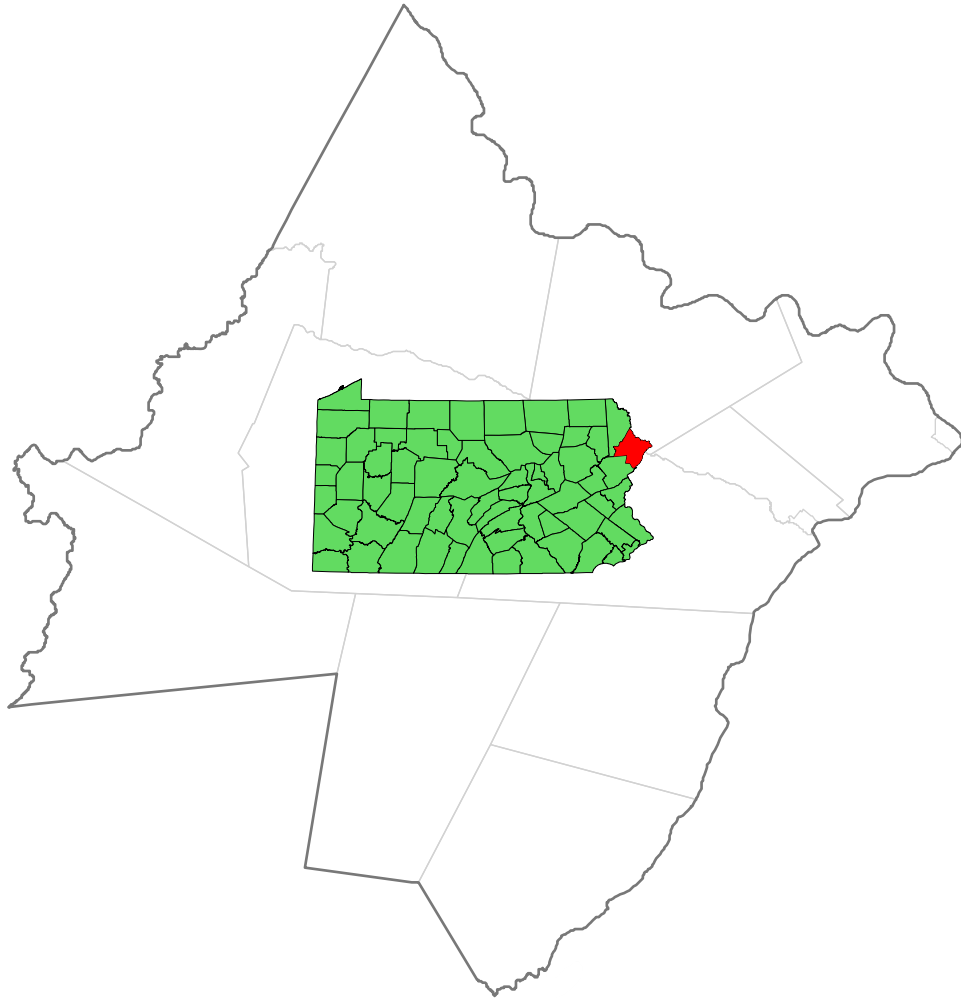


A Natural Areas Inventory of Pike County, Pennsylvania



Document includes the original 1990 full report
followed by the 1995 update addendum.

This Natural Areas Inventory was conducted by

Pennsylvania Natural Heritage Program
208 Airport Drive
Middletown, Pennsylvania 17057

For

Pike County Planning Commission
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A NATURAL AREAS INVENTORY
OF PIKE COUNTY, PENNSYLVANIA

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Errors and omissions in the text and on the maps are solely the responsibility of the senior author.

INTRODUCTION

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

The scenic and natural environments that have attracted so many people to the county are quickly being lost because of increasing development pressure. If these natural environments and the plants and animals associated with them are to be maintained, wise planning is required. A balance is necessary between growth and the natural resources of the county, and this can only be accomplished by guiding development away from the most environmentally sensitive areas.

In order to plan development and ensure protection for environmentally sensitive areas, county and municipal governments, the public, and development interests must know the locations and importance of the sites. Knowing where the sites exist, and their quality and significance, can help prevent conflicts over land use. Determining which sites are most threatened can help direct protection efforts and limited conservation dollars to those areas first.

The Natural Areas Inventory of Pike County is one aspect of the county's overall comprehensive plan. The purpose of the inventory is to provide maps of the best natural areas in the county and the locations of all known animal and plant species of special concern (endangered, threatened, or rare). A written description and a summary table of the most important sites, including quality, degree of rarity, and last-observed date accompany each map. The locations of some areas that cannot be deemed natural but may be of significance for wildlife and open space at the county or local level have also been included. An overall summary of the highest quality sites is included with some suggestions for protection of each. The information and maps presented in the Pike County Natural Areas Inventory report should be a useful guide for planning development and parks, conserving natural areas, and for setting protection priorities for the preservation of the most vulnerable sensitive areas within the county.

COUNTY OVERVIEW

The topography, geology, soils, and climate of Pike County have been important in the development of the forests, wetlands, and other natural communities located there. The vegetation that exists and the impact of man on that vegetation have been the framework for locating and identifying natural communities within the county. Therefore a brief review of some of these important factors will set the stage for the rest of this report.

Physiography

Bedrock and glacial geology and soils have been important factors in the formation of natural vegetation and land-use patterns of Pike County. The county is located in three sections of two physiographic provinces (Geyer and Bolles 1979) that reflect the bedrock geology, elevation, and shape of the landscape. Most of Pike County is within the Allegheny (Glaciated) Low Plateaus Section of the Appalachian Plateaus Province with the western end of the county in the Pocono Plateau Section of the same province. A narrow arm of the Valley and Ridge Province, Appalachian Mountain Section, occurs along the Delaware River south of Matamoras.

All of Pike County has been influenced by glaciation - most recently by the Wisconsin Glacier that withdrew about 10,000 to 15,000 years ago (Larsen 1982). Glaciation modified the landscape by carving valleys, scraping mountains, leaving depressions that filled with water, and leaving deposits of rock, sand, silt, and clay as unstratified glacial till and stratified drift. Glacial debris brought from other areas produced soil types that could not have developed from the bedrock in the county. New drainage patterns that developed due to the scraping and deposition of debris and ice resulted in the formation of the many wetlands and natural ponds in the county. Many of the plant species that were common during and shortly after the glacial period retreated northward as the climate warmed. Some of these species can still be found in the bogs and other wetland habitats that are found in the county.

Soils

Soil patterns in Pike County reflect either the bedrock beneath the soils or the glacial material that was deposited over the landscape. The soils that developed have influenced the vegetation, settlement, and land use patterns within the county. Seven soil associations are recognized within the county

(Taylor 1969). Soil associations consist of one or more major soil types (series) and at least one minor soil series in a distinctive landscape pattern. The seven, from Taylor (1969) are:

- 1) Chenango-Tunkhannock-Tioga - These are deep, well drained, nearly level to gently sloping soils on low terraces of major stream valleys. They form on terraces and floodplain deposits of stratified silt, sand, and gravel. The largest areas of this association are located along the Delaware and Lackawaxen Rivers.

Most of the land has been cleared for agriculture and is the best farmland in the county.

2) Holly-Papakating-Peat and Muck - These are deep, poorly drained and very poorly drained, nearly level soils of floodplains and upland depressions found throughout the county. These soils receive large amounts of surface water runoff and are slow to drain. They are frequently flooded for long periods and throughout much of the year. These soils are typically fine-textured silt loams that developed from alluvial deposits, or from organic deposits that accumulated in depressions where a high water table persists throughout the year. Most of this association is either swamp forest, bog, marsh, or wet meadow.

3) Wurtsboro-Mardin-Swartswood - These are well drained, gently sloping to sloping loamy soils of uplands. They formed in gray glacial till and are very stony. This association is found mostly in the eastern and central portions of the county. Most of the association is wooded with only small areas being cultivated. Much of this land is being developed for vacation homes.

4) Volusia-Tughill-Morris-Norwich - These are deep somewhat poorly drained, nearly level to sloping, loamy soils on concave slopes, in valleys, and in closed depressions of uplands. They formed in glacial till derived from siltstone and sandstone. These soils occur throughout the county in upland valleys where drainage is slow to very slow. All of these soils have a high water table and are often very stony. As a result, they are of limited value for agriculture and housing and most is either wooded or used for pasture.

5) Culvers-Cattaraugus-Morris - These are deep, well drained to somewhat poorly drained, gently sloping to moderately steep, stony soils on uplands. These soils are in the western part of the county primarily on the Pocono Plateau. The soils formed in glacial till that is composed of red sandstone and shale. The soils of this association have moderate natural fertility and medium to low moisture availability. The Culvers and Cattaraugus soils are some of the best farming soils in the western part of the county. About half of the acreage of these soils has been cleared and cultivated.

6) Dekalb-Manlius-Oquaga - These are moderately deep and deep, well drained, gently sloping to steep, very stony and shaly soils of uplands. They are located on the bluffs along the Delaware River, on the steep valley slopes along the Lackawaxen River, and on tributaries of both rivers. These soils occur where glacial scouring removed most of the previous soil and left little or no glacial material behind. Most of the area is wooded and most of the land that had been cleared for agriculture has reverted to shrubs or woodland.

7) Stony Land-Rushtown - These are chiefly steep, stony and shaly areas along the river bluffs of the Delaware River. The major components of the landscape are the bluffs and cliffs and the material that has accumulated at the base of the slopes. Where soil has formed, it is very shaly with very little subsoil. The bluffs and cliffs are sparsely vegetated because of the lack of soil and unstable substrate, and lack of water. Some of the most unusual plant communities in the county are found here and the bluffs add to the scenic quality of the Delaware River. The loose, shaly soil is mined from the base of the slopes for road surfacing and fill material.

Vegetation

Pike County is located in the Glaciated Section of the original Oak-Chestnut Forest Region (Braun 1950). The Oak-Chestnut forest extended from southern New England to northern Georgia. Oaks, and formerly chestnuts, are the tree species used to characterize the forest. Nothing remains of the original primary vegetation because of the demise of the chestnut from the chestnut blight caused by the parasitic fungus Endothia parasitica introduced to America in 1904. The forest of this region is now called Mixed Oak Forest (Oplinger and Halma 1988, Monk et al. 1990). Because of logging, much of the reproduction of oaks has been as sprouts from the stumps so that the forest is also known as "sprout hardwoods" (Braun 1950). These forests have been logged in the past for lumber and fuel (Keever 1972) and most of the forest today consists of even-aged timber between 40 and 80 years old.

White, Red and Black oaks are the primary species of the forest. Sometimes these species occur together but each prefers different moisture and nutrient conditions. White oaks do best on the moist soils while red oak prefers drier, better drained soil conditions, and black oak does best on the dry upland slopes. Common associates include red and sugar maple, black cherry, black gum, and white pine. Shrubs include blueberry, shadbush, viburnums, and witch hazel.

On the ridge tops where conditions can be very harsh, chestnut oak is the dominant species. Soils are shallow, nutrients are usually scarce, and winds and weather can be severe, and the trees are stunted as a result. Black gum, gray birch, huckleberry, blueberries, and mountain laurel are common associates.

The Allegheny Section of the Hemlock-White Pine-Northern Hardwoods Forest (or simply Northern Hardwoods) is found on the Pocono Plateau at the western corner of the county (Braun 1950, Oplinger and Halma 1988). This forest type is found in various forms from Minnesota to Northern New England and eastern Canada and as far south as central Pennsylvania. The deciduous portions are usually dominated by beech and sugar maple while the mixed communities are dominated by hemlock with sugar maple, beech, and other hardwoods. White Pine is a subordinate species now but it

was a more common component of the forest prior to logging. Because of the proximity of the Mixed Oak Forest and the Northern Hardwoods Forest, species overlap and outliers can be found in either forest type due to aspect, moisture, and soils.

One of the most striking features of any glaciated landscape is the abundance of wetlands. When the ice retreated it left ice blocks and shallow drainage channels behind. As the ice blocks melted and glacial debris accumulated around them, steep sided "kettle hole" lakes formed. Surface water from the glacier was trapped in those drainage channels that were blocked by debris and marshes and swamps eventually formed behind the blockage.

In many of the kettle holes, bogs formed because there was very little contact with surface and ground water from the surrounding watershed. Nutrients and oxygen became scarce in such environments; because of the lack of oxygen, organic matter did not decompose but slowly filled the lake.

These peatlands often have developed a floating bog mat over the lake surface. The most common type is called a "level bog" by Johnson (1985) and is the only kind known in Pennsylvania. In Pike 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 pond. The first zone consists of low shrubs and sedges and is the floating mat overlying the pond, the second zone typically contains taller shrubs and is not as treacherous. The final zone is the bog forest, or boreal conifer swamp, that is dominated by black spruce and larch. Many of the plant species inhabiting bogs are more typical of peatlands much farther to the north and reach their southernmost limit in these bogs.

Marshes, wet meadows, and swamps have formed in shallow depressions and along streams and other water bodies. These wetlands receive water that is generally well aerated and relatively high in nutrients. Very little organic matter accumulates in these wetlands and different plant species dominate. Red maple, hemlock, ash, black gum, and yellow birch are typical canopy species while blueberry and swamp azalea are common shrub species.

PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to plan the wise use of Pike County's natural features, the Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by Pike 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 eight years of operation, the PNDI data base has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (called natural communities in PNDI terminology), sensitive plant and animal species, heron rookeries, and several other noteworthy natural features. Over 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 7.5-minute USGS quadrangle maps.

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

The PSO has used this systematic inventory approach to identify the areas of highest natural integrity in Pike County. These areas, comprised of natural communities with their characteristic species, represent an estimated 85-90 percent of the biological diversity of an area (The Nature Conservancy 1988); the other 10-15 percent consists of sensitive plant and animal species which occur both within and outside these natural communities. The full range of biological diversity in Pike County can be conserved by protecting sites with the best occurrences of the county's natural communities and by protecting populations of the county's sensitive plants and animal species. The natural community and sensitive species data are the basis for judging the biological values of sites within the county.

SUMMARY AND RECOMMENDATIONS

A meeting of TNC personnel was held to discuss the most important sites for protection in Pennsylvania; the following Pike County sites are regarded as being significant for natural communities and species of special concern and contain some of the best natural areas in the state.

The following seven sites (see Figure 1 for locations) from Table 1 are the most critical sites in Pike County for receiving protection or ensuring continued protection in the future. Each site is followed by its USGS topographic quadrangle map name. Figure 1 shows the locations of the seven sites within the county.

MILLRIFT CLIFFS (Port Jervis North). The Acidic Cliff Community is located along the Delaware River and contains an excellent population of a state-endangered plant species. The site should be protected for its biological importance and for its scenic contribution to the Delaware River area. Although a road and several houses occur along the top of the cliff, the impact appears to be minimal at present. However, attempts to log and build new housing have placed the plant species in jeopardy. It is important that water quality and flow pattern not be changed if the species is to remain on the wet cliff face. Diversion of overland and subsurface flow and logging east of the road will adversely impact the species. It is strongly recommended that further development and logging be prevented east of the road and be carefully scrutinized within the entire watershed outlined on the map. TNC has begun to pursue conservation easements in this area and the county and township should encourage conservation among the various landowners.

MILLRIFT FLATS (Port Jervis North). This Xeric Central Conifer Forest is an unusual occurrence along a sandy alluvial terrace in Pennsylvania. This fact and the five animals of special concern make this site a high priority for protection. A few houses have encroached on the natural community and may become a prime development area soon. This area should be protected through conservation easements, tax incentives to landowners or through purchase. The entire watershed which offers a scenic view of the river and also contains a small natural community on the slopes above Millrift Flats should also be included in any protection plan.

TWELVEMILE POND (Twelvemile Pond). This large Glacial Lake is relatively undisturbed and contains excellent populations of a state-endangered and a state-rare plant. The lake and surrounding uplands are privately owned and appear to be under no threat at the present time. The county should work with the landowners to ensure that it is always protected and continues to harbor the plants of special concern. Conservation easements are recommended now and purchase as a nature preserve if the owners ever wish to sell.

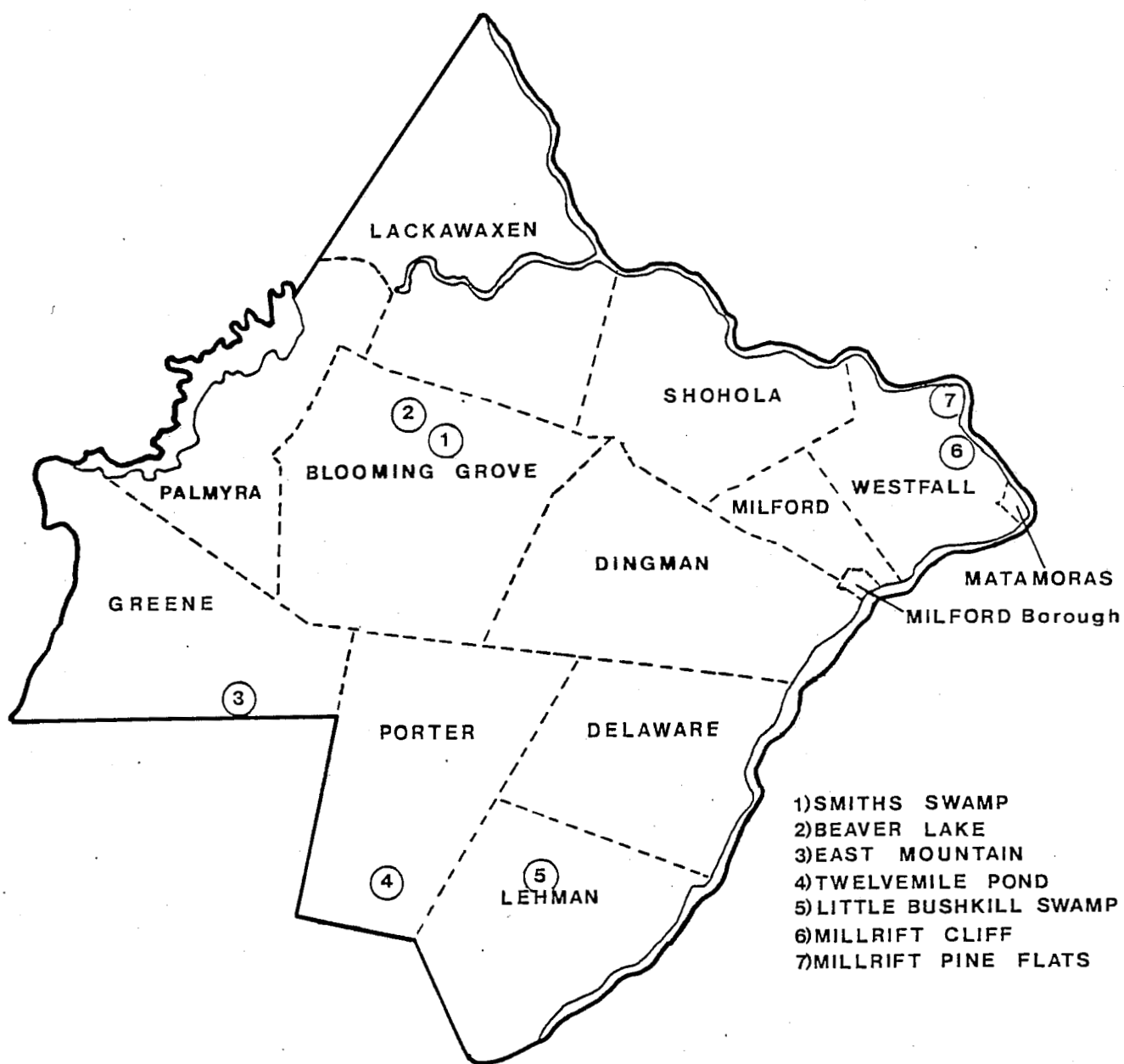


Figure 1. Top priority sites in Pike County. See Table 1 and text for descriptions.

BEAVER LAKE (Rowland). This excellent Glacial Bog at the northern end of Beaver Lake provides habitat for at least four plants of special concern. The site is on private fish and game club property and is currently being protected; protection can be enhanced through a conservation easement that restricts development and logging in the watershed.

EAST MOUNTAIN (Promised Land). This excellent Ridgetop-Dwarf-tree Forest is entirely on private land and appears to be secure from development. This mountain top and the valley (Mud Pond Swamp and Run area) to the east form part of the largest undeveloped, privately-owned tract in Pike County. The natural community on the mountain is likely to yield rare species and eagles make use of the valley during the winter. Conservation easements on the mountain and valley or some form of tax incentives are ways to ensure that this area remains excellent wildlife habitat and open space.

SP521/Little Bush Kill Swamp (Lake Maskenozha). This swamp contains only one of five populations in Pennsylvania of a state-endangered plant. The swamp is partially within the Delaware State Forest but the plant population is located outside the state forest boundary. Housing development is occurring near the southern edge of the swamp and may pose a threat if a protective buffer zone is not placed around the swamp. A conservation easement on the swamp and about 500-foot wide upland buffer around the swamp should ensure the species survival here.

SMITH'S SWAMP (Rowland). This wetland contains the only known state population of a state-endangered plant species and three other plant species of special concern. Although the site is on state game land and state forest land, it is important that water quality and quantity entering the swamp remain unchanged. Any proposals for housing or commercial development within the watershed should be given close scrutiny to be sure that there are no direct or indirect impacts on the swamp. Beaver have flooded and killed vegetation at the southern end of Smith's Swamp and it is recommended that they be removed to stop further degradation.

General Summary and Recommendations

Pike 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 Pike County.

Since there is only limited money and personnel time that can be devoted to the pursuit of land conservation, two tables are presented to direct protection efforts towards the most important sites first. Table 1 lists all the known sites where exemplary natural communities and species of special concern are located in approximate order of importance for the protection of biological

diversity. The table also summarizes their significance, any potential threats, and some recommendations for protection. Table 2 is a list of secondary sites that may be acceptable for county or township parks and passive recreation. The sites in Table 1 should be actively pursued for protection in order of importance while those in the second table might be targeted once protection of the Table 1 sites has been accomplished or as opportunities arise.

All privately-owned sites that are described above (also see Figure 1) and given a priority rank of 1 or 2 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, watersupply, etc. Two important areas for protection and ideal for parks are the Delaware River corridor and the Mud Pond Region. Natural communities and species of special concern found in these areas will fit into any plan for a county park or preserve. Creating county or township natural areas around municipal water supply watersheds can serve the purposes of providing an additional protective buffer around the water supply and provide low-impact recreation opportunities. In addition, larger open-space areas are created for wildlife than could be achieved through either the watershed land or the natural area alone. Fee title, easements, tax incentives, and agreements with and among landowners are all tools that can be used to create these conservation lands.

The importance of waterbodies 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 Pike 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 must be made by town, county, state, and federal agencies, developers, and residents to lessen the impact of housing development on the watersheds and plant communities of the county. Certainly, new housing and commercial development should be discouraged or given close scrutiny before

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

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

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
1	Millrift Cliffs	Port Jervis North	This Acidic Cliff community has an excellent population of a G5S1 ² plant; recommend secure easements and purchase of land on and above cliffs to prevent logging and changes in water quality and flow to the cliff.
1	Millrift Pine Flats	Port Jervis North	Recommend complete protection of this site by conservation easement and purchase; 2 natural communities and 5 special concern animals; site may be threatened by development and site should be excluded from gypsy moth control spray program.
1	Twelvemile Pond	Twelvemile Pond	Large Glacial Lake with 2 excellent populations and 1 poor population of plants of special concern; recommend purchase as a county nature preserve or conservation easement to ensure little or no development occurs around lake.
2	East Mountain Thicket	Promised Land	Excellent example of a Ridgetop Dwarf-tree Forest; part of largest undeveloped tract in private ownership in Pike Co; recommend work with landowners to protect region from development, prevent gypsy moth control spraying on mountain.
2	Little Bush Kill Swamp	Lake Maskenozha	Small population and only county site of a G4S1 PE plant; site is threatened by nearby development; recommend purchase or conservation easement.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
2	Smiths Swamp	Rowland	Good Boreal Conifer Swamp and Glacial Bog communities and 4 special concern plants, including only extant site in state for a PE species; owned jointly by PGC and Bureau of Forestry; remove beaver and avoid logging and other disturbances in watershed.
2	Beaver Lake	Rowland	Excellent Glacial Bog with at least 4 plants of special concern; although protected, recommend conservation easement to ensure long-term protection of site...
3	Corilla Lake	Narrowsburg	Good quality Glacial Lake with 1 G5S3 plant; recommend easement; work with landowner association to protect site from herbicides and nutrient enrichment.
3	Fairview Lake	Hawley	Fair population of a G4S2 plant; recommend work with landowners around lake to ensure good water quality, monitor septic systems and prevent herbicides from entering lake.
3	Lake Belle	Promised Land	Good quality Glacial Lake with 1 excellent population of a G5S2 plant; no current threat; recommend conservation easement and work with landowner association to protect isolated site.
3	Lake Laura	Promised Land	Good populations of 2 aquatic plants of special concern; no current threats to this isolated lake but conservation easement suggested to prevent future encroachment.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
3	Lake Maskenozha	Lake Maskenozha	Excellent population of a G5S2 plant; prevent use of herbicides but encourage landowners to control exotic aquatic plants.
3	Lake Scott	Promised Land	Good quality Glacial Bog with 5 special concern plants; recommend easement to protect site; possible addition to Bruce Lake State Forest Natural Area; possible threats from beaver and I-84 salt applications.
3	Lehman Township Woods (SA519)	Lake Maskenozha	Extant location for a G4S2 animal of special concern; limit development and prevent aerial spraying for gypsy moth control.
3	Little Mud Pond	Pecks Pond	Fair quality Glacial Bog with 3 good populations of special concern plants; flooding is greatest threat but recreational overuse of the bog and water quality degradation associated with nearby cabins may also be problems; Delaware State Forest - needs to be managed to preserve site.
3	Little Mud Pond Swamp	Rowland	Excellent Boreal Conifer Swamp and good Glacial Bog with 3 plants of special concern; past peat mine operation may have changed hydrology; Delaware State Forest in part, entire wetland and watershed should be set aside as a natural area.
3	Little Teedyuskung Lake Bog	Narrowsburg	Fair quality Broadleaf-conifer Swamp and Glacial Bog communities with a fair population of 1 special concern plant; recommend conservation easement.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
3	Mashipacong Shale Cliff	Port Jervis South	Good quality Shale Cliff community with a good population of a G5S3 plant; recommend conservation easement on site and on adjacent land to prevent encroachment; possible county or township natural area and scenic overlook.
3	Matamoras Cliffs	Port Jervis South	Good population of a G5S3 plant in an excellent Shale Cliff community; recommend site become township or county natural area and scenic overlook.
3	Pecks Pond Bog	Pecks Pond	Largest Glacial Bog mat in northeastern PA with good to excellent populations of 3 plants and 1 animal of special concern in Delaware State Forest; water quality should be monitored and new development limited in the watershed.
3	Sawkill Mud Pond	Edgemere	Good Glacial Bog with 1 G5S3 plant; threats from upslope development; protect watershed with conservation easements.
3	Shoemakers Barren	Bush Kill	Fair quality Acidic Cliff community with a fair population of a G5S3 plant; site in Delaware Water Gap National Recreation Area but land use on adjacent property could have negative impact; protect plant and community with conservation easement on adjacent land, potential impacts if sprayed for gypsy moths.
3	Shohola Falls Swamp	Shohola	Good Boreal Conifer Swamp partially on State Game Land; private land on west side may be subject to development; recommend conservation easement to protect swamp.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
3	Silver Lake	Edgemere, Lake Maskenozha	Two G5S2 aquatic plants occur here; threats include herbicide applications to the lake and pollution from faulty septic systems; work with landowners around lake to limit future development and monitor water quality.
4	Bald Hill	Shohola	Good example of a Ridgetop Dwarf-tree Forest with good species diversity; past disturbance minimal; prevent gypsy moth spraying.
4	Balsam Swamp	Promised Land	Excellent Broadleaf-conifer Swamp protected within the Bruce Lake State Forest Natural Area.
4	Ben Bush Swamp	Pecks Pond	Fair example of a Broadleaf-conifer Swamp community on state forest land; some threat from beaver; prevent logging adjacent to swamp.
4	Big Bear Swamp	Lake Maskenozha	Good quality Broadleaf-conifer Swamp within Stillwater State Forest Natural Area; control beaver and continue present protection.
4	Big Dam Ridge Swamp	Promised Land	No threat to this site with a fair population of a G4S2 plant; recommend work with landowner to protect site.
4	Blooming Grove Long Pond Swamp	Promised Land	Excellent Glacial Bog with fair to good populations of 3 plants of concern; protected as part of Bruce Lake State Forest Natural Area.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
4	Bruce Lake	Promised Land	Excellent Glacial Lake and good example of a Glacial Bog, 5 special concern plants associated with the 2 communities; part of Bruce Lake State Forest Natural Area; remove beaver that are causing flooding.
4	Buck Bar	Lake Maskenozha	Excellent population of a G5S3 plant in Delaware Water Gap National Recreation Area; exotic species invasion may be only threat.
4	Buckhorn Oak Barren Pond Eddy (SA508)		Poor example of a Ridgetop Dwarf-tree Forest with a good population of a G4S2 animal in state forest; recommend prevention of aerial spraying for gypsy moth.
4	Bushkill Shale Cliff	Flatbrookville	Excellent Shale Cliff community with excellent population of a G5S3 plant in Delaware Water Gap National Recreation Area; recommend National Park Service manage area to ensure survival of community and species; prevent spraying for gypsy moth.
4	Bushkill Swamp	Pond Eddy	Fair example of a Glacial Bog community with a poor population of a G5S3 plant in a state game land; beaver flooding is degrading bog; recommend removal of beaver and restricting logging in watershed.
4	Crooked Swamp	Edgemere	Poor quality Glacial Bog with a poor population of a G5S3 plant on state forest land; site being impacted by I-84 and needs protection from highway runoff.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
4	Crossroads Tavern Woods	Hawley	Fair population of a G5S2/S3 plant along roadside; recommend herbicides not be used along this section of road and that roadside grass mowing be delayed until August.
4	Dingmans Falls	Lake Maskenozha	Good Waterfall and Plungepool community with a poor population of a G4S1 plant; site receives heavy but controlled use; recommend National Park Service manage area to encourage plant species.
4	Dry Brook Shale Barren	Milford	Fair quality Shale Cliff with a fair population of a G5S3 plant in Delaware Water Gap National Recreation Area; manage to improve community and species habitat; prevent spraying for gypsy moth.
4	Edgemere Road Woods	Pecks Pond	Poor population of a G5S2/S3 plant along roadside; recommend herbicides not be used along this section of road and that roadside grass mowing be delayed until August.
4	Elbow Swamp	Pecks Pond	Good population of a G5S2 animal on state forest land; prevent aerial-spray control program for gypsy moths.
4	Eschbach Heights Shale Barren	Lake Maskenozha	Fair to Good population of a G5S3 plant in Delaware Water Gap National Recreation Area; species appears to be declining and may require management to prevent its loss.
4	Germantown Swamp	Rowland	Small, fair Broadleaf-conifer Swamp in state forest; recommend no logging in swamp and a buffer zone around it.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
4	Glenside Shale Barren	Lake Maskenozha	Fair Shale Cliff community with a good population of a G5S3 plant in Delaware Water Gap National Recreation Area; recommend shale quarry at base of cliff be stabilized to prevent further cliff erosion; prevent spraying for gypsy moth.
4	Lake Paupack	Newfoundland	Fair Glacial Bog with a fair population of a G5S3 shrub; site is privately protected but recommend conservation easement.
4	Long Swamp	Edgemere	Fair example of a Boreal Conifer Swamp with a fair population of a G5S2 special concern plant; protect watershed from development with a conservation easement.
4	Low Knob	Pecks Pond	Small Ridgetop Dwarf-tree Forest in state forest; recommend preserving in present condition and exclusion from gypsy moth spray program.
4	Lower Shapnack Island	Lake Maskenozha	Excellent population of a G5S3 plant in Delaware Water Gap National Recreation Area; exotic species invasion may be only threat.
4	Mainses Pond	Hawley	Good population of a G5S2 plant; recommend working with landowners to restrict development in watershed.
4	Milford Cliffs	Milford	Good Shale Cliff community and G5S3 species population in Delaware Water Gap National Recreation Area; recommend National Park Service manage area to ensure survival of community and species; prevent spraying for gypsy moth.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
4	Old Port Jarvis Road Shale Cliff	Milford	Good population of a G5S3 plant on a Shale Cliff community; may be degraded soon by housing; work with landowner to protect site; prevent spraying for gypsy moth.
4	Paupack Falls	Newfoundland	Good example of a Waterfall and Plungepool community; some erosion problems in ravine around falls; recommend conservation easement and formulate management plans.
4	Pine Lake	Newfoundland	Good Glacial Bog with 3 plants of special concern in State Forest Natural Area; has been degraded by beaver impoundment; recommend beaver removal.
4	Pocono Env. Ed. Center	Lake Maskenozha	Fair population of a G5S2 special concern plant; maintain site in present condition.
4	Raymondskill Falls	Milford	Good Waterfall and Plungepool community with a fair population of a G4S1 plant; site is within Delaware Water Gap National Recreation Area; recreational use is limited and management adequate.
4	Rock Hill Pond	Pecks Pond	Fair quality Glacial Bog that has been partially flooded; Delaware State Forest in part; work with state and private camp to protect water quality; limit logging and development.
4	Shapnack Island	Lake Maskenozha	Excellent population of a G5S3 plant in Delaware Water Gap National Recreation Area; exotic species invasion may be only threat.

Table 1 (Continued, next page.)

Table 1 (Continued.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
4	White Birch Swamp	Pecks Pond	Fair quality Broadleaf-conifer Swamp in state forest; threatened by sand-and-gravel excavation on edge; recommend buffer zone between quarry operation and wetland.
4	Wolf Lake	Narrowsburg	Glacial Lake community with 3 plants of special concern including 1 G5S1; lakeside development is limited but recommend water-quality monitoring; conservation easement and work with landowner association to protect lake and species.
5	Bushkill Falls	Bushkill	Scenic Waterfall and Plungepool community; current commercial tourist enterprise and management appears compatible; maintain water quality by limiting upstream development.
5	Conservation Island Promised Land		Poor example of mature Northern Hardwood Forest in state park; although protected, site needs management to reduce deer-browse damage.
5	Forest Lake	Narrowsburg	Dammed Glacial Lake and associated wetlands; one G5S2 plant population; work with landowner association to prevent logging and development in watershed.
5	Fulmer Falls	Lake Maskenozha	Fair Waterfall and Plungepool community in state park; receives heavy use but boardwalks appear sufficient to prevent damage to area.
5	High Knob	Pecks Pond Promised Land	Poor quality Ridgetop Dwarf-tree Forest on state forest land; recommend no further development.

Table 1 (Concluded, next page.)

Table 1 (Concluded.)

