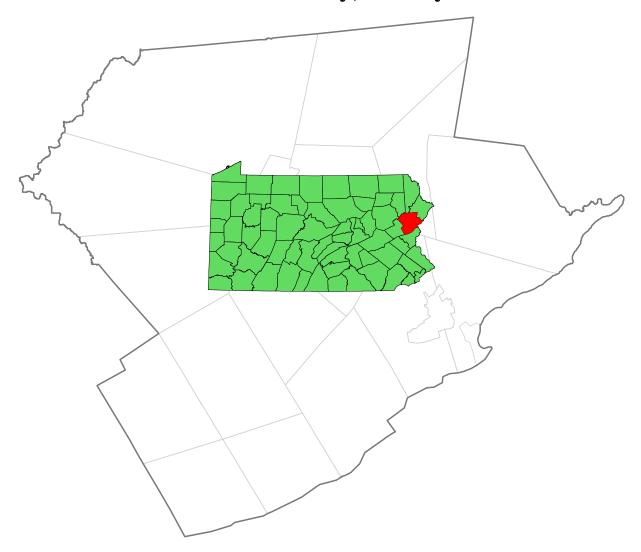
# A Natural Areas Inventory of Monroe County, Pennsylvania



Document includes the original 1991 full report followed by the 1999 update addendum.

This Natural Areas Inventory was conducted by

Pennsylvania Natural Heritage Program 208 Airport Drive Middletown, Pennsylvania 17057

For

The Monroe County Planning Commission Monroe County Courthouse Stroudsburg, PA 1 83 60

# A NATURAL AREAS INVENTORY OF MONROE COUNTY, PENNSYLVANIA 1991

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#### GLOSSARY

<u>Alluvium</u> - sediment deposited by rivers; includes gravels, sands, silts, and clays

ATC - Appalachian Trail Conference

ATV - all-terrain-vehicle

<u>Barrens</u> - 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

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

Effluent - waste water from septic tanks or from stormwater sewers

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

Exemplary Natural Community - natural habitat that has received little or no human disturbance or has recovered sufficiently that the species composition reflects natural conditions

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

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

<u>Fen</u> - peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh vegetation

Forb - non-grass herbaceous plant such as goldenrod

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

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

<u>Kettle</u> - depression formed when a chunk of ice entrapped in glacial material melts leaving behind a void

End Moraine - ridge of till marking a stationary front of an ice sheet

NPS - National Park Service

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

Outwash - sands and gravels deposited by glacial meltwaters

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

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

<u>Stratified Drift</u> - glacial material deposited in layers by meltwaters

<u>Succession</u> - natural process of vegetation change through time; over time, the vegetation of a site will change in composition and structure as light and soil conditions change

 $\underline{\text{Till}}$  - jumbled mix of glacial material of varying particle size deposited by ice

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

<u>Understory</u> - layer of shrubs and small trees between the herbaceous layer and the canopy

#### INTRODUCTION

Monroe is a county rich in scenic and natural resources. However, its rural character and mountainous terrain in combination with its proximity to major metropolitan centers have made Monroe County an attractive place to have a permanent residence or a vacation home. As a result, Monroe is one of the fastest growing counties in Pennsylvania.

The scenic and natural environments that attract so many people to the county are quickly being lost because of increased development. Wise planning is needed to maintain these natural environments and the plants and animals associated with them. To achieve a balance between economic growth and protection of natural resources, development should be guided toward the most suitable sites and away from environmentally sensitive areas where possible.

In order to plan development and ensure protection of important natural areas, county and municipal government officials, private citizens, and developers need to know the location and importance of sites. This knowledge can prevent conflicts over land use. A ranking of sites in terms of significance and vulnerability can help direct protection efforts and limited conservation dollars to the most critical areas.

The Natural Areas Inventory of Monroe County, in conjunction with the county's comprehensive plan, can provide guidance for open space and nature preserves. The inventory report briefly describes the geology, soils and vegetation of the county; methodology used to gather information, including the Pennsylvania Natural Diversity Inventory data base, is also described. A summary of the highest quality sites in the county with conservation recommendations and tables listing sites in approximate order of importance precedes individual map descriptions. The Results section includes maps of the best natural areas in the county and the locations of all known and plant species of special concern (endangered, threatened, or rare). A written description and a summary table listing the quality, degree of rarity, and last-observed date of each "element occurrence" accompany each map. The locations of some areas that are too disturbed to be deemed natural, but are significant at the local level for wildlife habitat and open space are also included.

The information and maps in the Monroe County Natural Areas Inventory report will be useful guides for planning the development of residential communities and park lands, for conserving natural areas, and for setting protection priorities for the most vulnerable natural areas.

#### COUNTY OVERVIEW

The climate, geology, topography, and soils of Monroe County are important factors in the development of the local forests, wetlands, and other natural communities. In addition, man's activities exert a profound influence on community composition and structure. To locate and identify natural communities within the county, we utilized an ecological approach considering the various environmental factors and human disturbances that contribute to vegetation patterns. A brief review of some important environmental factors sets the stage for the rest of the report.

### Physiography

The following discussion of the geology and topography of Monroe County is taken from Lipscomb (1981) and Oplinger and Halma (1988).

Monroe County straddles two physiographic provinces, each bearing a distinctive landscape reflecting the underlying bedrock geology. The northern two-thirds of the county are in the Pocono Plateau and Glaciated Low Plateaus sections of the Appalachian Plateaus province. The southern third of the county is in the Appalachian Mountain section of the Valley and Ridge province.

Sedimentary rocks folded and faulted to varying degrees as a consequence of continental collision millions of years ago underlie Monroe County. The rocks in the Valley and Ridge province are intensely folded so as to resemble a ruffled potato chip in cross-section. In contrast, the rocks of the Appalachian Plateaus province are flat-lying to gently dipping. The topography varies accordingly with ridges and valleys characteristic of southern Monroe County and a broad, gently undulating plateau in the north. The "Pocono Front", a dramatic escarpment, defines the southern and eastern boundaries of the Pocono Plateau. Camelback Mountain is the highest point along the escarpment rising 1,000 feet above the surrounding land.

The sedimentary rocks of Monroe County trend from northeast to southwest. Moving from the northern part of the county to the south, one finds that the composition of the rocks varies. The Catskill Formation composed of shales and sandstones with scattered thin fossiliferous beds lies in the north. Further south, the Onondaga Formation, a limestone interbedded with shale, appears. Continuing south, additional formations of varying composition, including the Keyser, Tonoloway, Bloomsburg and McKenzie, crop out.

Mantling the bedrock in many parts of Monroe County are glacial deposits of varying thickness. These sediments were deposited by ice and meltwaters associated with various glacial advances of the Pleistocene epoch extending back a million years. The Wisconsin glacier was the last ice-sheet to retreat from the

area approximately 10,000 to 15,000 years ago. A broad, pockmarked ridge of loose boulders, sands, and silts, collectively called till, marks the southernmost extent of the Wisconsin This ridge called a terminal moraine extends across the Glaciation further modified the pre-existing Pocono Plateau. landscape by carving valleys, scraping mountains, scouring out depressions that later filled with water, and depositing a hodgepodge of sediments. Pre-existing drainage patterns were radically altered by the scouring action of the ice and the deposition of The many wetlands and natural ponds in Monroe glacial debris. County formed in the resulting depressions and impounded waterways. In some of these wetlands, plant species that were common during and shortly after the glacial period, when the climate was much cooler, can still be found.

#### Soils

The distribution of soils in Monroe County reflects the topography and geology. In turn, soils have given rise to patterns of vegetation and land-use. Lipscomb (1981) recognizes fifteen soil associations within the county. A soil association consists of one or more major soil types (series) and at least one minor soil series occurring in a distinctive landscape pattern. These fifteen associations are grouped into five general categories described below (refer to Lipscomb (1981) for more complete soil descriptions):

1) <u>Dominantly deep soils formed in glacial till mainly in the Appalachian Plateaus province</u>

This diverse group of soils occurs in northern Monroe County and covers approximately half of the county. The soils develop on nearly level to gentle slopes and range from well drained to poorly drained. The characteristic stoniness of the soils has precluded most agricultural efforts and left much of the landscape in forest. Substantial areas covered by these soils are in state forest and game lands and, thus, utilized for recreation. Remaining areas have undergone residential development. The associations comprising this group include:

Lackawanna-Wellsboro-Oquaga
Wurtsboro-Swartswood-Volusia
Chippewa-Norwich-Mucky peat
Clymer-Buchanan
Wellsboro-Morris-Lackawanna
Empeyville-Worth
Wyoming-Swartswood-Norwich

2) <u>Dominantly moderately deep soils formed in glacial till mainly</u> in the Appalachian <u>Plateau province</u>

This category of soils consists of the Lordstown-Oquaga association which occurs on ridges in northern Monroe County and covers approximately 10% of the county. The soils are sloping to very steep, moderately deep, and well drained. The stony character

of the soils and the steepness of the slopes on which they form limit agriculture. However, housing developments are extending into areas covered by these soils.

# 3) Dominantly deep soils formed in glacial till mainly in the Valley and Ridge province

This diverse group of soils occurs in southern Monroe County and covers approximately 10% of the county. These soils develop on nearly level to moderately steep uplands and range from well drained to somewhat poorly drained. In places, these soils have supported agricultural activities. Areas unsuitable for agriculture have remained wooded or have been developed. The soil associations composing this group include:

Mardin-Bath-Volusia Meckesville-Kedron Leck Kill-Klinesville

# 4) <u>Dominantly shallow and moderately deep soils formed in glacial till mainly in the Valley and Ridge province</u>

This diverse group of soils occurs in southern Monroe County and covers approximately 20% of the county. These soils form on gently sloping to rolling dissected uplands and on steep to very steep ridge slopes. The soils tend to be shallow and well drained. Until the recent surge in residential development, much of the area covered by these soils was forested. This group of soils includes the following associations:

Dekalb-Hazleton-Laidig Weikert-Hartleton Benson-Rock outcrop

# 5) <u>Dominantly deep soils formed in glacial outwash and alluvium</u> mainly on terraces and flood plains

The Wyoming-Chenango-Pope association comprises this group of soils which occurs on terraces and flood plains adjacent to major streams, primarily in southern and south-central Monroe County. These soils cover approximately 10% of the county. The soils are nearly level to sloping, deep, somewhat excessively drained and well drained. Most area covered by these soils has been cleared for agricultural use or residential development.

#### **Vegetation**

The vegetation of Monroe County reflects the prevailing environmental conditions and disturbance history, both natural and human.

The southern part of Monroe County is classified as Mixed Oak Forest (Oplinger and Halma 1988, Monk et al. 1990). Earlier, this forest-type was designated as Oak-Chestnut Forest (Braun 1950). However, the loss of the American chestnut, a primary constituent of the forest, in the early part of the century rendered the original classification inappropriate. The chestnut blight

resulted from the parasitic fungus <u>Endothia</u> <u>parasitica</u> which was introduced to America in 1904.

At present, the Mixed-Oak Forest consists of red, white, and black oaks with some white pine. Although the three oak species often grow together, each prefers different moisture conditions. White oak thrives on moist soils while red oak prefers drier, better drained soils and black oak favors dry upland slopes. Red and sugar maple, beech, white ash, hickories, and tulip-tree are common associates. Shadbush is a common sub-canopy tree. A diversity of shrubs typical of the forest-type include blueberries, viburnums, spicebush, witch hazel, and rosebay rhododendron.

"Sprout hardwoods" (Braun, 1950), another name for the Mixed Oak Forest, refers to the manner in which oaks vegetatively reproduce from stumps. Many of the oak forests in the area have been cut a number of times for lumber and fuel. As a result, one tends to find relatively even-aged stands that are typically less than a hundred years old.

Variations of the Mixed Oak Forest occur as a result of different environmental conditions. For example, on ridgetops where harsh conditions prevail, chestnut oak dominates. Shallow, dry, nutrient-poor soils and extreme exposure to wind and ice storms combine to stunt and deform the vegetation. Assorted oaks, black gum, gray birch, red maple, huckleberry, blueberries, and mountain laurel are common cohorts.

Moving north of the Mixed Oak Forest up onto the Pocono Plateau, one enters the Northern Hardwoods Forest (Oplinger and Halma 1988). This forest is a part of the larger Allegheny Section of the Hemlock-White Pine-Northern Hardwoods Forest (Braun 1950) that extends from Minnesota to northern New England and eastern Canada and as far south as central Pennsylvania. On the Pocono Plateau, the dominant forest trees include red and sugar maple, beech, yellow birch, white ash, and hemlock with assorted oaks and black cherry as minor components. White pine, now a subordinate species, was more common prior to logging. Variations in the Northern Hardwoods Forest abound. For example, hemlock dominates in cool ravines or on north-facing slopes to the exclusion of most other species. In wetter environments, coniferous species including larch, spruce, and fir are more abundant.

One of the most striking features of the glaciated landscape of Monroe County is the abundance of wetlands. When the ice retreated it left ice blocks and shallow drainage channels behind. Glacial debris accumulated around the ice blocks, so that when they melted, steep-sided "kettle hole" lakes remained. Meltwaters blocked by glacial debris formed shallow lakes that filled in over time to form marshes and swamps.

In many of the kettle holes, nutrient- and oxygen-poor

conditions slowed the decomposition of organic matter so that it accumulated over time to form thick peat deposits. The "level bog" (Johnson 1985) is the type found in Pennsylvania. In Monroe County, these range in size from less than an acre to more than 40 acres. The classic bog has concentric zones of vegetation surrounding a central "eye" of open water. The first zone is a floating mat of low shrubs and sedges. The surrounding second zone has taller shrubs and is not nearly as treacherous for the avid bog walker. The outermost zone is the boreal conifer swamp dominated by black spruce and larch. Many northern species reach the southern limit of their respective ranges in Pocono bogs.

Marshes, wet meadows, and swamps have formed in shallow depressions and along streams. Unlike bogs, these wetlands receive well-aerated, mineral-rich waters which promote decomposition processes. A different suite of plants inhabits these wetlands that have relatively little organic matter accumulation. Red maple, hemlock, ash, black gum, and yellow birch are typical canopy species while blueberry and swamp azalea are common shrubs.

#### PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to plan the wise use of Monroe County's natural features, the Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by Monroe County to provide environmental data for use in site evaluations throughout the county. The Pennsylvania Natural Diversity Inventory (PNDI) data base was established in 1982 as a joint venture of PSO/TNC, the Pennsylvania Department of Environmental Resources, and the Western Pennsylvania Conservancy. In its nine years of operation, the PNDI data base has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (called natural communities in PNDI terminology), sensitive plant and animal species, heron rookeries, and several other noteworthy natural features. 7,000 detailed occurrence records, largely the result of field surveys, are stored in computer files and denoted on topographic maps. Additional data are stored in extensive manual files set up for over 150 natural community types, over 800 plant and animal species, about 650 managed areas, and for each of Pennsylvania's 881 71° USGS topographic quadrangle maps.

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

The PSO has used the systematic inventory approach for natural communities and species of special concern to identify the areas of highest natural integrity (least disturbed) in Monroe County. The array of natural communities, each with its own characteristic mix of species, may contain an estimated 85-90 percent of all the species found in a given geographic area (The Nature Conservancy 1988); the other 10-15 percent of the components of biological diversity consists of sensitive plant and animal species which do not have a special affinity for any particular natural community and will not be protected by protecting natural community sites. The full range of biological diversity in Monroe County can be conserved by protecting sites with the best occurrences of the county's natural communities and by protecting populations of the county's sensitive plants and animal species that do not occur within the natural communities. The natural community and sensitive species data are the basis for judging the biological values of sites within the county.

#### NATURAL AREAS INVENTORY METHODS

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

#### Map and Air Photo Interpretation

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

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

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

## Field Work

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

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

## Data Analysis

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

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

## Priorities for Protection

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

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

#### SUMMARY AND RECOMMENDATIONS

A meeting of TNC personnel and biologists and ecologists from around the state was held to discuss the most important sites for protection in Pennsylvania; several Monroe County sites are regarded as being among the most significant for natural communities and species of special concern in the state. The following five sites from Table 1 are the most critical sites in Monroe County for receiving protection or ensuring continued protection in the future. Each site is followed by its USGS topographic quadrangle map name.

Long Pond Macrosite Preserve (Pocono Pines, Blakeslee):

The Long Pond Macrosite Preserve encompasses excellent examples of Acidic Shrub Swamp and Ridgetop Dwarf-tree Forest natural communities that typify the Pocono Plateau. It is one of the most unique ecosystems in the Northeast and an extremely important site for preservation. Numerous plant and animal species of special concern inhabit these communities. The natural beauty of the Poconos has drawn vacationers and year-round residents to the region resulting in the loss of many natural areas. Preservation of this large, relatively undisturbed tract of land will ensure that future generations will be able to view and enjoy the untouched pristine habitats that characterize the Poconos.

# Lake Mineola Marsh (Brodheadsville):

Lake Mineola Marsh is a robust emergent marsh formed in a shallow kettle lake to the south of Lake Mineola. A Pennsylvania Endangered (PE), globally critically imperiled (GIS1) bulrush population grows in the marsh. This species has been listed as Federally Endangered. The population in the marsh is the best extant occurrence of the species in Pennsylvania and the thirteenth occurrence world-wide. A suggested Pennsylvania Threatened spikerush also occurs in the marsh where it grows on floating organic mats. The protection of the lake's naturally fluctuating water table is of critical importance. Surrounding activities that threaten to disrupt the hydrology should be investigated. Local landowners and mine operators are working to protect the hydrology of the ground water system which should benefit the plant.

# Big Offset Barren (Saylorsburg):

Big Offset Barren on the summit of Blue Mountain supports a good population of a Pennsylvania Endangered (PE), globally imperiled (G2S1) sedge which grows on moist to dry slopes. The sedge grows in the filtered light and shade of a low, scrubby forest of sassafras, red maple, scrub oak, and assorted ericaceous shrubs. The plants grow near the Appalachian Trail on land owned by the Blue Mountain Consolidated Water Company. Although the population does not appear to be threatened at present, trail expansion into the area should be avoided.

# Cherry Creek Fen (Saylorsburg):

Cherry Creek Fen is a good quality Shrub Fen containing good populations of a Pennsylvania Endangered animal and three plant species of special concern including a state-endangered wildflower. Flowing calcareous water derived from weathering of the underlying limestone bedrock and till creates conditions amenable to suites of plants that are unable to tolerate the more acidic conditions found on adjacent bedrock types. The restriction of many of these plants to calcareous wetlands accounts for their rarity. An open graminoid area with scattered shrub hummocks of poison sumac and spicebush typify the site. The landowners of Cherry Creek Fen have informally agreed to protect the site and to notify The Nature Conservancy of any threats to the property.

# Tannersville Bog (Mount Pocono):

Tannersville Cranberry Bog, a preserve owned and managed by The Nature Conservancy, supports an excellent population of a butterfly imperiled in Pennsylvania (S2) and three natural communities: Boreal Conifer Swamp, Acidic Broadleaf Swamp, and Glacial Bog. Two plant species of special concern grow in the Glacial Bog. Continued development around the wetland complex threatens to degrade water quality and alter species composition. Three steps for protecting the wetland are: 1) use mechanical tree and shrub control along utility line right-of-ways that cross the wetland, 2) restricting development within the bog's primary watershed, and 3) acquiring additional buffer land around the wetland. Conservation easements on adjoining properties would further help to protect the wetland.

# Two Mile Run Swamp (Blakeslee, Thornhurst):

Two Mile Run is a diverse wetland complex containing a large excellent quality Boreal Conifer Swamp dominated by red spruce, tamarack, and balsam fir, and two plant species of special concern growing in an acid shrub swamp. The relatively undisturbed Two Mile Run Swamp needs further study for species of special concern. Logging, development, and flooding should be avoided or restricted within the Two Mile Run watershed.

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

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

Rank Name Topo. Map State Ranks , Importance Recommendations  1 Long Pond Macrosite Pocono Pines Preserve Blakeslee Thornhurst State Ranks , Importance Recommendations  1 Long Pond Macrosite Pocono Pines Blakeslee Thornhurst State area is considered to be the most important site in PA for the preservation of biodiversity and one of the top sites in eastern US because of the concentration of rare species. Further development in this area should be curtailed.  1 Lake Mineola Marsh Brodheadsville Two plants of special concern including one of the few remaining sites for a GISI, PE plant. Nearby sand-and-gravel operation may pose a grave threat by lowering watertable.  2 Big Offset Barren Saylorsburg Wind Gap Wind Focono NPS, ATC, a water company, a gas transmission line company, and the county.  2 Cherry Creek Fen Saylorsburg A good G2G3S1 natural community with 4 special concern species in a quickly developing area; protect site by protecting water quality; limit future development in watershed.  2 Tannersville Bog Mount Pocono East Stroudsburg Stroudsbu	County	ex-voSite	USGS	Natural Community, TNC Global
Preserve Blakeslee considered to be the most important site in PA for the preservation of biodiversity and one of the top sites in eastern US because of the concentration of rare species. Further development in this area should be curtailed.  1 Lake Mineola Marsh Brodheadsville Two plants of special concern including one of the few remaining sites for a G1S1, PE plant. Nearby sand-and-gravel operation may pose a grave threat by lowering watertable.  2 Big Offset Barren Saylorsburg Wind Gap Win	1 -			State Ranks <sup>2</sup> , Importance
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Wind Gap  Wind Gap  population; site management will require cooperation among NPS, ATC, a water company, a gas transmission line company, and the county.  2 Cherry Creek Fen  Saylorsburg  A good G2G3S1 natural community with 4 special concern species in a quickly developing area; protect site by protecting water quality; limit future development in watershed.  2 Tannersville Bog  Mount Pocono East Stroudsburg  Mount Pocono East Stroudsburg  Stroudsburg  Mount Pocono East Stroudsburg  This wetland system contains 3 natural communities and 3 special concern species; watershed protection is critical to ensure the continued quality of this wetland.  2 Twomile Run Swamp  Blakeslee Thornhurst  Large diverse wetland with excellent Boreal Conifer Swamp	1	Lake Mineola Marsh	Brodheadsville	including one of the few remaining sites for a GIS1, PE plant. Nearby sand-and-gravel operation may pose a grave
community with 4 special concern species in a quickly developing area; protect site by protecting water quality; limit future development in watershed.  2 Tannersville Bog Mount Pocono East natural communities and 3 special concern species; watershed protection is critical to ensure the continued quality of this wetland.  2 Twomile Run Swamp Blakeslee Large diverse wetland with excellent Boreal Conifer Swamp	2	Big Offset Barren		population; site management will require cooperation among NPS, ATC, a water company, a gas transmission line company,
East natural communities and 3 special concern species; watershed protection is critical to ensure the continued quality of this wetland.  2 Twomile Run Swamp Blakeslee Large diverse wetland with excellent Boreal Conifer Swamp	2	Cherry Creek Fen	Saylorsburg	community with 4 special concern species in a quickly developing area; protect site by protecting water quality; limit future development in
Thornhurst excellent Boreal Conifer Swamp	2	Tannersville Bog	East	natural communities and 3 special concern species; watershed protection is critical to ensure the continued quality of this
		-		

Table 1 (Continued.)

County Rank <sup>1</sup>	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations		
			and 2 species of special concern; serious threat from housing; purchase and easement recommended.		
3	Adams Swamp	Blakeslee	Large, good to excellent Boreal Conifer Swamp; partially protected by TNC; protect and minimize development in watershed.		
3	Bender Swamp	Tobyhanna Sterling	Excellent Acidic Shrub Swamp natural community and population of a G5S3, PR plant; protected as part of Tobyhanna S.P. and newly acquired state game land; prevent beaver flooding and limit logging in watershed.		
3	Bloomer Swamp	Skytop	Good quality Boreal Conifer Swamp with small population of a G4S1, PE plant; logging around perimeter of wetland poses an immediate threat; recommend a conservation easement.		
3	Bradys Swamp	Thornhurst	Excellent Acidic Shrub Swamp natural community with 1 G5S3, PR plant and 1 G5S2, PT plant on state game lands; maintain forested buffer zone.		
3	Camelback Mountain	Mount Pocono	A good natural community within Big Pocono State Park; may need fire management in the future to maintain community.		
3	Cresco Heights	Buck Hill Falls	Fair Acidic Rocky Summit natural community with a good population of a G5S1, PE plant		
(Continued, next page.)					

Table 1 (Continued.)

	unty nk	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks, Importance
		Barrell 1997 - The Control of the Co		Recommendations
			·	and 3 TU species; exclude ATV traffic.
	3	Fern Ridge Bog	Blakeslee	Complex of 3 Acidic Shrub Swamps with 4 occurrences of 2 special concern species; protect as part of Long Pond Macrosite.
	3	Lake Naomi Shrub Swamps	Pocono Pines	Marginal natural community with 4 special concern species including a PE shrub; expansion of a sand-and-gravel quarry or housing development could seriously threaten these wetlands.
	3	Lost Lakes	Pocono Pines Blakeslee	Two good to excellent natural communities with 4 species of special concern; entire area should be protected through conservation easement or purchase.
	3	Seven Pines Mountain	Buck Hill Falls	Good quality Ridgetop Dwarf- tree Forest on state game land; will need management to maintain community.
	4	Arnott Fen	Bushkill	Fair quality community with 4 species of special concern: 1 PE animal, 2 PE plants, and 1 PR plant; protected within DWGNRA.
•	4	Big Marsh	Tobyhanna Thornhurst	Fair Acidic Shrub Swamp, 2 plants of special concern including 1 PE shrub; protected within SGL127.
	1 	Circle Bog	Pocono Pines	Two fair to good natural communities; should be protected as part of Long Pond Macrosite Preserve.
(C	ontin	ued, next page.)		

Table 1 (Continued.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
4	Huckleberry Marsh	Tobyhanna	Good Acidic Shrub Swamp and good population of a PR shrub; protected within SGL127.
4	Eschenbaugh Swamp	Tobyhanna	Good quality Boreal Conifer Swamp with fair population of a PR plant; within SGL127.
4	Laurel Drive Bog	Tobyhanna	Fair Glacial Bog with 1 PE plant and 1 PR plant; possibly threatened by surrounding development; protect as part of Steamtown Excursion Railroad corridor.
4	Pocono Lake Preserve	Blakeslee	Good quality Boreal Conifer Swamp with 2 plants of special concern, and 3 nesting pairs of Osprey; site protected.
4	Pond Swamp	Tobyhanna	Good example of Acidic Shrub Swamp with excellent population of a PR shrub and fair population of a TU plant; protected within SGL127.
4	SA511	Bushkill	A Globally-rare, State- imperiled moth breeds within the confines of Ressaca Falls Boy Scout Camp; need conservation agreement to manage for the species.
4	SA565, SA577	Pocono Pines	Two excellent populations of G4S2 butterflies along powerline; seek protection agreement with PA Power & Light Co.
4	Schoch Barren  ued, next page.)	Blakeslee	fair to good Ridgetop Dwarf- tree Forest; protected within SGL129 and Delaware State Forest; state agencies need to coordinate protection actions.

Table 1 (Continued.)

timestas mily	County Rank <sup>I</sup>	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
	4	Stillwater Lake Swamps	Pocono Pines	One wetland contains 3 good populations of special concern plants, the other contains a fair population of a PR shrub; problems may arise from pollution and blocked drainage; monitor site.
	4	Tamaque Lake Swamp	Pocono Pines	Two fair to good natural communities with 1 good population of a PR shrub.
	4	Wagners Bog	Blakeslee	Two good natural communities and 3 good populations of special concern species, including a PE shrub; site is threatened by surrounding development; work to avoid impacts from pollutants.
)	5	Halfmoon Lake	Pocono Pines	Poor Glacial Bog 1 Fair population of a TU plant; protect as part of Long Pond Macrosite Preserve.
	5	NC515	East Stroudsburg	Fair quality Northern Conifer Swamp in an area that is quickly developing; provide buffer zone for the entire small watershed.
	5	NC516, SP515	Stroudsburg	Poor Acidic Rocky Summit natural community with a poor population of G5S3, TU shrub that is suffering from disease; protected by DWGNRA.
	5	NC517	Skytop	Fair natural community; maintain vegetated buffer along stream; seek easement to discourage development in watershed.

(Continued, next page.)

Table 1 (Continued.)

County Rank <sup>I</sup>	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
5	NC526	Buck Hill Falls	Old-growth Northern Conifer Forest; owners seeking conservation easement.
5	NC547	Stroudsburg Saylorsburg	Marginal example of Mesic Central Forest; protect woodland and a buffer around it from disturbance.
5	NC557	Tobyhanna	Fair quality Glacial Bog on SGL127; encroachment from nearby private homes; work with homeowners to prevent pollution of wetland.
5	NC562, SP563	Tobyhanna Thornhurst	Fair population of a PR plant in a fair Boreal Conifer Swamp within SGL127; recent logging is a threat to this plant that requires cool, shady sites.
5	NC565, SP566	Tobyhanna	Fair Acidic Shrub Swamp and fair population of a PR plant within Tobyhanna State Park.
5	NC570, SP569	Tobyhanna	Fair Acidic Shrub Swamp with 1 good population of a PR plant; maintain adequate buffer between swamp and development to the north.
5	NC581, SP576	Stroudsburg	Marginal Acidic Shrub Swamp with fair population of a G5S3, TU shrub; protected as part of municipal water supply; notify company of need to protect plant.
5	Ramot Bog	Pocono Pines	Fair Glacial Bog with 1 G4S3 TU species; protect with easement as part of Long Pond Macrosite Preserve.

(Continued, next page.)

Table 1 (Continued.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
5	NC545, SA517	Tobyhanna	Good site for G5S3 mammal within SGL127; protect creek area from logging.
5	SA529	Pohopoco Mountain	Osprey nesting at edge of reservoir in protected municipal watershed.
5	SA559	Stroudsburg	Fair site for a G4S2S3 bat; formerly site for a federally-endangered bat; seek conservation easement and provide management.
5	SP501	Wind Gap	Poor population of a PE plant; seek agreement with pipeline company to protect and manage site.
5	SP508	Blakeslee	Poor population of a PR shrub in a disturbed bog; maintain or improve current conditions.
5	SP510	Stroudsburg	Fair population of a PE plant; seek conservation easement to ensure protection.
5	SP515	Bushkill	Fair population of a PR plant near development; seek agreement with landowner to protect site.
5	SP516	Thornhurst Blakeslee	Fair population of a PR plant near Anglewood Lake; work with landowner to maintain opening in swamp.
5	SP519	Stroudsburg	Excellent population of a G5S3, TU shrub; no threats and protected within DWGNRA.
5	SP521	Tobyhanna	Good population of a PR aquatic plant in state park

Table 1 (Continued.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
			lake; possible threat from herbicides used to control aquaticplants.
5	SP529	Tobyhanna	Good population of a PR aquatic plant in small pond within SGL127; herbicides should not be used in or near pond.
5	SP536	Tobyhanna	Good population of a G4S2, TU aquatic plant; herbicides may be main threat; contact landowners.
5	SP548, SA571	Tobyhanna	Breeding site for PE bird and also fair population of PR plant; protected within state park and army depot.
5	SP564	Tobyhanna	Poor population of a PR shrub along Gouldsboro Lake shore; maintain habitat; protect as part of Steamtown Excursion Railroad.
5	SP578, SP580	Stroudsburg	Poor populations of a PR tree and TU shrub on DWGNRA land near Totts Gap; maintain or improve forest openings.
5	Lake Naomi	Pocono Pines	A PR submerged aquatic and a TU floating-leaved aquatic grow in muddy substrate at northeastern end of large, man-made lake.
5	NC630, NC631	Pocono Pines Mount Pocono	High-gradient Clearwater Creek communities and Exceptional Value streams which course off Pocono Plateau; protect watersheds from development and logging.

(Continued, next page.)

Table 1 (Continued.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
5	SP511, SA569	Blakeslee Pocono Pines	An excellent population of a PR rush and a pair of osprey reside at lakeside; minimize development in area of plant and in vicinity of nesting pair.
5	NC546	Tobyhanna	Exceptional Value stream; watershed should be protected from development and logging.
5	GE512, GE513	East Stroudsburg	Significant geologic features.
5	GE564	Stroudsburg	Significant geologic feature.
5	GE543	Portland Stroudsburg	Significant geologic feature.
5	NC515	Skytop East Stroudsburg	A fair quality Northern Conifer Swamp; limit logging and development within upper watershed.
5	NC531, NC532 NC533	Buck Hill Falls	Three High-gradient Clearwater Creek communities and Exceptional Value streams; restrict logging and development within watersheds.
5	NC534	Buck Hill Falls	A fair quality Boreal Conifer Swamp community; limit future logging within the watershed and provide adequate buffer zone.
5	SP515	Thornhurst	A secure population of a PT sedge in Wagner Run.
5	SP508, SP502	Bushkill Flatbrookville	Excellent population of PR wildflower growing in limestone rock crevices along Delaware River; no known threats.

Table 1 (Concluded.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global State Ranks <sup>2</sup> , Importance Recommendations
5	SP519, SP520	Skytop	Two TU wetland plants in vernal pond habitat; no known threats.
5	GE511	Skytop	Significant geologic feature.

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

# Acronyms:

ATC - Appalachian Trail Conference

ATV - All terrain vehicle

DWGNRA - Delaware Water Gap National Recreation Area

NPS - National Park Service

S.P. - State Park

SGL - State Game Lands

TNC - The Nature Conservancy

See Appendix I for explanation of Global and State vulnerability ranks, and federal and state protection status.

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

County	Site	USGS	Importance
Rank	Name	Topo. map	
High	Appalachian Trail	Wind Gap Kunkletown Saylorsburg Stroudsburg	Important site for open space recreation <sup>2</sup> .
High	Delaware River	Bushkill Flatbrookville Stroudsburg Portland	Important wintering area for bald eagles; recreation; water supply.
High	Goose Pond Swamp*	Skytop Promised Land	Breeding birds and other wildlife habitat; potential for rare species; recommend conservation easement.
High	Kintz Swamp*	Skytop	Wildlife habitat; headwaters of Stony Run.
High	Little Pond Swamp*	Skytop Promised Land	Wildlife habitat; potential for rare species and natural communities; recommend conservation easement.
High	Longpatch Swamp	Thornhurst	Potential for rare species and natural communities in protected area.
High	Mount Wismer*	Buck Hill Falls Skytop	Scenic view; potential for rare plants.
High	Spruce Mountain*	Buck Hill Falls	Scenic view; potential for rare plants.
High	Underwood Swamp	Thornhurst Tobyhanna	Potential for rare species and natural communities in protected area.
High	Upper Buck Hill Creek*	Buck Hill Falls	Wildlife habitat; potential for rare plants.
	Big Spring* ued, next page.)	Buck Hill Falls	Water supply for Buck Hill Falls.

Table 2 (Continued.)

County Rank <sup>I</sup>	Site Name	USGS Topo. map	Importance		
Medium	Green Ridge Marsh	Saylorsburg	Diverse wetland habitat; wildlife habitat; potential for rare species.		
Medium	Mud and Sipos Swamp Area*	Buck Hill Falls	Concentration of wetlands; wildlife habitat; potential for rare species.		
Medium	Pinemere Camp Swamp	Saylorsburg	Relatively large hardwood- conifer swamp; wildlife habitat; natural water filter.		
Medium	Pocono Plateau Lake Wetlands*	Buck Hill Falls	Concentration of wetlands; wildlife habitat; potential for rare species.		
Medium	Pohopoco Creek Floodplain Forest	Brodheadsville	Only well developed floodplain forest in county; relatively large woodland in an agricultural area.		
Medium	Spruce Cabin Run	Skytop	Good water quality; wildlife habitat; low-impact recreation.		
Medium	Stony Run	Skytop	Good water quality; wildlife habitat; low-impact recreation.		
Medium	Stony Run Pond	Skytop	Potential for rare animals; low-impact recreation.		
Medium	Wallpack Bend Cliff	Flatbrookville	Only north-facing cliff on this section of Delaware River; habitat for PA- Vulnerable plant species.		
Medium	Wild Creek Reservoir Watershed	Pohopoco Mountain	Major water supply reservoir; wildlife habitat in protected area.		
Low	Bond Hill Falls*	Buck Hill Falls	Scenic waterfall and ravine.		
(Continued, next page.)					

Table 2 (Continued.)

	County Rank <sup>1</sup>	Site Name	USGS Topo. map	Importance
	Low	Boulder Field	Blakeslee	Geologic formation.
	Low	Dutch Hill*	Buck Hill Falls	Scenic wildflower area; relatively large wildlife habitat in developed area.
	Low	Goose Pond Run Falls*	Skytop	Scenic waterfall and ravine.
	Low	H. Bender Falls*	Skytop	Scenic waterfall and ravine.
	Low	Intake Dam Woods	East Stroudsburg	Watershed protection for Sambo Creek; municipal water supply; wildlife habitat and open space in a developing area.
	Low	Leavitt Falls*	Skytop	Scenic waterfall and ravine.
	Low	Lon Price Marsh*	Buck Hill Falls	Wildlife habitat.
_/	Low	Sand Spring*	Buck Hill	Natural spring.
	Low	Selfice Swamp	Thornhurst	Large, diverse wetland in protected area.
	Low	Spruce Cabin Pond*	Skytop	Poor quality bog and wildlife habitat.
	Low	Spruce Mountain Run Falls*	Buck Hill Falls	Scenic waterfall and ravine.
	Low	The Mash*	Buck Hill Falls	Wildlife habitat.
	Low	Tims Swamp	Twelvemile Pond	Poor example of hardwood- conifer swamp on state forest lands.
	Low	Vogt Farm Wetland*	Buck Hill Falls	Indian artifacts.
		Wagner Way Swamp	Thornhurst	Wildlife habitat and open space in developed area.
	(Conclud	led, next page)		

Table 2 (Concluded.)

