain in a contiguous and unfragmented forested context. This pond likely provides the necessary breeding habitat for forest dwelling amphibians. A dirt lane passes near the pond. It appears that no traffic has impacted the pond at this time, but measures may need to be taken to block the possibility of the degradation of this habitat by All Terrain Vehicles.
5	RATTLING RUN/ SCHUYLKILL GAP	West Brunswick Twp, Port Clinton Boro & Berks County	Rattling Run has been designated as an **Exceptional Value Stream** by the PA Department of Environmental Protection, and as a Class A Trout Water by the PA Fish & Boat Commission. Undisturbed forested buffers should be maintained along the length of the stream. **A Geologic Feature** at this site represents an outstanding example of a water gap in Blue Mountain. This site falls primarily within SGL#110 & #106, Weiser State Forest and includes a section of the Appalachian Trail.
5	SCHWEIGERTS SCHOOL	Wayne Twp.	A nest of a G5, PA-Candidate at risk animal species **the Barn Owl (*Tyto alba*)**, was observed here in 1998. A hole in the nesting structure has been filled and may not provide access for future nesting. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania.

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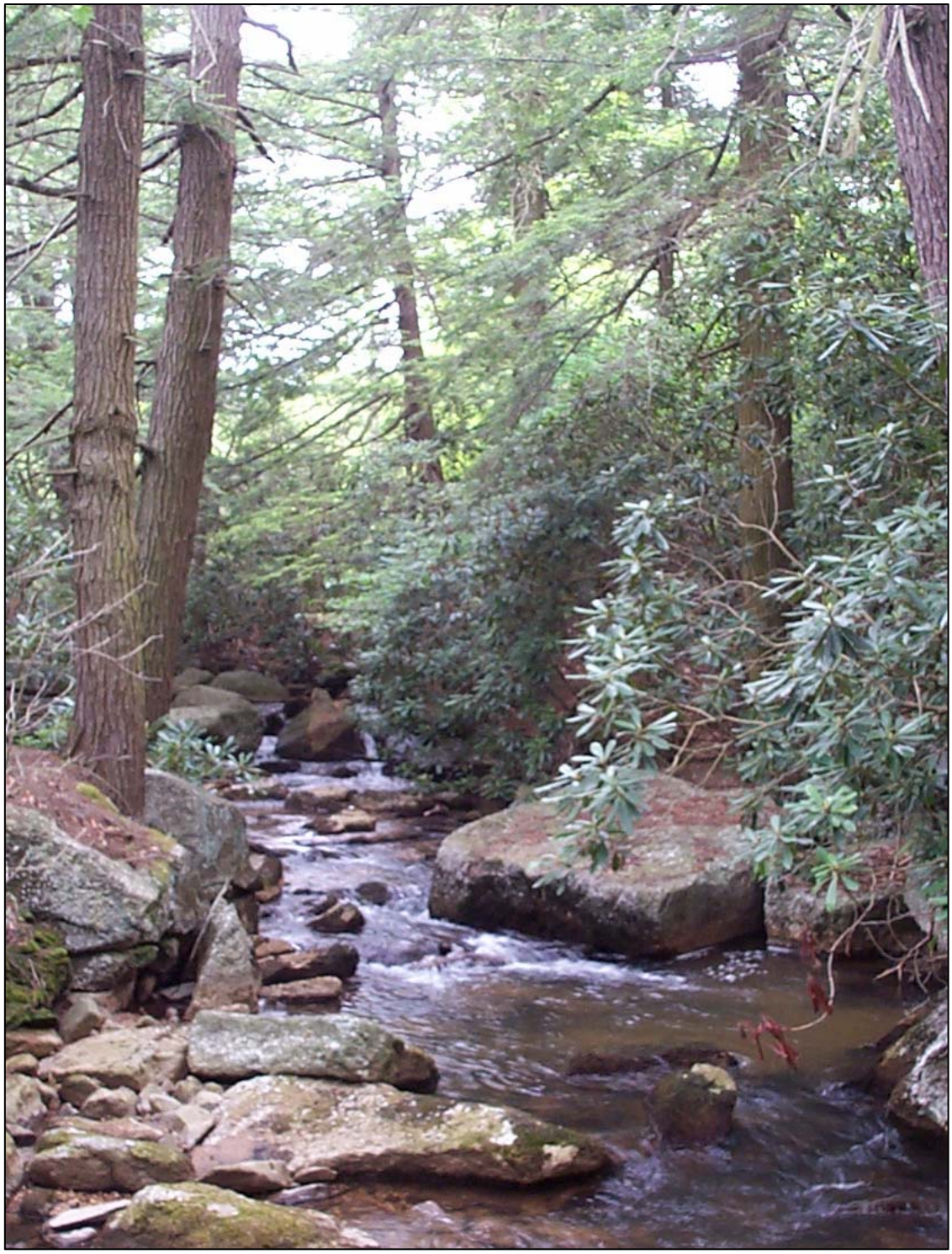
TABLE 3. Areas of Local Significance in Schuylkill County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential (These sites do not include high quality natural communities and no species of special concern have been documented at the sites although several of the areas have potential for rare species to occur).

County Rank[1]	Site Name	Municipality	Natural Feature and Importance
High	Hometown Ridgetop Dwarf-Tree Forest	Rush Twp.	This site represents one of five expansive Ridgetop Dwarf-Tree Forest Natural Communities that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.
High	Dyer Run	Cass Twp.	This site includes the ravine and creek of Dyer Run, the outflow of Minersville Reservoir. This Hemlock–Oak Forested Ravine has a thick undergrowth of rhododendron. Several seeps with lush sphagnum moss flow into the creek from the adjacent slopes. Dramatic conglomerate outcrops flank the ravine for scenic splendor.
High	Exmoor Wetlands	Pine Grove Township	This Locally Significant site includes the floodplains along the Swatara Creek between Pine Grove Borough and I-81. The various wetland habitats found at this site include forested wetlands, shrub wetlands, and herbaceous openings dominated by sedges and grasses. Changes in the hydrology (draining or filling), or changes at the upstream water treatment facility could impact the health of this wetland system.
High	Moss Glen Watershed	Blythe Twp.	This site is comprised of the hemlock and rhododendron covered banks and seeps of Big Creek, which feeds the Moss Glen Reservoir. The well-developed understory is inhabited by a good diversity of birds including an exceptional number of Canada Warblers, a bird typically of more northern affinity. Several seepages feed Big Creek from the adjoining hillsides, creating sparsely canopied wetlands, which include several good-quality populations of Coville's rush (*Juncus gymnocarpus*).
Medium	Eisenhuth Seeps	Ryan Twp.	This Locally Significant site includes three spring-fed forested seeps leading into the Eisenhuth Reservoir. As the streamlets rise in elevation they branch repeatedly, some ending in a carpet of sphagnum moss. Thick stands of Coville's rush (*Juncus gymnocarpus*) line the seeps from top to bottom. Additional surveys for species of concern are encouraged.

County Rank[1]	Site Name	Municipality	Natural Feature and Importance
Medium	Mahoning Creek Wetlands	West Penn Twp. & Carbon Co.	This Locally Significant site is comprised of a shrub swamp, wooded swamp, sedge meadow and vernal pool wetland types. The site provides important breeding habitat for amphibians, reptiles, birds and a host of wetland plant species. Much of this type of habitat has been drained or filled in the past, so the protection of what is left is critically important. Disturbances observed at this site include a recent attempt to fill and drain this wetland. Though the destruction of this wetland habitat has ceased for the time being, efforts should be made to secure this site as valuable wildlife habitat.
Medium	Rabbit Run Wetland	East Brunswick Twp.	The wetlands at this site have an exceptional diversity of plant species. The late autumn mowing regime at this site helps maintain the habitat for these species.
Medium	Shenandoah Municipal Authority Watershed	Union Twp.	This Locally Significant site contains the forested seeps, streams and creeks leading into Shenandoah Reservoir #6. The hemlock forest at the head of the reservoir resembles old growth, with large hemlocks, yellow birch, tulip poplar and chestnut oak. A tree ring core from one of the hemlocks revealed a conservative estimate of 150 years. The hemlocks in this older-growth forest are currently infested with the hemlock wooly adelgid (*Adelges tsugae*). This site should be considered for the release of biological control agents for the hemlock wooly adelgid.
Medium	Tumbling Run	Blythe & North Manheim Twps.	This site includes Tumbling Run, the main tributary to Silver Creek Reservoir, which contains a good-quality headwaters swamp. Extensive clearcutting and over-browsing by deer have diminished this site's quality, but it still functions as a migration corridor for birds and other animals. Reducing the size of the deer herd at this location would help improve this habitat. The Tumbling Run Creek is designated as a High-Quality Stream by the PA Department of Environmental Protection, and as a Class A trout water by the PA Fish & Boat Commission.
Low	Ashland Watershed	Butler Twp.	This site, pressed between Rt-61 and I-81, includes the Ashland Reservoir and the surrounding spring-fed seeps and streams. The hemlock-lined ravines provide good habitat for forest dwelling birds, stream salamanders and other wildlife. A wetland east of the reservoir may provide habitat for species of concern. Additional surveys to this area are encouraged.
Low	Little Schuylkill River	East Brunswick & West Brunswick Twps.	This Locally Significant site is a length of the Little Schuylkill River between New Ringgold and Drehersville. Previously impacted by acid mine drainage, this river has seen much recent improvement. The site includes two wetlands, a mesic rock-outcrop community and a historic cultural feature. The biggest disturbance is invasive plant species.

County Rank[1]	Site Name	Municipality	Natural Feature and Importance
Low	Little Schuylkill River Outcrops	Rush Twp.	This Locally Significant site is a rocky outcrop at an extreme bend in the Little Schuylkill River within State Game Lands #227. Despite an accumulation of litter at this site, the cliff face and outcrops exhibit good plant diversity as well as an exceptionally scenic setting. The use of this site by litterbugs and invasive species, such as multiflora rose (*Rosa multiflora*) and Japanese barberry (*Berberis thunbergii*), pose the greatest threat to this site.
Low	Sweet Arrow Lake	Pine Grove & Washington Twps.	This Locally Significant site includes Sweet Arrow Lake and the adjacent headwaters. This body of water serves as a migration stopover for many species of birds. It also provides recreational boating and fishing opportunities. No threats were reported, and no special management appears to be needed. This site is owned primarily by Schuylkill County.

Natural Areas of Schuylkill County by Township



BARRY TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Mahanoy Creek at Taylorsville	Animal: Great Blue Heron *(Ardea herodias)*	G5	S3S4B,S4N	N	2002	CD

Managed Areas: Weiser State Forest

Barry Township:

MAHANOY CREEK AT TAYLORVILLE (Barry, Butler & Eldred Townships) - This site hosts the only known **Great Blue Heron (*Ardea herodias*)** nesting site in Schuylkill County. This species was in severe decline throughout Pennsylvania at the turn of the century and for 50 years after, but has made a remarkable comeback in recent decades (Brauning 1992). Acid mine drainage (AMD), which kills fish and other aquatic life, may have deprived these birds of their food source in the past. Efforts to mitigate the effects of AMD over the past few decades have likely helped restore life to some of these previously disturbed aquatic habitats. Disturbance or destruction of this woodland rookery by logging operations poses the greatest threat to this site. A wide, undisturbed forested buffer should be maintained around this site. A portion of Weiser State Forest and private property are included in this site.

It is possible that additional field studies would identify sensitive features along Back Creek, Hans Yost Creek, or the many seeps draining off the mountain slopes. Good quality populations of Coville's rush (*Juncus gymnocarpus*) have been documented in the seeps draining from Mahantango Mountain. Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. Not only are they important to many plant and animal species, but the features also help to improve water quality, provide groundwater recharge, and protection from flooding.

Barry Township

Mahanoy Creek at Taylorville

Scale 1:45,000

0.5 0 0.5 1 Miles

Barry Township

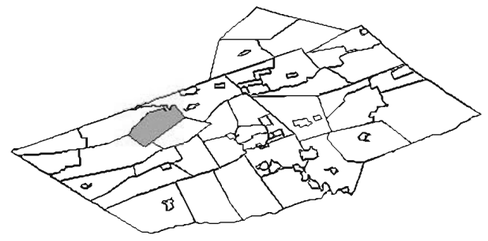
Schuylkill County Natural Areas Inventory

Natural Areas:

Mahanoy Creek at Taylorville

Managed Areas:

Weiser State Forest



Legend

- Natural Area or Locally Significant Site
- Managed Area

Top: The yellow-fringed orchid (*Platanthera ciliaris*) occurs in several open wetlands in Schuylkill County. Removal from its natural habitat by uninformed gardeners may pose the greatest risk to this species. Photo by the Pennsylvania Science Office of The Nature Conservancy.

Bottom: The chalk-white fossil ferns on black shale from the St. Clair fossil site are world-renowned. Mining activity brings these fossils to the surface. The fossils at this site present an excellent educational opportunity to describe the biologic and geologic processes involved in the formation of coal and other fossil fuels. This site is on private property.

BLYTHE TOWNSHIP, Middleport & New Philadelphia Boroughs

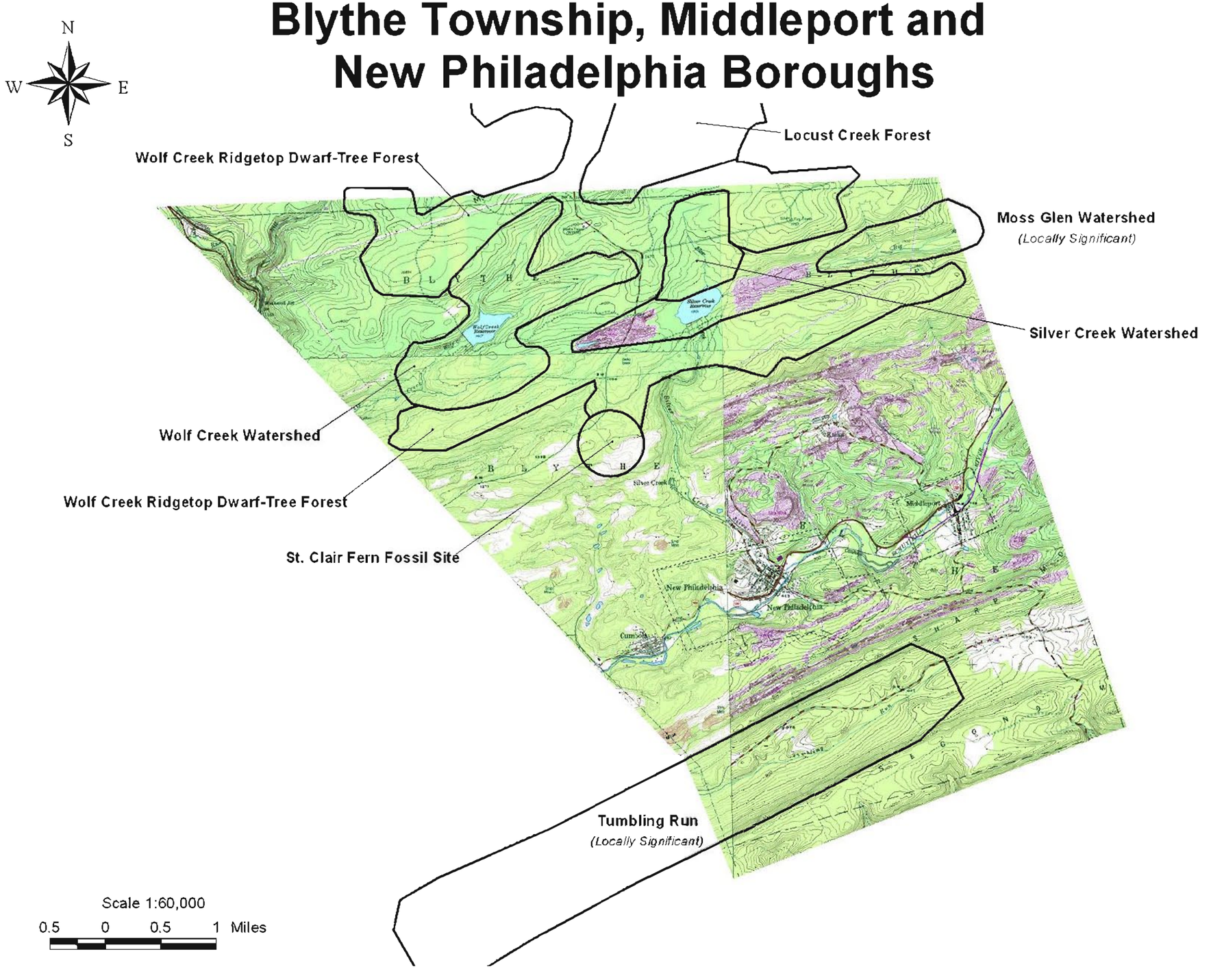
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Locust Lake Forest	Animal	G5	S2S3B-S3N	N	1999	E
St. Clair Fern Fossil Site	Geologic Feature			N		E
Silver Creek Watershed	Plant: Coville's rush *(Carex collinsii)*	G4	S2	PE	7/03/2002	B
	Plant: Yellow-fringed orchid *(Platanthera ciliaris)*	G5	S2	TU	7/03/2002	D
Wolf Creek Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	7/02/02	B
Wolf Creek Watershed	Plant: Coville's rush *(Carex collinsii)*	G4	S2	PE	7/31/2002	A
	Plant: Yellow-fringed orchid *(Platanthera ciliaris)*	G5	S2	TU	7/31/2002	BC
	Plant: Screwstem *(Bartonia paniculata)*	G5	S3	N	7/31/2002	D

Locally Significant: Moss Glen Watershed
Tumbling Run

Other: Tumbling Run – High Quality Stream, Class-A Trout Water
Wolf Creek – High Quality Stream

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Blythe Township, Middleport and New Philadelphia Boroughs



Blythe Township, Middleport and New Philadelphia Boroughs

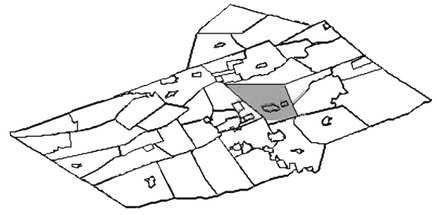
Schuylkill County Natural Areas Inventory

Natural Areas:

- Locust Creek Forest
- Silver Creek Watershed
- St. Clair Fossil Site
- Wolf Creek Ridgetop Dwarf-Tree Forest
- Wolf Creek Watershed

Locally Significant Sites:

- Moss Glen Watershed
- Tumbling Run



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Blythe Township:

LOCUST LAKE FOREST (Blythe & Ryan Townships) - In 1999, a nesting pair with young of a **G5, PA-Candidate rare animal species of concern** was located in Locust Creek State Park. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon. Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites. This site is primarily within Locust Lake State Park.

SILVER CREEK WATERSHED (Blythe Township) – This site contains two plant species of concern: a good-quality population of the G4, S2 PA-Endangered **Collin's sedge (*Carex collinsii*),** a species more typically of Atlantic coastal distribution, and a small population of the G5, S2 **yellow-fringed orchid (*Platanthera ciliaris*).** These inland populations of Collin's sedge represent a very rare occurrence for this plant species. The habitat of these species is the shrubby stream bank and the adjoining seeps of Silver Creek, which, along with Big Creek, fills the Silver Creek Reservoir. The unusual and interesting mix of species at this site, along with Collin's sedge and the yellow-fringed orchid, include bayberry (*Myrica pennsylvanica*), smooth winterberry (*Ilex laevigata*), and Coville's rush (*Juncus gymnocarpus*), a combination that likely does not occur in many other locations in the world. Disturbances observed during site visits include abandoned strip mines, dirt roads, utility lines & planted exotic conifers. Undisturbed forested buffers should be maintained around all seeps and creek banks within this watershed.

ST. CLAIR FERN FOSSIL SITE (Blythe Township) - The **chalk-white fossil ferns** on black shale from this site are world-renowned. Mining activity brings these fossils to the surface (Geyer and Bolles 1979). The fossils at this site present an excellent educational opportunity to describe the biologic and geologic processes involved in the formation of coal and other fossil fuels. Conservation of this site for future generations should be considered a top priority when development plans are generated for this area. This site is private property.

WOLF CREEK RIDGETOP DWARF-TREE FOREST (Blythe & Ryan Townships) - This Natural Community lies to the west of Route 61 between Pottsville and Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine–Scrub Oak Woodland", "Pitch Pine-Mixed Hardwood Woodland", "Pitch Pine-Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine, scrub oak, chestnut oak (*Quercus montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp.*), huckleberries

(*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered moth species, endemic to Pennsylvania, that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. This site includes portions of Weiser State Forest and Locust Lake State Park.

WOLF CREEK WATERSHED (Blythe Township) –Field visits to the Wolf Creek reservoir watershed in 1991, 1997 and 2002 revealed several populations of three plant species of concern. Several good to excellent-quality populations of a G4, S2 PA-Endangered plant species, **Collin's sedge (*Carex collinsii*),** a species more typically of Atlantic coastal distribution, were found growing in shrub-swamp thickets along Wolf Creek. These inland populations represent a very rare occurrence for this plant species. Collin's sedge was found growing in conjunction with Coville's rush (*Juncus gymnocarpus*), a highly unusual plant association that likely does not occur in many other locations in the world. A good-quality population of a G5, S2 plant of special concern, **the yellow-fringed orchid (*Platanthera ciliaris*)**, was also located in Wolf Creek. The third plant species of concern found at this site is the G5, S3 **screwstem (*Bartonia paniculata*)**. Associated species at this site include cinnamon fern (*Osmunda cinnamomea*), sedges (*Carex folliculata* & *C. trisperma*), Coville's *rush (Juncus gymnocarpus*), skunk cabbage (*Symplocarpus foetidus*), sundew (*Drosera rotundifolia*), highbush blueberry (*Vaccinium corymbosum*), dewberry (*Rubus hispidus*) and sphagnum moss (*Sphagnum spp.).*

This site also includes a **"sphagnum-sedge wetland"** of excellent quality. This community type lacks a canopy of trees or shrubs, and is characterized by a thick layer of sphagnum moss, various graminoids including cotton grass (*Eriophorum virginicum*), Collin's sedge, Coville's rush, and ferns. Stunted-growth shrubs including highbush blueberry (*Vaccinium corymbosum*) and smooth winterberry (*Ilex laevigata*) ring the opening.

No threats were reported from this creek, however, beaver activity & competition from other plant species could be problems in the future. This site and the surrounding area are primarily on Municipal Watershed Property. Recent regulations regarding the mandatory treatment of drinking

water has led some water companies to consider selling-off large tracts of watershed property deemed unnecessary for water purification. In the event that this property is considered for sale, concerted efforts should be made to purchase this land, or a conservation easement, for the protection of the unique habitat at this site. The PA Department of Environmental Protection designates Wolf Creek as a High-Quality Stream.

Locally Significant Sites:

Moss Glen Watershed (Blythe & Schuylkill Townships) – This **Locally Significant site** is comprised of the forested banks and seeps of Big Creek, which feeds the Moss Glen Reservoir. The creek banks are cloaked in hemlocks, white pines and rhododendrons, creating a cool, shaded environment. The well-developed understory is inhabited by a good diversity of birds including an exceptional number of Canada Warblers (*Wilsonia canadensis*), a bird typically of more northern affinity. Several seepages feed Big Creek from the adjoining hillsides, creating sparsely canopied wetlands dominated by skunk cabbage (*Symplocarpus foetidus*) and cinnamon fern (*Osmunda cinnamomea*), and including several good-quality populations of Coville's rush (*Juncus gymnocarpus*). Among the bird species observed at this site include Hermit Thrush (*Catharus guttatus*), Red-eyed Vireo (*Vireo olivaceus*), Ovenbird (*Seiurus aurocapillus*), Black-throated Green Warbler (*Dendroica virens*), Scarlet Tanager (*Pyrangea olivaceus*), Common Yellow-throat (*Geothylpis trachias*), Black-throated Blue Warbler (*Dendroica caerulescens*), Black-and-white Warbler (*Mniotilta varia*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), Ruby-throated Hummingbird (*Archilochus colubris*), and Eastern Towhee (*Pipilo erythrophthalmus*). Previous mining operations, creation of new access roads and construction of cell towers were the only disturbances noted on this site. Further fragmentation of this landscape by these activities would diminish the quality of this site. This site is the property of the Blythe Township Municipal Authority.

Tumbling Run (Blythe and North Manheim Townships) – This **Locally Significant site** includes Tumbling Run, the main tributary to Silver Creek Reservoir, which contains a fair-quality headwaters swamp. Extensive clearcutting and over browsing by deer have diminished this site's quality, but it still functions as a migration corridor for birds and other animals. Reducing the size of the deer herd at this location would help improve this habitat. Undisturbed forested buffers should be maintained around all seeps and creek banks within this watershed. The Tumbling Run Creek is designated as a High-Quality Stream by the PA Department of Environmental Protection, and as a Class A trout water by the PA Fish & Boat Commission.

BRANCH TOWNSHIP

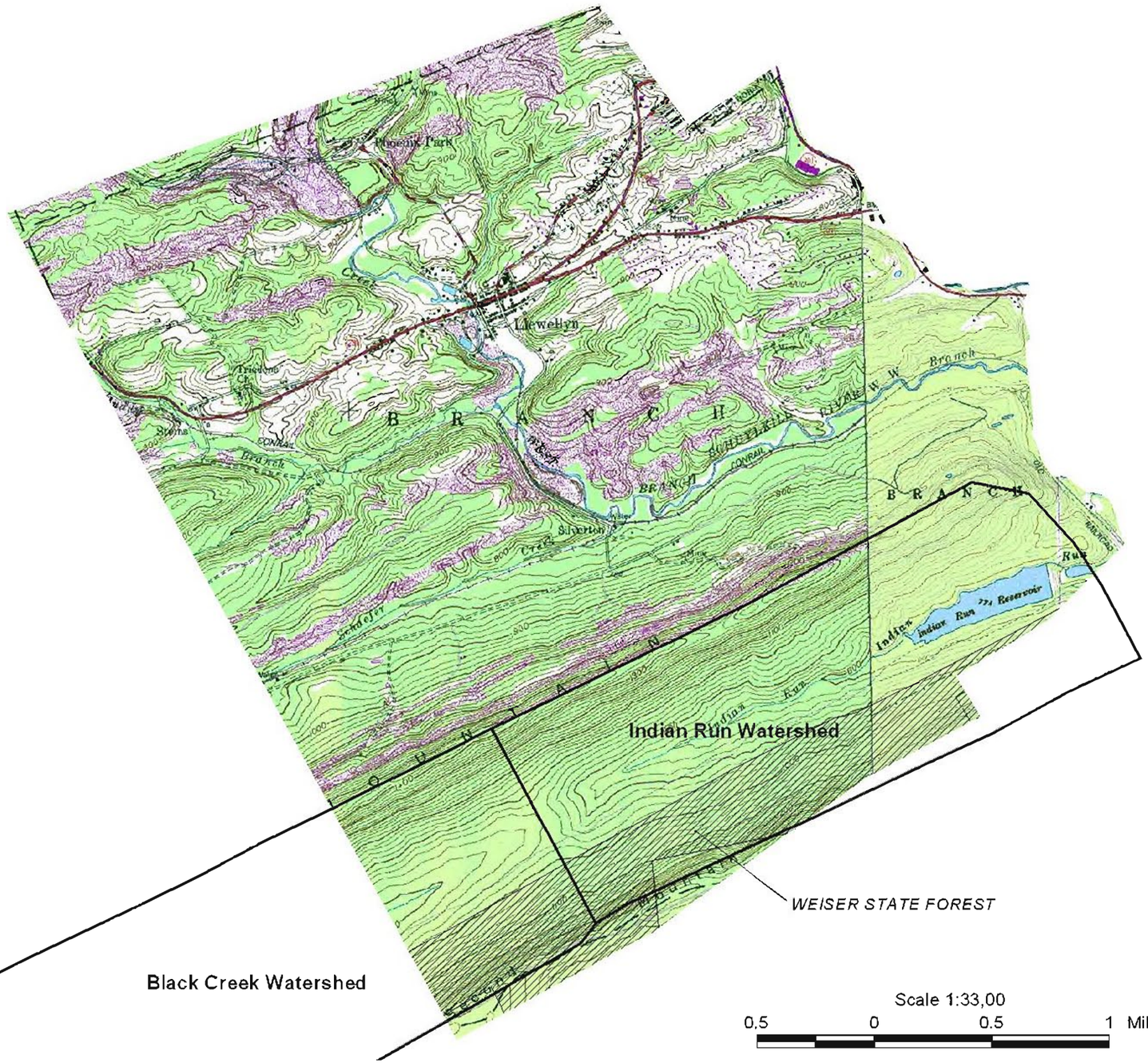
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Black Creek Watershed	Bird: Pied-billed Grebe *(Podilymbus podiceps)*	G5	S3B,S4N	N	6/17/2002	E
Indian Run Watershed	Animal: Northern long-eared bat (*Myotis septentrionalis*)	G4	S3B,S3N	CR	7/22/2002	E
	Animal: Mountain starwort *(Stellaria borealis)*	G5	S1S2	N	7/01/2002	B

Managed Areas: Weiser State Forest

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

The virtually undisturbed lush seeps feeding Indian Run harbor a great diversity of plant and animal life.
(Photo by the PA Science Office of The Nature Conservancy)

Branch Township



Branch Township

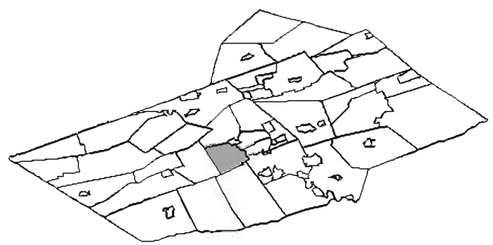
Schuylkill County
Natural Areas Inventory

Natural Areas:

Black Creek Watershed
Indian Run Watershed

Managed Areas:

Weiser State Forest



Legend

- Natural Area or Locally Significant Site
- Managed Area

Branch Township:

BLACK CREEK WATERSHED (Branch & Reilly Townships) - The large, contiguous forest within this relatively undisturbed valley contains a beautiful mosaic of hemlock palustrine forest, alder-sphagnum wetland with graminoid openings, and an extensive Blueberry/Meadowsweet shrub swamp. In conjunction with the Indian Run watershed to the east, this area represents an intact palustrine ecosystem of rare quality and size in Schuylkill and many neighboring Counties. It is the contiguous and relatively undisturbed nature of these watersheds and excellent water quality of the streams that make this area one of the top sites in the county for conservation. This is an example of a landscape-scale ecosystem that if left intact, can be expected to be viable well into the future.

A single occurrence of a G5, S3B-S4N PA-Candidate rare bird species of concern, **the Pied-billed Grebe *(Podilymbus podiceps)*** was observed at this site. This species has been known to breed in many open-water habitats and at this site was observed in an isolated active beaver pond surrounded by a Hemlock-mixed hardwood forest. Associated species included Osprey (*Pandion haliatus*), Great Blue Heron (*Ardea herodias*), Tree Swallow (*Tachycineta bicolor*), Red-shouldered Hawk (*Buteo lineatus*), and Black-throated Green Warbler (*Dendroica virens*). This site contains no immediate threats or disturbances, since the area is fairly remote. Acid mine drainage was observed in a shrub swamp leading out of the beaver pond, and should be monitored for possible decreased water quality in the future.

The hemlock-palustrine forest, the surrounding alders-sphagnum wetland and the meadowsweet/blueberry shrub swamp provide excellent quality habitat for many neo-tropical migrant landbirds. Many uncommon northern affinity species such as Canada Warbler (*Wilsonia canadensis*), Northern Waterthrush (*Seiurus noveboracensis*), and Black-throated Blue Warbler (*Dendroica caerulescens*) were present in good numbers. Other bird species observed include Scarlet Tanager (*Piranga olivacea*), Veery (*Catharus fuscescens*), Blue-headed Vireo (*Vireo solitarius*), Black-and-white Warbler (*Mniotilta varia*), Hooded Warbler (*Wilsonia citrina*), Great Crested Flycatcher (*Myiarchus crinitus*) and Ovenbird (*Seiurus aurocapillus*). The dominant vegetation at this site includes hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), meadowsweet (*Spirea latifolia*), highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), three-way sedge (*Dulichium arundinaceum*), St. John's wort (*Hypericum spp.)*, alder (*Alnus spp*.), royal fern (*Osmunda regalis*), soft rush (*Juncus effusus*) and short-hair sedge (*Carex crinita*). Observed disturbances include logging in some areas which could make conditions favorable for exotic species. This site is primarily owned by the Pine Grove Borough Water Authority, and includes a portion of Weiser State Forest.

INDIAN RUN WATERSHED (Branch, North Manheim & Wayne Townships) – This site includes the Indian Creek and the myriad of springs and seeps draining off the adjacent slopes. Being primarily within the Schuylkill County Municipal Authority watershed, this site has seen virtually no recent disturbance. The braided headwaters of Indian Creek are particularly diverse in plant species. Over 120 species were listed during the inventory. This mixed hardwood and conifer forest is dominated by red maple (*Acer rubrum*), black birch (*Betula lenta*), yellow birch (*Betula alleghaniensis*), various oaks (*Quercus spp.*), black gum (*Nyssa sylvatica*), hemlock (*Tsuga canadensis*), pitch pine (*Pinus rigida*), and white pine (*Pinus strobus*).

An unknown-quality population of a G4, S3B, S3N PA-Candidate rare animal species, **the northern long-eared bat (*Myotis septentrionalis*),** was found at this site during the July 2002 inventory. These animals are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed. The PA Game Commission monitors this species.

Also found at this site was a good-quality population of **mountain starwort (*Stellaria borealis*)** a G5, S1S2 plant species of concern. The plants were found growing in the braided headwaters of Indian Creek in deep, organic, water-saturated soil. Associated species include mosses (*Bryophytes*), blue marsh violet (*Viola cucullata*), enchanter's-nightshade *(Circaea alpina),* sedges (*Carex leptalea, C. echinata*), golden saxifrage (*Chrysosplenium americanum*) and jewelweed (*Impatiens capensis*). This site is currently protected as watershed property by the Schuylkill County Municipal Authority. In the event that the Water Authority considers this property obsolete for the purpose of water purification, effort should be made to secure this area for conservation purposes.