County Rank ¹	Site Name	USGS Topo. Map	Natural Community, TNC Global and State Ranks, Importance, Recommendations
5	Lake Giles	Rowland	Fair population of a G5S2 aquatic plant; work with landowners to avoid pollution due to over-development in watershed.
5	Pinchot Falls	Milford	Waterfall and Plungepool community on Sawkill Creek, a High-gradient Clearwater Creek; falls are protected as part of Grey Towers; Sawkill Creek is a designated Exceptional Value Stream; continue current protection and management.
5	Point Peter	Narrowsburg	Fair Ridgetop Dwarf-tree Forest; spraying for gypsy moths not advised.
5	Taylorstown Swamp	Rowland	Fair Broadleaf-conifer Swamp that is partially on state forest property; logging in and around swamp has degraded site; recommend prevention of further logging.
5	Tinkwig Creek	Hawley	Poor population of a G5S2/S3 plant growing on roadside; recommend no use of herbicides and delay roadside maintenance until August.
5	Twin Lakes	Shohola	Poor population of a G5S2 plant; recommend landowners around lake monitor water quality and prevent further development around lake.
5	Well Road Swamp	Rowland	Fair example of a Boreal Conifer Swamp on State Game Land; flooding has caused some species to decline; recommend allowing natural drainage to resume.

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

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

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

County Rank*	Site Name	USGS Topo. map	Importance
High	Delaware River ¹	Narrowsburg Eldred Shohola Pond Eddy Port Jervis North Port Jervis South Milford Culvers Gap Lake Maskenozha Flatbrookville	Wintering Bald Eagle habitat; bird migration corridor; shad spawning grounds; rare plants; water supply; river recreation; aesthetics; protect water quality, prohibit further development along shore and limit development in watershed.
High	Mud Pond Region	Promised Land	Large, undeveloped tract of mixed oak forest and wetlands; wildlife and recreational value; work with landowners to protect land (see East Mountain Thicket, Table 1).
Medium	Bald Hill Swamp	Edgemere Pecks Pond	Large conifer swamp at headwaters of Little Bush Kill; although protected as state forest, development is encroaching and should be excluded within a buffer zone area.
Medium	Big Swamp	Twelvemile Pond	Only partially protected by state forest; protect from encroachment.
Medium	Lackawaxen River	Hawley Rowland Shohola	River recreation; aesthetics. protect water quality by limiting further development in watershed.
Medium	Spruce & Rowland Swamps, Masthope Creek Region	Narrowsburg	Large undeveloped tract near Delaware River; needs more field survey but potential for large county or township park; work with landowners to protect land.

Table 2 (Continued, next page.)

Table 2 (Continued.)

County Rank*	Site Name	USGS Topo. map	Importance
Medium	Sunset Creek Ravine	Lake Maskenozha	Tributary to Delaware River; heavy development pressure upstream may cause water quality problems.
Medium	Toms Creek	Lake Maskenozha	Direct tributary to Delaware River; heavy development pressure; protect upper reaches from further encroachment.
Low	Deep Brook	Milford	Potential as county/township park near Milford Borough; water quality protection for Delaware River.
Low	Gates Run	Hawley	Some older-growth hemlock and wetland; logging should be prohibited along stream.
Low	Hemlock Farms Barren	Pecks Pond	Poor quality scrub oak barren that provides open space and wildlife habitat; development unlikely.
Low	Holsey Meadow Swamp	Pecks Pond	Diverse wetland partially in state forest; include buffer zone around it as protection from logging.
Low	Ledgedale Swamp	Newfoundland	Large swamp that has potential as a local natural area near Lake Wallenpaupack.
Low	Little York Swamp	Pecks Pond	Large swamp surrounded by upland forest; restrict development within watershed; work with landowner to protect land.
Low	Maple Swamp	Pecks Pond	Important for protecting water quality of Pecks Pond; development has reduced its importance to wildlife.

Table 2 (Continued, next page.)

Table 2 (Concluded.)

County Rank*	Site Name	USGS Topo. map	Importance
Low	Painter Swamp	Twelvemile Pond	Fairly diverse of plant life; in state forest; protect from logging.
Low	Poison Brook Swamp	Edgemere	Protected as state forest but encroachment to the south has had serious impacts.
Low	Sagamore Swamp	Edgemere	Impacted by development; further encroachment should be discouraged.
Low	Sunrise Swamp	Edgemere	Impacted by development; further encroachment should be discouraged.
Low	Wallenpaupack Creek	Newfoundland	Major contributor to Lake Buck Hill Falls Wallenpaupack; some older-growth forest; protect water quality by limiting development in watershed; potential for addition to Tobyhanna State Park.

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

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

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. 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 Pike County Natural Areas Inventory.

NATURAL AREAS INVENTORY METHODS

Methods used in the Pike 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) reconnaissance by aircraft; and 3) ground survey.

Map and Air Photo Interpretation

A list of natural features found in Pike 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 maps were consulted to increase our understanding of the county's environment. Because vegetation in many instances must be classified at an ecosystem level, it was critical that an ecologist or person with similar training interpret the maps and air photos.

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

Once some photo interpretation was done, field surveys were conducted to determine what was actually on the ground to improve the accuracy and consistency of interpretation. Biologists finding minimally disturbed natural vegetation or species of special concern at a site outlined the site on a field map for future reference. In the lab, the photo signatures (characteristic patterns, texture, tone of vegetation, and other features on the photos) of these sites could be compared with other areas found on the photos to identify similar plant communities that could be

checked during future surveys. Biologists consistently finding poor quality sites associated with particular photo signatures could eliminate similar areas 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 PNA 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 PNA 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. For sites of state-wide significance, more intensive study was made using PNDI Survey Forms.

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.

RESULTS

On 7 February 1989, the Pike County Inventory began with a public meeting held at the county administration building in Milford. At that time, Peter Wulforth, County Planning Director, and TNC personnel explained the purpose and procedures of the inventory. We solicited input into the project from individuals and local conservation organizations. We sought the help of anyone who had knowledge of natural communities, endangered species, or important wildlife breeding areas. Field survey forms (Appendix IV) were distributed at the meeting and response was quite good; detailed maps and species lists have been submitted for many sites around the county.

One reconnaissance flight was taken over the county to look at sites that were not easily accessible on foot and to eliminate disturbed areas. The flight occurred on 16 May 1989 and covered the entire county in a flight path that proceeded north and south from east to west.

Site Summaries by USGS Topographic Maps

Portions of Pike County are located on 22 USGS topographic 7½ minute quadrangle maps (Figure 2). Communities, species of special concern, significant geologic features, and some areas that may be of local importance for wildlife and open space have been located on these base maps. The most important areas are represented on the maps in bold print. Natural communities and the most critical sites for species of concern have been given site names in 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. The area outlined represents the species' location and the watershed or subwatershed area where the elements (species or natural communities) are located. Development activities proposed within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities

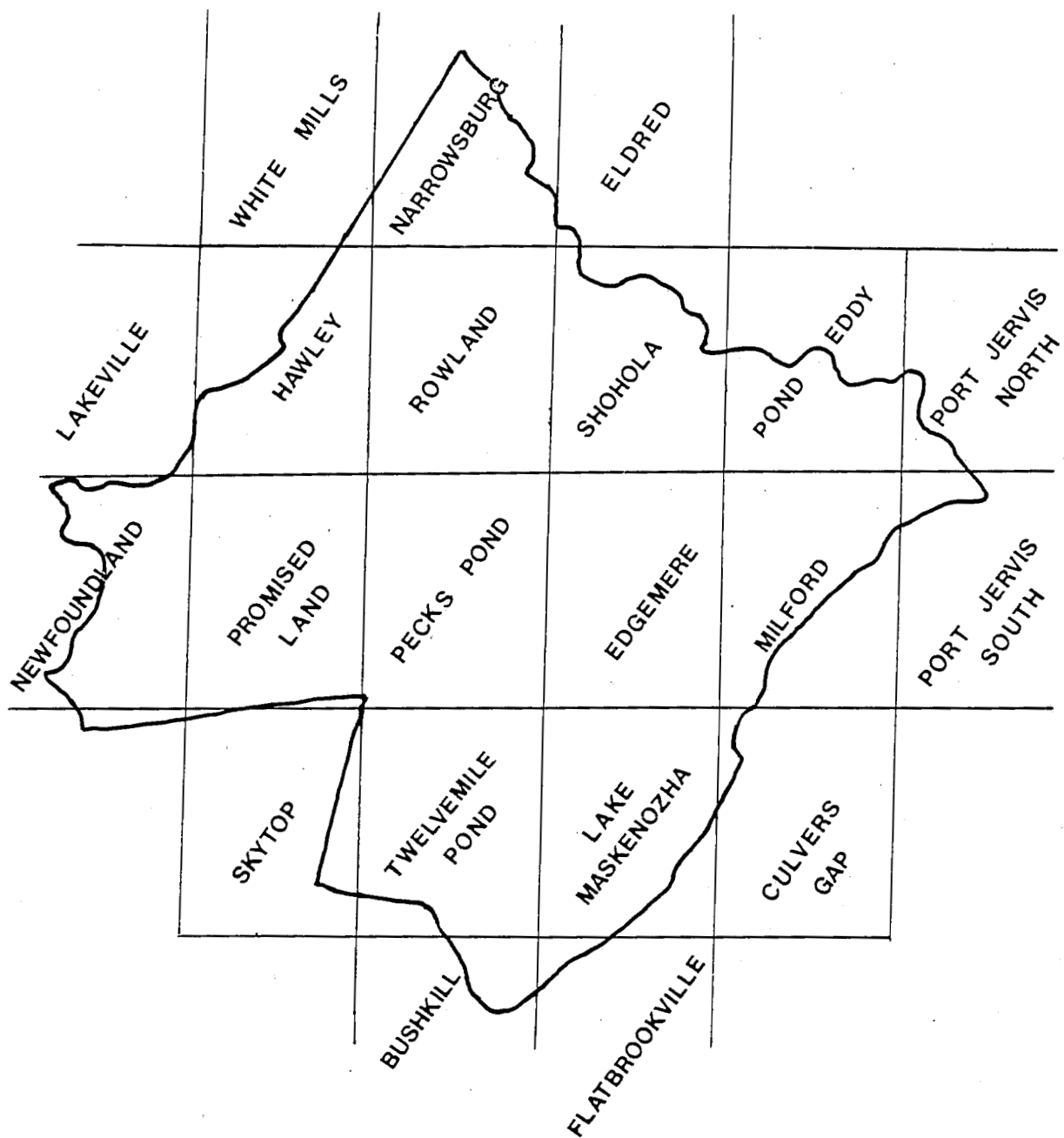


Figure 2. USGS topographic quadrangle map index of Pike County.

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. At these sites, the vegetation has been disturbed enough that they cannot be considered natural, but they do hold potential for parks or passive recreation/open space areas.

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

USGS QUADRANGLE MAP: White Mills

<u>TNC Rank</u>	<u>Legal Status</u>	<u>Last</u>
Global State	Fed. State	Seen Quality

NATURAL COMMUNITIES: none identified.

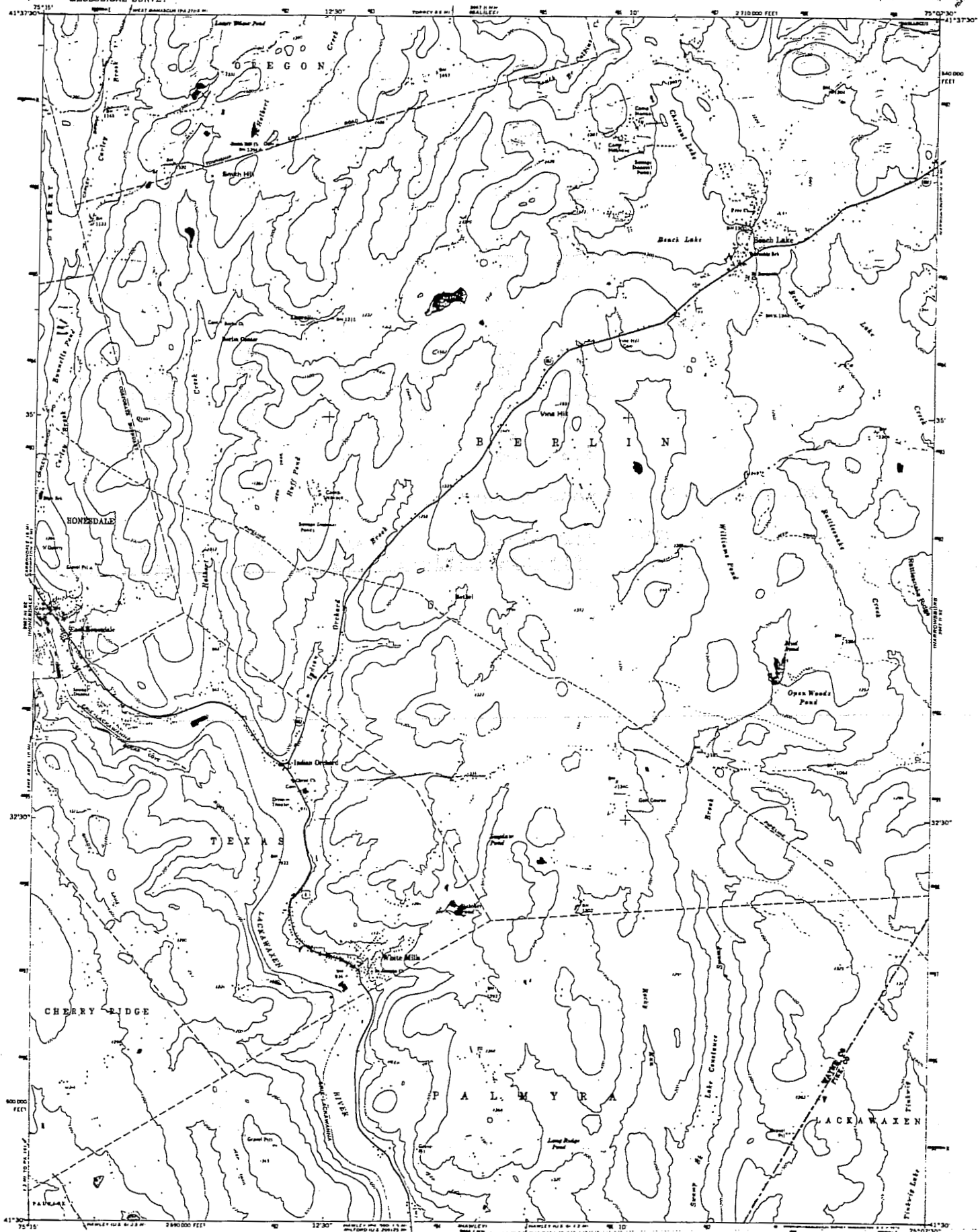
SPECIAL PLANTS: none identified.

SPECIAL ANIMALS: none identified.

OTHER: none identified.

White Mills Quadrangle:

Only a small portion of Pike County is located on this map (in the lower right corner) and no species or natural communities of special concern were found.



Map edited and published by the Geological Survey
Control by USGS and USGAS

Topography by photogrammetric methods from aerial
photographs taken 1964. Field check 1967.
Projection: 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks
zone 18 shown in blue

Four red dashed lines indicate selected fence and land lines where
generally shown on aerial photographs. This information is uncheckered

U.S. GEOLOGICAL SURVEY
WASHINGTON, D.C. 20508

SCALE 1:24,000

CONTOUR INTERVAL 20 FEET
ELEVATION IN MEAN SEA LEVEL

ROAD CLASSIFICATION
Primary highway all weather Light duty road all weather
Hard surface Improved surface
Unimproved road, fair or city
weather
U.S. Route State Route

WHITE MILLS, PA.

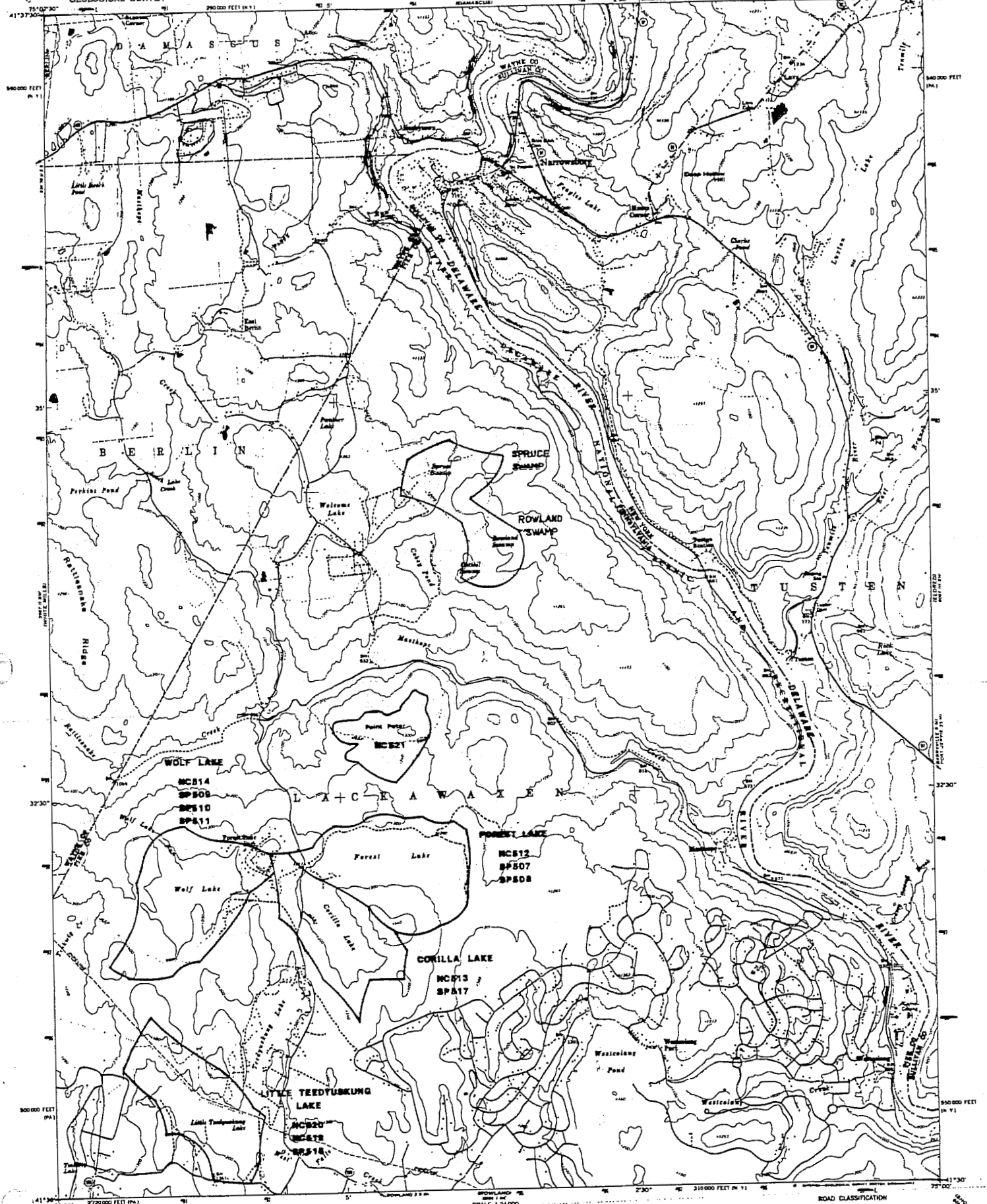
N4130-7557515-75

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WASHINGTON D.C. 20508
A COLOR DISTANCE TOPOGRAPHIC MAP AND SYMBOLS IS AVAILABLE AT \$10.00

USGS QUADRANGLE MAP: Narrowsburg

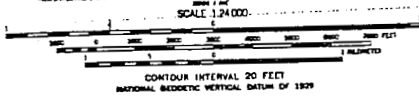
		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	<u>Quality</u>
		<u>Global</u>	<u>State</u>	<u>Fed.</u>	<u>State</u>	<u>Seen</u>	
NATURAL COMMUNITIES:	512	G?	S1	N	N	6/06/89	B
	513	G?	S1	N	N	6/06/89	B
	514	G?	S1	N	N	6/06/89	B
	519	G?	S2S3	N	N	6/12/89	BC
	520	G?	S3S4	N	N	6/12/89	BC
	521	G2G3	S1S2	N	N	6/06/89	C
SPECIAL PLANTS:	507	G5	S2	N	PR	7/29/87	AB
	508	G5	S2	N	PR	7/28/87	BC
	509	G5	S1	N	PE	7/29/87	C
	510	G5	S2	N	PR	7/29/87	B
	511	G5	S2	N	PR	7/29/87	B
	517	G5	S2S3	N	PR	6/06/89	D
	518	G5	SU	N	N	6/12/89	C
SPECIAL ANIMALS:	none identified.						
OTHER:	Spruce Swamp, Rowland Swamp, Masthope Creek, Delaware National Scenic and Recreational River.						

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Map compiled, edited, and published by the Geological Survey in cooperation with New York Department of Public Works. Data by USGS and NYS DPW.

Topographic by photostereoscopic methods from aerial photographs taken 1945. First checked 1964. Photometric projection. 10,000-foot grid based on Pennsylvania coordinate system, north zone, and New York coordinate system, east zone. 1000-foot Universal Transverse Mercator grid, zone 18, shown in blue. 1927 North American Datum. To place on the projected North American Datum means the projection lines 5 meters wide and 33 meters apart as shown by dotted corner lines. Few red dashed lines indicate sectioned fence and head lines where generally inside on aerial photographs. This information is uncorrected.



ROAD CLASSIFICATION

Primary highway, all weather	Light duty road, all weather
Secondary highway, all weather	Unimproved road, fair or dry weather
Light duty road, all weather	Unimproved road, fair or dry weather

Legend:
○ U.S. Route
○ State Route

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

NARROWSBURG, N.Y.—PA.
41075-C1-77-024
1965
GPO: 1965-0-275-000

Narrowsburg Quadrangle:

The significant natural areas on this map are centered around. **FOREST LAKE** is a Glacial Lake Community (**NC512**) that contains an excellent population of a state-rare plant (**SP507**) and a good population of another state-rare plant (**SP508**). **WOLF LAKE** is a Glacial Lake (**NC514**) that supports three species of special concern - a fair population of a state-endangered plant (**SP509**) and good populations of two state-rare plants (**SP510**, **SP511**). **CORILLA LAKE** is also a Glacial Lake (**NC513**) that contains a poor population of a state-rare plant (**SP517**). North of Forest Lake at Point Peter there is a fair example of a Ridgetop Dwarf Tree Forest Community (**NC521**).

Point Peter and the three glacial lakes are within a privately owned hunting club and not seriously threatened, but logging and development should be restricted within the lakes' watersheds. Water quality in Wolf Lake should be closely monitored for septic system waste because of housing along the lake shore. Special attention should be given to land use within the watersheds of all these lakes to ensure their continued high quality in the future. Use of herbicides to control weeds in the glacial lakes should be avoided. Long term management plans should include land use practices that would enhance the aesthetic qualities of these lakes and protect the rare species they contain.

LITTLE TEEDYUSKUNG LAKE is a small kettle hole Glacial Lake surrounded by a good glacial bog community (**NC519**) and a good broadleaf-conifer swamp community (**NC520**). The bog contains a fair population of one proposed state-rare sedge (**SP518**). However, the bog is being adversely affected by flooding by beaver and much of the watershed has been logged within the last 20 years. These impacts to the wetland have reduced the wetland's quality and development proposed within the watershed is a serious threat to the long-term survival of the natural communities and species of concern here.

Development around neighboring Teedyuskung Lake has had serious consequences for water quality by increasing the nutrient load in the lake from septic systems and other sources. Poor water quality and an increase in the amount of aquatic weeds have been consequences of siting houses close to the lake. Steps should be taken to avoid the duplication of lakeside development around Little Teedyuskung Lake.

The northern tip of Pike County in Lackawaxen Township is in need of further inventory. Areas such as **Spruce Swamp**, and **Rowland Swamp** may prove to contain natural communities and species of special concern.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as

possibly breeding within the area covered by the Narrowsburg USGS topographic map: Peregrine Falcon, Osprey, Bald Eagle, Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, Red-shouldered Hawk, Saw-whet Owl, and Whip-poor-will. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Eldred

<u>TNC Rank</u>	<u>Legal Status</u>	<u>Last</u>	
Global State	Fed. State	Seen	Quality

NATURAL COMMUNITIES: none identified.

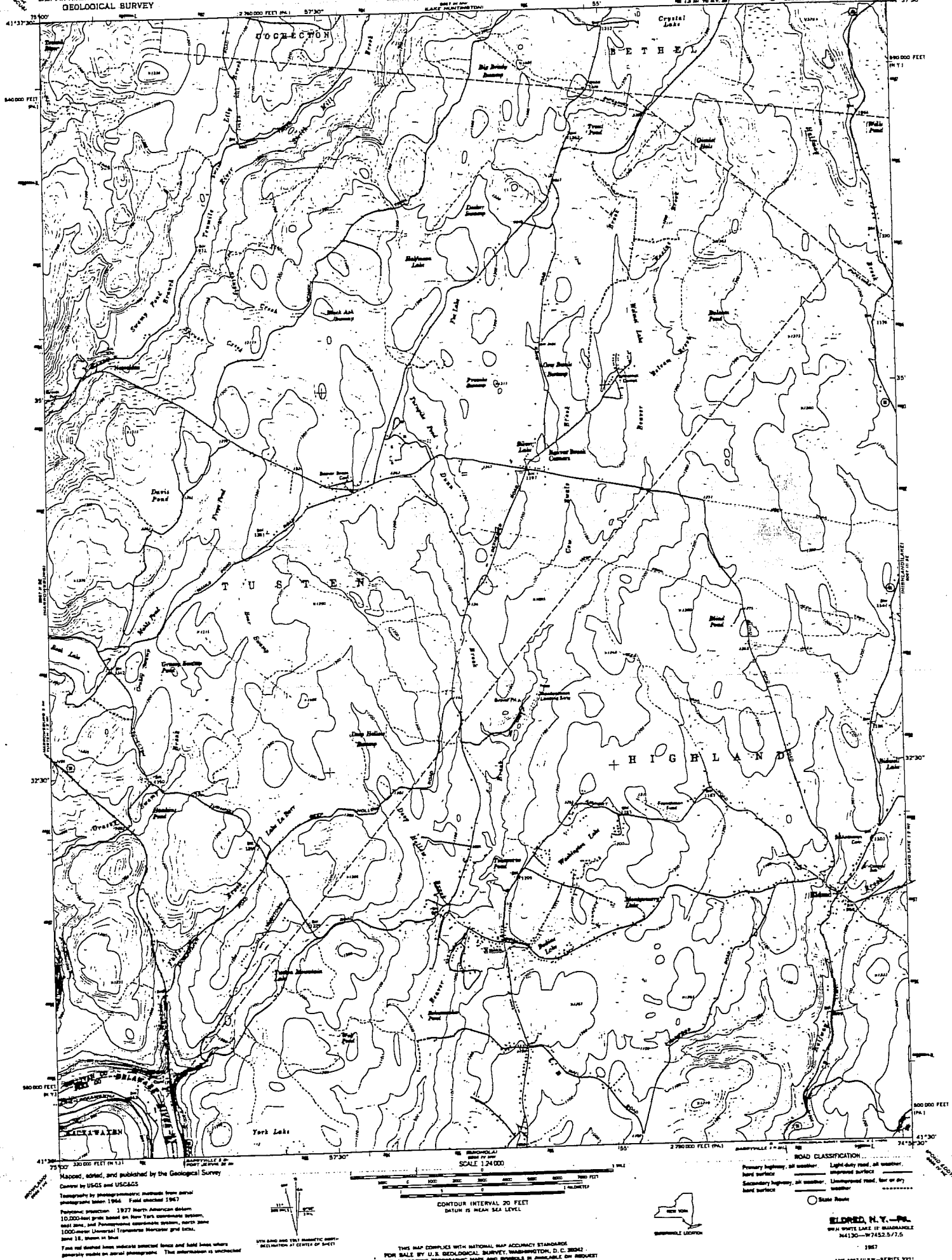
SPECIAL PLANTS: none identified.

SPECIAL ANIMALS: none identified.

OTHER: Delaware National Scenic and Recreational
River.

Eldred Quadrangle:

Only a small portion of Pike County is on this map and no species of special concern or natural communities were found. The Delaware River, the most important feature on this map, takes a sharp southerly turn in the lower left corner on this map.



USGS QUADRANGLE MAP: Lakeville

<u>TNC Rank</u>	<u>Legal Status</u>	<u>Last</u>	
Global State	Fed. State	Seen	Quality

NATURAL COMMUNITIES: none identified.

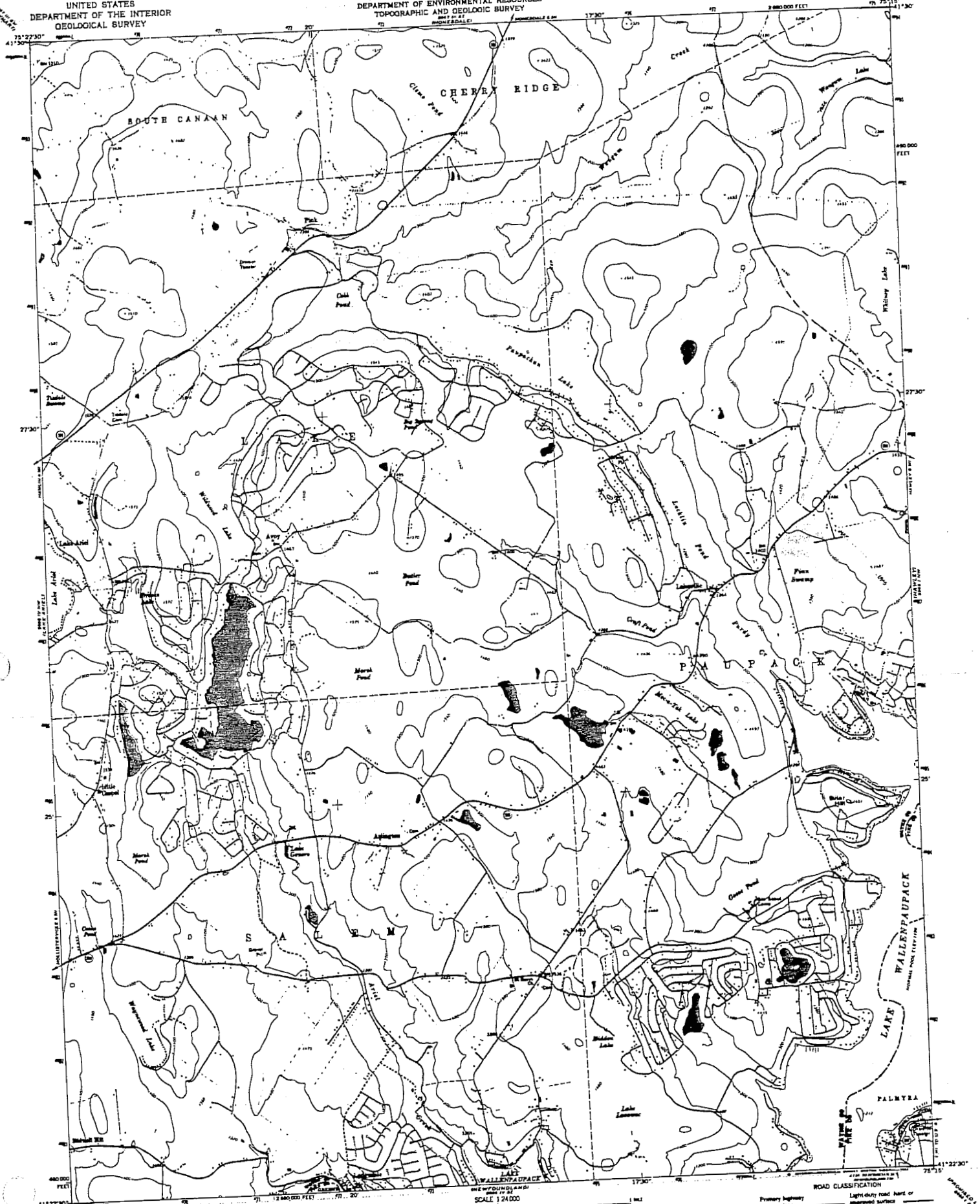
SPECIAL PLANTS: none identified.

SPECIAL ANIMALS: none identified.

OTHER: none identified.

Lakeville Quadrangle:

Only a small portion of Pike County is on this map and no species of special concern or natural communities were found in the Pike County portion. Lake Wallenpaupack, a man-made lake, comprises the larger portion of Pike County on this map. The smaller portion is a developed lakeside tip of Palmyra Township.



Maped, edited, and published by the Geological Survey
Control by UNGS and NGS/NOAA

Topography by photogrammetric methods from aerial photography
from 1963. First checked 1964

Projection: UTM, 10,000-foot grid ticks based on Pennsylvania
coordinate system, north zone. 1000-meter Universal Transverse

Mercator grid ticks, zone 18, shown in blue

1927 North American Datum

The place on the projected North American Datum 1927
shown the projection from 5 meters north and 31 meters west
in meters by dashed corner ticks

Low and shaded lines indicate selected fence and field lines shown
generally visible on aerial photography. This information is uncharted



CONTOUR INTERVAL 20 FEET
INTERNAL BENCHMARK VERTICAL DATUM OF 1929

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



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

LAKEVILLE, PA.

41075-03-77-024

1966

USGS QUADRANGLE MAP: Hawley

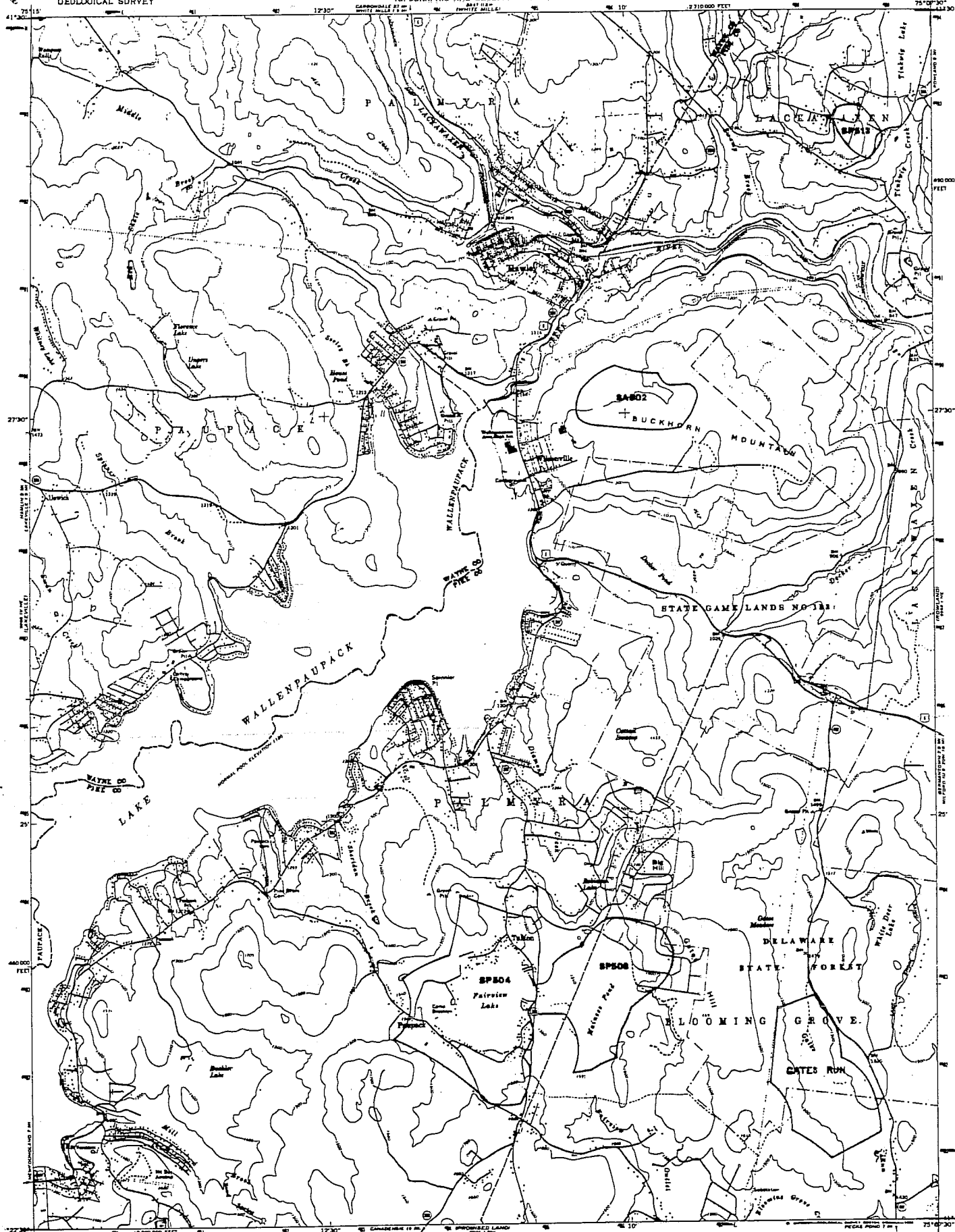
		<u>TNC Ranks</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality

NATURAL COMMUNITIES: none identified.