County	Site	USGS	Importance
Rank <sup>I</sup>	Name	Topo. map	
Low	Zimmer Wildlife Sanctuary	Skytop Buck Hill Falls	Wildlife refuge protected by Natural Lands Trust.

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

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

<sup>\*</sup> These sites provided by Concerned Citizens of Barrett Township.

# General Summary and Recommendations

Monroe County is lucky to have so many important sites for biological diversity that are already protected from development as state or federal lands. In addition, many more sites are protected as part of private lake associations or fish and game clubs. Private clubs with large land holdings will come under greater pressure to sell off land to developers to generate revenue. These private lands should be the focus of the county's and townships' efforts to protect biological diversity, open space, and the quality of life in Monroe County.

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

There are sites in the county (Table 2) that do not have rare species or good natural communities but could be excellent sites for county or township parks or natural areas, especially those that can serve more than one purpose - recreation, wildlife habitat, flood and sediment control, water supply protection, Important areas for local protection and ideal for parks are any large tracts of forest or concentration of wetlands such as the land near Lost Lakes along the terminal moraine north of I-80. Protecting additional land adjacent to state forest, state game lands, or municipal watersheds creates larger areas of open land for wildlife than could be effectively done by any group It may also be possible to effectively bridge the gaps between unconnected conservation lands which will help ensure large, unbroken tracts of natural land and greatly increase the value of the individual tracts for open space and wildlife. Natural communities and species of special concern found in these areas can fit into any plan for a county park or preserve. Creating county or township natural areas around municipal water supply watersheds (e.g., Intake Dam Woods on Sambo Creek) can serve the purposes of providing an additional protective buffer around the water supply and provide low-impact recreation In addition, larger open-space areas are created opportunities. for wildlife than could be achieved through either the watershed land or the natural area alone. Fee title, easements, tax incentives, and agreements with and among landowners (such as watershed associations) are all tools that can be used to create these conservation lands.

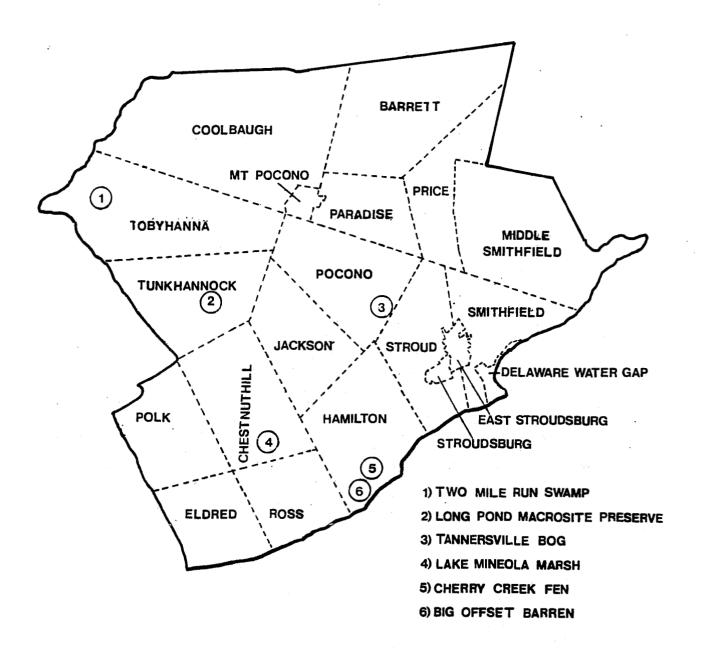


Figure 1. Top priority sites in Monroe County. See Table 1 and text for descriptions.

The importance of water bodies to biodiversity is illustrated by the number of rare species in the county associated with water. Protection of the wetlands, natural lakes, rivers, and creeks of Monroe County is vital, especially those that protect biodiversity, supply drinking water, and are attractive recreational resources. Protection of the critical watersheds is the only way to ensure that the water in the lakes, streams and wetlands will always be good quality. A cooperative effort can be made by town, county, state, and federal agencies, developers, and residents to lessen the impact of housing and commercial development on the watersheds and plant communities of the county. Planning development in watersheds may be done in a way to allow different types and densities of development or other activities depending on distance to the natural feature. Certainly, new housing and commercial development should be discouraged or given close scrutiny before it is allowed in the watersheds outlined in this report and careful review should be required within any watershed in the county. Townships can require minimum setbacks and vegetated buffer zones around all water bodies to help protect water quality. Landowners within any particular watershed can act on their own to protect water by forming watershed or lake associations to voluntarily monitor and screen proposals in their localities.

Where development is to occur, plans should provide for creating natural buffers between the development and wetlands and water bodies. Developers can be encouraged to include buffer zones and open space in their plans. Care should be taken to ensure that natural areas do not become "islands" surrounded by development. When a wetland is completely surrounded by development, even though the wetland has not been directly impacted, the swamp is effectively isolated and reduces its value for wildlife. Cluster development would allow the same amount of development but on much less land in such areas and, most importantly, would leave much of the uplands intact as corridors for wildlife movement into the surrounding uplands and between swamps.

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

In this report, we have outlined the watersheds where the

natural communities and species of special concern occur. core areas where the species and communities occur need to be given the most attention, and fee title acquisition is encouraged. Ideally, all of the land within the watersheds outlined in this report should receive some form of protection. but there are not sufficient financial resources to protect all of the land nor will all landowners be interested in land Not all of this land can receive the same amount of protection. protection nor do all activities need to be excluded. Current land uses that are not impacting these important sites should be encouraged to continue. Conservation easements are designed to allow landowners the current use of their land while protecting the owner and the resource from outside development pressure. Where easements are not possible any proposals for significant land use changes should be closely scrutinized by planners to assess the potential impacts on the resource. If there are any questions about the impact of the proposed development, we suggest that our office, Pennsylvania Science Office of The Nature Conservancy, be consulted.

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

#### RESULTS

The Monroe County Inventory began with a meeting held at the county court house in Stroudsburg. At that time, Lisa Surma of the county planning office and TNC personnel explained the purpose and procedures of the inventory to the Natural Areas Inventory Study Committee. We solicited input into the project from these individuals. At subsequent public meetings, we sought the help of organizations and individuals who had knowledge of natural communities, endangered species, or important wildlife breeding areas in the county. Field survey forms (Appendix IV) were distributed at the meeting for those who wished to submit information.

Two reconnaissance flights were taken over the county to look at sites that were not easily accessible on foot and to eliminate disturbed areas. The flights occurred on 19 and 20 October 1990 and covered the entire county.

## Site Summaries by USGS Topographic Maps

Portions of Monroe County are found on 22 USGS 71° topographic quadrangle maps (Figure 2). Communities, species of special concern, significant geologic features, and areas of local importance for wildlife and open space have been located on these base maps. The most important areas are represented on the maps in bold print. Natural communities and the most critical sites for species of concern have been given site names in bold type, such as LONG POND SWAMP, and are followed by natural community and species map codes (e.g., NC501, SA502, SP503). Lesser quality sites with poor representations of communities or species of special concern have been outlined and noted with the map code number in bold type only. outlined represents the species' location and the watershed or sub-watershed area where the elements (species or natural communities) are located. Development activities proposed within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess these impacts.

Finally, some sites have been mapped that do not appear to have species of special concern and are labeled with a site name in plain type. Although these sites cannot be considered natural because of human disturbance, they do hold potential for parks or passive recreation/open space areas.

Each topographic map is accompanied by a table that lists all of the exemplary natural communities and species of special concern located on the map. The communities and species are identified by a PNDI map code unique to each element on that map.

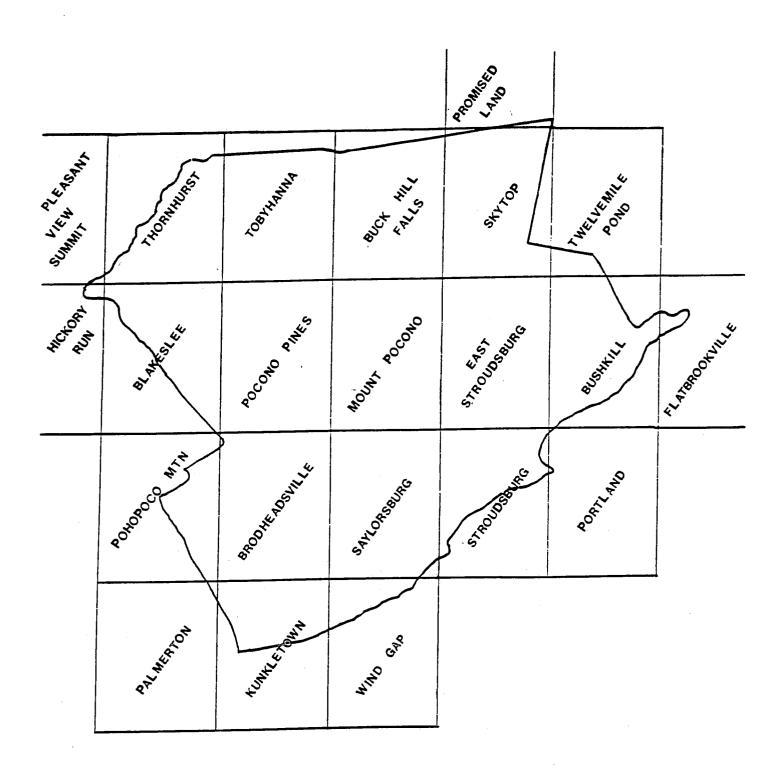


Figure 2. Monroe County outline with names and locations of the USGS topographic quadrangle maps of the county.

Following each element is its global and state ranks, federal and state protection status, the date last observed, and its quality rank. In addition, sites of local significance, geologic features, state forest natural areas, and natural communities and species that are located primarily on adjacent maps are listed within an "Other" category.

Figure 3 is a sample map with explanations of the different typefaces, symbols, and demarcations found on the topographic maps.

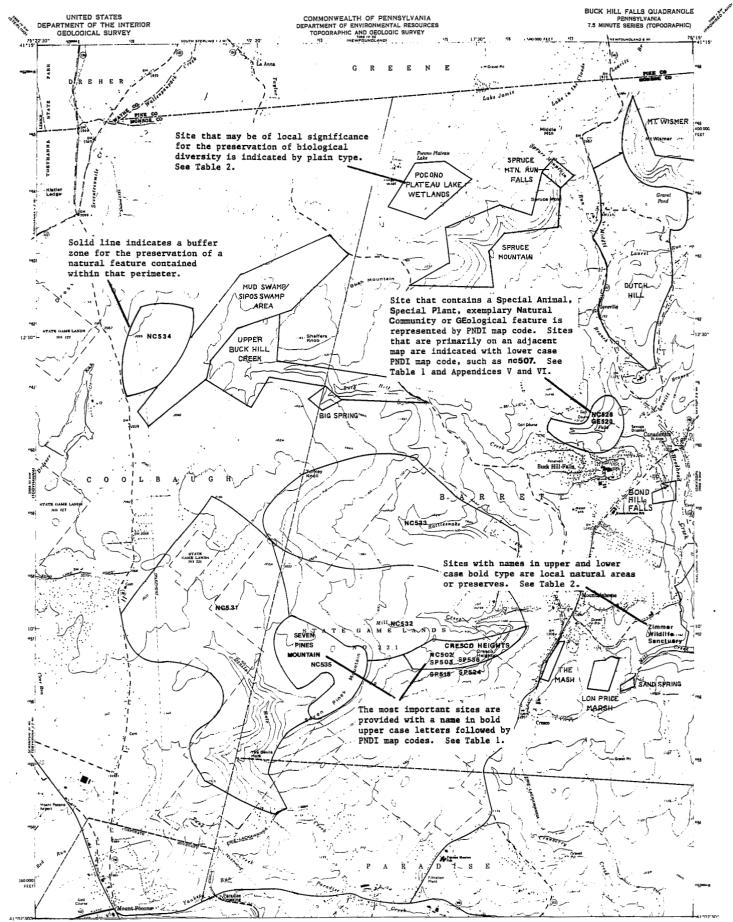
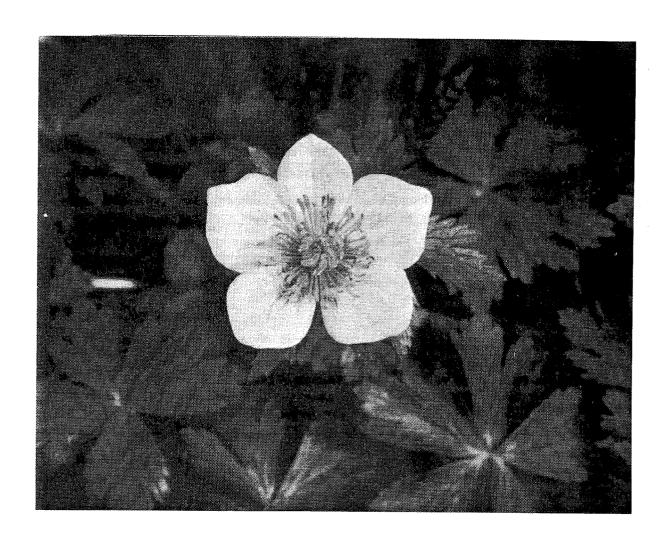


Figure 3. Sample USGS topographic map with explanations of the various types of County Natural Areas Inventory information added.



Spreading Globe Flower (<u>Trollius laxus</u> spp. <u>laxus</u>) is a Pennsylvania Endangered plant that is found in wetlands fed by calcium-rich ground water. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Promised Land

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

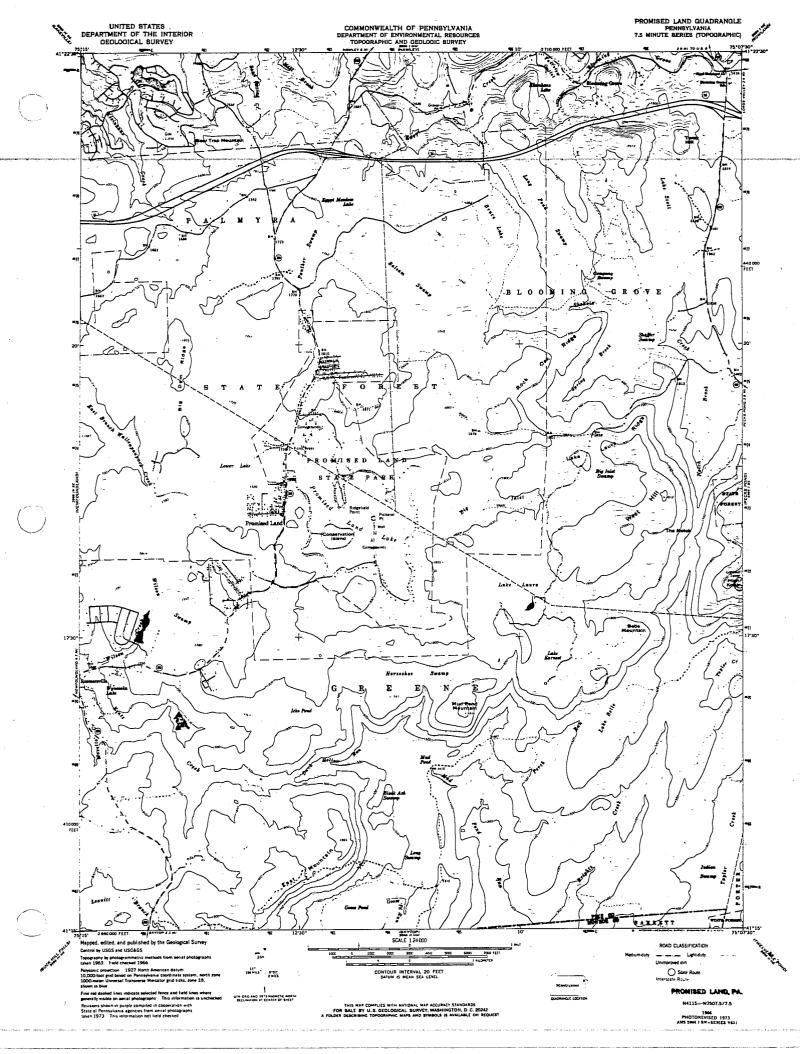
SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: None identified.

# Promised Land Quadrangle:

Only a small portion of Monroe County extends onto the southeast corner of the Promised Land quadrangle. PSO staff did not find natural communities or species of special concern in this area.



USGS QUADRANGLE MAP: Pleasant View Summit

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

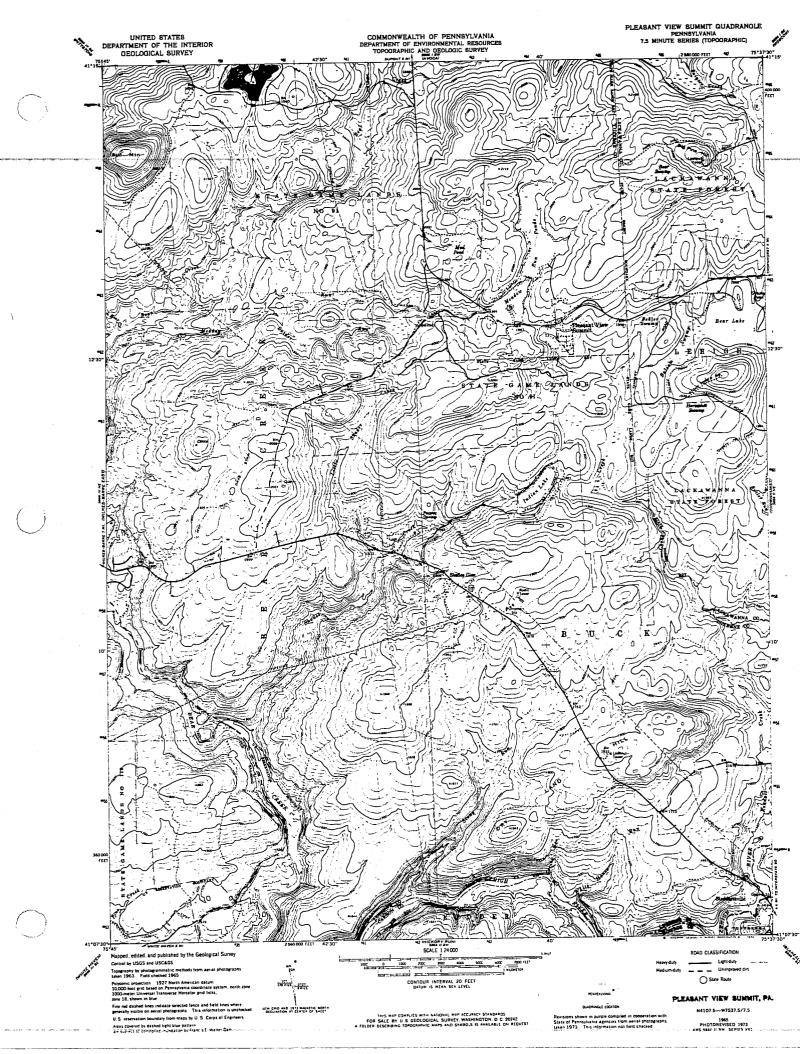
SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: None identified.

## Pleasant View Quadrangle:

Only a small portion of Monroe County extends onto the southeast corner of the Pleasant View Summit quadrangle. PSO staff did not find natural communities or species of special concern in this area.

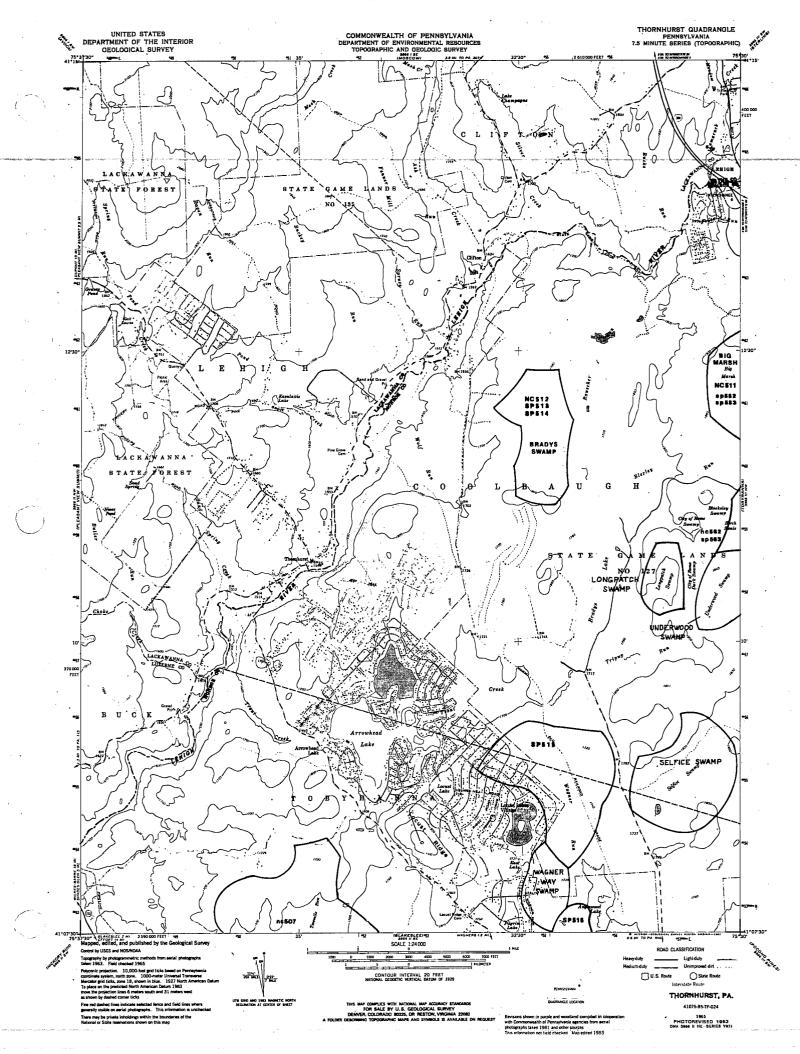


# USGS QUADRANGLE MAP: Thornhurst

		TNC I			Status State	Last Seen	Quality
NATURAL COMMUNITIES:	511 512	G5 G5	S3 S3	N N	N	12/15/85 5/23/90	
SPECIAL PLANTS:	513 514 515 516	G5 G5 G5 G5	S3 S2 S2 S3	N N N N	PR PT PT PR	5/23/90 5/23/90 7/10/90 8/15/90	C

SPECIAL ANIMALS: None identified.

Longpatch Swamp, Selfice Swamp, Wagner Way Swamp, Underwood Swamp; see adjacent maps for nc507, sp552, sp553, nc562, and sp563. OTHER:



#### Thornhurst Quadrangle:

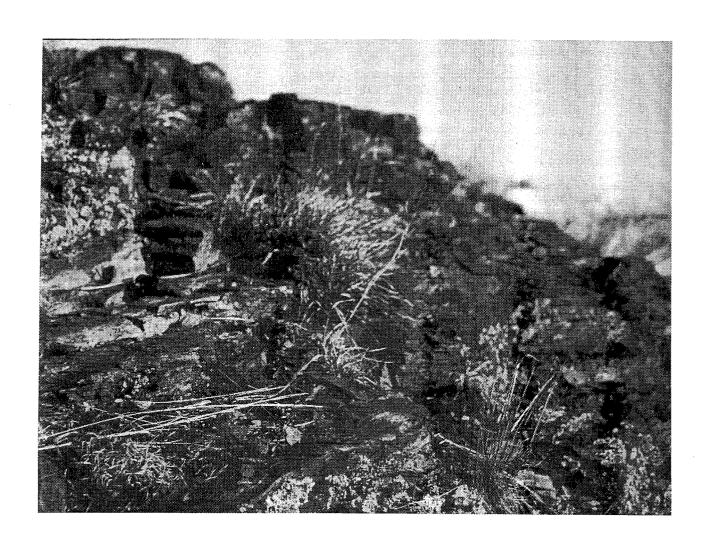
BRADYS SWAMP, located northwest of Bradys Lake, is an excellent example of an Acidic Shrub Swamp (NC512). Covering approximately 80 acres, the large swamp contains a fair population of a state-threatened sedge (SP514) and a good population of a state-rare shrub (SP513). There has not been any recent activity in the swamp but the second-growth hardwood forest surrounding the swamp indicates past logging. Because Bradys Swamp occurs within State Game Lands 127 (SGL 127), it receives limited protection. In the future, activities such as logging should be minimized within the swamp's watershed and the existing hydrology should be maintained. Flooding due to human or beaver impoundment may drown the plant species of special concern.

BIG MARSH is a second large Acidic Shrub Swamp (NC511) of importance on the Thornhurst quadrangle with a portion extending onto the adjacent Tobyhanna quadrangle (see NC554). The 80-acre swamp, dominated by rhodora (Rhododendron canadense) with some sheep laurel (Kalmia angustifolia), contains the only known extant Pennsylvania population of a shrub (sp552) whose suggested state status is endangered. In addition, the swamp supports a fair population of a state-rare shrub (sp553). Increased erosion and sedimentation from recent clear-cutting of approximately 20 acres of upland forest along the northern margin of the swamp poses the most immediate threat to Big Marsh. Future logging in the swamp watershed should be restricted.

Wagner Run, a large robust emergent marsh, supports a good population of a state-threatened sedge (SP515). The original community was degraded by flooding resulting from construction of a railroad bed and a beaver dam. To the south, the marsh grades into a boreal conifer swamp (WAGNER WAY SWAMP) dominated by spruce (Picea sp.) and balsam fir (Abies balsamea). The swamp, though disturbed by past logging, deserves protection at the local level. Consideration should be given to annexing the swamp to the State Game Lands.

SP516 marks the location of a small population of a staterare rush growing in full sunlight in a clearing along a property boundary. The property boundary should be kept clear to promote the persistence of the plant at the site.

Three swamps of local significance have not been adequately investigated to determine the presence or absence of species of special concern. LONGPATCH SWAMP is a broadleaf-conifer swamp that has been degraded by logging. UNDERWOOD SWAMP is a mosaic of different wetland types as is SELFICE SWAMP which supports a robust emergent marsh along its western edge where beaver activity has caused flooding and an expansive shrub swamp along its eastern margin. Logging within the swamps should be avoided.

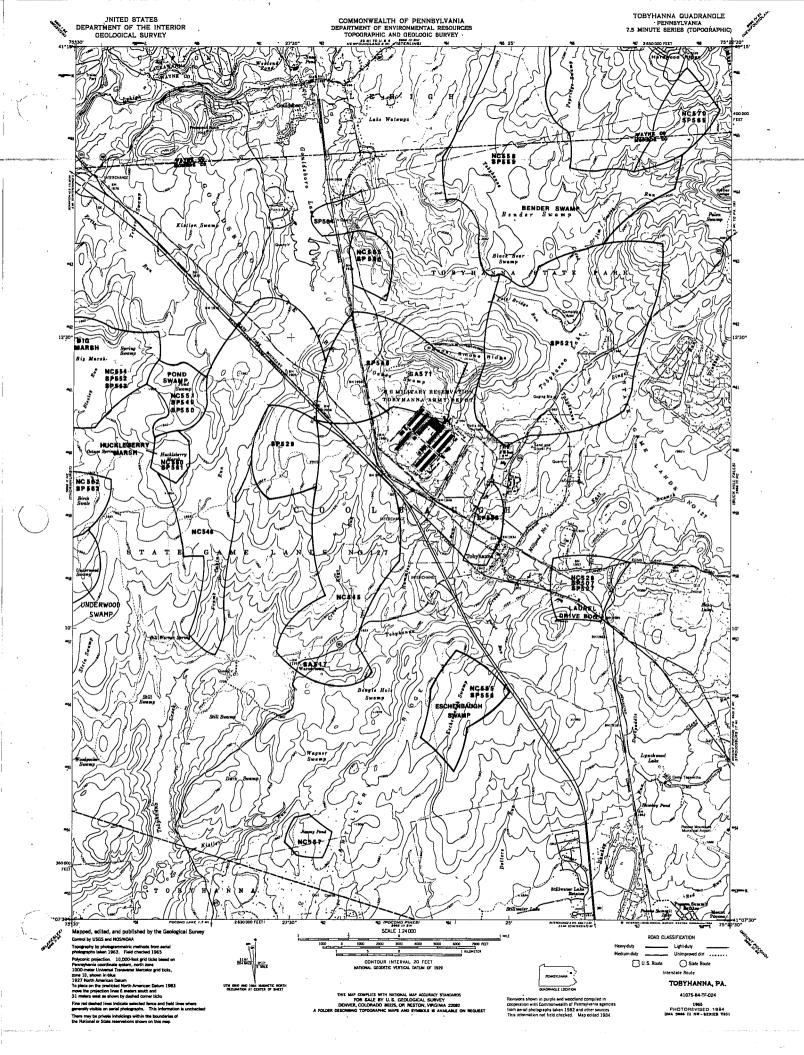


This Acidic Rocky Summit natural community at Cresco Heights (Buck Hill Falls topographic map) is habitat for four plants of special concern in Pennsylvania. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Tobyhanna

	TNC	Rank	Legal	Status	Last	
	Global	State		State	Seen	Quality
						_
NATURAL COMMUNITIES: 52		S2S3	N	Ŋ	7/27/89	
54		S3	N	N	1990	E
54		S3	N	N	1990	E
55		S3	N	N	3/02/90	
55		<b>S</b> 3	N	N	5/09/90	
55		S2	N	N	5/23/90	В
55		S2S3	N	N	5/22/90	
55		S3	N	N	5/17/90	) A
56		S3	N	N	6/13/90	) B
56	2 G?	S3S4	N	N	6/13/90	CD
56	5 G5	S3	N	N	6/14/90	
57	0 <b>G</b> 5	S3	N	N ,	7/19/90	
SPECIAL PLANTS: 50	7 G5	Sl	N	PE	5/23/90	۱ ۲۵
SPECIAL PLANTS: 50		S2	N	PR		
52		S2	N		8/19/82	В
				PR	7/27/89	
52		S2	Ŋ	PR	9/28/86	) В
53		S2	N	N	9/20/89	
54		S3	N	PR	8/22/89	<u>.</u>
54		<b>S</b> 3	N	PR	3/02/90	) A
55		<b>S</b> 3	N	TU	3/02/90	) C
55		Sl	N	TU	5/09/90	C
		S3	N	PR	5/09/90	C
55		S3	N	PR	5/23/90	C
559		S3	N	PR	5/17/90	
56.		S3	N	PR	6/13/90	
56:		S3	N	PR	6/13/90	
√56•		S3	N	PR	6/13/90	
560		S3	N	PR	6/14/90	
569	9 G5	S3	N	PR	7/19/90	В
SPECIAL ANIMALS: 51	7 G5T5	<i>S</i> 3	N	N	8/15/84	В
57:		Sl	N	PE	6/01/90	

OTHER: Underwood Swamp.



#### Tobyhanna Quadrangle:

BIG MARSH is a large Acidic Shrub Swamp (NC554) located on State Game Lands 127 (SGL 127). The wetland extends onto the Thornhurst quadrangle (see NC511). The 80-acre swamp dominated by rhodora (Rhododendron canadense) with some sheep laurel (Kalmia angustifolia) contains the only known extant Pennsylvania population of a shrub (SP552) whose suggested state status is endangered. In addition, the swamp supports a fair population of a state-rare shrub (SP553). Increased erosion and sedimentation from recent clear-cutting along the northern margin of the swamp pose the most immediate threat to Big Marsh. In the future, logging in the swamp watershed should be restricted.

POND SWAMP, located on SGL 127, is a good example of an Acidic Shrub Swamp (NC551) and is dominated by a state-rare shrub (SP549). A good population of a plant (SP550) listed as Tentatively Undetermined grows on a floating bog mat. The upland woods surrounding the swamp were logged in the past. Future logging within the swamp watershed should be avoided or minimized. At the very least, an adequate vegetated buffer zone should be left around the swamp to stem sediment and nutrient runoff to the wetland.

HUCKLEBERRY MARSH is a good Acidic Shrub Swamp (NC560) dominated by a state-rare shrub (SP561), leatherleaf (Chamaedaphne calyculata), and rhodora (Rhododendron canadense). As for other wetlands, future logging should be restricted within the swamp watershed.

ESCHENBAUGH SWAMP (NC555) is a Boreal Conifer Swamp community that is in excellent condition, but relatively small and, therefore, ranked as a "B" occurrence. Black spruce (Picea mariana) and larch (Larix laricina) dominate the 60 to 70 acre wetland. Scattered openings throughout the swamp harbor a staterare shrub (SP556). Since the swamp is on SGL 127, it is protected from development. While there are no perceptible threats at present, future logging remains a possibility. A minimum 300-ft. buffer zone should be established around the swamp to protect it from the adverse impacts of logging and other disturbances.

A small Glacial Bog community (NC557) occurs at the southern end of SGL 127. The site, known as Jimmy Pond, is a C-ranked community because of its small size and encroachment from a housing development to the south. The bog is protected from most direct impacts because it is located on SGL 127. However, indirect impacts from logging of uplands or from the nearby development remain a possibility. Logging should not occur closer than 100 to 300 feet of the wetland perimeter. The housing development could adversely affect the water quality and hydrology of the bog. If houses in the nearby development have

individual septic systems and wells, new housing should be limited and minimum setbacks required to ensure that pollution and drawdown of the water table do not occur. Either impact can damage the bog community by encouraging the invasion of weedy and non-bog species.

Along the eastern margin of Birch Swale one finds a fairly poor example of a Northern Conifer Swamp (NC562) dominated by red spruce (Picea rubens) with balsam fir (Abies balsamea), hemlock (Tsuga canadensis), and yellow birch (Betula alleghaniensis). A small population of a state-rare plant (SP563) grows on peat moss (Sphagnum spp.) hummocks with goldthread (Coptis groenlandica), star-flower (Trientalis borealis), and three-seeded sedge (Carex trisperma). Both the swamp and the surrounding uplands have been logged, the former lightly. Future logging within the swamp should be avoided and logging of uplands should be restricted to a minimum distance of 200' from the wetland.

Since many of the significant natural areas on the Tobyhanna quadrangle occur on SGL 127, it is imperative that the Pennsylvania Game Commission and game land managers be informed of the sites identified in this inventory. The primary threat to all the wetland natural communities is the practice of clear-cutting up to the edge of the wetland. The species of special concern would greatly benefit from maintenance of a significant vegetation buffer around wetland margins to absorb sediments and nutrients.

BENDER SWAMP, located in Tobyhanna State Park, is an important wetland complex on the Tobyhanna quadrangle. Bender Swamp is a mosaic of conifer swamps, shrub swamps, mixed broadleaf-conifer swamps, and robust emergent marshes. NC558 marks the approximate location of an excellent example of an Acidic Shrub Swamp that is dominated by a state-rare shrub (SP559) with rhodora and leatherleaf as co-dominants. Further investigation of this site is needed to identify additional species of special concern and natural communities.

Hardwood Ridge Swamp, found at the headwaters of Jim Smith Run, is a fair Acidic Shrub Swamp (NC570) that contains a good population of a state-rare shrub (SP569). The housing development on Hardwood Ridge (Wayne County) could adversely affect the swamp if there is on-site sewage disposal. Logging within the swamp watershed should be restricted to protect the wetland and the water quality of Tobyhanna Lake into which Jim Smith Run feeds.

A fair Acidic Shrub Swamp (NC565), located northwest of the Tobyhanna Army Depot, supports a fair population of a state-rare shrub (SP566). There do not appear to be any threats to this site since it is within Tobyhanna State Park.

LAUREL DRIVE BOG is a fair to good Glacial Bog (NC528) consisting of open water and peatland supporting leatherleaf (Chamaedaphne calyculata) and scattered red maple (Acer rubrum). Construction of a railroad bed (now part of the Steamtown National Scenic and Historic Railroad project) through the bog resulted in degradation of the western portion. The bog east of the railroad maintains a large population of a state-endangered grass (SP507), known from the site since 1869, and a poor population of a state-rare sedge (SP527). As part of the Steamtown Excursion Railroad project, the National Park Service should work to protect the bog and its flora.

Oakes Swamp, located in the Tobyhanna Army Depot, has been impacted by beaver activity and construction of a railroad bed and several roads. As a result, it is in various stages of succession with large patches of reed canary grass (Phalaris arundinacea), stands of red maple (Acer rubrum) and larch (Larix laricina), open water areas, and numerous dead snags. A breeding pair of Osprey (SA571) have nested in the swamp for the last few years. The birds, introduced through a program at East Stroudsburg University, have raised at least one brood at the site. Apparently, the interior of the swamp where the birds nest is secluded and protected from intruders. In addition, a fair population of a state-rare shrub (SP548) grows in the swamp. The greatest potential threat to the plant is flooding caused by beaver dams.

Several aquatic plant species of special concern grow in the ponds and lakes of the area. Tobyhanna Lake within Tobyhanna State Park harbors SP521, a free-floating aquatic plant that forms extensive mats. The healthy population has created problems for local residents who have used herbicides, without apparent success, to eradicate the plant. We recommend that mechanical methods, not chemical, be used to keep the plant from clogging swimming areas. The same species (SP529) thrives in a small pond on SGL 127. Herbicide use in and around the pond should be avoided. A good population of a second aquatic species of special concern (SP536) grows with Nuttall's bur reed (Sparganium americanum), rice cut-grass (Leersia oryzoides), and yellow pond-lily (Nuphar luteum) in a small pond near an abandoned railroad spur line on the army depot property. Nutrient enrichment (lawn fertilizers, etc.) and herbicide runoff from development on the north side could eradicate the species from the pond.

A state-rare shrub (SP564) grows along the eastern shore of Gouldsboro Lake. This poor population occupies marginal habitat and is probably a remnant of a larger population that existed before the lake was created. More importantly, bald eagles, seen in the vicinity of the lake, are probably catching fish from it.

