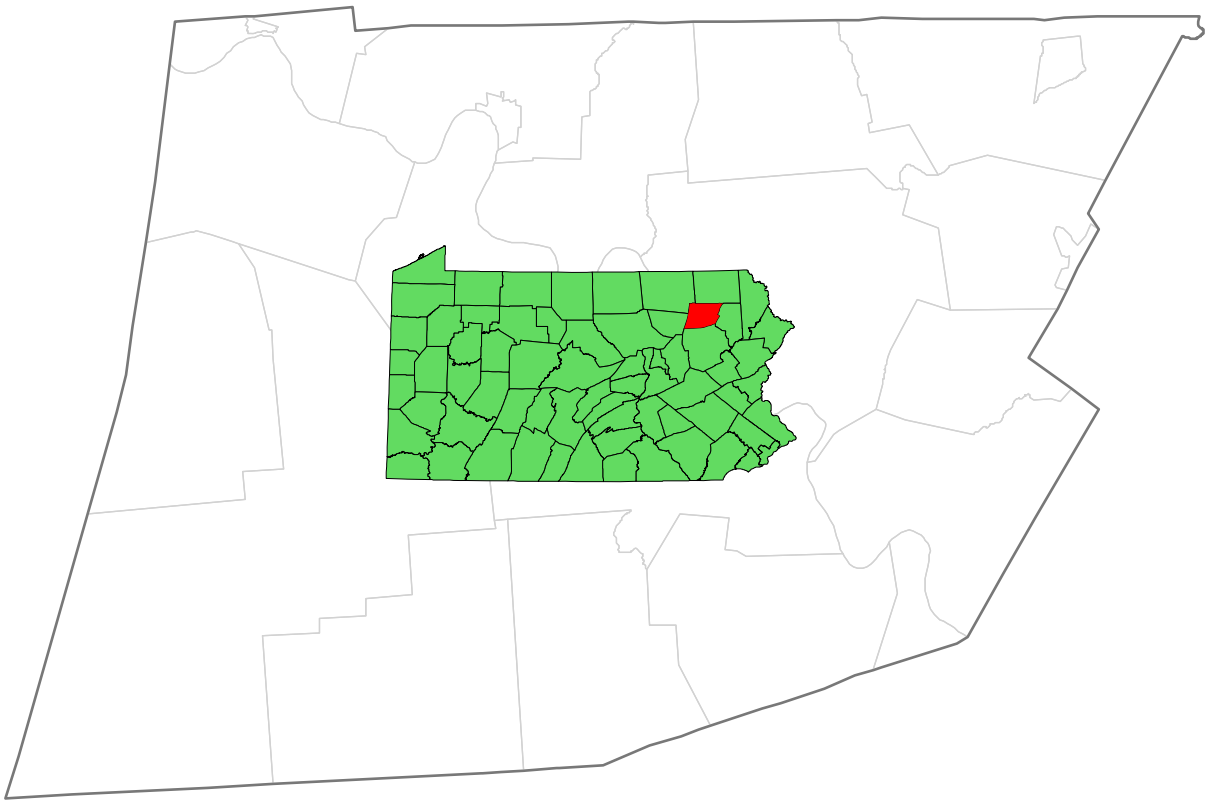
A Natural Areas Inventory of Wyoming County, Pennsylvania



Document includes the original 1995 full report
followed by the 2001 update addendum.

This Natural Areas Inventory was conducted by

Pennsylvania Natural Heritage Program
208 Airport Drive
Middletown, Pennsylvania 17057

For

The Wyoming County Planning Commission
1 Courthouse Square
Tunkhannock, PA 18657

A NATURAL AREAS INVENTORY OF WYOMING COUNTY, PENNSYLVANIA

1995

A NATURAL AREAS INVENTORY OF WYOMING COUNTY, PENNSYLVANIA

1995

Anthony F. Davis, Ecologist
Julie A. Lundgren, Assistant Ecologist
Barbara Barton, Zoologist
Jill R. Belfonti, Information Manager
Jenni L. Farber, Asst. Information Manager
John R. Kunsman, Botanist
Anthony M. Wilkinson, Coordinator/Zoologist

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

for

The Wyoming County Planning Commission
1 Courthouse Square
Tunkhannock, PA 18657

(Funded, in part, by a grant from the Department of Community Affairs, Bureau of Recreation and Conservation: RIRA-TAG-8-84)

View of the Susquehanna River from Falls Cliff near Falls. The Susquehanna River is a very significant natural feature in Wyoming County. Photo: Pennsylvania Science Office of The Nature Conservancy.