SPECIAL PLANTS:	504	G4	S2	N	PT	7/30/87	C
	508	G5	S2	N	PR	1986	B
	513	G5	S2S3	N	PR	6/06/89	C

SPECIAL ANIMALS:	502	G5	S2	N	N	8/09/72	U
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OTHER: Gates Run, Lackawaxen River.



Mapped, edited, and published by the Geological Survey
Control by USGS and NOAA

Topography by photogrammetric methods from aerial
photographs taken 1963. Field checked 1966.

Perimeter projection. 10,000-foot grid scale based on Pennsylvania
statewide system, North zone. 1000-foot Universal
Transverse Mercator grid scale, zone 18, shown in blue.

1977 North American Datum. To place on the projected
North American Datum 1983, move the projection lines
5 meters south and 51 meters west as shown by
dashed corner ticks.

For not shown lines indicate selected lines and field lines where
generally visible on aerial photographs. This information is checked
There may be ground irregularities within the boundaries of
the National or State boundaries shown on this map.



SCALE 1:24,000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1985



ROAD CLASSIFICATION
Heavy-duty Light-duty
Medium-duty Unimproved dirt
U.S. Route State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 20192
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Boundaries shown in purple and unshaded contours in green
with Commonwealth of Pennsylvania Agency as from aerial
photos 1961 and other sources. This information

HAWLEY, PA.

41075-02-77-024

1966

Hawley Quadrangle:

Fairview Lake is a privately-owned lake that contains a fair population of a state-threatened plant species (**SP504**) despite being almost completely surrounded by development. Nutrient run-off from lawn fertilizers and on-site sewage disposal from lakeside cottages and summer camps should be discouraged to maintain this population of this clean-water species. An educational program to inform landowners about the connection between the lake water's quality and what they do on their land will help to keep Fairview Lake clean.

Fairview Lake is connected to Maines Pond by a small stream and any problems that develop in this lake will eventually find their way to Maines Pond. Maines Pond is the site for a good population of a state-rare species (**SP508**). There is a threat of development to the north of Maines Pond. However, the remaining perimeter of the pond is undeveloped at present and should be encouraged to remain that way to avoid the problems of nutrient run-off from development as seen at Fairview Lake.

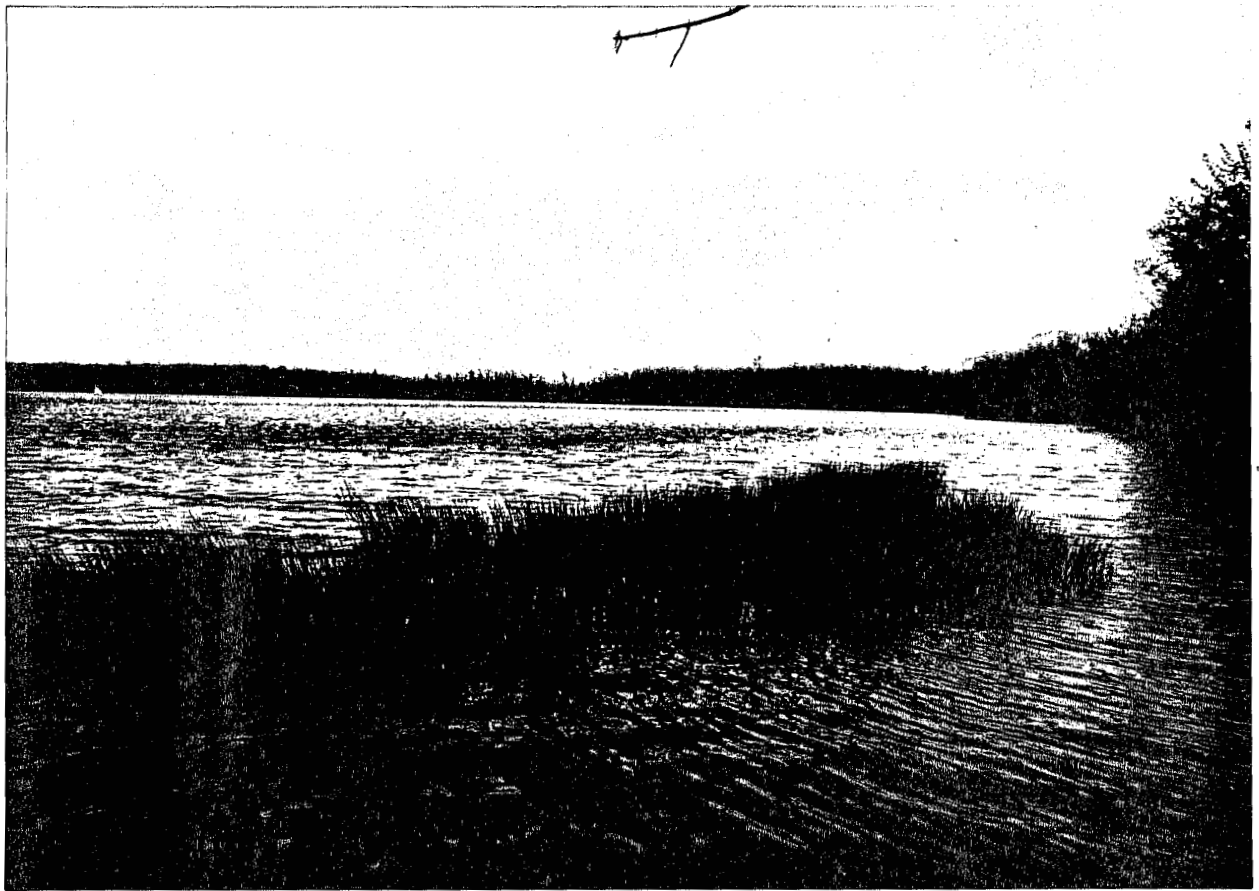
An animal of special concern (**SA502**) occurs in the vicinity of Buckhorn Mountain. This species has not been seen since 1972 but is believed to be extant because the habitat remains intact. This site needs protection from logging and development. Fortunately, State Game Land No. 180 surrounds Buckhorn Mountain and may provide additional habitat for this species.

A fair population of a state-rare plant (**SP513**) occurs along Route 590 south of Tinkwig Lake. Its precarious roadside location requires a restricted mowing and herbicide application regime. Mowing should occur after July to ensure that this species is allowed to flower and disperse seed. Herbicide applications to control roadside weeds should be discouraged. Maintenance mowing should be done once in early spring (March) and again in late summer (August). This regimen would actually benefit this species by keeping the site open for more light penetration which this species prefers, and it would reduce the competition from other aggressive roadside plants.

Gates Run is a natural area of local significance only. This site contains some older growth hemlock and logging should be restricted within 150 feet of the stream. It is partly on Delaware State Forest property and partly on private property. State and private landowners should be encouraged to maintain the woodland and prevent logging within 200 feet of the run to help maintain the quality of Gates Run.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Hawley USGS topographic map: Hooded Merganser, Sharp-shinned Hawk, Cooper's

Hawk, Northern Goshawk, Red-shouldered Hawk, and Saw-whet Owl. Due to insufficient information, exact locations could not be mapped.



Bayonet Rush (Juncus militaris), a Pennsylvania-endangered aquatic plant, is known from only two locations in Pike County. Photo: Pennsylvania Science Office of The Nature Conservancy.

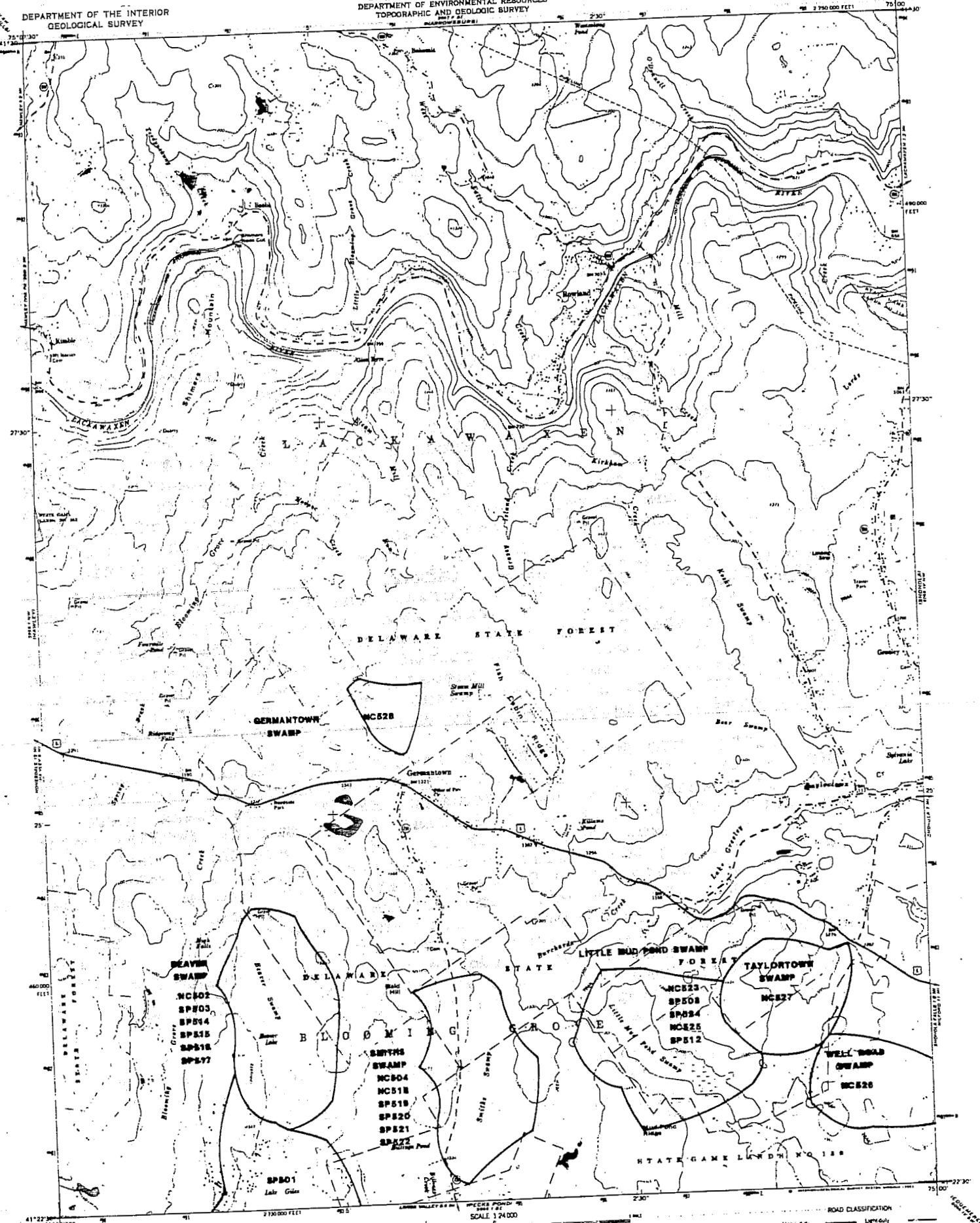
USGS QUADRANGLE MAP: Rowland

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	502	G?	S2S3	N	N	8/03/89	A
	504	G?	S2	N	N	9/13/89	B
	518	G?	S2S3	N	N	9/13/89	A
	523	G?	S2S3	N	N	9/13/89	A
	525	G?	S2	N	N	9/13/89	A
	526	G?	S2	N	N	10/11/89	C
	527	G?	S3S4	N	N	8/24/89	C
	528	G?	S3S4	N	N	8/24/89	C

SPECIAL PLANTS:	501	G5	S2	N	PR	8/05/82	C
	503	G5T5	S2	N	TU	8/05/82	D
	508	G5	S3	N	PR	9/13/89	C
	512	G5	S2	N	TU	9/13/89	AB
	514	G5	S3	N	PR	89	BC
	515	G5	SU	N	PR	8/03/89	B
	516	G5	S2	N	PT	8/03/89	B
	517	G4	S3	N	PR	8/03/89	A
	519	G5	S3	N	PR	9/13/89	D
	520	G5	SU	N	PT	9/13/89	CD
	521	G5	S1	N	PE	9/13/89	AB
	522	G5	S3	N	PR	9/13/89	A
	524	G5	SU	N	PT	9/13/89	AB

SPECIAL ANIMALS: none identified.

OTHER: Lackawaxen River.



Mapped, edited, and published by the Geological Survey

Mappe, income, and production by
County by USGS and MOSAIDA
Representative by photogrammetric methods from aerial
photographs taken 1963. Field checked 1966.
Polyconic projection. 10,000-foot grid lines based on
North American coordinate system, north zone
1000-meter Universal Transverse Mercator grid lines.
Zone 18, section 14. 1:272,000. American Datum.
1 inch on the ground. South American Datum 1963
zone the projection. 5 meters south and
1:272,000. 1963. 5 meters south and
1:272,000. 1963. 5 meters south and

Revisions shown in purple and significant comments in cooperation with Counterparts of Participating agencies from aerial photographs taken 1961 and other sources. This information not field checked. Map dated 1987.

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

ROWLAND, PA

41075-D1-TV-024

1966
PHOTOREVISED 1983
DMA 8000 I NC-SERIES V23

Rowland Quadrangle:

There are three very significant natural areas on this map. They are all located on the lower third of the map south of U.S. 6 and they are **BEAVER LAKE**, **SMITH'S SWAMP** and **LITTLE MUD POND SWAMP**.

BEAVER LAKE contains an excellent Glacial Bog (**NC502**) on the north side of Beaver Lake and provides habitat for good populations of a state-threatened plant (**SP516**), two state-rare plants (**SP514**, **SP517**), and a species that has been proposed for state-rare status (**SP515**). There is one plant species of special concern in Beaver Lake which is poorly represented (**SP503**). The site is privately owned and virtually undisturbed, therefore logging should be discouraged in the watershed.

SMITH'S SWAMP contains a high quality Glacial Bog community (**NC518**) harboring 4 plant species of special concern. First, there is an excellent population of a state-endangered plant (**SP521**) which represents the only extant location for this species in the state. There is a fair population of a state-threatened plant (**SP520**) and an excellent population of a state-rare shrub (**SP523**). Lastly, there is a fair population of another state-rare shrub (**SP519**). The bog community is surrounded by a good quality boreal conifer swamp. Smith's Swamp is located primarily on State Game Land No. 180 and also on Delaware State Forest land. Logging within the watershed of Smith's Swamp should be restricted. Cooperation between the two state agencies would be necessary in order to maintain the natural diversity of Smith's Swamp. This site is worthy of being designated as a natural area by the state Bureau of Forestry.

LITTLE MUD POND SWAMP is an extensive Boreal Conifer Swamp (**NC525**) of high quality which supports an excellent population of a plant species of special concern (**SP512**). The swamp surrounds an exemplary example of a Glacial Bog community (**NC523**) which contains an excellent population of a state-threatened plant (**SP524**) and a good population of a state-rare shrub (**SP508**). One half of the swamp is on Delaware State Forest land and the other half is privately owned. The entire swamp should be protected from logging, development, nutrient run-off, and from the excavating that has occurred on the southern edge. There is also an island of much older Canada hemlocks (*Tsuga canadensis*) which provide cover for numerous cavity-dwelling animals. This site, like Smith's Swamp should be designated as a state Bureau of Forestry natural area.

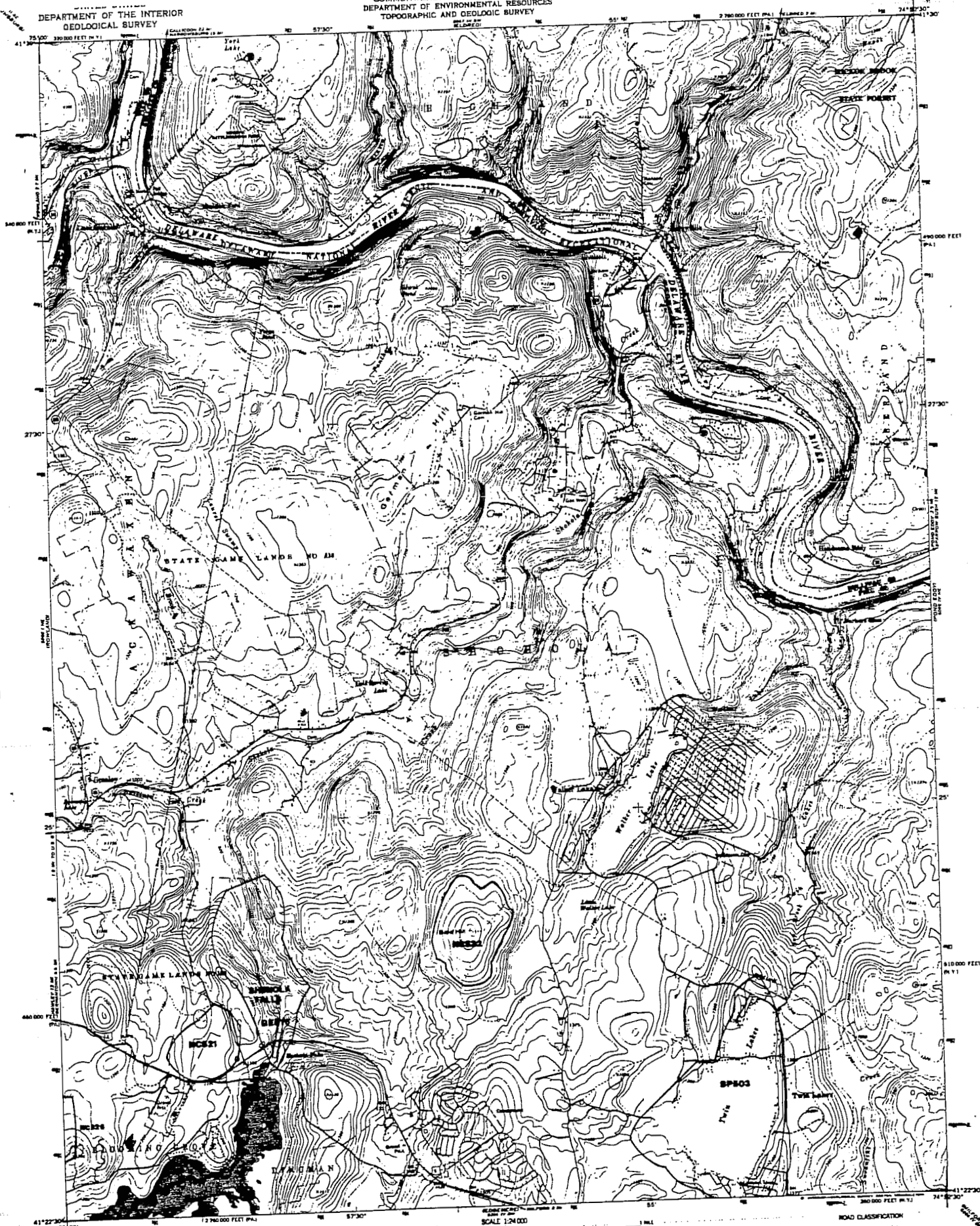
TAYLORTOWN SWAMP and **GERMANTOWN SWAMP** are fair quality Broadleaf-Conifer Swamps (**NC527**, **NC528**, respectively). Development and logging should be restricted within their watersheds. Both swamps are on Delaware State Forest property.

WELLS ROAD SWAMP is a fair quality Boreal Conifer Swamp (NC526) located entirely within State Game Land No. 180. Logging should be restricted within the swamp's watershed.

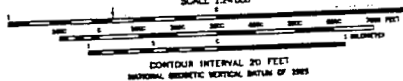
The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Rowland USGS topographic map: Swainson's Thrush, Osprey, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Saw-whet Owl, and Whip-poor-will. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Shohola

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	521	G?	S2	N	N	8/09/89	B
	522	G?	S?	N	N	10/12/89	B
SPECIAL PLANTS:	503	G5	S2	N	PR	9/20/88	D
SPECIAL ANIMALS:	none identified.						
GEOLOGICAL FEATURES:	516	-	-	-	-	9/20/89	E
OTHER:	Delaware National Scenic and Recreational River, nc526, Lackawaxen River.						



Map made, edited, and published by the Geological Survey
Control by U.S.G.S. and P.D.G.S.
Topography by photogrammetric methods from aerial
photographs taken 1963. First edition 1963.
Polyconic projection. 10,000-foot grid based on Pennsylvania
mean sea level, with zone, and zone four coordinates shown, and zone
1000-meter Universal Transverse Mercator grid lines, zone 18, shown in blue.
1927 North American Datum.
To show on the projected North American Datum 1983
the projection lines 5 meters above and
32 meters below as shown by dotted lines and
plus not shown from vertical control lines and field lines where
generally visible in aerial photographs. This information is uncorrected.
There may be private encroachments within the boundaries of
the National or State Reservations shown on this map.



THIS MAP COMPLETES WITH INTERNAL MAP ADJUSTMENT SURVEYS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225 OR RESTON, VIRGINIA 20192
A FOLDER INCLUDING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



Boundaries shown in purple and uncolored contained in consultation
with Commission on Pennsylvania Geographic Names and
photographic terms 1961 and other sources. The information
has been checked. Map made 1963.

ROAD CLASSIFICATION
Heavy-duty _____ Light-duty _____
Medium-duty _____ Unimproved _____
U.S. Route _____ State Route _____

SHICKOLA, PA.-N. Y.
43076-08-77-024

PHOTOGRAPHED 1963
DATA FROM FY 1963-1964



Waterfall-and-Plungepool natural communities are scenic and provide habitat for a rich variety of mosses, ferns, and flowering plants. Photo: Pennsylvania Science Office of The Nature Conservancy.

Shohola Quadrangle:

SHOHOLA FALLS is an impressive waterfalls and rapids and is located in State Game Lands No. 180. It is mapped as an outstanding geological feature (**GE516**). Further survey of this site is necessary to determine if this site is a natural community and to look for species of special concern. Logging and development should be restricted within the watershed of the falls, and water quality should be maintained at an acceptably clean level. This includes protecting the water quality of the reservoir upstream from the falls. Also, this site should be considered in all decisions regarding water release from the reservoir.

Shohola Falls Swamp (NC521) is a good quality Boreal Conifer Swamp community. The swamp is dense with ericaceous shrubs and is dominated by younger spruce and larch. The swamp is nearly all contained within State Game Land No. 180. Logging and development should be restricted within the swamp's watershed.

Bald Hill is a good example of the Ridgetop Dwarf Tree Forest community. The summit of Bald Hill is dominated by many different species of oaks. Many of the oaks occur in a dwarf form including chestnut oak (*Quercus montana*), red oak (*Q. rubra*) and white oak (*Q. alba*). The dominant understory shrub is also a species of oak, scrub oak (*Q. ilicifolia*). At the top of Bald Hill scrub oak grows in dense thickets where there are trails cut through for hiking and off-road vehicles. Typically fire plays an important role in maintaining this community. The large number of oak species and the scarcity of pitch pine trees suggests that there has not been a fire here for quite some time. Also, there is evidence of logging of the slopes of Bald Hill. The Ridgetop Dwarf Tree Forest community would benefit from a controlled burn periodically. In addition, it would reduce the fuel load for a potential wild fire.

Twin Lakes contains a small population of a state-rare aquatic plant (**SP503**). Despite being almost completely surrounded by development Twin Lakes is sufficiently large enough to warrant some protection from further decline and possible loss of the rare plant. The biggest threat is continued development and the resulting decline of water quality. Creation of a homeowners' watershed or lake association to control development and monitor water quality may be useful to ensure continued enjoyment of the lake.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Shohola USGS topographic map: Hooded Merganser, Osprey, Bald Eagle, Northern Harrier, and Cooper's Hawk. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Pond Eddy

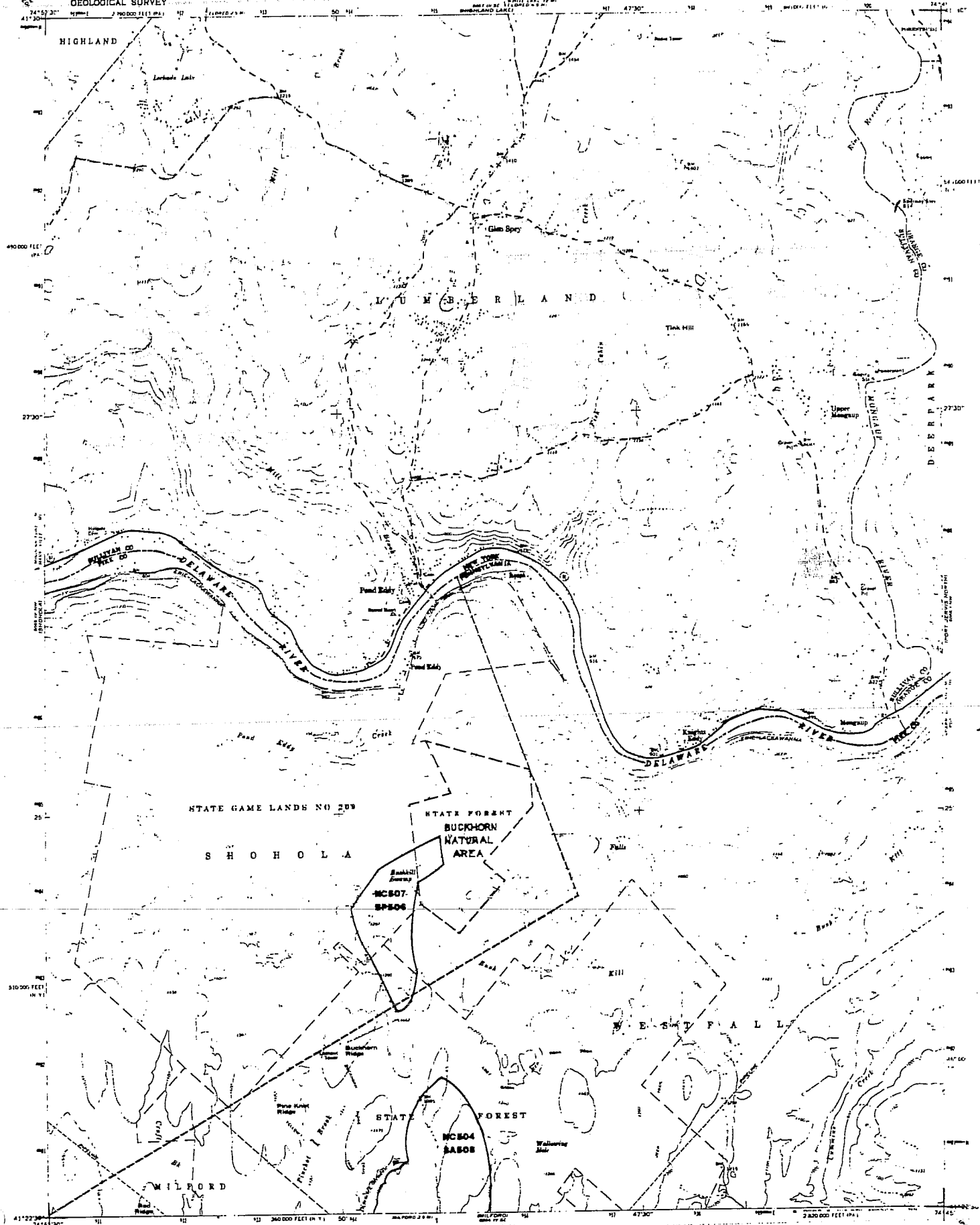
		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	504	G2G3	S1S2	N	N	9/23/87	C
	507	G?	S2S3	N	N	8/03/89	C
SPECIAL PLANTS:	506	G5	SU	N	PR	8/03/89	C
SPECIAL ANIMALS:	508	G4T3	S2	N	N	5/26/88	B
OTHER: Buckhorn State Forest Natural Area, Delaware National Scenic and Recreational River.							

Pond Eddy Quadrangle:

Bushkill Swamp contains a fair quality Glacial Bog community (**NC507**). The Glacial Bog and the adjacent swamp are being adversely affected by flooding caused by beaver. The majority of the swamp, especially to the north, is composed of standing dead spruce and exhibits low vegetative diversity as a result of the flooding. However, the bog community to the south is relatively intact and contains one state-rare plant (**SP506**). Further investigation may reveal more species of concern. Since Bushkill Swamp is on state-owned property, it is somewhat protected. Besides the flooding by beaver, logging of the surrounding upland forest presents the greatest potential threat to the swamp.

Buckhorn Oak Barren is a fair example of a Pitch Pine-Scrub Oak Barren community (**NC504**). However, fire suppression is causing the pitch pine and scrub oak to succeed to a xeric central hardwood community dominated by oaks and hickories. This habitat supports a good population of an animal of special concern (**SA508**). The **Buckhorn State Forest Natural Area** is located in the vicinity of this natural community and could be expanded to include the natural community.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Pond Eddy USGS topographic map: Bald Eagle, Sharp-shinned Hawk, Cooper's Hawk, and Northern Goshawk. Due to insufficient information, locations could not be mapped.



Map prepared and published by the Geological Survey
in cooperation with Pennsylvania Department
of Internal Affairs, Topographic and Geologic Survey
Control by USGS and USGAS

Topography by photogrammetric methods from aerial
photographs taken 1963. Field checked 1965

Projection: 1927 North American datum
10,000-foot grid based on New York coordinate system
east zone, and Pennsylvania coordinate system, north zone
1000-meter Universal Transverse Mercator grid 18C,
zone 18, shown in blue

Four red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is uncorrected

UTM and MGRS MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

Map photoreduced 1976

No major culture or drainage changes shown

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WASHINGTON, D.C. 20542
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

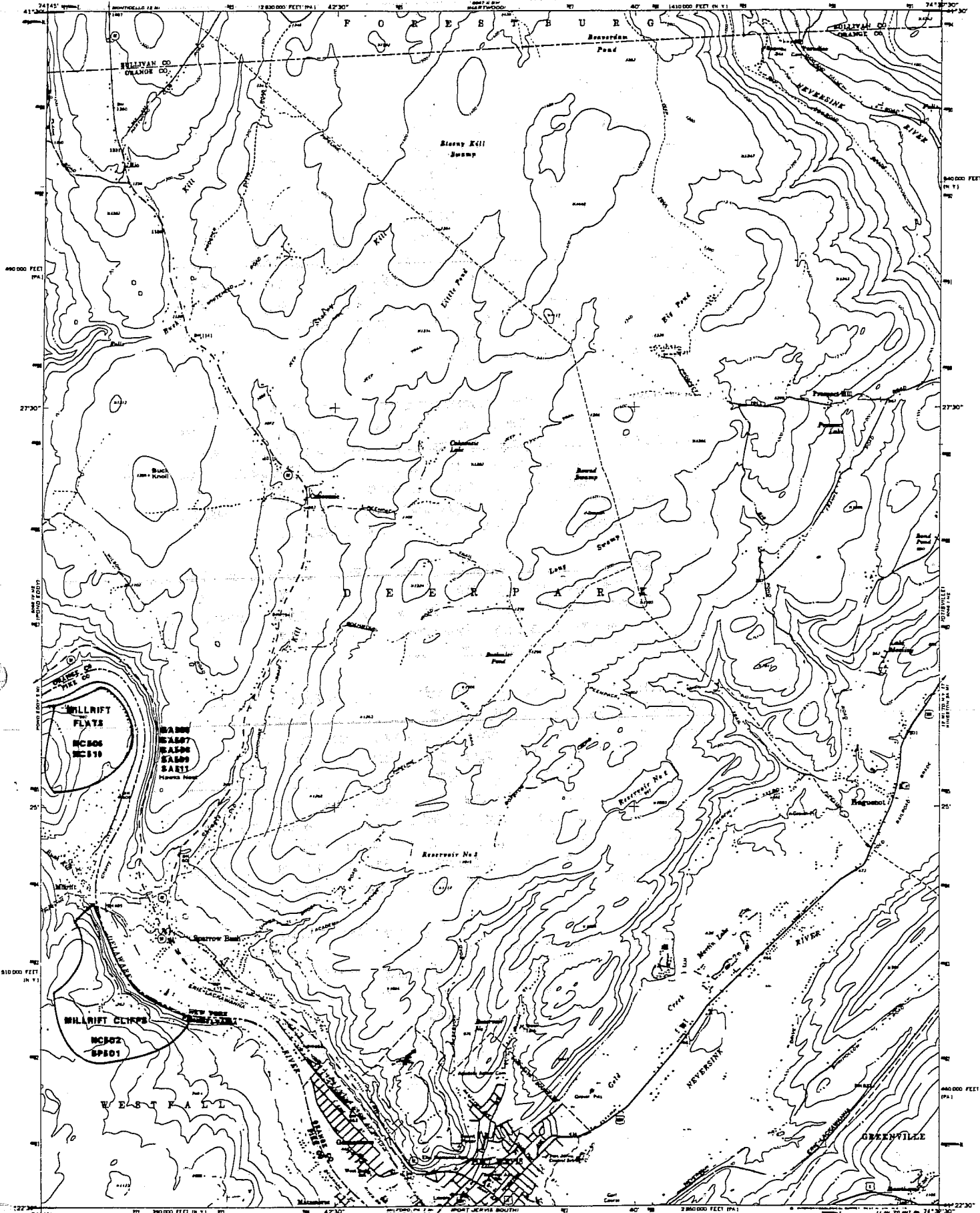
Sections shown in blue compiled or corrected in 1971
State of Pennsylvania geologic map of 1970
Scale 1:20,000

ROAD CLASSIFICATION
Heavy duty — Light duty
Medium-duty — Unimproved on
Scale Four

POND EDDY, N.Y.-PA.
N41225-W744575
PHOTOGRAPHED 1976
1980
PHOTOGRAPHED 1971

USGS QUADRANGLE MAP: Port Jarvis North

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	502	G?	S2	N	N	6/20/89	A
	505	G?	S3S4	N	N	9/26/89	B
	510	G?	S?	N	N	8/30/90	C
SPECIAL PLANTS:	501	G5	S1	N	PE	5/03/89	A
SPECIAL ANIMALS:	506	G5	S3	N	N	9/25/89	B
	507	G5	S3	N	N	9/25/89	B
	508	G5	SU	N	N	9/25/89	B
	509	G5	S3	N	N	9/25/89	B
	511	G4	S1	N	N	8/09/90	E
OTHER:	Delaware National Scenic and Recreational River.						