One small mammal (SA517) has been found along Tobyhanna

Creek near Route 423. The habitat is ideal for this semi-aquatic animal and, since the site is unlikely to be developed, should remain as such. A small parking area by the road should not be enlarged and logging should be avoided along the creek.

Two creeks, Cross Keys Run (NC545) and Flame Cabin Run (NC546), are receiving protection through their Exceptional Value designation by the Pennsylvania Department of Environmental Resources.

In addition to controlling logging and development in swamp watersheds, preservation of Acidic Shrub Swamp natural communities requires maintenance of the "natural" hydrology of these ecosystems. Flooding caused by beaver dams or man-made impoundments quickly degrades this community type through "drowning" and loss of the relatively low-growing shrubs that comprise the community. Taller shrubs and mixed graminoid and robust emergent plants replace the original swamp constituents. The resulting marsh community is very common throughout northeastern Pennsylvania and less desirable than the original acidic shrub swamp, a community type that is relatively rare and restricted to the Pocono Plateau.

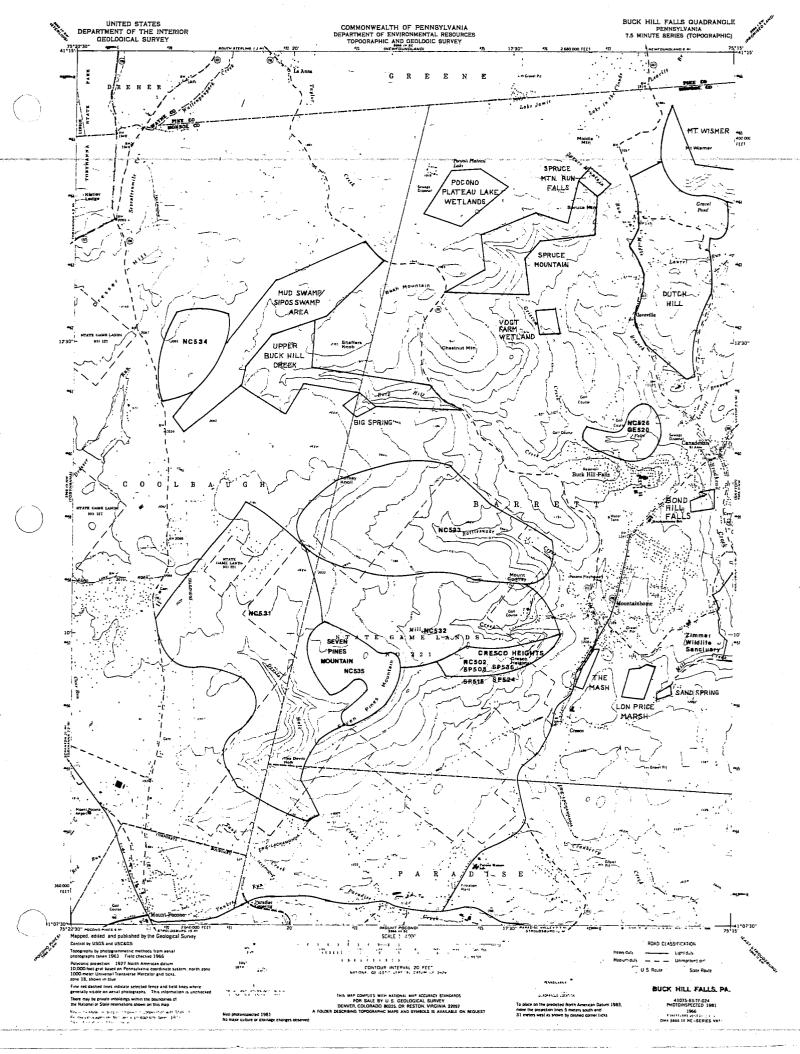
USGS QUADRANGLE MAP: Buck Hill Falls

		TNC R		<u>Legal S</u> e Fed.	tatus State	Last Seen	Quality
NATURAL COMMUNITIES:	502	G?	SIS2	N	N	5/06/9]	L C
•	526	` G5	S3S4	N	N	9/19/88	ВВ
	531	G?	S3	N	N	11/07/90	B D E E
	532	G?	S3	N	N	1990	E
	533	G?	S3	N	N	1990	E
	534	G?	S2	N	N	6/19/90	E C
	535	G?	s?	N	N	11/07/90	) B
SPECIAL PLANTS:	503	G5	Sl	N	PE	5/06/91	AB
	515	G5	S1S2	N	TU	5/06/91	. с
	524	G4G5Q	S2	N	TU	5/06/91	. C . E
`	:536	G5	S3	N	TU	5/06/91	. С
SPECIAL ANIMALS:	None	identi	fied.				
GEOLOGICAL FEATURES:	520	-	-	-	-	1990	-

Zimmer Wildlife Sanctuary, Mt. Wismer, Dutch Hill, Spruce Mountain Run Falls, Spruce

Mountain, Pocono Plateau Lake Wetlands, Vogt Farm Wetland, Mud Swamp/Sipos Swamp, Upper Buck Hill Creek, Big Spring, Bond Hill Falls, The

Mash, Lon Price Marsh, Sand Spring.



### Buck Hill Falls Quadrangle:

CRESCO HEIGHTS (NC502) is an Acidic Rocky Summit community located on State Game Lands 221. Although it is only a fair representation of this community type, it harbors a good population of a state-endangered plant (SP503) that typically occurs on rocky shorelines, but also grows at a few, scattered locations throughout the Appalachian Mountains. A small shrub, proposed for state-rare status (SP536), is also found here. This species inhabits rocky slopes and gravel bars and islands in the Delaware and Susquehanna Rivers. Two additional species (SP524, SP515) listed as Tentatively Undetermined also grow at the site. At present, the major threat to this community and associated species is motorcycle traffic on the trails along the ridge. To prevent further erosion problems, all off-road motor vehicles should be routed around this area and, perhaps, banned entirely from SGL 221.

Within Jenkins Woods near Buck Hill Falls is a remnant of Northern Conifer Forest (NC526) covering about 30 acres. This stand of old-growth hemlock (<u>Tsuga canadensis</u>) and white pine (<u>Pinus strobus</u>) having diameters of close to 40 inches represents the type of forest that covered much of the Pocono Plateau prior to logging. Rosebay rhododendron (<u>Rhododendron maximum</u>) and ferns flourish beneath the canopy which includes at least 10 tree species. The site is privately protected and there appear to be few problems or threats. To guard against exotic species establishment or wind damage, a protective forest buffer should be maintained around the old-growth forest. Within the same area is Buck Hill Falls (GE520) which tumbles over sandstones and siltstones of the Catskill Formation. The height and beauty of the falls attract many visitors to the site.

Sipos Swamp, situated at the headwaters of Buck Hill Creek, provides a fair example of a Boreal Conifer Swamp community (NC534) that is dominated by black spruce (Picea mariana) and larch (Larix laricina). The swamp is relatively undisturbed except for a telephone right-of-way and a property boundary swath cut through the wetland. We recommend that local botanists investigate the open sedge areas in the swamp in late summer for species of special concern. Although logging of the upland woods has had minimal impacts on the wetland, future logging within the swamp's watershed should be restricted to selective logging with "best management practices" observed.

Devils Hole Creek, a High-gradient Clearwater Creek (NC531), and designated Exceptional Value stream, occurs both on State Game Lands No. 221 and on private property. The creek has excellent quality water and supports native brook trout. Historic human disturbances in the gorge include logging and scattered plantations of exotic trees. Currently, littering and erosion and vegetation damage caused by ATVs threaten the scenic

quality of the gorge and may degrade water quality. The Game Commission should post signs alerting the public to litter and erosion problems. Further housing development in the upper watershed should be limited to avoid water pollution.

Mill Creek (NC532) and Rattlesnake Creek (NC533) are both Exceptional Value streams. The watersheds of both streams need to be protected from housing development to ensure that water quality is maintained.

At the top of SEVEN PINES MOUNTAIN to the east of Devils Hole is an occurrence of a Ridgetop Dwarf-tree Forest natural community (NC535). Poor soils, past fires and other climatic factors characterize the environmental conditions of this natural community. Scrub oak (Quercus ilicifolia) dominates the community and forms a dense, nearly impenetrable thicket which provides valuable habitat for wildlife. Further investigation may reveal some rare species of butterflies or moths which favor this environment. The community is on SGL 221 and is unlikely to be logged because of the poor timber quality. Controlled burns should be considered to maintain the site as a viable natural community.

Zimmer Wildlife Sanctuary is owned by the Natural Lands Trust. Although species of special concern and natural communities are not known to occur here, the township should discourage new development in the surrounding area to maintain the integrity of the refuge and to ensure that it does not become an isolated "island" of forest in a sea of development. The wildlife value of the sanctuary will be less without corridors for wildlife to traverse between this site and nearby wetlands and upland forest.

The following sites are from an unpublished report by the Concerned Citizens of Barrett Township who mapped the best natural features in their township. MT WISMER is a rocky plateau and steep hillside that features a scenic view of the valley The DUTCH HILL area features the largest display of native rhododendrons in the township. SPRUCE MOUNTAIN RUN FALLS presents a scenic ravine and falls while SPRUCE MOUNTAIN offers a scenic view from a rocky plateau and hillside. POCONO PLATEAU LAKE WETLANDS complex is a fairly large area of swamps and upland that provides wildlife habitat. VOGT FARM WETLAND is an archaeological site. MUD SWAMP/SIPOS SWAMP AREA provides wildlife habitat and UPPER BUCK HILL CREEK is considered a High Quality Cold Water Fishery by the PA Fish Commission. BIG SPRING provides Buck Hill Falls with its water supply. HILL FALLS is a relatively undisturbed ravine and waterfall near a populated area. THE MASH is a wetland that provides open space near a populated area. LON PRICE MARSH is an open wetland providing habitat for waterbirds and other wildlife. is a natural spring that contributes water to Mill Creek.

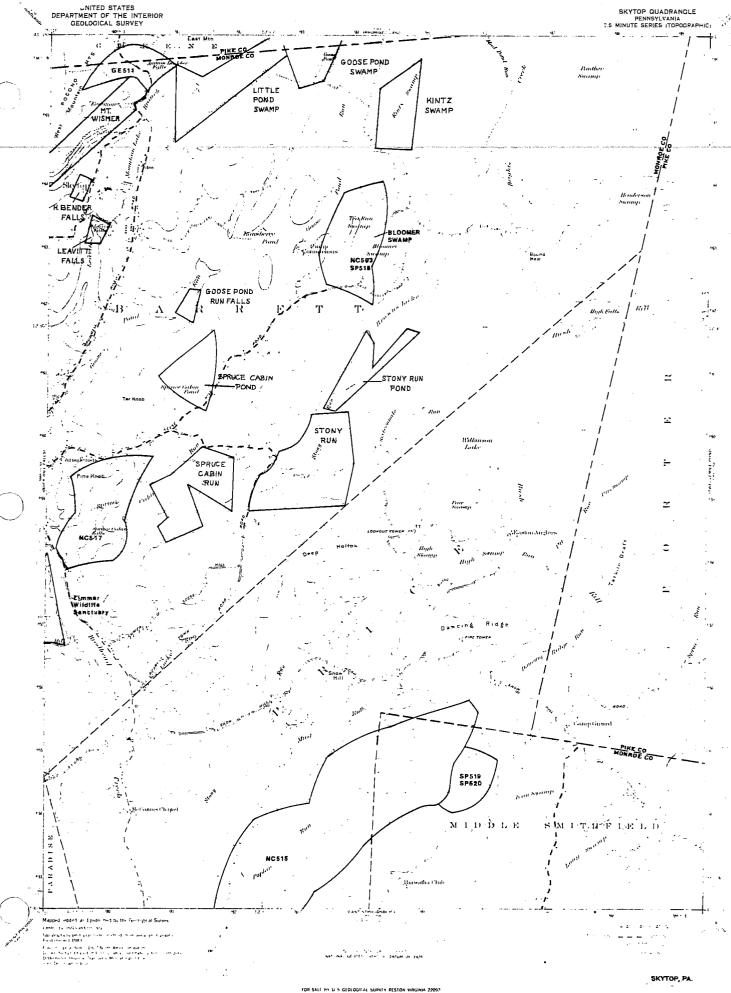
# USGS QUADRANGLE MAP: Skytop

		TNC Rank		Legal Status		Last		
		Global	State	Fed.	State	Seen	Quality	
NATURAL COMMUNITIES: 5	503	G?	S2	N	N	10/04/90	С	
5	515	G?	S3	N	N	1990	E	
× 5	517	G?	S3S4	N	N	6/06/90	C	
SPECIAL PLANTS: 5	518	G4	sı	N	PE	10/04/90	С	
·5	519	G5	S2	N	TU	8/30/90	E	
5	520	G5	SU	N	TU	, 8/30/90	C	
SPECIAL ANIMALS: N	Ione	identi	fied.					
GEOLOGICAL FEATURES: 5	511	-	-		-	1990	-	

OTHER:

Zimmer Wildlife Sanctuary, Mt. Wismer, Little Pond Swamp, Goose Pond Swamp, Kintz Swamp, Stony Run, Stony Run Pond, Spruce Cabin Pond, Goose Pond Run Falls, Leavitt Falls, H. Bender

Falls, Spruce Cabin Run.



#### Skytop Quadrangle:

BLOOMER SWAMP is a fair quality Boreal Conifer Swamp community (NC503) dominated by black spruce (Picea mariana). Open shrub- and sedge-dominated patches within the wetland contain a fair population of a state-endangered sedge (SP518). This 50-acre swamp is in good shape. A little-used road on the east and south and an oak forest that was logged approximately 50 years ago surround the swamp. Recent logging around the northern edge of the wetland should not extend further. Within Barrett Township, Bloomer Swamp represents a very important natural area and should receive high priority for protection by the town and county. We recommend further investigation of the swamp for species of special concern.

Spruce Cabin Falls (NC517) is a fair quality waterfall and plungepool natural community. The scenic falls are relatively small given the low discharge of Spruce Cabin Run. Diverse plants grow on the moist ledges adjacent to the falls. SPRUCE CABIN RUN has been nominated for Exceptional Value stream status. Logging and development within its watershed should be restricted.

Hiawatha Road Pond, northwest of Ivan Swamp, provides habitat for a spike rush (SP519) and a sedge (SP520) that are listed as Tentatively Undetermined. The pond is vernal, full of water during the early growing season and dry by late summer. Only a handful of species are able to tolerate the stresses of such a variable environment. Further research is needed to determine the "naturalness" of this community. In addition, similar ponds in the vicinity should be investigated for the occurrence of species of special concern.

Poplar Run (NC515) is a designated Exceptional Value stream and wild trout stream. Indian Ladder Falls (GE511) is a scenic waterfall that tumbles over the sandstone and siltstone bedrock at the edge of the Pocono Plateau. Permission of the landowner is required to visit the area. Zimmer Wildlife Sanctuary is a refuge owned by the Natural Lands Trust. To guarantee that this sanctuary remains valuable to wildlife, the township can help prevent housing and commercial development from encroaching upon the area. Maintenance of wide vegetated corridors will allow wildlife to move freely between the sanctuary and nearby wetlands and forests.

The following sites are from an unpublished report by the Concerned Citizens of Barrett Township who mapped the best natural features in the township which they deemed worthy of protection. MT. WISMER is a rocky plateau and steep hillside that features a scenic view of the valley below. LITTLE POND SWAMP and GOOSE POND SWAMP provide wildlife habitat and may contain rare plants. Both are part of the wetland and creek

complex east of East Mountain that is one of the largest private undeveloped tracts in the Poconos. Although degraded by past peat mining, Goose Pond Swamp is still worthy of protection.

KINTZ SWAMP as the headwaters of STONY RUN which is being evaluated for Exceptional Value stream status requires protection to ensure high stream water quality. At least two rare animals have been reported from the STONY RUN POND area, but further investigation is required to confirm these occurrences. SPRUCE CABIN POND is a very low quality glacial bog because of flooding of the bog mat and nutrient run-off from surrounding development. GOOSE POND RUN FALLS, LEAVITT FALLS, AND H. BENDER FALLS are scenic falls and ravine areas within the township.

USGS QUADRANGLE MAP: Twelvemile Pond

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

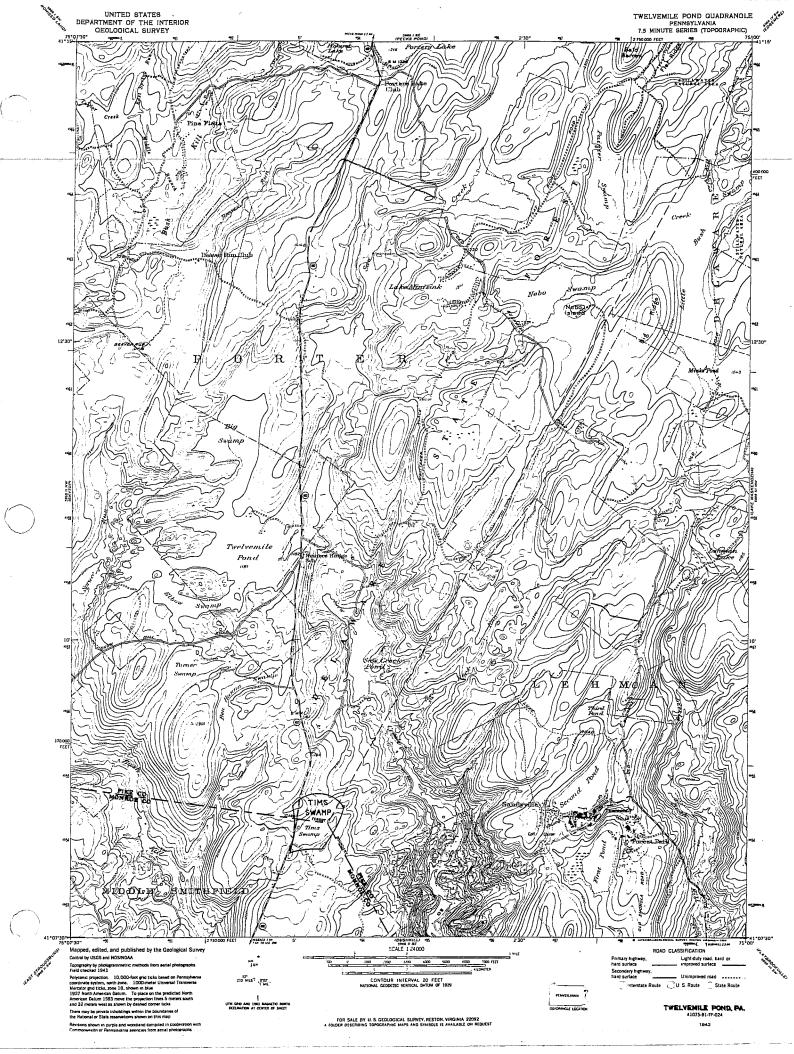
SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: Tims Swamp.

### Twelvemile Pond Quadrangle:

TIMS SWAMP, located along PA 402 near the Monroe County line, is a natural area of local significance. Tims Swamp consists of approximately 20 acres of forested peatland codominated by broadleaf and coniferous trees including red maple (Acer rubrum), black spruce (Picea mariana), and larch (Larix laricina) with scattered white pine (Pinus strobus) and pitch pine (Pinus rigida). A dense shrub understory includes sheep laurel (Kalmia angustifolia), black chokeberry (Aronia melanocarpa), maleberry (Lyonia ligustrina), swamp azalea (Rhododendron viscosum), and high-bush blueberry (Vaccinium corymbosum). PSO staff did not find species of special concern at the site, but recommend further investigation. The swamp's location in the Delaware State Forest affords it some protection. Logging to the north of the swamp and development to the south should be limited where possible.



USGS OUADRANGLE MAP: Hickory Run

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

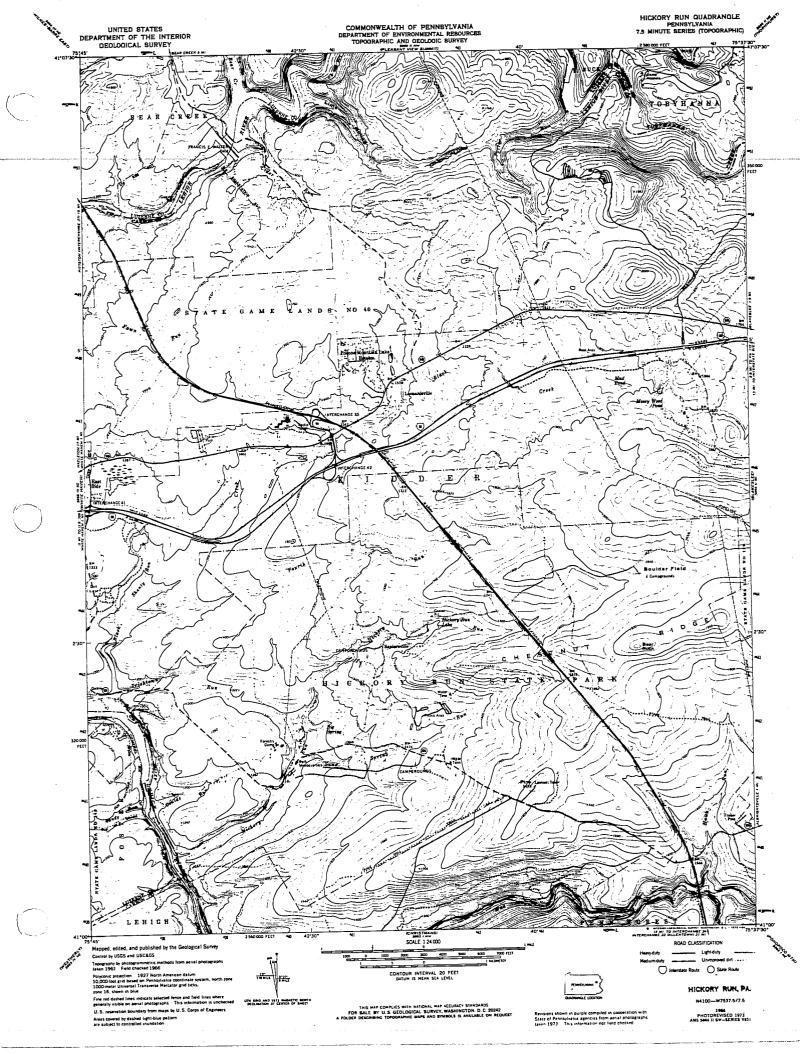
SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: None identified.

### Hickory Run Quadrangle:

Only a small portion of Monroe County extends onto the northeast corner of the Hickory Run quadrangle. PSO staff did not find animal or plant species of special concern or natural communities in the area. However, others are encouraged to check for unique natural features since there are old records for species of special concern in this area.

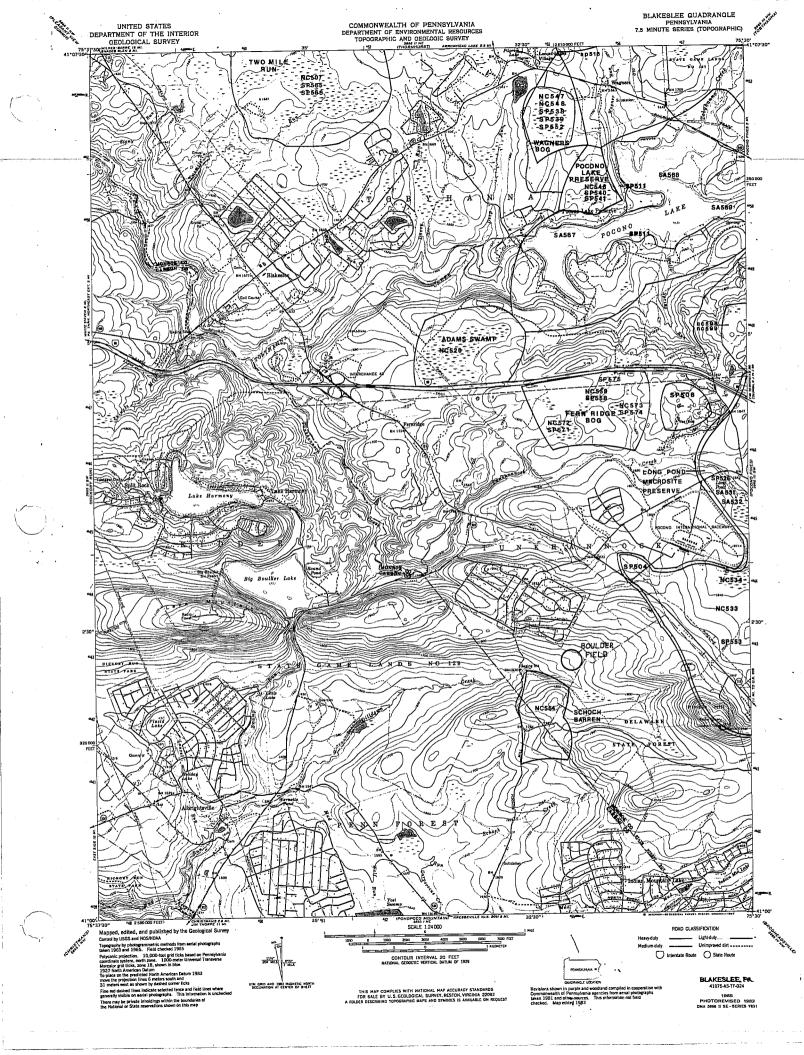


USGS QUADRANGLE MAP: Blakeslee

	G1	TNC F	Rank State		<u>Status</u> State	Last Seen	Quality
NATURAL COMMUNITIES:	507	G?	S2	N	N	12/15/8	85 A
	520	G?	S2	N	N	3/25/8	
	534	G5	S3	N	N	6/07/8	
	546	G?	S2	N	N	6/30/8	
	547	G?	S2	N	N	6/30/8	
	548	G5	<b>S</b> 3	N	N	6/30/8	
	533	G2G3			N	4/16/8	
•	559	G5	S3	N	N	4/16/8	
	564	G2G3	S1S2	N	N	8/25/8	
	572	G5	S3	N	N	9/12/9	
	573	G5	S3	N	N	9/12/9	
	504	G5	Sl	N	PE	7/11/9	90 C
	508	G5	S3	N	PR	5/27/8	
	511	G5	<b>S</b> 3	N	PR	8/20/8	32 A
	526	G5	S2	N	PR	6/17/8	
	538	G5	S3	N	PR	6/30/8	
	539	G5	S3	N	PR	6/30/8	86 B
	540	G5	S3	N	PR	6/30/8	36 B
	541	G5	S3	N	PR	6/30/8	36 C
	552	G5	Sl	N	PE	4/27/8	37 B
	553	G2	Sl	C2	PE	6/26/9	0 A
	558 565	G5	<b>S</b> 3	N	PR	4/16/8	88 A
	565 566	G5	S2	N	PT	6/07/9	
	571	G5 G5	S3 S3	N	PR	6/07/9	00 C
	574	G5	53 53	N N	PR	9/12/9	
	575	G5	53 53	N N	PR PR	9/12/9 9/12/9	
SPECIAL ANIMALS:	531	G3G4	S2	N	N	8/15/8	5 B
	532	G5	S2	N	N	8/15/8	
	567	G5	si	N	PE	6/01/9	
	568	G5	Sl	N	PE	6/01/9	0 T
	569	G5	Sl	N	PE	6/01/9	

\*mapped at more than one location

OTHER: Boulder Field; see adjacent quadrangles for sp516, nc598, and nc599.



#### Blakeslee Quadrangle:

The entire Blakeslee quadrangle occurs on the Pocono Plateau. The Wisconsin end moraine, a broad ridge of till one and a half miles in width, extends across the middle of the map (Crowl and Sevon, 1980). Interstate-80 follows the end moraine characterized by small hills and ridges surrounding wet depressions.

ADAMS SWAMP, a good to excellent quality Boreal Conifer Swamp (NC520) dominated by spruce (Picea sp.) and tamarack (Larix laricina) with an understory of rosebay rhododendron (Rhododendron maximum), exemplifies one type of wetland found on the end moraine. A red spruce (Picea rubens) canopy and an open to dense understory of winterberry holly (Ilex verticillata) and highbush blueberry (Vaccinium corymbosum) characterize the west side of the swamp. The large swamp (300+ acres) is relatively undisturbed except for Interstate-80 which bounds the southern margin and a pipeline right-of-way that crosses the swamp. In the future, development and logging within the swamp's watershed should be minimized.

FERN RIDGE BOG refers to a complex of wetlands formed in the numerous depressions of the end moraine. Three good to excellent quality Acidic Shrub Swamp natural communities (NC559, NC572, and NC573) that drain into Tunkhannock Creek occur here. Each swamp contains good to excellent populations of a state-rare shrub (SP558, SP571, and SP574, respectively). NC572, the westernmost swamp of the complex, is a 40-acre low, compact shrub peatland supporting black chokeberry (Aronia melanocarpa), leatherleaf (Chamaedaphne calyculata), sheep laurel (Kalmia angustifolia), bog laurel (Kalmia polifolia), rhodora (Rhododendron canadense), highbush blueberry, and northern wild raisin (Viburnum cassinoides). A hunting stand on the eastern edge of the swamp is the only sign of disturbance. NC559, a ten-acre peatland dominated by leatherleaf and peat moss (Sphagnum spp.), shows signs of recent burning, but little other disturbance. NC573 is a secluded, 20-acre wetland dominated by black chokeberry, leatherleaf, sheep laurel, rhodora, highbush blueberry, and northern wild raisin. In a depression near Interstate-80, a good population of a state-rare rush (SP575) thrives. While construction of I-80 disturbed the northern edge of the Fern Ridge Bog wetland complex, it did not disturb the natural communities. The Nature Conservancy owns and protects the western tract of land comprising the wetland complex. Bethlehem Water Authority owns the eastern part of the wetland complex and has not allowed development of the land. In the future, the wetlands of the Fern Ridge Bog site should continue to be actively protected since they provide such fine examples of natural communities characteristic of the end moraine. Logging and development within the watershed of Fern Ridge Bog should be avoided or minimized.

The western margin of the LONG POND MACROSITE PRESERVE, largely located on the adjacent Pocono Pines quadrangle, extends along the eastern side of the Blakeslee quadrangle. This large preserve exhibits the unique characteristics of the Pocono Plateau. Near the outlet of Long Pond, an excellent population of a state-rare shrub (SP526) that is part of the population that extends along Tunkhannock Creek on the Pocono Pines quadrangle thrives in lakeside wetlands. Sampling in the mid-1980's revealed the occurrence of two good populations of dragonflies (SA531 and SA532) that are imperiled in the state (S2) in the area. NC534 marks an excellent quality Acidic Shrub Swamp that continues on the Pocono Pines quadrangle.

NC533 marks an excellent quality Ridgetop Dwarf-tree Forest natural community that is continuous with the "scrub oak/pitch pine scrub barrens" on the Pocono Pines quadrangle. (Quercus ilicifolia), scattered pitch pine (Pinus rigida), a shrub layer dominated by sheep laurel, and local depressions supporting rhodora and peat moss with assorted sedges, grasses, and wildflowers typify the community. Under natural circumstances, fire maintains this community type allowing those rare species to thrive that depend on this type of periodic disturbance. Until recently, humans lived in harmony with these "barrens" setting periodic fires to enhance the huckleberry crop. However, fires are suppressed now to protect homes built near and within the barrens. The long-term health of this barrens will depend on limiting new development in the area and allowing periodic fires to burn. Nearby, the population of a stateendangered sedge (SP553) that continues on the Pocono Pines quadrangle (as SP515) thrives.

SP504, located near the Pocono International Raceway entrance, marks a fair population of a state-endangered grass species. This population, currently recovering from recent construction along the gas pipeline, should be checked annually to monitor its viability. The Pocono Raceway grounds supervisor and the pipeline owner should be notified of the population's existence and encouraged to participate in its protection. Halting herbicide use near the site and mowing the pipeline right-of-way in the early spring or late fall of each year are two management strategies that would promote the grass species.

SCHOCH BARREN (NC564) is a fair to good quality Ridgetop Dwarf-tree Forest that is part of the mosaic of this community type found in the general area. This 220-acre "pitch pine/scrub oak barrens" is close enough to the much larger barrens south of Long Pond (i.e. NC533) to share plant species and support the rich moth and butterfly fauna found on the Pocono Pines quadrangle. This barrens consists of clumps of scrub oak and northern wild raisin among shrubs of the heath family. Recent burning of the barrens was apparent in 1989. Fires should continue to be allowed to burn as they occur. Location of the

barrens within State Game Lands No. 129 and the Delaware State Forest protects it from development. As comparable areas outside of state protection continue to be destroyed by development, this barrens will become one of the few remaining examples of its kind in the area.

A good example of a BOULDER FIELD is located north of NC564. This site is significant as a geologic feature at the local level.

TWO MILE RUN, a diverse wetland complex of shrub swamps and boreal conifer swamps, is located north of the end moraine. An excellent, large Boreal Conifer Swamp (NC507) dominated by red spruce, tamarack, and balsam fir (Abies balsamea) occurs here. An shrub swamp community within the Two Mile Run complex contains a good population of a state-threatened sedge (SP565) and a fair population of a state-rare rush (SP566). The large, diverse, relatively undisturbed Two Mile Run wetland complex needs further investigation since it is likely that additional species of special concern grow or live within its watershed. The Nature Conservancy ranks the Two Mile Run wetland complex as a high priority protection site in Monroe County. Disruptive activities such as logging, development, flooding, off-road vehicle rampaging, and dumping should be avoided or restricted within the Two Mile Run watershed.

WAGNERS BOG, located north of the end moraine to the northwest of Pocono Lake, is a 60-acre wetland that contains a Boreal Conifer Swamp (NC547) and an Acidic Shrub Swamp (NC548) that are both of good quality. The Boreal Conifer Swamp, approximately 40 acres in size, consists of a dense canopy of hemlock (Tsuga canadensis), red maple (Acer rubrum), and red spruce with a mixed shrub layer. The Acidic Shrub Swamp, approximately 20 acres in size, consists of scattered tamarack and red spruce with a dense shrub layer dominated by leatherleaf, black chokeberry, highbush blueberry, and sheep laurel. wetland supports good populations of a state-endangered shrub (SP552), a state-rare rush (SP538), and a state-rare shrub Care should be taken to minimize pollution of the wetland by the large development surrounding it. Closed septic systems could be used in place of on-site sewage disposal. wetland's habitat value has probably been reduced by the nearby road and development. If development is minimal and natural corridors left intact, then the negative impacts can be lessened.

POCONO LAKE PRESERVE, a 50-acre wetland near the northwestern edge of Pocono Lake, contains a good quality Boreal Conifer Swamp (NC546) characterized by a canopy of white pine (Pinus strobus), tamarack, and red spruce, a highbush blueberry shrub layer, and peat moss. A good population of a state-rare rush (SP540) and a fair population of a state-rare shrub (SP541) thrive in the wetland. In the future, development and logging

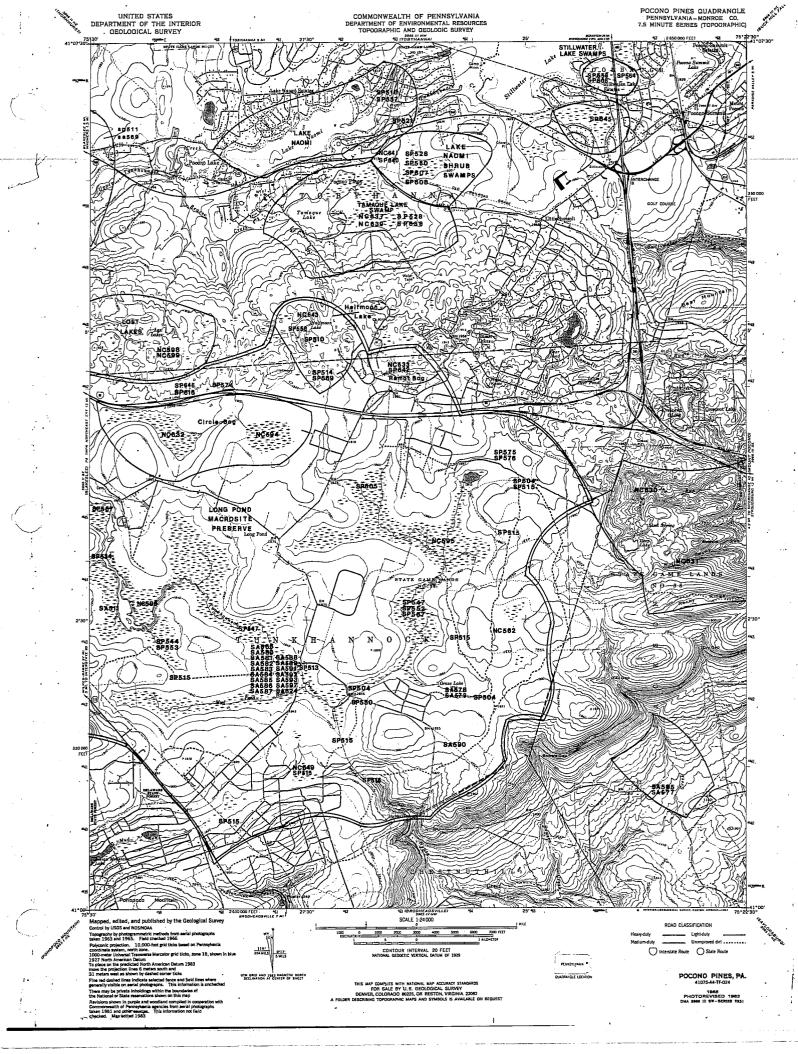
within the watershed of the wetland should be minimized or avoided.

Along the margin of Pocono Lake, an excellent population of a state-rare rush (SP511) occurs at two known sites and probably at additional sites yet to be found. Pocono Lake provides good feeding and nesting habitat for Osprey (SA567, SA568, and SA569) that were introduced to the site. Widespread DDT use prior to the early 1970's severely reduced the osprey population throughout its range. Now, its numbers are steadily increasing. Hopefully, wild breeding pairs will soon follow the introduced breeding pairs at Pocono Lake. However, continued development around the margin of Pocono Lake could drive the birds to more remote localities.