PREFACE

The Wyoming County Natural Areas Inventory is a document compiled and written by the Pennsylvania Science Office of The Nature Conservancy. It contains information on the locations of rare, threatened, and endangered species and of the highest quality natural areas in the county. Each site description is accompanied by general management recommendations that would help to ensure the protection and continued existence of these rare plants, animals and natural communities. The recommendations are based on the biological needs of these elements (species and communities). The recommendations are strictly those of The Nature Conservancy and do not necessarily reflect the policies of the state or the policies of the county or townships for which the report was prepared.

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

ACKNOWLEDGMENTS

This study was developed, in part, with financial assistance through the Recreational Improvement and Rehabilitation Act Grant Program (RIRA-TAG-8-84) as administered by the Pennsylvania Department of Community Affairs, Bureau of Recreation and Conservation. Additional funding came from a Community Development Block Grant, the Audubon Society and anonymous donors. The project was initiated by the Wyoming County Commissioners.

The Pennsylvania Science Office (PSO) of The Nature Conservancy thanks the members of the agencies noted above and all the individuals who have contributed time and expertise to the study. We especially thank William W. Reid, Wyoming County Commissioner, for his time and effort. We also thank the members of the NAI Committee for their suggestions and review of the document. Special thanks to the DER Bureau of Forestry for its review, Clark Shiffer for odonate surveys; Doug Gross, Skip Conant and Commissioner Reid for breeding bird information; Eugene Weiner, PA Game Commission, for his help with surveys on game lands; Hetty Baiz for her work in getting the project off the ground and to all the landowners who granted us permission to survey sites on their lands. Brandon Rozell, Betsy Ray and Heather Glennon, ecology interns, provided much of the graphics work.

The species information utilized in the inventory came from many sources as well as our own field surveys. Biologists from institutions and agencies such as the Academy of Natural Sciences in Philadelphia, the Morris Arboretum of the University of Pennsylvania, the Department of Environmental Resources Bureau of Forestry, the Pennsylvania Game Commission and the Pennsylvania Fish and Boat Commission were among the contributors. In addition, innumerable private citizens contributed valuable information that was incorporated into the study. The task of inventorying the natural heritage of Wyoming County would have been far more difficult without this tremendous pool of information gathered by many people over many years.

Copies of this document may be obtained from:
Wyoming County Planning Commission
1 Courthouse Square
Tunkhannock, PA 18657

TABLE OF CONTENTS

FIGURES AND TABLES

GLOSSARY

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

ATV - all-terrain-vehicle.

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

canopy - the layer formed by the tallest vegetation.

circumneutral - pH around seven.

colluvium - soil material, rock fragments, or both, moved by creep, slide or local water flow and deposited at the base of steep slopes.

D.E.R. - Pennsylvania Department of Environmental Resources

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

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

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

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

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

Exceptional Value Waters (EV) - D.E.R. designation for a stream or watershed which constitutes an outstanding national, State, regional or local resource, such as waters of national, State or county parks or forests; or waters which are used as a source of unfiltered potable water supply, or waters of wildlife refuges or State game lands, and other waters of substantial recreational or ecological significance. For purposes of this study, EV streams are mapped as High Gradient Clearwater Creek natural communities (see Appendix V for community description). For more detailed information about EV stream designations, the reader is referred to the Special Protection Waters Implementation Handbook (Shertzer 1992).

exotic - non-native; used to describe plant or animal species that were introduced by humans; examples include Japanese honeysuckle and crown vetch; exotics present a problem because they may outcompete native species.

forb - non-grass herbaceous plant such as goldenrod.

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

ground cover - low shrubs, herbs and moss cover that are found at or close to the ground surface.

High-Quality Coldwater Fisheries (HQ-CWF) - D.E.R. designation for a stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection. For more detailed information about HQ-CWF stream designations, the reader is referred to the Special Protection Waters Implementation Handbook (Shertzer 1992).