Maped, edited, and published by the Geological Survey

Control by USGS and USCGS

Topography by stereographic methods from aerial photography taken 1962. First edition 1962. Supersedes Army Map Service map dated 1947.

Photocopy projection. 1927 North American datum. 10,000-foot grid based on New York coordinate system, east zone and Pennsylvania coordinate system, north zone. 1000-meter Universal Transverse Mercator grid ticks. Zone 18, shown in blue.

Two red dashed lines indicate selected fence and field lines where generally visible on aerial photography. This information is unclassified. Red text indicates areas in which only landmark buildings are shown.

1000-foot grid and zone marked for north-south orientation at 60° 00' 00" N



ROAD CLASSIFICATION

Primary highway	Light-duty road, hard or unpaved surface
Secondary highway	Unimproved road
Arterial route	U.S. Route
State route	State Route

PORT JERVIS NORTH, N.Y.-PA.

641225-7437.5/7.5

1964

AMS 601-1 NW-4 SERIES V2

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 20192. A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST.

Port Jervis North:

The two terrestrial communities and species of concern found within the area of this map are both along the Delaware River and are at least indirectly associated with it. The Acidic Cliff Community (**NC502**) known as **MILLRIFT CLIFFS** are bluffs high above the river. Here there are sheer drops and ledges of exposed bedrock. Hemlock and great rhododendron are the major plant species growing here on the ledges. In places, water flows down over the rocks in thin sheets for several months each year. The state-endangered plant species (**SP501**) associated with the community is near its southern limit and is only one of two locations for it in Pennsylvania. This species depends on the cool wet cliffs in order to survive.

Major threats to the community are few since logging and building are not practical on these steep slopes. However, continued clearing, housing development at the top of the cliff between Millrift and Matamoras could threaten the species by creating a warmer, drier environment on the cliff face. The removal of trees and the disruption of water movement would both be detrimental to the survival of this plant.

MILLRIFT FLATS is a Xeric Central Conifer Forest (**NC505**) dominated by mature pitch pine 50-60 feet tall, a very unusual occurrence in Pennsylvania. Oaks are the dominant midstory species and will eventually become dominant. Blueberries and huckleberry are the dominant shrubs.

The soil here is very sandy, alluvial soil deposited by glacial meltwater during the last glacial period. This alluvial plain is today about 100 feet higher than the river and these well drained soils support species that are adapted to very dry conditions. Although there were no plant species of concern located here, 4 rare moths were trapped on one night in September 1989 and another in August of 1990. At least two of these moths feed exclusively on pitch pine and one of the moths had never been found in Pennsylvania before. Further moth trapping in the spring of 1990 produced a fifth rare moth species.

The major threat to this site is housing development. Some houses have already been built and it is probable more will be located here in the future. Management of this site should include controlled burns to suppress oak succession and allow regeneration of pitch pine. Increased housing will only make this type of management more difficult. The unusual nature of this particular community occurrence and the imminent threat should make this a high priority for protection.

A second natural community (**NC510**) is found on the hill to the west of the Flats and is included within the protection area for Millrift Flats. No species of special concern have been located

here and the community is of only marginal quality. There do not appear to be any major threats to this site either. If the Millrift Flats is protected then this site should be included also.

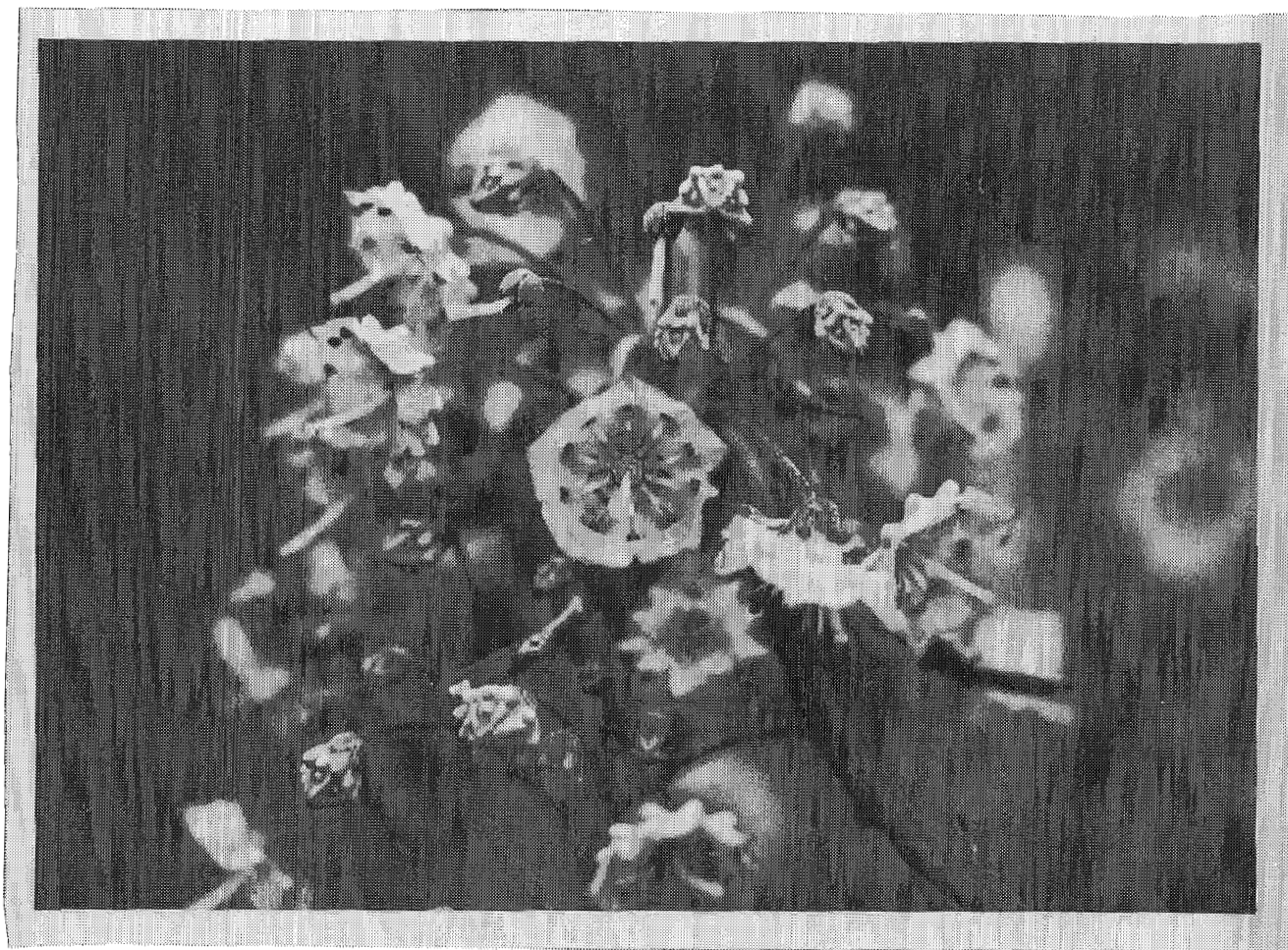
USGS QUADRANGLE MAP: Newfoundland

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	506	G?	S2S3	N	N	7/12/89	A
	526	G?	S2S3	N	N	7/11/89	B
	529	G?	S3S4	N	N	7/11/89	A
SPECIAL PLANTS:	515	G5	S3	N	PR	7/12/89	A
	524	G5	S2	N	TU	7/15/83	E
	525	G5	S3	N	PR	7/11/89	B
	530	G4	S3	N	PR	7/15/83	E

SPECIAL ANIMALS: none identified.

OTHER: Wallenpaupack Creek, Ledgesdale Swamp, ge511,
nc526, sp526, nc530, nc531.





Bog laurel (Kalmia polifolia) is a colorful June-flowering shrub found in Glacial Bog natural communities. Photo: Pennsylvania Science Office of The Nature Conservancy.

Newfoundland Quadrangle:

PINE LAKE is the most significant natural area on this map. It has been designated as a state forest natural area by the state Bureau of Forestry and is mostly on state forest property. Pine Lake is a large glacial lake with an excellent Glacial Bog community (**NC506**) adjacent to it that supports an excellent population of a state-rare shrub (**SP515**). There is also an extant population of one state-rare plant (**SP530**), and one plant species of concern (**SP524**) with a tentatively undetermined status.

The lake has experienced some flooding caused by beaver which is having a adverse impact on the bog community. Logging and development on private lands near Pine Lake may be greater threats in the long term and should be restricted within the lake's watershed. Continued monitoring of the plant species of special concern will be useful in determining the impact of flooding on the plant populations.

LAKE PAUPACK has a good Glacial Bog community (**NC526**) along the southeast shore that harbors a good population of a state-rare shrub (**SP525**). Down stream from Lake Paupack there is an impressive Waterfall and Plungepool community (**NC529**). Both natural communities are on private property and are benefitting from protection by the Lake Paupack Club. Logging and development appear to be the biggest threats to both communities. Also, water quality should be monitored to ensure that the lake and associated communities remain healthy and attractive.

Ledgedale Swamp is a large, low quality swamp containing a mix of hardwoods and conifers that is worthy of protection as a natural area of local significance only.

The upper reaches of **Wallenpaupack Creek** continue from the Buck Hill Falls map on to Newfoundland. Care should be taken to protect the watershed from overdevelopment to ensure good water quality in the creek.

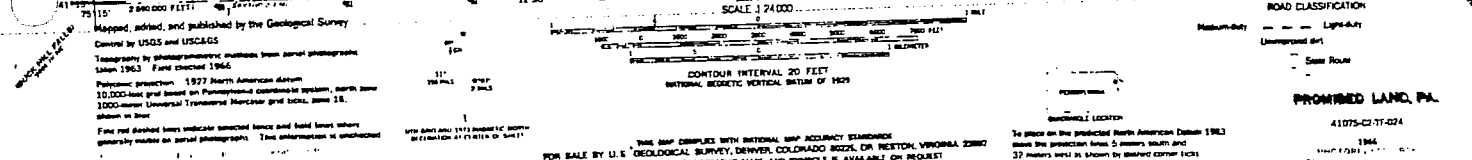
The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Newfoundland USGS topographic map: Olive-sided Flycatcher, Yellow-bellied Flycatcher, Swainson's Thrush, Osprey, Sharp-shinned Hawk, and Cooper's Hawk. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Promised Land

		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	503	G?	S1	N	N	10/04/89	A
	512	G?	S3S4	N	N	6/24/89	D
	524	G?	S?	N	N	2/20/90	A
	525	G?	S2S3	N	N	8/02/89	AB
	530	G?	S2S3	N	N	8/03/89	AB
	535	G?	S2S3	N	N	10/04/89	B
	538	G?	S3S4	N	N	10/04/89	A
	539	G?	S1	N	N	8/02/89	B
SPECIAL PLANTS:	504	G5	S2	N	PR	8/02/89	A
	505	G5	S2	N	PR	8/02/89	B
	516	G4	S2	N	PT	7/86	D
	517	G5	S2	N	PR	7/86	A
	522	G4	S2	N	PR	4/24/89	B
	526	G5	SU	N	N	8/02/89	A
	527	G5T5	S2	N	TU	8/02/89	CD
	528	G5	S2	N	PT	8/02/89	B
	529	G5	S2	N	PR	8/02/89	C
	531	G5	S3	N	PR	8/03/89	B
	532	G5	SU	N	N	8/03/89	B
	533	G5	S2	N	TU	8/03/89	BC
	534	G5	SU	N	PT	8/02/89	B
	536	G5	S3	N	PR	10/04/89	C
	537	G4	S3	N	PR	10/04/89	B
	540	G4	S4	N	PT	8/05/89	U
	542	G5	S2S3	N	TU	5/13/90	E

SPECIAL ANIMALS: none identified.

OTHER: Mixed oak forest and wetlands of the Mud Pond Run area.



41075-C2-TF-024

15



The pitcher-plant (Sarracenia purpurea) is a common insectivorous plant of Glacial Bog natural communities. Photo: Pennsylvania Science Office of The Nature Conservancy.

Promised Land Quadrangle:

On this map, four very significant natural areas are located just south of Interstate Highway 84 between routes 390 and 402; they are **LAKE SCOTT**, **BRUCE LAKE**, **LONG POND SWAMP** and **BALSAM SWAMP**.

LAKE SCOTT is an excellent example of a Glacial Bog community (**NC525**) and this site contains 5 plant species of special concern in Pennsylvania. This includes good populations of two state-threatened plants (**SP528**, **SP534**), an excellent population of a proposed state-rare plant (**SP526**), and fair populations of another state-rare plant (**SP529**) and of a status tentatively undetermined plant (**SP527**).

Lake Scott is on private property and receiving some protection from the Blooming Grove Hunting Club. This lake is relatively undisturbed but does have one building located a short distance from the eastern lake margin. Further development should be discouraged around the lake, and logging should not be permitted within the lake's watershed.

BRUCE LAKE is an excellent example of a Glacial Lake community (**NC503**) where a state-threatened plant (**SP516**), a state-rare plant (**SP517**), and Tentatively-undetermined (**SP542**) are located. Bruce Lake also has a good Glacial Bog community (**NC535**) along the western shore. The bog contains one good population and one fair population of two state-rare plants (**SP536**, **SP537**).

Bruce Lake is the focus of the Bruce Lake State Forest Natural Area designated by the state Bureau of Forestry, Department of Environmental Resources. The bog is currently disturbed by flooding caused by beaver. The populations of species of special concern on the bog mat and in the lake should be monitored to detect any decline in numbers attributable to the water level rise. This would ascertain whether beaver management is warranted at Bruce Lake.

LONG POND SWAMP is also an excellent example of a Glacial Bog community (**NC530**). This community contains good populations of one state-rare plant (**SP531**), a species proposed as state-rare (**SP532**), and a status tentatively-undetermined plant (**SP533**).

Long Pond Swamp has no development around it except for I-84 where it crosses the watershed to the north. Long Pond Swamp is part of the Delaware State Forest and is partially within the Bruce Lake State Forest Natural Area. The entire swamp and bog community and the pond should be considered for inclusion and protection within the Natural Area.

BALSAM SWAMP is a large, high quality example of a broadleaf-conifer swamp (**NC538**). The swamp is co-dominated by broadleaf and

coniferous trees including red maple (Acer rubrum), yellow birch (Betula alleghaniensis), black gum (Nyssa sylvatica), red spruce (Picea rubens), white pine (Pinus strobus) and canada hemlock (Tsuga canadensis) with a dense shrub understory of great rhododendron (Rhododendron maximum). Many of the trees are over 100 years old. This swamp is in excellent condition except for some flooding along the northern edge along Egypt Meadows Lake. In this area flooding has left many of the red spruce standing dead. Balsam Swamp is within the Bruce Lake Natural Area and is protected.

Conservation Island is a remnant example of a Northern Hardwood Forest community (NC512) located in Promised Land Lake. Although there are some impressive older trees, the vegetative diversity below them is low. The understory is sparse and there is evidence of heavy deer browse. Some of the older trees include red maple (Acer rubrum), yellow birch (Betula alleghaniensis), gray birch (B. lenta), american beech (Fagus grandifolia), white pine (Pinus strobus), black cherry (Prunus serotina), red oak (Quercus rubra) and canada hemlock (Tsuga canadensis). The understory consists mainly of striped maple (Acer pensylvanicum) and there is virtually no regeneration of the older northern hardwood trees.

Conservation Island is used for educational and light recreational purposes under the management of Promised Land State Park. The park should encourage visitors to hike the nature trail on the island. The deer browse should be controlled to allow some of the trees to regenerate. Protective fencing to exclude deer from some areas is probably the easiest method to encourage regeneration.

LAKE BELLE is a good example of a Glacial Lake community (NC534) that supports an excellent population of a state-rare aquatic plant (SP504). The lake is remote and undisturbed and is part of what appears to be the largest undeveloped tract of private land in Pike County. This undeveloped land comprises the lower one third of this map and is located due south of Promised Land State Park.

LAKE LAURA is a large Glacial Lake that contains a state-threatened plant (SP540) and a good population of a state-rare plant (SP505). There has been some development on the southern lake margin where there are presently three buildings and an access road. Further development within the watershed should be restricted.

EAST MOUNTAIN is a good example of a Ridgetop-Dwarf Tree Forest community (NC524). There is very little soil development here and there are large exposed rocky areas, moisture is scarce, and wind and sun make it an inhospitable place for many species. The trees are small and densely packed - predominantly scrub (bear) oak and stunted chestnut oak - while low shrubs are confined to the

scattered openings. These dwarf tree forests have rarely been logged because of the poor timber but may frequently burn. No known species of special concern are known from this site but these communities are often inhabited by rare butterflies and moths.

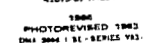
To the east and north of East Mountain is a large area of second-growth, mixed oak forest and wetlands where human disturbance is currently minimal. This is part of one of the largest tracts of undeveloped, private land in Pike County. The area seems to be well protected now but it is an area that would make an excellent addition to Promised Land State Park or as a county natural area if the landowners should ever wish to sell.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Promised Land USGS topographic map: Promised Land, Cooper's Hawk, and Northern Goshawk. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Pecks Pond

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	<u>Quality</u>
		<u>Global</u>	<u>State</u>	<u>Fed.</u>	<u>State</u>	<u>Seen</u>	
NATURAL COMMUNITIES:	527	G?	S2S3	N	N	8/18/89	B
	528	G?	S2	N	N	8/22/89	B
	529	G?	S2S3	N	N	8/22/89	B
	530	G?	S?	N	N	8/23/89	B
	531	G?	S?	N	N	10/05/89	BC
	532	G?	S3S4	N	N	6/13/89	C
	533	G?	S2S3	N	N	9/27/89	B
SPECIAL PLANTS:	509	G5	S3	N	PR	8/22/89	B
	512	G5	S2	N	PT	9/27/89	A
	517	G5	S2	N	TU	3/01/90	C
	520	G5	S2S3	N	PR	6/14/88	D
	524	G5	S3	N	PR	3/01/90	B
	525	G5	S2	N	PR	9/27/89	AB
	526	G5	SU	N	PT	9/27/89	AB
SPECIAL ANIMALS:	518	G5T5	S2	N	N	6/14/88	B
	523	G5	S2	N	N	7/01/88	AB

OTHER: Stillwater State Forest Natural Area, Holsey
Meadow Swamp, Little York Swamp, Maple Swamp, Hemlock
Farms Barrens, Bald Hill Swamp.





Bald eagles (Haliaeetus leucocephalus) are becoming common winter residents along the Delaware River. Bald eagles are also seen in summer near large waterbodies, but no nesting sites have been found in Pike County. Photo: Cameron Davidson.

Pecks Pond Quadrangle:

PECKS POND and the adjacent swamps make up a large portion of the significant natural areas on this map. On the southeast side of Pecks Pond exists one of the largest Glacial Bog communities (**NC533**) in the state and contains excellent populations of several species of special concern. Excellent populations of two state-threatened plant species (**SP512, SP526**) and one state-rare plant (**SP525**) are found here. This community also supports an excellent population of an animal of special concern (**SA523**).

The large size of this community and the excellent populations of 4 special concern species makes Pecks Pond a very important natural area. Since Pecks Pond is contained within the Delaware State Forest it is protected from most direct threats. However, indirect threats such as changes in water quality from development run-off and sewage to the east of the site may have an adverse impact on the bog community.

Pecks Pond is a recurring candidate lake for dredging or further impoundment because it is a very shallow. However, either dredging or a raised lake level would threaten the existence of this 40-acre bog.

ROCK HILL POND is a good quality Glacial Bog community (**NC527**) that is located along the north side of the lake. The lake is presently used for recreational purposes by Rock Hill Camp on the south side of the lake. Further investigation for species of special concern is needed at this site. Part of the bog community is on Delaware State Forest land and therefore protected to some extent. However, a much larger part of the bog and the lake itself are privately owned. Care should be taken to control development along the margin of the lake and minimize boat access facilities at the camp.

BEN BUSH SWAMP is a large Boreal Conifer Swamp (**NC528**) with an island of old-growth trees. The swamp is contained entirely within the Delaware State Forest and is reasonably well protected. Logging should be restricted in this area to maintain the Boreal Conifer Swamp community and old-growth tree island.

LITTLE MUD POND is also a good lakeside Glacial Bog community (**NC529**) that supports good populations of three state-rare plants (**SP509, SP517, SP524**). The lake and the adjacent bog community are on Delaware State Forest land. There are about a dozen cabins on the south side of the lake and the lake is presently used for light recreational boating and fishing. If possible, gasoline outboard motors should be excluded from the pond.

Little Mud Pond may need more protection from overuse by recreational boaters, especially over-visitation to the bog mat. Also, further development on the south side and logging should be restricted within the lake's watershed. There is a swamp dominated

by spruce and larch along the northern margin of the pond where further investigation may produce new locations for other species of special concern.

High Knob and Low Knob are both good examples of Ridgetop-Dwarf Tree Forest communities (**NC530, NC531**). High Knob is larger but has been disturbed by powerline cuts and radio towers. Low Knob is smaller but it is relatively undisturbed. Both sites are on Delaware State Forest property and need to be managed to maintain these communities. Management may include controlled burns since fire has probably played a major role in the formation and continued existence of this community type. Further degradation of these two hilltops should be avoided and a thorough search for rare species dependent on this community type be conducted.

White Birch Swamp is a fair quality Broadleaf-Conifer Swamp (**NC532**) worthy of protection. The swamp is located entirely on Delaware State Forest property and should be protected from the sand and gravel excavation occurring on the western perimeter and a substantial no-logging buffer zone created around it.

At Elbow Swamp, also on Delaware State Forest property, there is a good population of an animal of special concern (**SA518**). If the site is allowed to remain in its present state, the species should continue to do well here.

A small population of a state-rare plant (**SP520**) is located southeast of Wolf Lake on privately owned land. For the plant to survive, development and future logging should be avoided in this upland forest.

There are numerous swamps adjacent to Pecks Pond which are worthy of protection for wildlife habitat, water quality, and flood control (**Holsey Meadow Swamp, Little York Swamp and Maple Swamp**). Each of these swamps is relatively large but has experienced disturbance by either logging or flooding to the extent that they cannot be called natural communities. Each of these swamps is worthy of protection as a county or township natural area.

A small scrub oak barren, **Hemlock Farms Barren**, occurs east of the development by that name. It does not show all of the characteristics of a good quality natural community, but offers a ridgetop view of the surrounding land and is valuable open space. Soils and poor quality timber make it unlikely that development or logging will occur.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Pecks Pond USGS topographic map: Swainson's Thrush, Osprey, Bald Eagle, Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, and Red-shouldered Hawk. Due to insufficient information, locations could not be

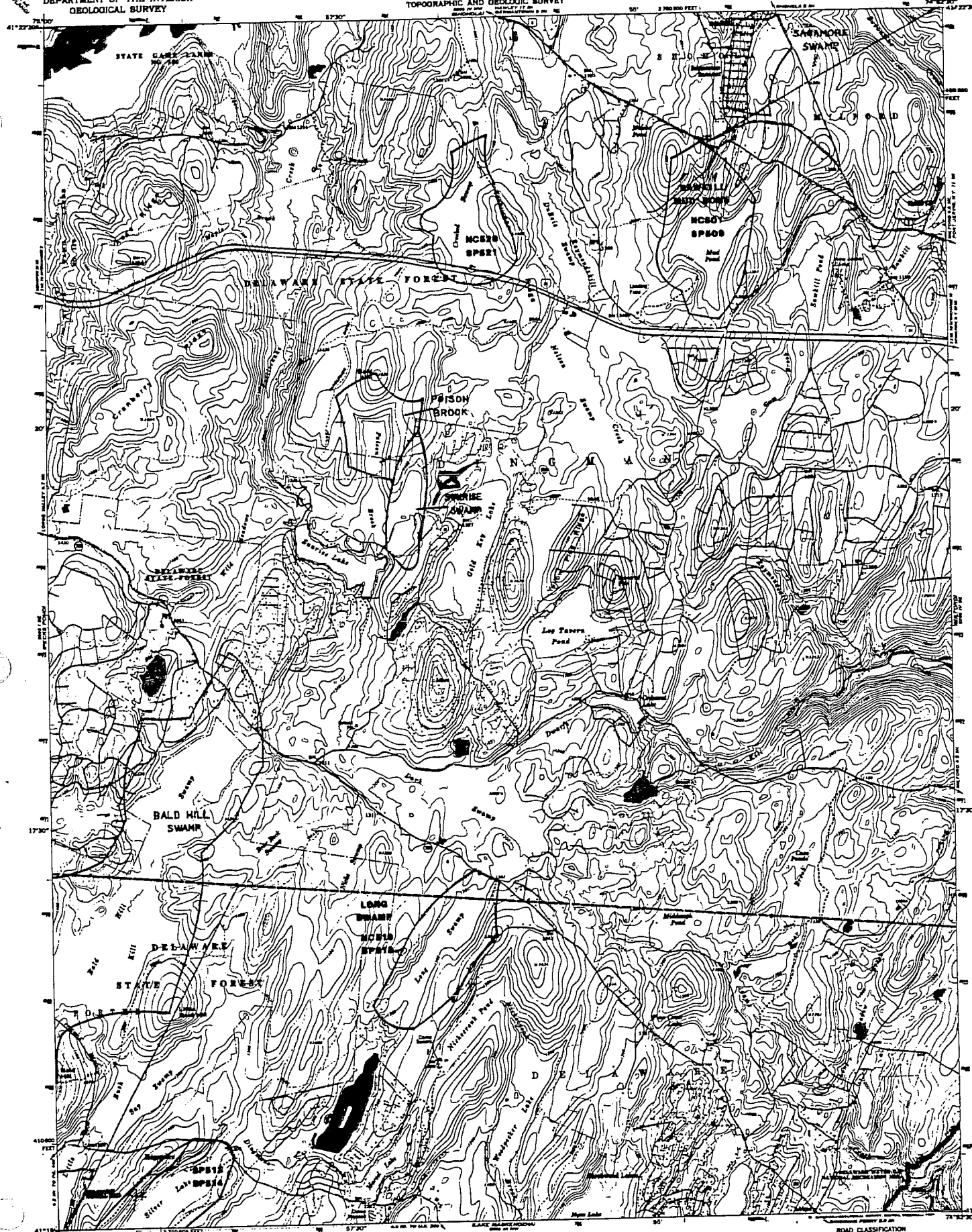
mapped.

USGS QUADRANGLE MAP: Edgemere

		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	501	G?	S2S3	N	N	5/31/85	B
	519	G?	S2	N	N	5/29/89	C
	520	G?	S2S3	N	N	7/31/89	C
SPECIAL PLANTS:	509	G5	S3	N	PR	5/31/85	B
	513	G5	S2	N	PR	1986	A
	514	G5	S2	N	PR	1986	E
	518	G5	S2	N	PT	5/29/89	B
	521	G5	S3	N	PR	7/31/89	C

SPECIAL ANIMALS: none identified.

OTHER: Poison Brook, Sagamore Swamp, Sunrise Swamp,
Bald Hill Swamp, Stillwater State Forest
Natural Area, sp503, nc517.



Maped, edited, and published by the Geological Survey

Checked by L. H. and M. C. H. 1964

Topographic information from aerial photographs taken 1963. First edition 1965

Photographic projection: 10,000-foot grid based on Pennsylvania coordinate system, north zone.

1:250,000 Universal Transverse Mercator grid zone, zone 18N, shown in blue

1927 North American Datum

7.5 minute and 15 minute American Datum 1983

shows the projection from 5 meters south and 32 meters east as shown by dashed corner marks

If one has desired to use the same scale and projection as shown



SCALE 1:24,000

CONTOUR INTERVAL 30 FEET

INTERNAL VERTICAL SCALE OF 1:250,000

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS FOR SALE BY U.S. GEOLOGICAL SURVEY

Revisions shown in blue and are subject to revision with the approval of the Pennsylvania Department of Environmental Resources

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



EDGEWATER, PA.

41074-CB-17-004

Edgemere Quadrangle:

SAWKILL MUD POND is a privately-owned glacial lake with a good Glacial Bog community (**NC501**) bordering the northern edge. The bog contains a good population of a state rare shrub (**SP509**) but is declining due to flooding by beaver. A recent housing development north of the pond may pose a threat to the community. Run-off from forest clearing and nutrient input from individual septic systems may seriously alter the water chemistry in the pond and bog if not restricted.

Crooked Mud Swamp is a Glacial Bog community (**NC520**) that has been impacted along its southern edge by the construction I-84. The highway has restricted drainage, raising the water level along the southern edge of the swamp. However, Crooked Mud Swamp drains to the north and the swamp seems to be recovering from the impact. The bog community is very flooded in some sections, but new floating mats are forming and there is a fair population of a state-rare shrub (**SP521**) on the existing mat. Along I-84 there are a number of introduced species and cattail (*Typha latifolia*) is becoming abundant. A major threat to the swamp is salt and other pollutants from the highway. If possible, an agreement to limit salt application should be worked out between the county, the state highway department, and the Bureau of Forestry in this watershed and the watersheds of other important communities along the highway.

LONG SWAMP is a fairly large Boreal Conifer Swamp community (**NC519**). It is part of a summer camp property and is used for educational purposes access via a boardwalk. A good population of a state-threatened sedge (**SP518**) grows along the boardwalk. Long Swamp is worthy of continued protection from logging and development which is spreading along the south edge of the swamp. Serious consideration must be given to the environmental impacts to the swamp and the population of the rare sedge before any new development plans are proposed for near this site.

Silver Lake is a large natural lake that has vacation home development along the western shore. Despite the impact, the lake supports an excellent population of a state-rare plant (**SP513**) and a poorly documented population of another state rare-plant (**SP514**). Further development should be severely restricted within the Silver Lake watershed without appropriate measures to protect water quality and ensure survival of the two plant species.

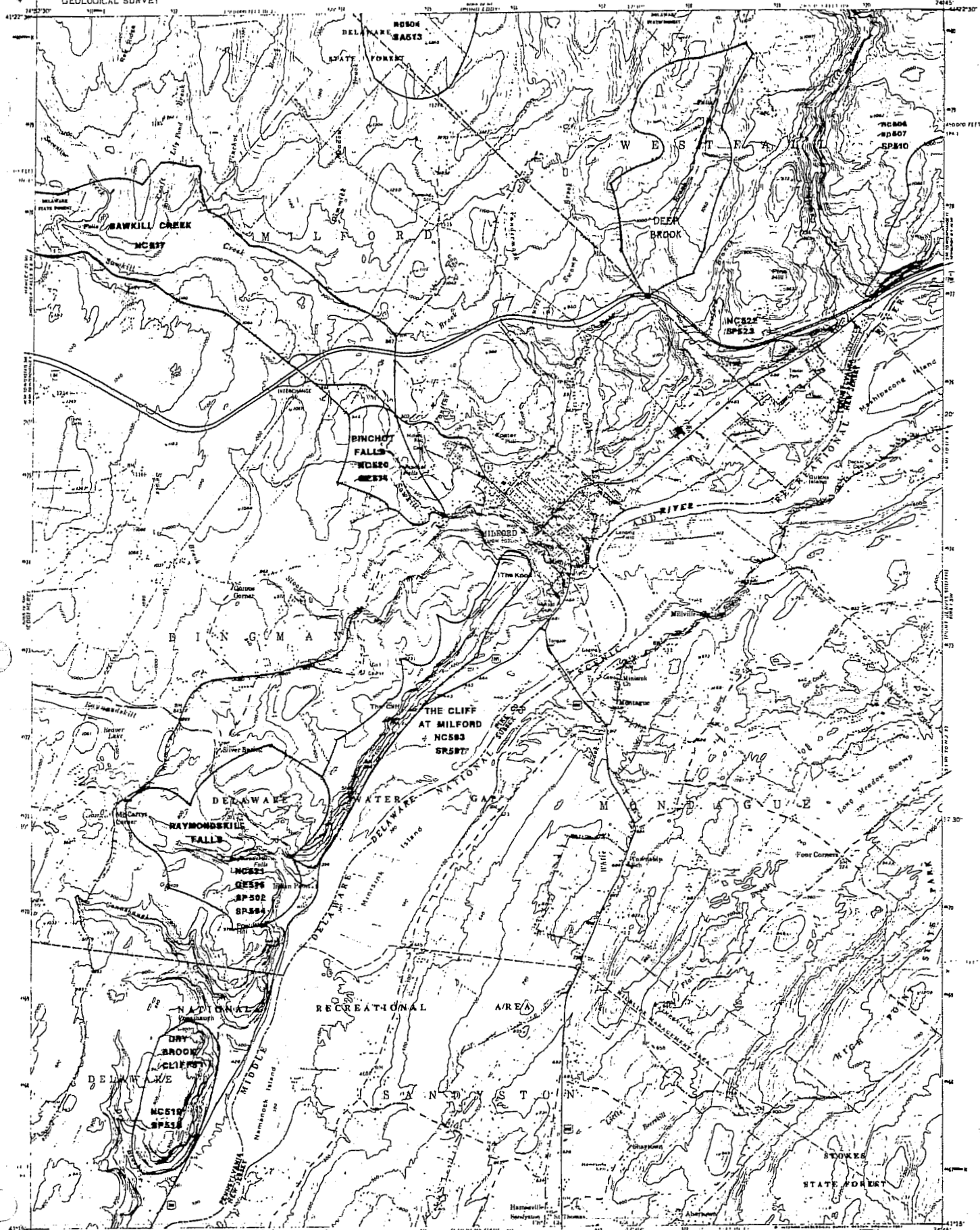
Sagamore Swamp is a small conifer swamp worthy of protection as a county or township natural area. **Poison Brook** on State Forest property and **Sunrise Swamp** on private property are similar mixed broadleaf and conifer swamps also worthy of protection as natural areas of local significance. These swamps should not be converted to reservoirs as was done to the southern portion of Poison Brook (not indicated on map). Development completely surrounds Sunrise

Swamp and it is having some negative impact on the natural community. Completely surrounded by development, the swamp is effectively isolated from nearby forests and wetlands thus lessening 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 between upland and other swamps. **Bald Hill Swamp** is mostly on state forest property but development is occurring on the adjacent private property. Some of this development, if not actually in portions of the wetland, is encroaching on it and may have some adverse impacts on water quality.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the edgemere USGS topographic map: Marsh Wren, Osprey, Bald Eagle, Northern Harrier, Red-shouldered Hawk, and Whip-poor-will. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Milford

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	503	G?	S2	N	N	8/04/89	B
	517	G?	S3	N	N	1989	E
	519	G?	S2	N	N	8/09/89	C
	520	G?	S3S4	N	N	8/04/89	B
	521	G?	S3S4	N	N	8/09/89	B
	522	G?	S2	N	N	8/30/90	C
SPECIAL PLANTS:	502	G4	S1	N	PE	7/06/83	C
	504	G5	S1	N	PE	7/06/83	B
	507	G5	S3	N	PR	8/04/89	A
	510	G5	S3	N	PR	9/07/89	B
	518	G5	S3	N	PR	8/09/89	B
	523	G5	S3	N	PR	8/30/90	B
SPECIAL ANIMALS:	513	G4T3	S2	N	N	5/26/88	B
GEOLOGICAL FEATURES:	514	-	-	-	-	1989	E
	515	-	-	-	-	8/09/89	E
OTHER:	Delaware National Scenic and Recreational River, Deep Brook, nc504, nc506, sp507.						