The mountain starwort (*Stellaria borealis*) and the Luna moth (*Actias luna*) were among the great diversity of plant and animal species found during a survey of Indian Run Watershed.
(Photos by the PA Science Office of The Nature Conservancy)

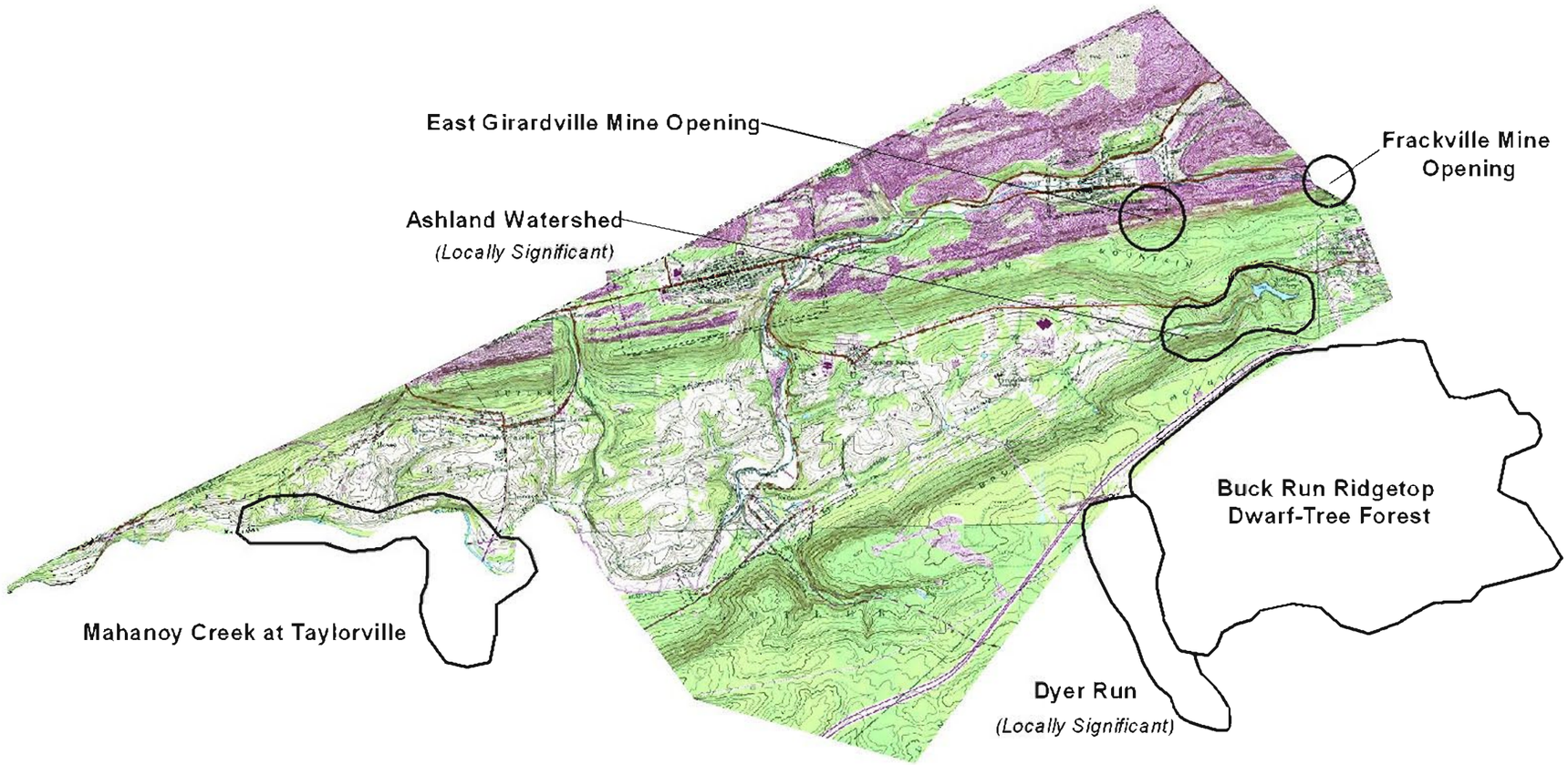
BUTLER TOWNSHIP, Ashland, Girardville & Gordon Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Buck Run Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/04/2002	B
East Girardville Mine Opening	Animal: Northern long-eared bat (*Myotis septentrionalis*)	G4	S3B, S3N	N	9/25/1994	E
Frackville Mine Opening	Animal: Northern long-eared bat (*Myotis septentrionalis*)	G4	S3B, S3N	N	9/24/1994	E
Mahanoy Creek at Taylorsville	Animal: Great Blue Heron *(Ardea herodias)*	G5	S3S4B,S4N	N	2002	CD

Locally Significant: Ashland Reservoir

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Butler Township , Ashland, Girardville and Gordon Boroughs



Scale 1:76,000

0.5 0 0.5 1 1.5 2 Miles

Butler Township, Ashland, Girardville and Gordon Boroughs

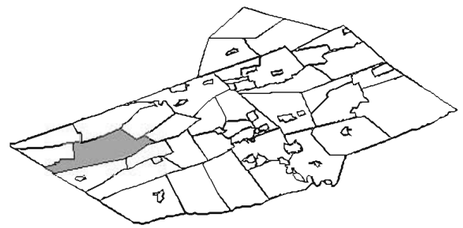
Schuylkill County Natural Areas Inventory

Natural Areas:

Buck Run Ridgetop Dwarf-Tree Forest
East Girardville Mine Opening
Frackville Mine Opening
Mahanoy Crrek at Taylorville

Locally Significant Sites:

Ashland Watershed
Dyer Run



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Butler Township:

BUCK RUN RIDGETOP DWARF-TREE FOREST (Butler, Cass, & Newcastle Townships.) – Only a small portion of this natural area falls in Butler Township. For a complete description of this site please see Cass Township.

EAST GIRARDVILLE MINE OPENING (Butler Township & Girardville Borough) - A single individual of a G4 PA-Candidate rare animal species, **the northern long-eared bat (*Myotis septentrionalis*)**, was found in association with an abandoned mine opening in 1994. This species is using abandoned mine openings and underground mines as hibernacula during the fall and winter months. These bats are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed. Blocking or collapsing the mine openings is a threat to these species. For safety reasons, the mine openings could be gated to exclude human interference, and still allow the animals to enter the mine. The PA Game Commission monitors this species.

FRACKVILLE MINE OPENING (Butler & West Mahanoy Townships) - In 1994, two individuals of a PA-Candidate rare animal species, **the northern long-eared bat (*Myotis septentrionalis*)**, were found in association with an abandoned mine opening. These animals are using abandoned mine openings and underground mines as hibernacula during the fall and winter months. These bats are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed. Blocking or collapsing the mine openings is a threat to these species. For safety reasons, the mine openings could be gated to exclude human interference, and still allow the animals to enter the mine. The PA Game Commission monitors this species.

MAHANOY CREEK AT TAYLORVILLE (Barry, Butler & Eldred Townships) - This site hosts the only known **Great Blue Heron (*Ardea herodias*)** nesting site in Schuylkill County. This species was in severe decline throughout Pennsylvania at the turn of the century and for 50 years after, but has made a remarkable comeback in recent decades (Brauning 1992). Hunting and the pesticide DDT may have been factors accelerating the decline of this species. Acid mine drainage (AMD), which kills fish and other aquatic life, may also have deprived these birds of their food source in the past. Efforts to mitigate the effects of AMD over the past few decades have likely helped restore life to some of these previously disturbed aquatic habitats. Disturbance or destruction of this woodland rookery by logging operations poses the greatest threat to this site. A wide, undisturbed forested buffer should be maintained around all heron nests at this site. A portion of Weiser State Forest and private property are included in this site.

Locally Significant site:

Ashland Reservoir (Butler Township) – This **Locally Significant site** pressed between Rt-61 and I-81 includes the Ashland Reservoir and the surrounding spring-fed seeps and streams. The hemlock-lined ravines provide good habitat for forest dwelling birds, stream salamanders and other wildlife. A wetland east of the reservoir may provide habitat for species of concern, additional surveys to this area are encouraged.

CASS TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Buck Run Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/04/2002	B

Locally Significant: Dyer Run

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

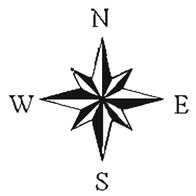
Cass Township:

BUCK RUN RIDGETOP DWARF-TREE FOREST (Butler, Cass, & Newcastle Townships.) - This Natural Community can be easily viewed from Interstate I-81 between the exits for Minersville and Frackville. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex**", **also known as a "Ridgetop Dwarf-Tree Forest"**. This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, the "Ridgetop Dwarf-Tree Forest" is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus ilicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp.*), huckleberries (*Gaylussacia spp.*), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered species that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.

Cass Township and Minersville Borough



Scale 1:45,000

0.5 0 0.5 1 Miles

Cass Township and Minersville Borough

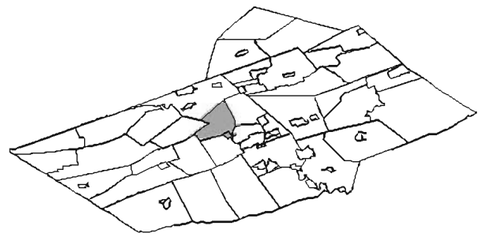
Schuylkill County Natural Areas Inventory

Natural Areas:

Buck Run Ridgetop Dwarf-Tree Forest

Locally Significant Sites:

Dyer Run



Legend

Natural Area or Locally Significant Site

Municipal Boundary

Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Area was delineated from aerial photographs.

Locally Significant Site:

Dyer Run (Butler & Cass Townships) - This **Locally Significant site** includes the ravine and creek of Dyer Run, the outflow of Minersville Reservoir. This site is a Hemlock – Oak Forested Ravine, with a thick undergrowth of rosebay (*Rhododendron maximum*) and mountain laurel (*Kalmia latifolia*). Several seeps with lush sphagnum moss (*Spagnum spp.)*, New York fern (*Thelypteris noveboracensis),* cinnamon fern (*Osmunda cinnamomea*) and sundew (*Drosera rotundifolia*) flow into the creek from the adjacent slopes. Other species characterizing this ravine include hobblebush (*Viburnum lantanoides*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), elderberry (*Sambucus canadensis*) and mountain holly (*Ilex montana*). Large-cobble conglomerate outcrops of precariously perched boulders flank this narrow, stony ravine. The hemlock ravine provides a lush, cool, shaded counterpart to the surrounding high elevation pitch pine – scrub oak forest matrix. Birds identified at this time of year were likely breeding in this location. Among the observed species were Ovenbird (*Seiurus aurocapillus*), Scarlet Tanager (*Piranga olivaceus),* Red-eyed Vireo (*Vireo olivaceus*), Black-throated Green Warbler (*Dendroica virens*), Black-and-white Warbler (*Mniotilta varia*), and Canada Warbler (*Wilsonia canadensis*).

A hemlock pest accidentally introduced from Asia, the hemlock wooly adelgid (*Adelges tsugae*), has detrimentally impacted hemlock stands throughout the mid-Atlantic states and New England. These small, aphid-like insects are covered with a cottony mass giving them a wooly appearance. They suck sap from the young twigs of hemlock trees resulting in the loss of needles and new growth. Without new shoot growth to support photosynthesis, tree health is seriously impaired, leading to defoliation and tree death within several years. This pest has the potential to severely alter hemlock-dominated habitats. As mature hemlock stands are defoliated, the cool, moist microclimate created by their deep shade ceases to exist. Plant and animal species that are adapted to this environment will, in effect, be homeless. Work is ongoing to identify and distribute natural predators of the wooly adelgid. This approach, known as biological control, is the only likely way to control this widespread pest. A small lady beetle (*Pseudoscymnus tsugae*) has been the focus of the biological control effort so far. This species, a natural predator of wooly adelgid in Japan, has proven effective in controlling this pest in its native setting. This wooly adelgid predator has been released at various sites in infested areas since 1995. Though initial results from these field releases have been encouraging, it will likely take many years to determine if this predator can be an effective control of the hemlock wooly adelgid in North America. In the meantime, hemlock dominated habitats are in serious danger from this pest.

The dramatic conglomerate boulder outcrops on the rim of this steep ravine lead to the hemlock and rhododendron enshrouding the clear, cool water of Dyer Run, Cass Township.
(Photos by the PA Science Office of The Nature Conservancy)

DELANO TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bears Head Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/21/02	B

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Delano Township:

BEARS HEAD RIDGETOP DWARF-TREE FOREST (Delano, East Union, Mahanoy & West Mahanoy Townships) - This Natural Community occupies the higher elevations of Locust Mountain north of Shenandoah and Delano, and is bounded on the east by Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered moth species that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

Delano Township

Scale 1:30,000

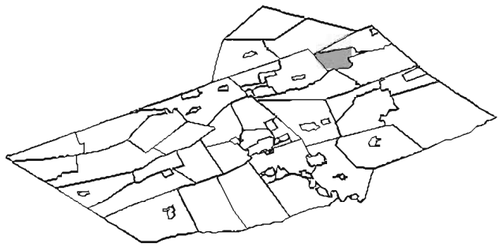
0.5 0 0.5 1 Miles

Delano Township

Schuylkill County
Natural Areas Inventory

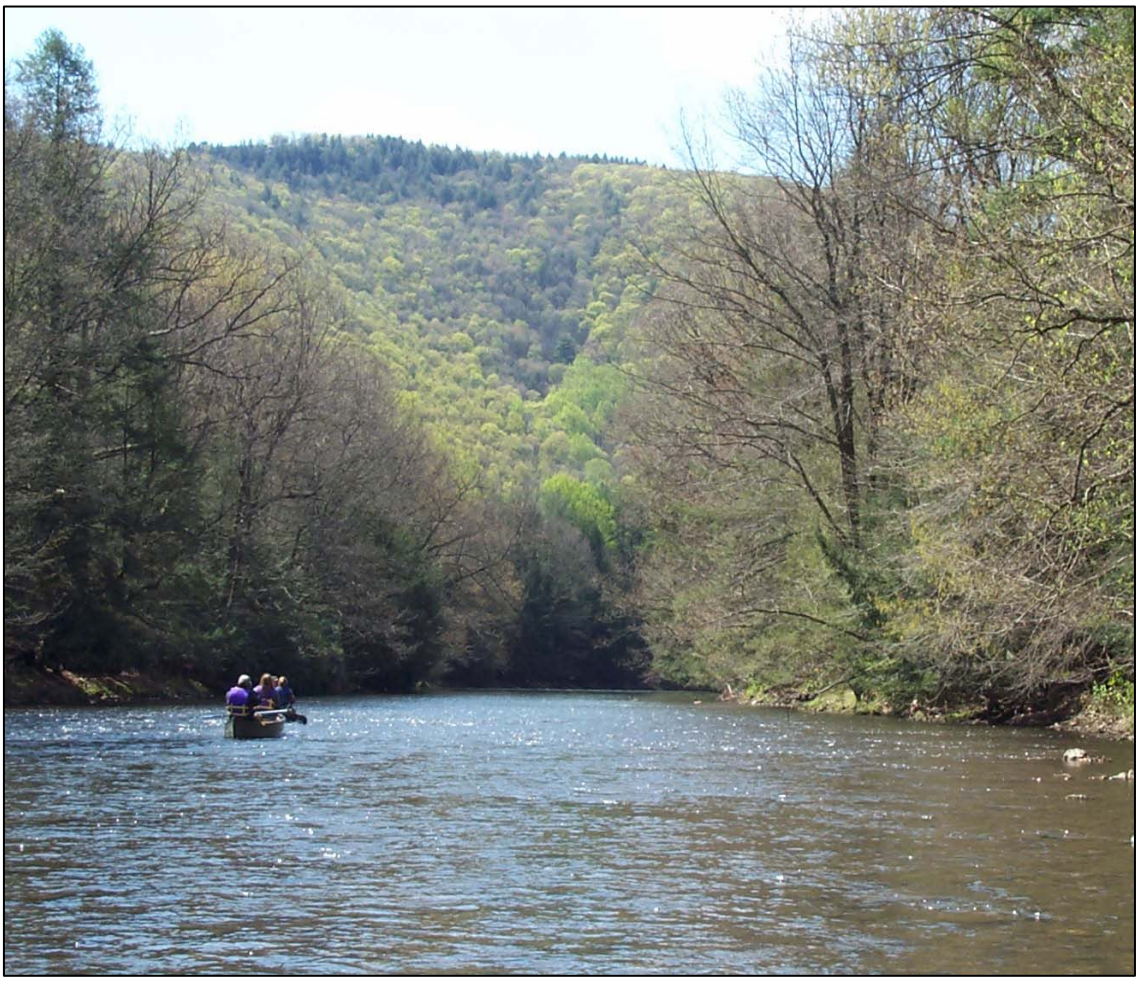
Natural Areas:

Bears Head Ridgetop Dwarf-Tree Forest



Legend

Natural Area or Locally Significant Site



A view of Hawk Mountain as seen from the Little Schuylkill River. Once considered quite degraded by acid mine drainage, the Little Schuylkill River has seen great improvement over the past two decades. The water once again hosts aquatic insect life, an essential component in aquatic ecosystems, upon which fish, birds and mammals all depend.
Photo by the PA Science Office of The Nature Conservancy.

EAST BRUNSWICK TOWNSHIP & New Ringgold Borough

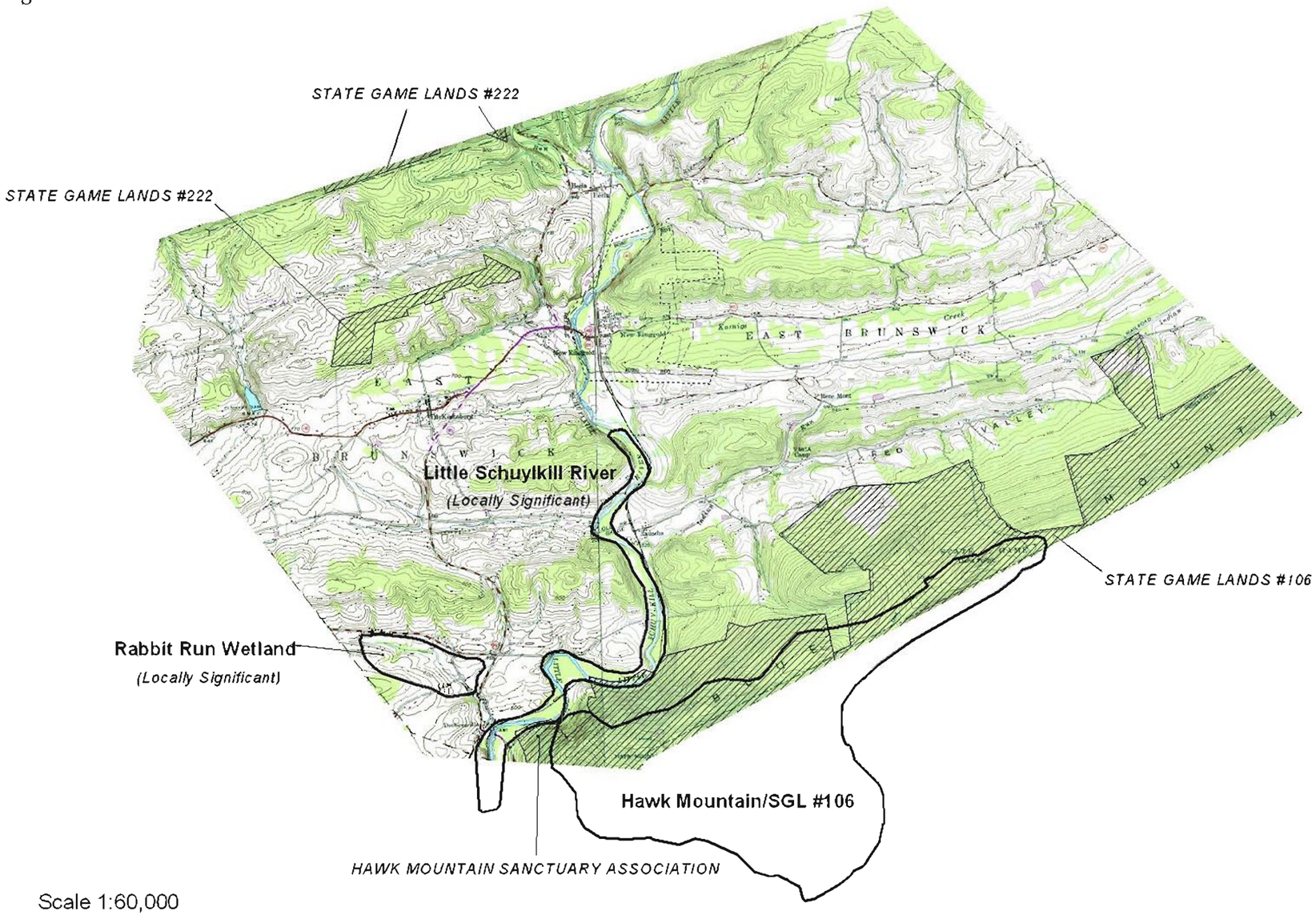
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Hawk Mountain / SGL #106	Animal	G4	S3S4	PC		E
	Animal	G5	S3S4	N	10/29/1997	E
	Animal: A geometer moth (*Apodrepanulatrix liberaria*)	G4	S3	N	1997	E
	Animal: Leonard's skipper butterfly *(Hesperia leonarus)*	G4	S3S4	N	2000	E
	Animal: Apple sphinx moth *(Sphinx gordius)*	G4	S1S3	N	1997	E
	Geological feature			N		E
	Geologic Feature			N		E

Locally Significant: Little Schuylkill River
Rabbit Run Wetlands

Managed Areas: Appalachian National Scenic Trail
Hawk Mountain Sanctuary
State Game Lands #106
State Game Lands #222

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

East Brunswick Township and New Ringgold Borough



East Brunswick Township and New Ringgold Borough

Schuylkill County

Natural Areas Inventory

Natural Areas:

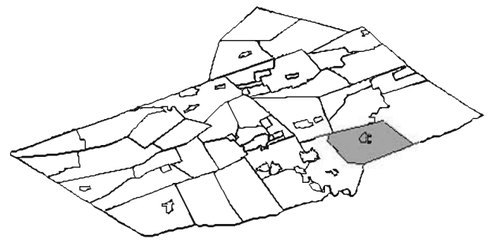
Hawk Mountain/SGL #106

Locally Significant Sites:

Little Schuylkill River
Rabbit Run Wetland

Managed Areas:

Appalachian National Scenic Trail
Hawk Mountain Sanctuary Association
State Game Lands #106
State Game Lands #222



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

East Brunswick Township:

HAWK MOUNTAIN / SGL #106 (East Brunswick & West Brunswick Townships, & Berks County) – Hawk Mountain is part of the Kittatinny Ridge, a natural bird migration corridor stretching from New York, through New Jersey and Pennsylvania to the Maryland border. The portion of the Kittatinny Ridge known as Hawk Mountain contains State Game Lands #106, Weiser State Forest, Hawk Mountain Sanctuary and a portion of the Appalachian Trail. Together this makes up one of the largest remaining blocks of contiguous forest in southeastern Pennsylvania. Hawk Mountain has been designated a globally Important Bird Area by the American Bird Conservancy, and as a state Important Bird Area by Audubon Pennsylvania.

Hawk Mountain Sanctuary is a private non-profit refuge established to protect migrating birds of prey. Thousands of raptors pass along Kittatinny Ridge on their yearly migratory travels. Among the 18,000 raptors from 16 species that use this migration flyway include Broad-winged, Sharp-shinned and Cooper's Hawks, Golden and Bald Eagles, Ospreys, Goshawks, Kestrels and Northern Harriers. Hawk Mountain Sanctuary personnel and contracted scientists have conducted extensive biological research at the Sanctuary and adjoining areas. This is reflected in a great deal of information available on species of concern for this site.

Besides the world-renowned bird migration corridor, this site is home to several invertebrate species of concern including the **apple sphinx moth (*Sphinx gordius*), a geometer moth (*Apodrepanulatrix liberaria*) & Leonard's skipper butterfly *(Hesperia leonarus)*.** These species each require specific vegetation as a food source for larval development. The management of invasive species of plants that can choke out native vegetation is critical for the protection of the habitat needed for these species. Aerial pesticide sprays used for the treatment of Gypsy moth infestations should be avoided in this area, as the rare moths and butterflies are also susceptible to these chemicals.

This site is also home to a good-quality population of a **G4, S3S4 PA Candidate animal species of concern**. This species is dramatically affected by human activity, and no longer occurs in many of its former locations (Hulse 2001). No disturbances were noted at the time of the field visit. Any logging near the site should only occur during the winter months. An intact forested buffer should be maintained around the stony outcrops and talus slopes on this site.

In 1997, a single specimen of a **G5, S3S4 animal species of concern** was found on this site. This species inhabits dry, sandy soil of thinly wooded uplands and rock strewn hillsides, and feeds primarily on frogs and toads. This species is thought to be declining throughout the state (Hulse 2001). Additional surveys for this species at this site are encouraged.

A study on the amphibians of Hawk Mountain was conducted in the spring of 1997 and revealed that ten species of salamanders and five species of frogs inhabit the streams and ponds in the vicinity (Monroe 1998). Species observed during this study included the green frog (*Rana clamitans*), pickerel frog (*Rana palustris*), wood frog (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*), northern spring salamander (*Gyrinophilus porphyriticus*) & long-tailed salamander (*Eurycena lengicauda*). The presence of this diversity of amphibians is notable in view of studies indicating the worldwide decline of amphibian species

(Blaustein 1994). The maintenance of undisturbed forested buffers around all temporary pools, streams and wetlands in the immediate vicinity of Hawk Mountain will be necessary to maintain the habitat required for the continued success of these species.

The Hawk Mountain Lookout **geological feature** is a massive outcrop of Tuscarora sandstone, 1520 feet above sea level. From this site, one can view a truly majestic 70-mile vista of the Great Valley and Blue Mountain. Dan's Pulpit is formed from outcrops of the Tuscarora quartzite standing in vertical columns. (Geyer & Bolles 1979). This area was designated a National Natural Landmark by the National Park Service in 1965. This site falls primarily within Hawk Mountain Sanctuary and SGL #106, and includes a portion of the Appalachian Trail.

Locally Significant Sites:

Little Schuylkill River (East Brunswick & West Brunswick Townships) – This **Locally Significant site** is a length of the Little Schuylkill River between New Ringgold and Drehersville. Previously impacted by acid mine drainage, this river has seen much recent improvement. A diverse plant association resembling a mesic riverside outcrop community inhabits a shale cliff railroad cut along the creek. Some invasive species like knotweed (*Polygonum cuspidatum*) are present along the banks. A spring and surface fed wetland known as Bickle's Bog occurs along the opposite side of the Railroad tracks. Though not a true bog, this botanically interesting wetland provides breeding habitat for many amphibians including wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculata*) and red-spotted newts (*Notophthalmus viridescens*). An enormous abandoned stone railroad bridge abutment can also be seen from the river. This masonry structure provides habitat for an interesting array of ferns and other plant species. A wetland near Drehersville provides habitat for an excellent diversity of plants, waterfowl, amphibians and reptiles. Changes in the hydrology of these wetlands, (filling, draining) and increased nutrient or acid mine runoff would detrimentally impact this site.

Rabbit Run Wetland (East Brunswick Township) – This **Locally Significant** site has a high degree of plant diversity with over 200 species observed during site visits in 2002. The wetlands at this site look remarkably different from spring to fall as a variety of plant species mature to dominate the site. Among the species observed at this site include Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), purple-stemmed aster (*Aster puniceus*), velvet grass (*Holcus lanatus*), vernal sweet-grass (*Anthoxanthum odoratum*), creeping spikemoss (*Selaginella apoda),* and a great variety of sedges (*Carex spp*.). The late autumn mowing regime provided by the private landowner at this site helps maintain this habitat by reducing the potential impact of invasive species. Additional surveys to this site are recommended to search for species of concern.

EAST NORWEGIAN TOWNSHIP, Saint Clair, Port Carbon,
Mechanicsville & Palo Alto Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

During this study, no species of special concern, exemplary natural communities, or locally significant sites were identified in East Norwegian Township or the neighboring Boroughs, therefore, no map has been provided for this township. However, environmentally sensitive areas may exist in the township. It is possible that additional field studies would identify sensitive features along Mill Creek, the Schuylkill River or the crest of Sharp Mountain south of Palo Alto. Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. The creation or preservation of undisturbed forested buffers along river and stream banks are not only important to many plant and animal species, but the features are also particularly effective in improving water quality, providing groundwater recharge, and protection from flooding.

EAST UNION TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bears Head Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/21/02	B
Blue Nob Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/10/02	B
Green Mountain	Animal	G4	S3S4	PC	6/15/2001	C

Managed Areas: State Game Lands #308

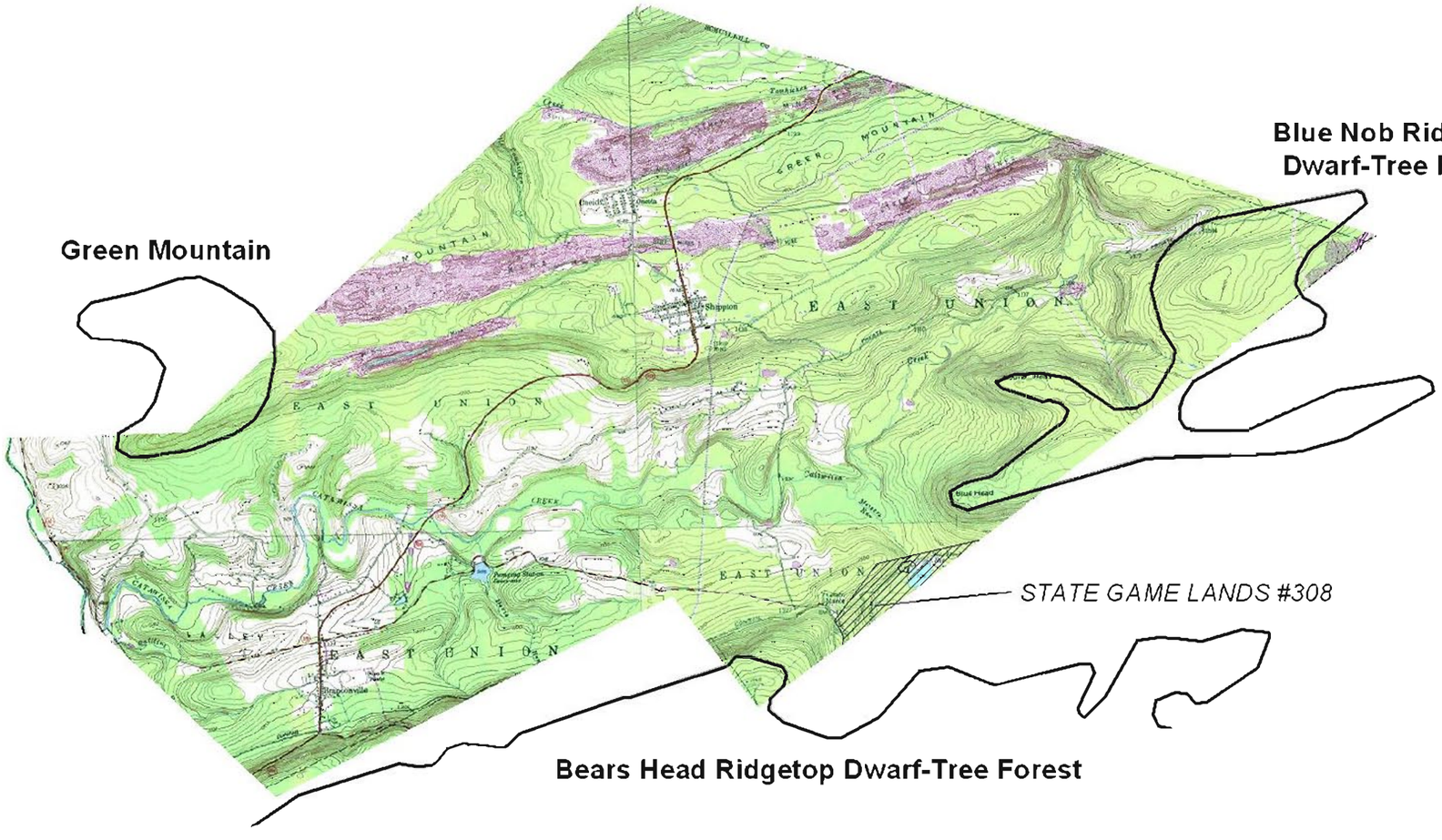
* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

East Union Township:

BEARS HEAD RIDGETOP DWARF-TREE FOREST (Delano, East Union, Mahanoy & West Mahanoy Townships) - This Natural Community occupies the higher elevations of Locust Mountain north of Shenandoah and Delano, and is bounded on the east by Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Quercus montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp.*), huckleberries (*Gaylussacia spp.*), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike1999).

East Union Township



Scale 1:61,000

0.5 0 0.5 1 Miles

East Union Township

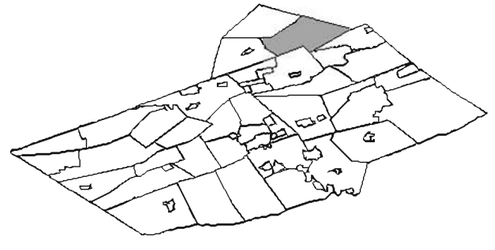
Schuylkill County
Natural Areas Inventory

Natural Areas:

Bears Head Ridgetop Dwarf-Tree Forest
Blue Nob Ridgetop Dwarf-Tree Forest
Green Mountain

Managed Areas:

State Game Lands #308



Legend

Natural Area or Locally Significant Site

Managed Area

(East Union Township continued)

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered moth species that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. . These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

BLUE NOB RIDGETOP DWARF-TREE FOREST (East Union & Kline Townships) - This site represents one of four expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain. While occurring frequently in Schuylkill County, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. The extent of this Natural Community was delineated from aerial photography.

GREEN MOUNTAIN (East Union & North Union Townships) - This site is a ridgetop sandstone/conglomerate rock outcrop within a dry oak-heath forest matrix. In 2001, a good quality population of a **G4, S3S4 PA Candidate animal species of concern** was mapped at this site. Associated tree species included chestnut oak (*Quercus montana*), black oak (*Q. velutina*), white oak (*Q. alba*), scarlet oak (*Q. coccinea*), scrub oak (*Q. ilicifolia*), pitch pine (*Pinus rigida*), white pine (*P. strobus*), red maple (*Acer rubrum*), black birch (*Betula lenta*), black gum (*Nyssa sylvatica*), and young American chestnut trees (*Castanea dentata*). A dense heath shrub layer included sheep laurel (*Kalmia angustifolia*), mountain laurel (*K. latifolia*), lowbush blueberry (*Vaccinium pallidum*), low sweet blueberry (*V. angustifolia*), black huckleberry *(Gaylussacia baccata*), rosebay (*Rhododendron maximum*), and witch hazel (*Hamamelis virginiana*). The sparse herbaceous layer included bracken fern (*Pteridium aquilinum*) and fly-poison (*Amianthium muscaetoxicum*). No disturbances were noted at the time of the field visit. Any logging near the site should only occur during the winter months. An intact forested buffer needs to be maintained around this site. This site should continue to be monitored on a regular basis. Threats to this site include pressure from the encroaching nearby development and potential selection as a communication tower site.