SP508 marks the location of a poor population of a staterare shrub growing in the disturbed environment of a peat mine.

USGS QUADRANGLE MAP: Pocono Pines

	TNC R			Status State		Quality
	GIODGI	blate	reu.	blace	peen	Quality
NATURAL COMMUNITIES: 2562	G2G3	SIS2	N	N	4/16/88	A
594	G?	S2S3	N	N	12/15/85	В
, 595	G?	S2	N	N	9/19/86	A
596	G5	S3	N	N	6/07/86	A
598	G?	S2S3	N	N	3/26/86	A
599	G?	S3S4	N	N	3/26/86	В
630	G?	S3	N	N	1990	E
631	G?	S3	N	N	1990	E
632	G?	S2	N	N	5/03/89	В
633	G?	<b>S2S3</b>	N	N	5/23/90	С
637	G5	S3	N	N	6/26/90	В
639	G?	S2	N	N	6/26/90	C
641	G5	S3	N	N	7/11/90	С
643	G?	S2S3	N	N	7/19/90	CD
649	G5	S3	N	N	8/15/90	C
SPECIAL PLANTS: *504	G5	S2	N	PR	8/26/86	A
510	G5	S3	N	PR	7/13/84	A
513	G4	S2	N	PR	6/07/86	A
*514	G4	S2	N	PR	7/13/84	A
515	G2	Sl	C2	PE	6/26/90	A
518	G5	S2	N	PR	8/19/82	A
*528	G5	Sl	N	PE	5/18/87	В
534	G4	S2	N	PR	6/17/86	В
544	G5	<b>S</b> 3	N	PR	9/06/84	В
547	G5	S3	N	PR	7/13/84	С
550	G5	S3	N	PR	7/12/84	С
552	G4	S1	N	PE	7/13/84	A
553	G5	S3	N	PR	7/12/84	D
556 557	G5T5 G5T5	S2	N	TU	7/19/90	C
558	G515	S2	N	TU	8/19/82	D
560	G5	S2 S2	N N	PT	7/16/86	В
564	G5	52 52	N	PT PR	7/16/86	C
*567	G5	S2 S2	N	PR	7/16/86	В
569	G5	S2	N	PT	6/17/86	A
574	G5	S3	N	PR	7/13/84	В
575	G5	Sl	N	PE	9/18/85	C
576	G5	S3	N	PR	9/17/85 9/17/85	C
605	G5	S3	N	PR		C
606	G5	S3	N	PR	6/30/86 7/16/86	В
607	G5	S3	N	PR	7/16/86	В
608	G5	S3	N	PR	7/16/86	C
616	G5	S2	N	TU	1987	A E
621	G5	S3	N	PR	1988	E E
638	G5	S3	N	PR	6/26/90	E B
(Continued.)				T. T.	0/20/90	Đ



USGS QUADRANGLE MAP: Pocono Pines (Continued.)

	TNC Global			<u>Status</u> State		Quality
SPECIAL PLANTS: 640	) G5	S3	N	PR	7/11/90	В
642		S3	N	TU	7/25/90	В
645	5 G5	<b>S3</b>	N	PR	10/22/90	CD
646	G5	<b>S3</b>	N	PR	10/22/90	C
· 647	7 G5	<b>S</b> 3	N	PR	7/26/90	С
SPECIAL ANIMALS: 513		S2	N	N	5/14/88	E
565		S2	N	N	5/14/85	A
566		Sl	N	N	5/13/85	AB
577		S2	N	N	5/14/85	A
578		S2	N	N	8/15/85	A
579		S2	N	N	8/15/85	A
580		S2	N	N	5/13/85	AB
581		S2	N	N	6/17/85	AB
- 582		SU	N	N	6/17/85	AB
√ <b>58</b> 3		Sl	N	N	7/17/85	AB
584		Sl	N	N	7/17/85	
585		S2	N	N	7/17/85	AB
∞ 58€		SU	N	N	7/17/85	AB
587		·S2	N		10/09/85	A
588		Sl	N		10/10/85	A
589		Sl	N		10/09/85	AB
590		S2	N		10/09/85	AB
591		SU	N		10/10/85	AB
· 592		S3	N		10/10/85	A
593		S2S3		N	6/17/85	AB
597		Sl	N	N	4/08/86	A
√ 624	G3Q	S1	N	N	5/13/88	A

OTHER: See adjacent Blakeslee quadrangle for SP511, SA569.

<sup>\*</sup>mapped at more than one location

## Pocono Pines:

Most of the Pocono Pines quadrangle covers the Pocono Plateau with a portion of the "Pocono Front" extending across the southeastern corner of the map. Glacial material mantles the underlying bedrock. The Wisconsin end moraine, a broad ridge of till approximately one and half miles in width, extends across the upper half of the map (Crowl and Sevon, 1980). Interstate-80, bordered by numerous developments, traces the end moraine for much of its length. Here, the hummocky topography consists of small hills surrounding closed depressions called "kettles" that formed from the melting of ice blocks entrapped in morainal material. To the north, ground moraine produces a gently undulating surface. South of the end moraine, there lies an extensive, relatively flat area across which Tunkhannock Creek meanders.

The LONG POND MACROSITE PRESERVE covers nearly a third of the Pocono Pines quadrangle and includes part of the end moraine and the broad area south of the end moraine drained by Tunkhannock Creek. This large area expresses the unique boreal qualities of the Pocono Plateau and is the top priority natural area in Monroe County and in all of eastern Pennsylvania.

Several natural communities represent the distinctive characteristics of the end moraine. Halfmoon Lake, a 15-acre glacial lake on the end moraine, has a five-acre low quality Glacial Bog (NC643) along its northern edge. Moving from the lake to the surrounding upland, the vegetation shifts from a one meter tall shrub zone of leatherleaf, sheep laurel, bog laurel (Kalmia polifolia), and rhodora (Rhododendron canadense) to a taller shrub margin of highbush blueberry and red maple with numerous standing dead conifer trees. A fair population of an aquatic plant (SP556) whose state status is Tentatively Undetermined grows in the lake. Dams created by beaver have flooded the lake and degraded lakeside plant communities. Removal of the beavers inhabiting Halfmoon Lake may be the first step towards restoration of the Glacial Bog community. To the south of Halfmoon Lake, numerous wetland depressions support good to excellent populations of a state-endangered rush (SP510), a state-threatened sedge (SP569), and a state-rare sedge (SP514). Bethlehem Water Authority ownership protects the lake's watershed to some extent. However, developments such as Emerald Lake Estates located to the east of the lake have encroached upon the To protect the Halfmoon Lake area, The Nature Conservancy is negotiating to take possession of about 75 acres.

Ramot Bog, a fair quality kettlehole Glacial Bog (NC633) contains a good population of a plant (SP642) whose state status is Tentatively Undetermined. Moving from the central area of open water to the uplands, one finds a floating shrub mat of leatherleaf surrounded by a taller shrub zone of highbush

blueberry grading into a woods of hemlock (<u>Tsuga canadensis</u>) and rosebay rhododendron (<u>Rhododendron maximum</u>). There is some evidence of flooding of the bog mat. Large housing developments surround this relatively undisturbed bog and may threaten it with excessive nutrient input from septic systems. Fortunately, the bog's watershed is small and could easily be protected by restricting logging and further development within the watershed.

South of Lost Lakes, a fair population of a state-rare rush (SP646) and a population of clubmoss (SP616) whose state status is Tentatively Undetermined grow in a "borrow pit", an area from which sand and gravel was excavated. The Nature Conservancy owns and protects the site. Nearby, a fair population of a state-rare shrub (SP574) grows in an acid seepage swamp. Road construction to the south has no significant impact on the species of special concern.

A small wetland and vernal pond area south of I-80 and east of the village of Long Pond contains fair populations of two species of special concern (SP575, SP576) that are PE and PR, respectively.

Most of the Long Pond Macrosite Preserve encompasses the broad area south of the end moraine that is drained by Tunkhannock Creek, a low-gradient meandering creek. Wetlands containing natural communities and species of special concern extend along Tunkhannock Creek. SP605 marks a good population of a state-rare rush. NC595 marks an excellent quality Boreal Conifer Swamp community dominated by red spruce (Picea rubens) and balsam fir (Abies balsamea) in some areas and by red maple and hemlock in others. At present, the swamp is relatively untouched, but development in the area poses a constant threat. Further downstream, one finds a concentration of wetland plant species of special concern denoted by SP547, a fair population of a state-rare rush, SP552, an excellent population of a stateendangered sedge, and SP567, an excellent population of a state-SP504 indicates an excellent population of a staterare shrub. rare grass and both SP550 and SP647 mark fair populations of a state-rare rush. An excellent population of a PR fern (SP513) is located in a shrub thicket along a road. This site has been known since at least 1936.

Wetlands surround Long Pond. An excellent Acidic Shrub Swamp community (NC596) dominated by leatherleaf, highbush blueberry, swamp azalea (Rhododendron viscosum), and hazel alder (Alnus serrulata) occurs at the eastern end of the pond. A wetland at the southeast end of Long Pond contains a good population of a state-rare rush (SP544) and a poor population of a state-rare creeping woody plant (SP553). Wetlands along the western margin of the pond support a good population of a state-rare sedge (SP534) and an excellent population of a state-rare shrub (SP504). These relatively undisturbed wetlands should be

protected from nearby development.

A bird species (SA511) considered threatened (S2) by The Nature Conservancy was observed in wetlands at the southern end of Long Pond. This migratory bird arrives in northern breeding areas in March and April and departs by September to November. It favors marshes, meadows, grasslands, and cultivated fields and can often be seen perched on stumps or posts. It eats small mammals, frogs, small snakes, small birds, many insects, and carrion and often flies very low to the ground when hunting. The bird adds to the biological diversity and richness of the Pocono Plateau wetlands.

Northwest of Long Pond, there are two large wetlands collectively called Circle Bog. NC594 marks a good quality Glacial Bog community dominated by waist-high leatherleaf, sheep laurel, and highbush blueberry. NC632 marks a good quality Boreal Conifer Swamp community consisting of a canopy dominated by tamarack (Larix laricina) and red maple, a dense understory of swamp azalea and highbush blueberry, and a ground layer of peat moss. The abundance of tamarack suggests past burning of the peatland. At present, the wetland has a good buffer surrounding it and shows no evidence of human disturbance except for Interstate-80 near its northern end.

One of the most unique features of the Long Pond Macrosite Preserve is the extensive upland community marked by NC562, an excellent quality Ridgetop Dwarf-tree Forest, also called "pitch pine/scrub oak barrens". Bear or scrub oak (Quercus ilicifolia) and sheep laurel with scattered pitch pine (Pinus rigida) and gentle depressions supporting rhodora and peat moss characterize the community. Under natural circumstances, fires periodically sweep through this forest community and act to keep it in a dwarfed state. Until recently, humans maintained this natural process by setting fires to enhance the blueberry crop. However, since humans started building homes in the forest community, fires have been suppressed. Over the long-term, fire suppression will cause succession of the forest community to a different, less desirable type. In the future, prescribed burning needs to be figured into management schemes for this forest community. present, the most destructive force affecting this "barrens" area is widespread development as has occurred in the Sierra View development.

Within the Sierra View development, a fair quality Acidic Shrub Swamp community (NC649) occurs at the head of Hypsy Gap Creek which flows southward off the Pocono Plateau. Diverse low shrubs including leatherleaf, sheep laurel, black huckleberry (Gaylussacia baccata), black chokeberry (Aronia melanocarpa), and rhodora, and taller shrubs including alder (Alnus rugosa), northern wild raisin (Viburnum cassinoides), and highbush blueberry compose the community. A fair population of a state-

endangered sedge (SP515), widespread throughout the Long Pond Macrosite Preserve, grows near the swamp margin. Flooding by beavers at the eastern end of the wetland has not yet harmed the natural community or the plant species of special concern. The swamp is relatively undisturbed, except for a large test pit dug nearby. Future building should not occur within or close to the wetland.

A diversity of insect species inhabit the varied communities of the Long Pond Macrosite Preserve and the "Pocono Front". Sampling in the mid-1980's at several different locations revealed a variety of insect species including moths and dragonflies that were deemed to have good to excellent populations (i.e. EO Ranks of A or B) based on the availability of habitat. Although these insect species do not have federal or state ranks, The Nature Conservancy ranks them at the state level as either endangered (S1), threatened (S2), rare (S3), or undetermined (SU).

At Grass Lake, PSO staff collected two insect species (SA578 and SA579). South of Grass Lake, one insect species (SA590) was collected. Near the confluence of Mud Pond Run and Tunkhannock Creek, PSO staff collected sixteen different insect species (SA566, SA580, SA581, SA582, SA583, SA584, SA585, SA586, SA587, SA588, SA589, SA591, SA592, SA593, SA597, and SA624) of special concern. In a powerline clear-cut near Fall Creek, two insect species (SA565 and SA577) were collected. Habitat loss and gypsy moth spraying threaten these insect populations.

In conclusion, the Long Pond Macrosite Preserve is the "jewel in the crown" that is the Poconos. It is one of the last remaining areas of substantial size in the Poconos that is fairly undisturbed by human activity. Benign ownership of the land by the Bethlehem Water Authority has permitted it to remain intact and to provide a showcase to future generations of the diverse, unique communities of the Poconos. The acid geology and cool mountain climate combine to produce a flora that is distinctly northern in character. All should strive to preserve this national treasure.

In the vicinity of LOST LAKES there is an excellent Glacial Bog (NC598) dominated by leatherleaf (Chamaedaphne calyculata), sheep laurel (Kalmia angustifolia), and peat moss (Sphagnum spp.). In the same area, a good example of Northern Hardwood Forest (NC599) composed of beech (Fagus grandifolia) and red maple (Acer rubrum) dominates the surrounding uplands. Although the forest is not virgin, it is very mature. At present, the remote Lost Lakes area is virtually undisturbed by human activity. Steps should be taken to prevent encroaching development from destroying its pristine quality.

TAMAQUE LAKE SWAMP is located east of Tamaque Lake, a large

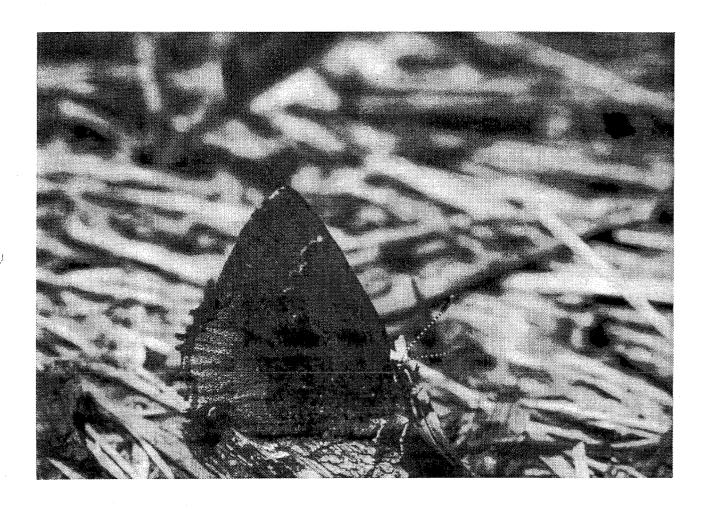
lake north of the end moraine. A 35-acre good quality Acidic Shrub Swamp (NC637) and a surrounding 25-acre fair quality Boreal Conifer Swamp (NC639) occur in the wetland. The Acidic Shrub Swamp supports a good population of a state-rare shrub (SP638) in association with rhodora, sheep laurel, black chokeberry, and leatherleaf. The Boreal Conifer Swamp consists of a canopy of leatherleaf. black spruce, tamarack, and balsam fir with a tall, dense shrub layer of rhodora, highbush blueberry, mountain-holly (Nemopanthus mucronatus), and winterberry holly (Ilex verticillata), and small open sedge-dominated patches. The natural communities are notable for their diversity and virtually undisturbed condition except for minor flooding from Tamaque Lake. Expansion of the sand and gravel quarry east of the site and extension of development west and south of the site could harm the natural communities. A minimum 200-foot buffer zone around the swamp is needed to protect it from human activities such as logging. All future development should be carefully scrutinized to assess adverse environmental impacts to the wetland.

LAKE NAOMI SHRUB SWAMPS, located southeast of Lake Naomi on the eastern side of PA 940, is a large wetland complex that contains a fair Acidic Shrub Swamp (NC641) dominated by a good population of a state-rare shrub (SP640) associated with black chokeberry, rhodora, leatherleaf, highbush blueberry, and northern wild raisin. An unusual combination of red spruce, tamarack, and pitch pine surrounds the Acidic Shrub Swamp. good population of a state-endangered shrub (SP528), a fair population of state-threatened sedge (SP560), a fair population of a state-rare rush (SP607), and an excellent population of a state-rare shrub (SP608) occur in wetlands along the old railroad grade. Expansion of quarry activities located between Lake Naomi Shrub Swamps and Tamaque Lake Swamp and extension of nearby development could harm the natural community and the species of special concern. Ideally, the entire area between PA 940 and the old railroad grade should be protected from future logging, development, and quarrying. A population of unknown size of a PR shrub (SP621) was located in a small wetland within a development near Lake Naomi in 1988.

A good population of a state-rare submerged aquatic (SP518) and a poor population of a floating-leaved aquatic (SP557) whose state status is Tentatively Undetermined grow in the muddy substrate of LAKE NAOMI at its northeastern end. Potential risks to these species and to the lake environment include degradation of water quality through nutrient enrichment and heavy sediment loads from eroding uplands. Homeowners around the lake should organize an effort to monitor water quality and make efforts to reduce their use of lawn fertilizers, herbicides and pesticides, and stabilize areas on their property that may be eroding. If homes still use on-site septic systems, these should be checked regularly to be make sure they are functioning properly. New development within the watershed should be discouraged.

STILLWATER LAKE SWAMPS, southeast of Stillwater Lake in Stillwater Lake Estates development, contains two swamps. One is a dense shrub swamp with scattered red maple trees that supports good populations of a state-threatened sedge (SP558), a state-rare shrub (SP564), and a state-rare rush (SP606). In the second wetland to the south, a poor population of a state-rare shrub (SP645) grows in a forested wetland of broadleaf and coniferous trees and tall ericaceous shrubs. The potential threats to both wetlands are polluted stormwater run-off from highways and septic effluent from the surrounding development. Efforts should be made to prevent pollution and to prevent flooding of either swamp by beaver or man.

Sand Spring Run (NC630) and Wolf Swamp Run (NC631) are High-Gradient Clearwater Creek communities and designated Exceptional Value streams that originate on the end moraine and flow eastward. To sustain the high quality of these creeks, logging and development within the creeks' watersheds should be avoided or minimized.

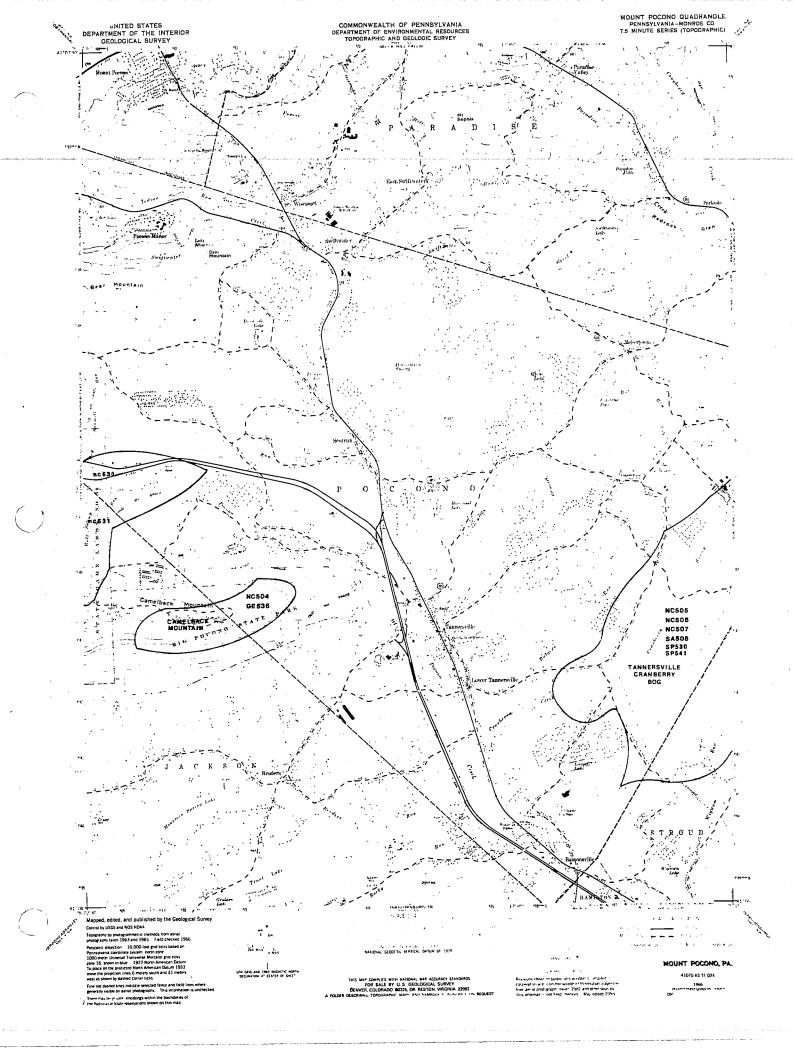


The frosted elfin butterfly (<u>Incisalia irus</u>) is one of many rare butterflies and moths that inhabit the barrens and wetlands at Long Pond (Pocono Pines topographic map). Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Mount Pocono

		TNC I			Status State	Last Seen	Quality
NATURAL COMMUNITIES:	504	G2G3	SIS2	N	N	5/13/85	В
	505	G?	S2	N	N	7/07/83	
	506	G5	S1S2	N	N	7/07/83	A B
	507	G?	S2S3	N	N	7/07/83	В
SPECIAL PLANTS:	530	G5	S3	N	PR	8/29/90	D
	541	G5	S3	N	И	8/29/90	В
SPECIAL ANIMALS:	508	G4G5	S2	N	N	7/18/84	A
GEOLOGICAL FEATURES:	-536	-	-		-	1990	-

OTHER: nc630, nc631, see Pocono Pines quadrangle.



## Mount Pocono Quadrangle:

The southern and eastern escarpments of the "Pocono Front" extend across the western side of the Mount Pocono quadrangle. Camelback Mountain marks the southeasternmost prong of the Pocono Plateau where the Pocono Front takes a "sharp turn" to the north. The area east of the Pocono Front and extending as far south as Tannersville is in the Low Plateaus section of the Appalachian Plateau Province. The region south of Tannersville is in the Appalachian Mountain section of the Valley and Ridge Province.

Glacial material mantles low-lying areas. The end moraine covers a very small portion of the Mount Pocono quadrangle extending from the lower north slopes of Camelback Mountain northwestward to the southwestern slopes of Bear Mountain (Crowl and Sevon, 1980). Ground moraine, till deposited irregularly across the landscape to create an undulating topography, covers much of the remaining area of the map. Alluvial deposits of sands and gravels extend along Pocono Creek.

TANNERSVILLE CRANBERRY BOG, a preserve owned and managed by The Nature Conservancy, is the most significant natural area on the Mount Pocono quadrangle. Located east of the town of Tannersville, the elongate northeast-southwest trending wetland drained by Cranberry Creek supports an excellent population of a butterfly (SA508) imperiled at the state level (S2) and three natural communities: an excellent quality Boreal Conifer Swamp (NC505), a good quality Acidic Broadleaf Swamp (NC506), and a good quality Glacial Bog (NC507).

The Boreal Conifer Swamp consists of a 45'-high canopy of black spruce (Picea mariana) and tamarack (Larix laricina) with scattered red maple (Acer rubrum), white pine (Pinus strobus), and gray birch (Betula populifolia) and very little understory. Red maple up to 60' tall dominates the Acidic Broadleaf Swamp with associates of sour gum (Nyssa sylvatica), black ash (Fraxinus nigra), white pine, hemlock (Tsuga canadensis), and yellow birch (Betula lutea). The understory contains rosebay rhododendron (Rhododendron maximum), highbush blueberry (Vaccinium corymbosum), and spicebush (Lindera benzoin) while cinnamon fern (Osmunda cinnamomea) and peat moss (Sphagnum spp.) compose the herbaceous layer.

The Glacial Bog community consists of a patchwork of shrubs and peat moss openings. The diverse shrub layer includes highbush blueberry, hazel alder (Alnus serrulata), poison sumac (Toxicodendron vernix), buttonbush (Cephalanthus occidentalis), leatherleaf (Chamaedaphne calyculata), swamp azalea (Rhododendron viscosum), mountain laurel (Kalmia latifolia), and sheep laurel (Kalmia angustifolia). In the peat moss openings, a poor population of a state-rare shrub (SP530) and a good population of a sedge (SP541) whose status is Tentatively Undetermined grow in

association with round-leaved sundew (<u>Drosera rotundifolia</u>), cotton-grass (<u>Eriophorum virginicum</u>), bog laurel (<u>Kalmia polifolia</u>), white beaked-rush (<u>Rhynchospora alba</u>), and pitcher plant (<u>Sarracenia purpurea</u>).

Continued development around the perimeter of the Tannersville Cranberry Bog threatens to degrade the water quality of the wetland and possibly harm the species of special concern. Already, nutrient run-off and non-point pollution from septic systems are having a noticeable impact. Future steps that should be taken to preserve the diverse wetland include 1) halting herbicide use along telephone line and power line right-of-ways that cross the wetland, 2) restricting development within the bog's primary watershed, and 3) acquiring additional buffer land around the wetland. Conservation easements on adjoining properties would further help to protect the wetland.

CAMELBACK MOUNTAIN, standing 2133 ft. above sea level at Pocono Knob (its highest point), towers above the surrounding landscape. The exceptional vistas available from Pocono Knob (GE536) qualify it as an outstanding scenic geologic feature in Pennsylvania (Geyer and Bolles, 1979). From the summit, one can see the diversity of landscapes comprising Monroe County. Pocono Plateau extends to the north and Blue Mountain with its gaps rises in the southeast. On exceptionally clear days, one can see the Catskills of New York looming to the northeast. lower slopes of Camelback Mountain are covered by mixedoak/northern hardwood forests that have been highly disturbed in many areas such as Camelback Ski Area located on the north-facing slope. However, the uppermost slopes of Camelback Mountain support a high quality Ridgetop Dwarf-tree Forest (NC504). the relatively poor, dry soils and extreme exposure to wind and ice-storms cause stunting of the trees. Bear oak (Quercus ilicifolia) with scattered to locally abundant pitch pine (Pinus rigida) and a shrub layer of sheep laurel, black huckleberry (Gaylussacia baccata), and lowbush blueberry (Vaccinium vacillans) characterize the community. To help maintain the low, open-heath shrub community, prescribed burning should be incorporated into the management plans of the Big Pocono State Park.

Sand Spring Run (nc630) and Wolf Swamp Run (nc631), are High Gradient Clearwater Creek natural communities and designated Exceptional Value streams that originate on the Pocono Pines quadrangle. On the Mount Pocono quadrangle, they extend eastward across the narrow band of end moraine north of Camelback Mountain. Polluting activities should be severely curtailed within the watersheds of these two creeks to ensure the continued health and productivity of the associated flora and fauna.

USGS QUADRANGLE MAP: East Stroudsburg

TNC Rank Legal Status Last
Global State Fed. State Seen Quality

NATURAL COMMUNITIES: 515 G? S3S4 N N 8/30/90 C

SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

GEOLOGICAL FEATURES: 512 - - - 1990 - 513 - - - 1990 -

OTHER: Intake Dam Woods; See adjacent maps for nc505, nc506, nc507, nc515, sa508, sp530, and sp541.

## East Stroudsburg Quadrangle:

The northern two-thirds of the East Stroudsburg quadrangle are in the Glaciated Low Plateaus section of the Appalachian Plateau province. The southern third extends into the Appalachian Mountain section of the Valley and Ridge province. Glacial material mantles much of the area.

In the northern part of the map, near Lesoine School, one finds a fair quality Northern Conifer Swamp (NC515) dominated by older hemlock (<u>Tsuga canadensis</u>) and white pine (<u>Pinus strobus</u>) with a dense understory of rosebay rhododendron (<u>Rhododendron maximum</u>). At present, the swamp is wild and undisturbed. Since the swamp is located high in a relatively small watershed, it should be easy to protect by restricting logging and development within the upper watershed. The wetland is the largest, least disturbed natural area in southern Price Township.

INTAKE DAM WOODS is a fairly mature mixed conifer and hardwood forest that was probably maintained as pasture at one time but has been allowed to revert to forest. White pine dominates the forest but white oak, hemlock, white ash, and red maple are also present. The past history and presence of exotic species prevent this site from being listed as more than of local significance (Table 2). Because this land along Sambo Creek is close to East Stroudsburg Reservoir lands, the protection of this woodland would provide nearly complete protection for the watershed should there be a need to expand water services in the future. Further, the combination of this tract with the watershed lands would create a significant amount of open space and wildlife habitat in an area that is rapidly becoming urbanized.

Two significant geological features occur on the East Stroudsburg quadrangle. GE512 indicates an outcrop of dark-gray chert, more commonly known as flint, that resembles a huge chair (Geyer and Bolles, 1979). This outcrop is called Indian Chair because Indians used the high-quality stone to make weapons and tools. GE513 marks the Centerfield Coral Reef which is one of the best sites in Pennsylvania for fossil horn coral specimens (Geyer and Bolles, 1979). Since this locality is on private property, permission to examine the outcrop should be obtained from the owner.

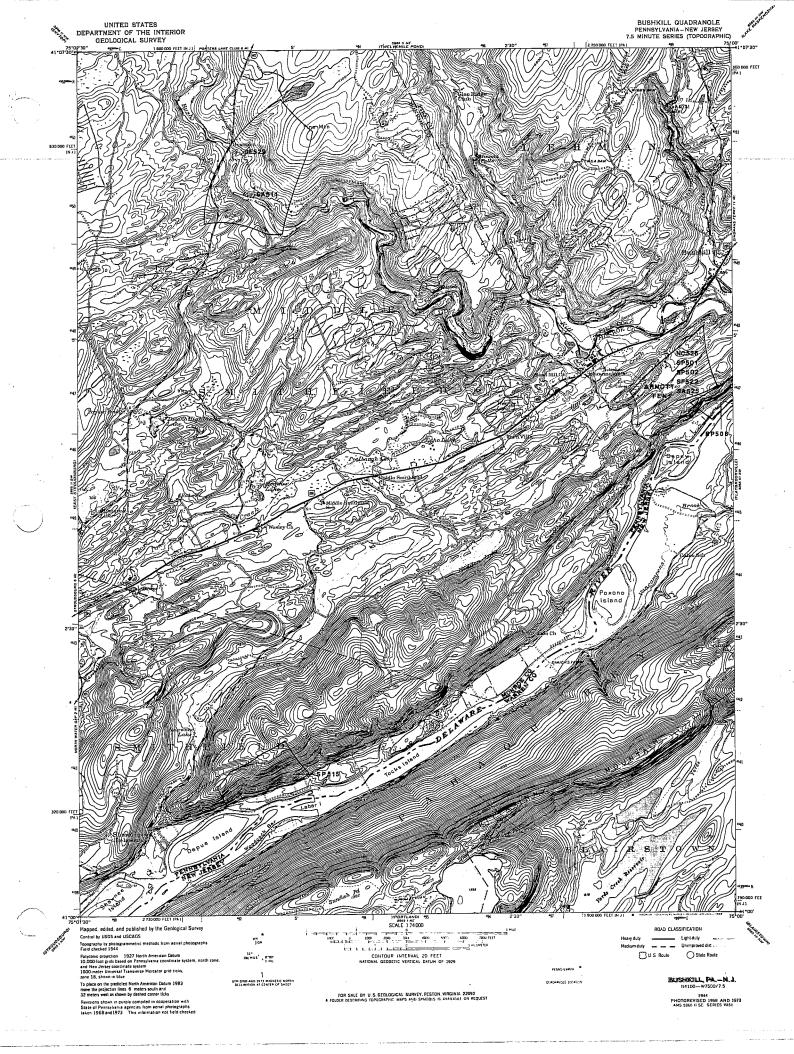


Hartford fern (Lygodium palmatum) was the first plant officially protected in the United States. In Pennsylvania, it is listed as Rare. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Bushkill

		TNC F			Status State	Last Seen	Quality
NATURAL COMMUNITIES:	526	G?	Sl	N	N	9/14/87	ВС
SPECIAL PLANTS:	501	G5	S1	N	PE	8/27/82	D
nd	502	G5	Sl	N	PE	9/14/87	В
	508	G5	S3	N	PR	10/17/91	В
	515	G5	<b>S</b> 3	N	PR	4/16/90	В
	522	G5	<b>S</b> 3	N	PR	9/14/87	D
SPECIAL ANIMALS:	511	G3	sı.	N	N	6/29/71	E
	525	G4	S2	3 <b>C</b>	PE	06/86	${f E}$
GEOLOGICAL FEATURES:	529	_		_	<b>-</b>	1990	-

OTHER: None identified.



## Bushkill Quadrangle:

The upper portion of the Bushkill quadrangle occurs in the Glaciated Low Plateaus section of the Appalachian Plateau province while the lower portion extends across the Valley and Ridge province. Various types of glacial material deposited to variable depths cover the area.

Scenic Resica Falls (GE529) is listed among the top geological features in Pennsylvania by Geyer and Bolles (1979). The falls, located near the town of Ressaca on the Bush Kill, cascade over the green and red sandstones and sandy shales of the Catskill Formation. At the Resica Falls Boy Scout Reservation, Schweitzer (1981) confirmed the presence of one state-imperiled (S1) moth (SA511) and possibly one other S1 moth species. Both of these species are associated with "pitch pine/scrub oak barrens" communities. Aerial spraying to control gypsy moths should be avoided in this area.

Along the Delaware River there are two localities for plant species of special concern. On the eastern edge of the map, south of Bushkill, an good population of a state-rare wildflower (SP508) grows in the cracks and hollows of limestone exposed along the river's edge. This population is continuous with one found on the adjacent Flatbrookville quadrangle. Although graffiti and litter make the area less attractive than it would be naturally, the plants are fairly inaccessible and presumably safe. In addition, the plants occur in the Delaware Water Gap National Recreation Area which prohibits wildflower picking.

The second locality near the Delaware River for a plant species of special concern is further south on a shale barrens high above the river. Here, a good population of a state-rare plant (SP515) thrives with a diverse suite of herbs under a thin canopy of white ash (Fraxinus americana), hickory (Carya sp.), crabapple (Crataegus sp.), and shadbush (Amelanchier sp.). The only evidence of human activity at the site is scattered trash. The Shawnee Development Corporation owns the site and should be encouraged to participate in its preservation.

East of Shoemakers, a fair to good quality Basin Graminoid-forb Fen, ARNOTT FEN (NC526), supports a good population of a state-endangered wildflower (SP502), poor populations of a state-endangered wildflower (SP501) and a state-endangered animal (SA525). This small natural community is part of a larger wetland complex. Calcareous (sweet) waters derived from weathering of the underlying limestone bedrock influence the array of species living in the community; the plant species of special concern growing here thrive under these conditions. Dominant plants of the fen include meadow-sweet (Spiraea latifolia), marsh fern (Thelypteris palustris), tussock sedge (Carex stricta), and peat

moss. The location of the site on National Park Service land affords it some protection. However, the fen's location within a transmission-line corridor may mean periodic disturbance as part of maintenance activities. Mechanical control of woody vegetation along the corridor is recommended in this area. Flooding from beaver may pose the greatest current threat; their removal is recommended to ensure the continued health of this unique wetland community.

USGS QUADRANGLE MAP: Flatbrookville

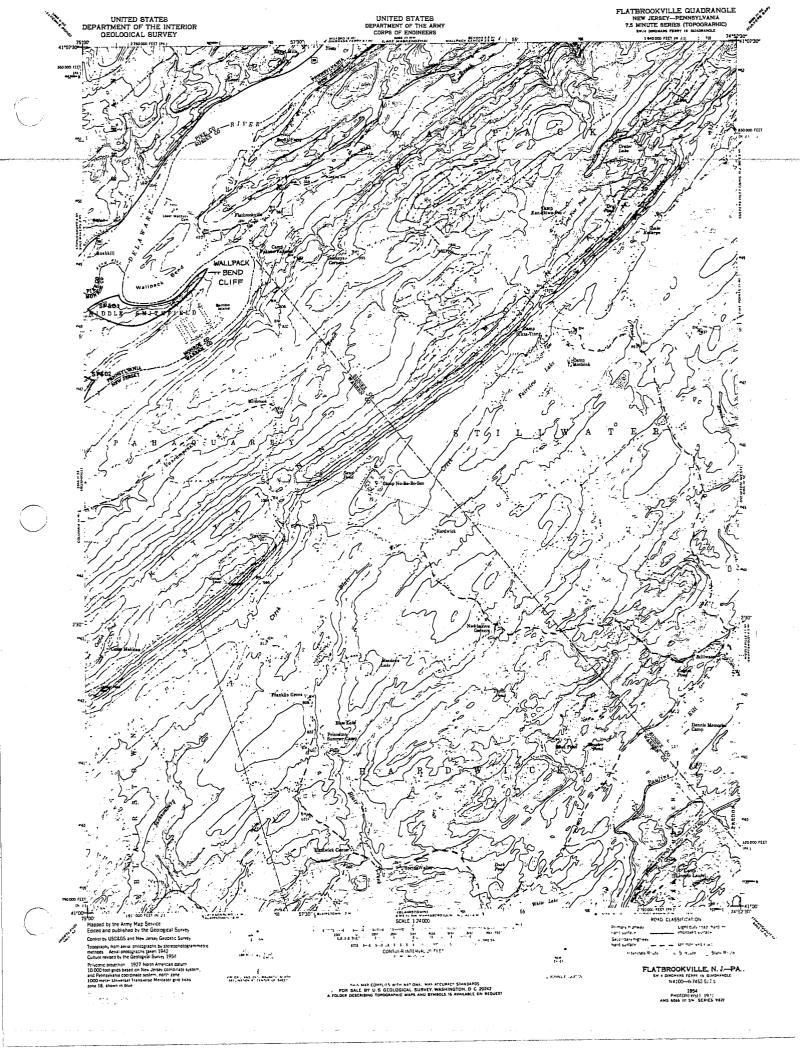
TNC Rank Legal Status Last Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: 501 G5 S4 N PV 8/02/82 D 502 G5 S3 N PR 10/17/91 B

SPECIAL ANIMALS: None identified.