Maped, edited, and published by the Geological Survey

Control by USGS, NAD83, and New Jersey Geographic Survey

Topography by photogrammetric methods from aerial

photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

Pennsylvania State Plane, North Zone, and

New Jersey coordinate system

1:50,000 scale Universal Transverse Mercator grid ticks

June 18, 1960. Not to scale. 1977 North American Datum

to place on the projected North American Datum 1983

from the projected North American Datum 1983

Maped, edited, and published by the Geological Survey

Control by USGS, NAD83, and New Jersey Geographic Survey

Topography by photogrammetric methods from aerial

photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

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photographs taken 1957. Field checked 1958

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Pennsylvania State Plane, North Zone, and

New Jersey coordinate system

1:50,000 scale Universal Transverse Mercator grid ticks

June 18, 1960. Not to scale. 1977 North American Datum

to place on the projected North American Datum 1983

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Topography by photogrammetric methods from aerial

photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

Pennsylvania State Plane, North Zone, and

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June 18, 1960. Not to scale. 1977 North American Datum

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Topography by photogrammetric methods from aerial

photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

Pennsylvania State Plane, North Zone, and

New Jersey coordinate system

1:50,000 scale Universal Transverse Mercator grid ticks

June 18, 1960. Not to scale. 1977 North American Datum

to place on the projected North American Datum 1983

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photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

Pennsylvania State Plane, North Zone, and

New Jersey coordinate system

1:50,000 scale Universal Transverse Mercator grid ticks

June 18, 1960. Not to scale. 1977 North American Datum

to place on the projected North American Datum 1983

from the projected North American Datum 1983

Maped, edited, and published by the Geological Survey

Control by USGS, NAD83, and New Jersey Geographic Survey

Topography by photogrammetric methods from aerial

photographs taken 1957. Field checked 1958

Projection: 10,000 foot grid scale based on

Pennsylvania State Plane, North Zone, and

New Jersey coordinate system

1:50,000 scale Universal Transverse Mercator grid ticks

June 18, 1960. Not to scale. 1977 North American Datum

to place on the projected North American Datum 1983

from the projected North American Datum 1983

ROAD CLASSIFICATION

Primary highway	Light-duty road, hard or
hard surface	unimproved surface
Secondary highway	Unimproved road
hard surface	U. S. Route
	State Route

MILFORD, PA.-N. J.

41074 C1-11-024

Milford Quadrangle:

THE CLIFF AT MILFORD is good example of a large Shale Cliff community (**NC504**) that supports an excellent population of a state-rare plant (**SP507**) and the cliff offers an impressive view of the Delaware River. Shale quarries at the base of the cliffs are the biggest threats to this site and should be restricted. This site is part of the Delaware Water Gap National Recreational Area (DWGNRA).

DRY BROOK CLIFFS (NC519) is also a good Shale Cliff community that supports a good population of a state-rare plant. Again, shale mining should be restricted around the base of the cliff community. This site is also part of the DWGNRA.

RAYMONDSKILL FALLS is an impressive Waterfall and Plungepool community and geologic feature (**NC521, GE515**) that contains two state-endangered plant species (**SP502, SP504**). The waterfalls are accessible to the public via trails and bridges within the DWGNRA. Although threats to this site are limited, erosion and vegetation destruction could result if public use is not carefully monitored and restricted to the trail system. It may become necessary to improve the barriers and railings to control off-trail foot traffic.

PINCHOT FALLS is also an impressive Waterfall and Plungepool community and geologic feature (**NC520, GE514**). The humid, misted cliff face supports a very diverse flora. However, no species of special concern were found during the 1989 visit, but further searches for special concern plants restricted to this community type are encouraged. The falls are part of the Gifford Pinchot Estate which is managed by the U.S. Forest Service.

SAWKILL CREEK is a High-Gradient Clearwater Creek community (**NC517**). The watershed of this creek contains many habitat types and is worthy of protection for wildlife. The high water quality of the creek can be maintained by restricting logging and development within the creek's watershed.

On a small hill between I-84 and US 209, there is a fair example of the Shale Cliff Community (**NC522**) that harbors a good population of a PR plant species (**SP523**). The site's location between two major roads detracts from its value as a natural area, and this community and plant species are both well represented along this section of the Delaware River. The hill has been proposed for limited development but it is still worthy of protection through a conservation easement.

Deep Brook is a lower quality clearwater creek which is bordered on both sides by steep forested slopes. Although Deep Brook does not meet natural community requirements, it is an attractive area that can serve local residents and tourists as a

park and natural area. Protection of the creeks and runs immediately adjacent to the Delaware River will help to maintain the water quality of the river and aid in ensuring that the Delaware River remains a scenic recreation area.

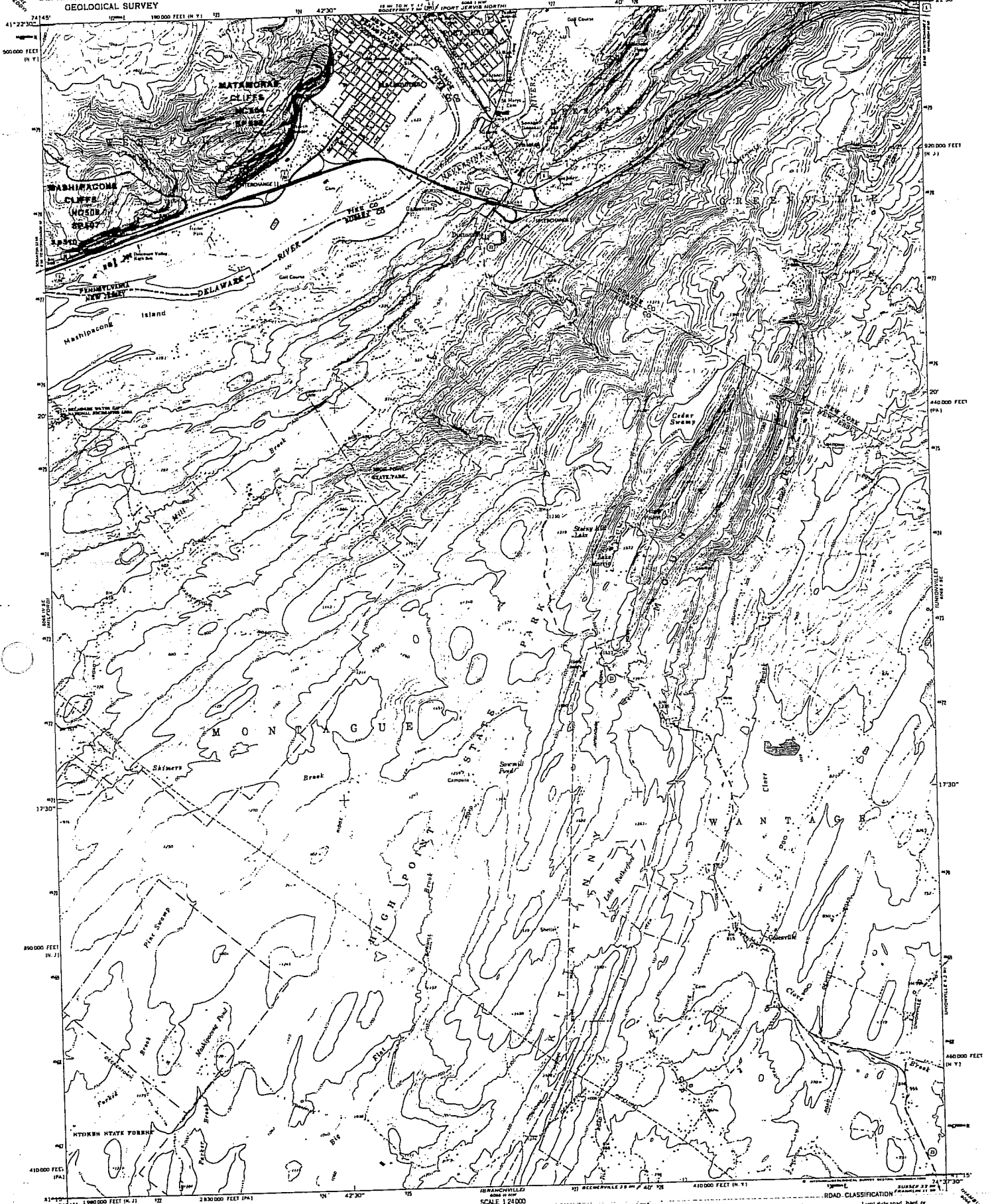
The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Milford USGS topographic map: Osprey, Sharp-shinned Hawk, Cooper's Hawk, and Northern Goshawk. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Port Jervis South

		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	504	G?	S2	N	N	7/10/84	B
	506	G?	S2	N	N	9/07/89	B
SPECIAL PLANTS:	502	G5	S3	N	PR	7/10/84	B
	507	G5	S3	N	PR	9/07/89	B
SPECIAL ANIMALS:	none identified.						
OTHER:	Delaware National Scenic and Recreational River, sp510.						

Port Jervis South Quadrangle:

There are two good examples of Shale Cliff communities at **MATAMORAS CLIFFS (NC504)** and **MASHIPACONG CLIFFS (NC506)**. Both of these sites contain good populations of a state-rare plant (**SP502, SP507**). These two cliffs also provide scenic overlooks of the Delaware River. The county or Westfall Township should work with the land owners to protect the sites from logging and excavation on and near these sites to ensure the maintenance of the species and communities.



Maped, edited, and published by the Geological Survey

Control by U.S.G.S. and U.S.C. and U.S.C.

Topography by photogrammetric methods from aerial photographs

June 1968. Field checked 1969

Supervision by Major Service, since March 1943

Photographic projection. 10,000-foot grid scale based on New Jersey

coordinate system, New York coordinate system, and zone, and

Pennsylvania coordinate system, north zone. 1000-meter Universal

Transverse Mercator grid scale, zone 18, shown in blue

1927 North American Datum. 75 places on the projected North

American Datum 1983 show the projection zone 6 meters south

and 33 meters west as shown by dashed corner scale

Five red dashed lines indicate unprojected areas and field lines where

generally outside on aerial photographs. This information is uncorrected

Rail line indicates areas in which only landmark buildings are shown

There may be private enclosures within the boundaries of

the National or State reservations shown on this map

SCALE 1:24,000

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1983 METRIC NORTH

DECLINATION AT CENTER OF SHEET

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS

FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092

A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in pencil and woodland completed in cooperation with

Commonwealth of Pennsylvania agencies from aerial photographs

sources. This information not field

ROAD CLASSIFICATION

Primary highway, hard surface

Secondary highway, hard surface

Unimproved road

Interstate Route

U.S. Route

State Route

Light-duty road, hard or improved surface

Unimproved road

Interstate Route

U.S. Route

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Light-duty road, hard or improved surface

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U.S. Route

State Route

USGS QUADRANGLE MAP: Buck Hill Falls

<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	<u>Quality</u>
Global	State	Fed.	State	Seen	

NATURAL COMMUNITIES: none identified.

SPECIAL PLANTS: none identified.

SPECIAL ANIMALS: none identified.

OTHER: Wallenpaupack Creek.

Buck Hill Falls Quadrangle:

Wallenpaupack Creek is a fair high-gradient coldwater creek that tumbles down a through a narrow valley. Hemlocks shade the stream and keep it cool. There has been very little development in this part of the watershed to date and water quality has remained high. Maintaining good water quality will require a cooperative effort between the citizens and governments of both counties.



ROAD CLASSIFICATION

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

BUCK HILL FALLS, PA.

41076-B1-TV-G24
PHOTOGRAPHED 1961
1964

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY REQUIREMENTS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

To place on the uncolored North American Datum 1983,
move the projection frame 5 meters south and

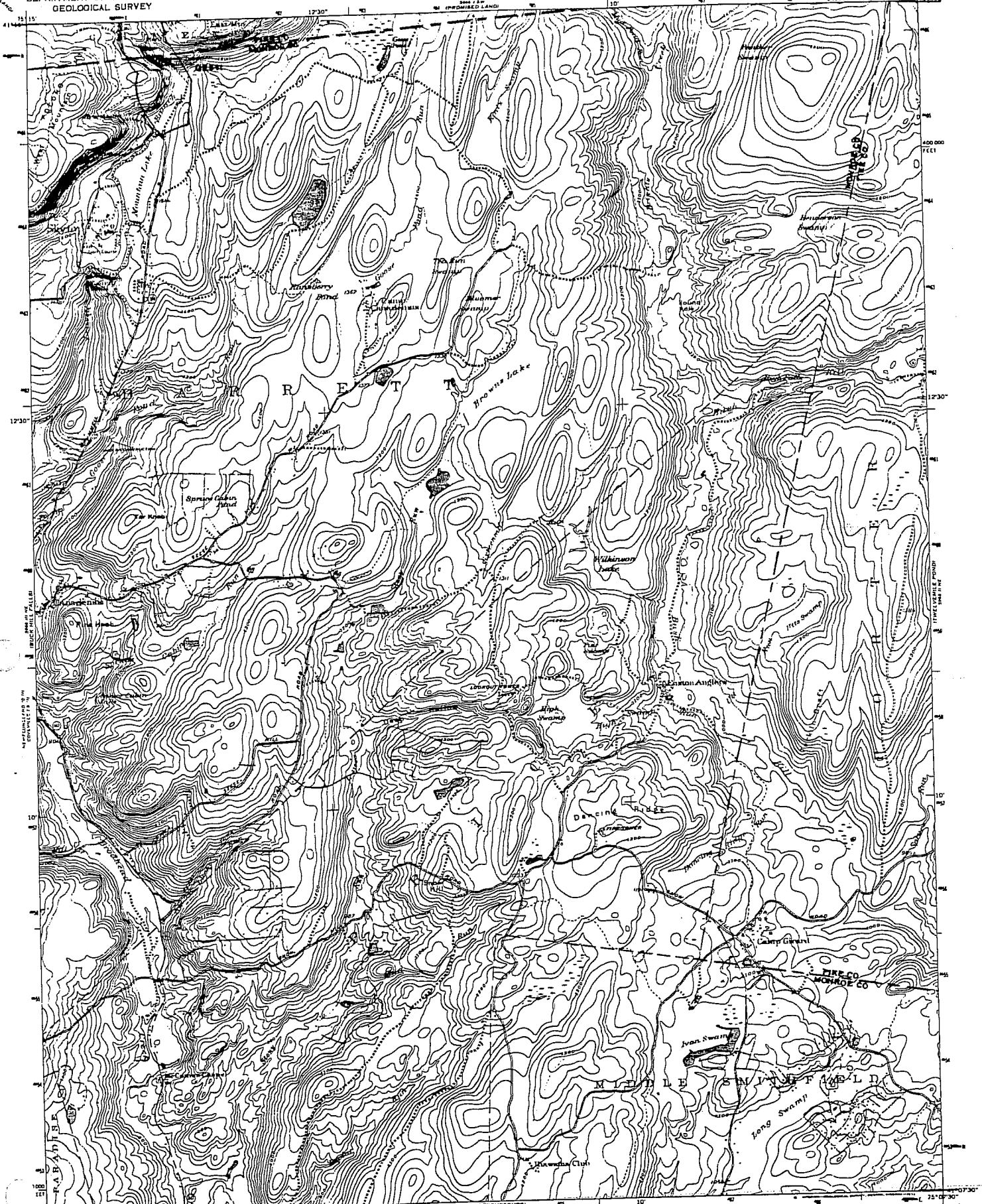
Maped, edited, and published by the Geological Survey
Control by USGS and USGAS
Topography by photogrammetric methods from aerial
photographs taken 1963. Field checked 1964
Projection projection. 1927 North American Datum
10,000-foot grid based on Pennsylvania coordinate system, north zone
1000-meter Universal Transverse Mercator grid section,
zone 18, shown in blue
Faint red dashed lines indicate projected fence and field lines where
generally visible on aerial photographs. This information is collected
There may be ground obstructions within the boundaries of
the National or State reservation shown on this map

USGS QUADRANGLE MAP: Skytop

	<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
	Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	none identified.					
SPECIAL PLANTS:	none identified.					
SPECIAL ANIMALS:	none identified.					
GEOLOGICAL FEATURES:	511	-	-	-	1979	E
OTHER:	none identified.					

Skytop Quadrangle:

Indian Ladder Falls is mapped as an Outstanding Geological Feature (GE511). Further investigation is necessary to determine if this site is a natural community and to search for species of special concern. Logging and development should be restricted in the vicinity of the falls to maintain their scenic quality.



Maped, edited, and published by the Geological Survey
Control by USGS and USGARS
Topography by photogrammetric methods from aerial photographs
First checked 1943
Photometric projection: 1927 North American datum
10,000-foot grid based on Pennsylvania coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks
zone 18, shown in blue
Revisions shown in purple connected in connection with
State of Pennsylvania agencies from aerial photographs
taken 1966 and 1973 This information not based checked

UTM GRID AND 1973 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24,000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1989



ROAD CLASSIFICATION
Major-duty Light-duty
Unimproved dirt ...
State Route

SKYTOP, PA.
H4107 5--W7507 5/75

USGS QUADRANGLE MAP: Twelvemile Pond

		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last Seen</u>	<u>Quality</u>
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	520	G?	S1	N	N	8/05/86	E
SPECIAL PLANTS:	502	G5?	S1	N	PE	8/05/86	A
	503	G5	S2	N	PR	8/25/86	A
	508	G5T5	S2	N	TU	8/20/82	C
	510	G4	S2	N	PT	8/25/86	C
SPECIAL ANIMALS:	507	G5	S3	N	N	1974	E

OTHER: Stillwater State Forest Natural Area, Big Swamp, Painter Swamp.

Twelvemile Pond Quadrangle:

TWELVEMILE POND is the most significant natural area on this map. It is a large, relatively undisturbed Glacial Lake (**NC520**) that contains excellent populations of a state-endangered plant (**SP502**) and a state-rare plant (**SP503**), and a fair population of a state-threatened plant (**SP510**). A strong effort should be made to work with the landowner to protect the lake and adjacent swamps. Twelvemile Pond is private but surrounded by state forest.

Lake Minisink is nearly surrounded by development. However, the lake provides sufficient habitat for an animal of special concern (**SA507**) that had been extirpated in much of Pennsylvania. Water quality should be monitored by residents to ensure that it does not become degraded by faulty on-site septic systems.

Minks Pond contains a fair population of a variety of plant of special concern (**SP508**) that has an undetermined state status (TU) at present but is considered threatened by TNC. Logging and development should be restricted within the lake's watershed.

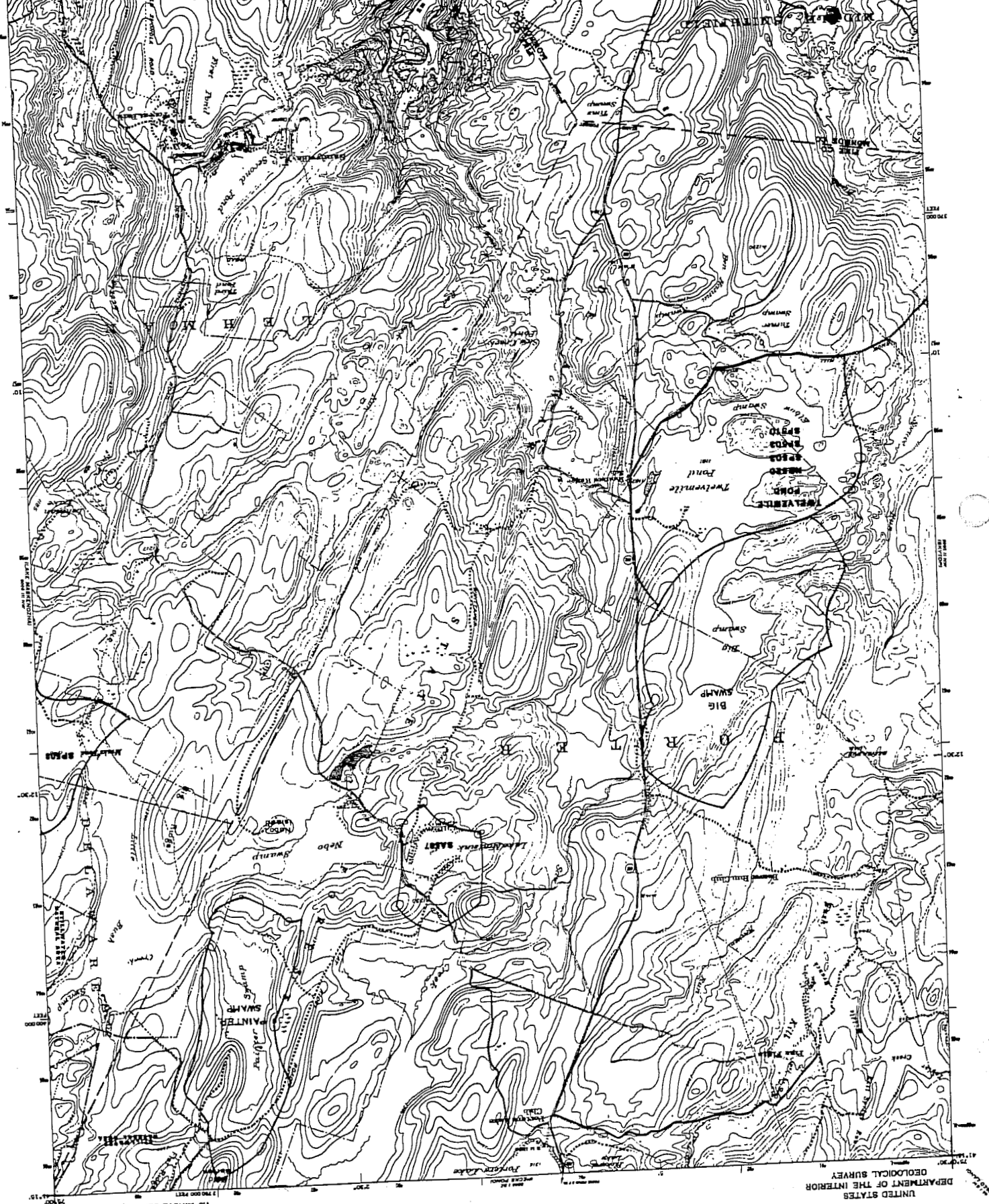
Big Swamp and **Painter Swamp** are large swamps with a mixture of hardwoods and conifers that are at least partially on state forest land. Both swamps have been logged but appear to be recovering from the disturbance.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Twelvemile Pond USGS topographic map: Osprey, Red-shouldered Hawk, Virginia Rail, Saw-whet Owl, and Whip-poor-will. Due to insufficient information, locations could not be mapped.

TWELVEMILE POND, PA.

1943
A1078-11-77-004

ROAD CLASSIFICATION
Primary Highway
Secondary Highway
Light-duty road, hard or
improved surface
Unimproved road
Dashed line
U.S. Route
State Route

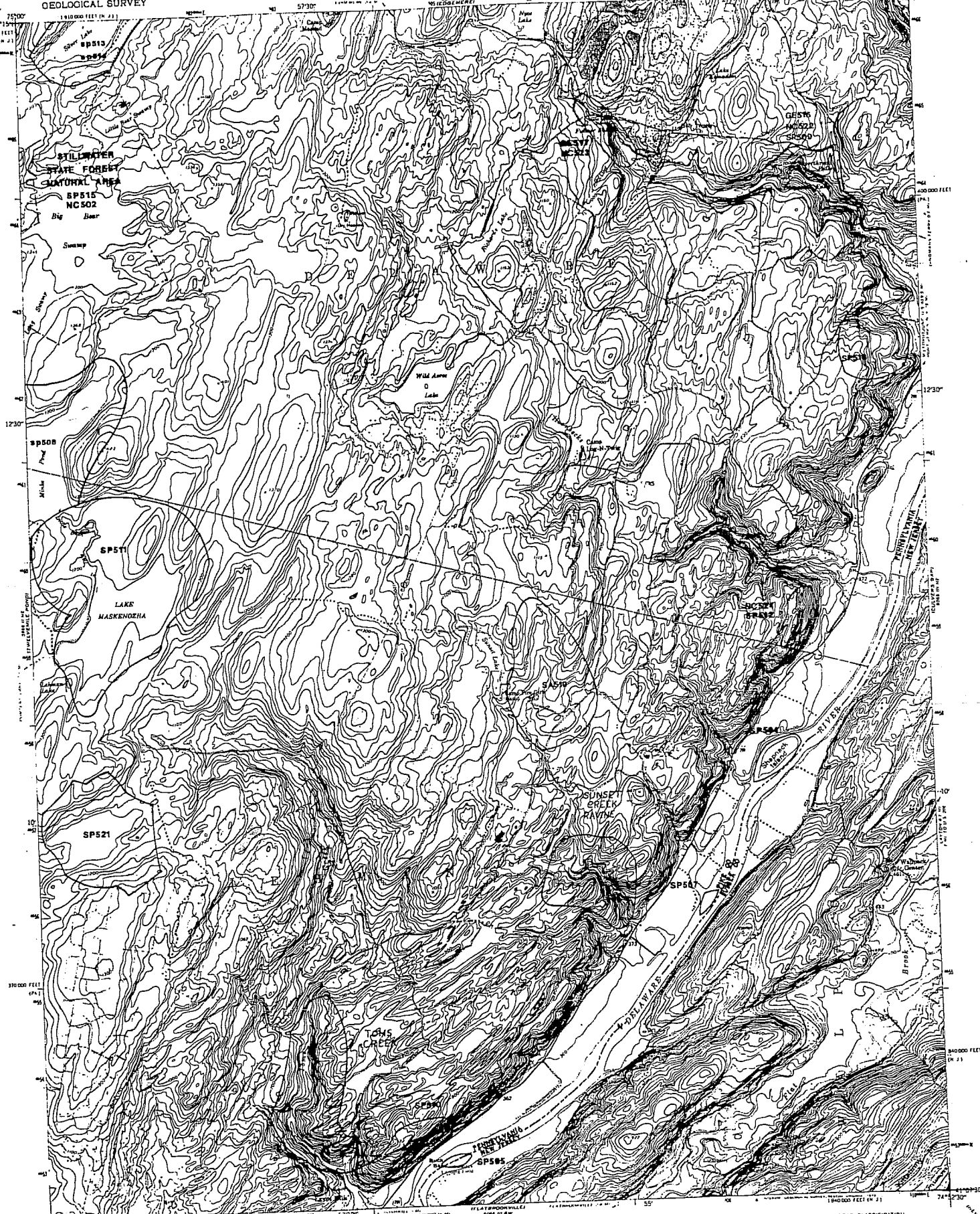


SCALE 1:24,000
CONTOUR INTERVAL 20 FEET
HORIZONTAL SCALE 1:24,000
VERTICAL SCALE 1:12,000
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20508
A POLAR PROJECTION MAP OF THE TWELVEMILE POND AREA, PENNSYLVANIA, IS AVAILABLE ON REQUEST

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
7.5 MINUTE SERIES (TOPOGRAPHIC)
PENNSYLVANIA
A1078-11-77-004
1943

USGS QUADRANGLE MAP: Lake Maskenozha

		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	502	G?	S3S4	N	N	9/20/89	B
	522	G?	S3S4	N	N	9/20/89	B
	523	G?	S3S4	N	N	9/01/89	E
	524	G?	S2	N	N	7/18/89	E
SPECIAL PLANTS:	504	G5	S3	N	PR	8/22/83	A
	505	G5	S3	N	PR	8/22/83	A
	507	G5	S3	N	PR	8/22/83	A
	509	G4	S1	N	PE	6/09/83	D
	510	G5	S3	N	PR	7/18/89	B
	511	G5	S3	N	TU	8/20/82	B
	512	G5	S3	N	PR	7/18/89	B
	515	G5	S2S3	N	PR	7/12/86	U
	518	G5	S2	N	PR	7/18/87	C
	521	G4	S1	N	PE	7/18/89	B
SPECIAL ANIMALS:	519	G4	S2	N	N	9/28/88	E
GEOLOGICAL FEATURES:	516	-	-	-	-	6/09/83	E
	517	-	-	-	-	9/01/83	E
OTHER: Delaware National Scenic and Recreational River, Sunset Creek Ravine, Stillwater State Forest Natural Area, Toms Creek, sp508, sp513, sp514.							



Map by the Army Map Service
Edited and published by the Geological Survey
Control by USGS, USCGS and New Jersey Geologic Survey
Topography from aerial photographs by stereophotogrammetric
methods. Aerial photographs taken 1942. Field check 1946
Culture revised by the Geological Survey 1954
Publication description: 1927 North American datum
111,000 foot grid based on Pennsylvania coordinate system
1000 meter Universal Transverse Mercator grid ticks
zone 18. Shown in blue
To place on the projected North American Datum 1983
move the projection lines 5 meters south and
32 meters west as shown by corner ticks

SCALE 1:24,000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 20192
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty
Medium-duty ——— Unimproved dirt
US Road
LAKE MASKENZOHA, PA-N.I.
NW 1/4 DINGMAN'S FERRY 15 QUADRANGLE
N4107.5 W7452.5/7.5
1954
PHOTOREVISED 1948 AND 1973
AND 8064 IN NW-SERIES 4831
Revisions shown in purple (checked in coordination with
State of Pennsylvania) and from aerial photographs
taken 1960 and 1971. Text information not from check

Lake Maskenozha Quadrangle:

Many of the significant natural areas on this map are associated with the Delaware River or with small tributaries that feed into the river.

Dingman's Falls and Fulmer Falls are two very impressive Waterfall and Plungepool communities (**NC522, NC523**) found along Dingman's Creek. Dingman's Falls are 150-foot falls that cut into shale to form a deep scenic gorge. It is densely shaded by canada hemlock (Tsuga canadensis), white pine (Pinus strobus), and great rhododendron (Rhododendron maximum). On the cliff face opposite the waterfall there is a highly misted microclimate with mosses, liverworts and ferns. This site also contains a marginal population of a state-endangered plant (**SP509**).

Fulmer Falls is a series of about 10 falls that are between 25 and 100 feet high. These falls also cut into shale rock forming deep gorges with canada hemlock dominating the steep, forested slopes. Dingman Falls and Fulmer Falls are both on DWGNRA property and are maintained as scenic attractions for visitors. Both sites have a network of trails, stairways, and bridges to access the falls' scenic vantage points. The primary threat to these sites is erosion of the steep slope vegetation as a result of overvisitation by the public. This threat can be minimized by posting regulations at trailheads, installing more fence barriers near sensitive natural areas, and increased patrolling of the trails.

Each of three sand bar islands in the Delaware River on this map contain excellent populations of a status-undetermined shrub (**SP504** on Shapnack Island, **SP507** south of Shapnack Island and **SP505** on Buck Bar Island). This species grows on the highly dynamic and scoured shores of these islands. The only threat would be a drastic change in the river's water quality or flooding regime.

Two Shale Cliff communities high above the Delaware River support good populations of a state-rare plant (**SP510, SP512**). Both sites have been significantly disturbed by shale quarries located at the base of the cliffs. Past logging has impacted all but the most inaccessible areas but both of these communities are now protected on the DWGNRA.

SP518 represents a poor population of a state rare plant found in a second growth mixed deciduous forest. This population should continue to survive under present conditions.

Stillwater State Forest Natural Area includes Big Bear Swamp (**NC502**), a good quality Broadleaf-Conifer Swamp. The swamp is approximately 150 acres in size and is co-dominated by broadleaf trees such as red maple (Acer rubrum) and black gum (Nyssa

sylvatica) and coniferous trees such as red spruce (Picea rubens) and white pine (Pinus strobus). The shrub layer is very dense and the herbaceous layer is quite diverse. Flooding by beaver is the biggest threat to the swamp. Since the swamp is so large, beaver impact would be confined to relatively small areas. Further investigation of Big Bear Swamp for species of special concern is needed.

Little Bushkill Swamp is a swamp dominated by young spruce, larch, and blueberries that supports a good population of a state-endangered sedge (**SP521**). This site is one of only three known extant sites for this species in the state. The swamp is somewhat degraded and development is encroaching on all sides. This area should be designated as a local natural area to protect it from encroaching development, and all logging and development should be severely restricted within the swamp's watershed. Also, nutrient run-off from septic systems and lawn fertilizers into the swamp from the newly developed areas should be carefully monitored.

Lake Maskenozha is a large, shallow impoundment that has standing dead trees in the water. Despite the impact, the perimeter of the lake is mostly undeveloped and contains a diverse aquatic flora including a fair population of a plant whose status is tentatively-undetermined (**SP511**).

SA519 was only discovered at this site in 1988 and information to determine its population status at this site is insufficient. The species requires dry, scrubby oak woods where it feeds in its larval form from May into August. Spraying with Dimilin to control gypsy moths at this site would probably be detrimental to the species.

Sunset Creek Ravine and **Tom's Creek** are mapped as natural areas of local significance only. Logging and development should be restricted within the primary watersheds of these creeks.

The Breeding Bird Atlas project (Brauning, in press) indicates that the following birds of special concern have been noted as possibly breeding within the area covered by the Lake Maskenozha USGS topographic map: Black Vulture, Northern Goshawk, Red-shouldered Hawk, and Whip-poor-will. Due to insufficient information, locations could not be mapped.

USGS QUADRANGLE MAP: Culvers Gap

<u>TNC Rank</u>	<u>Legal Status</u>	<u>Last</u>	
Global State	Fed. State	Seen	Quality

NATURAL COMMUNITIES: none identified.