ELDRED TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Mahanoy Creek at Taylorsville	Animal: Great Blue Heron *(Ardea herodias)*	G5	S3S4B,S4N	N	2002	CD

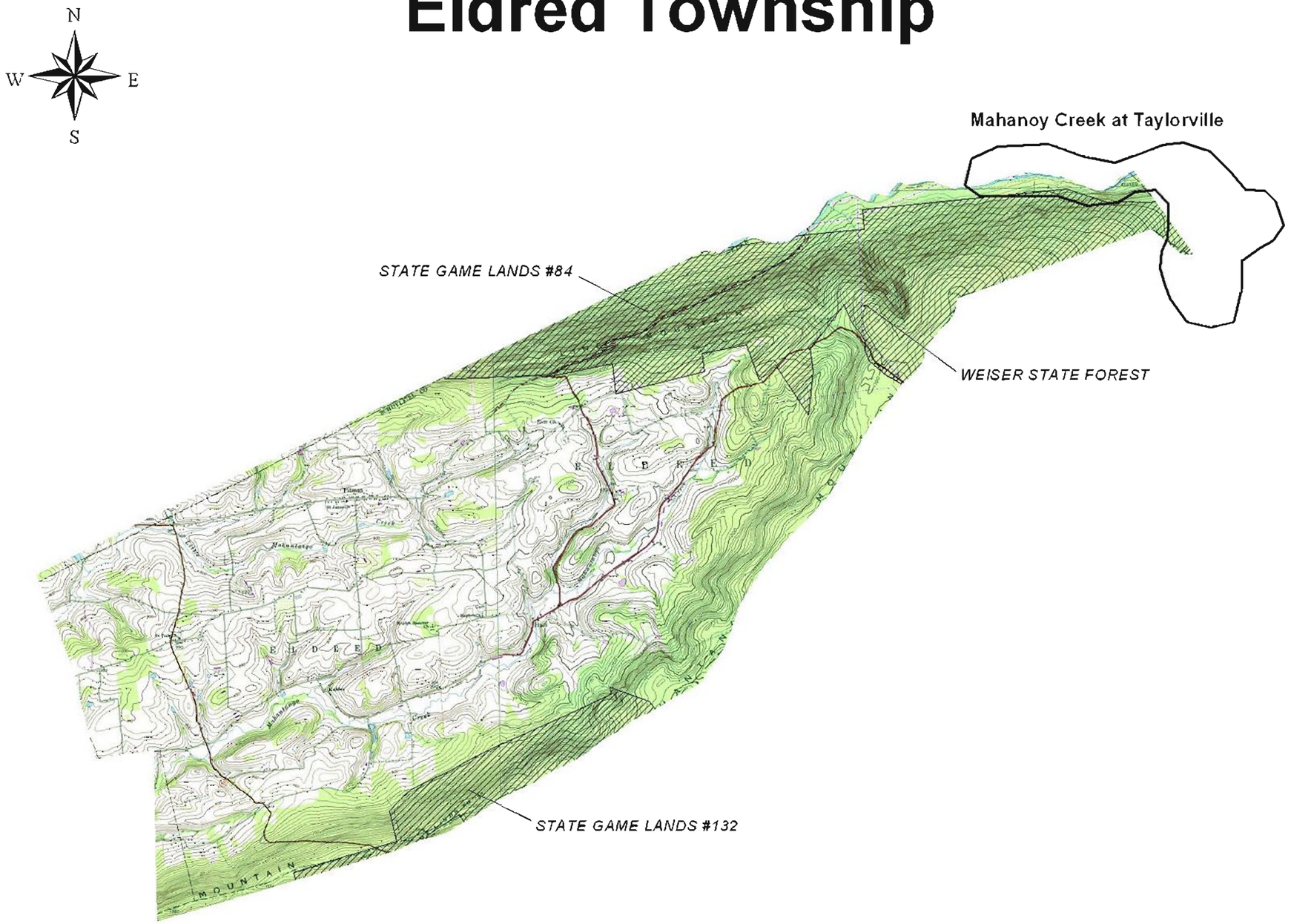
Managed Areas: State Game Lands #84
State Game Lands #132
Weiser State Forest

Eldred Township:

MAHANOY CREEK AT TAYLORVILLE (Barry, Butler & Eldred Townships) - This site hosts the only known **Great Blue Heron (*Ardea herodias*)** nesting site in Schuylkill County. This species was in severe decline throughout Pennsylvania at the turn of the century and for 50 years after, but has made a remarkable comeback in recent decades (Brauning 1992). Acid mine drainage (AMD), which kills fish and other aquatic life, may have deprived these birds of their food source in the past. Efforts to mitigate the effects of AMD over the past few decades have likely helped restore life to some of these previously disturbed aquatic habitats. Disturbance or destruction of this woodland rookery by logging operations poses the greatest threat to this site. A wide, undisturbed forested buffer should be maintained around this site. A portion of Weiser State Forest and private property are included in this site.

It is possible that additional field studies would identify sensitive features along the banks of Mahantango Creek, the Little Mahantango Creek or their tributaries draining off of Line and Mahantango Mountains. Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. The creation or preservation of undisturbed forested buffers along river and stream banks are not only important to many plant and animal species, but the features are also particularly effective in improving water quality, providing groundwater recharge, and protection from flooding. The forested slopes of Line and Mahantango Mountains also act as natural corridors for animal migration, and as refugia for more common species of plants.

Eldred Township



Scale 1:58,000

0.5 0 0.5 1 Miles

Eldred Township

Schuylkill County Natural Areas Inventory

Natural Areas:

Mahanoy Creek at Taylorville

Managed Areas:

State Game Lands #84
State Game Lands #132
Weiser State Forest

Legend

- Natural Area or Locally Significant Site
- Managed Area

FOSTER TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

During this study, no species of special concern, exemplary natural communities, or locally significant sites were identified in Foster Township. Consequently, no map has been provided for this township. However, environmentally sensitive areas may exist in the township. It is possible that additional field studies would identify sensitive features along the banks of Crystal Run and Hans Yost Creek. Several good-quality populations of Coville's rush (*Juncus gymnocarpus*) have been located along Crystal Run. Once considered globally rare, Coville's rush was found in so many locations in Schuylkill County during the 1990's that it has been removed from the list of rare plants. Though widespread in this county, Coville's rush is known in few other locations in the state (Rhoads and Kline 1993). Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. The creation or preservation of undisturbed forested buffers along river and stream banks are not only important to many plant and animal species, but the features are also particularly effective in improving water quality, providing groundwater recharge, and protection from flooding. As development escalates near the Rt. 901 exit from Interstate I-81, efforts should be made to guide industrial and commercial projects onto already disturbed sites. By reclaiming previously disturbed areas, not only does this preserve habitat for more common animal and plant species, it also makes Foster Township a more attractive place to live and work.

Foster Township

Foster Township

Schuylkill County
Natural Areas Inventory

FRAILEY TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Good Spring Creek Woods	Plant: Minniebush *(Menziesia pilosa)*	G4G5	S3	PR	10/03/1991	C

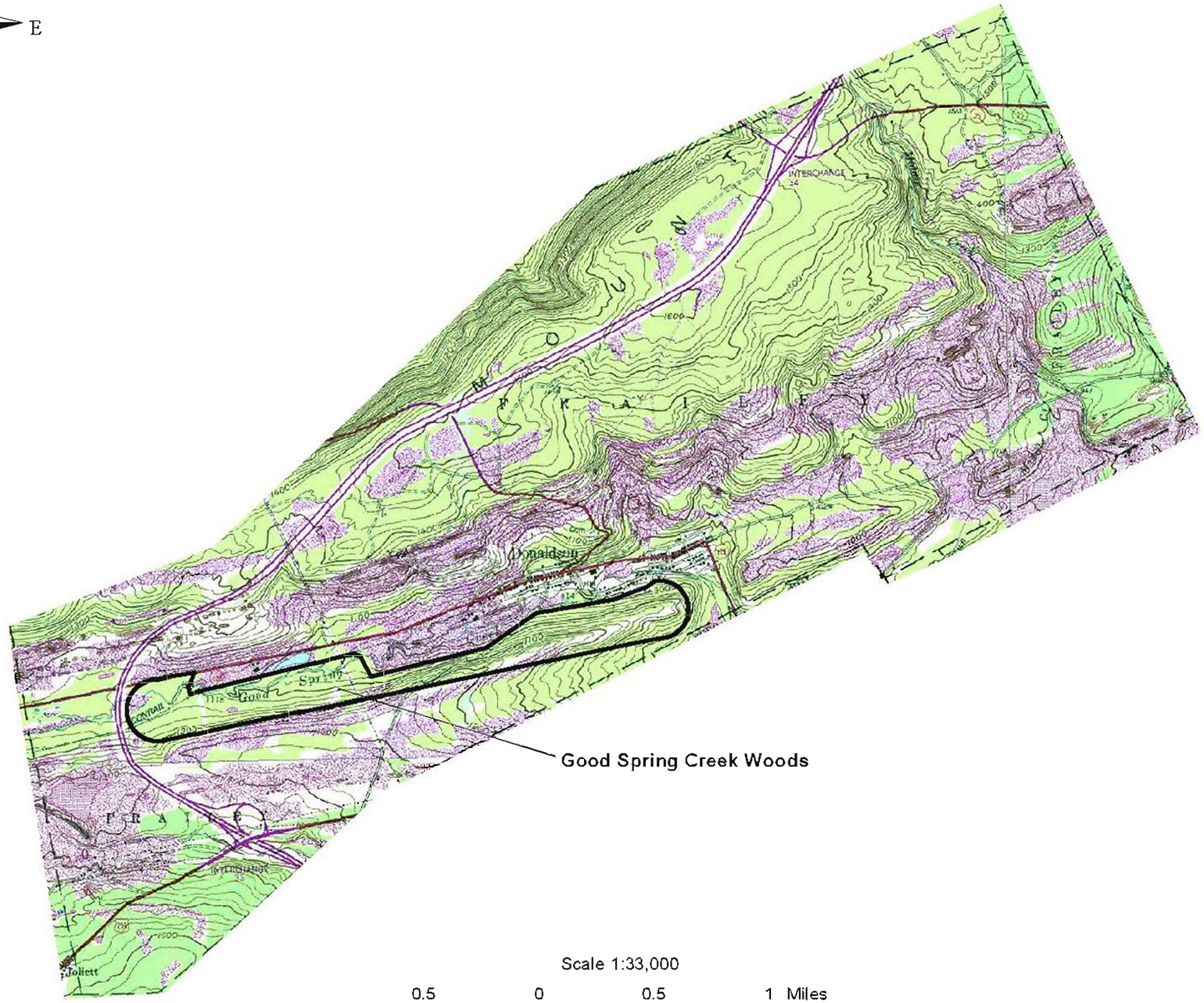
* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Frailey Township:

GOOD SPRING CREEK WOODS (Frailey Township) - In 1991, a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*),** was found in acidic, sandstone woods and roadsides along Good Spring Creek. Minniebush has been reported historically from several counties in western Pennsylvania, but only those populations occurring along the forested ridges of Cumberland, Dauphin, Lebanon & Schuylkill Counties have been documented in Pennsylvania since 1980. This species has a global distribution limited to the southern Appalachian Mountains. The northernmost known populations of this species occur in Pennsylvania (Natureserve 2003). Disturbances include acid mine drainage, utility line right-of-ways and exotic species. This site also includes good populations of Coville's rush (*Juncus gymnocarpus*). Once considered globally rare, Coville's rush was found in so many locations in Schuylkill County during the 1990's that it has been removed from the state list of rare plants. Though occurring frequently in this county, Coville's rush is known in few other locations in the state (Rhoads and Kline 1993).

As development escalates near the Rt. 25 exit from Interstate I-81, efforts should be made to guide industrial and commercial projects onto already disturbed sites. By reclaiming previously disturbed areas, not only does this preserve habitat for more common animal and plant species, it also makes Frailey Township a more attractive place to live and work.

Frailey Township



Scale 1:33,000

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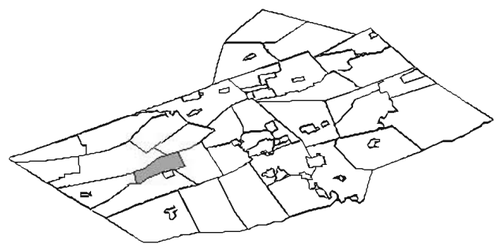
Frailey Township

Schuylkill County
Natural Areas Inventory

Natural Areas:

Good Spring Creek Woods



Legend

Natural Area or Locally Significant Site

Above: The Allegheny woodrat (*Neotoma magister)*, which was once a common resident in Pennsylvania, is found in several locations in Schuylkill County. The woodrat is a Pennsylvania-Threatened species. Photo: Fred Habegger

Below: The Timber Rattlesnake (*Crotalus horridus*), a PA–Candidate species of concern, has been found on mountain ridges in Schuylkill County. These misunderstood snakes are relatively mild-mannered, and will seek escape before defending themselves. This species is endangered in Pennsylvania primarily due to exploitation by snake hunters (Hulse 2001).
(Photo by the PA Science Office of The Nature Conservancy)

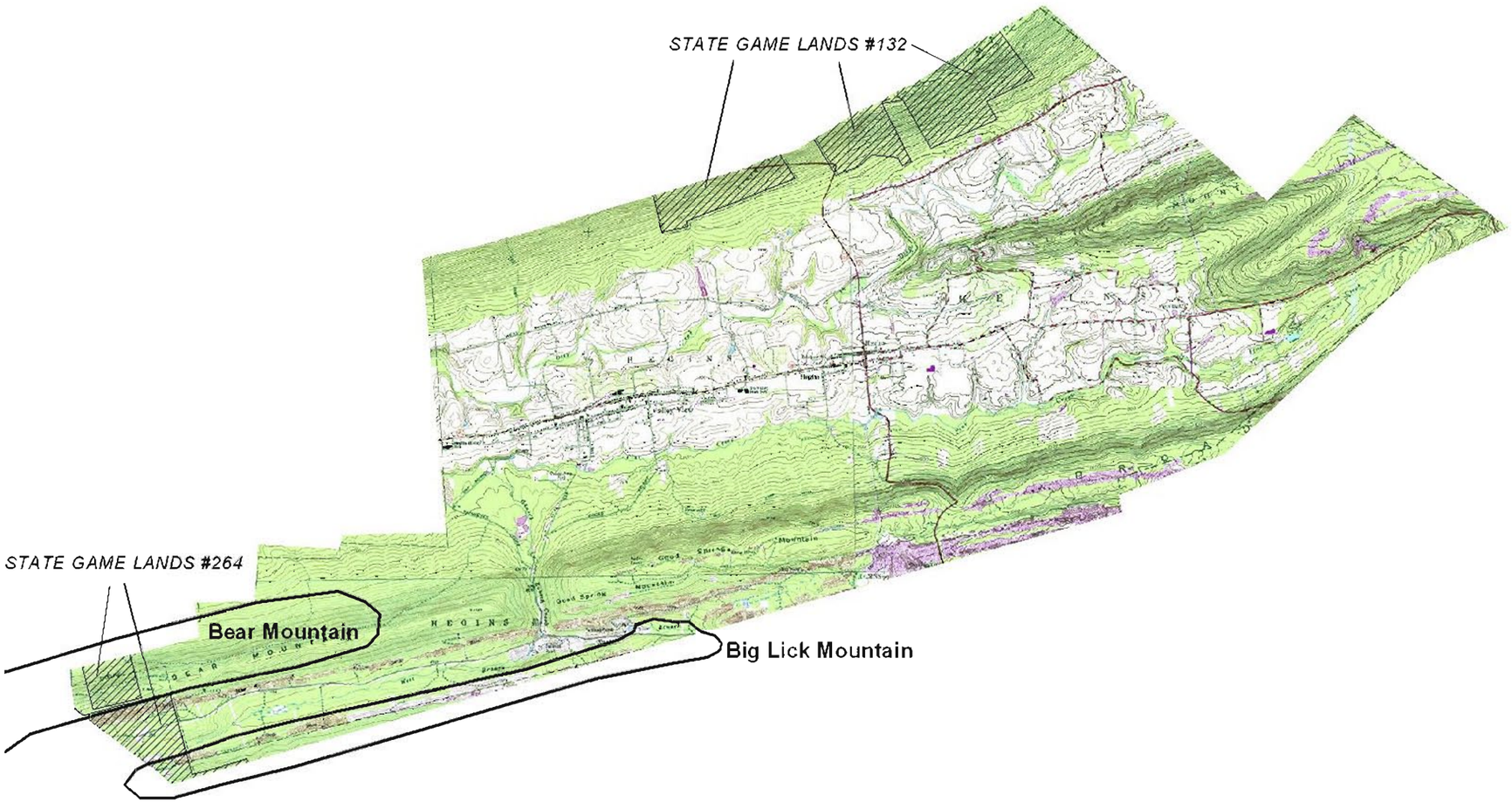
HEGINS TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bear Mountain	Plant: Minniebush (*Menziesia pilosa*)	G4G5	S3	PR	06/2001	B
	Animal: Allegheny woodrat (*Neotoma magister*)	G3G4	S3	PE	09/2001	B
Big Lick Mountain	Plant: Minniebush (*Menziesia pilosa*)	G4G5	S3	PR	06/2001	B

Managed Areas: State Game Lands #132
State Game Lands #264

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Hegins Township



Scale 1:71,000

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Hegins Township

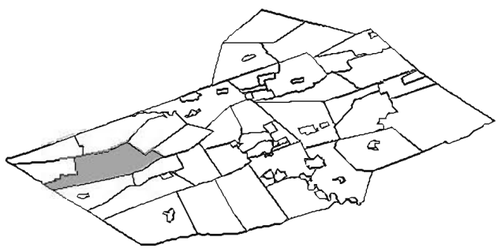
Schuylkill County
Natural Areas Inventory

Natural Areas:

Big Lick Mountain
Bear Mountain

Managed Areas:

State Game Lands #132
State GAme Lands #264



Legend

Natural Area or Locally Significant Site

Managed Area

Hegins Township:

BEAR MOUNTAIN (Hegins & Hubley Townships, & Dauphin County) - In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain. This shrub, related to blueberries, has a very limited distribution in Pennsylvania. It occupies the slopes of northern Dauphin and western Schuylkill Counties, as well as the southern mountains of Bedford and Somerset Counties. This species occurs scattered sparingly from Georgia, where it is considered critically imperiled, through the Smokey Mountains of Tennessee, to the northernmost limit of its range in Pennsylvania. The canopy tree species at this site included chestnut oak (*Quercus montana*), black oak (*Q. velutina*), black birch (*Betula lenta*), black gum (*Nyssa sylvatica*), red *maple (Acer rubrum*), hemlock (*Tsuga canadensis*), and sassafras (*Sassafras albidum*). Associated shrub species include mountain laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), dangleberry (*G. frondosa*), beaked hazelnut (*Corylus cornuta*), striped maple (*Acer pensylvanicum*), and American chestnut tree sprouts (*Castanea dentata*). The dry oak-heath woods of these slopes have seen recent logging activity, which seems to have benefited this plant's growth. No threats are evident and no special management appears to be needed.

Evidence of several fair-quality populations of a G3G4, S3 PA-Threatened animal species, the **Allegheny woodrat *(Neotoma magister)***, was found at this site during a site survey in 2001. This species typically inhabits the deep crevices of rocky outcrops, boulder-strewn talus slopes and caves. Populations of this species throughout the state have experienced rapid decline in recent decades due to unknown causes (Merritt 1987). Additional surveys for this species at this site are recommended. These ridges and slopes are cloaked in a dry oak-heath forest matrix composed of black oak (*Quercus velutina*), red oak (*Quercus rubra*), chestnut oak (*Quercus montana*), red maple (*Acer rubrum*), sassafras (*Sassafras albidum*), Eastern hemlock (*Tsuga canadensis*), black birch (*Betula lenta*), wild grape (*Vitis sp*.), mountain laurel (*Kalmia latifolia*), and rhododendron (*Rhododendron sp*.). This site includes a portion of State Game Lands #264 and private property.

BIG LICK MOUNTAIN (Hegins & Porter Townships) - In 1991 and again in 2001 a good-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Big Lick Mountain. This species occupies oak-heath woods, borders of woods, heath thickets, openings associated with logging or woods roads, rocky places, and bare sandy openings. The surrounding land is forested or in the process of becoming so. Some strip mining continues to the north. Disturbances include strip mining, logging and exotic species. No threats are evident and no special management appears to be needed. This site includes a portion of State Game Lands #264 and private property.

HUBLEY TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bear Mountain	Plant: Minniebush (*Menziesia pilosa*)	G4G5	S3	PR	06/2001	E
	Animal: Allegheny woodrat (*Neotoma magister*)	G3G4	S3	PE	09/2001	E

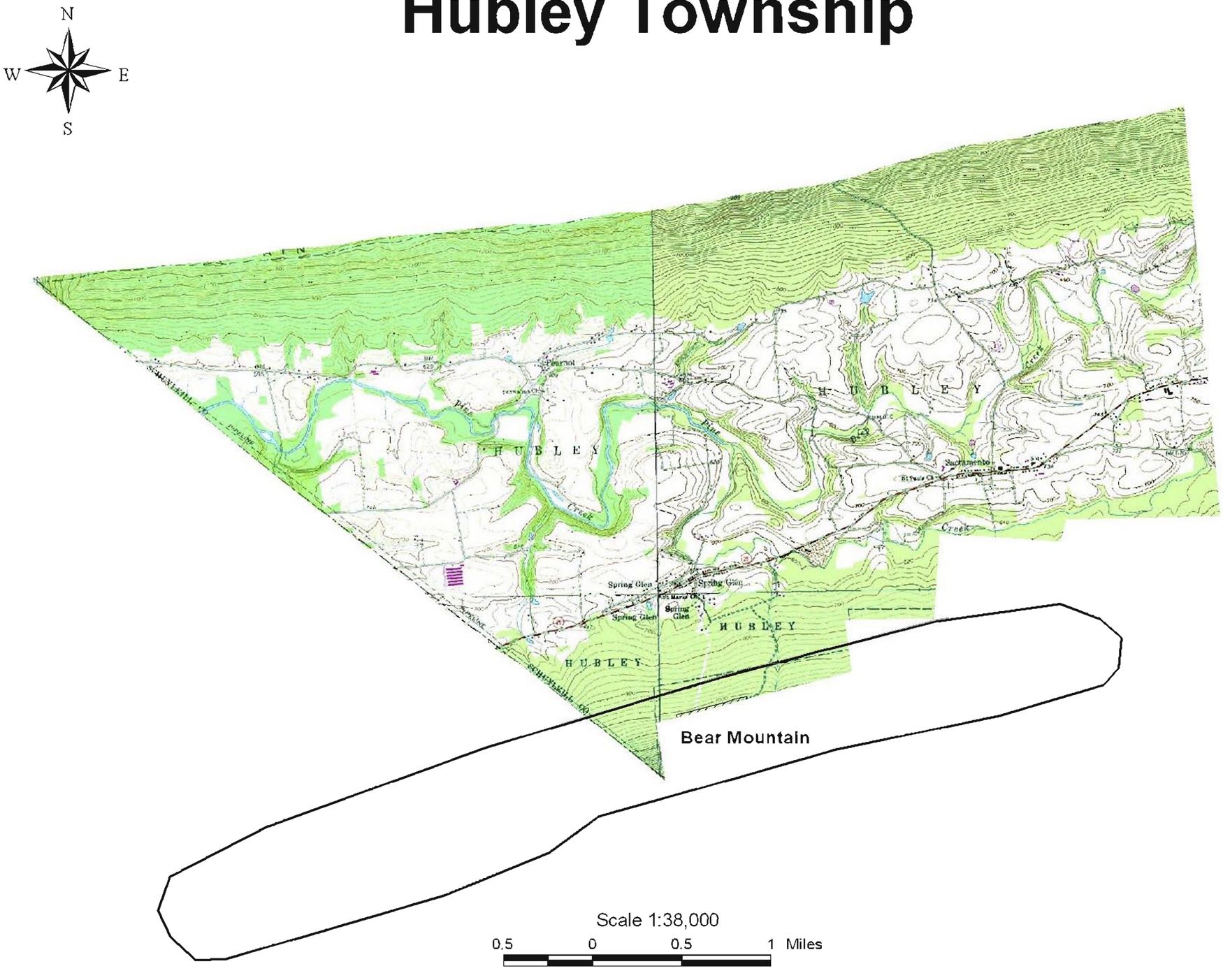
* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Hubley Township:

BEAR MOUNTAIN (Hegins & Hubley Townships, & Dauphin County) - In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain. This shrub, related to blueberries, has a very limited distribution in Pennsylvania. It occupies the slopes of northern Dauphin and western Schuylkill Counties, as well as the southern mountain of Bedford and Somerset Counties. This species occurs scattered sparingly from Georgia, where it is considered critically imperiled, through the Smokey Mountains of Tennessee, to the northernmost limit of its range in Pennsylvania. The canopy tree species at this site included chestnut oak (*Quercus montana*), black oak (*Q. velutina*), black birch (*Betula lenta*), black gum (*Nyssa sylvatica*), red *maple (Acer rubrum*), hemlock (*Tsuga canadensis*), and sassafras (*Sassafras albidum*). Associated shrub species include mountain laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), dangleberry (*G. frondosa*), beaked hazelnut (*Corylus cornuta*), striped maple (*Acer pensylvanicum*), and American chestnut tree sprouts (*Castanea dentata*). The dry oak-heath woods of these slopes have seen recent logging activity, which seems to have benefited this plant's growth. No threats are evident and no special management appears to be needed.

Evidence of several fair-quality populations of a G3G4, S3 PA-Threatened animal species, the **Allegheny woodrat *(Neotoma magister)***, was found at this site during a site survey in 2001. This species typically inhabits the deep crevices of rocky outcrops, boulder-strewn talus slopes and caves. Populations of this species throughout the state have experienced rapid decline in recent decades due to unknown causes (Merritt 1987). Additional surveys for this species at this site are recommended. These ridges and slopes are cloaked in a dry oak-heath forest matrix composed of black oak (*Quercus velutina*), red oak (*Quercus rubra*), chestnut oak (*Quercus montana*), red maple (*Acer rubrum*), sassafras (*Sassafras albidum*), Eastern hemlock (*Tsuga canadensis*), black birch (*Betula lenta*), wild grape (*Vitis sp*.), mountain laurel (*Kalmia latifolia*), and rhododendron (*Rhododendron sp*.). This site includes a portion of State Game Lands #264 and private property.

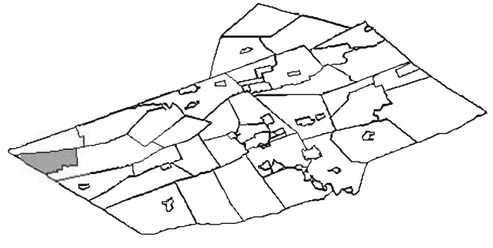
Hubley Township



Hubley Township

Schuylkill County
Natural Areas Inventory

Natural Areas:
Bear Mountain



Legend

Natural Area or Locally Significant Site

KLINE TOWNSHIP & McAdoo Borough

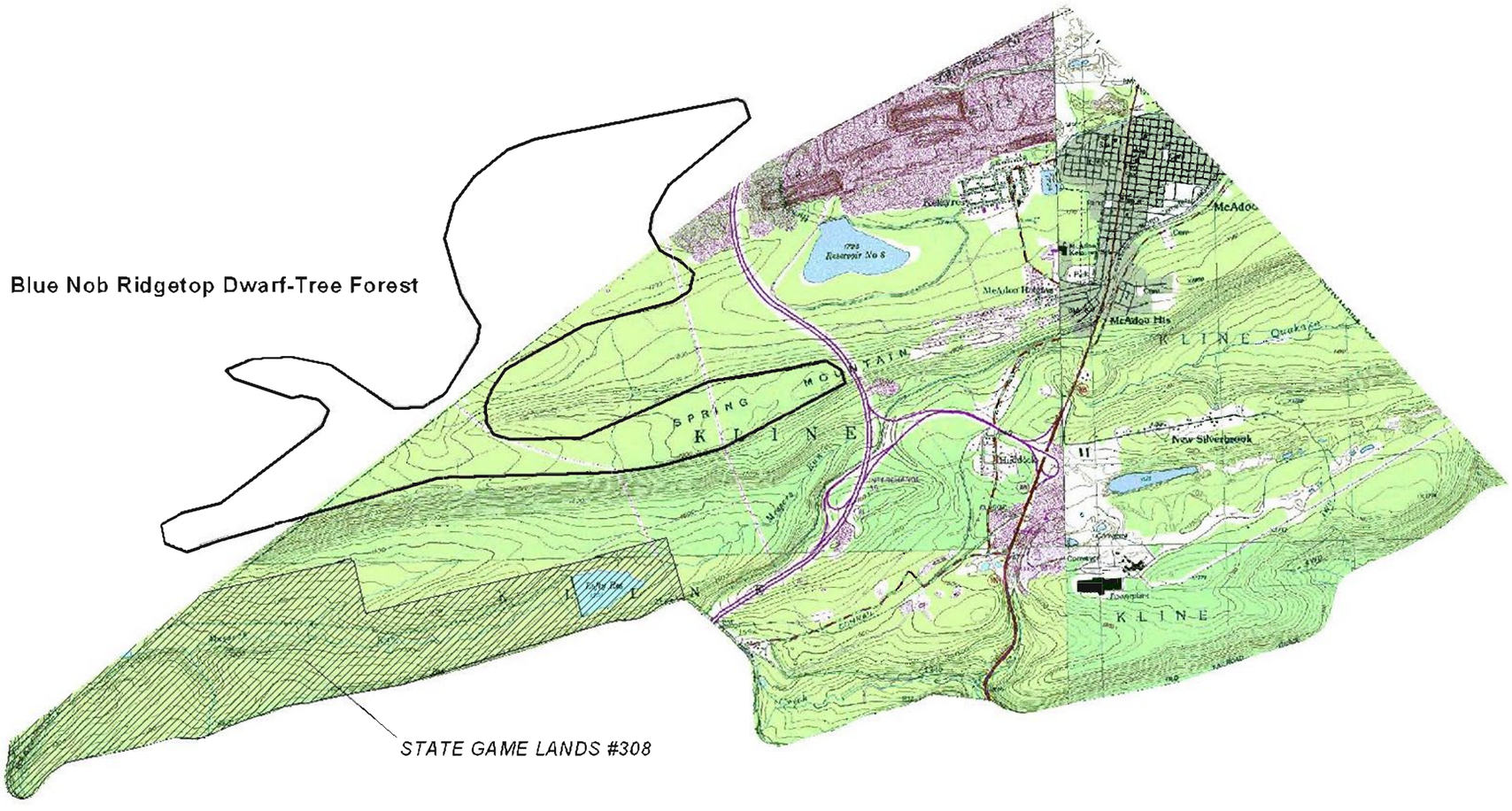
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Blue Nob Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/10/02	B

Managed Areas: State Game Lands #308

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

The ground cover in a recently burned portion of a Ridgetop Dwarf-tree Natural Community is composed primarily of low serviceberry (*Amelanchier stolonifera*), red chokeberry (*Aronia arbutifolia*) and reindeer lichen (Cladina spp.). Photo by the PA Science Office of The Nature Conservancy.

Kline Township and McAdoo Borough



Scale 1:42,000

0.5 0 0.5 1 Miles

Kline Township and McAdoo Borough

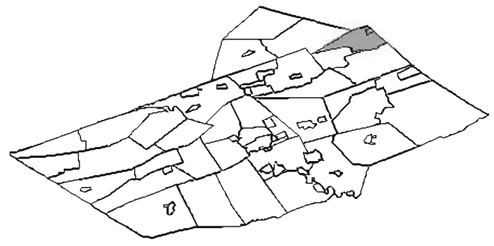
Schuylkill County Natural Areas Inventory

Natural Areas:

Blue Nob Ridgetop Dwarf-Tree Forest

Managed Areas:

State Game Lands #308



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Kline Township:

BLUE NOB RIDGETOP DWARF-TREE FOREST (East Union & Kline Townships) - This Natural Community occupies the higher elevations of Spring Mountain east of Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest"**. This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered, Pennsylvania endemic species that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

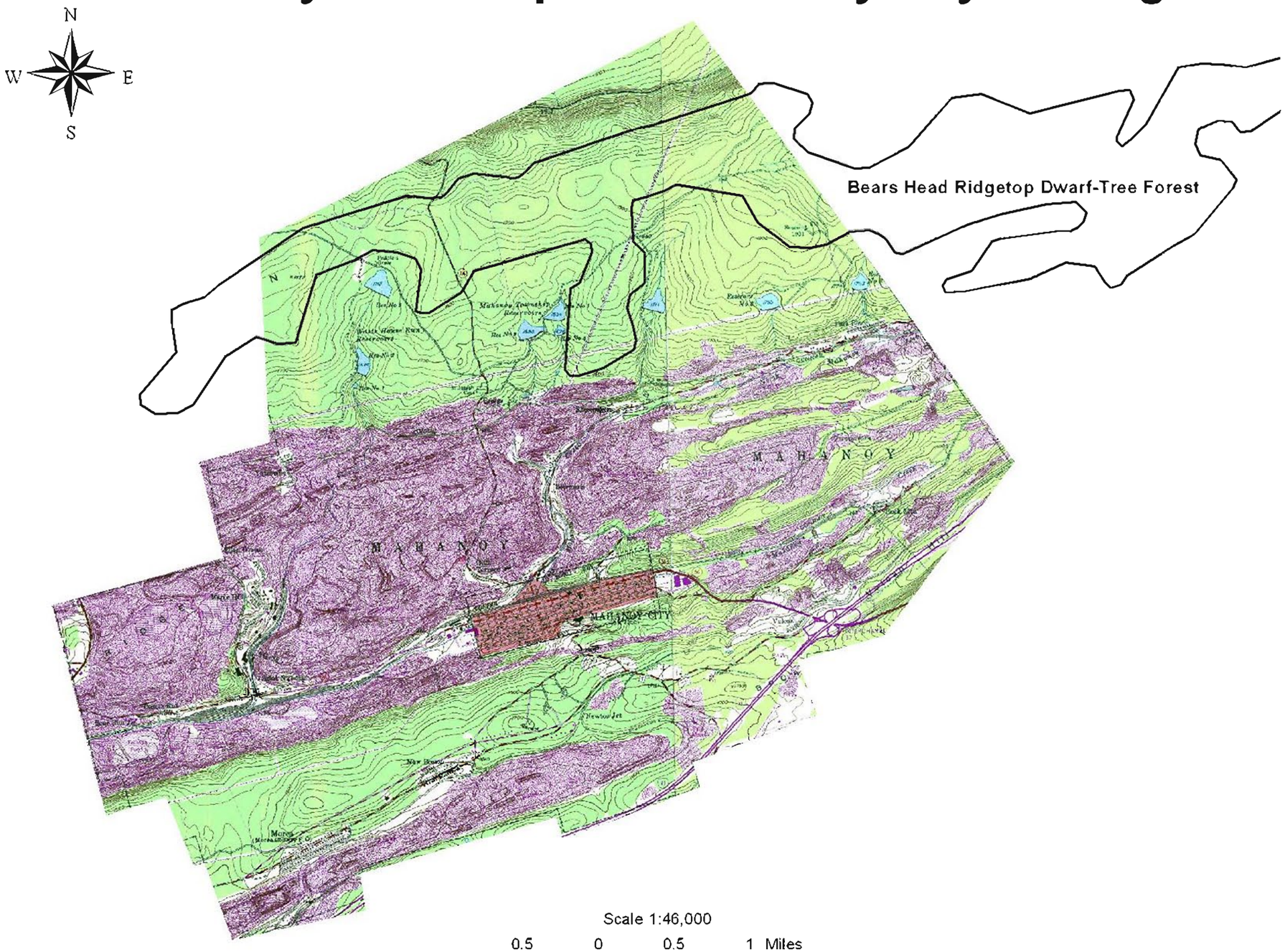
MAHANOY TOWNSHIP & Mahanoy City

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bears Head Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/21/02	B

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Thin, droughty soils, harsh winter conditions and frequent wild fires have helped shaped the Ridgetop Dwarf-tree Natural Community found on the higher elevations of Broad Mountain. (Photo by the PA Science Office of The Nature Conservancy)

Mahanoy Township and Mahanoy City Borough



Scale 1:46,000

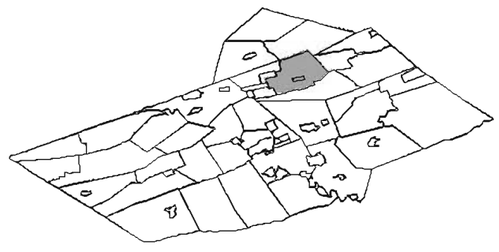
0.5 0 0.5 1 Miles

Mahanoy Township and Mahanoy City Borough

Schuylkill County Natural Areas Inventory

Natural Areas:

Bears Head Ridgetop Dwarf-Tree Forest



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary

Mahanoy Township:

BEARS HEAD RIDGETOP DWARF-TREE FOREST (Delano, East Union, Mahanoy & West Mahanoy Townships) - This Natural Community occupies the higher elevations of Locust Mountain north of Shenandoah and Delano, and is bounded on the east by Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine, scrub oak, chestnut oak (*Quercus montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*) black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered species, endemic to Pennsylvania, that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

NEW CASTLE TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Buck Run Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/04/2002	B

Other: Kaufman Run, Mud Run & Tar Run: Class-A Trout Waters

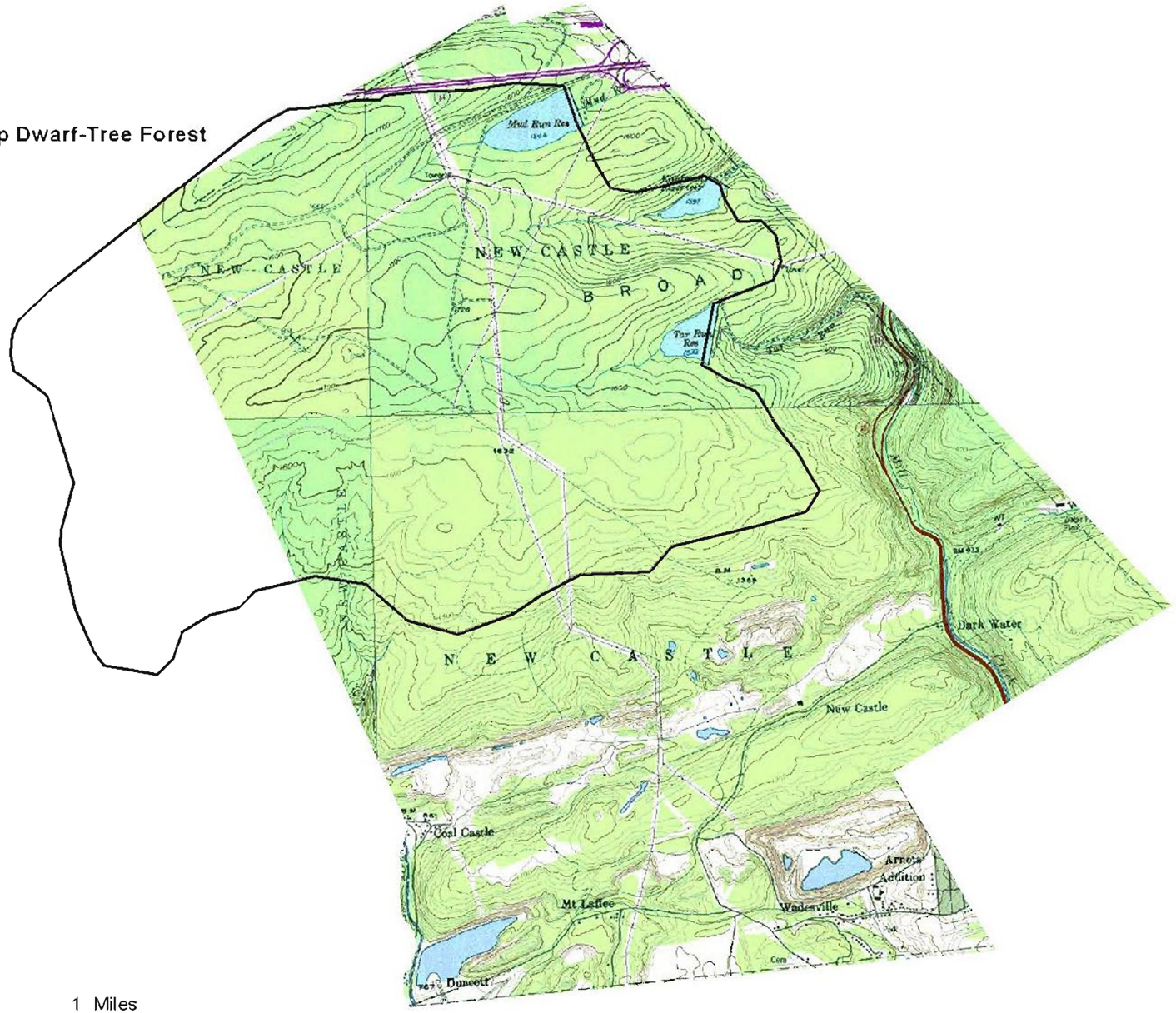
* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Pitch pine (*Pinus rigida*) is a fire dependent species that has the unusual tendency to produce growth from lateral branch buds in response to a fire event, giving the trees a "bearded" appearance. Pitch pine is a common component of the Buck Run Ridgetop Dwarf-tree Forest Natural Community. (Photo by the PA Science Office of The Nature Conservancy)

New Castle Township

N
W E
S

Buck Run Ridgetop Dwarf-Tree Forest



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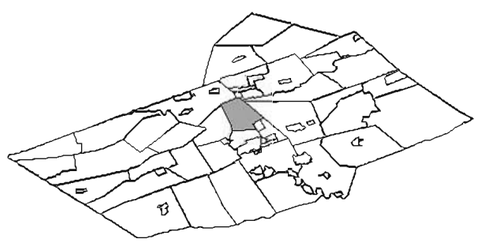
New Castle Township

Schuylkill County
Natural Areas Inventory

Natural Areas:

Buck Run Ridgetop Dwarf-Tree Forest



Legend

Natural Area or Locally Significant Site

New Castle Township:

BUCK RUN RIDGETOP DWARF-TREE FOREST (Butler, Cass, & Newcastle Townships.) - This Natural Community can be easily viewed from Interstate I-81 between the exits for Minersville and Frackville. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest"**. This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered species, currently known only from Pennsylvania, that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Area was delineated from aerial photographs.