OTHER: Wallpack Bend Cliff.

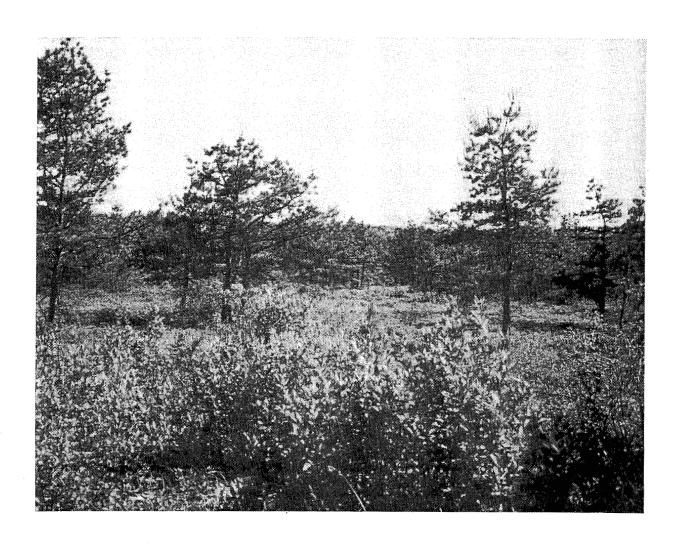


## Flatbrookville Quadrangle:

A striking feature of the Flatbrookville quadrangle is Wallpack Bend, the largest meander in the Delaware River. Geyer and Bolles (1979) consider this meander one of the best examples of its kind in the state.

WALLPACK BEND CLIFF occurs on the outside edge of the meander. Older hemlock (Tsuga canadensis) with an open understory of rosebay (Rhododendron maximum) dominate this steep north-facing slope. Survey of the site did not reveal species of special concern. However, Wallpack Bend Cliff is significant at the county level because it provides a good example of a northern conifer forest with a relatively diverse assemblage of plant species (including a Pennsylvania Vulnerable plant (SP501)) and is the only north-facing hemlock slope along the Delaware River in Monroe County. At the western end of the cliff area, a small population of a Pennsylvania-vulnerable plant was located in 1982. The species is no longer considered "Rare", but because of its economic value it remains in danger of extirpation. receives some protection because it is located in the Delaware Water Gap National Recreation Area. However, trampling and erosion from hikers could harm the steep slopes and ravines.

To the south of Wallpack Bend, an good population of a state-rare wildflower (SP502) grows in the cracks and hollows of limestone exposed along the river's edge. This site is secure within the Delaware Water Gap National Recreation Area.



The Pitch Pine-Scrub Oak Barrens natural community makes Long Pond one of the most ecologically unique sites in Pennsylvania. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Pohopoco Mountain

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

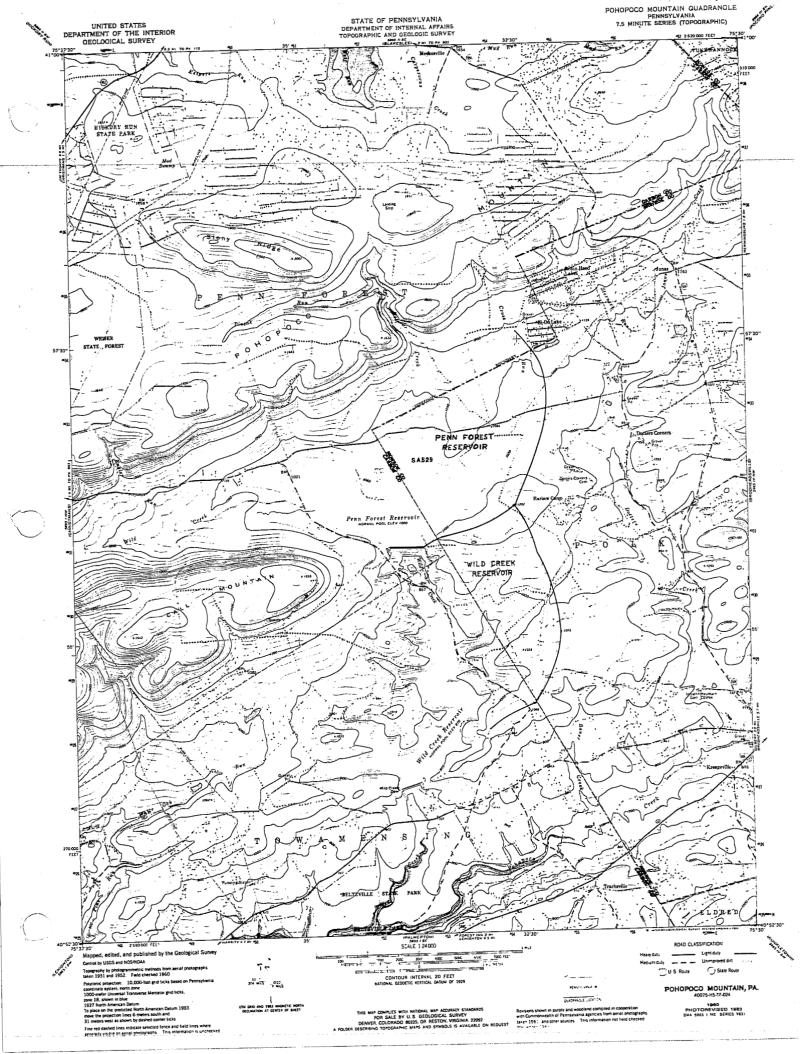
SPECIAL ANIMALS: 529 G5 S1 N PE 6/01/90 I

OTHER: Penn Forest Reservoir, Wild Creek Reservoir

watersheds.

# Pohopoco Mountain Quadrangle:

Monroe County extends onto the eastern half of the Pohopoco Mountain quadrangle. A state-endangered bird (SA529) has been located nesting along the shore of Penn Forest Reservoir. The watersheds of both Penn Forest and Wild Creek Reservoirs are almost entirely protected by the Bethlehem Water Authority. Continued protection will not only serve to protect these important municipal water supplies into the future, but also provide critical open space and wildlife habitat. It will serve to benefit the bird species of special concern and, perhaps, attract additional nesting pairs to the lake. PSO staff did not find natural communities or plant species of special concern in this part of Monroe County. Others are encouraged to search for unique natural heritage features.



USGS QUADRANGLE MAP: Brodheadsville

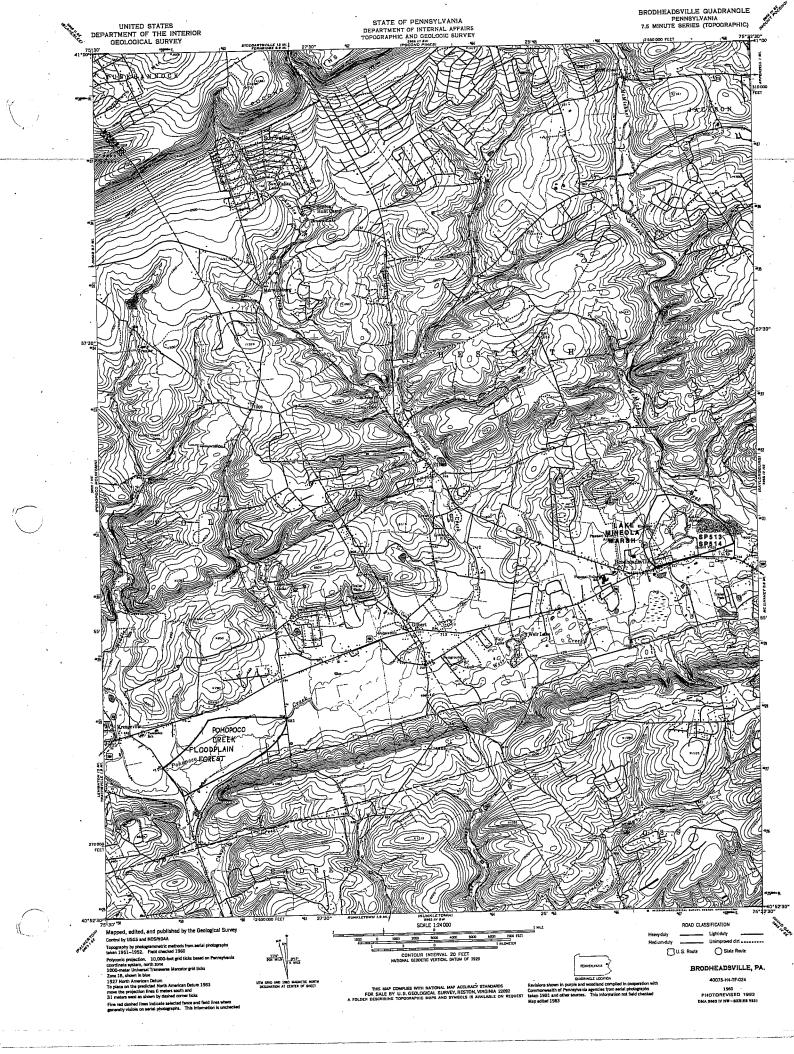
TNC Rank Legal Status Last Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: 513 G1 S1 C2 PE 9/06/90 C 514 G5 S2 N PR 9/06/90 E

SPECIAL ANIMALS: None identified.

OTHER: Pohopoco Creek Floodplain Forest.



## Brodheadsville Quadrangle:

The majority of the Brodheadsville quadrangle occurs in the Appalachian Mountain section of the Valley and Ridge province. The Pocono Front, the escarpment of the Pocono Plateau, extends from northeast to southwest across the northwest corner of the map. Glacial debris mantles parts of the quadrangle with some areas having little to no cover (Crowl and Sevon, 1980). McMichael Creek flows southward along the eastern side of the map and follows the glacial margin with end moraine material piled along its western bank and ground moraine extending to the east. Immediately northeast of the town of Brodheadsville, one finds a deposit of unconsolidated deltaic sands and gravels that accumulated where a glacial stream bearing meltwater and sediment flowed into an ancient lake that was impounded behind the end moraine. Past and present quarry operations have extracted sands and gravels from this deposit.

LAKE MINEOLA MARSH, a cattail-dominated marsh occurring in a shallow kettle lake south of Lake Mineola, is the most important site on the quadrangle, and one of the most important sites in Pennsylvania because it contains a fair to good population of a globally, critically-imperiled bulrush (SP513). Currently, this species is Pennsylvania-endangered and is being proposed for listing on the Federal Endangered Species List. Lake Mineola Marsh also supports a state-rare spike rush (SP514) that grows on organic mats floating in the lake.

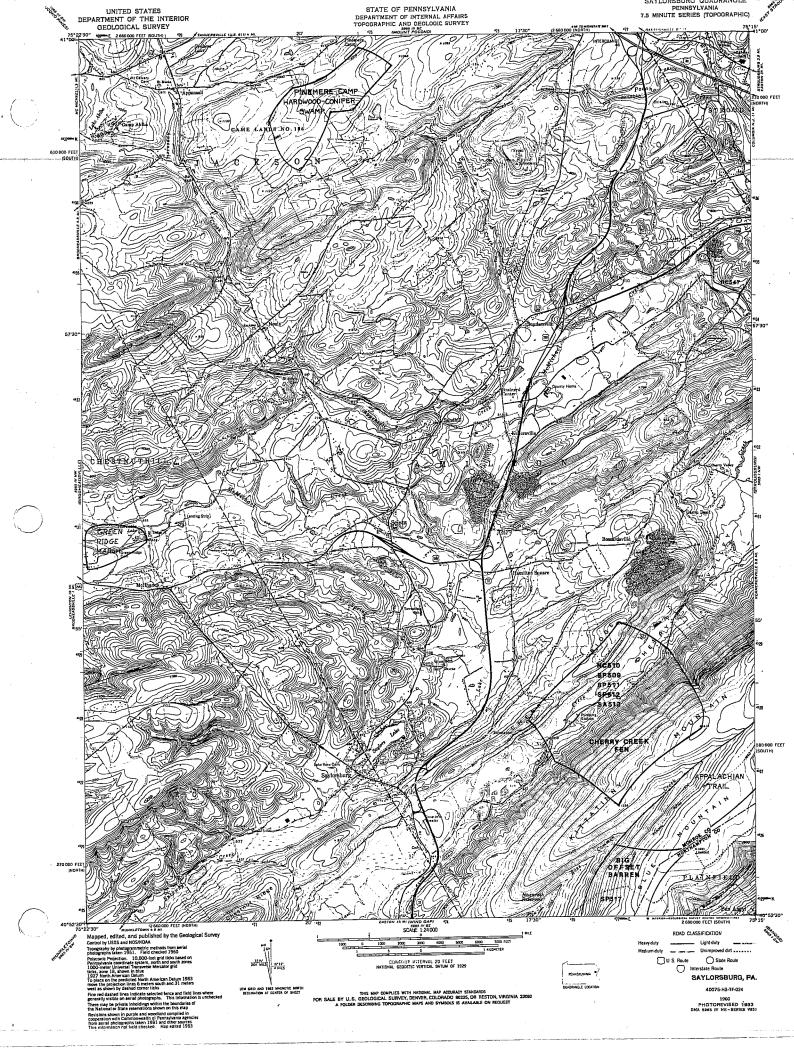
The occurrence of these species of special concern in the marsh probably relates to the unique hydrological setting of the shallow kettle lake. Both Lake Mineola and the shallow kettle lake occur in the geologic unit composed of unconsolidated deltaic sands and gravels. Groundwater flows readily through these coarse geologic materials and feeds both lakes which lack either inlets or outlets. The water level of these lakes rises and falls from year to year as a function of precipitation. plant species find this natural fluctuation in water level intolerable. However, the two species of special concern appear to thrive and, perhaps depend upon, this variation in water Any activity that would drain or flood the shallow kettle lake, thus causing permanent alteration of the existing hydrologic condition, threatens the long-term health and survival of the plant species of special concern. The impact of a planned sub-aquifer sand-and-gravel operation in the same geologic unit near Lake Mineola Marsh is unknown. It is recommended strongly that hydrologic investigations be conducted to determine the effect that this mining operation will have upon the hydrology of the shallow kettle lake. Alteration of the present hydrologic condition could eradicate the species of special concern from the The loss of the globally-rare bulrush from Lake Mineola Marsh would be an ecological tragedy at the state, national, and international levels.

The POHOPOCO CREEK FLOODPLAIN FOREST, located southwest of Gilbert, is significant at the local level because it is one of the few large forested tracts along the valley floor. Red maple (Acer rubrum), assorted shrubs including silky dogwood (Cornus amomum), buttonbush (Cephalanthus occidentalis), winterberry holly (Ilex verticillata), and spicebush (Lindera benzoin), and a diversity of herbaceous plants comprise the forest. In places, the forest gives way to open areas dominated by grasses such as rice cutgrass (Leersia oryzoides), sedges including Carex stricta, and bulrushes such as Scirpus cyperinus. The forest provides a haven for wildlife in this agricultural landscape. Logging, which has occurred within the forest, should be minimized to preserve the wildlife habitat and other values associated with floodplain forests.

USGS QUADRANGLE MAP: Saylorsburg

		TNC I			Status State	Last Seen	Quality
NATURAL COMMUNITIES:	510	G2G3	Sl	N	N	9/14/87	В
SPECIAL PLANTS:	509	G5	S1	N	PE	9/14/87	В
	511 512	G5 G5	S3 S2	N N	PR PT	9/14/87 9/14/87	B B
	517	G2	Sl	C2	PE	7/05/89	В
SPECIAL ANIMALS:	513	G4	S2	3 <b>C</b>	PE	7/17/85	В

OTHER: Pinemere Camp Hardwood-conifer Swamp, Green Ridge Marsh, Appalachian Trail; see Stroudsburg map for nc547.



#### Saylorsburg Quadrangle:

The Saylorsburg quadrangle occurs within the Appalachian Mountain section of the Valley and Ridge province. At the southeast corner of the map, Kittatinny Mountain and Cherry Valley provide an example of the typical landscape pattern of the region with resistant sandstones underlying the highest ridges and less resistant limestones underlying valleys. Glacial material mantles the area with the exception of the upper parts of Kittatinny and Blue Mountains.

CHERRY CREEK FEN constitutes the most important site on the map because of the good quality Shrub Fen (NC510) and good populations of a state-endangered wildflower (SP509), a statethreatened sedge (SP512), and a state-rare wildflower (SP511) A good population of a state-endangered animal found there. (SA513) that thrives in the rich waters of the wetland makes the site especially important. Flowing calcareous water derived from weathering of the underlying limestone bedrock and till influences this natural community. The relatively high pH of the water creates conditions amenable to suites of plants that are unable to tolerate the more acidic conditions found on adjacent bedrock types. The restriction of many of these plants to calcareous wetlands accounts for their rarity. At this site, one finds an open graminoid area consisting mainly of sedges (Carex spp.) and spike rushes (Eleocharis spp.) with scattered shrub hummocks dominated by poison sumac (Toxicodendron vernix) and spicebush (Lindera benzoin) and a smaller open area of saturated stones and gravel. The plants of special concern grow in the open at the edges of hummocks and in the saturated stony areas. A surrounding shrub zone dominated by hazel alder (Alnus serrulata) and spicebush (Lindera benzoin) grades into a red maple (Acer rubrum)/white pine (Pinus strobus) swamp. landowners of Cherry Creek Fen have "registered" the natural area with The Nature Conservancy. "Registry" means that the landowners have informally agreed to protect the land and to notify the Conservancy of any threats to the property. This collaboration of efforts should protect the core of the wetland, but continued efforts will be needed to prevent adverse off-site effects.

A good population of a state-endangered sedge (SP517) grows on moist to dry slopes near the summit of Blue Mountain in an area called BIG OFFSET BARREN. The sedge grows in the filtered light and shade of a low, scrubby forest composed of sassafras (Sassafras albidum), red maple, scrub oak (Quercus ilicifolia), and assorted ericaceous shrubs. The plants grow near the Appalachian Trail on land owned by the Blue Mountain Consolidated water Company. Although the population does not appear to be threatened at present, trail expansion into the area should be avoided. In addition, the canopy of the low forest may require opening in the future to encourage plant reproduction.

PINEMERE CAMP HARDWOOD CONIFER SWAMP is a 75-acre swamp dominated by hemlock (Tsuga canadensis) and rosebay (Rhododendron maximum) that is significant at the local level. The swamp has been logged and most of the trees are less than 60-years old. However, the site provides excellent wildlife habitat in an area that is under extreme development pressure. The swamp is partially on State Game Lands 186 and therefore somewhat protected. Housing development is encroaching to the edge of the swamp on private lands to the southeast. Township officials and local conservationists should work with the homeowners here to encourage them to leave a 100-200 foot buffer between their lawns Homeowners should also be informed about and the wetland edge. the problems associated with runoff contaminated with lawn fertilizers and pesticides. With the homes so close to the swamp, mosquitoes may cause some problems. Homeowners bothered by mosquitoes are encouraged to contact the local Audubon Society or other conservation group about ways to control mosquitoes and other pests in an environmentally sound manner.

GREEN RIDGE MARSH is a second natural area of local significance on the Saylorsburg quadrangle. This wetland complex of open graminoid areas, shrub swamp, and forested swamp borders the two branches of McMichael Creek and extends from the downstream side of the West End Mining gravel and sand quarry operation to McIlhaney Road. A distinctive feature of this area is the abundance of water seeping from adjacent valley walls composed of loosely consolidated glacial material. Abundant springs of cold water emanate from the southern valley wall. diverse mixture of grasses, sedges, rushes, and herbaceous plants including tussock sedge (Carex stricta), jewelweed (Impatiens capensis), and skunk cabbage (Symplocarpus foetidus) comprise the open areas. The abundance of water flowing across the ground surface and the structure of the vegetation in these areas suggest potential habitat for a state-endangered animal. recommended that searches for this animal be conducted in midlate April when it first emerges from winter hibernation. maple (Acer rubrum), winterberry holly (Ilex verticillata), alder (Alnus rugosa), silky dogwood (Cornus amomum), spicebush (Lindera benzoin), and poison sumac (Toxicodendron vernix) comprise the shrubby portions of the wetland. At its eastern end, there is a very scenic forest of hemlock and yellow birch (Betula lutea) with rosebay forming an impenetrable understory in places. Green Ridge Marsh is notable for its variety of wetland types in close proximity to one another, its relatively high diversity of native plants, its scenic quality, and the excellent habitat it provides for animals of all types in an area that is fast becoming developed. The Pohoqualine Fishing Association owns much of the Green Ridge Marsh and is dedicated to its preservation. However, continued efforts are needed to monitor and limit potential off-site impacts to the wetland including non-point source pollution and siltation from quarry activities.

The APPALACHIAN TRAIL is located along Blue Mountain at the very southern edge of the county. Although not a natural feature, it is important that the trail, and a buffer area around it, remain in a fairly natural setting for the trail to be fully enjoyed. In places, low-density housing is encroaching upon the trail; even this amount of development should be considered unacceptable.

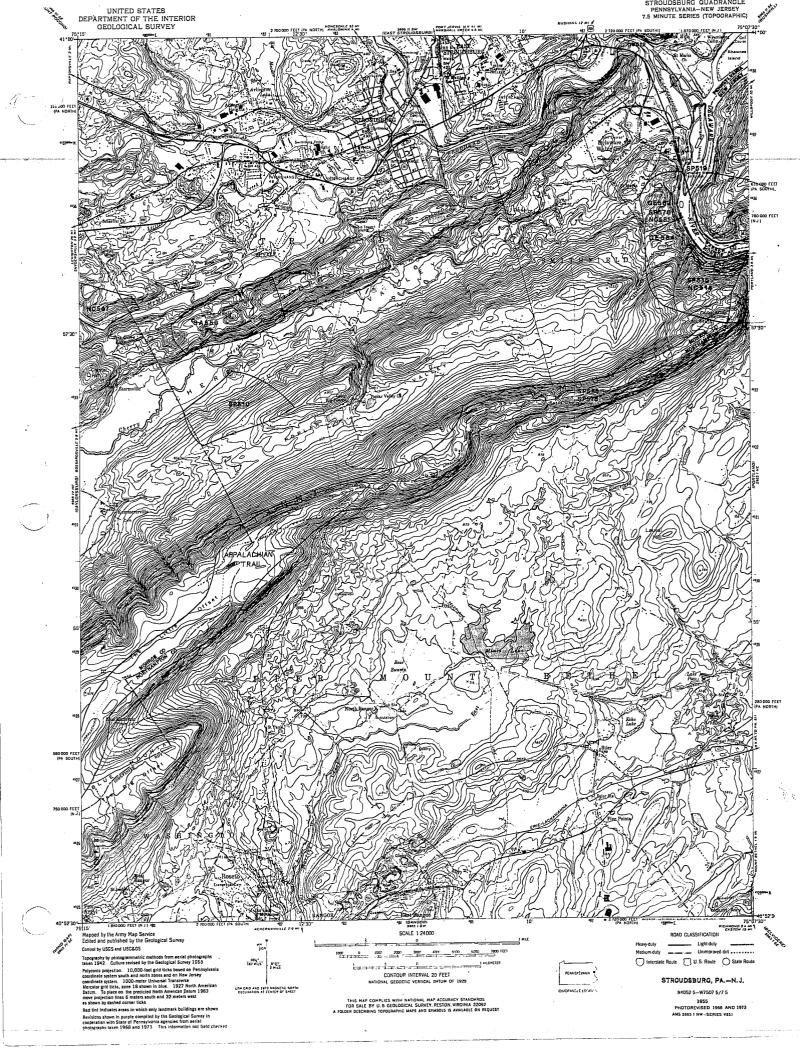


The greatest population concentration of the variable sedge (<u>Carex polymorpha</u>), a globally-threatened plant, is in the Poconos. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Stroudsburg

		TNC R Global			<u>Status</u> State	Last Seen	Quality
NATURAL COMMUNITIES:	516	G?	S1S2	N	N	5/13/83	CD
· S & .	547	G?	S2	N	N	6/07/86	С
	581	G5	S3	N	N	6/20/89	С
SPECIAL PLANTS:	510	G4T3Q	Sl	3C	PE	4/21/86	С
	515	G5	<b>S</b> 3	N	TU	6/20/89	D
	519	G5	S3	N	TU	7/12/83	A
	576	G5	S3	N	TU	6/20/89	C
•	578	G5	S3	N	PR	7/03/89	CD
	580	G5	S3	N	TU	7/03/89	CD
SPECIAL ANIMALS:	559	G4	S2S3	N	N	3/15/88	С
GEOLOGICAL FEATURES:	562	<b>-</b> ,	· -	-	-	1990	_
	√564	-	-	-	-	1990	-

OTHER: Appalachian Trail; see adjacent map for ge512.



### Stroudsburg Quadrangle:

The most striking feature of the Stroudsburg quadrangle is Kittatinny Mountain which trends from northeast to southwest across the middle of the map. This distinctive ridge marks the division of the Valley and Ridge province into the Appalachian Mountain section to the north and the Great Valley section to the south. The Appalachian Trail and the boundary between Monroe County and Northampton county also extend along this ridge.

From Kittatinny Mountain northward, the bedrock geology alternates between hard rock that holds up ridges and soft rock that underlies gentle slopes and valleys. For example, quartzite and sandstone underlie the front and broad ridge, respectively, of Kittatinny Mountain. Limestones and shales underlie Cherry Valley. Glacial material, primarily till as both end and ground moraine, mantles much of the area (Crowl and Sevon, 1980).

Natural communities, plant species of special concern, and special geologic features occur on Kittatinny Mountain within the Delaware Water Gap National Recreation Area. In the vicinity of Totts Gap on the crest of Kittatinny Mountain, fair to poor populations of a state-rare tree (SP578) and a shrub whose status is Tentatively Undetermined (SP580) occur in forest openings in association with pitch pine (Pinus rigida), scrub oak (Quercus ilicifolia), low-bush blueberries (Vaccinium angustifolium and Vaccinium pallidum), and a dewberry (Rubus flagellaris). These dry areas are subject to periodic fires which should be allowed to burn to keep the areas open, thus preventing shading and loss of the plants of special concern.

Farther east, on the Mount Minsi area of Kittatiny Mountain, rocky outcrops and balds with patches of shadbush (Amelanchier arborea), scrub oak, low-bush blueberry, tufted hairgrass (Deschampsia caespitosa), and dwarf dandelions (Krigia sp.) comprise a poor example of an Acidic Rocky Summit natural community (NC516). This community supports a poor population of a shrub whose state status is Tentatively Undetermined (SP515). From this vantage point, one can see the spectacular Delaware Water Gap (GE564) where the mighty Delaware River cut through Kittatinny Mountain to expose an impressive sequence of tilting sedimentary strata.

Nearby, just south of Lake Lenape, is a large overhanging cliff (GE562) that once provided shelter for the Leni Lenape Indians (Geyer and Bolles, 1979). In the same area, a shallow depression contains a marginal quality Acidic Shrub Swamp (NC581) characterized by a border of buttonbush (Cephalanthus occidentalis) surrounding numerous hummocks vegetated by red maple (Acer rubrum), highbush blueberry (Vaccinium corymbosum), and other ericaceous shrubs. A fair population of a shrub whose state status is Tentatively Undetermined (SP576) thrives in the

acid, mucky soils of the swamp. The area is within the municipal watershed of the Boro of Delaware Water Gap.

On the southeast corner of Schellenbergers Island in the Delaware River, an excellent population of a shrub whose state status is Tentatively Undetermined (SP519), occurs in large dense thickets growing in river sands and gravels. Associated species include willows (Salix spp.), raspberry (Rubus sp.), wild grape (Vitis sp.), and assorted herbaceous plants. The plant of special concern thrives in the highly disturbed environment of the alluvial island where it is subjected to annual flooding and scouring. At present, human activities, which are minimal on this part of the island, do not threaten the plant.

Cherry Valley parallels Kittatinny Mountain to the north. A fair population of a state-endangered plant (SP510) grows on the southern slope of Cherry Valley west of Camp Big Pocono. The plant grows in a wooded area that has numerous seeps and streamlets. In 1986, the landowner of the site was aware of the plant's existence and agreeable to protecting it. The continued health of the population will depend on preventing disturbance within, and upslope of, the site.

On the opposite side of Cherry Valley, near The Knob on Godfrey Ridge, there occurs a fair population of a bat (SA559) that TNC considers to be possibly imperiled (S2S3) in Pennsylvania.

North of Godfrey Ridge on the western side of the quadrangle, a fair quality Mesic Central Forest (NC547) covers a low limestone ridge with pronounced ledges that rises above the north side of McMichael Creek. Tulip poplar (Liriodendron tulipifera), sugar maple (Acer saccharum), and hemlock (Tsuga canadensis) dominate the canopy of this very mature 10-15 acre woodland. Witch hazel (Hamamelis virginiana) and spicebush (Lindera benzoin) dominate the shrub layer. The forest is notable for its maturity and scenic quality, its diversity of native species and lack of exotic species, and its exemplification of a now-diminished forest type. The forest should be protected from logging, which has occurred in its southern part, and development.

The APPALACHIAN TRAIL is located along Blue Mountain at the very southern edge of the county. Although not a natural feature, it is important that the trail, and a buffer area around it, remain in a fairly natural setting for the trail to be fully enjoyed. In places, low-density housing is encroaching upon the trail; even this amount of development should be considered unacceptable. Those areas near the trail that are feasible to develop because of soils and slope should be targeted for protection soon.

USGS QUADRANGLE MAP: Portland

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: None identified.

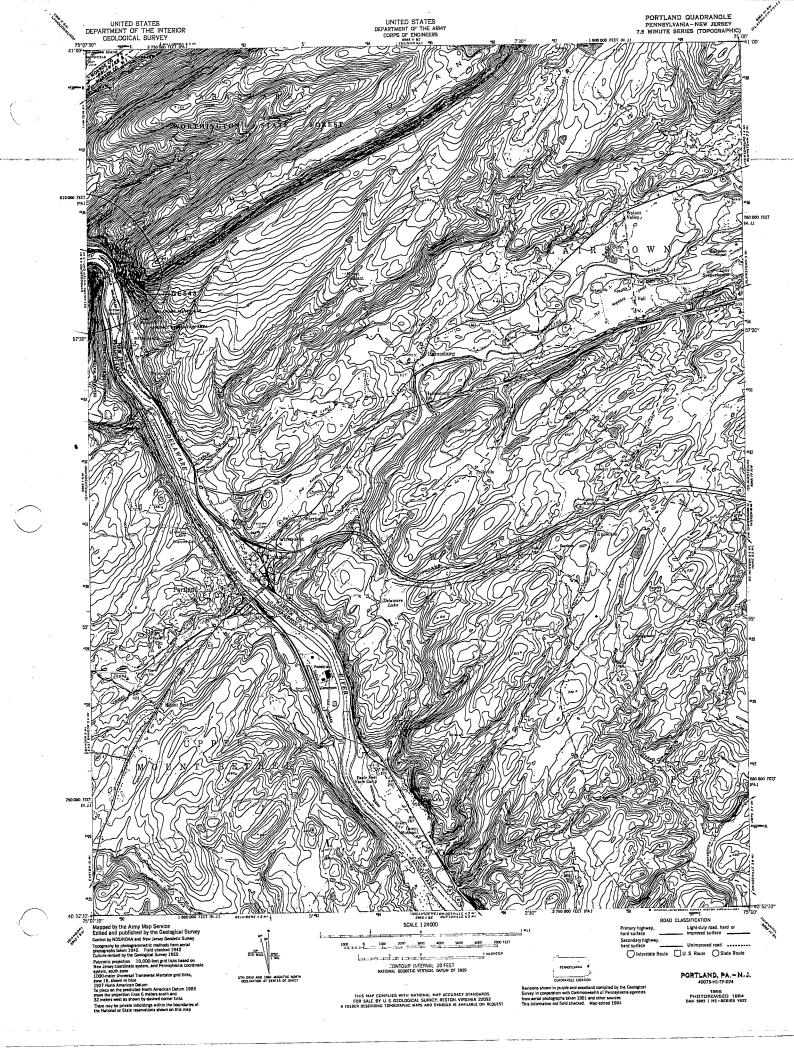
SPECIAL ANIMALS: None identified.

GEOLOGICAL FEATURES: 543 - - - 1990 -

OTHER: None identified.

### Portland Quadrangle:

Two small areas of Monroe County that are adjacent to the Delaware River extend onto the Portland quadrangle. The Delaware Water Gap is a significant geological feature (GE543) that is among the finest found in the United States (Geyer and Bolles, 1979). Numerous artists have painted this magnificent cut through Kittatinny Mountain. Over millions of years, the Delaware River eroded a gap in the ridge to expose a section of dipping gray shale, white quartzite, and red sandstone. This famous feature is located in the Delaware Water Gap National Recreation Area.



USGS QUADRANGLE MAP: Palmerton

TNC Rank Legal Status
Global State Fed. State

Seen Quality

NATURAL COMMUNITIES: None identified.

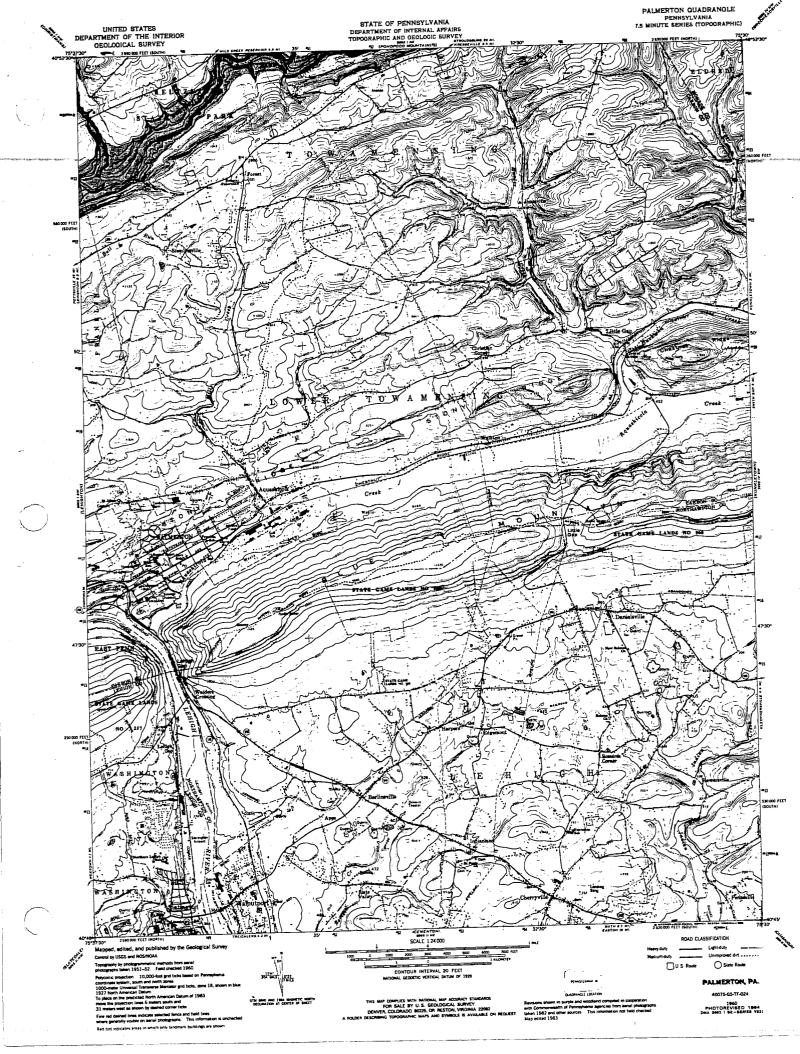
> None identified. SPECIAL PLANTS:

None identified. SPECIAL ANIMALS:

OTHER: None identified.

### Palmerton Quadrangle:

Only a very small portion of Monroe County occurs on the northeast corner of the Palmerton quadrangle. Field surveys did not reveal any natural communities, special plants, or special animals in this portion of Monroe County.