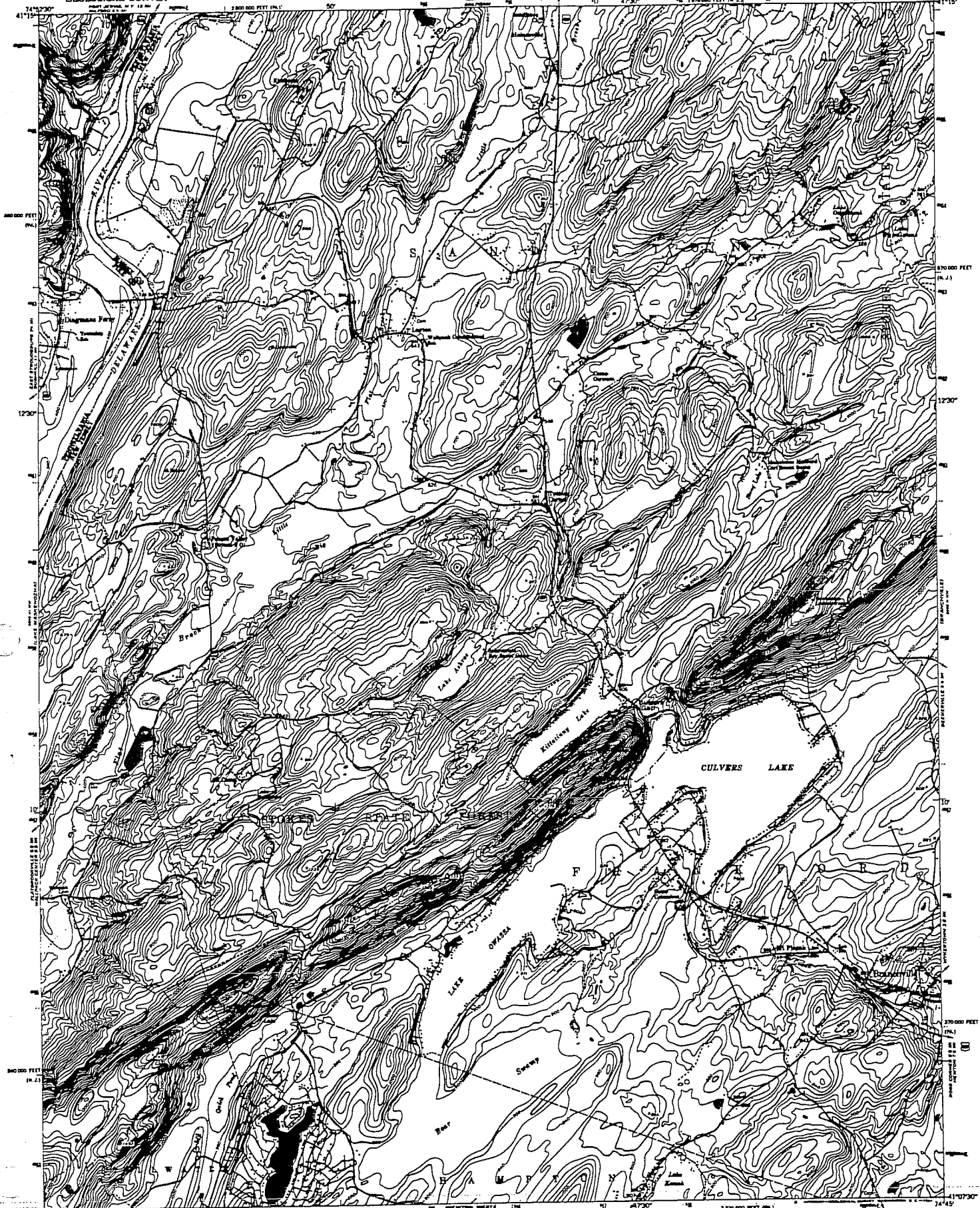
SPECIAL PLANTS: none identified.

SPECIAL ANIMALS: none identified.

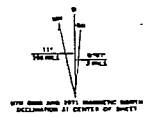
OTHER: Delaware National Scenic and Recreational
River.

Culvers Gap Quadrangle:

Only a small portion of Pike County is on this map and no species or natural communities of special concern were found.



Map made by the Army Map Service
Edited and published by the Geological Survey
Control by USGS, USCGS, and New Jersey Geographic Survey
Topography from aerial photographs by stereogrammetric methods. Aerial photography taken 1942. First check 1943
Culture revised by the Geological Survey 1954
Polyconic projection. 1927 North American datum
10,000-foot grid based on New Jersey coordinate system
and Pennsylvania coordinate system. North zone
1000-meter Universal Transverse Mercator grid lines,
zone 18, shown in blue



SCALE 1:24,000
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U.S. Route
State Route
Light-duty road, hard or
unimproved surface
CULVERS GAP, N.J.-PA
NEW BRUNSWICK PERMY OF QUADRANGLE
N4107 5-W 7445/74

USGS QUADRANGLE MAP: Bushkill

		<u>TNC Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Fed.	State		
NATURAL COMMUNITIES:	506	G?	S1S2	N	N	6/27/89	B
	535	G?	S3S4	N	N	6/29/89	C
SPECIAL PLANTS:	505	G5	S1	N	PE	7/01/83	E
	518	G5	S3	N	PR	6/27/89	B
SPECIAL ANIMALS:	none identified.						
GEOLOGICAL FEATURES:	528	-	-	-	-	6/29/89	E
	530	-	-	-	-	1979	E
OTHER:	none identified.						

Bushkill Quadrangle:

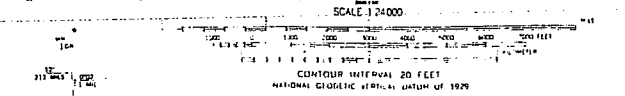
SHOEMAKERS BARRENS is a fair example of an Acidic Rocky Summit community (**NC506**) located at the southern tip of Pike County. This community supports a good population of a state-rare plant (**SP518**) which is typically found on the Shale Cliff communities along the Delaware River. Although vegetation is similar to the cliff community, Shoemaker Barrens lacks the steep, near vertical slopes associated with a cliff community; rather it contains open balds of rock outcrops near the summit of the mountain.

Bushkill Falls is a very impressive Waterfalls and Plungepool community (**NC535**) which is also one of the county's most visited scenic attractions. The numerous falls are surrounded by a network of trails, bridges, and stairs that provide public access to all the falls' viewing points. Although the site is well maintained by a professional staff, there is still significant erosion, littering, and plant disturbance (picking, breaking and carving etc.). However, the public is restricted by fences and barriers from visiting the more fragile, wet cliff faces where a diverse array of mosses and ferns thrive. These areas warrant further checking for species of special concern. Overvisitation is the biggest threat and care should be taken to minimize the effect of such high volume foot traffic.

Winona Falls is a Waterfall and Rapids mapped as an Outstanding Geological Feature (**GE530**). Further survey of this site is necessary to determine if this site is a natural community and to look for species of special concern. Logging and development should be restricted near the falls if it is to continue to be a scenic attraction.



Mapped, edited, and published by the Geological Survey.
Compiled by USGS and HOSMOM.
Topography by photogrammetric methods from aerial photographs.
Field checked 1944.
Photographic projection: 10,000-foot grid ticks based on Pennsylvania coordinate system, north zone, and New Jersey coordinate system 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue.
1927 North American Datum.
To place on the Universal North American Datum 1983 move the projection lines 5 meters south and 37 meters west as shown by dashed corner ticks.
There may be minor irregularities where the boundaries of the States or State reservations shown on this map.
Revisions shown in purple and woodland colored in cooperation with Commonwealth of Pennsylvania agencies from aerial photographs taken 1961 and other sources.



ROAD CLASSIFICATION

Heavy duty	Light duty
Medium duty	Unimproved dirt
U.S. Route	State Route

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

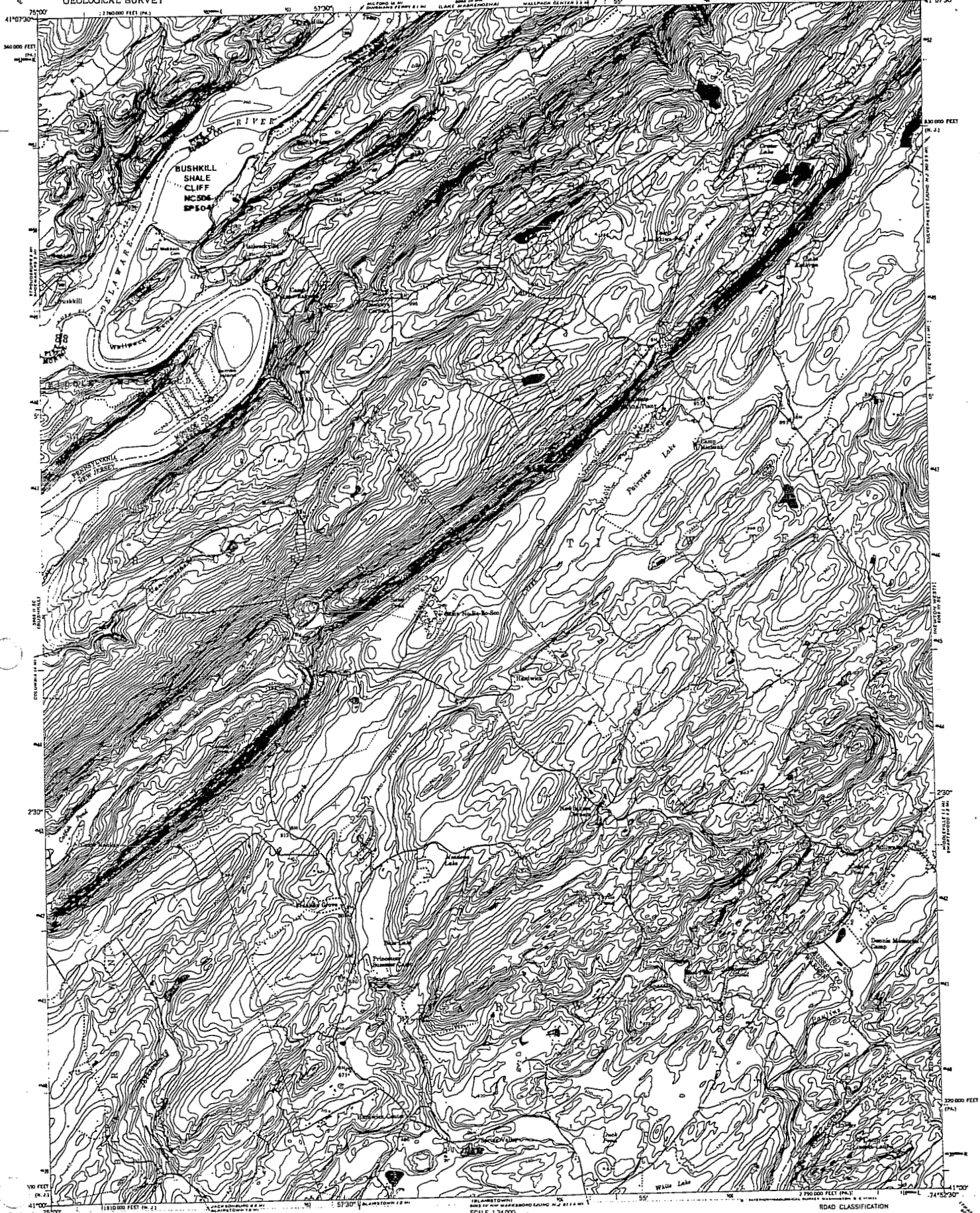
BUSHKILL, PA.-N.J.
41075-A1-TF-024
1944
PHOTOREPRODUCED 1983
FED. GOV. PRINT. OFF. WASHINGTON, D.C.

USGS QUADRANGLE MAP: Flatbrookville

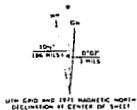
		<u>TNC Rank</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	505	G?	S2	N	N	7/11/89	A
SPECIAL PLANTS:	504	G5	S3	N	PR	7/11/89	A
SPECIAL ANIMALS:	none identified.						
OTHER:	Delaware National Scenic and Recreational River.						

Flatbrookville Quadrangle:

BUSHKILL SHALE CLIFF is an exemplary example of a Shale Cliff community (**NC505**) that contains an excellent population of a state-rare plant (**SP504**). The population of this species was the largest seen during the 1989 county inventory. The shale cliff is protected within the DWGNRA but past shale excavations have destabilized the slopes near the base. Excavating for shale should be avoided along the cliff base since it may pose a threat to the community and the species at the summit.



Maped by the Army Map Service
Edited and published by the Geological Survey
Control by USGAS and New Jersey Geologic Survey
Topography from aerial photographs by stereophotogrammetric
methods. Aerial photographs taken 1942
Culture revised by the Geological Survey 1954
Polemic projection. 1927 North American datum
10,000 foot grid based on New Jersey coordinate system,
and Pennsylvania coordinate system, north zone
1000 meter Universal Transverse Mercator grid scale,
zone 18, shown in blue
Boundary shown on map is based on the General Land Office
survey, aerial photographs taken 1942. 34m information



THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20542
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Primary highway ——— Light duty road, road or
hard surface ——— unpaved surface
Secondary highway ——— Unimproved road
hard surface ——— U.S. Route ——— State Route
Interstate Route ——— U.S. Route ——— State Route
FLATBROOKVILLE, N. J.-PA.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:50,000—1:62,500
1954
PHOTOGRAPHIC 1951

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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.

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

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

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

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

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

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

Appendix I (Continued.)

STATE STATUS

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

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

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

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

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

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

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

Appendix I (Continued.)

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

LE - Listed Endangered

LT - Listed Threatened

LS - Listed Special Concern

N - Not Listed

Appendix I (Continued.)

GLOBAL ELEMENT RANKS

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

Appendix I (Concluded.)

STATE ELEMENT RANKS

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

APPENDIX II
Pennsylvania Natural Diversity
Element Occurrence Quality-Ranks

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

Appendix II (Concluded.)

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

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

* Intermediate ranks may also be assigned

APPENDIX III

THE NATURE CONSERVANCY

COUNTY: _____ NO. _____

POTENTIAL NATURAL AREA SURVEY FORM

QUAD NAME/CODE: _____

Site Name: _____
Location: _____

PHOTO NO./DATE: _____
Township: _____

Air Survey Surveyors: _____ Date: _____

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

*E=Eliminate

Ground Survey Surveyors: _____ Date: _____
Community Type Eliminate Notable Natural Quality-Rank

Comment:

Appendix III (Concluded.)

THE NATURE CONSERVANCY
POTENTIAL NATURAL AREAS SURVEY FORM--NATURAL COMMUNITY

NATURAL COMMUNITY (C rank or better)_____

Map the exact boundary around ranked portions of natural community.

EO-RANK:_____ WHY?_____

COMMON PLANTS (or attach species list):_____

OTHER PLANTS:_____

DOMINANTS OF THE PLANT COMMUNITIES (PC) IN THE NATURAL COMMUNITY:

1. _____
2. _____
3. _____
4. _____

SIGNS OF DISTURBANCE:_____

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

ANIMALS:_____

APPENDIX IV
RECOMMENDED NATURAL AREA FIELD SURVEY FORM

Surveyor: _____ Address & Phone _____

Date of Observation _____ Site Name _____

Quadrangle Name _____ Exact Location of
Site (please be specific & include a map or sketch) _____

Owner: _____
Owners Attitude Toward Conservation: _____

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

Source of Lead: _____

Current Land Use: _____

Type of Area: ____ Old Growth Forest; ____ Marsh; ____ Shrub Swamp;
____ Forested Swamp; ____ Bog; ____ Natural Pond.

Written Description: Try to convey a mental image of the site
features (including vegetation, significant animals & plants,
aquatic features, land forms, geologic substrata, scenic
qualities, etc.): _____

Evidence of Disturbance: _____

Site Condition Compared to Your Last Visit: _____

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

APPENDIX V
CLASSIFICATION OF NATURAL COMMUNITIES
IN PENNSYLVANIA
(DRAFT)

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

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK	STATE RANK
<u>PALUSTRINE COMMUNITIES</u>			
ACIDIC BROADLEAF SWAMP	PAA	G5	S1S2
CIRCUMNEUTRAL BROADLEAF SWAMP	PAB	G?	S2S3
BOREAL CONIFER SWAMP	PAC	G?	S2
NORTHERN CONIFER SWAMP	PAD	G?	S3S4
BROADLEAF-CONIFER SWAMP	PAE	G?	S3S4
FLOODPLAIN SWAMP	PAF	G?	S1
CALCAREOUS SEEPAGE SWAMP	PAG	G?	S1
ACIDIC SHRUB SWAMP	PAH	G5	S3
CIRCUMNEUTRAL SHRUB SWAMP	PAJ	G?	S3
GRAMINOID MARSH	PBA	G?	S3
ROBUST EMERGENT MARSH	PBB	G?	S2
MIXED GRAMINOID-ROBUST EMERGENT MARSH	PBC	G?	S2S3
CALCAREOUS MARSH	PBD	G?	S1
GLACIAL BOG	PCA	G?	S2S3
NONGLACIAL BOG	PCB	G?	S3
RECONSTITUTED BOG	PCC		
SHRUB FEN	PDA	G2G3	S1
BASIN GRAMINOID-FORB FEN	PDB	G?	S1
HILLSIDE GRAMINOID-FORB FEN	PDC	G?	S1
CIRCUMNEUTRAL SEEP COMMUNITY	PEA	G?	S3?
CALCAREOUS SEEP COMMUNITY	PEB	G?	S1
ACIDIC SEEP COMMUNITY	PEC	G?	S3?
RIVERSIDE SEEP COMMUNITY	PED	G?	S2?
<u>TERRESTRIAL COMMUNITIES</u>			
BOREAL FOREST	TAA	G?	S?
NORTHERN CONIFER FOREST	TBA	G5	S3S4
NORTHERN HARDWOOD FOREST	TBB	G?	S3S4
NORTHERN HARDWOOD-CONIFER FOREST	TBC	G?	S3
XERIC CENTRAL HARDWOOD FOREST	TCA	G?	S5
XERIC CENTRAL CONIFER FOREST	TCB	G?	S3S4
XERIC CENTRAL HARDWOOD-CONIFER FOREST	TCC	G?	S3
PITCH PINE-SCRUB OAK BARRENS	TCD	G2G3	S1S2
DRY-MESIC ACIDIC CENTRAL FOREST	TCE	G?	S5
DRY-MESIC CALCAREOUS CENTRAL FOREST	TCF	G?	S2S3
MESIC CENTRAL FOREST	TCG	G?	S2
TALUS SLOPE FOREST	TCH	G?	S2?
COASTAL PLAIN FOREST	TEA	G?	S1
FLOODPLAIN FOREST	TFA	G?	S2
RIVER GRAVEL COMMUNITY	TGA	G?	S4S5
EASTERN SERPENTINE BARRENS	THA	G2	S1
APPALACHIAN SHALE BARREN	THB	G?	S1

Appendix V (Continued.)

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

Appendix V (Continued.)

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

Acidic Rocky Summit (THK): Inhabits xeric ridgetops or summits where soils are acidic, bedrock outcrops are a prominent feature which results in frequent openings in the tree or shrub canopy. Bare ground and openings dominated by herbaceous or dwarf shrub species are common.

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

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. Water influencing the site is acidic. Small open bog areas are frequently associated with this type.

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

Broadleaf-Conifer Swamp (PAE): A forest community codominated 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 (Acer rubrum)
Yellow Birch (Betula lutea)
Canada Hemlock (Tsuga canadensis)
Blue Highbush Blueberry (Vaccinium corymbosum)
Sphagnum Moss (Sphagnum spp.)

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.

Appendix V (Continued.)

Sphagnum Moss (Sphagnum spp.)
Leatherleaf (Chamaedaphne calyculata)
Beaked Sedge (Carex rostrata)
Round-leaved Sundew (Drosera rotundifolia)
Large Cranberry (Vaccinium macrocarpon)
Blue Highbush Blueberry (V. 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, dark-stained 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 a drop of more than 10 feet per mile. The substrate is composed of bedrock, boulders, and sand and gravel deposits; riffles and pools are common. The water is generally highly oxygenated and relatively cold.

Brook Trout (Salvelinus fontinalis)
Mayflies (order Ephemeroptera)

Ridgetop Dwarf-tree Forest (TCD): A forest community on the tops of high ridges where soil is thin and infertile. Temperatures are extreme and high wind velocities are common. The forest is characterized by stunted oaks (less than 15 feet) and shrubs caused by the harsh conditions, successive fires, and possibly cutting which have acted to create a relatively permanent state.

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

Shale Cliff Community (THG): This community inhabits near-vertical cliff exposures of resistant shale bedrock with

Appendix V (Concluded.)

associated ledges and open talus; soil is almost nonexistent. No endemic flora are associated with the shale cliff.

Moss Pink (Phlox subulata)
Lyre-leaved Rock Cress (Arabis lyrata)
Eastern Red Cedar (Juniperus virginiana)
Pitch Pine (Pinus rigida)
Scrub Pine (P. virginiana)

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 (Salvelinus fontinalis)
Rock Clubmoss (Lycopodium porophyllum)

Xeric Central Conifer Forest (TCB): A forest community occurring on excessively drained, infertile, sandy gravelly soils of upper slopes, south-facing ridges, and flats. The most characteristic species are pines with subordinate oaks and ericaceous shrubs (blueberries and huckleberries).

Pitch Pine (Pinus rigida)
Table-mountain Pine (P. pungens)
Scrub Pine (P. virginiana)
Chestnut Oak (Quercus montana)
Scrub Oak (Q. illicifolia)
Huckleberry (Gaylussacia spp.)
Blueberry (Vaccinium spp.)
Bracken Fern (Pteridium aquilinum)

APPENDIX VI
SPECIAL PLANTS AND ANIMALS OF PIKE COUNTY

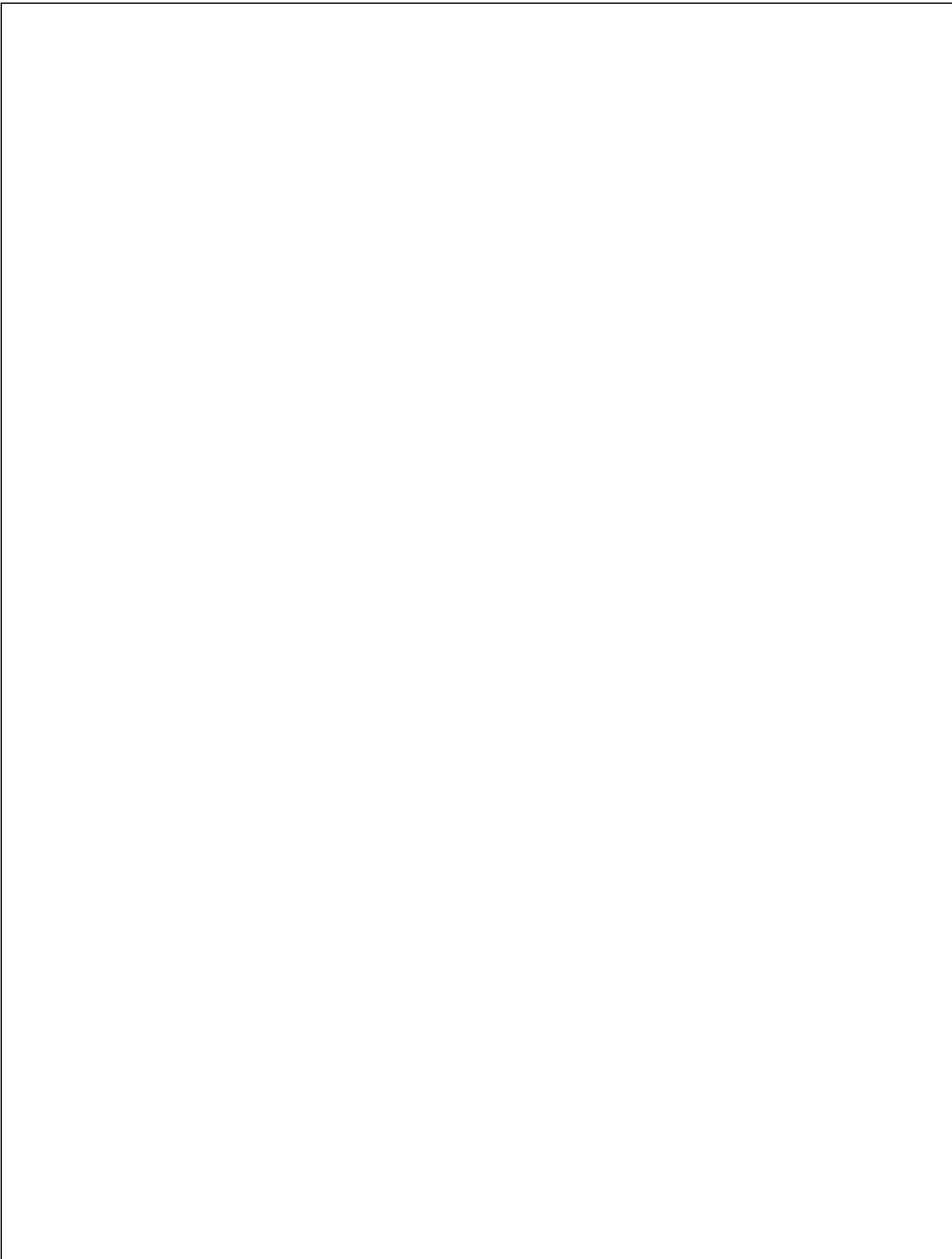
PLANTS

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
ANDROMEDA POLIFOLIA	BOG-ROSEMARY
ARCEUTHOBIMUM PUSILLUM	DWARF MISTLETOE
CAREX BEBBII	BEBB'S SEDGE
CAREX COLLINSII	COLLIN'S SEDGE
CAREX LASIOCARPA	MANY-FRUITED SEDGE
CAREX PAUPERCULA	BOG SEDGE
ELEOCHARIS OLIVACEA	CAPITATE SPIKE-RUSH
ERIOPHORUM TENELLUM	ROUGH COTTON GRASS
GALIAM LABRADORICUM	LABRADOR MARSH BEDSTRAW
GOODYERA TESSELATA	CHECKERED RATTLESNAKE-PLANTAIN
JUNCUS MILITARIS	BAYONET RUSH
LEDUM GROENLANDICUM	LABRADOR TEA
LOBELIA DORTMANNA	WATER LOBELIA
LUPINUS PERENNIS	LUPINE
LYCOPODIUM POROPHILUM	ROCK CLUBMOSS
LYGODIUM PALMATUM	HARTFORD FERN
MYRIOPHYLLUM TENELLUM	SLENDER WATER-MILFOIL
NUPHAR LUTEUM SSP PUMILUM	YELLOW COWLILY
NYMPHOIDES CORDATA	FLOATING-HEART
OPUNTIA HUMIFUSA	PRICKLY-PEAR CACTUS
ORONTIUM AQUATICUM	GOLDEN CLUB
PRUNUS PUMILA	SAND CHERRY
SEDUM ROSEA	ROSEROOT STONECROP
UTRICULARIA PURPUREA	PURPLE BLADDERWORT
XYRIS MONTANA	NORTHERN YELLOW-EYED GRASS

Appendix VI (Concluded.)

ANIMALS

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
ANOMOGYNA ELIMATA	SOUTHERN VARIABLE DART
CARTEROCEPHALUS PALAEMON MANDAN	ARCTIC SKIPPER
DOROCORDULIA LEPIDA	ELEGANT SKIMMER
EPIGLAEA APIATA	POINTED SALLOW
ERYNNIS PERSIUS PERSIUS	PERSIUS DUSKYWING
HEMILEUCA MAIA	BARRENS BUCKMOTH
METAXAGLAEA SEMITARIA	FOOTPATH SALLOW
XYLOTYPE CAPAX	BARRENS XYLOTYPE
ZANCLOGNATHA MARTHA	a NOCTUID MOTH



PIKE COUNTY NATRUAL AREAS INVENTORY

Update - 1995

submitted to:
Pike County Planning Commission
506 Broad St.
Milford, PA 18337

Pennsylvania Science Office
of
The Nature Conservancy
34 Airport Dr.
Middletown, PA 17057

August 1995

These data are a supplement to the Pike County Natural Areas Inventory (NAI) completed in 1990. Included are new findings of species of special concern and natural communities in the county since the time of the NAI. There are 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. The format follows that of the Pike County NAI with the corresponding page number from the NAI report listed with the USGS quadrangle map table in this document. As in the NAI report, there are tables listing the additional elements (by PA Natural Diversity Inventory code) with their respective global and state rarity ranks, state and federal legal status, site quality, and date last observed. Following the table is a brief narrative for each element noting whether it is a NEW occurrence or an UPDATE. Sections of USGS maps accompany the text showing the location of the element. These map sections can be transcribed on to the original maps produced for the 1990 NAI. Questions about this supplement or the original can be directed to the NAI Coordinator at the address on the title page.

COPY

USGS QUADRANGLE: Narrowsburg (35)

			<u>TNC Ranks</u>	<u>Legal Status</u>		<u>Last</u>		
			Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	514	G?	S2S3	N		N	91-10-8	B
SPECIAL PLANTS:	509	G4G5	S1	N		PE	91-10-8	C
	523	G4	S2	N		PT	91-10-8	B
	524	G5	S2	N		TU	91-10-8	B
	525	G5	S2	N		TU	91-10-15	C

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

COPY

Narrowsburg Quadrangle:

NC514 -UPDATE- WOLF LAKE showed no new disturbances when last observed in October of 1991. Good examples of the Acidic Glacial Lake natural community are fairly rare in Pennsylvania. The sandy-cobble zone around the edge and the deep water in the middle has been protected by an excellent upland forest buffer. The finding of these aquatic specimens (**SP524, SP525, SP509, SP523**) illustrates the importance of the Forest Lake macro site. Although the surrounding forest is managed and no motorized boats are permitted on the lake, the area needs ongoing protection from shoreline development, dock construction, the use of aquatic herbicides, pollution and introduction of exotic fish.

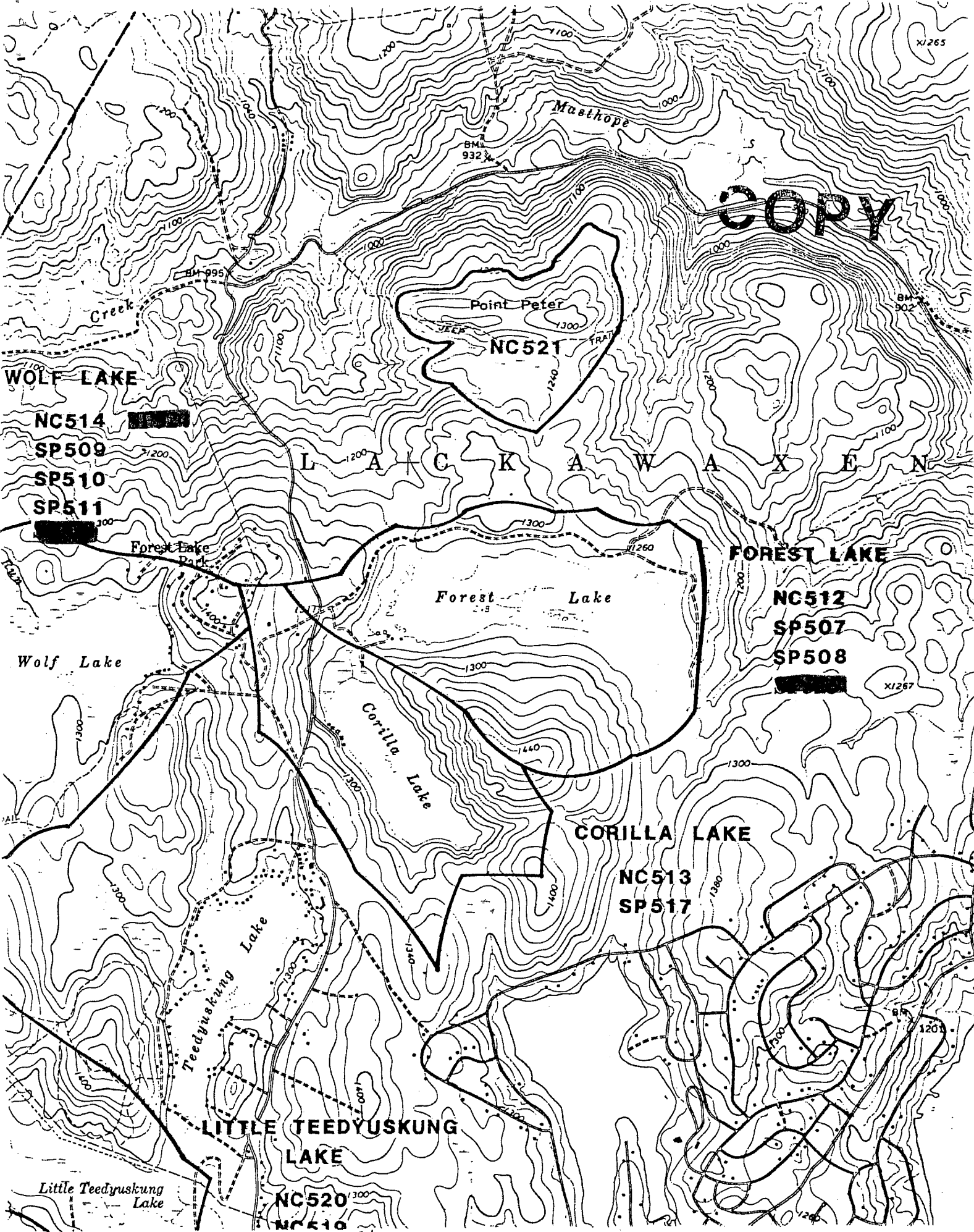
SP509 -UPDATE- The population of this state endangered rush is doing well and its quality status is unchanged from 1987. In August of 1991, 20 fruiting and approximately 100 other individual plants were growing in water up to 2 feet deep.

SP523 -NEW- Another state threatened plant was found at Wolf Lake in October of 1991. Two hundred mature individuals of this rooted, aquatic perennial that grows in the shallow water of ponds and lakes were found among bur-reed, seven-angle pipewort, spike-rush and pickerel weed.

SP524 -NEW- Wolf Lake has a good occurrence of this aquatic plant. Several hundred vigorous plants are growing in a shallow area of the sandy silt lakebed in association with waterweed, bayonet rush, bur-reed, seven-angle pipewort and ribbonleaf pondweed.

SP525 -NEW- Forest Lake also contains a fair occurrence of the aquatic (**SP524**) found at Wolf Lake. Approximately 35 individuals were found in October of 1991 growing in similar habitat as SP524.

COPY



Narrowsburg

COPY

USGS QUADRANGLE: Hawley (43)

		<u>TNC Ranks</u>	<u>Legal Status</u>		<u>Last</u>		
		Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:							
SPECIAL PLANTS:							
	508	G5	S2	N	PR	91-7-17	B
	509	G5	S2	N	PE	91-7-17	D
	520	G5	S2	N	PR	91-8-14	B
	521	G5	S3	N	PR	91-8-14	C
	522	G5	S2	N	TU	91-9-16	B
	523	G5	S2S3	N	PR	91-9-16	B
SPECIAL ANIMALS:							
GEOLOGICAL FEATURES:							
OTHER:							

Hawley Quadrangle:

SP522 -NEW- When Fairview Lake was revisited in September of 1991, a good occurrence of this aquatic plant was found in the inundated sandy and rocky bed of the lake. Several hundred vigorous mature specimens of this rooted submergent aquatic are growing in association with swamp-loosestrife, yellow water lilies and algae.

SP523 -NEW- Fairview Lake is also the home of this state rare emergent aquatic. It is growing in the sandy beds of shallow water in association with yellow pond lily. The plants are of good quality and viability. As with **SP522**, heavy recreational use of the lake and the resulting motorboat wave action and pollution are threats to these aquatic species.

SP509 -NEW- This state endangered grass and the following three state rare plants are located at Mainses Pond. The pond was revisited in the fall of 1991. This pond was dammed in the eighteen forties, but has been relatively undisturbed in recent years. The lake's shoreline and the surrounding uplands are almost completely wooded. A small drainage enters on the north end of the pond. An old leatherleaf stand and a great quaking sphagnum mat are near the drainage's confluence with the pond. On the west side is an emergent bog with floating vegetation. The small, vigorous population of **SP509** is growing on an open mudflat in inundated soil. Associated species include: bladderwort, pondweed and quillworts. Evidence of disturbances includes past logging, a small rock dam and several small rowboats. Continued interest by landowners, restriction of residential development and prevention of pollution from Fairview Lake is important to maintain this pond's quality.