Also within this site are three streams with special designations. The Pennsylvania Fish & Boat Commission has designated **Kaufman Run, Mud Run & Tar Run as Class-A Trout Waters** from their headwaters to their respective reservoir dams. The continued maintenance of undisturbed forested buffers, which provide a cooling effect along the shores of these streams, is essential to maintain their quality.

NORTH MANHEIM TOWNSHIP, Cressona, Landingville & Schuylkill Haven Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Indian Run Watershed	Animal: Northern long-eared bat (*Myotis septentrionalis*)	G4	S3B, S3N	CR	7/22/2002	E
	Plant: Mountain starwort *(Stellaria borealis)*	G5	S1S2	N	7/01/2002	B

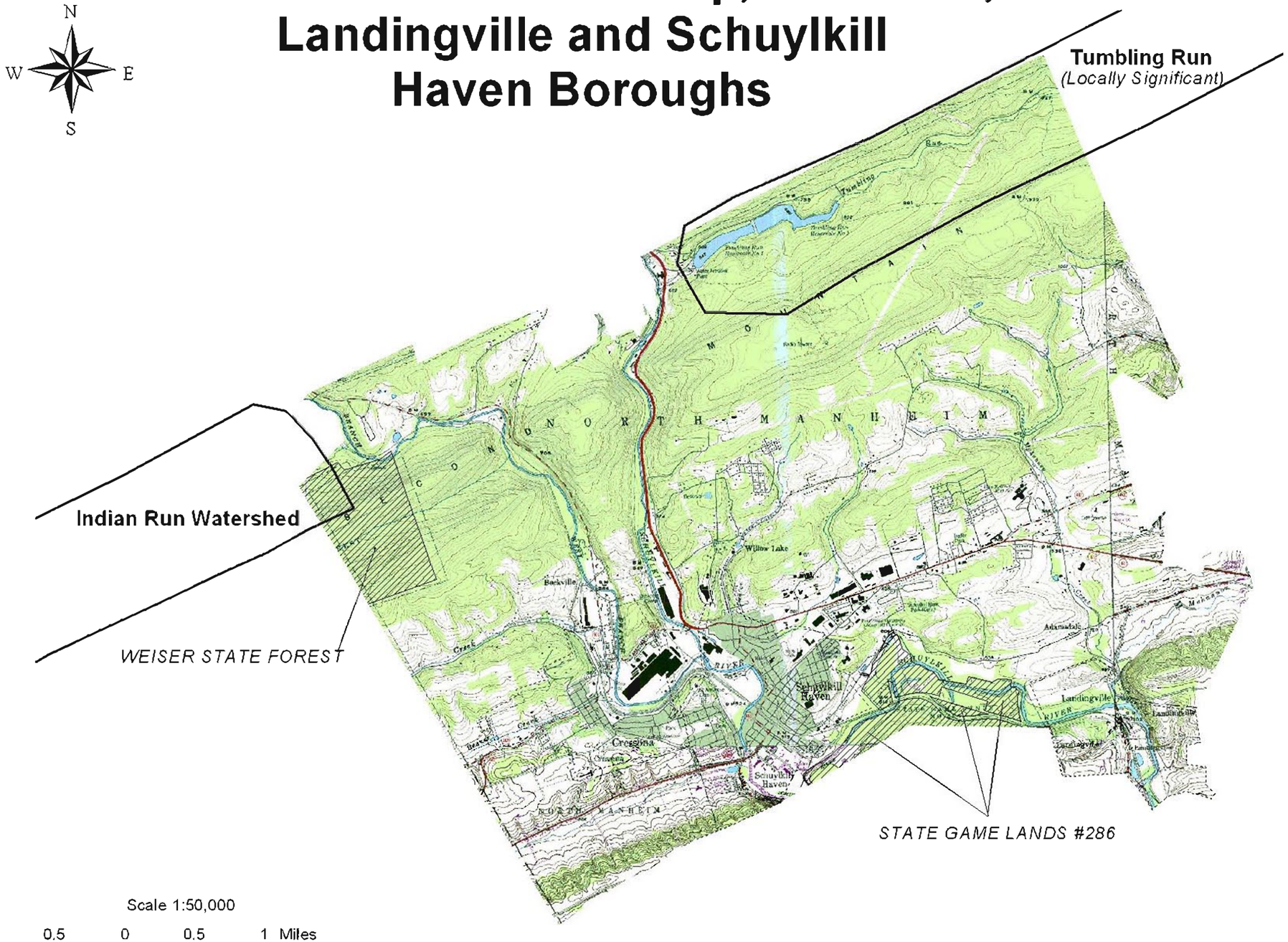
Locally Significant: Tumbling Run

Managed Areas: Weiser State Forest
State Game Lands #286

Other: Tumbling Run Creek – High Quality Stream & Class-A Trout Waters

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

North Manheim Township, Cressona, Landingville and Schuylkill Haven Boroughs



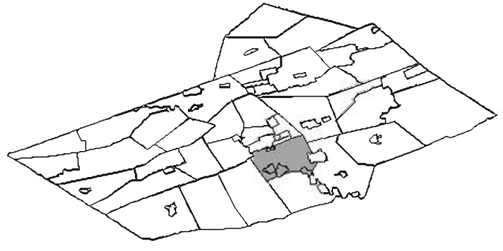
North Manheim Township, Cressona, Landingville and Schuylkill Haven Boroughs

Schuylkill County
Natural Areas Inventory

Natural Areas:
Indian Run Watershed

Locally Significant Sites:
Tumbling Run

Managed Areas:
State Game Lands #286
Weiser State Forest



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

North Manheim Township:

INDIAN RUN WATERSHED (Branch & North Manheim & Wayne Townships) – This site includes the Indian Creek and the myriad of springs and seeps draining off the adjacent slopes. Being primarily within the Schuylkill County Municipal Authority watershed, this site has seen virtually no recent disturbance. The braided headwaters of Indian Creek are particularly diverse in plant species. Over 120 species were listed during the inventory. This mixed hardwood and conifer forest is dominated by red maple (*Acer rubrum*), black birch (*Betula lenta*), yellow birch (*Betula alleghaniensis*), various oaks (*Quercus spp.*), black gum (*Nyssa sylvatica*), hemlock (*Tsuga canadensis*), pitch pine (*Pinus rigida*), and white pine (*Pinus strobus*).

An unknown-quality population of a G4, S3B, S3N PA-Candidate rare animal species, **the northern long-eared bat (*Myotis septentrionalis*),** was found at this site during the July 2002 inventory. These animals are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed. The PA Game Commission monitors this species.

Also found at this site was a good-quality population of **mountain starwort (*Stellaria borealis*)** a G5, S1S2 plant species of concern. The plants were found growing in the braided headwaters of Indian Creek in deep, organic, water-saturated soil. Associated species include mosses (*Bryophytes*), blue marsh violet (*Viola cucullata*), enchanter's-nightshade *(Circaea alpina),* sedges (*Carex leptalea, C. echinata*), golden saxifrage (*Chrysosplenium americanum*) and jewelweed (*Impatiens capensis*). This site is currently protected as watershed property by the Schuylkill County Municipal Authority. In the event that the Water Authority considers this property obsolete, effort should be made to secure this area for conservation purposes.

Locally Significant Site:

Tumbling Run Creek (Blythe and North Manheim Townships) – This Locally Significant site includes Tumbling Run, the main tributary to Silver Creek Reservoir, which contains a fair-quality headwaters swamp. Extensive clearcutting and over browsing by deer have diminished this site's quality, but it still functions as a high-quality migration corridor for birds and other animals, and as a refuge for a high diversity of more common plant and animal species. Reducing the size of the deer herd at this location would help improve this habitat. The Tumbling Run Creek is designated as a High-Quality Stream by the PA Department of Environmental Protection, and as a Class-A trout water by the PA Fish & Boat Commission. The continued maintenance of undisturbed forested buffers, which provide a cooling effect along the shores of this stream and its tributaries, is essential to maintain its quality.

Barn Owls (Tyto alba) require open meadows for feeding and tree cavities or human made structures for nesting. A shift in agricultural practices, loss of suitable nesting structures and a general change in land use patterns pose threats to the continued success of this species in Pennsylvania.
Photos by Jim Malone

NORTH UNION TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Green Mountain	Animal	G4	S3S4	PC	6/15/2001	C
Zion Grove	Animal: Barn owl *(Tyto alba)*	G5	S3B-S4N	N	2001	E

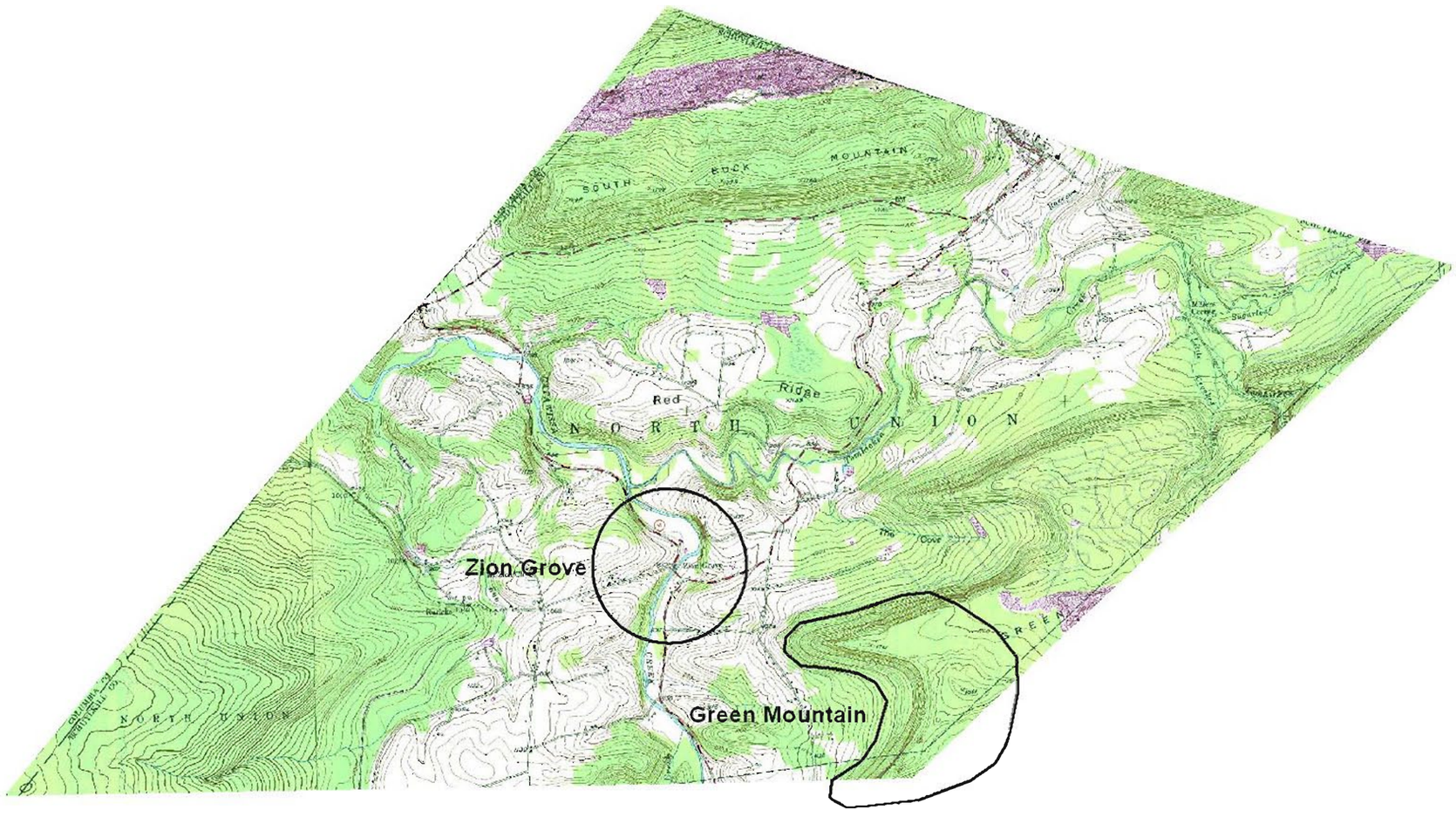
* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

North Union Township:

GREEN MOUNTAIN (North Union & East Union Townships) - This site is a ridgetop sandstone/conglomerate rock outcrop within a dry oak-heath forest matrix. In 2001, a good quality population of a **G4, S3S4 PA Candidate animal species of concern** was mapped at this site. Associated tree species included chestnut oak (*Quercus montana*), black oak (*Q. velutina*), white oak (*Q. alba*), scarlet oak (*Q. coccinea*), scrub oak (*Q. ilicifolia*), pitch pine (*Pinus rigida*), white pine (*P. strobus*), red maple (*Acer rubrum*), black birch (*Betula lenta*), black gum (*Nyssa sylvatica*), and young American chestnut trees (*Castanea dentata*). A dense heath shrub layer included sheep laurel (*Kalmia angustifolia*), mountain laurel (*K. latifolia*), lowbush blueberry (*Vaccinium pallidum*), low sweet blueberry (*V. angustifolia*), black *huckleberry (Gaylussacia baccata*), rosebay (*Rhododendron maximum*), and witch hazel (*Hamamelis virginiana*). The sparse herbaceous layer included bracken fern (*Pteridium aquilinum*) and fly-poison (*Amianthium muscaetoxicum*). No disturbances were noted at the time of the field visit. Any logging near the site should only occur during the winter months. An intact forested buffer needs to be maintained around this site. This site should continue to be monitored on a regular basis. Threats to this site include pressure from the encroaching nearby development or the potential selection as a communication tower site.

ZION GROVE (North Union Township) - A nesting pair of a G5, PA-Candidate at risk animal species, the **Barn Owl (*Tyto alba*),** has been observed here seasonally since 1995. Successful breeding was noted on 2 of the last 6 years. This species requires open meadows for feeding and tree cavities or human made structures for nesting. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania (Brauning 1992).

North Union Township



Scale 1:49,000

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North Union Township

Schuylkill County
Natural Areas Inventory

Natural Areas:

Green Mountain
Zion Grove

Legend

Natural Area or Locally Significant Site

NORWEGIAN TOWNSHIP & Pottsville Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

During this study, no species of special concern, exemplary natural communities, or locally significant sites were identified in Norwegian Township / Pottsville Borough. Consequently, no map has been provided for this township. However, environmentally sensitive areas may exist in the township. It is possible that additional field studies would identify sensitive features along the West Branch Schuylkill River and its tributaries. Wetlands, floodplain forests, and vernal pools are features that may occur along the river and its tributaries. Whenever possible, efforts should be made to preserve or restore these features in the landscape. Not only are they important to many plant and animal species, but the features also help to improve water quality, provide groundwater recharge, and protection from flooding.

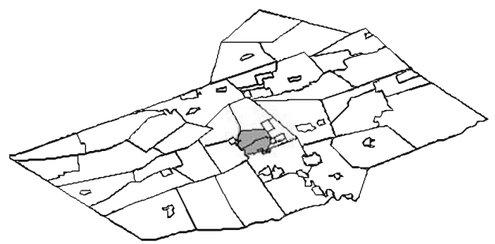
Norwegian Township, Pottsville City and Mount Carbon Borough

Scale 1:30,000

0.5 0 0.5 1 Miles

Norwegian Township, Pottsville City and Mount Carbon Borough

Schuylkill County
Natural Areas Inventory



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary

PINE GROVE TOWNSHIP & Pine Grove Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
DeHaas Run Wetlands	Natural Community	G?	S3	N	4/30/2002	E
	Plant: Netted chain fern (*Woodwardia areolata*)	G5	S2	N	7/26/2001	C
Gold Mine Wetlands	Southern Bog Clubmoss (*Lycopodiella appressa*)	G5	S2	PT	7/28/99	D
Swatara Creek Floodplain	Animal: Black dash butterfly (*Euphyes conspicuus*)	G4	S3	N	6/28/2000	BC
	Plant: Screwstem *(Bartonia paniculata)*	G5	S3	N	9/30/1999	D
	Plant: Cattail sedge *(Carex typhina)*	G5	S2	PE	8/31/2000	BC
	Plant: Netted chain fern (*Woodwardia areolata*)	G5	S2	N	8/31/2000	D
Swope Valley Run	Animal	G3	S2	PE	5/15/2002	E
	Plant: Screwstem *(Bartonia paniculata)*	G5	S3	N	8/14/2001	D

Locally Significant: Exmoor Wetlands
Sweet Arrow Lake

Managed Areas: Appalachian National Scenic Trail
Sweet Arrow Lake
State Game Lands #80
State Game Lands #160
State Game Lands #211
State Game Lands #229
Swatara State Park

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Pine Grove Township and Pine Grove Borough

Scale 1:74,000

0.5 0 0.5 1 Miles

Pine Grove Township and Pine Grove Borough

Schuylkill County Natural Areas Inventory

Natural Areas:

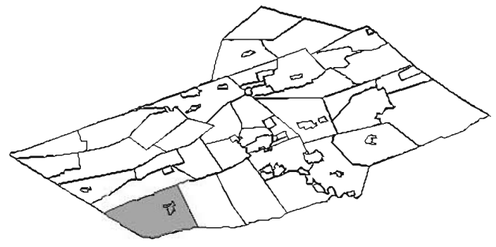
- Dehaas Run Wetlands
- Gold Mine Wetlands
- Swatara Creek Floodpain
- Swope Valley Run

Locally Significant Sites:

- Exmoor Wetlands
- Sweet Arrow Lake

Managed Areas:

- Appalachian National Scenic Trail
- State Game Lands #80
- State Game Lands #160
- State Game Lands #211
- State Game Lands #229
- Swatara State Park



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Pine Grove Township:

DEHAAS RUN WETLANDS (Pine Grove & Tremont Townships) – This site includes two large, excellent-quality, open wetlands that may have been created or enhanced by past beaver activity, and a series of vernal pools between them. In 2001, a marginal-quality population of a G5, S2 plant species of concern, the **netted chain fern (*Woodwardia areolata*)**, was documented at this site. Though considered a small population for this species on a statewide range, it is noteworthy for being one of the few occurrences in the Ridge and Valley Province. The habitat is composed of a shrub-graminoid wetland with an extensive sphagnum substrate exhibiting a 'quaking' aspect. Besides an excellent population of Coville's rush *(Juncus gymnocarpus),* associated species at this site include cinnamon fern *(Osmunda cinnamomea),* various sedges *(Carex folliculata, C. echinata, C. utriculata, C. trisperma, Dulichium arundinaceum),* bur-reed *(Sparganium americanum),* marsh St.-Johns-wort *(Triadenum fraseri),* round-leaved sundew *(Drosera rotundifolia),* highbush blueberry *(Vaccinium corymbosum),* poison sumac (*Toxicodendron vernix*) and cotton grass (*Eriophorum virginicum).* A hemlock forest and a forested wetland rings the shrub swamp openings with pronounced spring-fed mound and pool microtypography. These undulating vegetated hummocks create less saturated habitat conditions where a variety of plant species occur.

The **ephemeral/fluctuating pool natural community** is located in the headwaters of DeHaas Run between the two wetland openings. The immediate habitat is a hemlock-mixed hardwood palustrine forest with a thick rosebay (*Rhododendron maximum*) understory. Except for a water-level ring of sphagnum moss, the ponds were unvegetated. The ephemeral pools along DeHaas Run provide important habitat for breeding amphibians. Wood frog (*Rana sylvatica*) eggs and tadpoles, and spotted salamander (*Ambystomata maculatum*) eggs and were observed in the pools.

A good diversity of bird life was also noted from this site. Since this site was visited very early in the breeding season, few of these species can be considered to be breeding here at this time. Among those species observed at this site include Ovenbird (*Seiurus aurocapillus*), Black-throated Green Warbler (*Dendroica virens*), Black-and-white Warbler (*Mniotilta varia*), Blue-headed Vireo (*Vireo solitarius*), Pileated Woodpecker (*Dryocopus pileatus*), Red-eyed Vireo (*Vireo olivaceus*), Blue-gray Gnatcatcher (*Polioptila caerulea*), Yellow-rumped Warbler (*Dendroica coronata coronata*), Ruby-crowned Kinglet (*Regulus calendula*), Hooded Warbler (*Wilsonia citrina*), Carolina Chickadee (*Poecile carolinensis*), Broad-winged Hawk (*Buteo palypterus*) and Red-headed Woodpecker (*Melanerpes erythrocephalus*).

GOLD MINE WETLANDS (Pine Grove Township and Lebanon County) - A small population of **Southern Bog Clubmoss (*Lycopodiella appressa*)**, an S2 Pennsylvania-Threatened plant species of concern, was found in a revegetated coal yard that is described as a springy area with an acidic substrate. The vegetation includes shrub/small trees areas and graminoid/herbaceous areas. The species composition, depending on the drainage, includes Poison Sumac (*Toxicodendron vernix*) and Virginia Pine (*Pinus virginiana*), occurring a few feet apart. Disturbances include lots of exotic plant species; competition and succession were the only observed threats.

SWATARA CREEK FLOODPLAIN (Pine Grove Township & Lebanon County) - This site is a dense shrub wetland along the floodplain of the Swatara Creek between Irving and the Lebanon County line. Two individuals of an invertebrate animal species of concern, **the black dash**

butterfly (*Euphyes conspicuus*), were observed at this site in 2000. This G4, S3 species occurs in marshes, wet meadows and the floodplains of slow woodland streams. Sedges, particularly the tussock sedge (*Carex stricta),* are the necessary host plants for the juvenile stage of this species. Additional site surveys for this species are encouraged to determine the extent of this population.

Three plant species of special concern were also found at this location during field visits in 1999 & 2000. This site contains a fair to good-quality population of the PA-Endangered **cattail sedge (*Carex typhina*)**, a small population of the G5, S2 **netted chain fern *(Woodwardia areolata)*** and a small population of the G5, S3 plant species **screw-stem *(Bartonia paniculata)***. Though considered a small population of the netted chain fern on a statewide range, it is noteworthy for being one of the few occurrences in the Ridge and Valley Province. The plants were seen growing among woody shrubs on elevated hummocks that are interspersed with exposed muck and standing water. Dominant tree species at this site include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), black ash (*Fraxinus nigra*), black gum (*Nyssa sylvatica*), oaks (*Quercus rubra & Q. palustris*), hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*). Common in the thick shrub layer were poison sumac (*Toxicodendron vernix*), winterberry holly (*Ilex verticillata*), spice bush (*Lindera benzoin*), smooth alder (*Alnus serrulata*), withe-rod (*Viburnum cassinoides*), arrow-wood (*Viburnum recognitum*) and highbush blueberry (*Vaccinium corymbosum*). Associated herbaceous species included cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), sensitive fern *(Onoclea sensibilis*), skunk cabbage (*Symplocarpus foetidus),* Jack-in-the-pulpit (*Arisaema triphyllum*), sedges (*Carex intumescens & C. folliculata*), reedgrass (*Cinna arundinacea*), manna grass (*Glyceria spp*.), and mosses.

This site was also noted for its good wetland-bird habitat. Observed species include Red-winged Blackbird (*Agelaius phoeniceus*), Swamp Sparrow (*Melospiza georgiana*), Northern Parula (*Parula americana*), Indigo Bunting (*Passerina cyanea*), Green Heron (*Butoides virescens*), Louisiana Waterthrush (*Seiurus motacilla*), Wood Duck (*Aix sponza*), Wood Thrush (*Hylocichla mustelina*), Field Sparrow (*Spizella pusilla*), White-breasted Nuthatch (*Sitta carolinensis*), Eastern Towhee (*Pipilo erythrophthalmus*), Common Yellowthroat (*Geothylpis trachias*), Song Sparrow (*Melospiza melodia*), Willow Flycatcher (*Empidomax trailii*) and American Woodcock (*Scolopax minor*).

Threats to this site include the potential spread of introduced invasive species of plants. The invasive succesional shrub autumn olive (*Elaeagnus umbellata*) was observed encroaching into meadow areas. A small amount of purple loosestrife (*Lythrum salicaria*) was observed at the wetland edge. A concerted effort to remove the few plants present, and continued vigilance would help keep this site free of these and other invasive species. The extensive meadow areas are currently mowed on an infrequent basis. This mowing regime should continue to provide habitat for wildflowers, butterflies and old-field dependent bird species. The site lies completely within Swatara State Park.

SWOPE VALLEY RUN (Pine Grove Township & Lebanon County) - In 2002, a good-quality population of **a G3, S2 PA-Endangered animal species** was found in a wetland dominated by reed canary grass (*Phalaris arundinacea*) and surrounded by multiflora rose (*Rosa multiflora*). Besides these two aggressive plant species, associated species include common cattail (*Typha latifolia*), skunk cabbage (*Symplocarpus foetidus*), wintercress (*Barbarea spp.*), elderberry (*Sambucus canadensis*), jewelweed (*Impatiens capensis*), wool grass (*Scirpus cyperinus*), red maple (*Acer rubrum*), sensitive fern (*Onoclea sensibilis*), tussock sedge (*Carex stricta*), swamp candles

(*Lysimachia terrestris*), sweet flag (*Acorus calamus*), multiflora rose, and crested shield fern (*Dryopteris cristata*). Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat.

In 2001, a small population of the G5, S3 plant species, **screwstem (*Bartonia paniculata*),** was found during a field visit to the seeps feeding Swope Valley Run. Prior logging, jeep roads, and exotic species including planted conifers have disturbed the habitat at this site. The seepy, open bank at this site also included dense moss cover (*Sphagnum spp. & Polytricum spp*.), dewberry (*Rubus hispidus*), New York fern (*Thelypteris novaboracensis*), horsetails (*Equisetum arvense*), whorled loosestrife (*Lysimachia quadrifolia*) and Canada mayflower (*Maianthemum canadense*). No threats are evident and no special management appears to be needed. This site includes private land and a portion of SGL#80.

Locally Significant Sites:

Exmoor Wetlands (Pine Grove Township) – This **Locally Significant site** includes the floodplains along the Swatara Creek between Pine Grove Borough and I-81. This site exhibits a variety of wetland habitat types covering a large, relatively undisturbed area. The various habitats found at this site include forested wetlands, shrub wetlands, and herbaceous openings dominated by sedges and grasses. No disturbances were noted and no special management appears to be necessary. Changes in the hydrology (draining or filling), or changes at the upstream water treatment facility could impact the health of this wetland system.

Sweet Arrow Lake (Pine Grove & Washington Townships) – This **Locally Significant site** includes Sweet Arrow Lake and the adjacent headwaters. This body of water serves as a migration stopover for many species of birds. It also provides educational, recreational boating and fishing opportunities. Bird species reported at this site during migration include Bald Eagle (*Haliaeetus leucocephalus*), Osprey (*Pandion haliaetus*), Tundra Swan (*Cygnus columbianus*), Hooded Merganser (*Lophodytes cucullatus*), Black Crowned Night Heron (*Nycticorax nycticorax*), Pied–billed Grebe (*Podilymbus podiceps*) and Common Snipe (*Gallinago gallinago*) breeding status unknown. No threats were reported, and no special management appears to be needed. This site is primarily owned by Schuylkill County.

Wetlands, like these along the Swatara Creek in Pine Grove Township, provide habitat for a large diversity of plant and animal species. Introduced species such as purple loosestrife (*Lythrum salicaria*) greatly diminish the quality of these wetlands for wildlife. (Photo PA Science Office of The Nature Conservancy)

PORTER TOWNSHIP & Tower City Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Big Lick Mountain	Plant: Minniebush (*Menziesia pilosa*)	G4G5	S3	PR	06/18/01	B

Managed Lands: State Game Lands #264

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

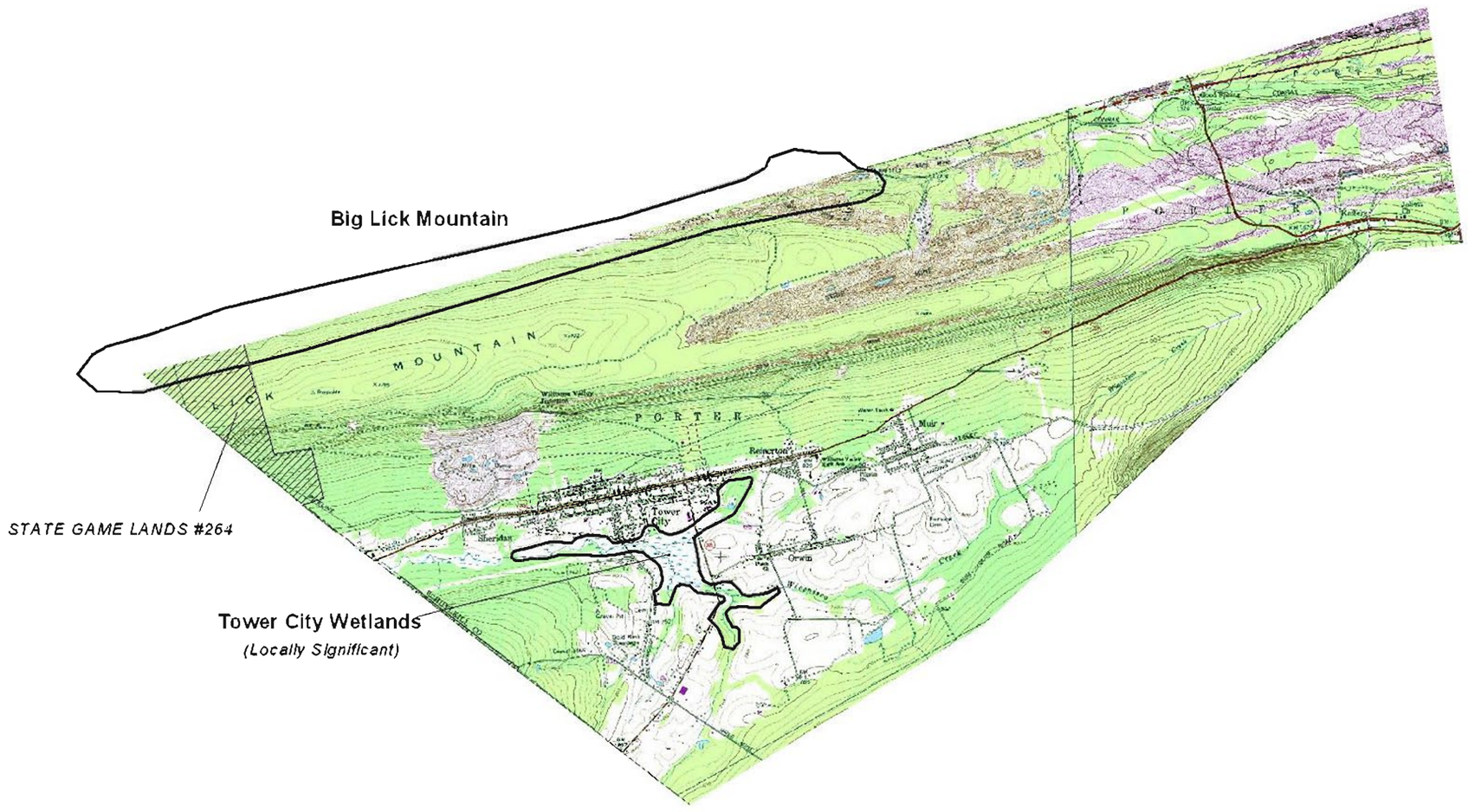
Porter Township:

BIG LICK MOUNTAIN (Hegins & Porter Townships) - In 1991 and again in 2001 a good-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Big Lick Mountain. The species occupies oak-heath woods, borders of woods, heath thickets, openings associated with logging or woods roads, rocky places, and bare sandy openings. The surrounding land is forested or in the process of becoming so. Some strip mining continues to the north. Disturbances include past and present mining activity, logging, woods roads and exotic species. No threats are evident and no special management appears to be needed.