### OUADRANGLE MAP: Kunkletown

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

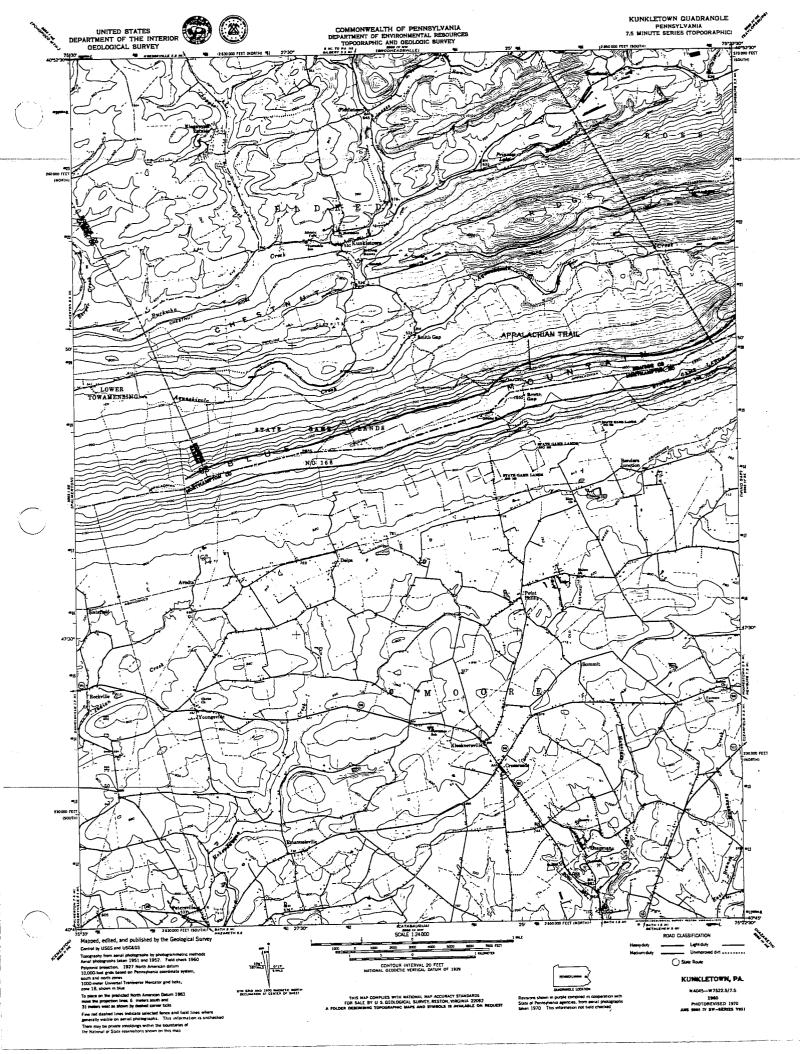
SPECIAL PLANTS: None identified.

SPECIAL ANIMALS: None identified.

OTHER: Appalachian Trail.

### Kunkletown Quadrangle:

A relatively small portion of southern Monroe County extends onto the Kunkletown quadrangle. The most outstanding feature of this section of Monroe County is the APPALACHIAN TRAIL that extends along the crest of Blue Mountain. Much of the area bordering the trail is protected because of its location in State Game Lands No. 168. Logging and development should be limited in areas near the trail that are not under state jurisdiction to preserve the spectacular scenery and relative "naturalness" of the trail corridor. The PSO field survey of the area did not reveal natural communities or plant and animal species of special concern. However, others are encouraged to search undeveloped areas for unique natural heritage features.



USGS QUADRANGLE MAP: Wind Gap

TNC Rank Legal Status Last

Global State Fed. State Seen Quality

NATURAL COMMUNITIES: None identified.

SPECIAL PLANTS: 501 G5 S1 N PE 8/27/82 D

SPECIAL ANIMALS: None identified.

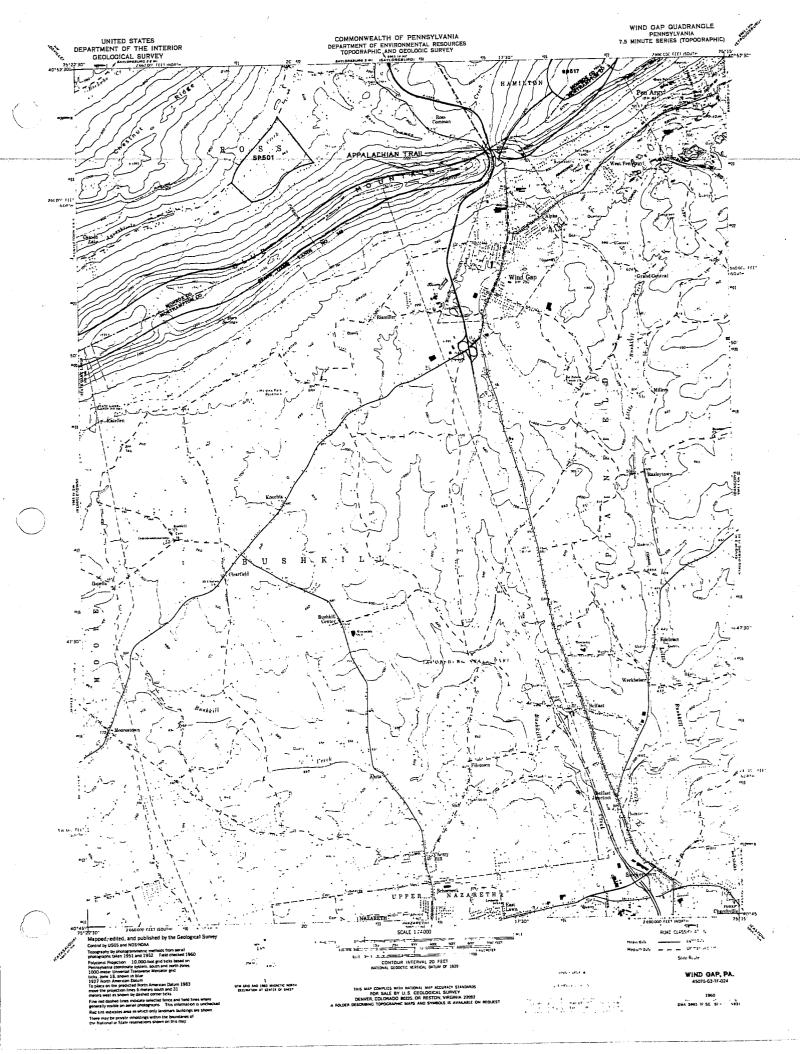
OTHER: Appalachian Trail; see adjacent map for

sp517.

### Wind Gap Quadrangle:

Only one species of special concern (SP501) has been verified in the Monroe County portion of this map. The species is located in a degraded shrub swamp along Aquashicola Creek near a pipeline crossing. The mechanical control of shrubs and saplings for vegetation management along the pipeline does not appear to be harming the plant at this time, but monitoring of the plant population by local naturalists is encouraged.

The APPALACHIAN TRAIL follows the crest of Blue Mountain along the Monroe - Northampton County border. Much of this portion of the trail is protected from development, but may be subject to logging. To preserve the quality of the hiking experience, logging should be discouraged near the trail. Where the trail crosses private property conservation easements should be sought to protect the trail from encroachment.



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## APPENDIX I. FEDERAL AND STATE STATUS, AND NATURE CONSERVANCY RANKS

### FEDERAL STATUS

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

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

LE--Taxa formally listed as endangered.

LT--Taxa formally listed as threatened.

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

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

S--Synonyms.

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

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

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

3A--Taxa for which the Service has persuasive evidence

of extinction.

3B--Names that, on the basis of current taxonomic understanding, usually as represented in published revisions and monographs, do not represent taxa meeting the Act's definition of "species".

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

### STATE STATUS

- PE Pennsylvania Endangered A classification of plant species which are in danger of extinction throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.
- PX Pennsylvania Extirpated A classification of plant species believed by the Department to be extinct within this Commonwealth. These plant species may or may not be in existence outside this Commonwealth. If plant species classified as Pennsylvania Extirpated are found to exist, the species automatically will be considered to be classified as Pennsylvania Endangered.
- PR Pennsylvania Rare A classification of plant species which are uncommon within this Commonwealth. All species of native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.
- PT Pennsylvania Threatened A classification of plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent further decline in this Commonwealth, or if the species is greatly exploited by man.
- PV Pennsylvania Vulnerable A classification of plant species which are in danger of population decline within Pennsylvania because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.
- TU Tentatively Undetermined A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.
- N None A classification of plant species which are believed to be endangered, rare, or threatened, but which have not yet been included within another classification due to delays created by required regulatory review processes.

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

LE - <u>Listed Endangered</u>

Game Commission - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation for the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in 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 Commission - Endangered Species are all species and subspecies of fishl which: (1) have been declared by the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species list published in the Federal Register; or, (2) have been declared by the executive director (PAFC) to be threatened with extinction and appear on the Pennsylvania Endangered Species List published in the Pennsylvania Bulletin.

LT - Listed Threatened

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

Fish Commission - Threatened Species are all species and subspecies of fish which: (1) have been 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.

<sup>1</sup> The word "Fish" when used as a noun includes all game fish, fish bait, bait fish, amphibians, reptiles, and aquatic organisms.

### GLOBAL ELEMENT RANKS

- G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
- G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- GH = Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the expectation that it may be rediscovered (e.g., Bachman's Warbler).
- GU = Possibly in peril range wide but status uncertain; need more information.
- GX = Believed to be extinct throughout its range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered.

### STATE ELEMENT RANKS

- S1 = Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.
- S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
- S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences.
- S4 = Apparently secure in state, with many occurrences.
- S5 = Demonstrably secure in state and essentially in eradicable under present conditions.
- SA = Accidental in state, including species which only sporadically breed in the state.
- SE = An exotic established in state; may be native elsewhere in North America (e.g., house finch).
- SH = Of historical occurrence in the state with the expectation that it may be rediscovered.
- SN = Regularly occurring, usually migratory and typically nonbreeding species for which no significant or effective habitat conservation measures can be taken in the state.
- SR = Reported from the state, but without persuasive
   documentation which would provide a basis for either
   accepting or rejecting (e.g., misidentified specimen) the
   report.
- SRF = Reported falsely (in error) from the state but this error persisting in the literature.
  - SU = Possibly in peril in state but status uncertain; need more information.
  - SX = Apparently extirpated from the state.

# APPENDIX II Pennsylvania Natural Diversity Element Occurrence Quality-Ranks

### Quality Rank\*

### Explanation

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

### Appendix II (concluded.)

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

- E Verified as extant, but has not been given a rank.
- I Species has been reintroduced by man to an area historically occupied by that species.

<sup>\*</sup> Intermediate ranks may also be assigned

### APPENDIX III

# THE NATURE CONSERVANCY POTENTIAL NATURAL AREA SURVEY FORM

The state of the s	The state of the s		angland in 198 dames, again, general	COUNT	[YY	NO
			OUA	D NAME	CODE:	
			~	<b>-</b> /		
Site Name:	····			PHOTO N	10./D	ATE:
Location:			, , , , , , , , , , , , , , , , , , ,	Townshi	ip:	
Air Survey Surv	eyors:					Date:
FOREST AGEC	TITOTING	CRAZT	NG	RECVRY	POT	PRIORITY*
yng mat old lt	bing clr	1+ mod				hi med lo
	my cii	TC MOG	11 4 J	94	P-	111 mcd 10
Wetland		_	_	_	_	_
Marsh				<u> </u>		
Meadow						
Shrub				<del></del>		
Seep				·		
Fen				•		-
Bog	-			·		<u> </u>
Pond Shore				•		-
Conifer				•		
Hdw-Cnfr	-			•		<u> </u>
Hardwood	-			•		-
Floodpln	-		_	•		
	_			:		
	_					
Upland						
Ser Barr		-		•		· •
Grad Tand						
Gras Land Lim Barr						
Dals Clade						
Rck Glade				·		
Pine Sav				<u> </u>		
Oak Sav				<u> </u>		<u> </u>
Pine For						<u> </u>
Oak For				·		<del></del>
Hdw For				•		
Hdw-Cnfr	-					
Cliff				·		
				·		·
	-			· <u> </u>	<del></del> •	-
				*E=E]	limina	
Ground Survey						Date:
Community Type	<u>Eli</u>	<u>minate</u>	<u>Notable</u>	Natur	al 🤉	<u>Quality-Rank</u>
				· ———		
Comment:					•	

### Appendix III (Concluded.)

# THE NATURE CONSERVANCY POTENTIAL NATURAL AREAS SURVEY FORM—NATURAL COMMUNITY

NATURAL COMMUNITY (C rank or better)
NATURAL COMMUNITY (C rank or better)
community.
EO-RANK:WHY?
COMMON PLANTS (or attach species list):
COMMON PLANTS (or attach species list):
OTHER PLANTS:
DOMINANTS OF THE PLANT COMMUNITIES (PC) IN THE NATURAL COMMUNITY:
2
3 <b>.</b>
4SIGNS OF DISTURBANCE:
SIGNS OF DISTURBANCE:
SPECIAL PLANT (map) FREQUENCY/HOW MANY? IN HOW MUCH AREA PC#
NIMALS:

## APPENDIX IV RECOMMENDED NATURAL AREA FIELD SURVEY FORM

Surveyor:	
Date of Observation	Site Name
Quadrangle Name	
Owner: Owners Attitude Toward Conservat	ion:
Site Elevation:	Size of Site (acres):
Source of Lead:	
Current Land Use:	
Written Description: Try to converge features (including vegetation, aquatic features, land forms, geoqualities, etc.):	Bog;Natural Pond. ey a mental image of the site significant animals & plants, ologic substrata, scenic
Site Condition Compared to Your	Last Visit:

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

# APPENDIX V. CLASSIFICATION OF NATURAL COMMUNITIES IN PENNSYLVANIA (DRAFT)

		GLOBAL STATE RANK RANK
ESTUARINE COMMUNITIES		
DEEPWATER SUBTIDAL COMMUNITY SHALLOW-WATER SUBTIDAL COMMUNITY FRESHWATER INTERTIDAL MUDFLAT FRESHWATER INTERTIDAL MARSH		G? S1 G? S1 G3G4 S1 G3G4 S1
RIVERINE COMMUNITIES		
LOW-GRADIENT EPHEMERAL/INTERMITTENT CREEK LOW-GRADIENT CLEARWATER CREEK LOW-GRADIENT CLEARWATER RIVER LOW-GRADIENT BROWNWATER CREEK MEDIUM-GRADIENT EPHEMERAL/INTERMITTENT CREEK MEDIUM-GRADIENT CLEARWATER CREEK MEDIUM-GRADIENT CLEARWATER RIVER MEDIUM-GRADIENT BROWNWATER CREEK HIGH-GRADIENT EPHEMERAL/INTERMITTENT CREEK HIGH-GRADIENT CLEARWATER CREEK HIGH-GRADIENT CLEARWATER RIVER HIGH-GRADIENT CLEARWATER RIVER HIGH-GRADIENT BROWNWATER CREEK WATERFALL AND PLUNGEPOOL SPRING COMMUNITY SPRING RUN COMMUNITY	RAB RAC RAD RBA RBB RBC RBD RCA RCB	G? S3S4 G? S2S3 G? S5 G? S3 G? S7 G? S3 G? S5 G? S3 G? S5
LACUSTRINE		
GLACIAL LAKE NONGLACIAL LAKE ARTIFICIAL LAKE NATURAL POND ARTIFICIAL POND STABLE NATURAL POOL EPHEMERAL/FLUCTUATING NATURAL POOL	LAB LAC	G? S2S3  G? S? G? S1
ARTIFICIAL POOL EPHEMERAL/FLUCTUATING LIMESTONE SINKHOLE	LCC LCD	G? S1

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	
PALUSTRINE COMMUNITIES		<b>(成数) 4 (後後の) 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997</b>	STATE OF THE STATE
ACIDIC BROADLEAF SWAMP CIRCUMNEUTRAL BROADLEAF SWAMP BOREAL CONIFER SWAMP NORTHERN CONIFER SWAMP BROADLEAF-CONIFER SWAMP FLOODPLAIN SWAMP CALCAREOUS SEEPAGE SWAMP ACIDIC SHRUB SWAMP CIRCUMNEUTRAL SHRUB SWAMP GRAMINOID MARSH ROBUST EMERGENT MARSH MIXED GRAMINOID-ROBUST EMERGENT MARSH CALCAREOUS MARSH GLACIAL BOG NONGLACIAL BOG RECONSTITUTED BOG SHRUB FEN BASIN GRAMINOID-FORB FEN HILLSIDE GRAMINOID-FORB FEN CIRCUMNEUTRAL SEEP COMMUNITY CALCAREOUS SEEP COMMUNITY RIVERSIDE SEEP COMMUNITY	PAA PAB PAC PAD PAE PAF PAG PAH PAJ PBA PBB PCA PCB PCB PCB PCC PDA PDB PCC PDA PDB PCC PEA PDB	65 6? 6? 6? 6? 6? 6? 6? 6? 6? 6? 6?	\$1\$2 \$2\$3 \$2 \$3\$4 \$3\$4 \$3\$4 \$1 \$3 \$3 \$3 \$2 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3
TERRESTRIAL COMMUNITIES			
BOREAL FOREST  NORTHERN CONIFER FOREST  NORTHERN HARDWOOD FOREST  NORTHERN HARDWOOD-CONIFER FOREST  XERIC CENTRAL HARDWOOD FOREST  XERIC CENTRAL CONIFER FOREST  XERIC CENTRAL HARDWOOD-CONIFER FOREST  PITCH PINE-SCRUB OAK BARRENS  DRY-MESIC ACIDIC CENTRAL FOREST  DRY-MESIC CALCAREOUS CENTRAL FOREST  TALUS SLOPE FOREST  COASTAL PLAIN FOREST  FLOODPLAIN FOREST  RIVER GRAVEL COMMUNITY  EASTERN SERPENTINE BARRENS  APPALACHIAN SHALE BARREN	TAA TBA TBB TBC TCA TCB TCC TCC TCC TCF TCF TCG TCH TEA TFA THA THB	G? G? G?? G?? G??????? G?? G??	S? S3S4 S3S4 S3S5 S3S4 S3S5 S2S5 S2S5 S2S5 S2S5 S1 S1

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
APPALACHIAN SAND BARREN	THC	G?	s?
BOULDER FIELD	THD	G?	S5
CALCAREOUS CLIFF COMMUNITY	THE	G?	S2
ACIDIC CLIFF COMMUNITY SHALE CLIFF COMMUNITY	THF THG	G? G?	S5 S2
RIVERSIDE OUTCROP COMMUNITY	THJ	G?	S2 S1S2
CALCAREOUS RIVERSIDE OUTCROP COMMUNITY	THJA	G?	SISZ
ACIDIC ROCKY SUMMIT COMMUNITY	THK	G?	S1S2
CALCAREOUS ROCKY SUMMIT COMMUNITY	THM	G?	Sl
SUBTERRANEAN COMMUNITIES			
SOLUTION CAVE TERRESTRIAL COMMUNITY	SAA	G?	S3
SOLUTION CAVE AQUATIC COMMUNITY	SAB	G?	S3
TECTONIC CAVE COMMUNITY	SAC	G?	<b>S3S4</b>
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		

<sup>\*</sup> Not all natural communities have been assigned global or state ranks because insufficient data exist on distribution of the types; disturbed and artificial systems are not ranked.

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

Acidic Broadleaf Swamp (PAA): Occupies low-lying areas, often glacial in origin, that are semi-permanently to permanently wet. Acidic waters (pH < 5) influence this forested wetland which is dominated by broadleaf deciduous trees.

Red Maple (Acer rubrum)
Sour Gum (Nyssa sylvatica)
Yellow Birch (Betula lutea)
Hemlock (Tsuga canadensis)
White Pine (Pinus strobus)
Winterberry Holly (Ilex verticillata)
Hazel Alder (Alnus serrulata)
Highbush Blueberry (Vaccinium corymbosum)
Cinnamon Fern (Osmunda cinnamomea)
Sedges (Carex spp.)
Sphagnum Moss (Sphagnum spp.)

Acidic Rocky Summit (THK): Inhabits xeric ridgetops or summits where soils are acidic. Numerous bedrock outcrops create openings in the tree or shrub canopy. Bare ground and openings are dominated by herbaceous or dwarf shrub species.

Black Huckleberry (<u>Gaylussacia baccata</u>)
Lowbush Blueberry (<u>Vaccinium angustifolium</u>)
Poverty Grass (<u>Deschampsia flexuosa</u>)
Scrub Oak (<u>Quercus ilicifolia</u>)
Black Chokeberry (<u>Aronia melanocarpa</u>)
Pitch Pine (<u>Pinus rigida</u>)
Plantain-leaved Pussytoes (<u>Antennaria plantaginafolia</u>)
Pinkster Flower (<u>Rhododendron nudiflorum</u>)

Acidic Shrub Swamp (PAH): Found in depressions, often glacial in origin, that are semi-permanently to permanently wet. Acidic waters influence the community which is dominated by ericaceous shrubs. In general, shrubs cover at least 50% of the peatland while trees cover less than 20%.

Leatherleaf (Chamaedaphne calyculata)
Sheep Laurel (Kalmia angustifolia)
Highbush Blueberry (Vaccinium corymbosum)
Speckled Alder (Alnus rugosa)
Hazel Alder (Alnus serrulata)
Winterberry Holly (Ilex verticillata)
Large Cranberry (Vaccinium macrocarpon)
Sphagnum Moss (Sphagnum spp.)

Boreal Conifer Swamp (PAC): A forest community dominated by conifers like black spruce, larch, and balsam fir on a permanently saturated substrate of shallow to deep peat. Acidic waters influence the community. Small open bog areas are frequently associated with this type.

Black Spruce (<u>Picea mariana</u>)
Larch (<u>Larix laricina</u>)
Balsam Fir (<u>Abies balsamea</u>)
Sheep Laurel (<u>Kalmia angustifolia</u>)
Highbush Blueberry (<u>Vaccinium corymbosum</u>)
Cinnamon Fern (<u>Osmunda cinnamomea</u>)
Sphagnum Moss (<u>Sphagnum spp.</u>)

Broadleaf-Conifer Swamp (PAE): A forest community co-dominated by broadleaf deciduous and coniferous trees on a permanently saturated substrate of shallow peat. The swamp is influenced by water that is acidic to circumneutral.

Red Maple (<u>Acer rubrum</u>)
Yellow Birch (<u>Betula lutea</u>)
Hemlock (<u>Tsuga canadensis</u>)
Highbush Blueberry (<u>Vaccinium corymbosum</u>)
Sphagnum Moss (<u>Sphagnum spp.</u>)

Glacial Bog (PCA): A low-nutrient, acid peatland community occurring in glaciated areas. Bands of plant communities from the bog pond to a graminoid ring and a shrub ring, and finally, a surrounding conifer wetland are characteristic of glacial bogs. The community is dominated by sphagnum mosses, sedges, low evergreen and deciduous shrubs, and scattered stunted conifers.

Sphagnum Moss (Sphagnum spp.)
Leatherleaf (Chamaedaphne calyculata)
Beaked Sedge (Carex rostrata)
Round-leaved Sundew (Drosera rotundifolia)
Large Cranberry (Vaccinium macrocarpon)
Highbush Blueberry (Vaccinium corymbosum)
Cotton Grass (Eriophorum virginicum)
Sheep Laurel (Kalmia angustifolia)

Glacial Lake (LAA): A naturally occurring body of water of glacial origin (ice scour or kettle hole) greater than 15 acres. A barren wave-swept shore is evident along the periphery and the lake is deep enough to thermally stratify during the summer. These lakes may be oligotrophic (low nutrient) to eutrophic (high nutrient load) or dystrophic (high organic matter content, darkstained water, low nutrient availability).

Pondweed (Potamogeton spp.)

White Pond Lily (Nymphaea odorata)
Floating Heart (Nymphoides cordata)
Water Milfoil (Myriophyllum humile)
Bladderwort (Utricularia spp.)

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

Brook Trout (<u>Salvelinus fontinalis</u>)
Mayflies (order Ephemeroptera)

Northern Conifer Forest (TBA): This forest community occurs on moderately well drained to poorly drained soils. It is best developed in deep cool ravines and on north-facing slopes. A low diversity of northern conifers with some northern hardwoods characterizes the forest.

Hemlock (<u>Tsuga canadensis</u>)
White Pine (<u>Pinus strobus</u>)
Red Spruce (<u>Picea rubens</u>)
Yellow Birch (<u>Betula lutea</u>)
Hobble-bush (<u>Viburnum alnifolium</u>)
Mountain Maple (<u>Acer spicatum</u>)
Wood Sorrel (<u>Oxalis montana</u>)

Northern Conifer Swamp (PAD): A forested swamp dominated by conifers such as hemlock and white pine in the overstory and ericaceous shrubs like rosebay rhododendron and highbush blueberry. The water influencing the wetland is usually acidic.

Hemlock (<u>Tsuga canadensis</u>)
White Pine (<u>Pinus strobus</u>)
Yellow Birch (<u>Betula lutea</u>)
Speckled Alder (<u>Alnus rugosa</u>)
Highbush Blueberry (<u>Vaccinium corymbosum</u>)
Goldthread (<u>Coptis triloba</u>)
Cinnamon Fern (<u>Osmunda cinnamomea</u>)
Peat Moss (<u>Sphagnum spp.</u>)

Northern Hardwood Forest (TBB): This forest community occurs on moderately well drained soils and is dominated by northern hardwood trees with an admixture of northern conifers. The herbaceous flora tends to be low in diversity.

Beech (<u>Fagus grandifolia</u>) Sugar Maple (<u>Acer saccharum</u>)

### Appendix V (Concluded.)

Yellow Birch (<u>Betula lutea</u>)
Red Maple (<u>Acer rubrum</u>)
Canada Hemlock (<u>Tsuga canadensis</u>)
Black Cherry (<u>Prunus serotina</u>)

Ridgetop Dwarf-tree Forest (TCD): A forest community on the tops of high ridges where thin, infertile soils, extreme temperatures, and high wind velocities create harsh growing conditions. The forest is characterized by stunted oaks (less than 15 feet) and shrubs. Adverse growing conditions, successive fires, and, in some cases, cutting have acted to arrest succession in these areas. On the Pocono Plateau, this community type refers to the "pitch pine/scrub oak barrens".

Scrub Oak (Quercus ilicifolia)
Chestnut Oak (Q. montana)
Pitch Pine (Pinus rigida)
Sassafras (Sassafras albidum)
Pin Cherry (Prunus pensylvanica)
Lowbush Blueberry (Vaccinium angustifolium)
Black Huckleberry (Gaylussacia baccata)
Black Chokeberry (Aronia melanocarpa)

Shrub Fen (PDA): A peatland community influenced by calcareous waters (pH > 7). This community often occurs on slopes that are saturated by seeps or small streams. Deciduous shrubs with limeloving herbaceous species predominate. Some acidic species grow on hummocks raised above the basic waters.

Poison Sumac (<u>Toxicodendron vernix</u>)
Red Maple (<u>Acer rubrum</u>)
Brook Lobelia (<u>Lobelia kalmii</u>)
Tussock Sedge (<u>Carex stricta</u>)
Spreading Globe Flower (<u>Trollius laxus</u> spp. <u>laxus</u>)

Waterfall and Plungepool (RDA): (includes Waterfall and Rapids) This community is located along creeks where a vertical drop of more than 5 feet occurs. Included in the community is the area from the top of the falls to the beginning of the outflow of the plungepool and the misted cliff faces adjacent to the falls. The current is rapid and the water highly oxygenated and the pool may have water several feet deep.

Brook Trout (<u>Salvelinus fontinalis</u>)
Rock Clubmoss (<u>Lycopodium porophilum</u>)

### APPENDIX VI SPECIAL PLANTS AND ANIMALS OF MONROE COUNTY

### PLANTS

### SCIENTIFIC NAME

AMELANCHIER BARTRAMIANA ANDROMEDA POLIFOLIA ASTER ERICOIDES CAREX COLLINSII CAREX FLAVA CAREX HAYDENII CAREX LASIOCARPA CAREX OLIGOSPERMA CAREX PAUPERCULA CAREX POLYMORPHA ELEOCHARIS OLIVACEA GAULTHERIA HISPIDULA GLYCERIA OBTUSA ILEX OPACA JUNCUS FILIFORMIS LEDUM GROENLANDICUM LEUCOTHOE RACEMOSA LOBELIA KALMII LONICERA VILLOSA LYCOPODIUM APPRESSUM LYGODIUM PALMATUM MUHLENBERGIA UNIFLORA MYRICA GALE MYRIOPHYLLUM FARWELLII NUPHAR LUTEUM spp. PUMILUM NYMPHOIDES CORDATA OPUNTIA HUMIFUSA PARNASSIA GLAUCA POTAMOGETON OAKESIANUS POTENTILLA FRUTICOSA POTENTILLA TRIDENTATA PRUNUS PUMILA SCIRPUS ANCISTROCHAETUS TROLLIUS LAXUS SSP. LAXUS UTRICULARIA PURPUREA

XYRIS MONTANA

### COMMON NAME

OBLONG-FRUITED SERVICEBERRY BOG-ROSEMARY WHITE HEATH ASTER COLLIN'S SEDGE YELLOW SEDGE HAYDEN'S SEDGE MANY-FRUITED SEDGE FEW-SEEDED SEDGE BOG SEDGE VARIABLE SEDGE CAPITATE SPIKE-RUSH CREEPING SNOWBERRY BLUNT MANNA-GRASS AMERICAN HOLLY THREAD RUSH LABRADOR TEA SWAMP DOG-HOBBLE BROOK LOBELIA MOUNTAIN FLY HONEYSUCKLE a CLUBMOSS HARTFORD FERN FALL DROPSEED MUHLY SWEET BAYBERRY FARWELL'S WATER-MILFOIL YELLOW COWLILY FLOATING-HEART PRICKLY-PEAR CACTUS CAROLINA GRASS-OF-PARNASSUS OAKE'S PONDWEED SHRUBBY CINQUEFOIL THREE-TOOTHED CINQUEFOIL SAND CHERRY NORTHEASTERN BULLRUSH SPREADING GLOBE FLOWER PURPLE BLADDERWORT NORTHERN YELLOW-EYED GRASS

#### ANIMALS

### SCIENTIFIC NAME

AESHNA CLEPSYDRA
APAMEA CRISTATA
APHARETRA PURPUREA
APLECTOIDES CONDITA
CHAETAGLAEA CERATA
CIRCUS CYANEUS
CLEMMYS MUHLENBERGII
DOROCORDULIA LEPIDA
EPIGLAEA APIATA
EPIRRITA AUTUMNATA HENSHAWI
ERYNNIS PERSIUS PERSIUS
GLENA COGNATARIA
HEMILEUCA MAIA
HEMIPACHNOBIA SUBPORPHYREA

MONOCHROMATEA
INCISALIA IRUS
ITAME SP. 1
LYCIA RACHELAE
MYOTIS SEPTENTRIONALIS
PANDION HALIAETUS
PAPAIPEMA SP. 1
PSECTRAGLAEA CARNOSA
SOREX PALUSTRIS ALBIBARBIS
XYLOTYPE CAPAX
ZALE CUREMA
ZALE SUBMEDIANA
ZANCLOGNATHA MARTHA

### COMMON NAME

SPOTTED BLUE DARNER
a NOCTUID MOTH
a NOCTUID MOTH
a NOCTUID MOTH
NORTHERN HARRIER
BOG TURTLE
ELEGANT SKIMMER
POINTED SALLOW
NOVEMBER MOTH
PERSIUS DUSKYWING
BLUEBERRY GRAY
BARRENS BUCKMOTH
SUNDEW MOTH

FROSTED ELFIN
BARRENS ITAME
TWILIGHT MOTH
NORTHERN LONG-EARED BAT
OSPREY
AMIANTHIUM BULB BORER
PINK SALLOW
WATER SHREW
BARRENS XYLOTYPE
a NOCTUID MOTH

Appendix VI (Continued.)

Vertebrate Characterization Abstracts

Circus cyaneus (Northern Harrier)

The Northern Harrier is a bird species that has a wide distribution in the New World breeding in areas as far north as Alaska and northern Saskatchewan and south to northern Baja California, southern Texas, and southeastern Virginia. During winter months it ranges from southern Canada to northern South America and the Antilles. In Pennsylvania, the species is statewide during migration and occasionally spotted during the winter. Most observations of the bird come from the southeast part of the state.

The Northern Harrier generally arrives in northern breeding areas in March and April and departs between September and November. It inhabits marshes, meadows, grasslands, and cultivated fields and often perches on the ground or on stumps or posts. It has been observed nesting 1) on the ground, near low shrubs, in tall weeds or reeds, sometimes in bogs, 2) on the tops of low bushes above the water, and 3) on a knoll of dry ground. It is carnivorous and enjoys a diet of small mammals, frogs, small snakes, lizards, crayfishes, many insects, small birds, and carrion. The Northern Harrier usually flies low when hunting and captures its prey on the ground.

The clutch size ranges from three to nine, with five as the average. Incubation lasts from 31-32 days and is accomplished by the female. The young fly at about 30-35 days. Some males are polygynous.

### Clemmys muhlenbergii (Bog Turtle)

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

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

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

### Appendix VI (Continued.)

### Myotis septentrionalis (Northern Long-eared Bat)

The Northern Long-eared Bat is widely distributed in eastern North America ranging from Hudson Bay south to Alabama and Georgia. Western populations extend to British Columbia and the Northwest Territories. In Pennsylvania, the bats occur in a handful of caves during the winter months. During the summer months, the bat is probably present in suitable habitat statewide, but is only known to occur in about one dozen scattered counties.

The Northern Long-eared Bat is closely associated with deciduous/coniferous forests. In the summer, it occurs under loose tree bark or in buildings. During the winter, it hibernates in caves and mines which have a high relative humidity, calm air flow, and temperatures near 40 degrees F.

The Northern Long-eared Bat preys on flying insects, foraging in upland forests above and below the canopy. The foraging activities begin just after dusk and prior to dawn. Unlike other Myotis species, it is not dependent upon water bodies as foraging areas. It may occur singly or in small colonies during the year. Small nursery colonies typically occur in manmade structures or tree cavities. The bat becomes most gregarious in the winter with congregations of 300-350 individuals.

The bat breeds during September and October. Fertilization is delayed until spring. Gestation ranges from 50 to 60 days. The litter size is usually one young born mid-June to early July.

### Pandion haliaetus (Osprey)

The Osprey is a bird species that is widely distributed. It breeds from Alaska to Newfoundland and south from Baja California to the West Indies. It winters from California to southern Bermuda and South America. During migration, the osprey is state-wide in Pennsylvania. The breeding populations in northern North America are migratory, arriving in northern breeding areas between March and May and departing between September and November.

The Osprey occurs along rivers, lakes, and seacoasts. During migration it is widespread, often crossing land between bodies of water. It nests in dead snags, living trees, cliffs, utility poles, wooden platforms on poles, channel buoys, chimneys, and windmills. Usually, nesting sites are near or above water. Ospreys often return to the same nest year after year. The bird eats fish almost exclusively and is famous for its impressive feetfirst plunges into water to catch fish.

The clutch size ranges from two to four and is usually three. Incubation lasts from four to seven weeks and is usually done by the female with the male providing food. The young first fly at seven to eight weeks. The Osprey first breeds at three years and may nest in loose colonies. In Pennsylvania, breeding occurs in the northeastern part of the state and along the lower Susquehanna River.

### Appendix VI (Concluded.)

The Osprey now found in Pennsylvania are the result of a reintroduction effort on the part of the PA Game Commission and East Stroudsburg University.

### Sorex palustris albibarbis (Water Shrew)

The Water Shrew ranges from southern Alaska to California, the Rockies, the northern Great Lakes region, and New England. A disjunct population survives in the middle Appalachians. In Pennsylvania, it is distributed in small pockets of optimal habitat primarily in the northeastern part of the state.

The Water Shrew is most abundant along small cold streams with thick overhanging riparian growth. Den sites are near water in underground burrows, rafted logs, beaver lodges, and other areas providing shelter. The surrounding forests are usually characterized by hemlock, spruce, and rhododendron.

The Water Shrew depends primarily on aquatic insects and may take small vertebrates when available. It hunts under and on top of the water. Reportedly, it has been seen running across the water surface. Generally, it is active throughout the day and in every season.

The Water Shrew breeds from February to August. Gestation probably takes three weeks. The litter size ranges from four to eight and averages six. Two to three litters may be produced each year. The shrew is sexually mature in nine months and usually does not survive past the second summer.

### A NATURAL AREAS INVENTORY OF MONROE COUNTY, PENNSYLVANIA Update -- 1999

Submitted to:
The Monroe County Planning Commission
Monroe County Courthouse
Middletown, PA 17057

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

#### INTRODUCTION

These data are supplementary to the Monroe County Natural Areas Inventory (NAI) completed in 1991. Included are new findings of species of special concern and natural communities in the county since the time of the NAI. There are also updates on species and communities (elements) reported in the original document. In some cases the site quality rank has changed and /or the state rarity rank (S rank) has changed, or additional species of concern have been identified at sites listed in the original report.

The format of this update follows that of the Monroe County NAI Report, and the reader is referred to that document for a summary of the Natural Areas identified in the county as well as for an explanation of the ranks and codes contained in this update. The Summary and Recommendations reviews the importance and conservation status of the six top priority sites for conservation identified in the original NAI report. These sites still represent the most critical sites for maintaining ecological diversity in Monroe County. Table 1 of the update lists each of the new or updated sites in order of priority for conservation, compared to all NAI sites identified in the county. Following Table 1 the update is arranged alphabetically by USGS quadrangle map. The corresponding page number from the original NAI is given for each USGS quadrangle table. Each table provides the global and state rarity ranks, state legal status, site quality, and the date last observed for each element. Following the table is a brief narrative for each site, noting whether it is a NEW occurrence or an UPDATE.

Sections of USGS maps accompany the map tables, showing the location of each NEW site only. The area outlined on the maps represents the species' locations as well as the watershed or subwatershed area where the elements (species or natural communities) are located. Proposed development activities within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess potential impacts.

These maps can be transcribed onto the original maps produced for the 1991 NAI. The new site boundaries are also included in GIS format on the enclosed disk. These boundaries are included as polygons in an Arc-View file titled "monrpoly.shp". The USGS quadrangle, township, and associated elements for each polygon are included in this file. The text of this report is saved to an MS-Word file titled "monupd.doc". Questions about this update or the original NAI can be directed to Aura Stauffer, assistant ecologist, or Richard Ring,, Natural Areas Inventory Coordinator, at the address on the title page.