High-Quality Trout-Stocked Fisheries (HQ-TSF) - D.E.R. designation for a stream or watershed which has excellent quality waters and environmental or other features that require special water quality protection. The stream is stocked with trout and does not support a sustainable reproducing population. For more detailed information about HQ-TSF stream designations, the reader is referred to the Special Protection Waters Implementation Handbook (Shertzer 1992).

hydric - wet, saturated to the surface or flooded for all or most of the year or growing season.

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

mesic - moist, not saturated.

natural area - as used in this study, a site with either an exemplary natural community or species of special concern; it is not to be confused with the State Forest Natural Areas which are specific management units designated by D.E.R. Bureau of Forestry.

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

odonates - dragonflies and damselflies; members of the taxonomic order Odonata.

PAFBC - Pennsylvania Fish & Boat Commission

Potential Natural Area - area that may have desirable environmental characteristics to support rare species or exemplary natural communities, but needs a field survey to confirm; a preliminary

category given to sites prior to field survey.

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

PSO - Pennsylvania Science Office of The Nature Conservancy

raptor - birds of prey including hawks, falcons, eagles, and owls.

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

SGL - State Game Lands (managed by the PA Game Commission)

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

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

State Forest Natural Area (SFNA) - Bureau of Forestry designation for an area of unique scenic, historic, geologic or ecological value which will be maintained in a natural condition, usually without direct human intervention.

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

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

taxa - genus, species, subspecies and varieties of plants or animals.

till - a jumbled mix of glacially-derived material of varying particle size (boulders, sand, silt, clay) laid down beneath the glacier (compact till), dropped by melting ice (ablation till), or pushed before or to the side (end or side moraine).

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

xeric - extremely dry or droughty.

INTRODUCTION

Wyoming County, an area of almost 400 square miles, is a rural county located in northeastern Pennsylvania. The Susquehanna River flows through the middle of the county from northwest to southeast and most development is concentrated within its corridor. The southwestern plateau is forested and mostly within state game lands; much of the rest of the county is given over to a mix of agriculture, forest and small villages. In 1990, the population of the county was just over 28,000 (1990 Census) and appears to be growing. Both Scranton and Wilkes-Barre are within commuting distances of much of the county. Wyoming County is also approximately 150 miles from New York City and Philadelphia, allowing easy access for vacationers and tourists.

The Endless Mountains, the lakes and creeks, and the pastoral scenery attract many people to the county; these natural qualities are important to both the economic and social well-being of county residents. Tourism is an important and growing industry in the county. Second home developments exist around Lake Carey and Lake Winola while hunting and fishing camps are found primarily in the southwestern corner. The rugged hills and forests of the southwest do not lend themselves to development or agriculture but they attract hunters, hikers and winter sports enthusiasts. The many trout streams that drain this region attract fishermen while the forests of this region provide timber for the wood products industry. The Susquehanna River is a major recreational and scenic resource. Agriculture, although declining in acres, is still an important economic component of the county. If the county is to further its goals for economic development, it must also be able to continue to attract tourist dollars and provide a natural environment that will attract tourists and encourage new people to settle and work in the county.

Wise planning can help maintain a natural and scenic environment along with the plants and animals associated with that environment. A balance between growth and conservation of natural resources can be achieved by guiding development and industry away from the most environmentally sensitive areas. This can be done by documenting the existing natural features on the landscape and providing information about sensitive areas to county and municipal governments, development interests and the public. Information on the location and importance of these sites can help to ensure their conservation and reduce the risks of conflict over land use in the future.

This report presents Wyoming County's known outstanding natural heritage features—geologic, floral, and faunal—that deserve protection for enjoyment by future generations. The Natural Areas Inventory of Wyoming County provides maps of the best natural communities (habitats) and all the known locations of animal and

plant species of special concern (endangered, threatened, or rare) in the county*. A written description and a summary table of the sites, including quality, degree of rarity, and last-observed date, accompany each map. The inventory includes the locations of some areas that are significant on a county-wide scale but that cannot be deemed exemplary natural communities because of past disturbances. These sites are important since they provide valuable wildlife habitat, offer a diversity of plant species and habitats, and/or are relatively rare in the county. An overall summary of the highest quality sites provides suggestions for maintaining these important sites as natural areas. The information and maps presented in this report provide a useful guide for planning development and parks, for conserving natural areas, and for developing priorities for preservation of the most vulnerable natural areas.