Locally Significant Site:

Tower City Wetlands (Porter Township and Tower City Borough) – This **Locally Significant site** is made up of a series of wetlands along the Wiconisco Creek. Scrub / shrub wetlands, primarily composed of smooth alder (*Alnus serrulata*) and steeple-bush (*Spiraea tomentosa*), are scattered among patches of emergent vegetation populated with various sedges and rushes and large patches of cattail (*Typha latifolia*). Areas of open water with floating vegetation including yellow cowlilly (*Nuphar lutea*) are abundant. Further surveys are recommended at this site for waterfowl and additional plant elements. Populations of common reed (*Phragmites australis*) should be monitored with the intention of reducing the presence of this invasive plant species.

Porter Township and Tower City Borough



Scale 1:52,000

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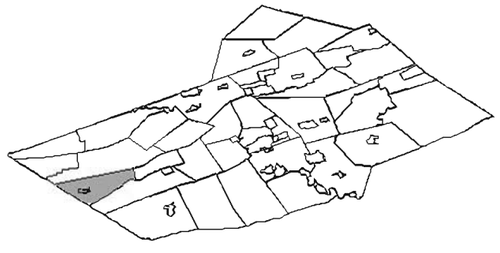
Porter Township and Tower City Borough

Schuylkill County Natural Areas Inventory

Natural Areas:
Big Lick Mountain

Locally Significant Sites:
Tower City Wetlands

Managed Areas:
State Game Lands #264



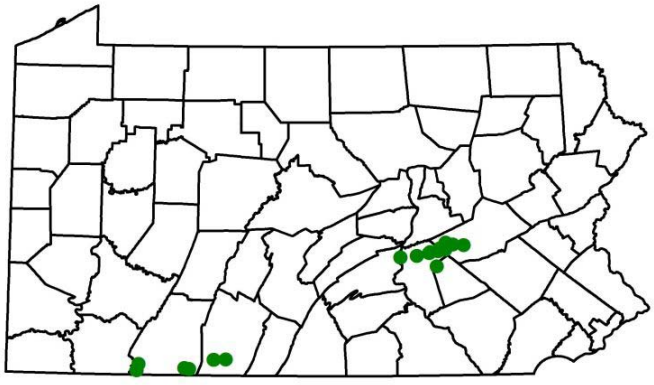
Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Minniebush (*Menziesia pilosa*)

A relative of the blueberry, minniebush (*Menziesia pilosa*) has a limited distribution in Pennsylvania. Though historically reported from a few counties in western Pennsylvania, this shrub is currently known to occur only in Cumberland, Dauphin, Lebanon and Schuylkill Counties.

Photo by Aura Stauffer



Map produced from the Pennsylvania Flora Database, Morris Arboretum of the University of Pennsylvania based on herbarium records.

REILLY TOWNSHIP

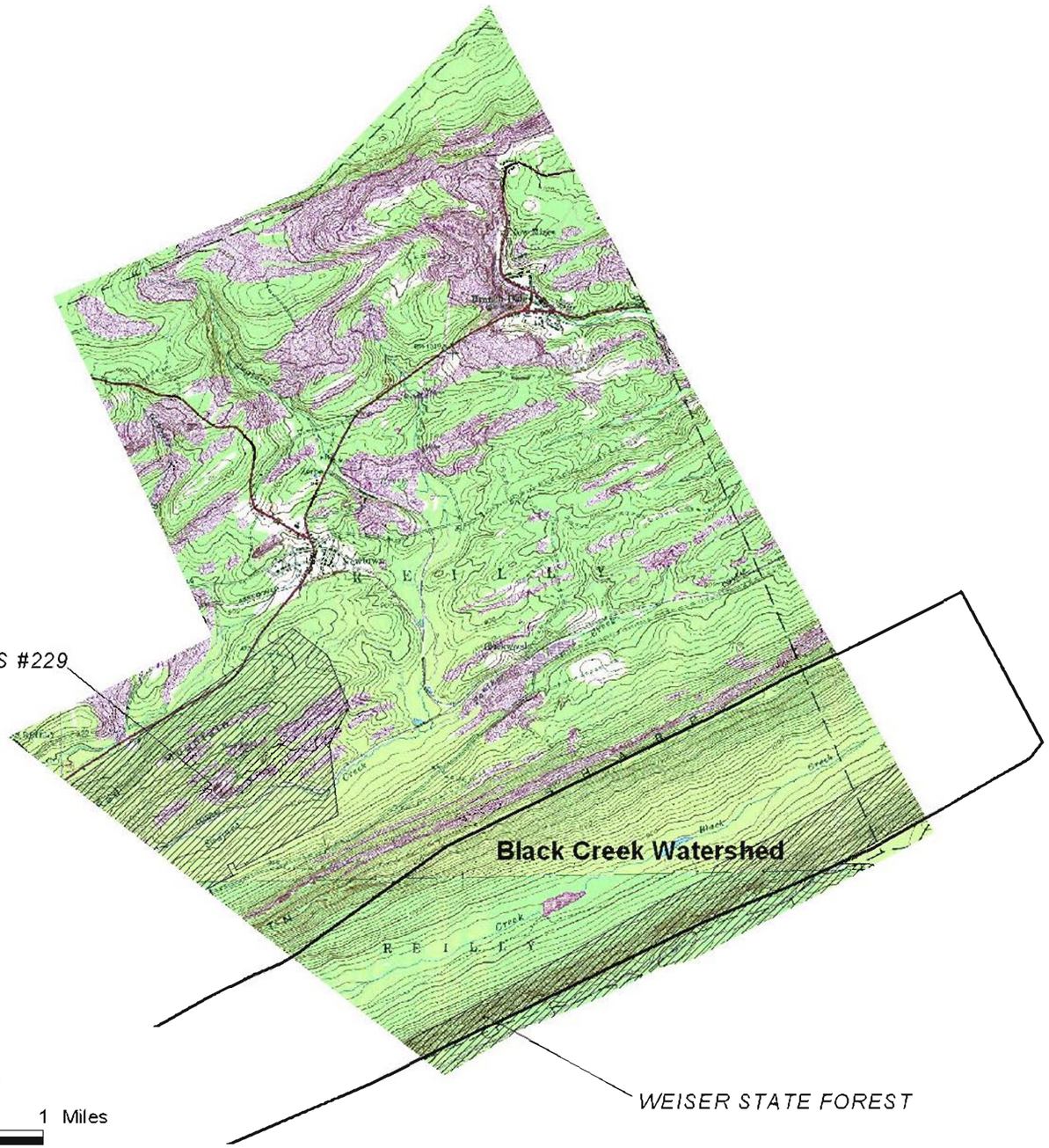
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Black Creek Watershed	Bird: Pied Billed Grebe (*Podilymbus podiceps*)	G5	S3B-S4N	N	6/17/2002	E

Managed Areas: State Game Lands #229
Weiser State Forest

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

The luxuriant headwater seeps of Black Creek
(Photo by PA Science Office of The Nature Conservancy)

Reilly Township



Scale 1:47,000

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Reilly Township

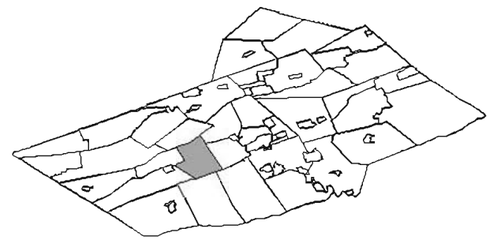
Schuylkill County Natural Areas Inventory

Natural Areas:

Black Creek Watershed

Managed Areas:

Weiser State Forest
State Game Lands #229



Legend

- Natural Area or Locally Significant Site
- Managed Area

Reilly Township:

BLACK CREEK WATERSHED (Branch & Reilly Townships) - The large, contiguous forest within this relatively undisturbed valley contains a beautiful mosaic of hemlock palustrine forest, alder-sphagnum wetland with graminoid openings, and an extensive Blueberry/Meadowsweet shrub swamp. In conjunction with the Indian Run watershed to the east, this area represents an intact palustrine ecosystem of rare quality and size in Schuylkill and many neighboring Counties. It is the contiguous and relatively undisturbed nature of these watersheds and excellent water quality of the streams that make this area one of the top sites in the county for conservation. This is an example of a landscape-scale ecosystem that if left intact, can be expected to be viable well into the future.

A single occurrence of a G5, S3B-S4N PA-Candidate rare animal species of concern, **the Pied-billed Grebe *(Podilymbus podiceps)*** was observed at this site. This species has been known to breed in many open-water habitats and at this site was observed in an isolated active beaver pond surrounded by a Hemlock-mixed hardwood forest. Associated species included Osprey (*Pandion haliatus*), Great Blue Heron (*Ardea herodias*), Tree Swallow (*Tachycineta bicolor*), Red-shouldered Hawk (*Buteo lineatus*), and Black-throated Green Warbler (*Dendroica virens*). Recent logging operations between the two watersheds was the only disturbance noted in this otherwise intact natural community. Acid mine drainage was observed in a shrub swamp leading out of the beaver pond, and should be monitored for possible decreased water quality in the future.

The hemlock-palustrine forest, the surrounding alders-sphagnum wetland and the meadowsweet/blueberry shrub swamp provide excellent quality habitat for many neo-tropical migrant landbirds. Many uncommon northern affinity species such as Canada Warbler (*Wilsonia canadensis*), Northern Waterthrush (*Seiurus noveboracensis*), and Black-throated Blue Warbler (*Dendroica caerulescens*) were present in good numbers. Other species observed include Scarlet Tanager (*Piranga olivacea*), Blue-headed Vireo (*Vireo solitarius*), Black-and-white Warbler (*Mniotilta varia*), Hooded Warbler (*Wilsonia citrina*), Great Crested Flycatcher (*Myiarchus crinitus*), Ovenbird (*Seiurus aurocapillus*) and Veery (*Catharus fuscescens*),. The dominant vegetation at this site includes hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), meadowsweet (*Spiraea latifolia*), highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), three-way sedge (*Dulichium arundinaceum*), St. John's wort (*Hypericum spp.)*, alder (*Alnus spp*.), royal fern (*Osmunda regalis*), soft rush (*Juncus effusus*) and short-hair sedge (*Carex crinita*). Observed disturbances include logging in some areas, which could make conditions favorable for exotic species. This site is primarily owned by the Pine Grove Borough Water Authority, and includes a portion of Weiser State Forest.

RUSH TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Greenwood Lake Wetland	Plant: Water bulrush *(Schoenoplectus subterminalis)*	G4G5	S3	N	7/11/2002	B
Lake Hauto	Plant: Climbing fern *(Lygodium palmatum)*	G4	S3	PR	6/18/1984	D
Nesquehoning Headwaters Vernal Pools	Natural Community (Ephemeral / Fluctuating Pools)	G?	S3	N	9/21/2002	E

Locally Significant: Hometown Ridgetop Dwarf-Tree Forest,
Little Schuylkill River Outcrops

Other: Still Creek – High Quality Stream

Managed Areas: State Game Lands #227
Tuscarora State Park

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

An Ephemeral / Fluctuating pool at the headwaters of the Nesquehoning creek appears meadow-like during the summer, but will fill with water during the winter to provide valuable breeding habitat for amphibians such as spotted salamanders (*Ambystoma maculatum*) and wood frogs (*Rana sylvatica*). Photo: PA Science Office of The Nature Conservancy.

Rush Township

Rush Township

Schuylkill County Natural Areas Inventory

Natural Areas:

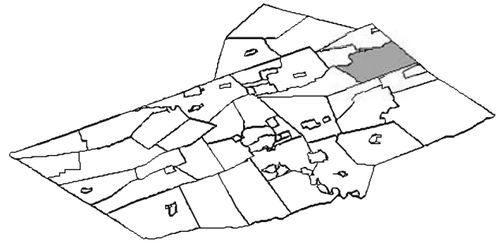
Greenwood Lake Wetland
Lake Hauto
Nesquehoning Headwaters Vernal Pools

Locally Significant Sites:

Hometown Ridgetop Dwarf-Tree Forest
Little Schuylkill River Outcrops

Managed Areas:

State Game Lands #227
Tuscarora State Park



Legend

Natural Area or Locally Significant Site

Managed Area

(Rush Township**:**

GREENWOOD LAKE WETLAND (Rush Township) – This site consists of the wetlands along the banks of the Greenwood and Hauto Lakes. A site visit in 2002 revealed a good-quality population of a G4G5, S3 plant species of concern, the **water bulrush *(Schoenoplectus subterminalis)***. The margins of Greenwood Lake provide exceptional habitat for this species. The northwestern edge of Greenwood Lake was noted as an exceptional sphagnum-sedge wetland opening with fair degree of plant diversity. This site also has a small, naturally occurring population of balsam fir (*Abies balsamea*). Though not considered rare in Pennsylvania, this site represents an unusual occurrence of this species south of the extent of glacial activity in Pennsylvania, and one of the few stands of balsam fir in the Ridge and Valley Geological Province. This stand of trees was described as being "the remnants of a once fine colony that have been spared the woodman's ax" (Wagner 1943). Birds observed at this site include Veery (*Catharus fuscescens*), Blue-gray Gnatcatcher (*Polioptila caerulea*), Red-eyed Vireo (*Vireo olivaceus*), Ovenbird (*Seiurus aurocapillus*), Black-and-white Warbler (*Mniotilta varia*), Black-throated Blue Warbler (*Dendroica caerulescens*), Eastern Towhee (*Pipilo erythrophthalmus*) and Eastern Wood-Pewee (*Contopus virens*). The land surrounding Greenwood Lake is used primarily for recreation and wildlife conservation purposes. No threats were observed and no special management appears to be needed.
LAKE HAUTO (Rush Township) - In 1984, a small population of a G4, S3 PA-Rare plant species, the **climbing fern *(Lygodium palmatum)***, was documented as occupying a small portion of the margin of Hauto Lake. The surrounding land is a housing development. No disturbances were noted, though clearing and /or draining were listed as potential threats. Runoff from homes and roadways may detrimentally impact the quality of this wetland. The maintenance of undisturbed forested buffers, which provide filtration of runoff and a cooling effect along the shores of this lake, is essential to maintain its quality. Additional surveys are recommend to determine the current population status of this species at this site.

NESQUEHONING HEADWATERS VERNAL POOLS (Rush Township) – An Ephemeral / Fluctuating Pool natural community was documented from this site in the fall of 2002. The pools and headwater seeps of the Nesquehoning Creek are perched on Broad Mountain in a contiguous and unfragmented forested context. The largest pond encountered had an extensive open area dominated by various grasses, sedges and rushes including switch grass (*Panicum virgatum*), beak-rush (*Rhyncospora capitellata*) and Canada rush (*Juncus canadensis*). A shrub layer composed of black huckleberry (*Gaylussacia baccata*), highbush blueberry (Vaccinium corymbosum), low sweet blueberry (*Vaccinium angustifolium*), and sheep laurel (*Kalmia angustifolia*), ringed the opening. This pond likely provides the necessary breeding habitat for forest dwelling amphibians including wood frogs (*Rana sylvatica*) and spotted salamanders (*Ambystoma maculatum*). A dirt lane passes near the pond. It appears that no traffic has impacted the pond at this time, but measures may need to be taken to block the possibility of the degradation of this habitat by All Terrain Vehicles.

Locally Significant Sites:

Hometown Ridgetop Dwarf-Tree Forest - (Rush Township) – This **Locally Significant site** includes the wide plateau between Hometown and Still Creek Reservoir. This site represents one of five expansive Ridgetop Dwarf-Tree Forest Natural Communities that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in

SchuylkillCounty, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The pitch pine barrens are disturbance dependent ecosystems. The development of a prescribed burn program would help to improve the quality of this fire-dependent natural community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Though hardwood species potentially imply a greater economic return as lumber, the harsh environmental conditions at these sites limit its ability to produce timber-quality stands of hardwood. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. This site was delineated from aerial photographs. Ground surveys are recommended to determine the quality of this natural community.

Little Schuylkill River Outcrops (Rush Township) – This **Locally Significant site** is a rocky outcrop at an extreme bend in the Little Schuylkill River within State Game Lands #227. Despite an accumulation of litter at this site, the cliff face and outcrops exhibit good plant diversity as well as an exceptionally scenic setting. The use of this site by litterbugs and populations of invasive species, such as multiflora rose (*Rosa multiflora*) and Japanese barberry (*Berberis thunbergii*), pose the greatest threat to this site.

Still Creek (Rush Township & Carbon County) – Still Creek, from its headwaters to the reservoir dam, has been designated a **High Quality Stream** by the Pennsylvania Department of Environmental Protection. The continued maintenance of undisturbed forested buffers, which provide a cooling effect along the shores of this stream, is essential to maintain its quality.

Invasive Plant Species

Among the most aggressive introduced plant species in Pennsylvania include the following four top offenders of natural areas. These species are not kept in check by natural predators, and out-compete native species. Once established, they can be very difficult and time consuming to remove. Natural Areas should be monitored regularly for pioneer populations of these species. Small populations, once encountered, should be eradicated to help ensure the continued viability of natural areas. Photos: PA Department of Agriculture

Japanese Knotweed (*Polygonum cuspidatum*)

Tree of Heaven (*Ailanthus altissima*)

Purple loosestrife (*Lythrum salicaria*)

Multiflora rose (*Rosa multiflora*)

RYAN TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Locust Creek	Animal	G4	S1	PE	4/28/1988	B
Locust Lake Forest	Animal	G5	S2S3B-S3N	N	1999	E
Wolf Creek Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	7/02/02	B

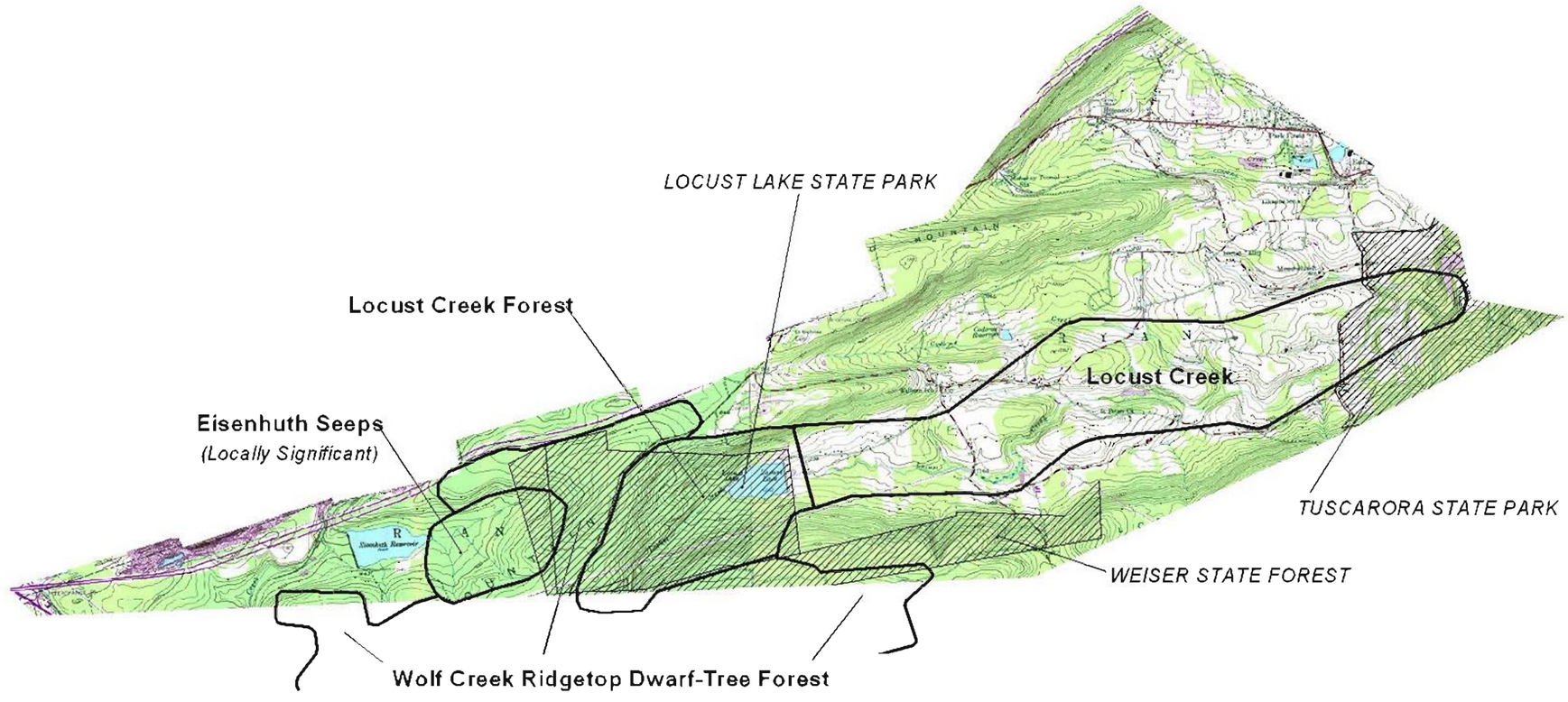
Locally Significant: Eisenhuth Seeps

Managed Areas: Locust Lake State Park
Tuscarora State Park
Weiser State Forest

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

The sphagnum moss lined seeps leading to the Eisenhuth Reservoir contain excellent populations of Coville's rush (*Juncus gymnocarpus*). A large proportion of the known global population of this plant species resides in similar seeps throughout Schuylkill County.
(Photo by the PA Science Office of The Nature Conservancy)

Ryan Township



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Ryan Township

Schuylkill County Natural Areas Inventory

Natural Areas:

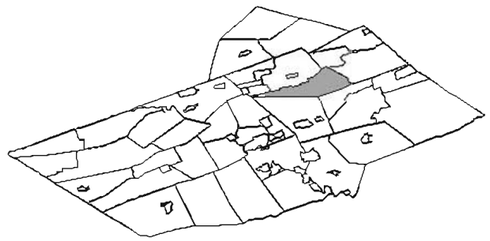
Locust Creek
Locust Creek Forest
Wolf Creek Ridgetop Dwarf-Tree Forest

Locally Significant Sites:

Eisenhuth Seeps

Managed Areas:

Locust Lake State Park
Tuscarora State Park
Weiser State Forest



Legend

Natural Area or Locally Significant Site

Managed Area

Ryan Township:

LOCUST CREEK (Ryan Township) – A good-quality population of **a G4, S1 PA-Endangered animal species of concern** has been documented in Locust Creek between Tuscarora Lake and Locust Lake. Typically of more northern distribution, this is the only currently known location in Pennsylvania for this species. This species requires cold, calcium-poor mountain streams. Associates of this species include the native brook trout (*Salvelinus fontinalis*), and the introduced brown and rainbow trout (*Salmo trutta & S. gairdnerii*). Enrichment of the water, particularly nitrate runoff, has been shown to cause declines of this species (Strayer and Jirka 1997). Changes in the creek hydrology, and landscape disturbances such as intensive agriculture and development may be responsible for the decline of this species. For these reasons, wide forested buffers should be created and preserved along Locust Creek for the long-term future of this species. This site includes portions of Tuscarora State Park and Locust Lake State Park.

LOCUST LAKE FOREST (Ryan & Blythe Townships) - In 1999, a nesting pair with young of a **G5, PA-Candidate rare animal species of concern** was located in Locust Creek State Park. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon (Brauning 1992). Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites. This site includes a portion of Locust Lake State Park.

WOLF CREEK RIDGETOP DWARF-TREE FOREST (Blythe & Ryan Townships) - This Natural Community lies to the west of Route 61 between Pottsville and Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*) and common hairgrass (*Deschampsia flexuosa*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (*Papaipema sp.1*) is a globally endangered species, currently known only from Pennsylvania that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development of a prescribed burn program would help to improve the quality of this fire-dependent natural community. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. This site includes portions of Weiser State Forest and Locust Lake State Park.

Locally Significant Site:

Eisenhuth Seeps (Ryan Township) – This Locally Significant site includes three spring-fed forested seeps leading into the Eisenhuth Reservoir. As the streamlets rise in elevation they branch repeatedly, some ending in a carpet of sphagnum moss. Thick stands of Coville's rush (*Juncus gymnocarpus*) occur along the seeps from top to bottom. Additional surveys for species of concern are encouraged.

Ecology of a Beaver Meadow

Beavers were once plentiful across all of Pennsylvania, dominating all wetland habitats, but overharvesting, and extensive logging in the late 18th and early 20th centuries resulted in the elimination of the beaver from the state (Merritt 1987). A reintroduction program began in 1917, and the state's population of beavers has increased steadily since. Beavers build dams on small streams to create habitat suitable for their needs. The resulting ponds flood vegetation and submerge tree roots within their sphere of influence. The trees, unable to get oxygen to the roots, die, leaving snags suitable for woodpeckers, wood ducks and other species. In the open water of the pond, aquatic vegetation replaces the submerged terrestrial plants, and fish, turtles and frogs become abundant. Once the beavers deplete an area of their preferred forage, they move on to more promising territory. The dam deteriorates, leaving an open meadow of nutrient-rich, deep soil easily colonized by successional herbs, grasses and shrubs. This cycle repeats itself as succession repopulates the area with young trees, the preferred food of the beaver. Below: a beaver dam and a beaver-felled tree on Messers Run in State Game Lands #84. Photos by the PA Science Office of The Nature Conservancy.

SCHUYLKILL TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

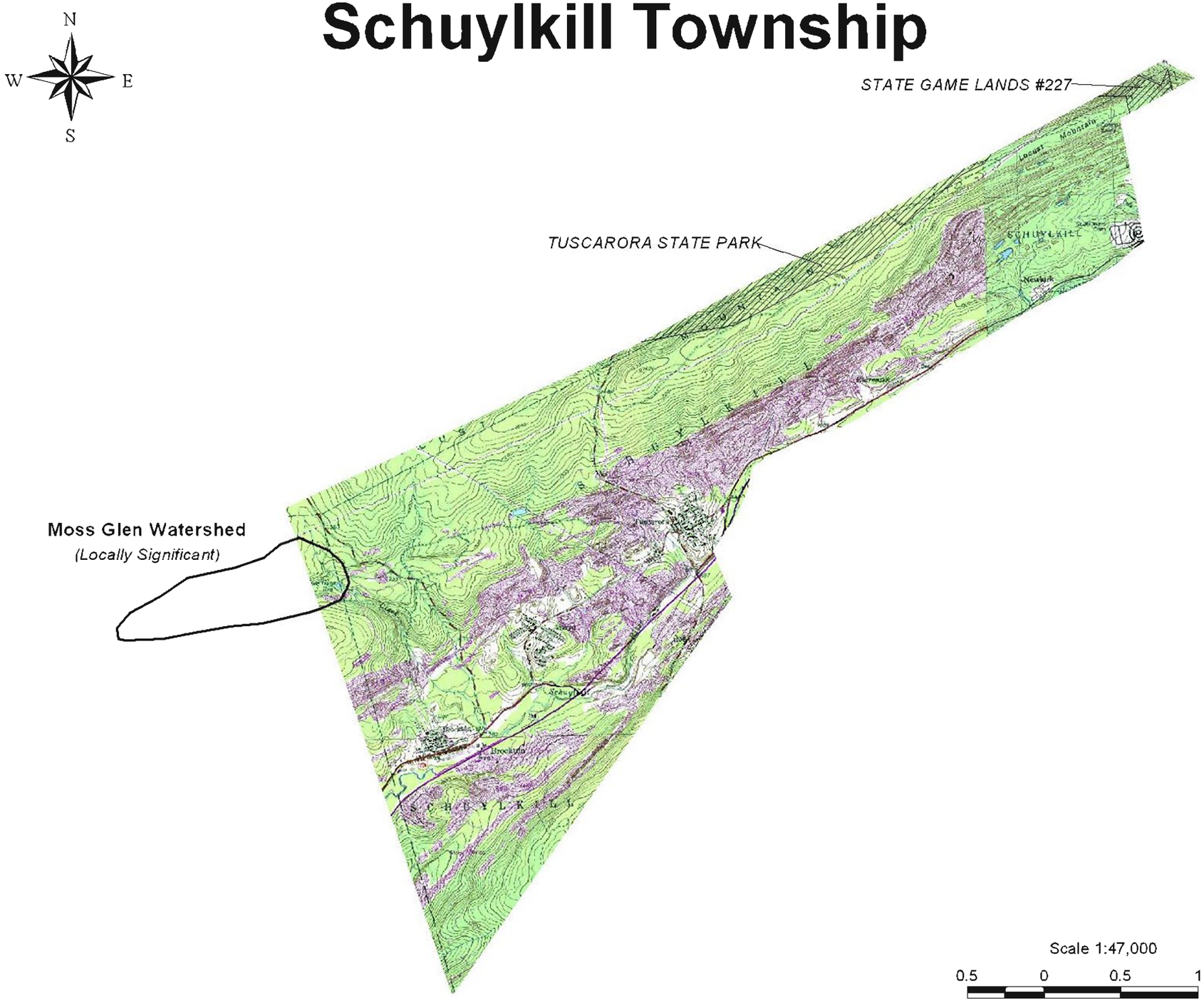
Locally Significant: Moss Glen Reservoir

Managed Areas: State Game Lands #227
Tuscarora State Park

Locally Significant Site:

Moss Glen Reservoir (Blythe & Schuylkill Townships) – This **Locally Significant site** is comprised of the forested banks and seeps of Big Creek, which feeds the Moss Glen Reservoir. The creek banks are cloaked in hemlocks, white pines and rhododendrons, creating a cool, shaded environment. The well-developed understory is inhabited by a good diversity of birds including an exceptional number of Canada Warblers (*Wilsonia canadensis*), a bird typically of more northern affinity. Several seepages feed Big Creek from the adjoining hillsides, creating sparsely canopied wetlands dominated by skunk cabbage (*Symplocarpus foetidus*) and cinnamon fern (*Osmunda cinnamomea*), and include several good-quality populations of Coville's rush (*Juncus gymnocarpus*). Among the bird species observed at this site include Hermit Thrush (*Catharus guttatus*), Red-eyed Vireo (*Vireo olivaceus*), Ovenbird (*Seiurus aurocapillus*), Black-throated Green Warbler (*Dendroica virens*), Scarlet Tanager (*Pyrangea olivaceus*), Common Yellow-throat (*Geothylpis trachias*), Black-throated Blue Warbler (*Dendroica caerulescens*), Black-and-white Warbler (*Mniotilta varia*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), Ruby-throated Hummingbird (*Archilochus colubris*), and Eastern Towhee (*Pipilo erythrophthalmus*). Previous mining operations, creation of new access roads and construction of cell towers were the only disturbances noted on this site. Further fragmentation of this landscape by these activities would diminish the quality of this site. This site is the property of the Blythe Township Municipal Authority.

Schuylkill Township



Schuylkill Township

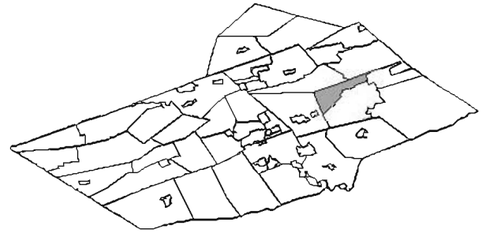
Schuylkill County Natural Areas Inventory

Locally Significant Sites:

Moss Glen Watershed

Managed Areas:

State Game Lands #227
Tuscarora State Park



Legend

- Natural Area or Locally Significant Site
- Managed Area

SOUTH MANHEIM TOWNSHIP & Auburn Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bear Creek At Aucheys	Animal	G5	S2S3B-S3N	N	5/01/1996	E
Blue Mountain Ridgetop	Natural Community	G?	S3	N	8/29/2001	E
	Animal	G5	S2S3B-S3N	N	1999	E
	Animal: Fly-poison borer moth *(Papaipema sp.1)*	G2G3	S2	N	9/24/1998	B
Stony Creek	Animal: Bald Eagle (*Haliaeetus leucocephalus*)	G4	S2B	PE	2002	E

Managed Areas: Appalachian National Scenic Trail
State Game Lands #110
State Game Lands #286
Weiser State Forest

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

The fly-poison borer moth *(Papaipema sp.1)* is currently only known from Pennsylvania. The larval stage of this species feeds on the roots of the fly-poison plant (*Amianthium muscaetoxicum*), a plant commonly found in dry oak forests and pitch pine barrens.
Photo: Tom Smith

South Manheim Township and Auburn Borough

South Manheim Township and Auburn Borough

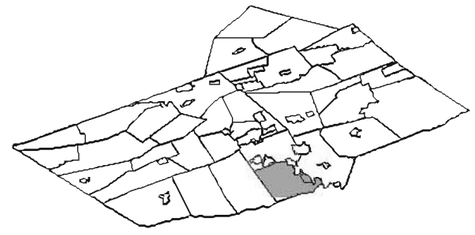
Schuylkill County Natural Areas Inventory

Natural Areas:

Bear Creek at Aucheys
Blue Mountain Ridgetop
Stony Creek

Managed Areas:

Appalachian National Scenic Trail
State Game Lands #110
State Game Lands #286
Weiser State Forest



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- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

South Manheim Township:

BEAR CREEK AT AUCHEYS (South Manheim & Wayne Townships) - A nesting pair of a **G5, PA-Candidate rare animal species of concern** was located at this site in 1996. The habitat is the forested creek bottom in the vicinity of Auchys. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon (Brauning 1992). Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

BLUE MOUNTAIN RIDGETOP (Wayne, South Manheim Twps. & Berks County) - This site includes a series of vernal pools that makeup an **Ephemeral/Fluctuating Pool Natural Community**. In 2001, a total of nine pools were documented on a flat ridgetop in SGL #110 adjacent to the Appalachian Trail. The ephemeral pools occur within a dry oak – heath forest matrix, and provide important habitat for breeding amphibians. Vegetation in each pool varies from unvegetated to heavily vegetated and may include cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), wool grass (*Scirpus cyperinus*), various sedges (*Carex folliculata, C. gynandra & Dulichium arundinaceum*), rice cut grass (*Leersia virginiana*), manna grass (*Glyceria spp*.), rushes (*Juncus spp*.), spike-rushes (*Eleocharis spp*.), marsh St.-John's-*wort (Triadenum virginicum*) and mosses (*Sphagnum spp*.). The threats to the pools include filling, spraying of pesticides to control mosquito populations, logging, and the practice of throwing slash from logging into the pools. Forested buffers need to be maintained around these ponds. No threats or disturbances were observed.

An invertebrate animal species of concern, **the fly-poison borer moth *(Papaipema sp.1)*** has also been found at this site since the 1970's, and as recently as 1998. This species is currently only known to occur in Pennsylvania. The larval stage of this species requires the fly-poison lily *(Amianthium muscaetoxicum*) as a food source. The use of *Bacillus thuringiensis* (BT) to control gypsy moths should not harm this species, but the spraying of Dimlin would pose a serious threat to the larvae.

A single juvenile **G5, PA-Candidate rare animal species of concern** was observed in 1999 on this forested ridgetop. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon (Brauning 1992). Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

STONY CREEK (South Manheim & West Brunswick Twps, Port Clinton Borough & Berks County) – A nesting pair of Bald Eagles have been observed at this site during the past two years. The pair forages for food along the Schuylkill River, and frequent the open water created by the Landingville Dam. After two centuries of severely declining numbers due to encroaching civilization, persecution and pesticide poisoning, Pennsylvania's populations of this national symbol have begun to recover. From the late 50's to the late 80's, Bald Eagles in Pennsylvania were only known to nest in Crawford County (Brauning 1992). Since that time, Bald Eagles have recolonized portions of the upper and lower Susquehanna River. Undisturbed forested buffers should be maintained around all nest sites. This site contains portions of Weiser State Forest, State Game Lands #110, the Appalachian National Scenic Trail and private property.