#### SUMMARY AND RECOMMENDATIONS

Monroe County has a wealth of unusual natural areas, and many of these sites support plant and animal species considered rare in the state or even globally. These sites are found throughout the county, in forested, agricultural, and more urbanized sections. Nineteen new sites are identified and mapped here for the first time., and updated information is provided on twenty-eight sites from the original NAI report. Many of the significant natural areas identified in the Inventory have been well protected, but some of the most unusual areas are only partially protected or not protected at all.

### Conservation Status of Top Priority Sites in Monroe County:

The following six sites from Table 1 are regarded as the most significant for Natural Communities and/or species of special concern. Each site is followed by its US Geological Survey quadrangle map and the municipality in which it is located. For additional information, consult the map tables and descriptions in this document and in the original NAI report.

Long Pond Macrosite (Blakeslee, Pocono Pines), Tunkhannock/Chestnut Hill/ Jackson Townships. There is no other place on Earth like the Long Pond ecosystem. The site encompasses outstanding examples of heath communities, oak barrens, and boreal wetlands,—including a one-of-a-kind rhodora- dominated heath community. Rhodora is a native azalea species which blooms in spectacular abundance at Long Pond in May. Dozens of rare, threatened, or endangered plant and animal species inhabit these communities. The Long Pond area supports the highest concentration of globally rare species (seven) and natural communities in Pennsylvania. Parts of this unique area have been protected by Monroe County and The Nature Conservancy, but about 10,000 acres are in need of protection.

Cherry Creek Valley (Saylorsburg, Stroudsburg), Hamilton/Stroud Townships. The Cherry Creek Valley is an agricultural landscape with Cherry Creek flowing through its center. The limestone-enriched groundwater and unique surface geology have combined to create unusual "calcareous fen" natural communities. The Cherry Creek Fen Site described in the original report supports five plant species of concern, and three new populations of rare plant species and a PA-Endangered animal species have recently been discovered at other associated wetlands along the valley bottom. Pocono Heritage Land Trust has protected about 100 acres, and about 1,000 additional acres in the valley need protection.

Big Offset Barren (Saylorsburg, Wind Gap), Ross Township. This scenic area atop Blue Mountain supports a good population of a globally rare, PA-Endangered plant species. This sedge species occupies dry to moist sites, and occurs here in an open forest of sassafras, red maple, and aspen. Some of this site is in public ownership, but additional land may need to be protected. Care should be taken to avoid disturbance of this population from use or re-routing of the nearby Appalachian Trail.

Tannersville Cranberry Bog (Mt. Pocono, E. Stroudsburg) Pocono/Stroud Townships. This world-renowned wetland system supports excellent examples of three natural communities: boreal conifer swamp (primarily spruce and tamarack) acidic broadleaf, swamp, and glacial bog. Three plant species of concern and a PA-Endangered butterfly species also occur here. While about 800 acres have been protected by The Nature Conservancy and Pocono Township, an additional 300 acres are in need of protection.

Two Mile Run Swamp (Blakeslee, Thornhurst), Tobyhanna township. Two Mile Run is a diverse wetland complex containing a large, excellent-quality boreal conifer swamp dominated by red spruce, tamarack, and balsam fir, and two plant species of special concern growing in an acidic shrub swamp. The site supports one of PA's largest and healthiest native spruce forests and one of its few large undisturbed peatland ecosystems. The Nature Conservancy, Wildlands Conservancy, and Tobyhanna Township have protected 2,300 acres. An additional 200-300 acres of primary habitat need protection, and there are approximately 1,700 acres of buffer land between Two Mile Run and the Lehigh River which should also be protected.

Lake Mineola Marsh\_(Brodheadsville), Chestnut Hill Township. Lake Mineola Marsh is a robust emergent marsh formed in a shallow kettle lake to the south of Lake Mineola. A Federally Endangered Bulrush and two additional plant species of concern occur here. The protection of the lake's naturally fluctuating water table is of critical importance. The Nature Conservancy, in cooperation with Pocono Heritage Land trust and the West End Youth Athletic Association, has protected more than 100 acres at the site. Additional land protection will be needed, both at the marsh itself and in the surrounding area affecting the hydrology of the lake.

Table 1. Addendum to Table 1 of Monroe CNAI of 1991. New or updated (since 1991) sites of statewide significance for the protection of biological diversity in Monroe County. Site are listed in approximate order of priority from the most important (rank=1) to the least (rank=5). Only new or updated sites are included, but priority rankings reflect sites' relative importance compared to all sites included in the original NAI.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
1	Long Pond Macrosite UPDATE	Blakeslee Pocono Pines	A bird species (SA587) listed as S3B, S4N by The Nature Conservancy is believed to be nesting at this site. A fair population of State-Endangered grass species (SP504) was observed once again in July of 1991. An additional population of this species (SP584) was found in 1994 within the Long Pond Macrosite. Three fair populations of a PA Endangered plant (SP526) were identified in 1993. The previously identified barrens community (NC533) appears to be doing well. Potential threats to the plant, animal, and natural communities on this site include development (e.g., residential and roadways).
1	Lake Mineola Marsh UPDATE	Brodheadsville	This site was revisited in December of 1991 and in 1993. A marginal population of a Federally Endangered bulrush (SP513a) still persists at the site. The Pennsylvania Rare spike rush (SP513b) was seen during the 1991 survey, but not during the 1993 site visit. Because the occurrence of this species from year to year is known to be quite variable, this species may still occur at the site. A new record of a marginal population of a Pennsylvania rare grass (SP513c) was observed in 1993. Nearby quarrying and development are potential threats of concern.

<sup>&</sup>lt;sup>1</sup> Sites are ranked from 1 to 5 with 1 being the highest priority sites for protection based on state or national significance, and 5 indicating the lowest priority for protection. Ranks take into account potential threats, management needs, and existing protection. Sites of similar rank are listed alphabetically quadrangle.

See Appendix F of the original NAI for an explanation of Global and State vulnerability ranks.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
1	Cherry Creek Valley UPDATE / NEW	Saylorsburg Stroudsburg	The site was revisited from 1994-1999. Five plant species of concern were still observed at the "Cherry Creek Fen Site." Three new populations of plant species of concern and two populations of a PA Endangered animal species were identified in the same watershed. These areas combined make up "Cherry Creek Valley;"
			one of the most important sites for conservation in the state. Threats include invasion by aggressive plant species (e.g., cattails).
2	Two Mile Run Swamp UPDATE	Blakeslee	Two plant species of concern were monitored in 1992. The population of a State Rare rush (SP549) is still marginal, and the Pennsylvania Endangered sedge (SP565) population was still ranked as "good." The biggest threat to the sedges is disturbance by ATVs. No threats to the rush population were identified.
2	Tannersville Cranberry Bog UPDATE	Mount Pocono	This site was revisited in 1992. A good populations of a PA Rare plant species (SP507) was found still growing at the site. Two new records of plant species of concern (SP530 a and b) were identified during the field visit. SP530a is a marginal population. Additional surveys are needed to the size and condition of SP530b. The greatest threat to the site appears to be natural succession.
2	Big Offset Barren UPDATE	Saylorsburg Wind Gap	A good to marginal quality population of a State Endangered plant species (SP517) was revisited in 1993 and 1997. The population seems to be doing well and the growth of the plants was vigorous.
3	Pocono Lake Preserve Site UPDATE	Blakeslee	This site was revisited in 1993. A new population of a State Rare plant (SP566) was found south of Pocono Lake. There are no apparent threats to this population and no special management is needed.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
3	Weir Creek Woods NEW	Brodheadsville	A small population of a Pennsylvania Endangered plant species (SP515) globally ranked as G3 was found at this site in 1993. Threats to the population include: mowing or spraying of the roadbank, road widening or highway construction projects, and the effects of road de-icing agents in winter. Additional surveys are needed to determine the extent of the population.
3	Buck Hill Falls UPDATE	Buck Hill Falls	A small population of a Pennsylvania Endangered plant species (SP530) was observed in a cliff area along Buck Hill Creek in June of 1991. Because this site is a tourist attraction that is kept in a natural state, the only potential threats to the plants appear to be trampling and picking by tourists, and scouring from the creek during high water.
3	Shoemakers Swamp NEW	Bushkill	The National Park Service owns this forested wetland. Four plant species (SP553a, b, c,d) of special concern were identified on this site in 1995. No obvious threats were observed during the field visit with the exception of increased beaver activity. Further work is needed to verify and evaluate the extent of the plant populations.
3	Lost Lakes UPDATE	Pocono Pines	This site was revisited in June and November of 1991. The kettlehole bog community (NC598a) is intact with three plant species of concern still present at the site (SP510, SP514, and SP569). A northern hardwood forest (NC598b) was identified at the site in 1991. At the time of the field visit, the site was under serious threat from development and draining of the land for a residential development (Emerald Lakes).

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						Toronto Company (Control of Control of Contr		
	County Rank <sup>1</sup>	Site Name or Code (municipality)		USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations			.!
	3	Sullivan Trail /Lake Na Shrub Swamps UPDATE	aomi	Pocono Pines	A good population of Pennsylvania Rare shrub (SP528b) ar marginal population of a State Endangered shrub (SP528a) y revisited at this site in 1997. Deer browse, trash dumping abundance of foot paths, and development are potential threat this bog/northern hardwood forest community. More surveys	were , an ts to		
		;	#		needed when the shrubs are flowering in order to ascertain population size.	the		
	4	Schoch Barren UPDATE		Blakeslee	This site is located in the Delaware State Forest and State G Lands No. 129. A Ridgetop Dwarf Tree Forest Nat Community still exists at the site. The site should be prote	tural		
• .					from gypsy moth spraying. Long term maintenance of the bahabitat with fire may be required.	irren		
	4	Wagners Bog UPDATE		Blakeslee	This site is a conservation area owned by the Wagner Forest I Home Owners Association. A poor population of a State I Endangered shrub (SP539b) and a good population of a State I shrub (SP539a) were found still intact when revisited in 1 Deer browse is the greatest threat to these two shrub species.	State Rare		
	4	Cresco Heights UPDATE		Buck Hill Falls	This site was revisited in June of 1991. Four plant species of concern were once again located. The plants were growing with normal vigor in the Acidic Rocky Summit Natural Community.			
	4	Arnott Fen UPDATE		Bushkill	The site was revisited in 1998. Five plant of concern occur as site. The condition of these plant populations ranges from good poor. The overall condition of the shrub fen (NC526) is good marginal. Invading shrubs and red maple saplings pose a three some of the species of concern at this site.	od to		
			- -		8	•		

County Site Name or Code Rank <sup>1</sup> (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
4 Tamaque Lake Swamp UPDATE	Pocono Pines	This site was revisited in 1993. A good population of a State Rare shrub (SP638) still exists at the site. In addition, two new small populations of a State Rare plant (SP657) and a State Rare rush (SP658) were identified. The only apparent threat to these acidic shrub swamp/boreal conifer swamp communities and the species they contain is development of the watershed.
West Mountain Monroe NEW	Skytop	An excellent population of a Pennsylvania Threatened plant (SP507) was recorded within the Skytop Resort area in June of 1991. No apparent threats to the population were identified. A management agreement with the Skytop Resort would ensure protection of this area.
4 Laurel Drive Bog UPDATE	Tobyhanna	This site was revisited in August of 1991. SP527 was not found during the field visit. The population of a plant species (SP507) of concern is still present and appears to be healthy. This area was mined in the past. Current threats include beaver activity.
5 Pimple Hill Barren NEW	Blakeslee	A poor quality population of a shrub species of concern was found at this site in 1998 along edge habitat between a conifer plantation and a heath barren. Additional surveys of this area and the adjacent heath barren are recommended when the shrubs are flowering.
5 Dutch Hill - William Price Nursery UPDATE	Buck Hill Falls	An individual male of an animal species of concern (SP538) was photographed in the Dutch Hill area during 1992. This species is known to den nearby. Because the home range of this animal varies (e.g., 1/2 to 20 square miles), habitat development is a threat.

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County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Shawnee Fen NEW	Bushkill	A small, poor population of a Pennsylvania Threatened plant (SP539) was found growing in a mossy, open area at this site in 1993. Threats to the plant species include changes in hydrology (e.g., drainage ditches), beaver activity, and competition /succession. Additional surveys are recommended.
5	Turn Farm Woods NEW	Bushkill	The site is part of the Delaware Water Gap National Recreation Area. A good population of a plant species (SP558) of concern was discovered here in 1997. Exotic species invasion appears to be the only threat at the site. Monitoring of the population is needed to determine the effects of these exotic plant species.
5	Laurel Run Road Site NEW	East Stroudsburg Skytop	Two colonies of an animal species of concern (SA517) of concern were seen at this site in 1990. Three colonies of the same species were seen on red oak leaves in June of 1991. Additional surveys are needed to determine the size and extent of these populations.
5	Old Hogback Road Wetland NEW	Flatbrookville	This site is part of the Delaware Water Gap National Recreation Area. It is a wetland area located within the Wallpack Bend Cliff site. A good population of a plant species of concern (SP507) was identified here in 1996. Beaver activity near the site appears to be changing the hydrology of the area. Periodic monitoring of the population status is recommended.
5	Lehigh River-RT 115 Bridge Site NEW	Hickory Run Pleasant View Summit Thornhurst	A good population of a Pennsylvania Rare plant species (SP526) was found growing in an open area on a rocky substrate in the Lehigh River.
			10

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Aquashicola Creek NEW	Kunkletown	A good to marginal population of a Pennsylvania tentatively undetermined plant species (SP511) was identified in an open portion of Aquashicola Creek on a pebble/cobble bottom. No obvious threats to this population were noted in the field.
5	Camelback Mountain UPDATE	Mount Pocono	A new record of a small population of a Pennsylvania Rare shrub (SP547) was identified within Big Pocono State Park. Potential threats include deer and natural competition. This natural barren should be kept intact. The use of fire may be warranted.
5	Delaware Water Gaps UPDATE	Portland Stroudsburg	A good example of an Acidic Cliff Natural Community (NC505) was found above the Delaware River in 1997. The community is nearly vertical and is 25-50 acres in size. This site is protected as part of the Delaware Water Gap National Recreation Area.
5	Aquashicola Creek Wetland NEW	Saylorsburg Wind Gap	A marginal population of a State Threatened plant (SP523) and a good to marginal population of another PA Threatened plant species (SP522) were mapped at this site in 1993. The vegetation is quite diverse, consisting of marshy areas and marshy areas interspersed with shrub thickets. Threats to the site include beaver activity and some grazing by cattle.
5	Buckwha Creek NEW	Saylorsburg	A marginal population of a plant species of concern (SP521) was identified at the site in 1993. The main threat to the site appears to be succession/competition. Site management recommendations include mowing every other year.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Hamilton Square Swale NEW	Saylorsburg	Two plant species of concern were mapped here in 1993. SP519a is listed as PA Threatened and SP519b is a Tentatively Undetermined plant species. Threats to the site include competition from exotic species and succession and deer browse. Further disturbance (e.g., grazing by cattle) of the site should be avoided.
5	Hartman's Cave UPDATE	Stroudsburg	This area was surveyed by the PA Game Commission in 1997. Ten individuals of SA505 were found in February. No special management recommendations were given by the PGC.
5	Mansfield Seep UPDATE	Stroudsburg	This area was revisited in April of 1991. A small population of a PA Endangered plant species (SP510) is still present at the site. Additional surveys are needed to determine the size of the population.
5	Mount Minsi UPDATE	Stroudsburg	A small population of a state-rare shrub species (SP515) was once again found growing at this site in 1992. Threats to the species include trampling by hikers and deer browse.
5	Pomeroy Woods UPDATE	Stroudsburg Saylorsburg	This Mesic Central Forest Natural Community (NC547) was observed again in 1992. The quality of the site was assessed as marginal to poor. The biggest threat appears to be development around the site.
5	Totts Gap UPDATE	Stroudsburg	This site was revisited in 1991. The PA Rare shrub species (SP578) was determined to be in poor condition.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Anglewood Lake Swamp UPDATE	Thornhurst	This population of a State Rare rush (SP516) was found intact in 1992. The population was found growing in a man-made clearing along a property line. Maintaining this opening in the winter or early spring will help to keep out shrubs.
5	Barney's Lake Swamp NEW	Tobyhanna	A marginal to good population of a PA Rare plant species (SP578) was mapped at the site in 1993. No threats to the species were apparent during the field visit. No special management was recommended.
5	East Branch Shrub Swamp NEW	Tobyhanna	An excellent population of a PA Threatened shrub (SP573) was mapped at the site in 1991. Threats to the site include powerline right-of-way maintenance and beaver activity.
5	Hummler Run NEW	Tobyhanna	An animal species of concern (SA576) was found in Hummler Run in 1993. Additional surveys are needed to determine the size of the population. No threats or management recommendations were noted.
5	Oakes Swamp UPDATE	Tobyhanna	In 1993, a marginal population of a PA Rare shrub (PA548) species was revisited. A new record of a State Threatened plant (SP579) was also identified at the site. Beaver activity and flooding associated with the construction of a highway were threatening the site at the time of the visit.
5	Pocono Lake North NEW	Tobyhanna Thornhurst	This site is on State Game Lands #127. A marginal to poor population of a PA Rare plant species (SP577) was found at the site in 1993. No special management recommendations were noted.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Powder Smoke Ridge Wetlands UPDATE/NEW	Tobyhanna	This site was revisited in 1993 to search for SP521 mentioned in the 1991 report. One new record of a animal species (SA580) of concern and two plant species of concern (SP 515 and SP581) were recorded in nearby wetlands. More surveys are needed to determine the size and quality of SA580. No obvious threats to the plant species were observed. No special site management is needed. The site boundary has been expanded since the 1991 report to include these new animal and plant populations.
5	Scott Property Site NEW	Tobyhanna Thornhurst	A poor to marginal Acidic Shrub Swamp Natural Community (NC584) was identified here in 1995. The site is dominated by leatherleaf, rhodora, sphagnum moss, and polytrichum mosses. Very pronounced mounds at the site suggest that this area was once logged. No obvious threats to the site or management needs were noted.
5	Warnertown Wetlands NEW	Tobyhanna	Four marginal to poor populations of plant species of concern (SP516, and SP520a,b,c) were identified in this area during 1991 and 1992. This site is a large clearing in which several sources of Tobyhanna Creek join together. The clearing was probably logged several years ago and the forest has never returned. The area consists of several habitat types including marshes, bogs, shrub
			thickets, and beaver ponds. No obvious threats to the plants were observed. The site should be kept in its present state.

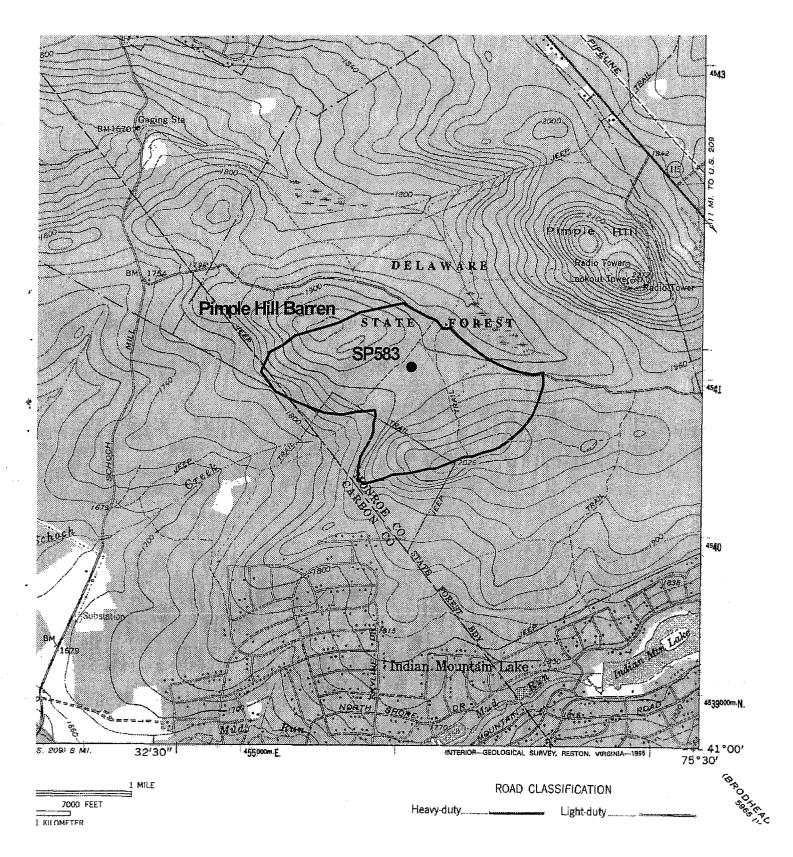
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County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks <sup>2</sup> , Importance and Recommendations
5	Aquashicola Creek Shrub Swamp UPDATE	Wind Gap	A plant species (SP501a) of special concern, which was identified in 1982, was revisited in 1993. This poor to moderate population is still present in the pipeline right-of-way. A new record of a State Threatened plant (SP501b) was also identified in the pipeline right-of-way. Periodic spraying in the right-of-way may be preventing these populations from spreading further. Occasional mowing may actually benefit these species and is preferred to spraying as a method of keeping the right-of-way open.

# USGS QUADRANGLE MAP: Blakeslee (65)

•		TNC	Ranks	State	Last	Quality
a montant are there a process above the artificial and whose or a cold status contains and state and state of the cold	Code	Global	State -	Status	Seen	VIII CANALANTANAMANANANANANANANANANANANANANANANANA
NATURAL COMMUNITIES:	533	G?	S1	N	10/14/92	A
•	564	G4	S3	N	11/5/91	BC
SPECIAL PLANTS:	504	G5	S1	PE	7/24/91	$\mathbf{C}$
	526	G5	S2	PE	7/21/93	В
	539a	G5	S3	PR	9/4/97	В
	539b	G5	S1	PE	9/4/97	D
•	549	G5	S3	PR	2/18/92	C
	565	G5	S3	PE	2/18/92	В
•	566	G5	S3	PR	7/9/93	C
•	583 .	G5	S1	TU	8/30/98	D
	584	G5	<b>S</b> 1	PE	9/16/94	D
SPECIAL ANIMALS:	587	G5	S3B,S4N	N	7/17/95	E

# Blakeslee Quad



Scale 1:24,000

### Blakeslee Quadrangle:

SP504, SP526, SP584, SA587 and NC533 - UPDATE - (Tunkhannock Twp.) "Long Pond Macrosite". This large site, which is partially located along the eastern side of the Blakeslee quadrangle, extends into the Pocono Pines quadrangle. A bird species (SA587) listed as S3B, S4N by The Nature Conservancy is believed to be nesting at this site. A pair were observed in 1995 flying over Long Pond during the breeding season. A fair population of State Endangered grass species (SP504) was observed once again in July of 1991. An additional population of this species (SP584) was found in 1994 within the Long Pond Macrosite. Three fair populations of a PA Endangered plant (SP526) were identified in 1993. A proposed bridge replacement threatened these populations in 1993. The previously identified Oak Heath Pitch Pine Barrens Natural Community (NC533) appears to be doing well. The invertebrate and vertebrate fauna, suite of rare plants, and outstanding natural communities at Long Pond represent one of the best assemblages of rare, natural features identified in the Commonwealth. Potential threats to the plant, animal, and natural communities on this site include adjacent development (e.g., residential and roadways).

SP583 - NEW - (Tunkhannock Twp., Monroe County and Penn Forest Twp., Carbon County) "Pimple Hill Barren" A poor quality population of a shrub species of concern (SP583) was found at this site in 1998 along edge habitat between a conifer plantation and a heath barren. Associated species include black chokeberry, rhodora, and scrub oak. Additional surveys of this area and the adjacent heath barren are recommended when the shrubs are flowering.

SP566 - UPDATE - (Tobyhanna Twp.) "Pocono Lake Preserve Site" This site was revisited in 1993 to search for new occurrences of a State Rare plant. A new marginal quality population of this plant species (SP566) was found south of Pocono Lake. Associated species include red maple, cinnamon fern, sedges, white pine, and sphagnum moss. There are no apparent threats to this population and no special management is needed.

NC564 - UPDATE - (Tunkhannock Twp, Monroe County and Penn Forest Twp., Carbon County) "Schoch Barren" This site is located in the Delaware State Forest and State Game Lands No. 129. A good to marginal quality Ridgetop Dwarf Tree Forest Natural Community globally ranked as G4 still exists at the site. These habitats have the potential for rare Lepidopteran species. Consequently, the site should be protected from gypsy moth spraying. Long term maintenance of the barren habitat with fire may be required.

SP565 and SP549 - UPDATE - (Tobyhanna Twp.) "Twomile Run Swamp" Two plant species of concern, which were identified at the site in 1990, were monitored in 1992. The population of a State Rare rush (SP549) was still marginal, and the Pennsylvania Endangered sedge (SP565) population was still ranked as "good." The biggest threat to the sedge population is disturbance by ATVs. No threats to the rush population were identified.

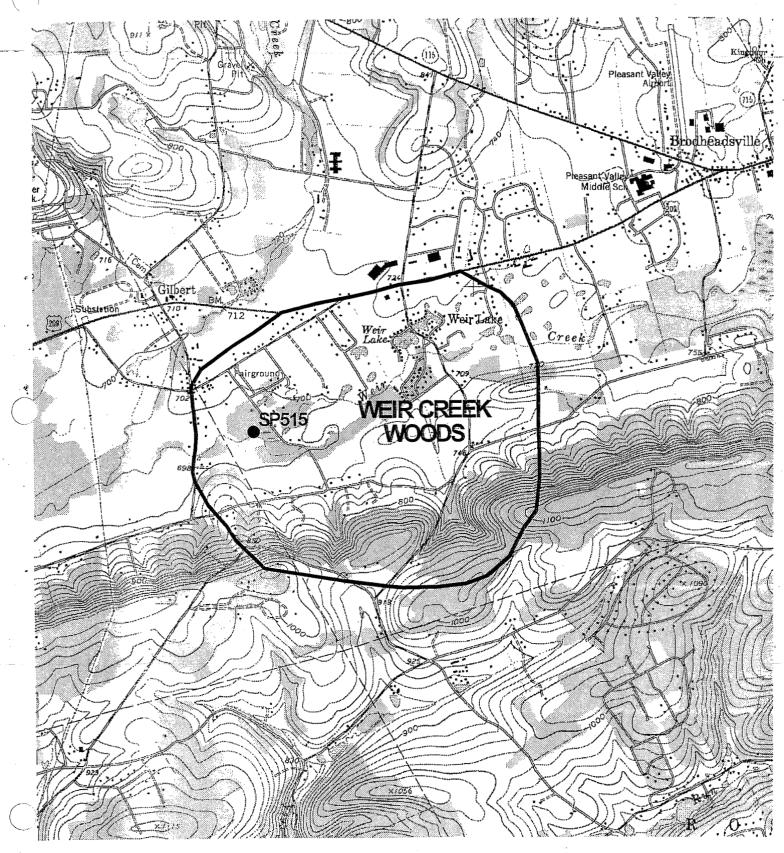
SP539a and SP539b - UPDATE - (Tobyhanna Twp.) "Wagners Bog" This site is a conservation area owned by the Wagner Forest Park Home Owners Association. A poor population of a State Endangered shrub (SP539b) and a good population of a State Rare shrub (SP539a) were found still intact when revisited in 1997. Deer browse is the greatest threat to these two shrub species.

### USGS QUADRANGLE MAP: Brodheadsville (99)

		TNC Ranks		State	Last	Quality	
	Code	Global	State	Status	Seen		
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	513a 513b 513c 515	G3 G5 G5 G3	S3 S3 S2 S2	PE PR PE PE	7/29/93 12/2/91 7/29/93 7/29/93	C E C D	

SPECIAL ANIMALS:

# Brodheadsville Quad



Scale 1:24,000

### Brodheadsville Quadrangle:

SP513a, SP513b, and SP513c - UPDATE - (Chestnut Hill Twp.) "Lake Mineola Marsh" This site was revisited in December of 1991 and in 1993. A marginal population of a Federally Endangered bulrush (SP513a) globally ranked as G3 still persists at the site. The Pennsylvania Rare spike rush (SP513b) was seen during the 1991 survey, but not during the 1993 site visit. Because the occurrence of this species from year to year is known to be quite variable, this species may still occur at the site. A new record of a marginal population of a Pennsylvania Rare grass (SP513c) was observed in 1993. Nearby quarrying and development are potential threats of concern.

SP515 - NEW- (Chestnut Hill and Polk Twps.) "Weir Creek Woods" This area consists of a slightly elevated bank that borders a road and woods. A vernal pond and marshes are nearby. A small population of a Pennsylvania Endangered plant species (SP515) globally ranked as G3 was found at this site in 1993. Associated species include highbush blueberry, lowbush blueberry, huckleberry, spotted wintergreen, dangleberry, poison sumac, swamp azalea, and tussock sedge. The roadside also has some exotic species (e.g., Canada bluegrass) and native weeds. Threats to the population include: mowing or spraying of the roadbank, road widening or highway construction projects, and the effects of road de-icing agents in winter. Additional surveys are needed to determine the extent of the population.

### USGS QUADRANGLE MAP: Buck Hill Falls (53)

	Code		Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	502a 502b 515 524 530	G5 G5 G5 G4 G5	S1 S3 S1S2 S2 S1	PE PR PE PT PE	6/27/91 6/27/91 5/6/91 6/27/91 6/26/91	B C C B
SPECIAL ANIMALS:	538	G5	S3S4	N	5/3/92	E
HQ-CWF/EV WATER	Devils Hole Creek					
OTHER:	East Branch Shrub Swamp; see Tobyhanna quadrangle for sp572					le for sp573

### Buck Hill Falls Quadrangle:

SA538 - UPDATE - (Barrett Twp.) "Dutch Hill - William Price Nursery" An individual male of an S3S4 animal species of concern (SP538) was photographed in the Dutch Hill area during 1992. This species is known to den nearby. Because the home range of this animal varies (e.g., 1/2 to 20 square miles), habitat development is a threat, but no special management or protection is recommended.

SP530 - UPDATE - (Barrett Twp.) "Buck Hill Falls" A small population of a Pennsylvania Endangered plant species (SP530) was observed in a cliff area along Buck Hill Creek in June of 1991. This plant species has been known to occur in this area since 1930. The surrounding land is densely wooded and is used for recreation. The site is kept cool moist by the surrounding forest, the dampness of the cliff face, and the close proximity of the creek. Associated species include maidenhair spleenwort, fragile fern, Northern beech fern, and various mosses and liverworts. Because this site is a tourist attraction that is kept in a natural state, the only potential threats to the plants appear to be trampling and picking by tourists, and scouring from the creek during high water.

SP502a, SP502b, SP515, and SP524 - UPDATE - (Barrett Twp.) "Cresco Heights" This site was revisited in May and June of 1991. Four good to marginal populations of plant species of concern (SP502a and b, SP515, and SP524) were once again located. SP524 is globally ranked as G4. The plants appear to be growing with normal vigor in the Acidic Rocky Summit Natural Community.

USGS QUADRANGLE MAP: Bushkill (89)

		TNC Ranks		State	Last	Quality
	Code	Global	State	Status	Seen	
NATURAL COMMUNITIES:	526	G2G3	<b>S</b> 1	N	9/8/98	BC
SPECIAL PLANTS:	501a	G5	<b>S</b> 1	PE	9/8/98	D
• .	501b	G5	<b>S</b> 1	PE	9/8/98	В
	501c	G5?	S2S3	PE ·	9/8/98	BC
	501d	G5	<b>S2</b>	PT	9/8/98	D
	522	G5	S2	PE	9/8/98	BC
	539	G4G5	S2	PT	6/1/93	D
	553a	G5	S3	PR	6/20/95	D
	553b	G5	S3	PR	6/20/95	D
	553¢	G5?	<b>S2S3</b>	PΕ	6/20/95	D
	553d	G3	<b>S</b> 3	PT	6/20/95	D
	558	G5	S2	N	9/28/97	В

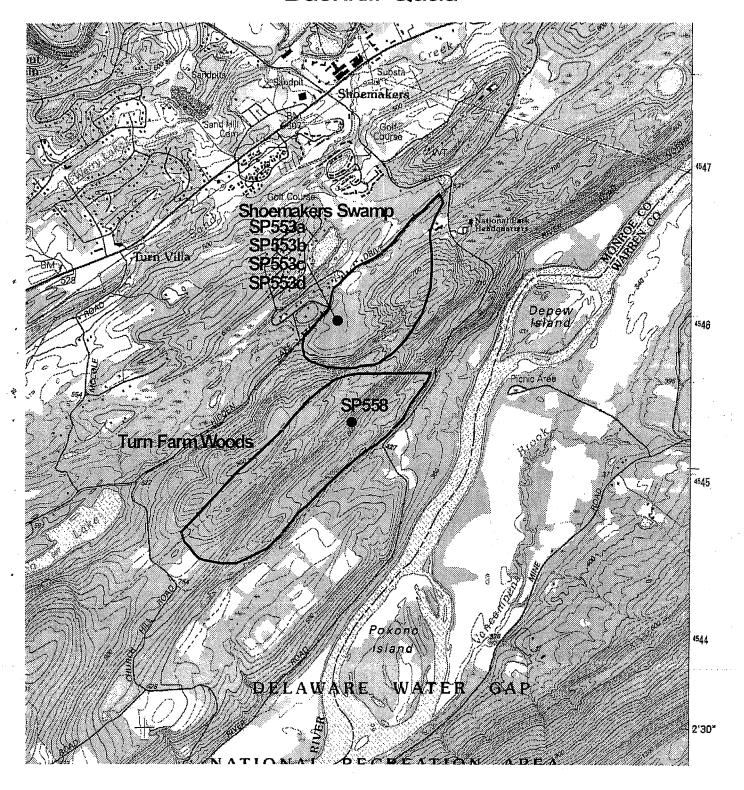
SPECIAL ANIMALS

# Bushkill Quad



Scale 1:24,000

# **Bushkill Quad**



Scale 1:24,000

### Bushkill Quadrangle:

SP501a, SP501b, SP501c, SP501d, SP522, and NC526 - UPDATE - (Middle Smithfield Twp.) "Arnott Fen" The site was revisited in 1998. Five plant species (SP501a, b, c, and d and SP522) of concern were identified during the field visit. The condition of these plant populations ranges from good to poor. The overall condition of the globally ranked G2G3 Shrub Fen Natural Community (NC526) is good to marginal. Invading shrubs and red maple saplings pose a threat to some of the species of concern at this site.

SP539 - NEW - (Middle Smithfield Twp.) "Shawnee Fen" This area consists of a shrub thicket on a flat, saturated and occasionally flooded calcareous glacial till. A small, poor population of a Pennsylvania Threatened plant (SP539) was found growing in a mossy, open area at this site in 1993. Associated plant species include sphagnum moss, creeping spikemoss, jewelweed, purple-leaved willow-herb, bedstraw, marsh fern, and skunk cabbage. Threats to the plant species include changes in hydrology (e.g., drainage ditches), beaver activity, and competition/succession. Additional surveys are recommended.

SP553a, SP553b, SP553c, and SP553d - NEW - (Middles Smithfield Twp.) "Shoemakers Swamp" The National Park Service owns this mixed hardwood forested wetland. Four plant species (SP553a, b, c, and d) of special concern including one G3 ranked species were identified on this site in 1995. All four plant populations are listed as poor quality. Associated species include skunk cabbage, sphagnum moss, bog buckbean, sedges, cinnamon fern, poison sumac, and alder. No obvious threats were observed during the field visit, with the exception of increased beaver activity. Further survey work is needed to verify and evaluate the extent of the plant populations.

SP558 - NEW - (Middle Smithfield Twp.) "Turn Farm Woods" The site is part of the Delaware Water Gap National Recreation Area. Recreational activities at the site include hiking, hunting, and snowmobiling. A good population of a S2 plant species (SP558) of concern was discovered here in 1997. The population is located in a flat to slightly depressional area between two ridges in an area with limestone geology. Plant species growing in association with the species of concern include stilt grass, Christmas fern, white-snakeroot, Virginia creeper, spicebush, multiflora rose, black birch, and sugar maple. Exotic species invasion appears to be the only threat at the site. Monitoring of the population is needed to determine the effects of these exotic plant species.

# USGS QUADRANGLE MAP: East Stroudsburg (85)

		TNC Ranks		State	Last	Quality
	Code	Global	State	Status	Seen	-
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						4,25
SPECIAL ANIMALS:	517	G5	S1S2	N	6/06/91	$\mathbf{E}_{\lambda}^{\prime}$
HQ-CWF/EV WATER	Poplar R	un				

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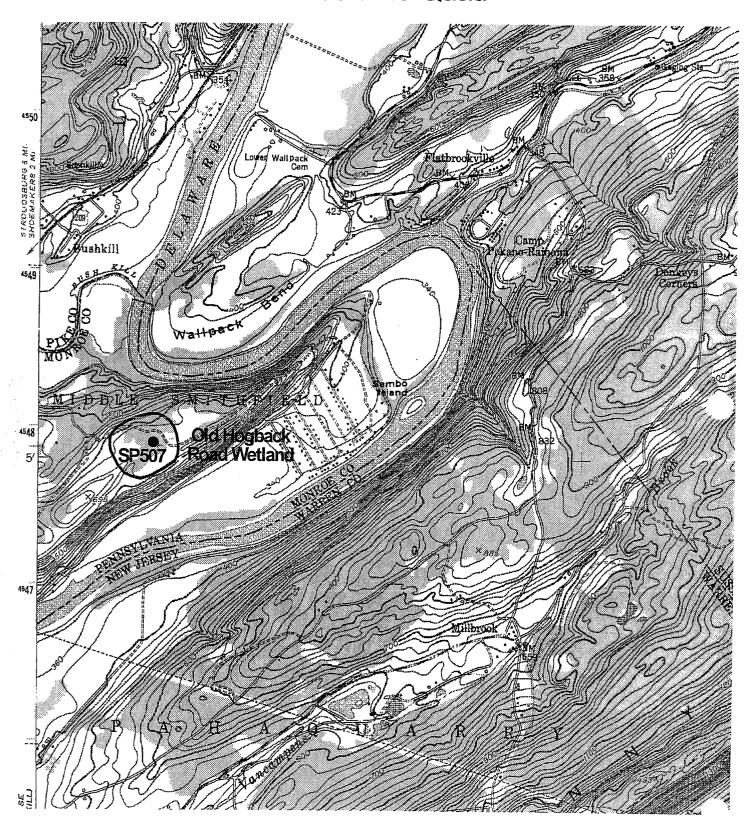
### East Stroudsburg Quadrangle:

SA517 - NEW - (Price Twp.) "Laurel Run Road Site" Two colonies of a G5 animal species of concern (SA517) of concern were seen at this site in 1990. Three colonies of the same species were seen on red oak leaves in June of 1991. Additional surveys are needed to determine the size and extent of these populations. This site extends into the Skytop quadrangle.