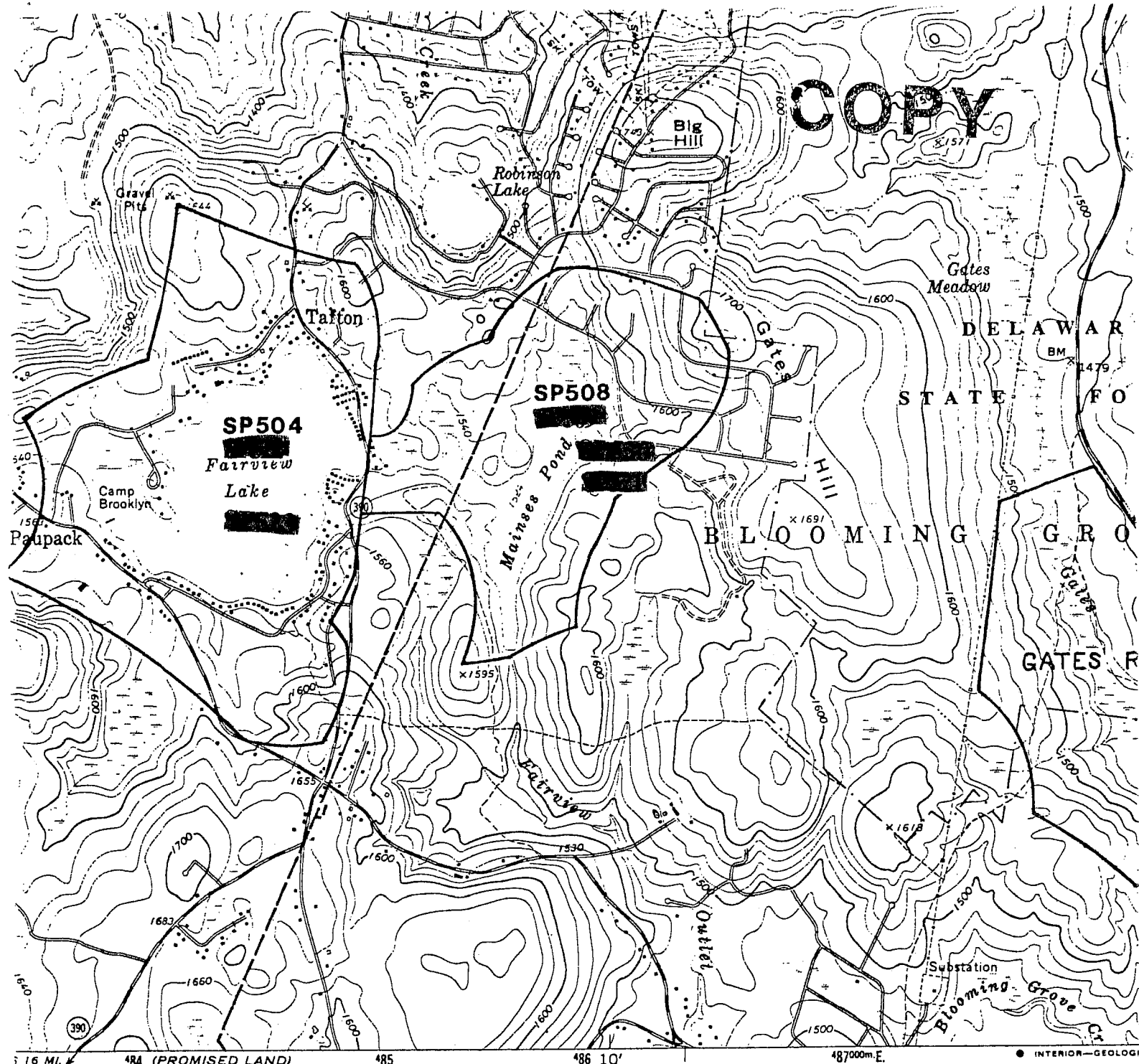
SP508 -UPDATE- There is no change in the status or quality of this state rare aquatic. The species was observed as "very common" in 1986, and the plant is now observed throughout the lake.

SP520 -NEW- This is a good quality, pure stand of a spike-rush. Several thousand were found on an open peat mat. Marsh Saint John's wort, arrowhead, Canada rush, cranberry and other peatland species are associated with the rare species.

SP521 -NEW- A fair occurrence of this state rare sedge is located on an open peat mat. Approximately 100 fruiting culms and several hundred vegetative plants were found. This saturated peat area also contains arrowhead, pickerel-weed, water hemlock, leatherleaf, marsh St. John's wort, wool grass, and other wetland species.

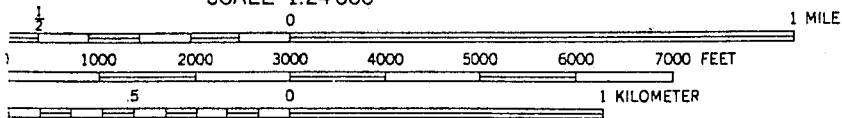
COPY

COPY



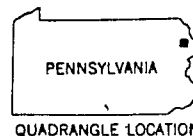
16 MI. 484 (PROMISED LAND) 5966 1 SW 485 486 10' 487000m.E. INTERIOR-GEOLOGI

SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Hawley



QUADRANGLE LOCATION

RO/
Heavy-duty
Medium-duty
U. S. R

MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
ALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
CRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple and woodland compiled in cooperation
with Commonwealth of Pennsylvania agencies from aerial
photos taken 1981 and other sources. This information
checked. Map edited 1983

COPY

USGS QUADRANGLE: Rowland (47)

			<u>TNC Ranks</u>		<u>Legal Status</u>	<u>Last</u>		
			Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	504	G?		S2	N	N	90-8-30	B
	518	G?		S2S3	N	N	90-8-30	BC
	523	G?		S2S3	N	N	93-6-18	B
	525	G?		S2	N	N	93-6-18	B
SPECIAL PLANTS:	508	G5		S3	N	PR	93-6-18	C
	512	G5		S2	N	PT	93-6-18	AB
	519	G5		S3	N	PR	91-5-16	D
	520	G5		S2	N	PR	90-8-30	D
	521	G5		S1	N	PE	91-5-16	BC
	522	G5		S3	N	PR	91-5-16	C
	524	G5		S2	N	PR	93-6-18	AB
	529	G5		S2	N	PT	91-5-16	B
	530	G5		S3	N	TU	91-5-16	B
	531	G5		S3	N	TU	92-7-18	B
	532	G5		S3	N	TU	93-6-18	B
	533	G5		S3	N	PR	93-6-18	C
	534	G5		S1	N	PE	93-6-18	C
	535	G5		S2S3	N	PT	93-6-24	E
	536	G5		S3S4	N	TU	93-6-24	E

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Rowland Quadrangle:

NC504 -SMITH'S SWAMP- This community remains an important area of natural diversity. It is a Boreal Conifer Swamp dominated by 30-50 foot spruce and larch with a thick 8-10 foot high shrub understory. Cinnamon fern dominates the open areas and sedges thrive on the hummocks. Maple and black gum are scattered throughout, especially in the beaver-impacted areas. Other associated species include: highbush blueberry, swamp azalea and sphagnum. Smith's Swamp was revisited in August of 1990 and in May of 1991, and it's status remains unchanged. Because of the many species of importance in this community, habitat maintenance is imperative. The area is threatened by beaver. The Pennsylvania Game Commission and the Bureau of Forestry are the owners. The following six elements of special concern have been observed.

NC518 -UPDATE- Within Smith's Swamp is a high quality Glacial Bog Community of approximately one-half acre. It is a very small glacial bog with a flat, inundated peat substrate. The open water is

surrounded by rings of sedges, followed by spike-rushes on the wettest, most exposed, areas of the mat. The interior consists of knee-high leatherleaf with sphagnum, cotton-grass, pitcher plants, cranberry and low evergreen shrubs and, finally, the adjacent Boreal Conifer Swamp with spruce and larch. At the present time, beaver activity to the south is not affecting the bog. The quality of the area when last visited in August of 1990 has been changed from A to BC.

SP519 -UPDATE- Eleven to fifty specimens of this evergreen shrub were found growing on the flat peat substrate in May of 1991. All were in leaf, mature and showing normal vigor. The species has not changed from it's D status and there are so few plants that even the excellence of the site will not improve the rank.

SP520 -UPDATE- This small patch of a Pennsylvania Rare rush was seen again in August of 1990. The quality of the site for species has been changed from CD to D.

SP521 -UPDATE- In 1989, 101-1000 mature, vigorous individuals of this Pennsylvania Endangered sedge were observed. This site was revisited in May of 1991, but the species occurrence is now ranked as only good to fair. It is very important that this site be maintained to prevent extinction of the only extant population of this sedge in Pennsylvania.

SP522 -UPDATE- The glacial bog also contains an occurrence of this rare evergreen shrub. The same number of plants were seen again in May of 1991, but the quality has been downgraded from excellent to fair.

SP529 -NEW- Several vigorous specimens of this Pennsylvania Threatened plant were found in May of 1991. It is a good occurrence and fifty percent of the plants were in flower. Associated species are: black spruce, American larch and blueberry.

SP530 -NEW- A good occurrence of this sedge was found in Smith's Swamp bog in May of 1991. Thousands of culms growing over a half-acre area showed good condition, viability and defensibility. The plants were in flower and had immature fruit. They were associated in the wet sphagnum mat with cotton grass, bog laurel and pine.

NC525 -UPDATE- LITTLE MUD POND SWAMP This Boreal Conifer Swamp, owned by the Pennsylvania Bureau of Forestry, was revisited in June of 1993. It is dominated by black spruce of uneven age; where it is dense there is little light penetration and there are few plants below the canopy. The area contains bog spruce/larch and highbush blueberry/sphagnum growth. The quality has been changed from excellent to good.

NC523 -UPDATE- Within Little Mud Pond Swamp is a five-acre Kettle Hole Glacial Bog bordered by a narrow zone of blueberry and sheep laurel. Leatherleaf dominates in a wide swath on the east side, and three to four acres of open water and mud flats dominate on the west side. The uplands are forested. There is a peat mine at the south end of the wetland complex. This mine is a threat to the Pennsylvania Rare and

COPY

Pennsylvania Threatened species that have been found here and the area should be considered for designation as a State Forest Natural Area. The bog was revisited in June of 1993 and it's quality downgraded from excellent to good. The following species are found at Little Mud Pond Swamp.

SP508 -UPDATE- Fifty to one hundred individuals of this state-rare shrub were seen again in June of 1993. The poor population, scattered throughout the excellent bog habitat, may be threatened by hydrologic changes caused by past peat mining at the south end of the wetland complex.

SP512 -UPDATE- The quality of this Pennsylvania Threatened evergreen shrub remains good to excellent. The site, a Boreal Conifer Swamp, was revisited in June of 1993. The population size is unknown but plants are easily found on black spruce. They are all in leaf, mature and of normal vigor. It is a good habitat of black spruce and tamarack.

SP524 -UPDATE- The state status of this rush is now determined to be Pennsylvania Rare. The same number of plants were seen again in the bog of Little Mud Pond Swamp in June of 1993. They were mature and growing vigorously in the peat bog.

SP532 -NEW- In June of 1993, a good occurrence of this herbaceous perennial was found. Over one thousand mature, fertile ramets with normal vigor were found on the open sphagnum mats around the pond. Associated species include: sedges, cranberry and leatherleaf.

SP533 -NEW- Little Mud Pond Swamp is the site of this Pennsylvania Rare evergreen sub-shrub that grows on hummocks and tree stumps in northern bogs and swamps. Sixty mature ramets with normal vigor and evidence of asexual reproduction were found on sphagnum mounds at the base of woody plants in a spruce/larch/blueberry thicket. The swamp is good to excellent habitat for the species.

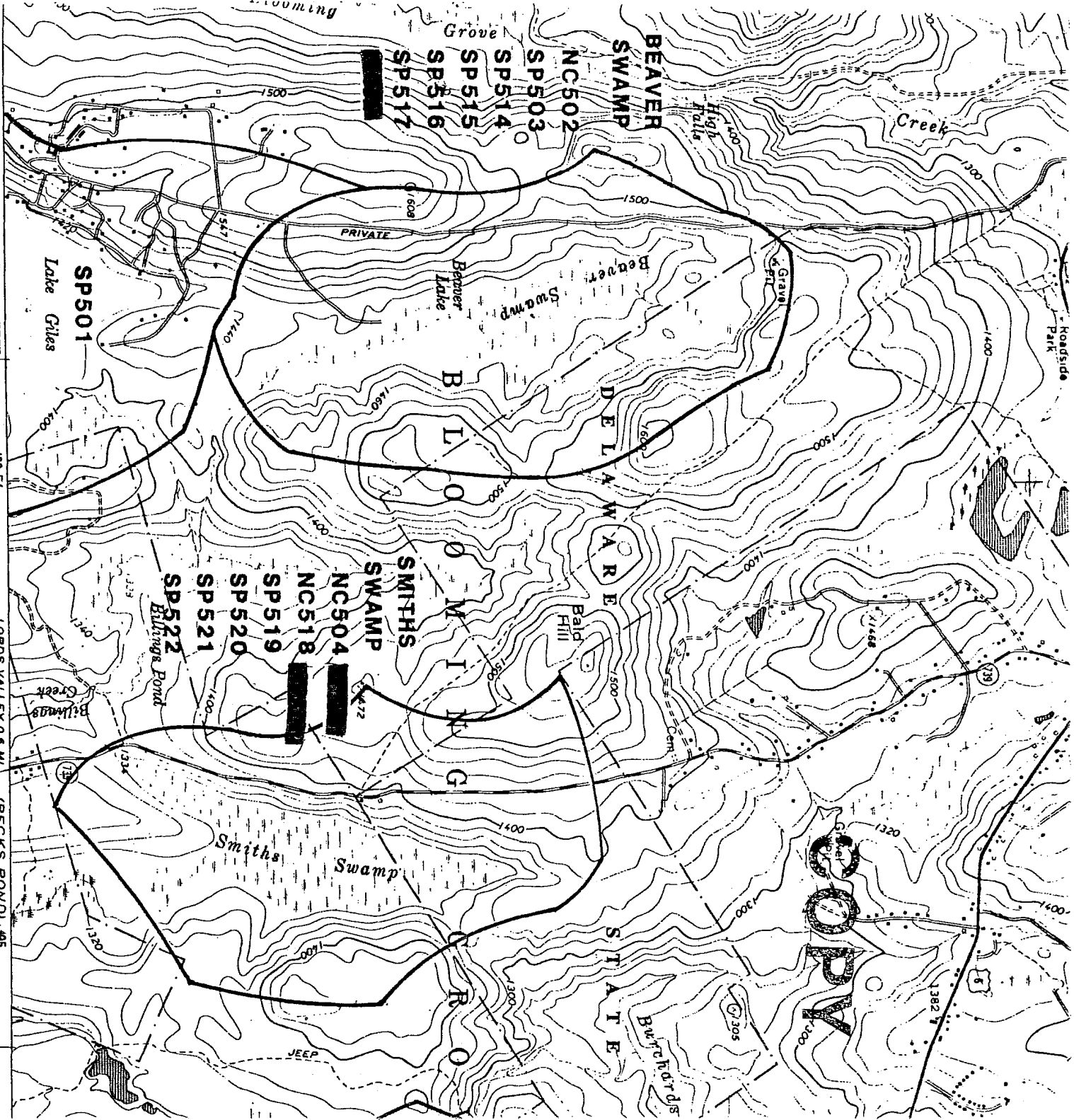
SP534 -NEW- A fair occurrence of this Pennsylvania Endangered sedge was found in Little Mud Pond Swamp in June of 1993. Five mature fruiting ramets with normal vigor were found on the open bog mat. They are growing with other sedges and leatherleaf. This area needs to be searched for more individuals.

SP531 -NEW- A good occurrence of this state-rare sedge was found at Beaver Lake in July of 1992. Five-thousand mature ramets with normal vigor were in the saturated, open bog mat surrounding the pond. They are growing with white beak rush, sedges, wild calla, tawny cotton-grass and pitcher plants. The area is owned by the Blooming Grove hunting and fishing club. A boardwalk over the vegetation is a minor disturbance.

SP535 and SP536 -NEW- The Lackawaxen River site was visited in June of 1993 and two new plants of importance were found. Rapid water level fluctuations and diminished water quality, especially high sediment

loads, will threaten both of these special plants. From Kimble to Lackawaxen, NW of Shimers Mountain, this Pennsylvania Threatened aquatic perennial (SP535) was found covering a 700-1000 square yard area. The flowering plants were exceptionally vigorous. They are growing on the open lighted, rocky bottom with riverweed and waterweed. Above Rowland almost every rock in suitably fast water has SP536. More than 10 thousand mature, vigorous, ramets were found above 10 riffles along a 12 mile stretch of the river. It requires rapidly flowing water over a rocky substrate. See also SP529 (Shohola Quadrangle).

COPY



Rowland

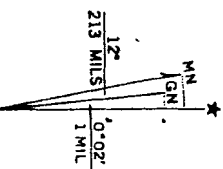
2730 000 FEET

493 5'

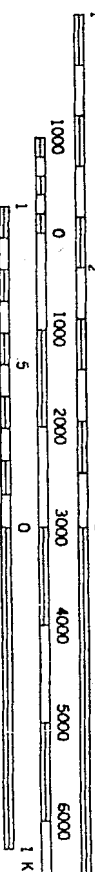
LORDS VALLEY 0.6 MI.

(PECKS POND) 45
5966 / SE

SCALE 1:24000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC DATUM OF 1929

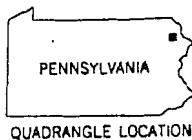
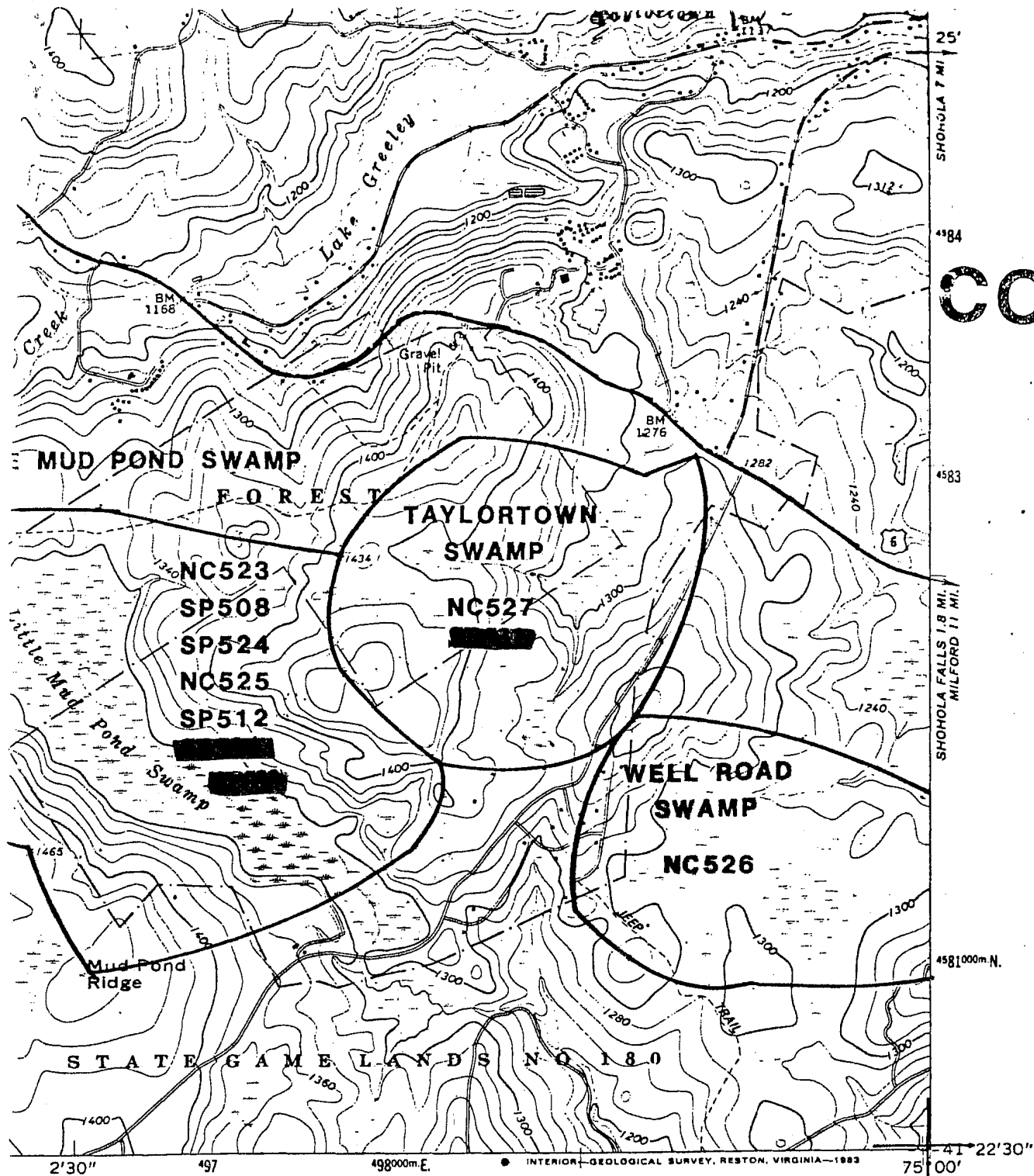


UTM GRID AND 1983 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

Geological Survey
aerial
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in this map
boundaries
applied in
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THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 2209
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON R

COPY



ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt =====
U.S. Route (shield symbol) State Route (circle symbol)

ROWLAND, PA.

41075-D1-TF-024

1966
PHOTOREVISED 1983
DMA 5966 I NE-SERIES V831

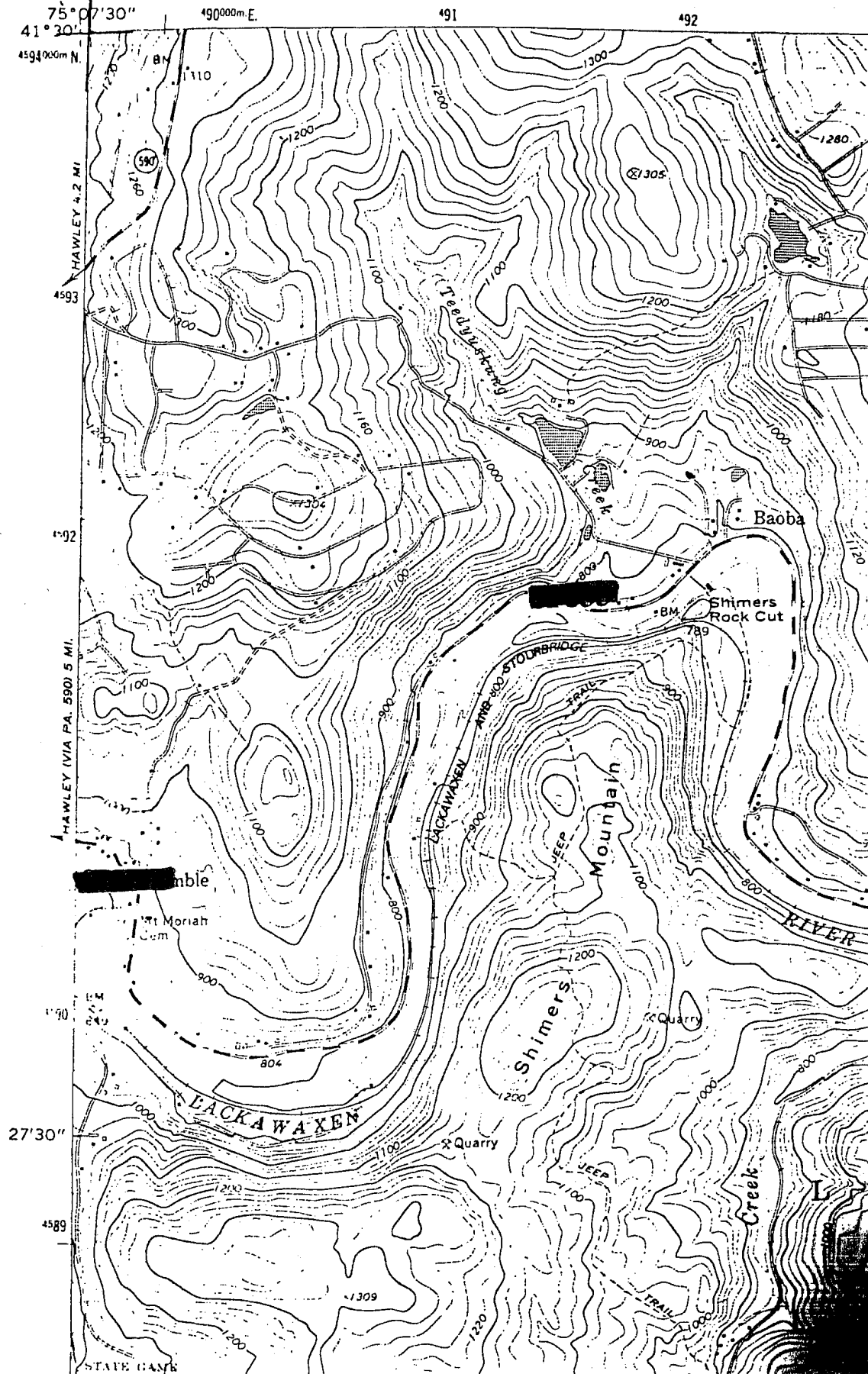
(EDGEMERE)
6006 IV SW

Rowland

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COPY

5967 11 SW
(WHITE MILLS)



COPY

USGS QUADRANGLE: Shohola (51)

<u>TNC Ranks</u>		<u>Legal Status</u>		<u>Last</u>	<u>Quality</u>
<u>Global</u>	<u>State</u>	<u>Fed.</u>	<u>State</u>	<u>Seen</u>	

NATURAL COMMUNITIES:

SPECIAL PLANTS:	509	G5	S3	N	PE	91-6-10	C
	519	G5	S2	N	TU	91-10-8	C
	525	G5	S2	N	PR	91-6-10	C
	529	G5	S3S4	N	TU	93-6-24	E

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Shohola Quadrangle:

SP529 -NEW- Above Rowland almost every rock in suitably fast water has this river plant. More than 10 thousand mature, vigorous ramets were found above 10 riffles along a 12 mile stretch of the river. It requires rapidly flowing water over a rocky substrate. See also **SP536** (Rowland Quadrangle).

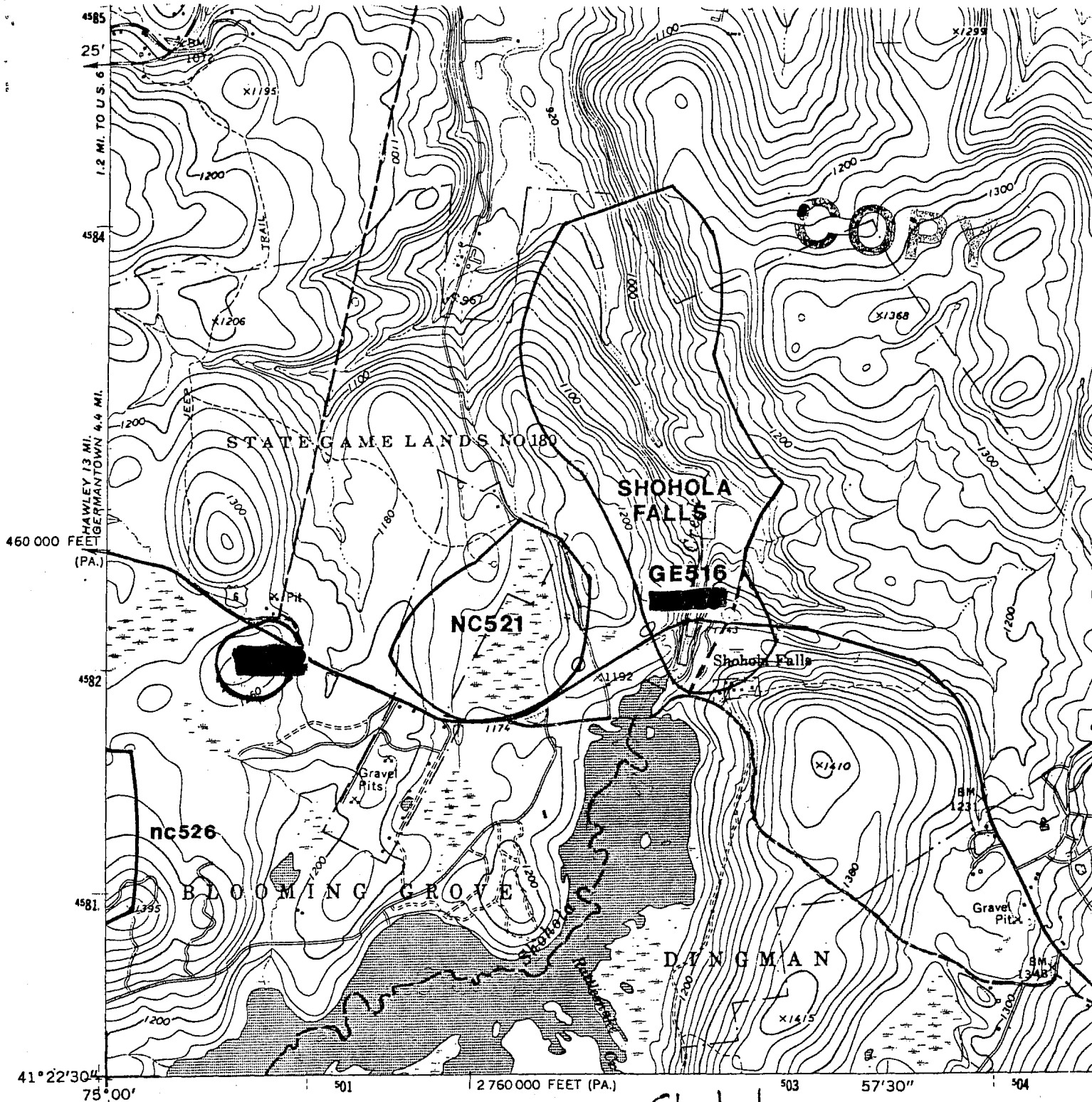
SP509 -NEW- A fair occurrence of this state-endangered grass is located on a high rock outcrop near Shohola Falls West. Approximately 40 genets with normal vigor are growing in the sandy, acidic, soil in partial light. They are associated with oaks, red maple, black gum, hairgrass, panic grass, sassafras, witch-hazel and bastard toadflax. The site, owned by the Pennsylvania Game Commission, is located at the crest of the ridge where the bedrock is close to the surface. The open road, television tower, sheds and clearings for storage are all disturbances. Succession is a threat and the area probably needs periodic disturbance for this species to maintain itself here.

SP525 -NEW- Near Shohola Falls is a small, conifer-hardwood seepage swamp surrounded by a well-drained hardwood forest. A fair occurrence of this Pennsylvania Rare sedge was found in the mosses covering the trees and rocks. Approximately 20 mature plants with normal vigor were found growing with other sedges, goldthread, Canada mayflower, sphagnum, mosses, star flower, partridgeberry, etc. The surrounding land is mostly State Game lands #180. This plant thrives in shade and the biggest disturbance would be the opening of the canopy by gypsy moths. Threats also include drought and deer. The entire swamp and the springs that feed into it are required for the species survival. A more accurate survey is needed.

SP519 -NEW- At three different locations along the eastern shore of Twin Lakes, a fair occurrence of this aquatic plant was observed in

October of 1991. (The rank may change when a more thorough search is conducted). Eighty plants with both mature and immature fruits were found on the sandy lake bottom. They are associated with purple wen-dock, ribbon leaf, pondweed and bur-reed. The area is mainly used for recreation and the summer homes around the edges of both lakes are disturbances. Other potential threats include pollution, herbicides and continued development.

COPY



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

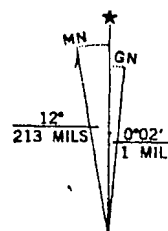
Polyconic projection. 10,000-foot grid ticks based on Pennsylvania coordinate system, north zone, and New York coordinate system, east zone 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue 1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 5 meters south and 32 meters west as shown by dashed corner ticks

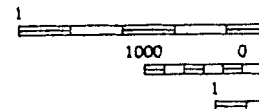
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

There may be private inholdings within the boundaries of

Shohola



UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

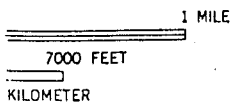
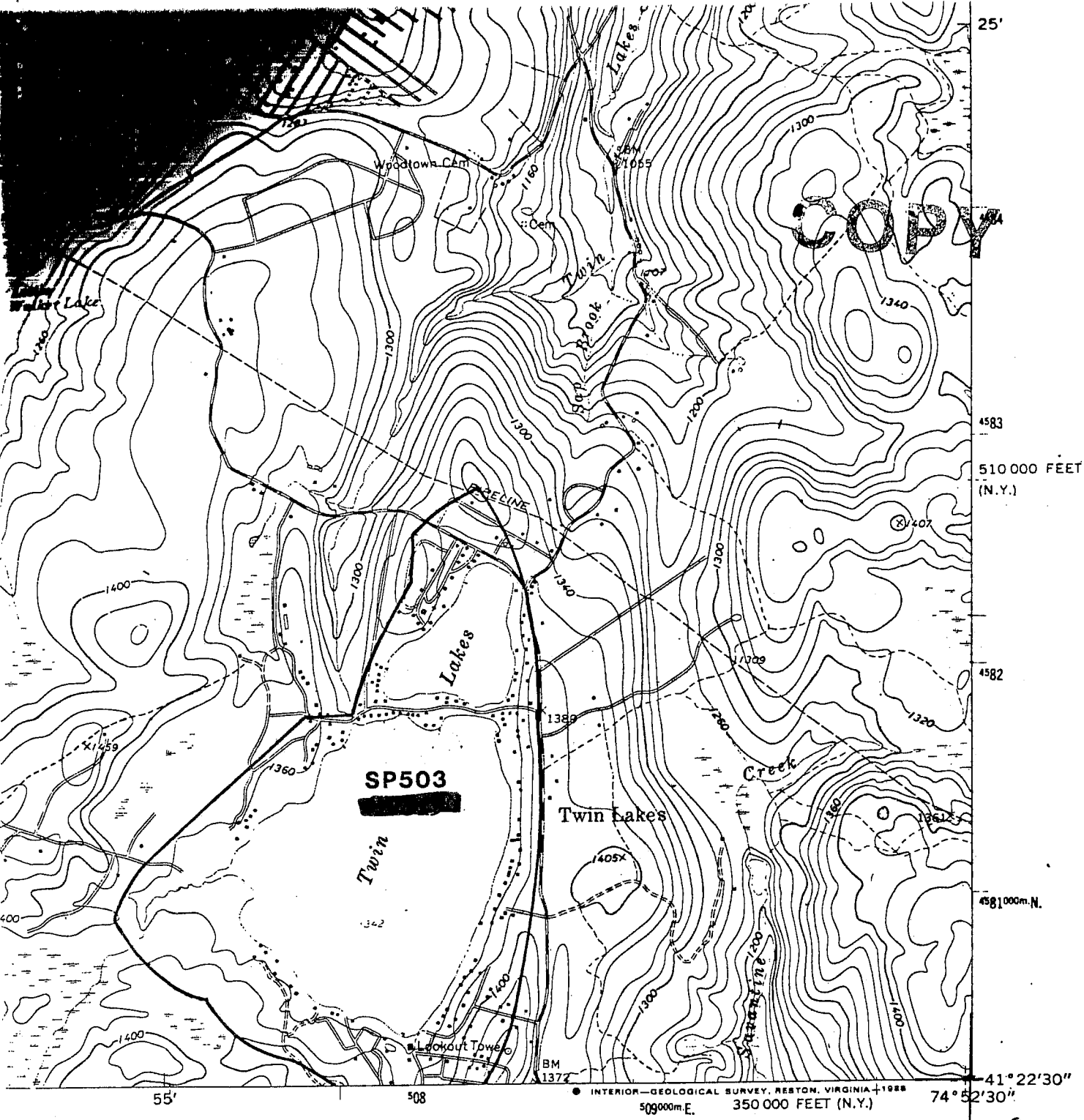


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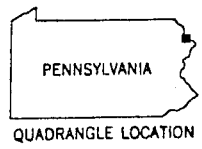
A FOLDER DESCR

(PECKS POND)
5966 (SE)



ROAD CLASSIFICATION

- Heavy-duty _____
- Medium-duty _____
- Light-duty _____
- Unimproved dirt _____
- U.S. Route (shield symbol)
- State Route (circle symbol)



SHOHOLA PA. - N. Y.