TAMAQUA & Coaldale Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Owl Creek Wetlands	Natural Community (Ephemeral / Fluctuating Pools)	G?	S3	N	4/22/2002	E

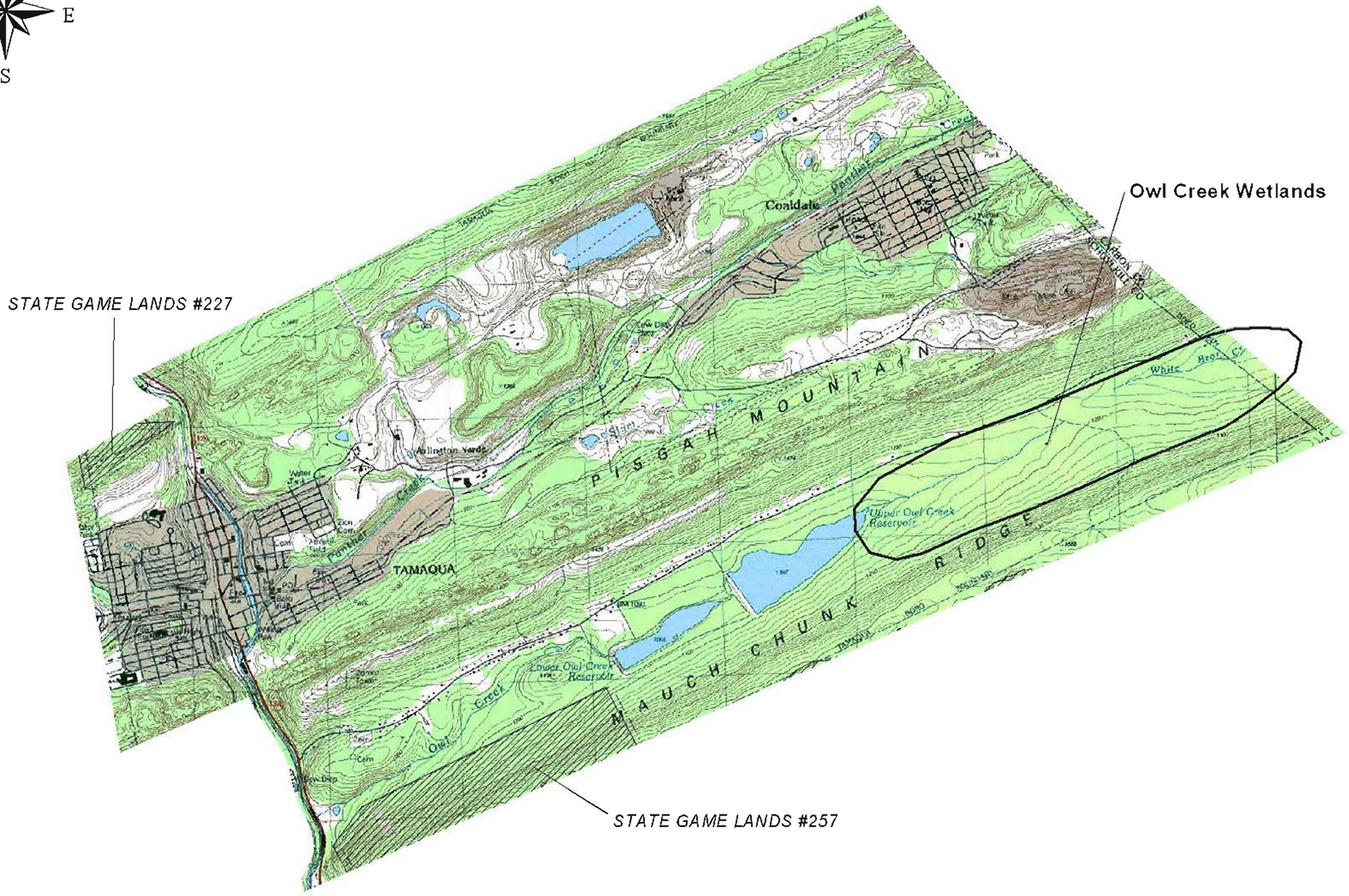
Other: Owl Creek – High Quality Stream & Class-A Trout Waters

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Tamaqua Borough:

OWL CREEK WETLANDS (Tamaqua Borough) - Fifteen vernal pools were documented during a site visit in April of 2002 to the drainage divide between Owl Creek and White Bear Creek. This series of vernal pools makes up an **Ephemeral/Fluctuating Pool Natural Community**. The ephemeral pools provide important habitat for breeding amphibians and wetland plant species. Wood frog (*Rana sylvatica*) eggs and tadpoles, and spotted salamander (*Ambystomata maculatum*) eggs and were observed in the pools. Numerous red efts, the terrestrial sub-adult stage of the red-spotted newt (*Notophthalmus viridescens viridescens*), were also observed at this site. The ponds are within a hemlock – mixed hardwood forest matrix. Associated tree species at his site include red *maple (Acer rubrum*), pin oak (*Quercus palustris*), white oak (*Q. alba*), black gum (*Nyssa sylvatica*), *hemlock (Tsuga canadensis*), white pine (*Pinus strobus*), black birch (*Betula lenta*), serviceberry (*Amelanchier sp*.) and hornbeam (*Carpinus caroliniana*). Frequent shrubs include rosebay (*Rhododendron maximum*), mountain laurel (*Kalmia latifolia*), highbush blueberry (*Vaccinium corymbosum*), winterberry holly (*Ilex verticillata*), mountain holly (*Nemopanthus mucronatus*), witch hazel (*Hamamelis virginiana*), spicebush (*Lindera benzoin*), arrow-wood (*Viburnum dentatum*), sheep laurel (*Kalmia angustifolia*), barberry (*Berberis thunbergii*), gooseberry (*Ribes sp*.), pinxter flower (*Rhododendron periclymenoides*) and greenbriar (*Smilax rotundifolia*). The herbaceous layer was sparse, but included cinnamon fern (*Osmunda cinnamomea*) and teaberry (*Gaultheria procumbens*). Extensive plantations of Norway spruce (*Picea abies*), scots pine (*Pinus sylvestris*) and red pine (*P. resinosa*) detract from the otherwise natural character of this watershed. A forested buffer should be maintained around this pond community. The threats to the pools include filling, spraying of pesticides to control mosquito populations, logging, and the practice of throwing slash from logging into the pools. A wide forested buffer should be maintained around this site.

Tamaqua and Coaldale Boroughs



Scale 1:36,000

0.5 0 0.5 1 Miles

Tamaqua and Coaldale Boroughs

Schuylkill County Natural Areas Inventory

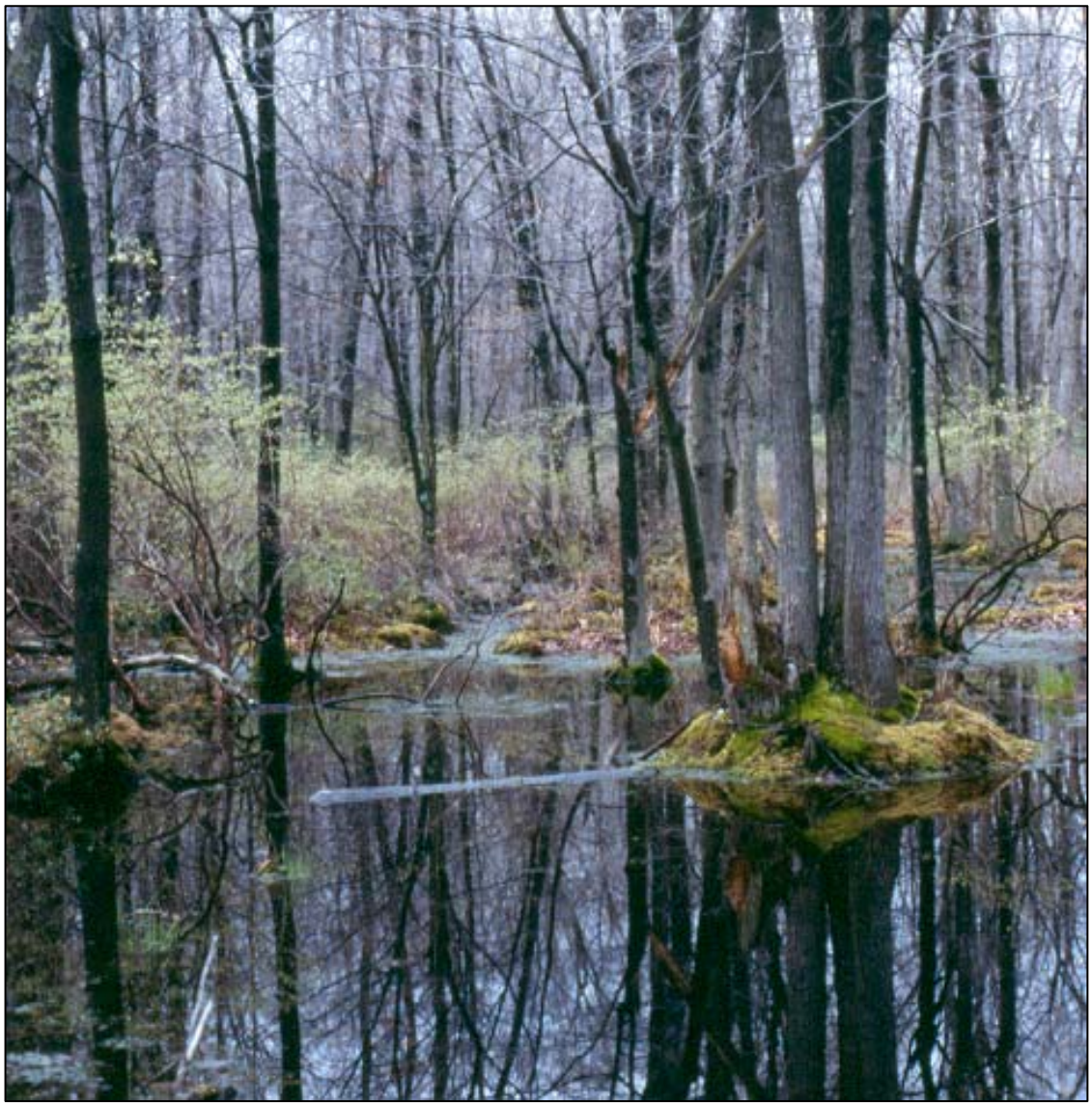
Natural Areas:
Owl Creek Wetlands

Managed Areas:
State Game Lands #227
State Game Lands #257

Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

Owl Creek is designated as a **High-Quality Stream** by the PA Department of Environmental Protection, and as a **Class-A trout water** by the PA Fish & Boat Commission. The continued maintenance of undisturbed forested buffers, which provide a cooling effect along the shores of this stream, is essential to maintain its quality.



A portion of the ephemeral / fluctuating pool natural community in the Owl Creek wetlands site. Photo by the Pennsylvania Science Office of The Nature Conservancy. Photo: Aura Stauffer

This portion of Dehaas Run Wetlands, known as Jeff's Swamp, is a mosaic of wetland types within the excellent forested context of State Game Lands #211 & #229.
Below: A hemlock palustrine forest rings shrub swamp and sedge meadow openings.

TREMONT TOWNSHIP & Tremont Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Black Creek Watershed	Bird: Pied Billed Grebe *(Podilymbus podiceps)*	G5	S3B,S4N	N	6/17/2002	E
DeHaas Run Wetlands	Natural Community (Ephemeral / Fluctuating Pools)	G?	S3	N	4/30/2002	E
	Plant: Netted chain fern *(Woodwardia areolata)*	G5	S2	N	7/26/2001	C
Sharp Mountain	Animal: Allegheny woodrat *(Neotoma magister)*	G3G4	S3	PE	1993	E
	Geologic Feature (Chinese Wall)			N		E

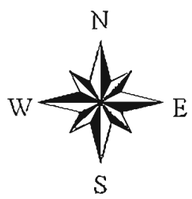
Managed Areas: State Game Lands #211
State Game Lands #229

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Tremont Township:

BLACK CREEK WATERSHED (Branch & Reilly Townships) - The large, contiguous forest within this relatively undisturbed valley contains a beautiful mosaic of hemlock palustrine forest, alder-sphagnum wetland with graminoid openings, and an extensive Blueberry/Meadowsweet shrub swamp. In conjunction with the Indian Run watershed to the east, this area represents an intact palustrine ecosystem of rare quality and size in Schuylkill and many neighboring Counties. It is the contiguous and relatively undisturbed nature of these watersheds and excellent water quality of the streams that make this area one of the top sites in the county for conservation. This is an example of a landscape-scale ecosystem that if left intact, can be expected to be viable well into the future.

Tremont Township and Tremont Borough



Tremont Township
Tremont Borough

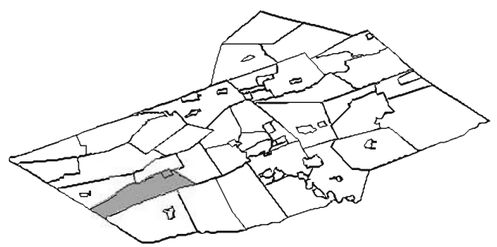
Schuylkill County
Natural Areas Inventory

Natural Areas:

Black Creek Watershed
Dehaas Run Wetlands
Gold Mine Wetlands
Sharp Mountain

Managed Areas:

State Game Lands #211
State Game Lands #229



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

(Tremont Township continued)

A single occurrence of a G5, S3B-S4N PA-Candidate rare animal species of concern, **the Pied-billed Grebe *(Podilymbus podiceps)*** was observed at this site. This species has been known to breed in many open-water habitats and at this site was observed in an isolated active beaver pond surrounded by a Hemlock-mixed hardwood forest. Associated species included Osprey (*Pandion haliatus*), Great Blue Heron (*Ardea herodias*), Tree Swallow (*Tachycineta bicolor*), Red-shouldered Hawk (*Buteo lineatus*), and Black-throated Green Warbler (*Dendroica virens*). This site contains no immediate threats or disturbances, since the area is fairly remote. Acid mine drainage was observed in a shrub swamp leading out of the beaver pond, and should be monitored for possible decreased water quality in the future.

The hemlock-palustrine forest, the surrounding alders-sphagnum wetland and the meadowsweet/blueberry shrub swamp provide excellent quality habitat for many neo-tropical migrant landbirds. Many uncommon northern affinity species such as Canada Warbler (*Wilsonia canadensis*), Northern Waterthrush (*Seiurus noveboracensis*), Veery (*Catharus fuscescens*), and Black-throated Blue Warbler (*Dendroica caerulescens*) were present in good numbers. Other species observed include Scarlet Tanager (*Piranga olivacea*), Blue-headed Vireo (*Vireo solitarius*), Black-and-white Warbler (*Mniotilta varia*), Hooded Warbler (*Wilsonia citrina*), Great Crested Flycatcher (*Myiarchus crinitus*) and Ovenbird (*Seiurus aurocapillus*). The dominant vegetation at this site includes hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), meadowsweet (*Spiraea latifolia*), highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), three-way sedge (*Dulichium arundinaceum*), St. John's wort (*Hypericum spp.),* alder (*Alnus spp*.), royal fern (*Osmunda regalis*), soft rush (*Juncus effusus*) and short-hair sedge (*Carex crinita*). Observed disturbances include logging in some areas which could make conditions favorable for exotic species. This site is primarily owned by the Pine Grove Borough Water Authority, and includes a portion of Weiser State Forest.

DEHAAS RUN WETLANDS (Pine Grove & Tremont Townships) – This site includes two large, excellent-quality, open wetlands that may have been created or enhanced by past beaver activity, and a series of vernal pools between them. In 2001, a marginal-quality population of a G5, S2 plant species of concern, the **netted chain fern (*Woodwardia areolata*),** was documented at this site. Though considered a small population for this species on a statewide range, it is noteworthy for being one of the few occurrences in the Ridge and Valley Province. The habitat is composed of a shrub-graminoid wetland with an extensive sphagnum substrate exhibiting a 'quaking' aspect. Besides an excellent population of Coville's rush *(Juncus gymnocarpus),* associated species at this site include cinnamon fern *(Osmunda cinnamomea),* various sedges *(Carex folliculata, C. echinata, C. utriculata, C. trisperma, Dulichium arundinaceum),* bur-reed *(Sparganium americanum),* marsh St.-Johns-wort *(Triadenum fraseri),* round-leaved sundew *(Drosera rotundifolia),* highbush blueberry *(Vaccinium corymbosum),* poison sumac (*Toxicodendron vernix*) and cotton-grass (*Eriophorum virginicum).* A hemlock palustrine forest, (a forested wetland), rings the shrub swamp openings with pronounced spring-fed mound and pool microtypography. These undulating vegetated hummocks create less saturated habitat conditions where a variety of plant species occur.

The **ephemeral/fluctuating pool natural community** is located in the headwaters of DeHaas Run between the two wetland openings. The immediate habitat is a hemlock-mixed hardwood palustrine forest with a thick rosebay (*Rhododendron maximum*) understory. Except for a water-level ring of sphagnum moss, the ponds were unvegetated. The ephemeral pools along DeHaas Run provide important habitat for breeding amphibians. Wood frog (*Rana sylvatica*) eggs and tadpoles, and spotted salamander (*Ambystomata maculatum*) eggs and were observed in the pools. Undisturbed forested buffers need to be maintained around these pools to effectively protect the integrity of this essential breeding habitat.

A good diversity of bird life was also noted from this site. Since this site was visited very early in the breeding season, few of these species can be considered to be breeding here at this time. Among those species observed at this site include Ovenbird (*Seiurus aurocapillus*), Black-throated Green Warbler (*Dendroica virens*), Black-and-white Warbler (*Mniotilta varia*), Blue-headed Vireo (*Vireo solitarius*), Pileated Woodpecker (*Dryocopus pileatus*), Red-eyed Vireo (*Vireo olivaceus*), Blue-gray Gnatcatcher (*Polioptila caerulea*), Yellow-rumped Warbler (*Dendroica coronata coronata*), Ruby-crowned Kinglet (*Regulus calendula*), Hooded Warbler (*Wilsonia citrina*), Carolina Chickadee (*Poecile carolinensis*), Broad-winged Hawk (*Buteo palypterus*) and Red-headed Woodpecker (*Melanerpes erythrocephalus*).

SHARP MOUNTAIN (Reilly & Tremont Townships, & Lebanon County) - Evidence of several fair-quality populations of a G3G4, S3 PA-Threatened animal species, the **Allegheny woodrat *(Neotoma magister)***, was found at this site during visits in 1990-1993. The site consists of a series of conglomerate outcrops and talus slopes on the ridge and slopes of Sharp Mountain between Lorberry Junction and continuing southwest into Lebanon County. This species typically inhabits the deep crevices of rocky outcrops, boulder-strewn talus slopes and caves. Populations of this species throughout the state have experienced rapid decline in recent decades due to unknown causes (Merritt 1987). Additional surveys for this species at this site are recommended. These ridges and slopes are cloaked in a dry oak-heath forest matrix composed of black oak (*Quercus velutina*), red oak (*Quercus rubra*), chestnut oak (*Quercus montana*), red maple (*Acer rubrum*), sassafras (*Sassafras albidum*), Eastern hemlock (*Tsuga canadensis*), black birch (*Betula lenta*), wild grape (*Vitis sp*.), mountain laurel (*Kalmia latifolia*), and rhododendron (*Rhododendron sp*.). Undisturbed forested buffers should be maintained around talus slopes and outcrops in this area. Past and present mining activity is the only disturbance noted from this site.

Chinese Wall is a **Geologic feature** consisting of a spectacular outcrop of Sharp Mountain quartz-pebble conglomerate that has been known locally as “High Rocks” and “Boxcar Rocks” (Geyer & Bolles 1979). Litter and vandalism detract from the natural beauty of this site. This site falls primarily within State Game Lands #211 & #229.

Hemlock Wooly Adelgid

The state tree of Pennsylvania, the Canada Hemlock (*Tsuga canadensis*), has been under attack by an accidentally introduced insect species, the Hemlock Wooly Adelgid (*Adelges tsugae).* Many of these trees may succumb due to defoliation by these insect pests. The character of these hemlock-dominated habitats will likely change dramatically if continued defoliation occurs. The removal of the hemlock canopy would likely result in a marked decrease in these shade-adapted species and an increase in shade intolerant species, including many species considered invasive. It is difficult to predict the future consequences of the loss of mature stands of hemlock in these habitats.

Top: The wooly adelgid appears as a cottony mass on the undersides of hemlock branches.

Center: The insect devours the evergreen needles of even the largest trees.

Botton: Hemlock cannot withstand defoliation, and will die shortly after being stripped of its needles.

UNION TOWNSHIP & Ringtown Borough

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

Locally Significant: Shenandoah Municipal Authority Watershed

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Older growth hemlocks occur in scattered patches within the Shenandoah Municipal Watershed. An accidentally introduced pest, the hemlock wooly adelgid, has been severely impacting hemlocks along the Eastern Seaboard. This site may be a good candidate for the release of biological control organisms. (Photo by the PA Science Office of The Nature Conservancy)

Union Township and Ringtown Borough

Shenandoah Municipal Authority Watershed
(Locally Significant)

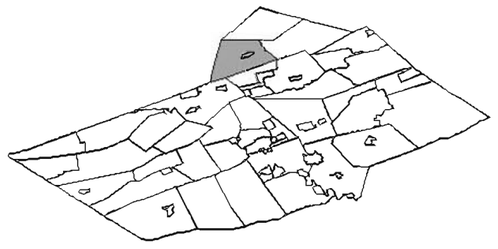
Scale 1:55,000

0.5 0 0.5 1 Miles

Union Township
Ringtown Borough

Schuylkill County
Natural Areas Inventory

Locally Significant Sites:
Shenandoah Municipal Authority Watershed



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary

Union Township:

Locally Significant Site:

Shenandoah Municipal Authority Watershed (Union Township & Columbia County) – This **Locally Significant site** contains the forested seeps, streams and creeks leading into Shenandoah Reservoir #6. The hemlock forest at the head of the reservoir resembles old growth, with large hemlocks (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), tulip poplar (*Liriodendron tulipifera)* and chestnut oak (*Quercus montana*). A tree ring core from one of the hemlocks revealed a conservative estimate of 150 years. The hemlocks in this older-growth forest are currently infested with the hemlock wooly adelgid (*Adelges tsugae*) to an extent that the branches appear ashen and skeletonized.

A hemlock pest accidentally introduced from Asia, the hemlock wooly adelgid, has detrimentally impacted hemlock stands throughout the mid-Atlantic states and New England. These small, aphid-like insects are covered with a cottony mass giving them a wooly appearance. They suck sap from the young twigs of hemlock trees resulting in the loss of needles and new growth. Without new shoot growth to support photosynthesis, tree health is seriously impaired, leading to defoliation and tree death within several years. This pest has the potential to severely alter hemlock-dominated habitats. As mature hemlock stands are defoliated, the cool, moist microclimate created by their deep shade ceases to exist. Plant and animal species that are adapted to this environment will, in effect, be homeless. Work is ongoing to identify and distribute natural predators of the wooly adelgid. This approach, known as biological control, is the only likely way to control this widespread pest. A small lady beetle (*Pseudoscymnus tsugae*) has been the focus of the biological control effort so far. This species, a natural predator of wooly adelgid in Japan, has proven effective in controlling this pest in its native setting. This wooly adelgid predator has been released at various sites in infested areas since 1995. Though initial results from these field releases have been encouraging, it will likely take many years to determine if this predator can be an effective control of the hemlock wooly adelgid in North America. In the meantime, hemlock dominated habitats are in serious danger from this pest.

The associated tree species at this site, yellow birch, tulip poplar and chestnut oak are unaffected by the wooly adelgid. These large and old trees at the western end of the reservoir should be protected from future logging operations, and a wide undisturbed buffer created around them to expand this potential future old growth site. This site should be considered for release of biological control agents for the hemlock wooly adelgid. More surveys to the headwaters of the reservoir are encouraged to determine the extent of this older-growth site.

UPPER MAHANTANGO TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

During this study, no species of special concern, exemplary natural communities, or locally significant sites were identified in Upper Mahantango Township. Consequently, no map is provided for this township. However, environmentally sensitive areas may exist in the township. It is possible that additional field studies would identify sensitive features along the banks of Mahantango Creek, the Little Mahantango Creek or their tributaries draining off of Mahantango Mountain. Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. The creation or preservation of undisturbed forested buffers along river and stream banks are not only important to many plant and animal species, but the features are also particularly effective in improving water quality, providing groundwater recharge, and protection from flooding. The forested slopes of Mahantango Mountains also act as a natural corridor for animal migration, and as refugia for more common species of plants.

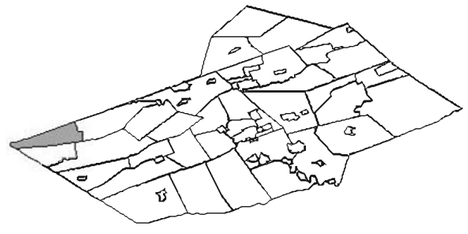
Upper Mahantango Township

Scale 1:45,000

0.5 0 0.5 1 Miles

Upper Mahantango Township

Schuylkill County
Natural Areas Inventory



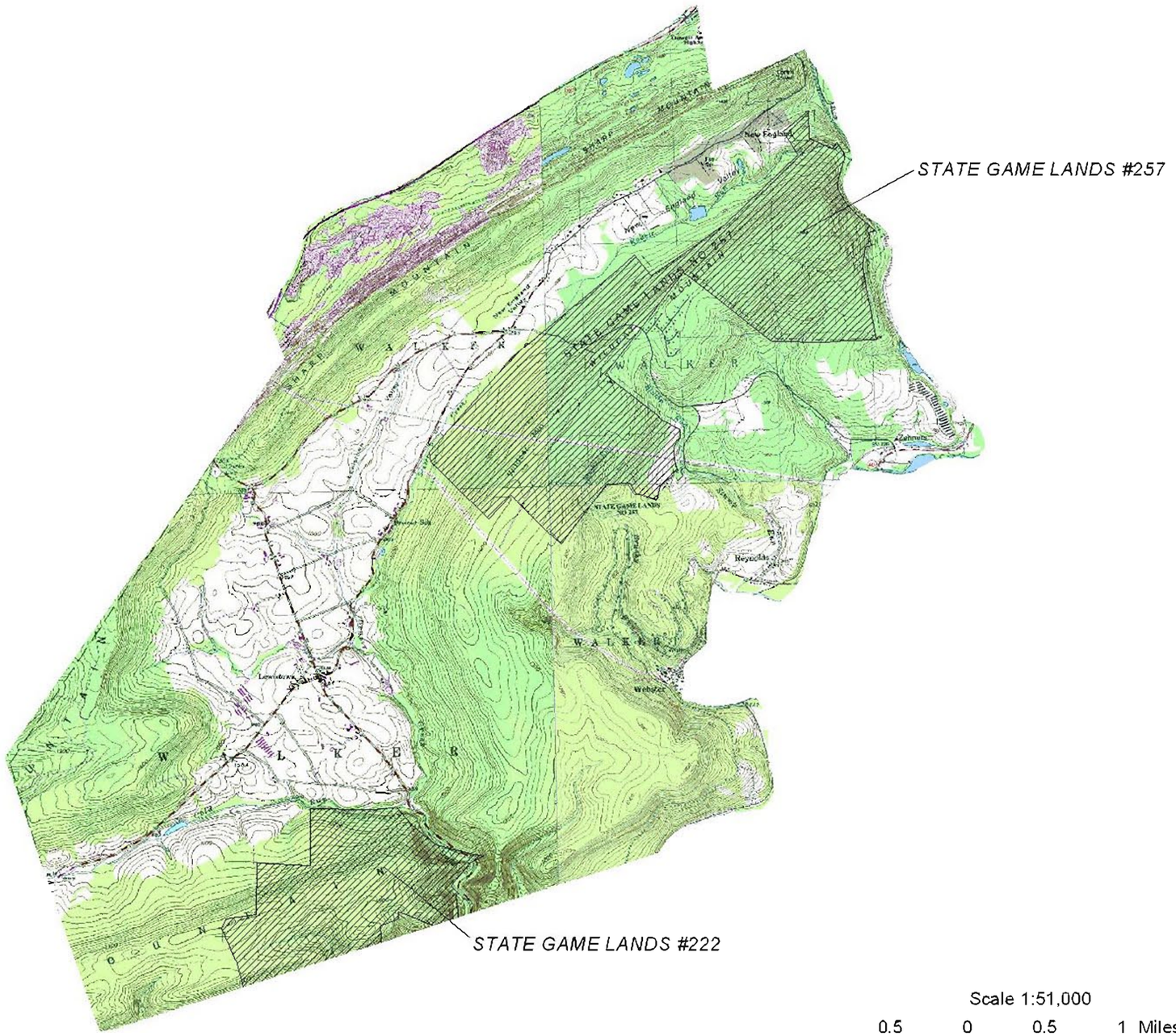
WALKER TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
None						

Managed Areas: State Game Lands #222
State Game Lands #257
Tuscarora State Park

During this study, no species of special concern, exemplary natural communities, or locally significant sites were identified in Walker Township. Consequently, no map is provided for this township. However, environmentally sensitive areas may exist in the township. It is likely that additional field studies would identify sensitive features along the banks of the Little Schuylkill River, Beaver Creek, Cold Run, Brushy Run and Stump Run, as well as the many seeps draining from Sharp, Second and Wildcat Mountains. Whenever possible, efforts should be made to preserve or restore wetland and floodplain forest features in the landscape. The creation or preservation of undisturbed forested buffers along river and stream banks are not only important to many plant and animal species, but the features are also particularly effective in improving water quality, providing groundwater recharge, and protection from flooding. The forested slopes of Sharp, Second and Wildcat Mountains also act as natural corridors for animal migration, and as refugia for more common species of plants. Efforts should be undertaken to maintain and preserve the unbroken integrity of these natural corridors.

Walker Township



Scale 1:51,000

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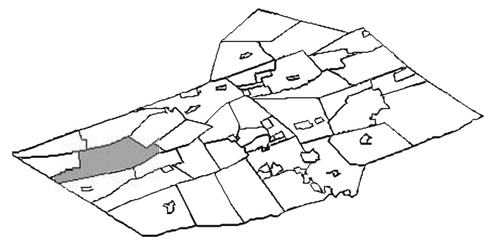
Walker Township

Schuylkill County Natural Areas Inventory

Managed Areas:

State Game Lands #222
State Game Lands #257



Legend

- Natural Area or Locally Significant Site
- Managed Area

WASHINGTON TOWNSHIP

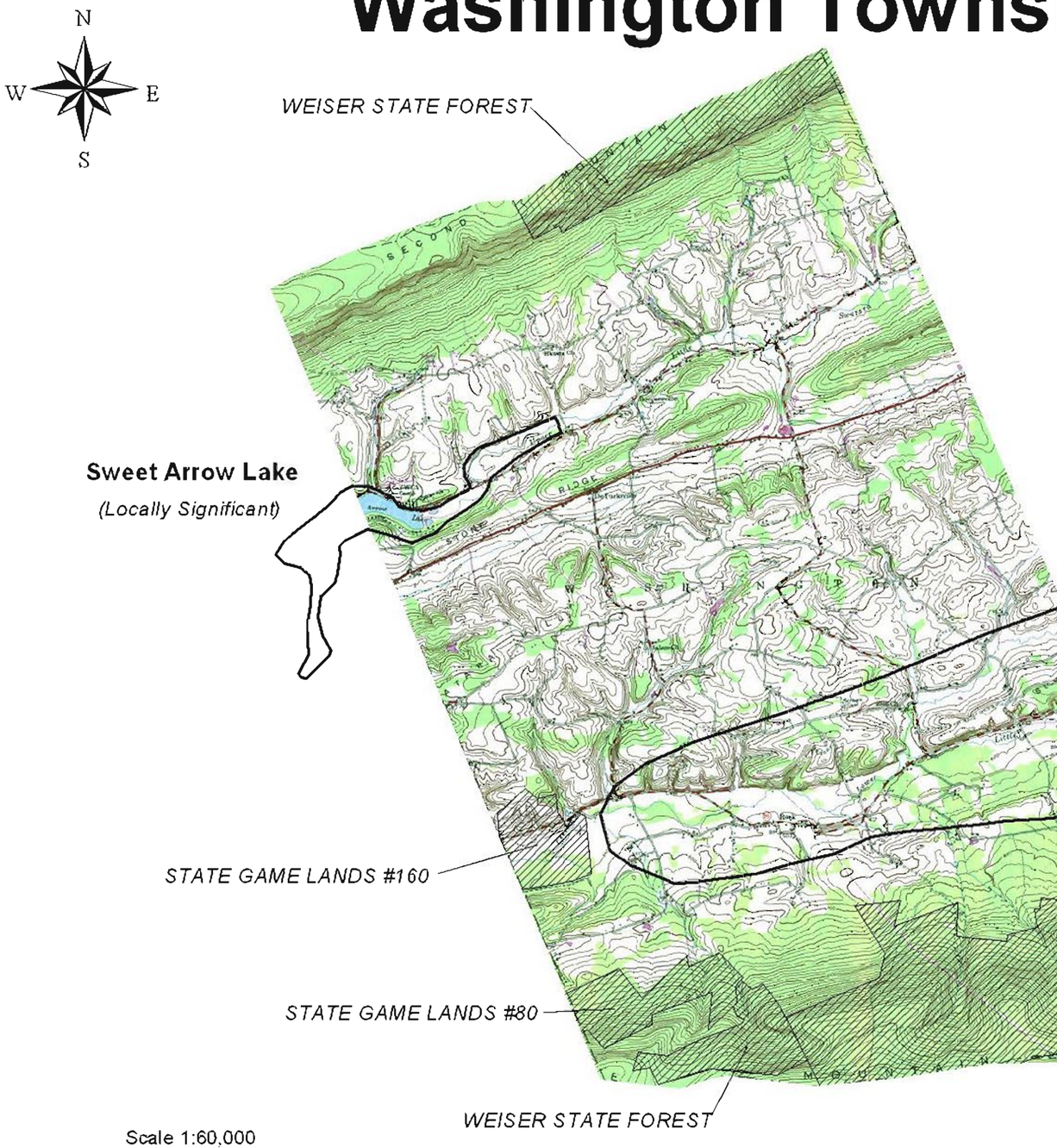
		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Lower Little Swatara Wetland	Animal	G3	S2	PE	5-15-2002	E
	Animal: Barn Owl (*Tyto alba*)	G5	S3B, S3N	N	1999	E

Locally Significant: Sweet Arrow Lake

Managed Areas: Appalachian National Scenic Trail
Sweet Arrow Lake
State Game Lands #80
State Game Lands #160
Weiser State Forest

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Washington Township



Washington Township

Schuylkill County

Natural Areas Inventory

Natural Areas:

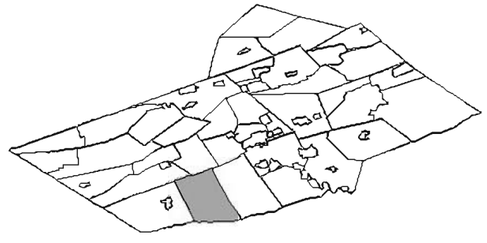
Lower Little Swatara Wetland

Locally Significant Sites:

Sweet Arrow Lake

Managed Areas:

Appalachian National Scenic Trail
State Game Lands #80
State Game Lands #160
Weiser State Forest



Legend

Natural Area or Locally Significant Site

Managed Area

Washington Township:

LOWER LITTLE SWATARA WETLAND (Washington & Wayne Townships) - A fair population of a **G3, S2 PA-Endangered animal species** was observed at this open tussock sedge marsh in 2002. The habitat was dominated by reed canary grass (*Phalaris arundinacea*). Other vegetation characteristic of this site include goldenrod (*Solidago spp*.), tear-thumb (*Polygonum spp.),* elderberry (*Sambucus canadensis*), swamp candles (*Lysimachia terrestris*), wintercress (*Barbarea spp*.), multiflora rose (*Rosa multiflora*), soft rush (*Juncus effusus*), sensitive fern (*Onoclea sensibilis*), red maple (*Acer rubrum*), spicebush (*Lindera benzoin*), skunk cabbage (*Symplocarpus foetidus*), sedges (*Carex spp*.), meadow rue (*Thalictrum spp*.), violet (*Viola spp*.), swamp dewberry (*Rubus hispidus*), arrow-wood (*Viburnum recognitum*), and swamp rose (*Rosa palustris*). Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat.