The Natural Areas Inventory of Wyoming County will be provided to each township and municipality through the Wyoming County Planning Commission. The inventory is one tool that will aid in the implementation of County and municipal comprehensive plans. Landowners will also find this inventory useful in the stewardship of their property. They can use this report to explore possible alternatives that will provide for their needs and still protect the species and habitats that occur on their land.

WYOMING COUNTY OVERVIEW

Climate, geology, landform, hydrology, glaciation and soils have contributed to the development of the plant communities (forests, wetlands, barrens, etc.) in the county. Both natural and human disturbances have played an important role in the development and alteration of those plant communities and have caused the extirpation of some species and the introduction of others. These factors combined provide the framework for locating and identifying exemplary natural communities and species of special concern within the county. The following sections on the physiography and geology, soils and vegetation of Wyoming County provide an overview of the county, serve as an introduction to the inventory methodology, and provide the background for the findings presented in this report.

Physiography and Geology

Physiographic Provinces are classified by the characteristic landscapes and distinctive geologic formations that comprise each province (Berg et al [1989] is the source of information on the

* Codes are used to identify these features on the maps. Rare plants and animals are subject to unauthorized collection and are not identified in the text in order to provide some measure of protection.

physiographic provinces of Pennsylvania). Physiography influences local climate while both physiography and bedrock and glacial geology influence soil formation (see Soils) and hydrology. Therefore, both are important to the patterns of plant communities and the organisms that dwell within the communities (see Vegetation). Certain plant communities and species might be expected to occur within some provinces and not in others due to climate, soils and wetness. Geologic information has come from a variety of sources including: Geyer and Bolles (1979, 1987), Eckenrode (1982), *The Atlas of Pennsylvania* (1989) and the *Geologic Map of Pennsylvania* (Berg et al. 1980).

Wyoming County is contained within two sections of the Appalachian Plateau Physiographic Province—the Glaciated Low Plateaus Section and the Allegheny High Plateaus Section (the Valley and Ridge Province barely brushes the county at the southeastern corner). The Glaciated Low Plateaus Section includes most of the county and is an area underlain predominantly by grayish red to brown sandstone, siltstone and shale bedrock of the Catskill Formation. Small areas of gray shale and sandstone of the Chemung Formation occur in the northwestern part of the county. Much of this landscape is characterized as broad rolling hills with fairly steep hillsides leading to narrow valleys.

The Allegheny High Plateaus Section occurs in the southwestern corner. Elevations over 2300 feet, the highest in the county, are found here. The landscape is underlain by "islands" of Mauch Chunk shale surrounded by very resistant sandstone and conglomerate of the Pocono Formation (also called the Burgoon Formation in central and western PA). Some anthracite coal has been extracted from the shale areas giving rise to local names such as "Coalbed Swamp" while the conglomerate bedrock is responsible for the conspicuous outcrops of Bartlett Mountain and Flat Top, locally known as "White Rocks". This plateau is mostly forested and has a high concentration of wetlands. Narrow, steep-sided ravines with cold rocky creeks drain the plateau and eventually feed into the Susquehanna River.

Glaciers have modified the landscape throughout the county. Deposits of rock, sand, clay and silt left directly by the glacier are called unstratified deposits or glacial till. Some of these deposits are as much as 300 feet thick. As a result of the glaciers, many of the soils that developed on till are too stony or wet for cultivation. Many wetlands have formed in the depressions that were the result of glacial scouring and the deposition of ice blocks (kettleholes), as well as glacial deposits that blocked drainage channels and altered stream flow. Stratified sands and gravels deposited by glacial meltwaters are located along many of the major rivers and creeks. The area known as Jayne Bend on the Susquehanna River is a glacial river terrace. Sand and gravel mining operations occur on some of the larger stratified deposits.

Soils

The distribution of soils in Wyoming County reflects both the topography, bedrock geology and the glacial history of the landscape. In turn, the pattern of land use across the landscape is greatly influenced by the types of soils in an area and their suitability for various activities. Much of the area has been maintained in woodland or as dairy and cattle farms because of the rocky soil and poor soil drainage. In addition, certain species and plant communities are closely tied to soil type and information on soils can provide an important lead for locating some of the rare species and communities.

Six soil associations are recognized in the county with each containing one or several major soil types (series) and some minor soils series as well. The following descriptions of the soil associations in Wyoming County are based on Eckenrode (1982) and the reader is directed to that publication for more detailed information. Information on associated vegetation is based on field surveys during the Natural Areas Inventory project.