# USGS QUADRANGLE MAP: Flatbrookville (93)

	Code	TNC I Global		State Status	Last Seen	Quality
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	507	G5	S2	TU	6/28/96	BÇ
SPECIAL ANIMALS						).

# Flatbrookville Quad



### Flatbrookville Quadrangle:

SP507 - NEW - (Middle Smithfield Twp.) "Old Hogback Road Wetland" This site is part of the Delaware Water Gap National Recreation Area. It is a wetland area located within the Wallpack Bend Cliff site. A good population of a Pennsylvania Tentatively Undetermined plant species (SP507) was identified here in 1996. The population was found in an opening of a forested wetland. Beaver activity near the site appears to be changing the hydrology of the area. Periodic monitoring of the population status is recommended.

# USGS QUADRANGLE MAP: Hickory Run (63)

		TNC Ranks		State	Last	Quality	
	Code	Global	State	Status	Seen		
	٠.						
NATURAL COMMUNITIES:		•					
SPECIAL PLANTS:	526	G5	<b>S</b> 3	PR	9/13/92	$\mathbf{B}_{i}$	
						£.	
SPECIAL ANIMALS:		7 1. O. B				₹	

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Hickory Run Quad

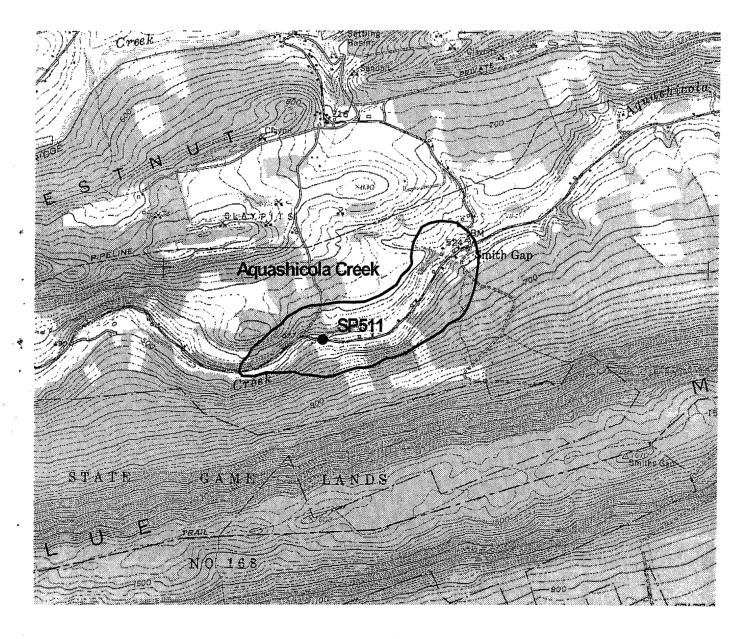
## Hickory Run Quadrangle:

SP526 - NEW - (Tobyhanna Twp., Monroe County, Kidder Twp., Carbon County, and Buck Twp., Luzerne County) "Lehigh River-RT 115 Bridge Site" A good population of a Pennsylvania Rare plant species (SP526) was found growing in an open area on a rocky substrate in the Lehigh River. Associated plant species include sedges. This site extends into the Pleasant View Summit and Thornhurst quadrangles.

# USGS QUADRANGLE MAP: Kunkletown (117)

· · · · · · · · · · · · · · · · · · ·		TNC	Ranks State		Last	Quality	
 time of the second seco	Code	Global	State	Status	Seen		
NATURAL COMMUNITIES:	•						
SPECIAL PLANTS:	511	G5	S3	TU	9/24/93	$C_{j}$	
SPECIAL ANIMALS:				•		K.	

# Kunkletown Quad



Scale 1:24,000

## Kunkletown Quadrangle:

SP511 - NEW - (Eldred Twp.) "Aquashicola Creek" A good to marginal population of a Pennsylvania Tentatively Undetermined plant species (SP511) was identified in an open portion of Aquashicola Creek on a pebble/cobble bottom. Associated species include waterweed, pondweed, algae, and aquatic-bryophytes. No obvious threats to this population were noted in the field.

## USGS QUADRANGLE MAP: Mount Pocono(81)

	Code	TNC Global	Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	507 530a 530b 547	G5 G5 G5 G5	S3 S2 S3 S3	PR TU PR PR	10/3/92 10/3/92 10/3/92 6/3/92	B C E
SPECIAL ANIMALS:						
HQ-CWF/EV WATER	Sand Spri Wolf Swa					

#### Mount Pocono Quadrangle:

SP547 - UPDATE - (Pocono and Jackson Twps.) "Camelback Mountain" A new record of a small population of a Pennsylvania Rare shrub (SP547) was identified within Big Pocono State Park. Associated species include scrub oak, low sweet blueberry, deerberry, black huckleberry, and hairgrass. Potential threats include deer and natural competition. This natural barren should be kept intact. The use of fire to maintain the barrens habitat may be warranted.

SP507, SP530a, and SP530b - UPDATE - (Pocono and Stroud Twps.) "Tannersville Cranberry Bog" This site was revisited in 1992. A good population of a PA Rare plant species (SP507) was found still growing at the site. Two new records of plant species of concern (SP530 a and b) were identified during the field visit. SP530a is a marginal population of a PA Tentatively Undetermined sedge species. Additional surveys are needed to the size and condition of SP530b. The greatest threat to the site appears to be natural succession.

## USGS QUADRANGLE MAP: Pleasant View Summit (41)

		TNC	Ranks	State	Last	Quality	
to est transferior and the contraction of the contr	Code	Global	State	Status	Seen	∰ form a framework property for some that of the first o	
NATURAL COMMUNITIE	ES:						
SPECIAL PLANTS:	505	G5	S3	TU	9/10/92	В	
SPECIAL ANIMALS:						я. У.	
OTHER	See Hick	korv Run O	uadrangle	for sp526			

#### Pleasant View Summit Quadrangle:

SP505 - NEW - (Tobyhanna Twp., Monroe County, Kidder Twp., Carbon County, and Buck Twp., Luzerne County) "Lehigh River - RT 115 Bridge" A good population of a Pennsylvania plant species (SP505) of concern (Tentatively Undetermined) was identified in a riffle area of the Lehigh River during 1992. Associated species include riverweed and pondweed. Potential threats to this plant species comes from competition with other aquatic plants. This site extends into the Hickory Run and Thornhurst quadrangles (see the Hickory Run quadrangle for the map of this site).

## USGS QUADRANGLE MAP: Pocono Pines (71)

	* .	TNC	Ranks	State	Last	Quality
	Code	Global	State	Status	Seen	
NATURAL COMMUNITIES:	562	G?	S1	N	10/14/92	A
NATURAL COMMUNITIES.	598a	G?	S3	N	11/5/91	C
	598b	G?	S3S4	N	11/5/91	CD
·	5980 660	G4	S3 S4	N	9/17/92	A
•	000	<del>4</del>	33	14	3/1//32	A
SPECIAL PLANTS:	504	G5	S3	PR	8/15/95	D
	510	G5	S3	PR	6/22/91	$\mathbf{A}$
	513	G4	S3	PR	7/21/93	C
	514	G4	S2	PT	6/22/91	$\mathbf{A}$
	515	G3	S2	PE	8/15/95	A
	526	G5	S2	PE	7/21/93	В
	528a	G5	S1	PE	9/4/97	C
	528b	G5	<b>S</b> 3	PR	5/3/94	B.
•	552	G4	S1	PE	7/9/93	AB
	569	G5	<b>S</b> 3	PT	6/22/91	$\mathbf{B}$
	638	G5	S3 ·	PR	9/30/93	B
	656	G4	S1	PE	7/23/93	C
	657	G5	S3	PR	9/30/93	D
	658	G5	S3	PR	9/30/93	D
	662	G5	S2	N	8/15/96	BC
	* 4					
SPECIAL ANIMALS:	511	G5	S3B,S4N	N/A	7/17/95	E
·	590	G5	S1S2	N/A	10/2/91	AB
HQ-CWF/EV WATER	Sand Spri Wolf Run	_				

#### Pocono Pines Quadrangle

SA511, SA590, SP504, SP513, SP515, SP526, SP552, SP656, SP662, NC562, and NC660 - UPDATE - (Tunkhannock Twp.) "Long Pond Macrosite". A bird species (SA511) listed as S3B, S4N by The Nature Conservancy is believed to be nesting at this site. A pair were observed in 1995 flying over Long Pond during the breeding season. Another animal species (SA590) of concern, which was observed at the site in 1985, was once again seen in October of 1991 in the barren area. Six plant species of special concern were identified at the site during several field investigations. Two excellent to marginal populations of a State Endangered sedge (SP552 and SP656) were identified in 1993. Also in 1993, a population of a PA Rare plant (SP513) globally ranked as G4 and a PA Endangered plant (SP526) species were found. A poor population of a State Rare plant (SP504) and an excellent population of a PA Endangered, G3 sedge (SP515) were identified in 1995. A marginal to good

population of a plant species (SP662) of concern was mapped in 1996. The previously identified Mesic Scrub Oak Heath Pith Pine Barrens Natural Community (NC562) and the G4 Ridgetop Dwarf Tree-Forest Natural Community (NC660) appear to be doing well. The invertebrate and vertebrate fauna, suite of rare plants, and outstanding natural communities at Long Pond represent one of the best assemblages of rare, natural features identified in the Commonwealth. Potential threats to the plant, animal, and natural communities on this site include development (e.g., residential and roadways). This site extends on to the Blakeslee quadrangle.

SP510, SP514, SP569, NC598a, and NC598b - UPDATE - (Tobyhanna and Tunkhannock Twps.) "Lost Lakes" This site was revisited in June and November of 1991. The Oligotrophic Glacial Kettlehole Bog Natural Community (NC598a) is intact with three plant species of concern still present at the site (SP510, SP514, and SP569). SP510 and SP514 are excellent quality populations, while SP569 is a good quality population. SP514 is globally ranked as G4. A marginal to poor quality Northern Hardwood Forest Natural Community (NC598b) was identified at the site in 1991. At the time of the field visit, the site was under serious threat from development and draining of the land for a residential development (Emerald Lakes).

SP528a, and SP528b - UPDATE - (Tobyhanna Twp.) "Sullivan Trail Site/Lake Naomi Shrub Swamps" A good population of Pennsylvania Rare shrub (SP528b) and a marginal population of a State Endangered shrub (SP528a) were revisited at this site in 1997. Deer browse, trash dumping, an abundance of foot paths, and development are potential threats to this bog/northern hardwood forest community. More surveys are needed when the shrubs are flowering in order to ascertain the population size.

SP638, SP657, and SP658 - UPDATE - (Tobyhanna Twp.) "Tamaque Lake Swamp" This site was revisited in 1993. A good population of a State Rare shrub (SP638) still exists at the site. In addition, two new small populations of a State Rare plant (SP657) and a State Rare rush (SP658) were identified. The only apparent threat to these acidic shrub swamp/boreal conifer swamp communities and the rare species they contain is development of the watershed.

## USGS QUADRANGLE MAP: Portland (113)

		TNC Ranks		State	Last	Quality
	Code	Global	State	Status	Seen	
NATURAL COMMUNITIES:	505	<b>G5</b>	S5	N/A	5/5/97	В
SPECIAL PLANTS						2

SPECIAL ANIMALS:

## Portland Quadrangle

NC505 - UPDATE - (Smithfield Twp., Monroe County and Pahaquarry Twp., Warren County) "Delaware Water Gap" A good example of an Northern Appalachian Acidic Cliff Natural Community (NC505) was found above the Delaware River in 1997. The community is nearly vertical and is 25-50 acres in size. The sparsely vegetated cliffs stretch from above the river approximately one mile to the southwest slopes. Vegetation identified included pitch pine, black cherry, scrub oak, mountain laurel, pink corydalis, goldenrod, and common cinquefoil. Animal species observed in this natural community included both black and turkey vultures, ravens, prairie warbler, and goldfinch. This site is protected as part of the Delaware Water Gap National Recreation Area. The community extends to the Stroudsburg quadrangle.

# USGS QUADRANGLE MAP: Saylorsburg (103)

		TNC	Ranks	State	Last	Quality
روس به المراجعة الم	Code	Global	State	Status	Seen	alliper a war a tiple to be a fine of the same of the
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	509a	G5	S1	PE	8/23/94	В
	509b	G5	S2	$\mathbf{PE}$	8/23/94	В
	509c	G5	S2	PT	6/8/94	В
	510a	G5	S2	PT	6/8/94	CD
	510b	G5?	S2S3	PE	8/23/94	E
	517	G3	S2	PE	7/3/97	BC
* .	519a	G4G5	S2	PT	6/16/93	В
	519b	G5	<b>S</b> 3	TU	6/16/93	BC
	521	G5	<b>S</b> 3	$\mathrm{TU}$	6/17/93	C
	522	G5	S2	$\mathbf{PT}$	8/4/93	BC
	523	G5	<b>S</b> 1	PT	8/4/93	C
	528	G5	S3	$\mathbf{T}\mathbf{U}$	6/4/97	BC
	529a	G5	S2	PE	6/4/97	$\mathbf{C}$
	529b	G5	S2	PT	6/4/97	C
SPECIAL ANIMALS:	SA530	G3 -	S2	PE	1999	Ë

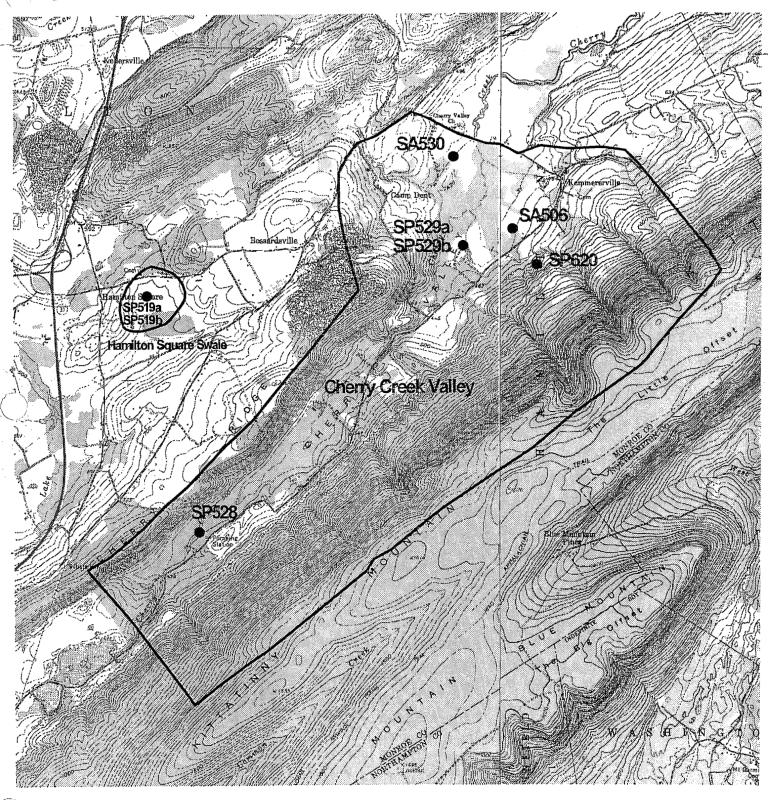
Wind Gap Quad

Scale 1:24,000

Ross Commar

# Saylorsburg Quad

# Stroudsburg Quad



Scale 1:35,000

#### Saylorsburg Quadrangle

SP522 and SP523 - NEW - (Hamilton and Ross Twps.) "Aquashicola Creek Wetland" This site is a poorly-drained wetland in the bottomland along Aquashicola Creek. The vegetation is quite diverse, consisting of marshy areas and marshy areas interspersed with shrub thickets. A marginal population of a State Threatened plant (SP523) and a good to marginal population of another PA Threatened plant species (SP522) were mapped at this site in 1993. Species associated with SP522 include burreed, rice-cut grass, needle spike-rush, arrowhead, and sedges. Poison sumac, highbush blueberry, red maple, alder-leaved buckthorn, speckled alder, swamp rose, and swamp azalea are the plant species growing near SP523. Threats to the site include beaver activity and some grazing by cattle. This site extends into the Wind Gap quadrangle.

SP517 - UPDATE - (Hamilton Twp., Monroe County and Plainfield, Northampton County) "Big Offset Barren" A good to marginal population of a State Endangered, G3 plant species (SP517) was revisited in 1993 and 1997. The population seems to be doing well and the growth of the plants was vigorous. This site extends on to the Wind Gap quadrangle.

SP521 - NEW - (Ross Twp.) "Buckwha Creek" This site is a wet to seasonally wet marsh/shrub thicket in the bottomland of Buckwha Creek. A marginal quality population of a plant species of concern (SP521) was identified at the site in 1993. Associated species include meadow-sweet, steeple-bush, sweet vernal grass, swamp candles, New York ironweed, field-wood rush, and marsh fern. The main threat to the site appears to be succession/competition. Site management recommendations include mowing every other year.

SP509a, SP509b, SP509c, SP510a, SP510b, SP528, SP529a, SP529b, and SA530-UPDATE/NEW - (Hamilton and Stroud Twps.) "Cherry Creek Valley" This site was revisited several times from 1994 to 1997. The site extends on to the Stroudsburg quadrangle. Good populations of three previously observed plant species of concern (SP509a, b, and c) still exist at the "Cherry Creek Fen" site identified in the original 1991 report. A marginal to poor population of a PA Threatened plant species (SP510a) and a population of a state-endangered plant (SP510b) were revisited in 1994. Additional surveys are needed to determine the extent and the quality of SP510b.

A new good to marginal population of a plant species of concern (SP528) was identified in the same watershed during 1995 and revisited in 1997. The population is found in a high gradient clearwater creek. associated with watercress. Threats to the population include pollution and sedimentation of the stream. Because the species requires open light, canopy closure over the creek would be detrimental. Additional surveys are needed to determine the extent of the population.

A new population of a State Endangered plant (SP529a) and a new population of a Pennsylvania-Threatened plant (SP529b) were found at the site in 1996. Both population were found in a calcareous fen and both populations were marginal. Threats to the fen community include the invasion of cattails. A new population of a G3, PA Endangered animal species (SA530) was discovered in 1999 in the same watershed. These areas combined make up "Cherry Creek Valley;" one of the most important

sites for conservation in the state. Maintaining the hydrology of the Cherry Creek Valley is important to the survival of these species.

SP519a and SP519b - NEW - (Hamilton Twp.) "Hamilton Square Swale" This site is a damp to wet abandoned pasture/meadow consisting of interspersed young woods, shrub thickets, and herbaceous areas. Two good to marginal quality populations of plant species of concern were mapped here in 1993. SP519a is listed as PA Threatened and SP519b is a Tentatively Undetermined plant species. Species associated with SP519a include spike rush, skunk cabbage, smooth goldenrod, jewelweed, sensitive fern, blue vervain, marsh fern, soft rush, and rough bluegrass. Species growing with SP519b include velvet grass, southern agrimony, spike rush, golden ragwort, and sweet vernal grass. Threats to the site include competition from exotic species and succession and deer browse. Further disturbance (e.g., grazing by cattle) of the site should be avoided.

## USGS QUADRANGLE MAP: Skytop (57)

	TNC	Ranks	State	Last	Quality
Code	Global	State	Status	Seen	

NATURAL COMMUNITIES:

SPECIAL PLANTS: 507 G4 S2 PT 6/27/91 A

SPECIAL ANIMALS:

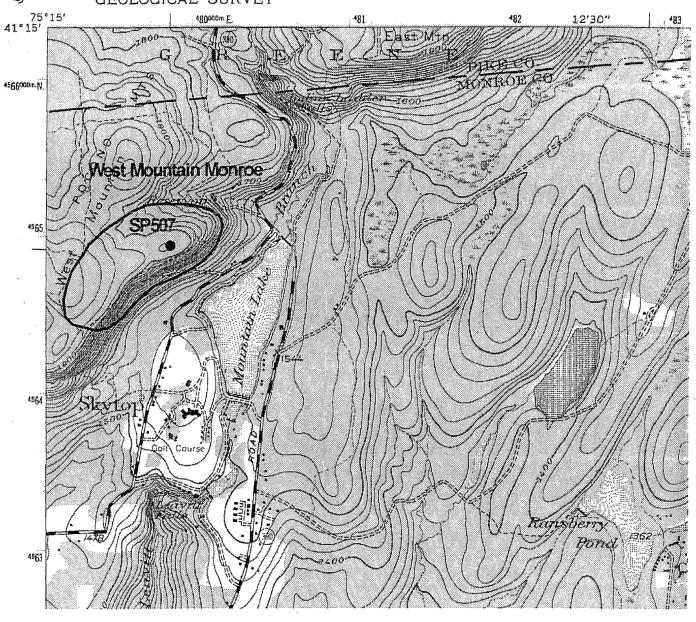
HQ-CWF/EV WATER Poplar Run

Spruce Cabin Run

OTHER: Laurel Run Road Site; see the East Stroudsburg quadrangle for sa517

# Skytop Quad

# UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY



Scale 1:24,000

## Skytop Quadrangle

SP507 - NEW - (Barrett Twp.) "West Mountain Monroe" An excellent population of a G4, Pennsylvania Threatened plant (SP507) was recorded within the Skytop Resort area in June of 1991. Associated species include common hairgrass, low shadbush, shadbush, and deerberry. No apparent threats to the population were identified. A management agreement with the Skytop Resort would ensure protection of this area. This area is located within the Mt. Wismer site.

SP510 - UPDATE - (Stroud and Hamilton Twps.) "Mansfield Seep" This area was revisited in April of 1991. A small population of a PA Endangered plant species (SP510) is still present at the site. Additional surveys are needed to determine the size of the population.

SP515 - UPDATE - (Smithfield Twp.) "Mount Minsi" A small population of a State Rare shrub species (SP515) was once again found growing at this site in 1992. Threats to the species include trampling by hikers and deer browse.

NC547 - UPDATE - (Stroud and Hamilton Twps.) "Pomeroy Woods" This Mesic Central Forest Natural Community (NC547) was observed again in 1992. The quality of the site was assessed as marginal to poor. The biggest threat appears to be development around the site.

SP578 - UPDATE - (Smithfield Twp., Monroe County and Upper Mount Bethel Twp., Northampton County) "Totts Gap" This site was revisited in 1991. The PA Rare shrub species (SP578) was determined to be in poor condition. The presence of the plant community is probably a result of fires at the site.

## USGS QUADRANGLE MAP: Thornhurst (43)

		TNC Ranks		State	Last	Quality
	Code	Global	State	Status	Seen	
NATURAL COMMUNITIES:						
SPECIAL PLANTS:	516	G5	S3	PR	9/16/92	BC

SPECIAL ANIMALS:

OTHER:

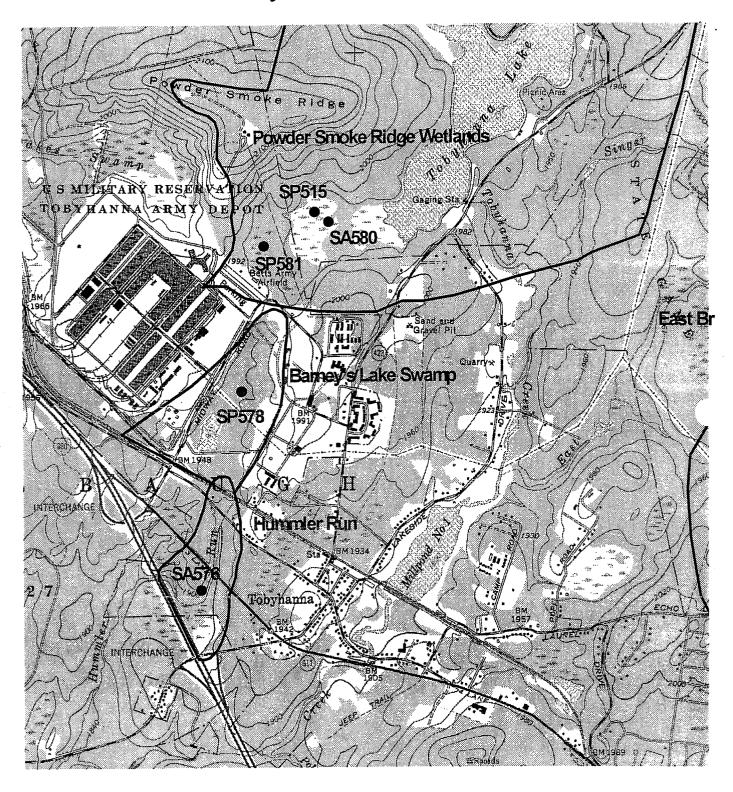
Lehigh River - Route 115 Bridge Site; see the Hickory Run and Pleasant View Summit quadrangles for sp526 and sp505; Pocono Lake North and Scott Property Site; see the Tobyhanna Quadrangle for sp577 and nc584.

#### Thornhurst Quadrangle

SP516 - UPDATE - (Tobyhanna and Coolbaugh Twps.) "Anglewood Lake Swamp" This population of a State Rare rush (SP516) was found intact in 1992. The population was found growing in a manmade clearing along a property line. Maintaining this opening in the winter or early spring will help to keep out shrubs.

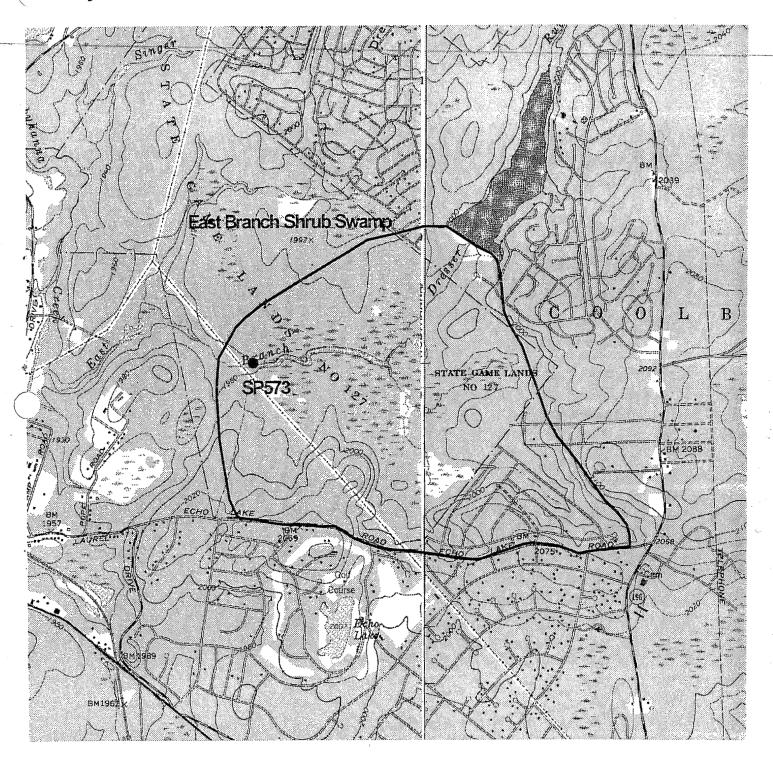
# USGS QUADRANGLE MAP: Tobyhanna (47)

		TNC Ranks		State Last		Quality	
and the second s	Code	Global	State	Status	Seen	St. No. All de UN Florence Contrate Con	
NATURAL COMMUNITIES:	584	G5	S3	N/A	4/13/95	CD	
SPECIAL PLANTS:	507	G5	S1	PE	8/14/91	В	
	515	G5	S3	PR	7/30/93	CD	
	516	G5	S3	PR	7/8/92	C	
	520a	G5	S2	PT	7/8/92	C	
	520b	G5	S3	PT	7/8/92	CD	
	520c	G5	S3	PR	8/14/91	D	
	548	G5	S3	PR	10/20/93	C	
	573	G5	S2	PT	9/4/91	$\mathbf{A}$	
	576	G5	S2S3	PC	9/30/93	E	
	577	G5	<b>S</b> 3	PR	10/19/93	CD	
	578	G5	S3	PR	7/22/93	BC	
	579	G5	<b>S</b> 3	$\mathbf{PT}$	8/13/93	CD	
	581	G5	S3	PT	6/25/93	В	
SPECIAL ANIMALS:	580	G5T5	S4	?	8/13/93	E	
HQ-CWF/EV WATER	Cross Key Flame Cal						



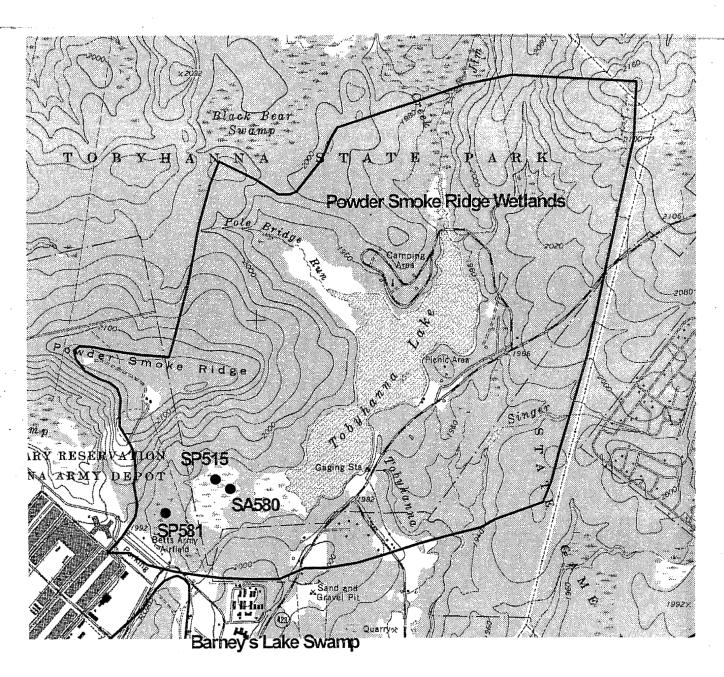
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# Buck Hill Falls Quad

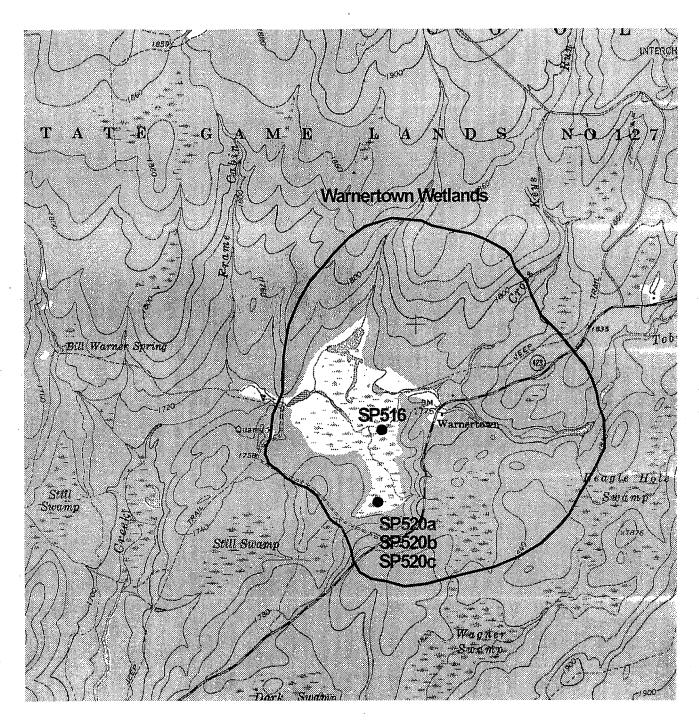


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#### Tobyhanna Quadrangle

SP578 - NEW - (Coolbaugh Twp.) "Barney's Lake Swamp" This swamp is an open hardwood-confer swamp dominated by red maple, yellow birch, hemlock, and spruce. A marginal to good population of a PA Rare plant species (SP578) was mapped at the site in 1993. Associated species include false lily-of-the-valley, sphagnum moss, star flower, sedges, red maple, yellow birch, and cinnamon fern. No threats to the species were apparent during the field visit. No special management was recommended.

SP573 - NEW - (Coolbaugh Twp.) "East Branch Shrub Swamp" This area is a shrub dominated peatland near a powerline right-of-way. An excellent population of a PA Threatened shrub (SP573) was mapped at the site in 1991. Associated species include tawny cotton grass, sphagnum moss, three-way sedge, leatherleaf, cranberry, black chokeberry, and mountain azalea. Threats to the site include powerline right-of-way maintenance and beaver activity. This site extends on to the Buck Hill Falls quadrangle.

SA576 - NEW - (Coolbaugh Twp.) "Hummler Run" An S2S3 animal species of concern (SA576) was found in Hummler Run in 1993. Additional species found in the stream during the survey include yellow perch and blacknose dace. Additional surveys are needed to determine the size of the population. No threats or management recommendations were noted.

SP507 - UPDATE - (Coolbaugh Twp.) "Laurel Drive Bog" This site was revisited in August of 1991. SP527 was not found during the field visit. The population of plant species (SP507) of concern is still present and appears to be healthy. This area was mined in the past. Current threats include beaver activity.

SP548 and SP579 - UPDATE - (Coolbaugh Twp.) "Oakes Swamp" In 1993, a marginal population of a PA Rare shrub (PA548) species was revisited. A new record of a State Threatened plant (SP579) was also identified at the site. Beaver activity and flooding associated with the construction of a highway were threatening the site at the time of the visit.

SP577 - NEW - (Tobyhanna and Coolbaugh Twps.) "Pocono Lake North" This site is a wet, open, acidic shrub thicket. on State Game Lands #127. Excavation has taken place in this area in the past. A marginal to poor population of a PA Rare plant species (SP577) was found at the site in 1993. The plant species is associated with sphagnum mosses, rhodora, withe-rod, tawny cotton grass, and sedges. No special management recommendations were noted. A small portion of this site extends on to the Thornhurst quadrangle.

SA580, SP515, and SP581 - UPDATE/NEW - (Coolbaugh Twp.) "Powder Smoke Ridge Wetlands". It is a group of four wetlands with wet peaty substrate and vegetation dominated by shrubs and small trees. This site was revisited in 1993 to search for SP521 mentioned in the 1991 report. One new record of a animal species (SA580) of concern and two plant species of concern (SP 515 and SP581) were recorded. More surveys are needed to determine the size and quality of SA580. No obvious threats to the plant species were observed. No special site management is needed. The site boundary has been expanded since the 1991 report to include the animal and plant populations.

NC584 - NEW - (Tobyhanna Twp.) "Scott Property Site" This area is a small kettlehole isolated from the stream by glacial eskers. A poor to marginal Acidic Shrub Swamp Natural Community (NC584) was identified here in 1995. The site is dominated by leatherleaf, rhodora, sphagnum moss, and polytrichum mosses. Very pronounced mounds at the site suggest that this area was once logged. No obvious threats to the site or management needs were noted. A small portion of this site extends on to the Thornhurst quadrangle.

SP516, SP520a, SP520b, and SP520c - NEW - (Coolbaugh Twp.) "Warnertown Wetlands." This site is a large clearing in which several sources of Tobyhanna Creek join together. The clearing was probably logged years ago and the forest has never returned. The area consists of several habitat types including marshes, bogs, shrub thickets, and beaver ponds. Four marginal to poor populations of plant species of concern (SP516, and SP520a,b,c) were identified in this area during 1991 and 1992. Plant species associated with SP516 include sphagnum moss, cranberry, sedges, and white beak-rush. Plant species identified growing near SP520a included steeple bush, meadow sweet, sedges, high bush blueberry, and maleberry. Sedges, cranberry, cattail, and Canada bluejoint were found growing in association with SP520b. Plant species associated with SP520c include highbush blueberry, red maple, sedges, and smooth shadbush. No obvious threats to the plants were observed. The site should be kept in its present state.

## USGS QUADRANGLE MAP: Wind Gap (119)

•		TNC	TNC Ranks		Last	Quality	
	Code	Global	State	Status	Seen	The second secon	
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	501a 501b 518	G5 G5 G3	S1 S2 S2	PE PT PE	8/27/93 8/27/93 7/3/97	CD C BC	

SPECIAL ANIMALS:

#### Wind Gap Quadrangle

SP501a, and SP501b - UPDATE - (Ross Twp.) "Aquashicola Creek Shrub Swamp" A plant species (SP501a) of special concern, which was identified in 1982, was revisited in 1993. This poor to moderate quality population is still present in the pipeline right-of-way. A new record of a State Threatened plant (SP501b) was also identified in the pipeline right-of-way. Periodic spraying in the right-of-way may be preventing these populations from spreading further. Occasional mowing may actually benefit these species and is preferred to spraying as a method of keeping the right-of-way open.

SP518 - UPDATE - (Hamilton Twp., Monroe County and Plainfield, Northampton County) "Big Offset Barren" A good to marginal population of a State Endangered plant species (SP518) was revisited in 1993 and 1997. The population seems to be doing well and the growth of the plants was vigorous. This site extends on to the Saylorsburg quadrangle.