Also at this site, a nest of a G5, PA-Candidate at risk animal species, the **Barn Owl (*Tyto alba*),** was observed in a hollow tree in 1999. The tree has since fallen down and hence unavailable for use as a den tree by this species. Further surveys to determine if this site has other suitable nesting sites for this species are recommended. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania (Brauning1992).

Locally Significant Site:

Sweet Arrow Lake (Pine Grove & Washington Townships) – This **Locally Significant site** includes Sweet Arrow Lake and the adjacent headwaters. This body of water serves as a migration stopover for many species of birds. This site also provides educational, recreational boating and fishing opportunities. Bird species reported at this site during migration include Bald Eagle (*Haliaeetus leucocephalus*), Osprey (*Pandion haliaetus*), Tundra Swan (*Cygnus columbianus*), Hooded Merganser (*Lophodytes cucullatus*), Black Crowned Night Heron (*Nycticorax nycticorax*), Pied–billed Grebe (*Podilymbus podiceps*), and Common Snipe (*Gallinago gallinago*) (breeding status unknown). No threats were reported, and no special management appears to be needed. This site is primarily owned by Schuylkill County.

WAYNE TOWNSHIP

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bear Creek at Aucheys	Animal	G5	S2S3B,S3N	CR	5/01/1996	E
Blue Mountain Ridgetop	Natural Community	G?	S3	N	8/29/2001	E
	Animal	G5	S2S3B-S3N	N	1999	E
	Animal: Fly-poison borer moth (*Papaipema sp.1*)	G2G3	S2	N	9/24/1998	B
Indian Run Watershed	Animal: Northern long-eared bat (*Myotis septentrionalis*)	G4	S3B,S3N	CR	7/22/2002	E
	Plant: Mountain starwort *(Stellaria borealis)*	G5	S1S2	N	7/01/2002	B
Lower Little Swatara Wetland	Animal: Barn Owl (*Tyto alba*)	G5	S3B, S3N	N	1999	E
	Animal	G3	S2	PE	5/15/2002	E
Schweigerts School	Animal: Barn Owl (*Tyto alba*)	G5	S3B, S3N	N	1998	E

Managed Areas: Appalachian National Scenic Trail
State Game Lands #80
State Game Lands #110
Weiser State Forest

Other: Bear Creek - Class-A Trout Water

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Wayne Township

Wayne Township

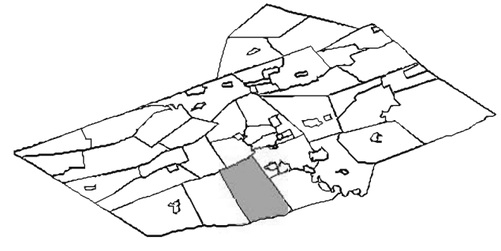
Schuylkill County
Natural Areas Inventory

Natural Areas:

Bear Creek at Aucheys
Blue Mountain Ridgetop
Indain Run Watershed
Lower Little Swatara Wetland
Schweigerts School

Managed Areas:

Appalachian National Scenic Trail
State Game Lands #80
State Game Lands #110
Weiser State Forest



Legend

Natural Area or Locally Significant Site

Managed Area

Wayne Township:

BEAR CREEK AT AUCHEYS (South Manheim & Wayne Townships) - A nesting pair of a **G5, PA-Candidate rare animal species** was located in 1996. The habitat is the forested creek bottom in the vicinity of Auchys. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon (Brauning 1992). Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

The Pennsylvania Fish & Boat Commission has designated 3.4 miles of Bear Creek, from its headwaters to T-959, a **Class-A Trout Water**. The continued maintenance of undisturbed forested buffers, which provide a cooling effect along the shores of this stream, is essential to maintain its quality.

BLUE MOUNTAIN RIDGETOP (Wayne, South Manheim Twps. & Berks County) - This site includes a series of vernal pools that makeup an **Ephemeral/Fluctuating Pool Natural Community**. In 2001, a total of nine pools were documented on a flat ridgetop in SGL #110 adjacent to the Appalachian Trail. The ephemeral pools occur within a dry oak – heath forest matrix, and provide important habitat for breeding amphibians. Vegetation in each pool varies from unvegetated to heavily vegetated and may include cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), wool grass (*Scirpus cyperinus*), various sedges (*Carex folliculata, C. gynandra & Dulichium arundinaceum*), rice cut grass (*Leersia virginica*), manna grass (*Glyceria spp*.), rushes (*Juncus spp*.), spike-rushes (*Eleocharis spp*.), marsh St.-John's-*wort (Triadenum virginicum*) and mosses (*Sphagnum spp*.), with one pond even containing cranberry (*Vaccinium macrocarpon*). The threats to the pools include filling, spraying of pesticides to control mosquito populations, logging, and the practice of throwing slash from logging into the pools. Forested buffers need to be maintained around these ponds. No threats or disturbances were observed.

An invertebrate animal species of concern, the **fly-poison borer moth (*Papaipema sp.1)***, has also been found at this site since the 1970's, and as recently as 1998. This species is currently only known to occur in Pennsylvania. The larval stage of this species requires the fly-poison lily *(Amianthium muscaetoxicum*) as a food source. The use of *Bacillus thuringiensis* (BT) to control gypsy moths should not harm this species, but the spraying of Dimlin would pose a serious threat to the larvae.

A single juvenile **G5, PA-Candidate rare animal species**, was observed in 1999 on this forested ridgetop. This species is associated with large contiguous stands of mature northern hardwood forest. Populations of this species in Pennsylvania were likely severely impacted by the extirpation of the passenger pigeon (Brauning 1992). Protection recommendations include providing a 300 meter radius undisturbed buffer around all active and inactive nest sites.

INDIAN RUN WATERSHED (Branch, North Manheim & Wayne Townships) – This site includes the Indian Creek and the myriad of springs and seeps draining off the adjacent slopes. Being primarily within the Schuylkill County Municipal Authority watershed, this site has seen virtually no recent disturbance. The braided headwaters of Indian Creek are particularly diverse in plant species. Over 120 species were listed during the inventory. This mixed hardwood and conifer

forest is dominated by red maple (*Acer rubrum*), black birch (*Betula lenta*), yellow birch (*Betula alleghaniensis*), various oaks (*Quercus spp.*), black gum (*Nyssa sylvatica*), hemlock (*Tsuga canadensis*), pitch pine (*Pinus rigida*), and white pine (*Pinus strobus*).

An unknown-quality population of a G4, S3B, S3N PA-Candidate rare animal species, **the northern long-eared bat (*Myotis septentrionalis*),** was found at this site during the July 2002 inventory. These animals are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed. The PA Game Commission monitors this species.

Also found at this site was a good-quality population of **mountain starwort (*Stellaria borealis*)** a G5, S1S2 plant species of concern. The plants were found growing in the braided headwaters of Indian Creek in deep, organic, water-saturated soil. Associated species include mosses (*Bryophytes*), blue marsh violet (*Viola cucullata*), enchanter's-nightshade *(Circaea alpina),* sedges (*Carex leptalea, C. echinata*), golden saxifrage (*Chrysosplenium americanum*) and jewelweed (*Impatiens capensis*). This site is currently protected as watershed property by the Schuylkill County Municipal Authority. In the event that the Water Authority considers this property obsolete, effort should be made to secure this area for conservation purposes.

LOWER LITTLE SWATARA WETLAND (Washington & Wayne Townships) - A fair population of **a G3, S2 PA-Endangered animal species** was observed at this open tussock sedge marsh in 2002. The habitat was dominated by reed canary grass (*Phalaris arundinacea*). Other vegetation characteristic of this site includes goldenrod (*Solidago spp.*), tear-thumb (*Polygonum spp.),* elderberry (*Sambucus canadensis*), swamp candles (*Lysimachia terrestris*), wintercress (*Barbarea spp.*), multiflora rose (*Rosa multiflora*), soft rush (*Juncus effusus*), sensitive fern (*Onoclea sensibilis*), red maple (*Acer rubrum*), spicebush (*Lindera benzoin*), skunk cabbage (*Symplocarpus foetidus*), sedges (*Carex spp.*), meadow rue (*Thalictrum spp.*), violet (*Viola spp.*), swamp dewberry (*Rubus hispidus*), arrow-wood (*Viburnum recognitum*), and swamp rose (*Rosa palustris*). Modification of the seepage areas and associated wetlands would be the greatest threat to this species. Invasion of reed canary grass and multiflora rose also pose a potential threat to this habitat.

Also at this site, a nest of a G5, PA-Candidate at risk animal species, the **Barn Owl (*Tyto alba*),** was observed in a hollow tree in 1999. The tree has since fallen down and hence unavailable for use as a den tree by this species. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania (Brauning 1992). Further surveys are encouraged to determine the continued existence of this species at this location.

SCHWEIGERTS SCHOOL (Wayne Township) - A nest of a G5, PA-Candidate at risk animal species, the **Barn Owl (*Tyto alba*),** was observed here in 1998. A hole in the nesting structure has been filled and may not provide access for future nesting. A shift in agricultural practices, loss of suitable nesting structures and general change in land use patterns pose threats to the continued success of this species in Pennsylvania (Brauning 1992).

One of the Ephemeral / Fluctuating Pools along the ridge of Blue Mountain has a bog-like appearance with cranberries (*Vaccinium macrocarpon*) sprawling over a thick mat of sphagnum moss. Photo by the PA Science Office of The Nature Conservancy.

WEST BRUNSWICK TOWNSHIP, Deer Lake, Orwigsburg & Port Clinton Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Deer Lake Fossil Site	Geologic Feature	G?	S?	N		E
Hawk Mountain / SGL #106	Animal	G4	S3S4	PC		E
	Animal	G5	S3S4	N	10/29/1997	E
	Animal: A geometer moth (*Apodrepanulatrix liberaria*)	G4	S3	N	1997	E
	Animal: Leonard's skipper butterfly *(Hesperia leonarus)*	G4	S3S4	N	2000	E
	Animal: Apple sphinx moth *(Sphinx gordius)*	G4	S1S3	N	1997	E
	Geological feature			N		E
	Geologic Feature			N		E
Rattling Run / Schuylkill Gap	Geologic Feature			N		E

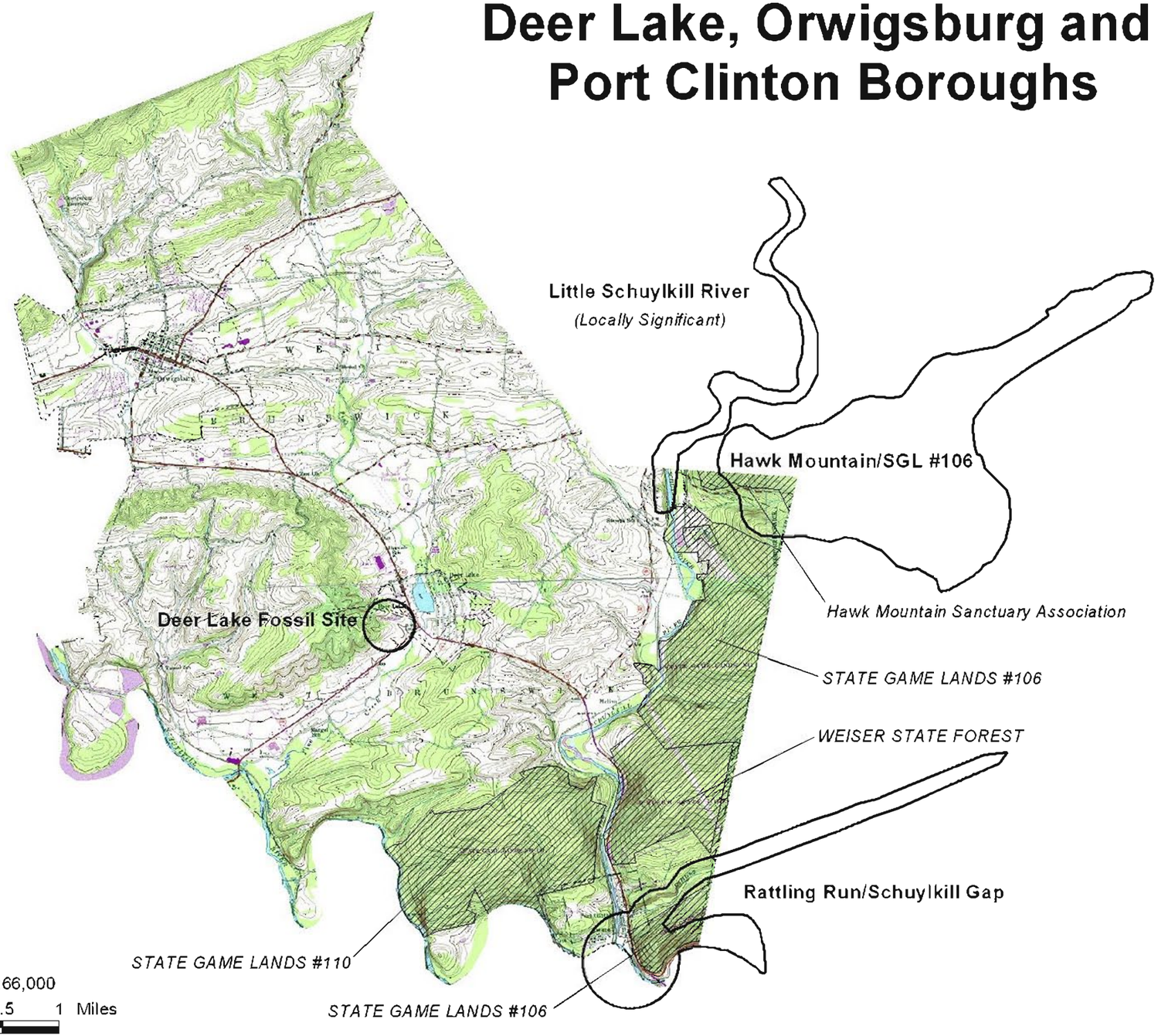
Locally Significant: Little Schuylkill River

Managed Areas: Appalachian National Scenic Trail
State Game Land #106
State Game Land #110

Other: Rattling Run: Exceptional Value Stream

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

West Brunswick Township, Deer Lake, Orwigsburg and Port Clinton Boroughs



West Brunswick Township, Deer Lake, Orwigsburg and Port Clinton Boroughs

Schuylkill County Natural Areas Inventory

Natural Areas:

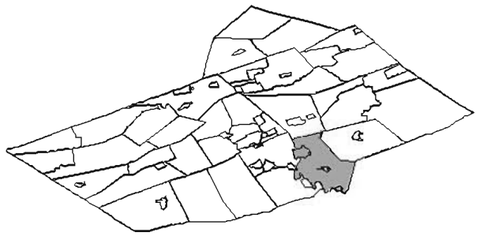
Deer Lake Fossil Site
Hawk Mountain/SGL #106
Rattling Run/Schuylkill Gap

Locally Significant Sites:

Little Schuylkill River

Managed Areas:

Appalachian National Scenic Trail
Hawk Mountain Sanctuary Association
State Game Lands #106
State Game Lands #110
Weiser State Forest



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary
- Managed Area

West Brunswick Township:

DEER LAKE FOSSIL SITE (West Brunswick Twp. & Deer Lake Borough) - The site has one of the most varied fossil assemblages in PA. Mahantango Formation / Devonian age. Contains brachiopods, gastropods, pelecypods, cephalopods, trilobites, coelenterates and plants. (Geyer & Bolles 1979). This site is on private property.

HAWK MOUNTAIN / SGL #106 (East Brunswick & West Brunswick Townships, & Berks County) – Hawk Mountain is part of the Kittatinny Ridge, a natural bird migration corridor stretching from New York, through New Jersey and Pennsylvania to the Maryland border. The portion of the Kittatinny Ridge known as Hawk Mountain contains State Game Lands #106, Weiser State Forest, Hawk Mountain Sanctuary and a portion of the Appalachian Trail. Together this makes up one of the largest remaining blocks of contiguous forest in southeastern Pennsylvania. Hawk Mountain has been designated a globally Important Bird Area by the American Bird Conservancy, and as a state Important Bird Area by Audubon Pennsylvania.

Hawk Mountain Sanctuary is a private non-profit refuge established to protect migrating birds of prey. Thousands of raptors pass along Kittatinny Ridge on their yearly migratory travels. Among the 18,000 raptors from 16 species that use this migration flyway include Broad-winged, Sharp-shinned and Cooper's Hawks, Golden and Bald Eagles, Ospreys, Goshawks, Kestrels and Northern Harriers. Hawk Mountain Sanctuary personnel and contracted scientists have conducted extensive biological research at the Sanctuary and adjoining areas. This is reflected in a great deal of information available on species of concern for this site.

Besides the world-renowned bird migration corridor, this site is home to several invertebrate species of concern including the **apple sphinx moth (*Sphinx gordius*), a geometer moth (*Apodrepanulatrix liberaria*) & Leonard's skipper butterfly *(Hesperia leonarus)*.** These species each require specific vegetation as a food source for larval development. The management of invasive species of plants that can choke out native vegetation is critical for the protection of the habitat needed for these species. Aerial pesticide sprays used for the treatment of Gypsy moth infestations should be avoided in this area, as the rare moths and butterflies are also susceptible to these chemicals.

This site is also home to a good-quality population of a **G4, S3S4 PA Candidate animal species of concern**. This species is dramatically affected by human activity, and no longer occurs in many of its former locations (Hulse 2001). No disturbances were noted at the time of the field visit. Any logging near the site should only occur during the winter months. An intact forested buffer should be maintained around the stony outcrops and talus slopes on this site.

In 1997, a single specimen of a **G5, S3S4 animal species of concern** was found on this site. This species inhabits dry, sandy soil of thinly wooded uplands and rock strewn hillsides, and feeds primarily on frogs and toads. This species is thought to be declining throughout the state (Hulse 2001). Additional surveys for this species at this site are encouraged.

A study on the amphibians of Hawk Mountain was conducted in the spring of 1997 and revealed that ten species of salamanders and five species of frogs inhabit the streams and ponds in the vicinity (Monroe 1998). Species observed during this study included the green frog (*Rana clamitans*),

pickerel frog (*Rana palustris*), wood frog (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*), northern spring salamander (*Gyrinophilus porphyriticus*) & long-tailed salamander (*Eurycena lengicauda*). The presence of this diversity of amphibians is notable in view of studies indicating the worldwide decline of amphibian species (Blaustein 1994). The maintenance of undisturbed forested buffers around all temporary pools, streams and wetlands in the immediate vicinity of Hawk Mountain will be necessary to maintain the habitat required for the continued success of these species.

The Hawk Mountain Lookout **geological feature** is a massive outcrop of Tuscarora sandstone, 1520 feet above sea level. From this site, one can view a truly majestic 70-mile vista of the Great Valley and Blue Mountain. Dan's Pulpit is formed from outcrops of the Tuscarora quartzite standing in vertical columns. (Geyer & Bolles 1979). This area was designated a National Natural Landmark by the National Park Service in 1965. This site falls primarily within Hawk Mountain Sanctuary and SGL #106, and includes a portion of the Appalachian Trail.

RATTLING RUN / SCHUYLKILL GAP (West Brunswick Township, Port Clinton Borough & Berks County) – The **Geologic Feature** at this site represents an outstanding example of a water gap in Blue Mountain, with an exceptional exposure of the quartzites of the Silurian age Tuscarora Formation (Geyer & Bolles 1979).

Rattling Run has been designated as an **Exceptional Value Stream** by the PA Department of Environmental Protection, and as a Class A Trout Water by the PA Fish & Boat Commission. This stream has a hemlock-mixed deciduous canopy and a thick rhododendron (*Rhododendron maximum*) understory along its banks. These vegetative elements shade the stream, providing the cool temperatures necessary for native trout and other cold water plants and animals.

A hemlock pest accidentally introduced from Asia, the hemlock wooly adelgid (*Adelges tsugae*), has detrimentally impacted hemlock stands throughout the mid-Atlantic states and New England. These small, aphid-like insects are covered with a cottony mass giving them a wooly appearance. This pest has the potential to severely alter hemlock-dominated habitats. As mature hemlock stands are defoliated, the cool, moist microclimate created by their deep shade ceases to exist. Plant and animal species that are adapted to this environment will, in effect, be homeless. Work is ongoing to identify and distribute natural predators of the wooly adelgid. This approach, known as biological control, is the only likely way to control this widespread pest. In the meantime, hemlock dominated habitats are in serious danger from this pest. This site falls primarily within SGL#110 & #106, Weiser State Forest, and includes a section of the Appalachian Trail.

Locally Significant Site:

Little Schuylkill River (East Brunswick & West Brunswick Townships) – This Locally Significant site is a length of the Little Schuylkill River between New Ringgold and Drehersville. Previously impacted by acid mine drainage, this river has seen much recent improvement. A diverse plant association resembling a mesic riverside outcrop community inhabits a shale cliff railroad cut along the river. Some invasive species like knotweed (*Polygonum cuspidatum*) are present along the banks. A spring and surface fed wetland known as Bickle's Bog occurs along the railroad tracks adjacent to the river. Though not a true bog, this botanically interesting wetland provides breeding habitat for

many amphibians including wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculata*) and red-spotted newts (*Notophthalmus viridescens*). An enormous abandoned stone railroad bridge abutment can also be seen from the river. This masonry structure provides habitat for an interesting array of ferns and other plant species. A wetland near Drehersville provides habitat for an excellent diversity of plants, waterfowl, amphibians and reptiles. Changes in the hydrology of these wetlands, (filling, draining) and increased nutrient or acid mine runoff would detrimentally impact this site.

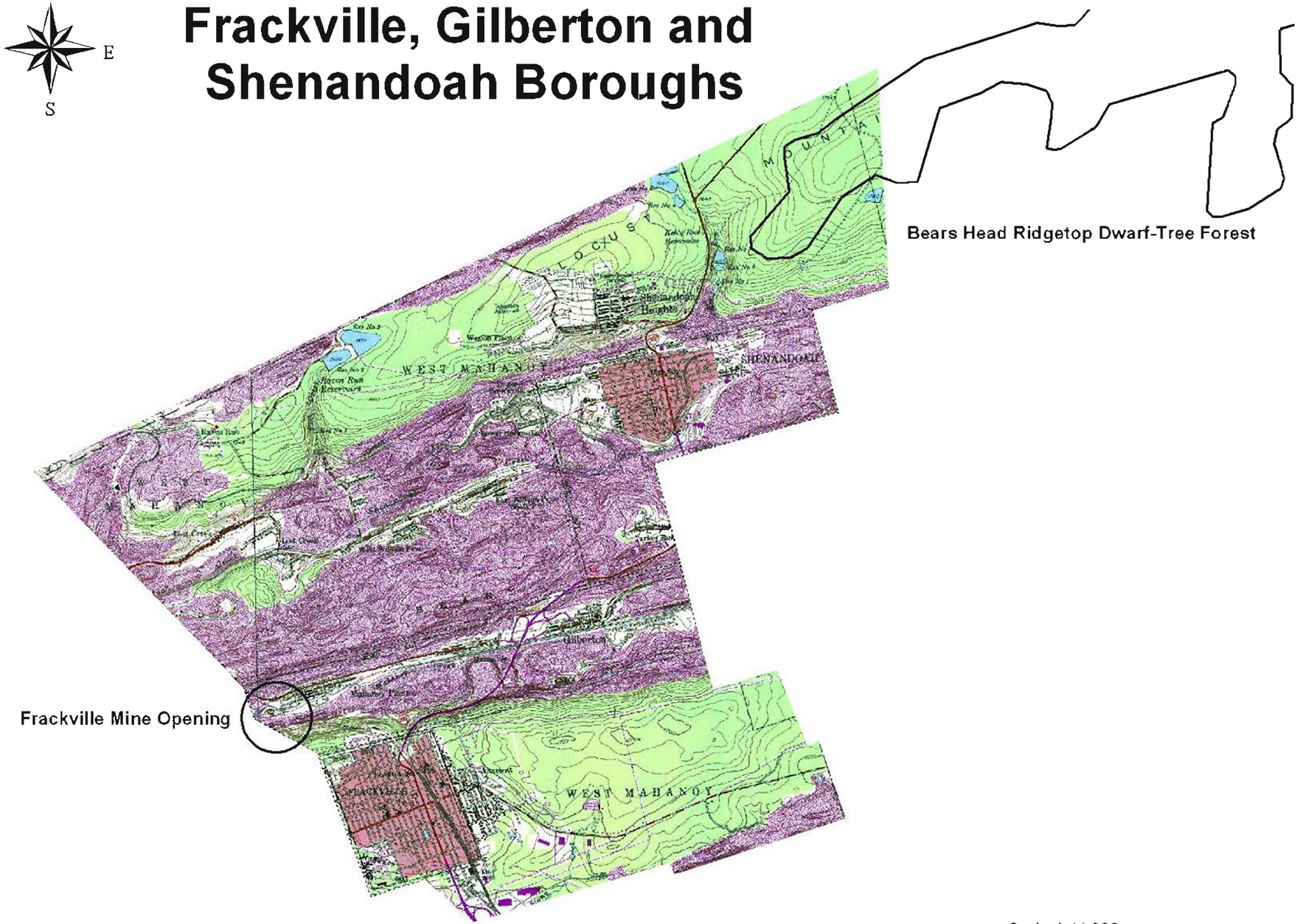
Rising like a Mayan ruin, an abandoned stone railroad abutment greets canoeists along the Little Schuylkill River.

WEST MAHANOY TOWNSHIP & Frackville, Gilberton & Shenandoah Boroughs

		TNC Ranks*				
Site Name	**Special Species / Community Type**	**Global**	**State**	**State Status**	**Last Seen**	**Quality****
Bears Head Ridgetop Dwarf-Tree Forest	Natural Community	G4	S3	N	6/21/02	B
Frackville Mine Opening	Animal: Northern long-eared bat *(Myotis septentrionalis)*	G4	S3B, S3N	N	9/24/1994	E

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

West Mahanoy Township, Frackville, Gilberton and Shenandoah Boroughs



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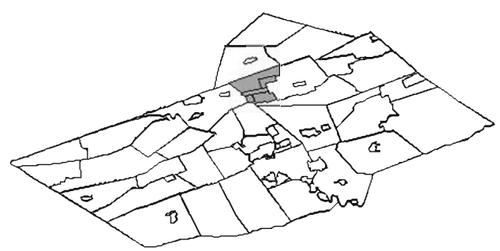
West Mahanoy Township, Frackville, Gilberton and Shenandoah Boroughs

Schuylkill County Natural Areas Inventory

Natural Areas:

Bears Head Ridgetop Dwarf-Tree Forest
Frackville Mine Opening



Legend

- Natural Area or Locally Significant Site
- Municipal Boundary

West Mahanoy Township:

BEARS HEAD RIDGETOP DWARF-TREE FOREST (Delano, East Union, Mahanoy & West Mahanoy Townships) - This Natural Community occupies the higher elevations of Locust Mountain north of Shenandoah and Delano, and is bounded on the east by Interstate I-81. This area, and several adjacent ridges in north central Schuylkill County, are vegetated in a distinct **"Ridgetop Acidic Barrens Community Complex", also known as a "Ridgetop Dwarf-Tree Forest".** This complex is a mosaic of more narrowly defined community types including the "Pitch Pine – Scrub Oak Woodland", "Pitch Pine - Mixed Hardwood Woodland", "Pitch Pine - Heath Woodland", "Scrub Oak Shrubland", and "Low Heath Shrubland" (Fike 1999). This community complex is typically found between elevations of 1200 to 2100 feet where thin, dry soils, high winds, repeated cutting and frequent fires limit the growth of trees.

Though covering many ridgetop plateaus in the county and this part of the state, this habitat type is considered rare on a global scale. The species found on these sites are specially adapted to the conditions of these acidic, droughty, nutrient poor soils, where other species cannot survive. The ridgetops in these areas are identified by pronounced dwarf-stature trees of pitch pine (*Pinus rigida*), scrub oak (*Quercus illicifolia*), chestnut oak (*Q. montana*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*) black gum (*Nyssa sylvatica*), gray birch (*Betula populifolia*) & sassafras (*Sassafras albidum*). The dwarfed trees are usually accompanied by a thick undergrowth of blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), mountain laurel & sheep laurel (*Kalmia latifolia & K. angustifolia*) and black chokeberry (*Aronia melanocarpa*). There usually exists a sparse herbaceous cover of bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), fly-poison (*Amianthium muscaetoxicum*), and wild sarsaparilla (*Aralia nudicaulis*) (Fike 1999).

Plant diversity is typically low in pitch pine barrens, but these specialized habitats frequently harbor a high diversity of rare butterflies and moths. The fly-poison borer (Papaipema sp1) is a globally endangered species, currently only known to occur in Pennsylvania, that is found solely in these environments. The pitch pine barrens are disturbance dependent ecosystems. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. Without periodic fires, the scrub habitat would succeed to other hardwood species. Other hardwood species may represent greater potential income as harvestable timber, but these trees would not likely become economically large enough due to the harsh conditions of these sites. The vast, nearly level expanses of Broad Mountain have seen recent commercial and industrial development in this relatively undisturbed area of the county. The periodic fire regime that has helped create and maintain the quality of this unique natural community type is likely incompatible with residential and commercial development. These Ridgetop Dwarf-Tree Natural Communities, having escaped two centuries of repeated logging and mining, may be passed intact into the future if careful planning for their survival is undertaken now. The extent of this Natural Community was delineated from aerial photography.

FRACKVILLE MINE OPENING (ButlerTwp. & Gilberton Boro) - In 1994, two individuals of a PA-Candidate rare animal species, the **northern long-eared bat (*Myotis septentrionalis*),** were found in association with an abandoned mine opening. These animals are using abandoned mine openings and underground mines as hibernacula during the fall and winter months. These animals are probably traveling to nearby wooded stream valleys to forage for food, roost, and breed.

Blocking or collapsing the mine openings is a threat to these species. For safety reasons, the mine openings could be gated to exclude human interference, and still allow the animals to enter the mine. The PA Game Commission monitors this species.

Several species of serviceberry (*Amelanchier spp*.) were documented from Bears Head including large populations of low serviceberry (*Amelanchier stolonifera*) seen (top) in flower and (bottom) in fruit. Photos by the PA Science Office of The Nature Conservancy.

WEST PENN TOWNSHIP

		TNC Ranks*					
Site Name	**Special Species / Community Type**	**Global**	**State**	**Federal Status**	**State Status**	**Last Seen**	**Quality****
Bears Rocks Erosional Remnant	Geologic Formation				N		E
SGL #217 and Appalachian Trail	Plant: Northeastern bulrush *(Scirpus ancistrochaetus)*	G3	S3	LE	PE	4/11/2002	AB

Locally Significant: Mahoning Creek Wetlands

Managed Areas: Appalachian National Scenic Trail
State Game Lands #106
State Game Lands #217
State Game Lands #257

* Please refer to Appendix IV for an explanation of TNC Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

West Penn Township:

BEARS ROCKS EROSIONAL REMNANT (West Penn Township and Lehigh County) – This outstanding **geologic feature** is composed of an outcrop of the Tuscarora quartzite that forms three large blocks standing in a row (Geyer & Bolles 1979).

SGL #217 AND APPALACHIAN TRAIL (West Penn Township and Lehigh County) – In 2002, a graminoid-dominated **Ephemeral Fluctuating pool Natural Community** was located along the ridge of Blue Mountain in SGL #217. A very good-quality population of a G3, S3 PA-endangered, and Federally-endangered plant species, the **northeastern bulrush *(Scirpus ancistrochaetus),*** was located in this pond. The Federally endangered status of this plant indicates that the species is in danger of extinction throughout all or a significant portion of its range. The northeastern bulrush is primarily found in temporary ponds and other pools with fluctuating water levels. These ponds also typically provide important breeding habitat for forest dwelling amphibians such as the wood frog (*Rana sylvatica*), and the spotted salamander (*Ambystoma maculatum*). Associated species at this site include wool-grass (*Scirpus cyperinus*), tussock sedge *(Carex stricta*), three-way sedge (*Dulichium arundinaceum*), moss (*Sphagnum spp.*), soft rush (*Juncus effusus*), highbush blueberry (*Vaccinium corymbosum*), red maple (*Acer rubrum*) and gray birch (*Betula populifolia*). A wide undisturbed forested buffer should be maintained around this site. No

West Penn Township

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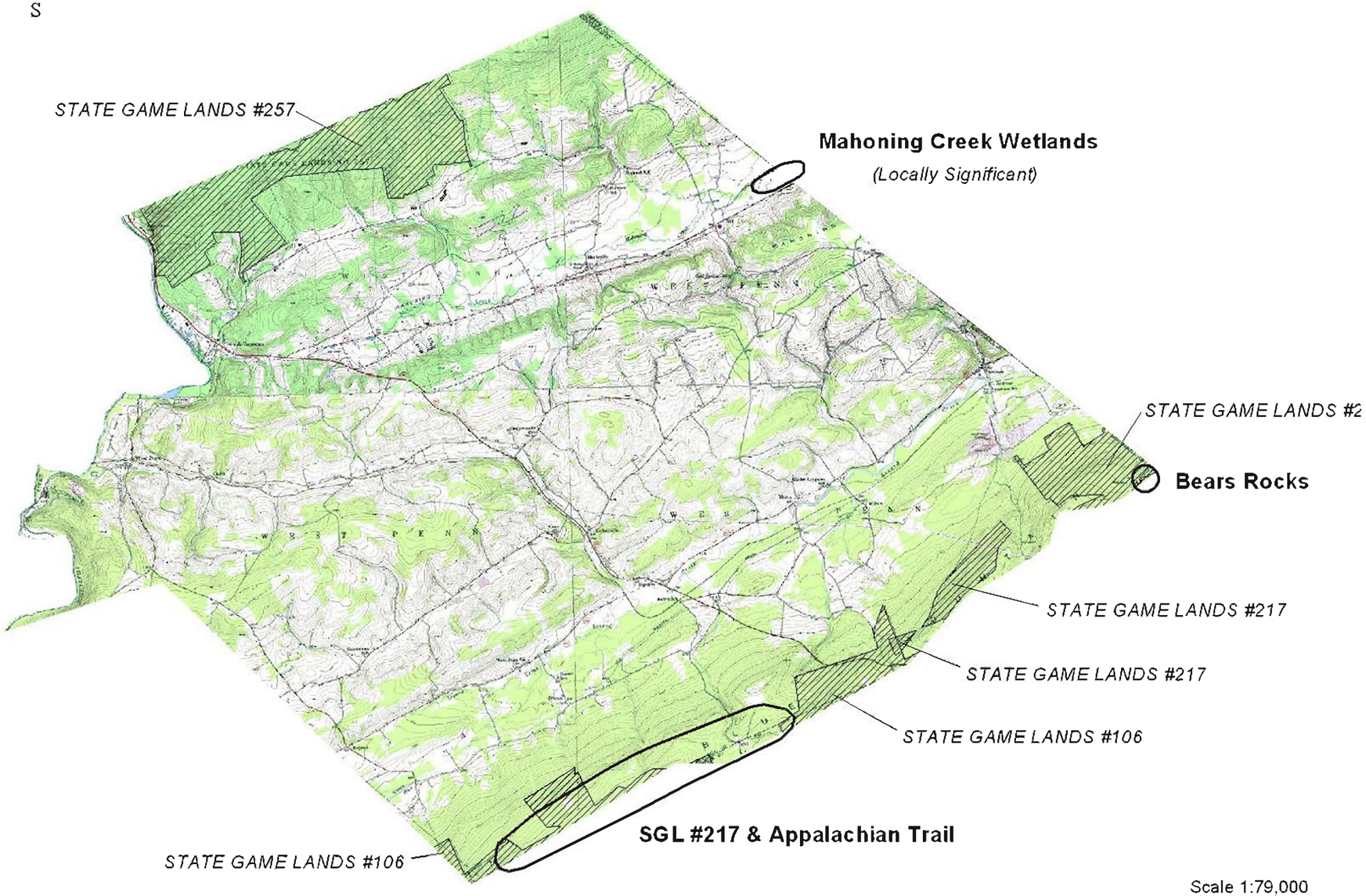

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West Penn Township

Schuylkill County
Natural Areas Inventory

Natural Areas:

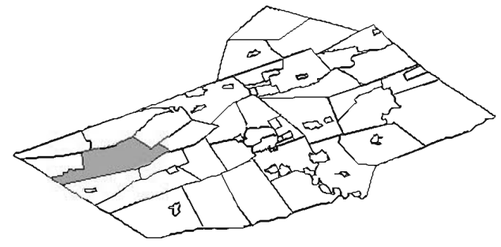
Bears Rocks
SGL #217 and Appalachian Trail

Locally Significant Sites:

Mahoning Creek Wetlands

Managed Areas:

Appalachian National Scenic Trail
State Game Lands #106
State Game Lands #217
State Game Lands #257



Legend

Natural Area or Locally Significant Site

Managed Area

disturbances were observed at this pond. Nearby disturbances include the creation of clearings as food plots and logging. The Game Commission should avoid the temptation to improve this wetland habitat. This site falls primarily within SGL #217, and includes a portion of the Appalachian Trail.