Wellsboro-Morris-Oquaga association - This is the major soil type in the county, primarily made up of Wellsboro soils. It is found on the broad rolling uplands where soils formed in glacial till derived from sandstone and shale. The soils are well suited to pastures and crops, primarily as dairy farms but today many of the farms have disappeared and development has increased. Northern hardwoods with sugar maple, beech, white ash, red oak and black cherry and hemlock appear to be fairly typical of mesic to slightly drier sites.

Mardin-Lordstown association - This occurs in a band along the northern part of the county through Meshoppen and north of Lake Carey east to the Lackawanna County line. A smaller area also occurs on the Lackawanna County line east of Lake Winola. This type is also formed in glacial till and is suitable for dairy or truck farms but has also seen increased building activities. Northern hardwoods such as sugar maple, beech and birch and hemlock are typical canopy species where forest exists on rolling upland; oaks predominate on steep south-facing slopes and hemlock is dominant on steep north-facing slopes.

Oquaga-Lackawanna-Arnot association - This association is found on the highlands and mountainsides in the western part of the county. This includes a minor association of Dystrochepts and rock outcrops on steep slopes. Some of the limiting factors for land use and vegetation growth are the steep slopes, shallow soils and stoniness. The area currently is used for timber production, recreation (on private and state lands) and seasonal camps. On steep south-facing slopes, oaks tend to dominate while hemlocks dominate the steep north-facing slopes.

Mardin-Bath-Volusia association - This is a very localized type found to the south and to the east of Noxen. It was formed in glacial till.

Wyoming-Pope association - This is limited to the terraces and floodplains along the Susquhanna River and its major tributaries. It does not extend to the upper reaches of these tributaries. Most of this area has been used as fields or pasture and for industry—sand and gravel extraction primarily. Areas that have received less human disturbance are characterized by floodplain species such as sycamore, silver maple and river birch. The river islands and shore at Tunkhannock provide a good example of the potential vegetation on this soil type.

Rock outcrop-Arnot-Dystrochrept association - Only a small area of this type occurs on the mountaintops and mountainsides of the western part of the county in the Bartlett Mountain-Flat Top area. This area, known locally as "White Rocks", is characterized by open outcrops of light gray-white conglomerate rock and green-gray sandstone. The summits tend to be sparsely vegetated, set within a complex of woodland and scrub habitats; shallow or absent soils, stoniness, and steep slopes are limiting factors here. Red spruce, mountain ash, lowbush blueberry and black huckleberry are scattered in pockets where some soil develops. Land use in this are is primarily recreation (on private and state lands). The Arnot types have also been used as a source of flagstone.

Vegetation

The vegetation of Wyoming County reflects the environmental conditions (geology, topography, soils, climate) and disturbance history, both natural and anthropogenic. On a broad scale of vegetation patterns, Wyoming County is located within two major forest types—Appalachian Oak Forest and Northern Hardwood Forest (Kuchler 1964, Bailey 1980). A broad band of Appalachian Oak Forest, somewhat analogous to Braun's (1950) Oak-Chestnut Forest, follows the Susquehanna River valley. The river, at elevations between 660 feet where it enters the county in the northwest and 580 feet as it leaves the county in the southeast, is much lower than the surrounding hills and mountains. Oaks predominate where the land has not been cleared on the well drained soils of the sand and gravel terraces and on the steep, south-facing slopes above the river. Black, red, white and chestnut oaks may be dominants or codominants depending on soil moisture and fertility. Other tree species include red maple, black cherry, gray and black birches, white pine, pitch pine, juniper and aspens. Shrubs include species of blueberries, huckleberries and other dry forest species.

Northern Hardwood Forest is found in two large blocks separated by Appalachian Oak Forest. The forest in the northeastern portion of the county is highly fragmented by agriculture. The block in the

southwestern corner on the Allegheny High Plateaus Section is largely intact. Sugar maple, red maple, yellow birch, hemlock and white pine are common canopy species along with red spruce in some places. This area is second growth forest and is dotted with wetlands and uplands dominated by boreal conifer species such as red spruce. A Spruce Rocky Summit natural community at White Rocks is one of the outstanding features of this area. Regeneration of trees after logging has been slow in some areas because of poor soils. Red maple, aspen and gray birch are common where regeneration has been poor.