41074-D8-TF-024

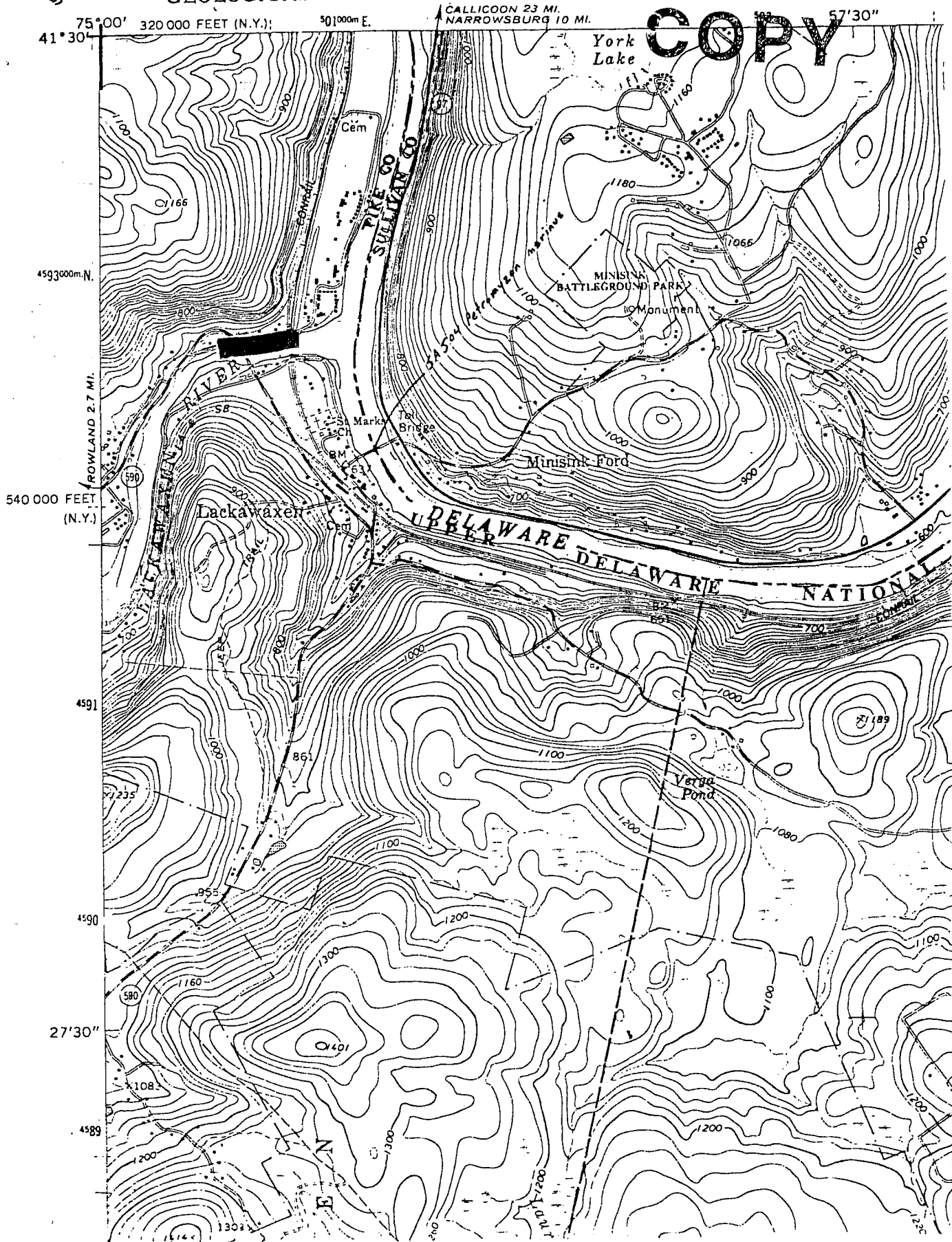
Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Pennsylvania agencies from aerial photographs taken 1981 and other sources. This information not field checked. Map edited 1983

1965
PHOTOREVISED 1983
DMA 6066 IV NW-SERIES V831

59°57'11"SE
(NARROWSBURG)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Shohola



COPY

USGS QUADRANGLE: Promised Land (68)

			<u>TNC Ranks</u>	<u>Legal Status</u>		<u>Last</u>		
			Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	524	G4		S2S3	N	N	92-9-15	B

SPECIAL PLANTS:

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Promised Land Quadrangle:

NC524 -UPDATE- This Ridgetop-Dwarf Tree Forest was revisited in September of 1992. The thickets of scrub oak are 4-8 feet tall. Pitch pine and sassafras are also scattered around the area. Huckleberry is abundant where the scrub oak growth is thin. The community contains scattered balds, a variety of mosses and chestnut and scarlet oaks in the moister sites. The quality of the site has been downgraded from A to B. There are disturbances from a road through the thickets, an old fire tower site and several campfire rings.

COPY

USGS QUADRANGLE: Pecks Pond (71)

			<u>TNC Ranks</u>		<u>Legal Status</u>	<u>Last</u>		
			Global	State	Fed.	State	Seen	Quality
NATURAL COMMUNITIES:	530	G4		S2S3	N	N	89-8-23	D
	531	G4		S2S3	N	N	89-10-5	D
SPECIAL PLANTS:	509	G5		S3	N	PR	92-7-18	B
	512	G5		S2	N	PT	92-7-19	A
	513	G5		S2	N	PE	91-7-16	C
	524	G4		S3	N	PR	92-7-18	B
	525	G5		S2	N	PR	92-7-19	AB
	535	G5		S2	N	PR	91-7-16	A
	536	G5		S3	N	TU	92-7-28	B

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Pecks Pond Quadrangle:

PECKS POND BOG was revisited in July of 1991 and 1992. The pond size has been enlarged by a dam. Private cottages are present along the western and southern edges. The east side is a 40-plus acre leatherleaf/sphagnum bog which grades into a swamp forest. The north end is shallow and contains frequent stumps and submerged logs. Pecks Pond Bog contains a number of Pennsylvania rare, threatened and endangered plants that need high quality water. Continued protection from contaminants is needed.

SP512 -UPDATE- This Pennsylvania threatened sedge was also revisited in 1992 and remains an excellent occurrence.

SP513 -NEW- At the north end of the pond, on an inundated mucky bottom, about 20 feeble immature colonies of this endangered grass were found. The plants should be checked when in flower to confirm identification. They are growing with fragrant water-lily, bur-reed, pickerel-weed and ribbonleaf pondweed.

SP525 -UPDATE- A population of this free-floating aquatic was found to be unchanged in quality or rank in 1992.

SP535 -NEW- In 1991, 1001-10,000 vigorous genets of this Pennsylvania Rare rush, that prefers wet pond margins and exposed peat, were found. This excellent occurrence on an open peat mat is associated with water-milfoil, marsh-St.-John's-wort, Canadian St.-John's-wort and creeping spike-rush.

COPY

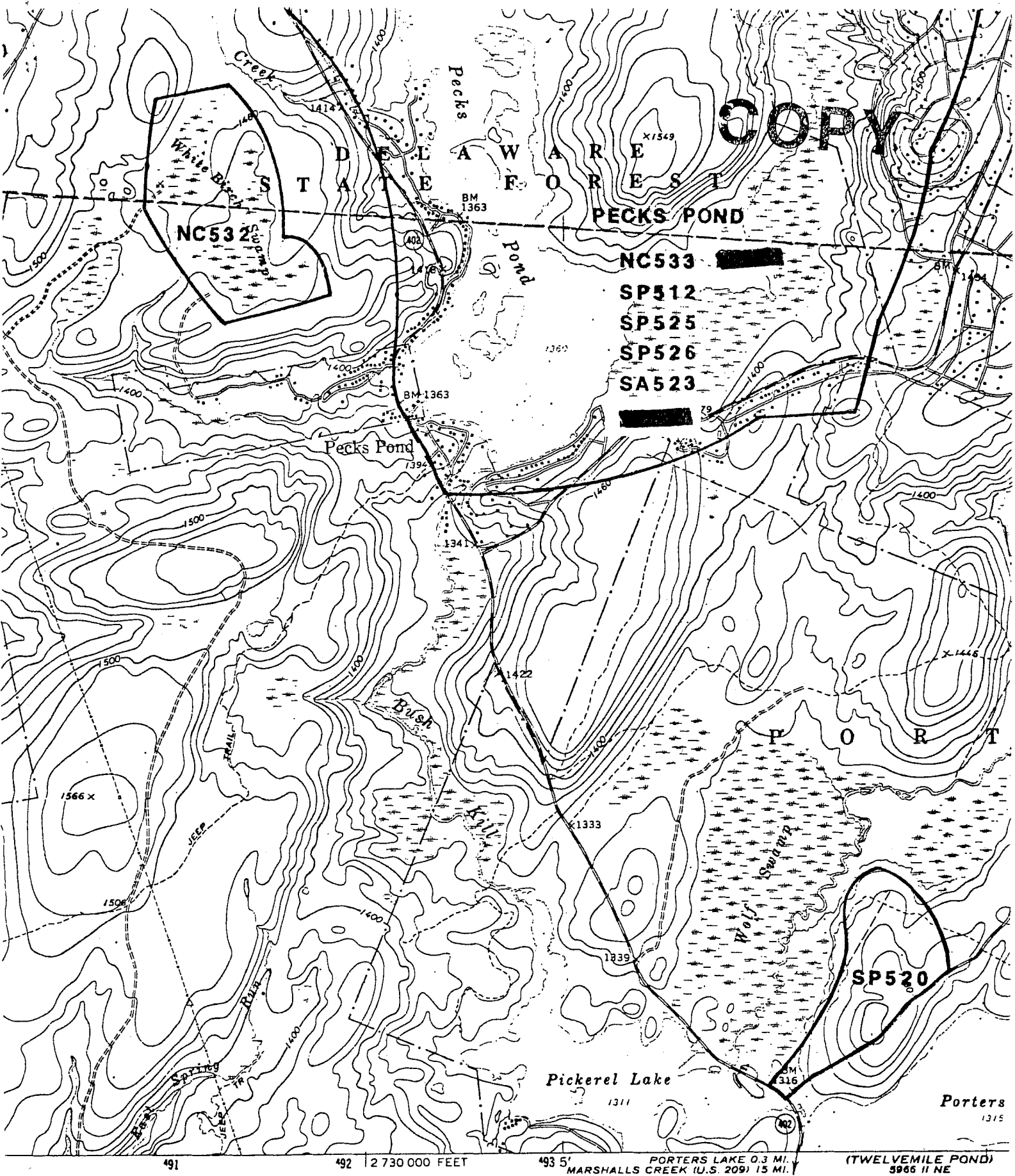
NC530 (High Knob) and **NC531** (Low Knob)- Due to revised ranking guidelines for the Ridgetop Dwarf-Tree Forest natural community type, each of these occurrences has been downgraded to a "D".

LITTLE MUD POND contains populations of three special plants observed in July of 1992. The pond continues to be used for recreation and the southeast section is disturbed by roads and houses. A bog mat dominated by leatherleaf surrounds 2/3 of the perimeter. The mat has few openings but there is a large one on the west edge of the pond. Because wetland protection and maintenance of the present water level continues to be vital, timber management should be monitored and hiking limited.

SP509 -UPDATE- Over 100 specimens of this Pennsylvania rare shrub were seen again in 1992 in the boggy thicket border of the pond. Their quality remains classified as good.

SP524 -UPDATE- A good occurrence of this species, which was first observed in 1938, remains in the boggy thicket bordering Little Mud Pond. The plants show vigorous growth and various reproductive stages. It is associated with a large variety of sphagnum bog plants: leatherleaf, cranberry, spatulate-leafed sundew, spike rush, tawny cotton-grass, sheep and bog laurel, black spruce, white beak-rush and pitcher plant.

SP536-UPDATE- A good occurrence of this sedge is found on the bog mat. This herbaceous perennial is growing with white beak-rush, brown-fruited rush, round-leafed sundew, horned bladderwort and other sedges.



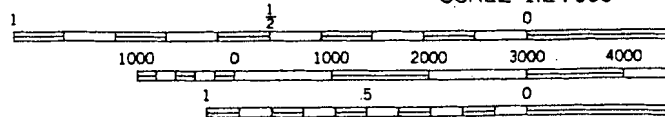
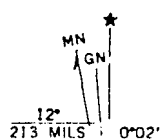
and published by the Geological Survey

OS/NOAA

mmetric methods from aerial photographs

icked 1966

10,000-foot grid ticks based on Pennsylvania



CONTOUR INTERVAL 20 FE

COPY

USGS QUADANGLE: Milford (81)

			<u>TNC Ranks</u>		<u>Legal Status</u>		<u>Last</u>	
			<u>Global</u>	<u>State</u>	<u>Fed.</u>	<u>State</u>	<u>Seen</u>	<u>Quality</u>
NATURAL COMMUNITIES:	521	G?		S3S4	N	N	93-8-3	B
SPECIAL PLANTS:	523	G5		S3	N	PR	91-6-19	C
	525	G5		S2	N	PE	93-8-3	D

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

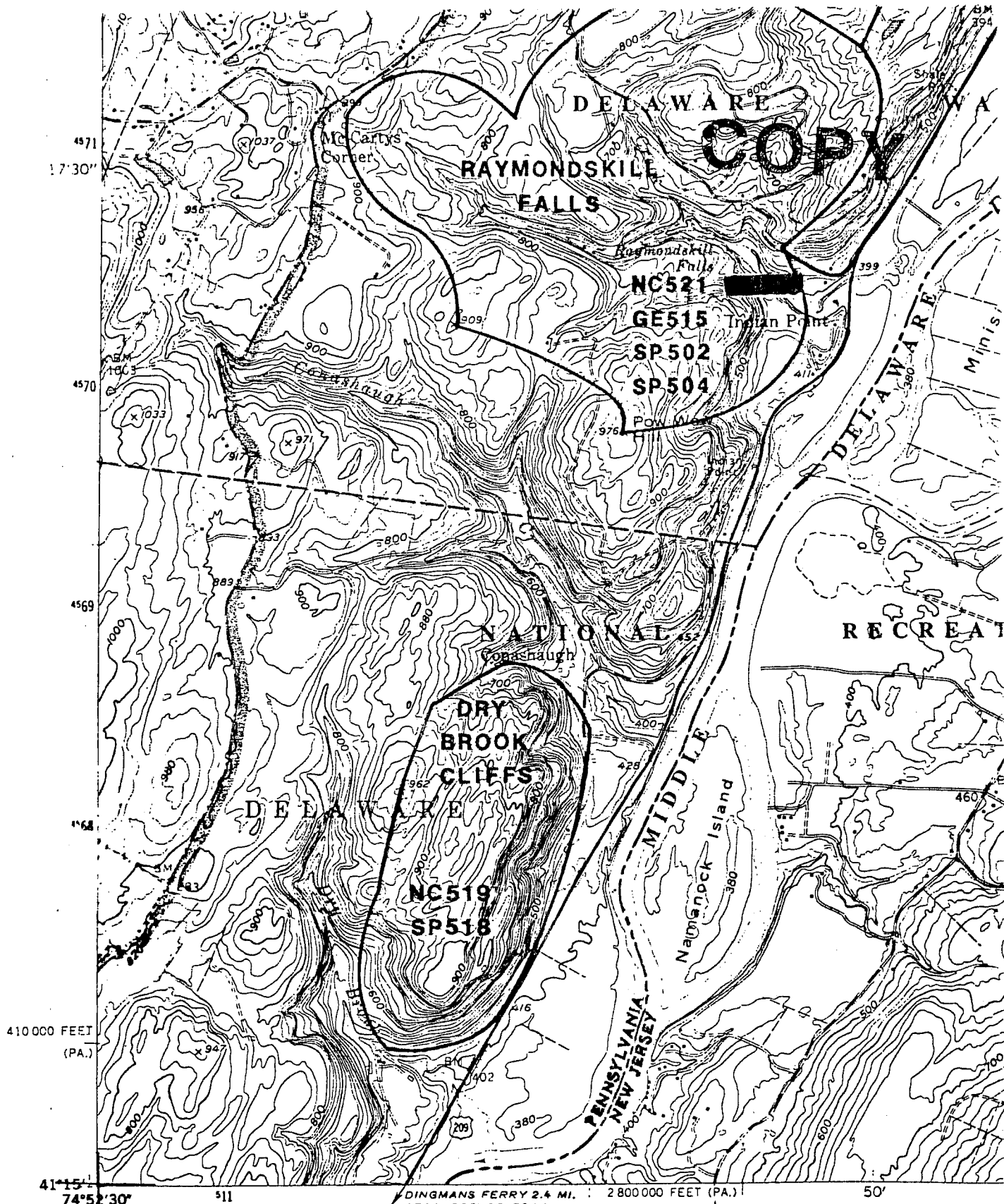
OTHER:

Milford Quadrangle:

NC521 -UPDATE- RAYMONDSKILL FALLS and plunge pool was unchanged in its quality rank following a 1993 visit. Public use continues to be carefully monitored to prevent erosion and the destruction of vegetation.

SP525 -NEW- On a south-facing, steep, wooded ravine downstream from Raymondskill Falls, one healthy plant of this Pennsylvania endangered species was found in August of 1993. Various mosses, bishop's cap, Jack-in-the-pulpit, jewelweed and coolwort are also found nearby. This area is not heavily visited, but there is erosion on adjacent slopes and hikers should remain on the trails.

SP523 -UPDATE- This Pennsylvania rare plant on the shale barren community between I-84 and US 209 appears to be thriving. The virtually undisturbed plants were observed by a NPS employee in June of 1991. Eighty percent were in flower and fruit. They are growing in association with red-cedar, scrub and chestnut oak and little bluestem.



Mapped, edited, and published by the Geological Survey

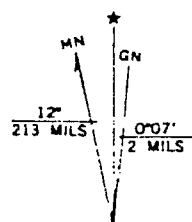
Control by USGS, NOS/NOAA, and New Jersey Geodetic Survey

Topography by photogrammetric methods from aerial photographs taken 1957. Field checked 1958

Polyconic projection. 10,000-foot grid ticks based on Pennsylvania coordinate system, north zone, and New Jersey coordinate system

1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum To place on the predicted North American Datum 1983

Milford



UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

FLAKE MASKENOZHA

COPY

USGS QUADRANGLE: Twelvemile Pond (91)

		<u>TNC Ranks</u>		<u>Legal Status</u>		<u>Last</u>	
		Global	State	Fed.	State	Seen	Quality

NATURAL COMMUNITIES:

SPECIAL PLANTS:	521	G5	S2	N	PR	91-8-15	D
	522	G5	S3	N	TU	91-8-15	D
	523	G5	S3	N	TU	91-8-15	C
	524	G5	S2	N	TU	91-8-15	B
	525	G5	S2	N	TU	91-8-15	C
	526	G5	S3	N	TU	91-8-15	B
	527	G5	S2S3	N	PR	91-7-16	C

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Twelvemile Pond:

SP527 -NEW- A fair occurrence of this state-rare emergent aquatic was observed at Lake Minisink in July of 1991. Fifty to one hundred plants of normal vigor are growing among fragrant water-lily, yellow pond lily, purple wen-dock, seven-angle pipewort and water willow.

Lake Minisink contains a bog at its north end and at its southwest corner. The surrounding area includes Delaware State Forest. Educating the owners of small vacation cottages about the harmful effects of clearing the shoreline is advisable.

In July and August of 1991, First, Second, and Third Pond were visited and found to contain a number of plants of concern. The ponds are owned by Tamiment Resort; descriptions are as follows.

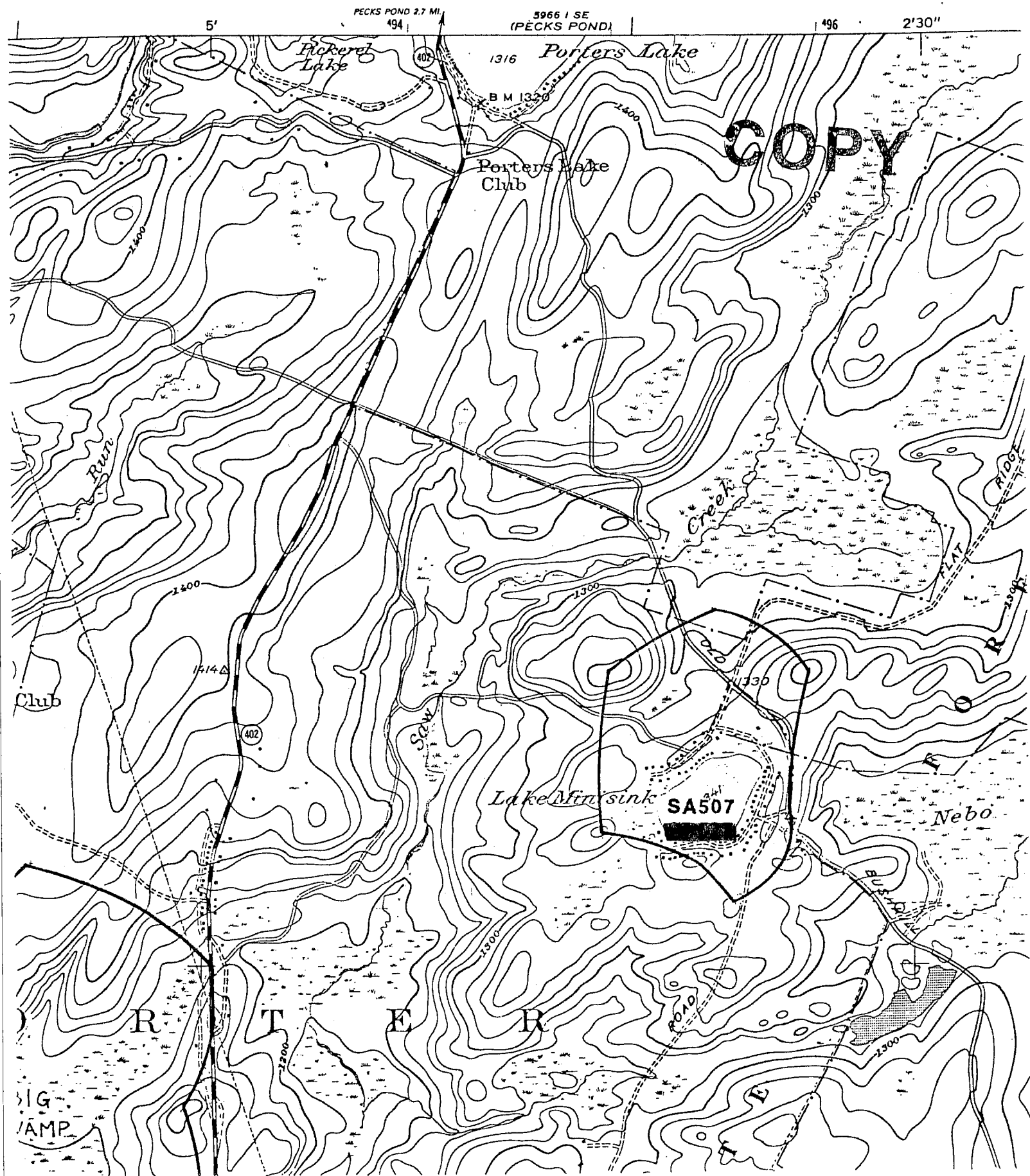
SP523, SP524 -NEW- First Pond is a glacial lake that, except for development at the north end, has an almost continuous fringe of forest. Two plants of significance were found, but the entire shoreline needs to be searched further. There are the potential threats of increased nutrient levels, increased turbidity and shoreline development. A fair occurrence of this deciduous shrub (**SP523**) that prefers moist acidic woods was found. The quality of the 35 mature plants found is marginal. They were found along the shore associated with oaks, black gum, sassafras, red maple, black birch, highbush blueberry, swamp azalea and dangleberry. A good occurrence of **SP524** was seen along a small part of the shoreline. Several hundred plants were in the sandy, silty pond bed growing with water-nymph and quillwort.

SP525, SP526 -NEW- Second Pond is a glacial lake surrounded on the north by an upland oak-heath forest and on the south by a resort complex. Disturbances to this site include development, herbicides, exotics, logging, increased nutrients and pollution of the lake, beavers and gypsy moth defoliation. About 200 mature specimens of **SP525** were found in one-inch deep water of the silty lake bottom. Nearby species include; water-nymph, pondweed, purple wen-dock, yellow pond-lily, fragrant water-lily, bur-reed, marsh-purslane, pickerel-weed and creeping spike-rush. A good occurrence of **SP526** was seen along a small section of the shoreline. About 150 mature plants were growing in the sandy, acidic, well drained soil. They are associated with oaks, black birch, American chestnut, sassafras, highbush blueberry and maleberry.

SP521, SP522 -NEW- Third Pond has been flooded by beaver activity and development from the surrounding resort. The sphagnum bog mat is still intact in a few spots, but water willow has formed a nearly solid growth around the pond. The spread of the resort complex, the construction of roads and houses and logging in the surrounding woods are threats to the site. A poor occurrence of this Pennsylvania Rare rush (**SP521**) was found. It is a small but vigorous population, growing in the wet peat with sphagnum, sedges, water-willow and leatherleaf. A poor occurrence of **SP522** is located on a well-drained, acidic sandstone slope. Associated species are: highbush blueberry, greenbrier, red maple, spruce, oak, dangleberry, witch hazel and black birch.

COPY

Twelvemile Pond



USGS QUADRANGLE MAP: Lake Maskenozha (93)

	<u>TNC Ranks</u>		<u>Legal Status</u>		Last Seen	Quality
	Global	State	Fed.	State		
NATURAL COMMUNITIES:	522	G?	S3S4	N	N	93-8-3 B
SPECIAL PLANTS:	505	G5	S3	N	PR	91-10-16 A
	509	G4	S1	N	PE	93-8-3 CD
	520	G5	S2	N	PE	93-8-3 D
	521	G4	S1	N	PE	91-7-15 B

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

COPY

Lake Maskenozha Quadrangle:

NC522 -UPDATE- DINGMAN'S FALLS was revisited in August of 1993. The site continues to be nearly undisturbed. It's quality and rank are unchanged.

SP509 -UPDATE- Although previous sitings were not relocated, a new clump of this state endangered clubmoss was found in 1993 growing on a flat rock outcrop adjacent to Dingman's Falls. The specimen was shown to the DWGNRA ranger. The site needs protection from trampling and picking by park visitors.

SP520 -NEW- In 1991 and again in 1993, two vigorous specimens of this Pennsylvania endangered herbaceous perennial were found at Dingman's Falls. This vulnerable habitat of a hemlock-hardwood forest, cool, moist ravines and damp cliffs also contains wood nettle, coolwort, golden saxifrage, ferns, violets, rhododendron, birch and some exotics. Visitors to the falls have caused some erosion, graffiti and litter. Visitor education should emphasize the importance of staying on trails and not picking flowers.

SP505 -UPDATE- BUCK BAR ISLAND was revisited in October of 1991 and the occurrence of this state rare deciduous shrub remains excellent. Tens to hundreds were growing in clumps on the north end of the island in the sand and gravel substrate. They are interspersed with grasses and a willow-sycamore-ash community. This DWGNRA site is undisturbed except for natural flooding and a purple loosetrife invasion on the shoreline.

SP521 -UPDATE- LITTLE BUSHKILL SWAMP continues to have a good occurrence of this state endangered sedge. In August of 1991, several dozen plants with immature fruit were found. This swamp with young

spruce and a heavy shrub layer, is downslope from a dry oak forest. This part of the wetland was less affected by a high water rise many years ago. Although openings need to be maintained, increasing traffic is detrimental to the swamp.

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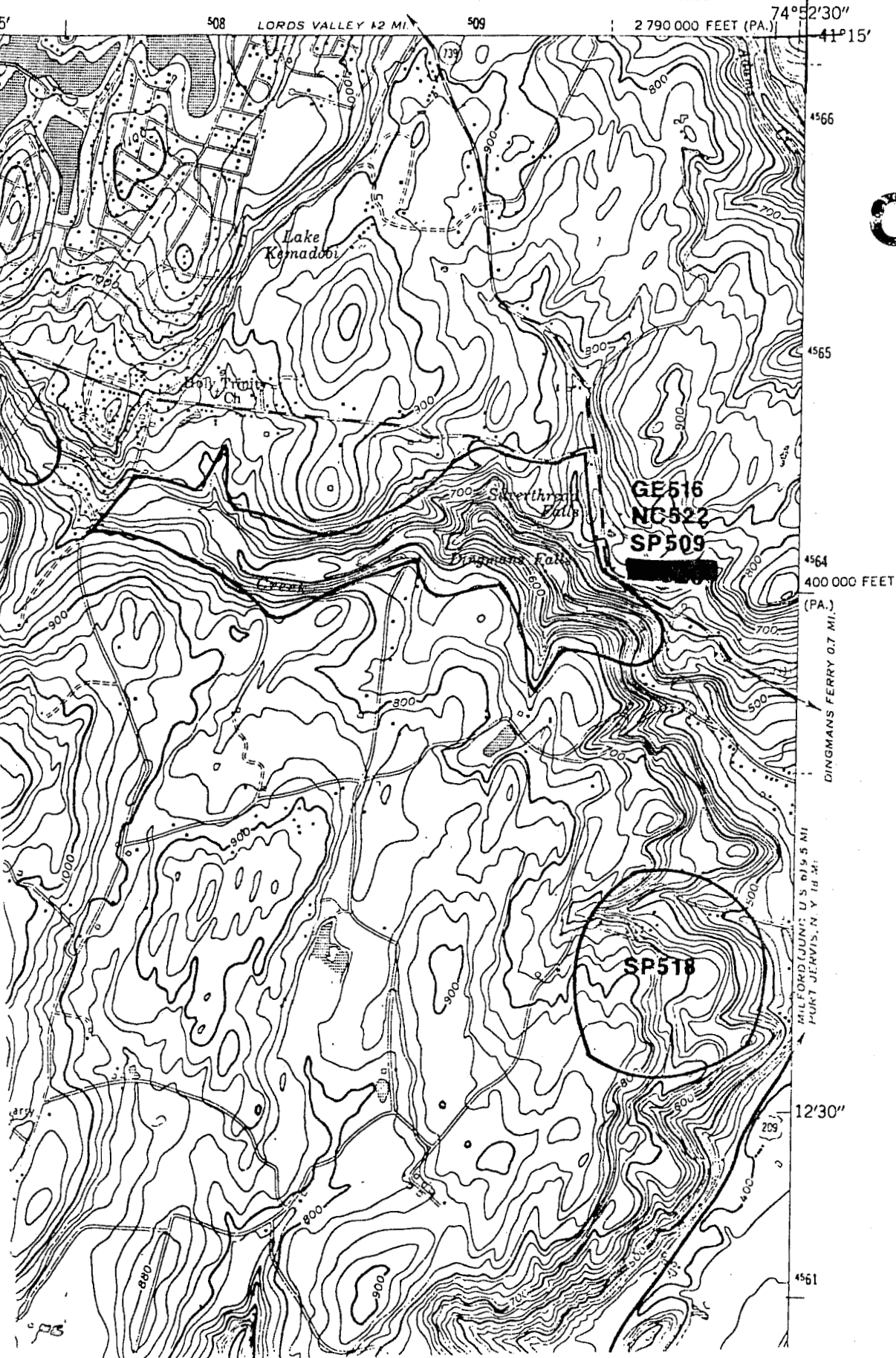
LAKE MASKENOZHA QUADRANGLE

PENNSYLVANIA—NEW JERSEY

7.5 MINUTE SERIES (TOPOGRAPHIC)

NW/4 DINGMANS FERRY 15' QUADRANGLE

6066 IV SE
(MILFORD)





USGS QUADRANGLE MAP: Bushkill (99)

			<u>TNC Ranks</u>		<u>Legal Status</u>		<u>Last Seen</u>	<u>Quality</u>
			<u>Global</u>	<u>State</u>	<u>Fed.</u>	<u>State</u>		
NATURAL COMMUNITIES:	506	G?		S2	N	N	93-7-8	C
	535	G?		S3S4	N	N	91-7-15	C
SPECIAL PLANTS:	518	G5		S3	N	PR	93-7-8	B
	541	G5		S3	N	TU	93-7-8	B

SPECIAL ANIMALS:

GEOLOGICAL FEATURES:

OTHER:

Bushkill Quadrangle:

NC506 -UPDATE- SHOEMAKERS BARRENS is an Acidic Rocky Summit of approximately 10 acres, with frequent, small rock outcrops in the canopy. Common species in the area include scrub oak, shield ferns, hair grass, poverty grass and spring beauty. Plants growing on the gas line crossing the natural community receive heavy deer browse. In August of 1993, these dry shaley cliffs were revisited and the quality of the community downgraded to C. This scenic area is adjacent to the Delaware Water Gap National Recreation Area and could be threatened by development.

SP518 -UPDATE- At Shoemakers Barrens, one large and several small patches of this Pennsylvania rare herbaceous perennial were revisited. The plants are in good condition producing both flowers and fruits.

NC535 -UPDATE- BUSHKILL FALLS was revisited in July of 1991. This 100-foot deep, scenic gorge, densely shaded by hemlock and rhododendron, remains intact. Mosses, liverworts, and ferns are thriving in enormous variety. The current is rapid and water is highly oxygenated. Past logging is evident in areas up to the gorge edge, but the boardwalks and fences are preventing access to the fragile micro-habitats.

SP541 -NEW- In July of 1993, a good occurrence of this uncommon heath family species was found, well-dispersed, in the acidic peatland of Sugar Mountain Swamp. The shrub shows normal growth and reproduction. This swamp is dominated by shrubs and saplings. The nearby bog and swamp species are: swamp-azalea, highbush blueberry, red maple, black spruce and the American larch. A few houses on the perimeter of the swamp are a disturbance, but the swamp itself shows no unnatural disturbances, no evident threats, or special management needs.

COPY

BUSHKILL QUADRANGLE

PENNSYLVANIA - NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)

6066
(LAKE M)

496 2'30" 497 2 750 000 FEET (PA.) 499 75 00' 41°07'30"

360 000 FEET (PA.)

4551

DINGMANS FERRY 11 MI.

4549

4548

5'

4547