Locally Significant Site:

Mahoning Creek Wetlands (West Penn Township & Carbon County) – This Locally Significant site is comprised of a mixture of wetland types grading one into another. Included at this site are shrub swamp, wooded swamp, sedge meadow and vernal pool wetland types. The site provides important breeding habitat for amphibians, reptiles, birds and a host of wetland plant species. Much of this type of habitat has been drained or filled in the past, so the protection of what is left is critically important. Disturbances observed at this site include a recent attempt to fill and drain this wetland. Though the destruction of this wetland habitat has ceased for the time being, efforts should be made to secure this site as valuable wildlife habitat.

The northeastern bulrush (Scirpus ancistrochaetus) is a Federally-Endangered plant species that is specially adapted to the fluctuating water levels of temporary pools. Photo: Julie Lundgren

RECOMMENDATIONS AND SUMMARY

Schuylkill County has a number of groups pursuing the protection of natural areas within the county. The following are general recommendations for protecting biological diversity within the county.

1. **All sites that are ranked 1 or 2 (Table 2) should be considered top priorities for conservation initiatives.** The conservation of sensitive natural features on privately owned lands at these sites may be protected through a combination of conservation easements and acquisition to encourage current land use or make improvements in land use where needed. The drafting and implementation of local zoning ordinances that provide for the conservation of these sensitive natural features can be an important initial step in this process.

2. **Management plans on public and private lands should address species of special concern and natural communities and assess the need for additional acres to complete protection**. Each element located within a given site will need to be addressed in new management plans for that area. Many of the already-protected sites are in need of additional land to complete protection and/or are in need of management to ensure the continued existence of the associated natural elements. Efforts are already underway to refine management plans for some of the high quality natural areas on public lands in the counties.

3. **Conservation easements or other low cost protection can be pursued on lower-ranked sites**. All sites of lower rank but with good to excellent populations of species of special concern or good natural communities on private land are also excellent candidates for conservation initiatives, but conservation easements or some form of tax incentives may be more appropriate. Conservation easements are designed to allow landowners the current use of their land while protecting the owner and the resource from outside development pressure. Management plans will be needed to ensure that these sites remain high-quality natural areas. Where easements are not possible, any proposals for significant land use changes should be scrutinized carefully by county and municipal planners.

4. **Low quality sites (e.g., with marginal or poor populations of listed species in marginal areas) should be carefully assessed before pursuing protection or management efforts.** The rare elements may be important for the maintenance of biological diversity at the local level, but costs and efforts for protecting these sites need to be weighed against other sites that will be left unprotected which truly have the potential for long-term viability of elements. However, these sites may have other qualities, such as scenic or recreation value, that make them likely conservation targets.

5. **Locally Significant sites (Table 3) may be protected as higher priority sites are completed or as new information emerges**. These are sites in the counties that do not have exemplary natural communities or known occurrences of rare species, but that could be excellent sites for county or township parks or as natural areas within existing parks (sites within existing managed areas will need to be included in management plans). Those that can serve more than one purpose such as recreation, environmental education, wildlife habitat, flood and sediment control, water supply, etc., are ideal. Species of special concern that may be found in some of these areas in future surveys can fit into County Park or conservation plans.

6. **Protection of the reservoirs, wetlands, rivers, and creeks of Schuylkill County is vital, especially those that protect biodiversity, supply drinking water, and are attractive recreational resources**. Many of the sites containing rare species, natural communities or locally significant habitats in Schuylkill County are associated with water. Protection of these watersheds is the only way to ensure the viability of natural habitats and water quality. Cooperative efforts on land use among municipal, county, state, and federal agencies, developers, and residents can lessen the impact of development on the watersheds and plant communities of the three counties. Protecting natural areas around municipal water supply watersheds provides an additional protective buffer around the water supply, habitat for wildlife, and may also provide low-impact recreation opportunities.

7. **Minimize encroachment on the parks and conservation lands throughout Schuylkill County**. Existing parks and conservation lands provide habitat for a number of plant and animal species and may be important not only on a county-wide level, but also on a regional scale. For example, they may serve as nesting or wintering areas for birds or as stopover areas during migration. Where appropriate, more land should be added or agreements worked out with abutting landowners to minimize encroachments that may threaten native flora and fauna.

8. **Counties and township officials can encourage landowners, whose land includes waterways, to maintain vegetated buffer zones along shorelines**. Vegetated buffers (preferably of PA-native plant species) help reduce erosion and sedimentation and help to shade and cool the water. This in turn benefits aquatic animal life, including the fisheries. These buffers also provide habitat for other wildlife species and help to create a diversity of habitats along the creek or stream.

9. **Scrutinize development proposals for their impact on entire watersheds not just the immediate impact area**. Certainly, new housing and commercial development can be given close scrutiny before it is allowed in the areas outlined in this report and careful review can be required within any watershed in the county. Townships can also 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.

10. **Development plans should provide for creating natural buffers between the development and the core preserve area, be it a barrens community, wetland, water body**, **or forest**. 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 if there are no direct impacts, the site is effectively isolated and its value for wildlife is reduced. If possible, networks or corridors of woodlands or greenspace should be preserved linking sensitive natural areas to each other. Cluster development could be used to allow the same amount of development on much less land in such areas, but most importantly, leave much of the land intact as corridors for wildlife and native plants.

11. **Grassroots organizations are needed**. County and municipal governments can do much of the work necessary to plan for the protection and management of the natural areas identified in this report. However, grassroots organizations are needed to assist with identifying landowners who

wish to protect their land, providing information about easements to landowners, land acquisition, and management and stewardship of protected sites. Increasingly, local watershed organizations and land trusts are taking proactive steps to accomplish conservation at the local level.

12. **Encourage development in sites that have already seen past disturbances.** Careful planning can maintain open space, including natural environments and the plants and animals associated with them. A balance between growth and the conservation of scenic and natural resources can be achieved by guiding development away from the most environmentally sensitive areas. The reclamation of previously disturbed areas, or brownfields development, for commercial and industrial projects presents one potential way to encourage economic growth while allowing ecologically sensitive areas to remain undisturbed.

    On the Township maps in this report, we have outlined the watersheds or subwatersheds where the natural communities and species of special concern occur. These areas should be viewed as zones of potential impact; protection of the entire area may not be necessary. Smaller buffer areas have been designated for locally significant sites. The core areas where the communities and species occur need to be given the most attention and fee title acquisition may be appropriate. Land uses that do not impact these important sites should be encouraged for the buffer zones.

    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 Pennsylvania Natural Diversity Inventory database, so too will the Natural Areas Inventories. If there are any questions about the impact of the proposed development or other activity, we suggest that our office, the Pennsylvania Science Office of The Nature Conservancy, be consulted at (717) 948-3962. Questions regarding protection methods and tools for planning should be directed to the Schuylkill County Conservation District at (570) 622-3742.

GLOSSARY

Acid Mine Drainage (AMD) – drainage flowing from or caused by surface mining, deep mining, or coal refuse piles that are typically highly acidic with elevated levels of dissolved metals (DEP).

Acidophilic – a plant that requires or prefers acidic soil conditions.

Alluvium – material such as sand, silt, or clay that is deposited on land by streams.

Anthropogenic – human caused.

ATV – all-terrain-vehicle.

Bald – a rocky or stony area with little or no vegetation.

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. Fire is a natural process on the ridgetop barrens. .

Bt (*Bacillus thuringiensis*) – an insecticide, which is produced by the fermentation of a bacterium (Bt), used to control many caterpillar-type pests (e.g., gypsy moth).

Bog – a nutrient poor, acidic peatland that receives water primarily from direct rainfall with little or no input from groundwater or runoff; vegetation consists primarily of peatmoss and ericaceous shrubs.

Bryophyte – liverworts, hornworts and mosses.

Canopy – the layer formed by the tallest vegetation.

Chitin – the material that enables insects to form an exoskeleton.

Circumneutral – pH between 5.5 and 7.

Co-dominant – where several species together comprise the dominant layer (see "dominant" below).

Community – an assemblage of plant or animal populations sharing a common environment and interacting with each other and the physical environment.

Community complex – a set of community types that tend to occur together under a specific set of environmental circumstances.

DBH – The diameter of a tree at breast height.

DCNR – Pennsylvania Department of Conservation and Natural Resources.

DEP – Pennsylvania Department of Environmental Protection.

Diabase – a dark gray igneous rock. The chemical composition of diabase may support unusual plant communities.

Dimilin – a commercially produced, restricted-use insecticide containing diflubenzuron as the active ingredient. Diflubenzuron, which has been used as a method to control gypsy moth, interferes with chitin production during the early stages of certain insects (DCNR, Division of Pest Management).

Disturbance regime – a repeating pattern of natural disturbances such as fire, flooding, ice scouring, windthrows, erosion, etc.

Dominant – the species (usually plant) exerting the greatest influence on a given community either by numerical dominance or influence on microclimate, soils and other species.

Element – all-inclusive term for species of special concern and exemplary natural communities.

Emergent – upright, rooted vegetation that may be temporarily to permanently flooded at the base, while the upper portions of the plant grow erect above the water surface.

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

Exceptional Value Waters (EV) – DEP designation for a stream or watershed which constitutes an outstanding national, state, regional or local resource, such as waters of national, state or county parks or forests; or waters which are used as a source of unfiltered potable water supply, or waters of wildlife refuges or State Game Lands, and other waters of substantial recreational or ecological significance. For more detailed information about EV stream designations, the reader is referred to the Special Protection Waters Implementation Handbook (Shertzer 1992).

Exotic – non-native; used to describe plant or animal species that were introduced by humans; examples include Japanese honeysuckle, purple loosestrife and grass carp; exotics present a problem because they may out-compete native species.

Extant – currently in existence.

Floodplain – low-lying land generally along streams or rivers that receives periodic flooding.

Forb – non-grass herbaceous plant such as goldenrod.

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

Ground cover – low shrubs, herbs and mosses that are found at or close to the ground surface.

Hibernacula – A location where animals hibernate.

Hibernation – The period of winter inactivity during which time normal physiological processes are reduced and a significant decrease in body temperature occurs. In Pennsylvania, true hibernation is shown by woodchucks, jumping mice, and bats.

High-Quality Coldwater Fisheries (HQ-CWF) – DEP designation (PA Code, Chapter 93) for a stream or watershed that has excellent quality waters and environmental or other features that require special water quality protection.

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

Lepidoptera – moths and butterflies.

Listed species – species that is monitored and considered to be of concern by PNDI.

Littoral – the area where water meets land, the shoreline.

Mesic – moist, not saturated.

Minerotrophic – groundwater fed; influenced by water that has been in contact with bedrock or soil, and is richer in mineral content than rainwater.

Native – describes species that occurred in Pennsylvania or in the area in which they are found prior to European settlement; not introduced by human activities.

Natural area – As used in this study, a site with either an exemplary natural community or species of special concern; not to be confused with the State Forest Natural Areas which are specific management units designated by DCNR Bureau of Forestry.

Non-point – refers to diffuse sources of pollution such as storm water runoff contaminated with oil or pesticides.

Oligotrophic – poor to extremely poor in nutrients; typically describes dilute waters with low base metal ion concentrations.

Palustrine – areas intermediate between aquatic and terrestrial habitats, where conditions are at least periodically wet enough during the growing season to produce anaerobic soil conditions and thereby influence plant growth.

Peat – partially decomposed remains of plant material in which at least some of the plant parts are still distinguishable.

POSCIP – Plant of Special Concern in Pennsylvania.

Potential Natural Area – used by The Nature Conservancy to denote an area that may have desirable environmental characteristics to support rare species or exemplary natural communities, but which needs a field survey to confirm; a preliminary category given to sites prior to field survey (see METHODS section).

Prescribed burning – burning under controlled conditions; needed to maintain communities such as limestone glades and pitch pine barrens.

Riparian – streamside.

R-O-W – Strip of land occupied or intended to be occupied by a street, crosswalk, railroad, electric transmission line, oil or gas pipeline, water main, sanitary or storm sewer line, or other special use.

Seeps – where water flows from the ground in a diffuse pattern and saturates the soil; lush herbaceous vegetation often grows in these wet areas.

Soil association – a group of soils that are geographically associated in a characteristic repeating pattern and defined and delineated as a single unit.

Soil series – groups of soils that have vertical profiles that are almost the same, that is, with horizons (layers) that are similar in composition, thickness, and arrangement.

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 (e.g., a field that is left alone may, over time, be taken over by shrubs, then small trees and eventually a woodland).

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

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

Vernal – occurring in the spring.

Xeric – extremely dry or droughty.

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APPENDIX I: NATURAL AREA 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, 208 Airport Drive, Middletown, PA 17057
(717) 948-3962. Additional forms may be obtained from this
office. Thank you for your contribution.

APPENDIX II: COMMUNITY CLASSIFICATION

CLASSIFICATION OF NATURAL COMMUNITIES
IN PENNSYLVANIA (1995 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			
ACIDIC GLACIAL LAKE	LAAA	G?	S2S3
CALCAREOUS GLACIAL LAKE	LAAB	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?	S2

ARTIFICIAL POOL	LCC	*	*
EPHEMERAL/FLUCTUATING LIMESTONE SINKHOLE	LCD	G?	S1

PALUSTRINE COMMUNITIES

ACIDIC BROADLEAF SWAMP	PAA	G5	S2S3
CIRCUMNEUTRAL BROADLEAF SWAMP	PAB	G?	S2S3
BOREAL CONIFER SWAMP	PAC	G?	S3
NORTHERN CONIFER SWAMP	PAD	G?	S3S4
BROADLEAF-CONIFER SWAMP	PAE	G?	S3S4
FLOODPLAIN SWAMP	PAF	G?	S1
EASTERN 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
OLIGOTROPHIC GLACIAL KETTLEHOLE BOG	PCAA	G?	S3
WEAKLY MINEROTROPHIC LAKESIDE BOG	PCAB	G?	S2
NONGLACIAL BOG	PCB	G?	S3
RECONSTITUTED BOG	PCC	*	*
POOR (GRAMINOID) FEN	PCD	G?	S1
SHRUB (CALCAREOUS) FEN	PDA	G2G3	S1
BASIN GRAMINOID-FORB (CALCAREOUS) FEN	PDB	G?	S1
HILLSIDE GRAMINOID-FORB (CALCAREOUS) FEN	PDC	G?	S1
NORTHERN APPALACHIAN CIRCUMNEUTRAL SEEP	PEA	G?	S3?
NORTHERN APPALACHIAN CALCAREOUS SEEP	PEB	G?	S1
NORTHERN APPALACHIAN ACIDIC SEEP	PEC	G?	S3?
RIVERSIDE SEEP	PED	G?	S2?

TERRESTRIAL COMMUNITIES

NORTHERN CONIFER FOREST	TBA	G5	S3S4
NORTHERN HARDWOOD (DECIDUOUS) FOREST	TBB	G?	S3S4
NORTHERN HARDWOOD-CONIFER FOREST	TBC	G?	S3
XERIC CENTRAL HARDWOOD (DECIDUOUS) FOREST	TCA	G?	S5
XERIC CENTRAL CONIFER FOREST	TCB	G?	S3S4
XERIC CENTRAL HARDWOOD-CONIFER FOREST	TCC	G?	S3
RIDGETOP DWARF-TREE FOREST	TCD	G4	S2S3
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	
MESIC SCRUB OAK-HEATH-PITCH PINE BARRENS	TCDA	G1	S1	
EASTERN SERPENTINE BARRENS	THA	G2	S1	
CENTRAL APPALACHIAN SHALE BARREN	THBA	G?	S1	
NORTHERN APPALACHIAN SHALE BARREN	THBB	G?	S2	
NORTHERN APPALACHIAN SAND BARREN	THC	G?	S?	
NORTHERN APPALACHIAN BOULDER FIELD	THD	G?	S5	
NORTHERN APPALACHIAN CALCAREOUS CLIFF	THE	G?	S2	
NORTHERN APPALACHIAN ACIDIC CLIFF	THF	G?	S5	
NORTHERN APPALACHIAN SHALE CLIFF	THG	G?	S2	
RIVERSIDE OUTCROP/CLIFF	THJ	G?	S1S2	
NORTHERN APPALACHIAN TALUS WOODLAND	TCHA	G?	S?	
NORTHERN APPALACHIAN ACIDIC ROCKY SUMMIT	THK	G?	S2	
NORTHERN APPALACHIAN CALCAREOUS ROCKY SUMMIT	THM	G?	S1	
CALCAREOUS ROCKY SLOPE	TFG	G?	S?	
CALCAREOUS RIVERSIDE OUTCROP	THH	G?	S1	
LAKE SEDIMENT SLUMP	TGB	G?	S1	
EASTERN GREAT LAKES BEACH COMMUNITY		TJA	G?	S?
EASTERN GREAT LAKES DUNE COMMUNITY	TJB	G?	S?	
EASTERN GREAT LAKES SAND PLAINS COMMUNITY		TJC	G?	S?
EASTERN GREAT LAKES BLUFF/CLIFF COMMUNITY	TJD	G?	S?	

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 MISCELLANEOUS 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 III: FIELD SURVEY FORM

PENNSYLVANIA NATURAL DIVERSITY INVENTORY EAST:
SPECIES OF SPECIAL CONCERN FIELD REPORT

SNAME: EOCODE:

SURVEYDATE:

SITENAME:

SOURCECODE

SURVEYSITE: SURVEYOR:

SPECIMEN REPOSITORY:

Locational Information QUADCODE DOTNUM TEN,TEN COUNTYCODE TOWNSHIP

LAT:

LONG:

DIRECTIONS:

Global PA EORANK:

EORANK COMMENTS:

DATA:

HABITAT DESCRIPTION:

MISCELLANEOUS:

DATA SENSITIVITY: OWNERCODE

REASON FOR DATA SENSITIVITY: OWNER

HABITAT SKETCH:

APPENDIX IV: RANKING DEFINITIONS

FEDERAL AND STATE STATUS, AND THE NATURE CONSERVANCY (TNC) 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 - Listed Endangered - Taxa in danger of extinction throughout all or a significant portion of their ranges.

LT - Listed Threatened - Taxa that are likely to become endangered within the foreseeable future through all or a significant portion of their ranges.

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

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

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 threats 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.

N - Taxa not currently listed by the U.S. Fish and Wildlife Service

STATE STATUS-NATIVE PLANT SPECIES

Legislative Authority: Title 25, Chapter 82, Conservation of Native Wild Plants, amended June 18, 1993, Pennsylvania Department of Environmental Resources.

PE - Pennsylvania Endangered - 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.

PT - Pennsylvania Threatened - 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.

PR - Pennsylvania Rare - 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.

PX - Pennsylvania Extirpated - 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.

PV - Pennsylvania Vulnerable - 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 - 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 - Plant species which are believed to be endangered, rare, or threatened, but which are being considered by the required regulatory review processes for future listing.

STATE STATUS-ANIMALS

The following state statuses are used by the Pennsylvania Game Commission for (1990, Title 34, Chapter 133 pertaining to wild birds and mammals) and by the Pennsylvania Fish and Boat Commission (1991, Title 30, Chapter 75 pertaining to fish, amphibians, reptiles and aquatic organisms):

PE - Pennsylvania 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 from 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 Pennsylvania; 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 and Boat Commission - Endangered Species are all species and subspecies: (1) 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) declared by the Executive Director (PaFC) to be threatened with extinction and appear on the Pennsylvania Endangered Species List published in the Pennsylvania Bulletin.

PT - Pennsylvania 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 and Boat Commission - Threatened Species are all species and subspecies: (1) declared by the Secretary 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.

TNC 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.

TNC 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 ineradicable 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 non-breeding 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.

Note: A "T" appearing in either the G Rank or S Rank indicates that the intraspecific taxa is being ranked differently than the species. A "Q" in the rank indicates that there is taxonomic uncertainty about a taxa being ranked (i.e., taxa is being accepted as a full species or natural community in this list but may be treated as a variety or form by others). A "?" after a "G" or "S" indicates that the rank is uncertain at this time.

APPENDIX V: PENNSYLVANIA 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; further distinguished by being an extensive, well-buffered occurrence. An A-rank population of a sensitive species is large in area and number of individuals, stable, if 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, or is nearly undisturbed but is less than A-rank because of significantly smaller size, poorer buffer, etc. A B-rank population of a sensitive species is at least 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 statewide 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 has 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 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; additional information needed to evaluate quality.

* Intermediate ranks may also be assigned.

APPENDIX VI: SPECIAL PLANTS AND ANIMALS OF SCHUYLKILL COUNTY

Animals of Special Concern

Scientific Name	State Common Name
Accipiter gentilis	Northern Goshawk
Apodrepanulatrix liberaria	A Geometer Moth
Ardea herodias	Great Blue Heron
Clemmys muhlenbergii	Bog Turtle
Crotalus horridus	Timber Rattlesnake
Euphyes conspicuus	Black Dash
Hesperia leonarus	Leonard's skipper (Butterfly)
Heterodon platyrhinos	Eastern Hognose Snake
Margaritifera margaritifera	Eastern Pearlshell (Freshwater mussel)
Myotis septentrionalis	Long-Eared Bat
Neotoma magister	Eastern Woodrat
Papaipema species #1	Fly-poison Borer Moth
Podilymbus podiceps	Pied-Billed Grebe
Sphinx gordius	Apple Sphinx Moth
Tyto albo	Barn Owl

Plants of Special Concern

Scientific Name	State Common Name
Bartonia paniculata	Screw-stem
Carex collinsii	Collin's sedge
Carex typhina	Cattail sedge
Lygodium palmatum	Climbing fern
Menziesia pilosa	Minniebush
Platanthera ciliaris	Yellow-fringed orchid
Schoenoplectus subterminalis	Water bulrush
Scirpus ancistrochaetus	Northeastern bulrush
Stellaria borealis	Mountain starwort
Woodwardia areolata	Netted chainfern

Natural Communities of Special Concern

Natural Community Name
Ephemeral / Fluctuating Natural Pool
Ridgetop Dwarf-Tree Forest

SITE INDEX

(Site names in upper case contain Species of Concern
Site names in lowercase are Locally Significant sites)

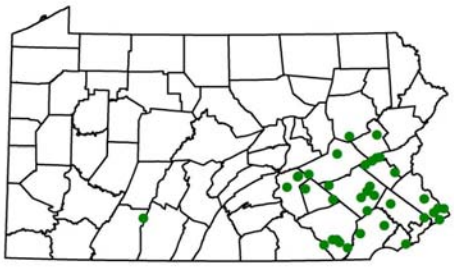
Site Name	Municipality(ies)	Page(s) #
FRACKVILLE MINE OPENING	Butler Twp. & Gilberton Borough	173
GOLD MINE WETLANDS	Pine Grove Twp. & Lebanon Co.	107
GOOD SPRING CREEK WOODS	Frailey Twp.	75
GREEN MOUNTAIN	North Union Twp.	67, 103
GREENWOOD LAKE WETLAND	Rush Twp.	121
HAWK MOUNTAIN LOOKOUT	East Brunswick & West Brunswick Twps. & Berks County	61, 167
INDIAN RUN WATERSHED	Branch & Tremont Twps.	43, 98, 161
LAKE HAUTO	Rush Twp.	121
Little Schuylkill River	East Brunswick & West Brunswick Twps.	61, 167
LOCUST CREEK	Rush & Ryan Twps.	127
LOCUST LAKE FOREST	Blythe & Ryan Twps.	127
LOWER LITTLE SWATARA WETLAND	Washington & Wayne Twps.	157
Mahoning Creek Wetlands	West Penn Twp. & Carbon Co.	178
MAHANOY CREEK AT TAYLORVILLE	Barry, Butler & Eldred Twps.	33, 48
Moss Glen Reservoir	Blythe Twp.	37
NESQUEHONING HEADWATERS VERNAL POOLS	Rush Twp.	121
OWL CREEK WETLANDS	Tamaqua Borough	140
SWATARA CREEK FLOODPLAIN	Pine Grove Twp. & Lebanon Co.	107
Rabbit Run Wetland	East Brunswick Twp.	61
RATTLING RUN/ SCHUYLKILL GAP	West Brunswick Twp, Port Clinton Borough & Berks County	167

Site Name	Municipality(ies)	Page(s) #
SCHWEIGERTS SCHOOL	Wayne Twp.	161
SGL #217 AND APPALACHIAN TRAIL	West Penn Twp. & Lehigh Co.	178
SHARP MOUNTAIN	Reilly & Tremont Twps., & Lebanon Co.	145
Shenandoah Municipal Authority	Union Twp.	151
SILVER CREEK WATERSHED	Blythe Twp.	37
ST. CLAIR FERN FOSSIL SITE	Blythe Twp.	37
State Game Lands #227 Riverside Outcrops	Rush Twp.	121
STONY CREEK	South Manheim Twp.	136
Sweet Arrow Lake	Pine Grove & Washington Twps.	107, 157
SWOPE VALLEY RUN	Pine Grove Twp. & Lebanon Co	107
Tumbling Run	Blythe & North Manheim Twps.	37, 98
WOLF CREEK RIDGETOP DWARF-TREE FOREST	Blythe & Ryan Twps.	37, 127
WOLF CREEK WATERSHED	Blythe Twp.	37
ZION GROVE	North Union Twp.	103

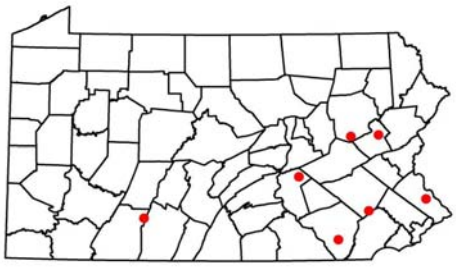
APPENDIX VII

Distribution maps of plant species of concern mentioned in this report. (These maps were produced from The Pennsylvania Flora Database, Morris Arboretum of the University of Pennsylvania based on herbarium records. These maps only represent those populations where a voucher specimen was collected. The true extent of these plant populations is unknown. Further research, especially field work, is necessary to verify existing records and to uncover new ones **Specimens collected in conjunction with the Schuylkill County NAI are not represented on these maps**.)

Screwstem (*Bartonia paniculata)*

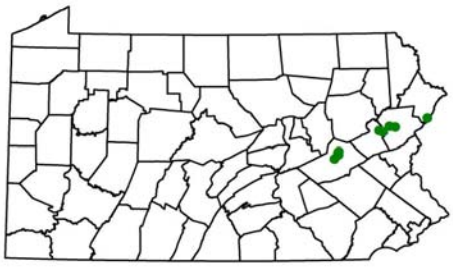


Historical & extant populations

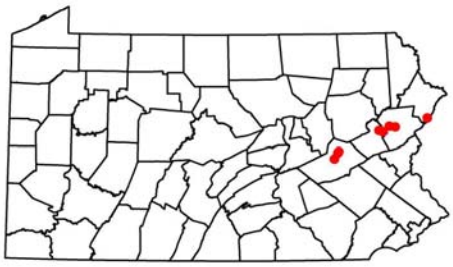


Collected since 1980

Collin's sedge (*Carex Collinsii*)

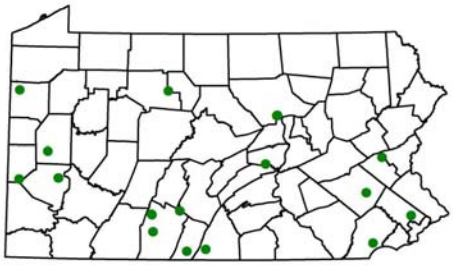


Historical & extant populations

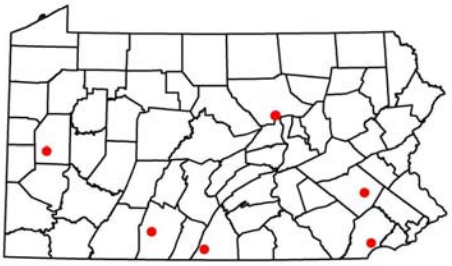


Collected since 1980

Cattail sedge (*Carex typhina*)

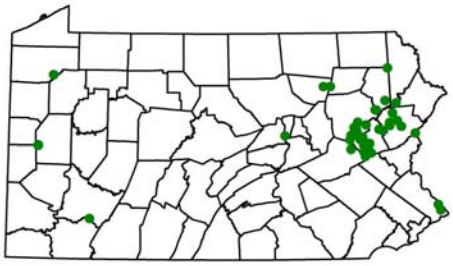


Historical & extant populations

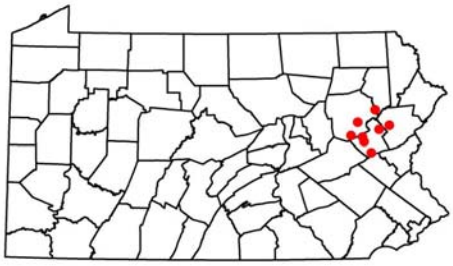


Collected since 1980

Climbing fern (*Lygodium palmatum*)

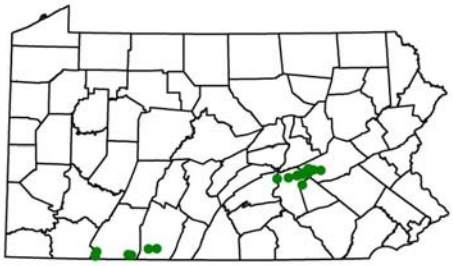


Historical & extant populations

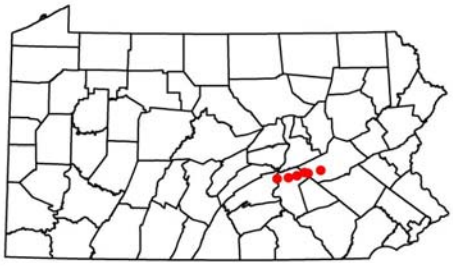


Collected since 1980

Minniebush *(Menziesia pilosa*)

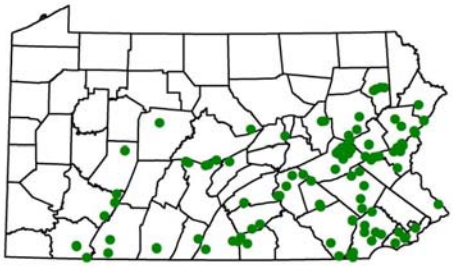


Historical & extant populations

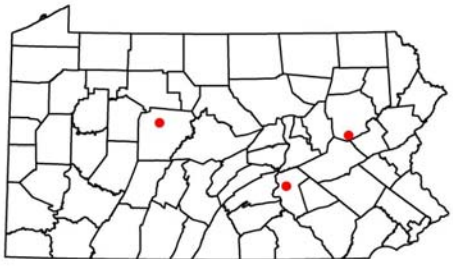


Collected since 1980

Yellow-fringed orchid (*Plantathera ciliaris*)

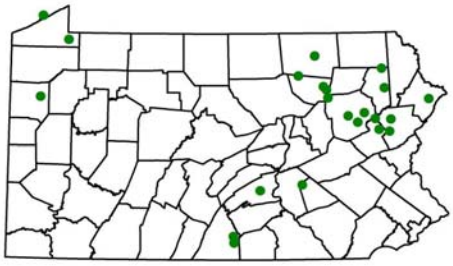


Historical & extant populations

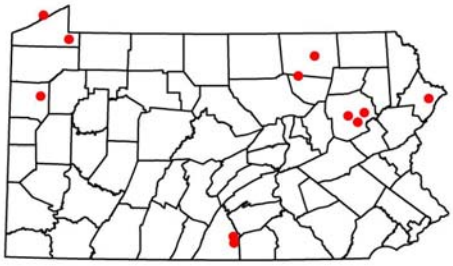


Collected since 1980

Water bulrush (*Schoenoplectus subterminalis*)

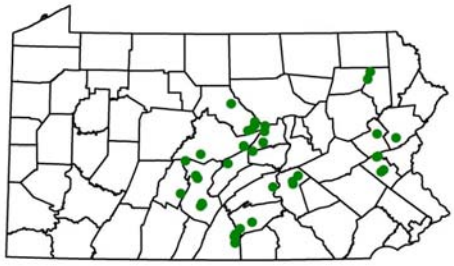


Historical & extant populations

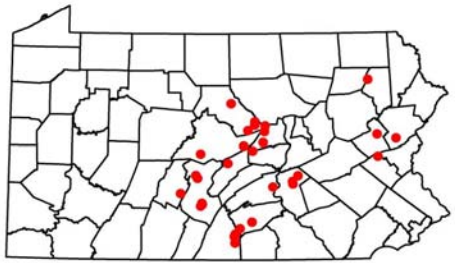


Collected since 1980

Northeastern bulrush (*Scirpus ancistrochaetus*)

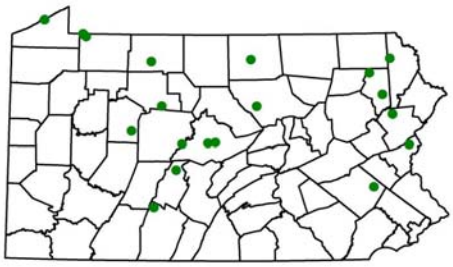


Historical & extant populations

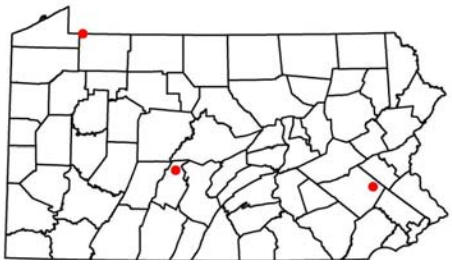


Collected since 1980

Mountain starwort (*Stellaria borealis*)

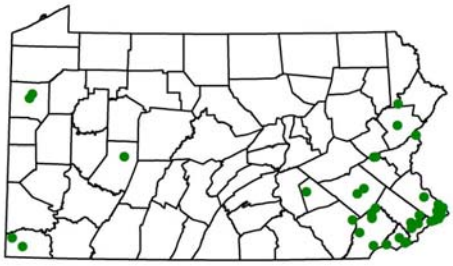


Historical & extant populations

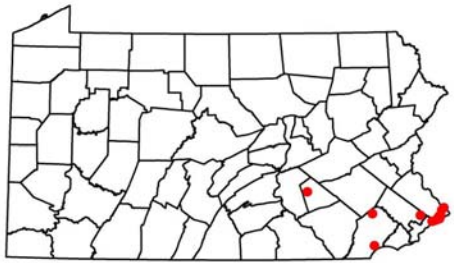


Collected since 1980

Netted chainfern (*Woodwardia areolata*)



Historical & extant populations



Collected since 1980