Wetlands are found throughout the county but are concentrated on the Allegheny High Plateaus. Many of these are shallow basins where peat has accumulated over time. Red spruce appears to be the natural climax species for these wetlands but many of the wetlands are now open shrub swamps dominated by leatherleaf, highbush blueberry, Sphagnum mosses and sedges. The cause of the shift to more open wetlands is the result of fire, logging or higher water levels due to beaver and other causes. The best and most stable of these are considered to be Acidic Shrub Swamp natural communities. Red spruce may be found along the edges of these swamps or as the dominant species in the Boreal Conifer Swamp communities. These spruce swamps have not received recent disturbance and some have recovered to the point to be considered as high quality natural communities. Both wetland community types are important in Wyoming County as habitat for rare species. Wetlands that have little or no peat development are more mineral-rich and tend to be dominated by eastern hemlock, red maple and yellow birch. Some of these also are important habitat for rare species but most have been altered by beaver. Most lakes (deepwater habitats) in the county have been enlarged by damming or are the result of flooding stream valleys. However, the ones that are relatively natural are habitat for many aquatic organisms, several of which are rare.

Disturbance

The nature, scale, and frequency of disturbance are influential factors in the evolution and appearance of natural communities. Disturbance has played a major role in forming the current vegetation of Wyoming County. Disturbance can be beneficial or destructive to the development and persistence of natural communities. Fires may have helped to establish and maintain some of the important plant communities that we see on the landscape today. Many Acidic Shrub Swamp communities show evidence of past fire and these swamp communities are important habitat for a variety of rare species. In fact, the introduction of controlled disturbance may be necessary in some cases to maintain natural systems.

The beaver is part of the natural system and their alterations to the landscape are important for maintaining a variety of open upland and wetland habitats. The species that require high light

regimes depend on open habitats created by beaver and may drop out of an area without beaver altering the natural vegetation. However, beaver are becoming more of a concern to conservationists because of their abundance. They appear to be without predators to keep their populations in check. Beaver are altering wetland systems to the degree that some of the rarer types, such as bogs, and the rare species that utilize bog habitats may be eliminated from some areas of Pennsylvania.

In many cases, disturbance clearly has been destructive to natural habitats and the species associated with them. Although necessary, farming and development are disturbances that may have completely eradicated some existing natural communities. Little floodplain forest remains along the Susquehanna River because its floodplain soils tend to be some of the best for farming and, as colonization and commerce moved inland in the eighteenth century, the river floodplains were the areas occupied first.

Human disturbance clearly has been the biggest factor in the formulation of present vegetation patterns in Wyoming County, whether it has been clearing for settlement, agriculture or timber harvest. Timber harvesting, especially repeated clearcutting, changes forest species composition dramatically. There are many species that thrive in mature forests but do not fair well in open woodlands. With good management practices, forest communities may recover sufficiently to resemble the species composition of the pre-settlement state. Much of the land that was used as pasture is reverting to woodland as farming declines.

Early successional forests and woodlands have a species composition that is unlike the original forests but help to maintain a variety of habitats and species on the landscape. Conversely, some species that were part of the original landscape have not been able to recover their original populations in these situations. Disturbance in forests and along floodplains can allow some formerly minor native species to become dominants to the exclusion of other native species. Native species with specific habitat requirements may disappear entirely from an area when no pockets of that habitat are retained on the landscape.

It is important to maintain a closed canopy in some mature forests when there is a likelihood of invasion by exotic species. The introduction and spread of exotic species across the landscape is a monumental problem in the protection of biodiversity. Many of these non-native plants and animals out-compete the desirable native species and radically alter habitats.

In some highly disturbed, open scrubby woodlands silverberry (Eleagnus umbellata) and other exotics are nuisance species. Crown vetch (Coronilla varia) can extend from roadsides, where it is planted to stabilize soils, into native grasslands and smother native plants. Japanese knotweed (Polygonum cuspidatum) invades

river shorelines. Common reed (Phragmites australis) and purple loosestrife (Lythrum salicaria) are aggressive, weedy species that may creep into wetlands in the wake of disturbance and possibly overwhelm native species. Garden loosestrife (Lysimachia vulgaris) is especially abundant on the wetter portions of the high shoreline of the Susquehanna River and has probably displaced some native plants. Many of the forests in the state have been altered by pest species introduced by man. The gypsy moth has altered species composition of forests in many areas by killing oaks and allowing more light into the understory. Chestnut blight (Endothia parasitica) has all but eliminated American chestnut from our forests. Control of these pest species is necessary for the long-term maintenance of high quality natural systems.

PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

The Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by Wyoming County to provide an inventory of significant flora, fauna and natural communities in Wyoming County. Critical to this effort is the Pennsylvania Natural Diversity Inventory (PNDI) data base. PNDI was established in 1982 as a joint venture of PSO/TNC, the Pennsylvania Department of Environmental Resources, and the Western Pennsylvania Conservancy. In its thirteen 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 (species of special concern), and heron rookeries. Several other noteworthy natural features are also mapped including D.E.R. designated Exceptional Value streams (Shertzer 1992) and outstanding geologic features (based on recommendations from Geyer and Bolles 1979 and 1987). Over 10,000 detailed occurrence records, largely the result of field surveys, are stored in computer files and denoted on topographic maps. Additional data are stored in extensive manual files set up for over 150 natural community types, over 800 plant and animal species, about 650 managed areas, and for each of Pennsylvania's 881 7½' USGS topographic quadrangle maps.

Beginning in 1982, PSO collected 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 conducted 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 Wyoming 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 Wyoming County can be conserved by protecting sites with the best occurrences of the county's natural communities and by protecting good populations of the county's sensitive plants and animal species. The natural community and sensitive species data are the basis for judging the biological values of sites within the county.

NATURAL AREAS INVENTORY METHODS

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

Map and Air Photo Interpretation

A list of natural features found in Wyoming County was prepared from the PNDI data base, and information was volunteered by local individuals and organizations familiar with the county. Photo interpreters familiarized themselves with the air photo characteristics of high quality natural communities already documented by PSO. Additional data such as vegetation maps, field surveys, and soil-survey maps were consulted to increase the photo interpreters' understanding of the county's environment. Physiography, geology and soils provided interpreters with a basis for making decisions on the probable types of vegetation that were observed on the photos and the species, common and rare, likely to be encountered. 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 progresses systematically within the area encompassed by each USGS topographic map and the natural area potential of all parcels of land is assessed using aerial photographs. Areas continuing into adjacent counties are examined in their entirety. Topographic maps for use during field surveys are marked to indicate locations and types of potential natural areas based on characteristics observed on the photos. For example, an uneven canopy and tall canopy trees could indicate an older forest; a low area with a dense cover of evergreens would indicate a conifer swamp.

Once some photo interpretation is done, field surveys are conducted to determine what is 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 are used to identify similar plant communities to be checked during future surveys. Biologists consistently finding poor quality sites associated with particular photo signatures can eliminate similar areas seen on the photos without additional field surveys. Upon completion of the photo-interpretation, potential survey sites are prioritized in preparation for the field surveys.

Field Work

Experienced PSO biologists and contractors did the field work to evaluate the naturalness of habitats and search for species of special concern. Workers categorized the vegetation by natural community type for each Potential Natural Area visited. An evaluation of quality was made for each natural community, care being taken to give reasons for the quality rank. Boundaries of the community types were redrawn, if needed, based on new field information. The Potential Natural Area Survey 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. Populations of sensitive plant and animal species were assessed and marked on USGS topographic quadrangle maps.

On May 20, 1993 a reconnaissance flight was taken over the the county to look at sites that had not been easily accessible on foot and to evaluate them prior to ground survey. The flight also provided a more accurate overview of the current condition and extent of potential and known natural areas.

Data Analysis

To organize the natural features data and set conservation priorities, each natural community or species (element) is ranked using factors of rarity and threat on a state-wide (state element ranking) and range-wide (global element ranking) basis (see Appendix 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 five element occurrence 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, an Acidic Rocky Summit community, heron rookery, or 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, including approximate watershed or subwatershed boundaries, were then transcribed on to acetate map overlays for presentation to the County for its use and distribution.

Information on the needs of the rare species in this report has come from a variety of sources including field guides and research

publications. For reptiles and amphibians, the major source is DeGraaf and Rudis (1981); for birds, Brauning (1992); for mammals, Chapman and Feldhammer (1982); for odonates, Carpenter (1991) and Dunkle (1989); and for plants, Rhoads and Klein (1993), Gleason (1952) and Fernald (1950).

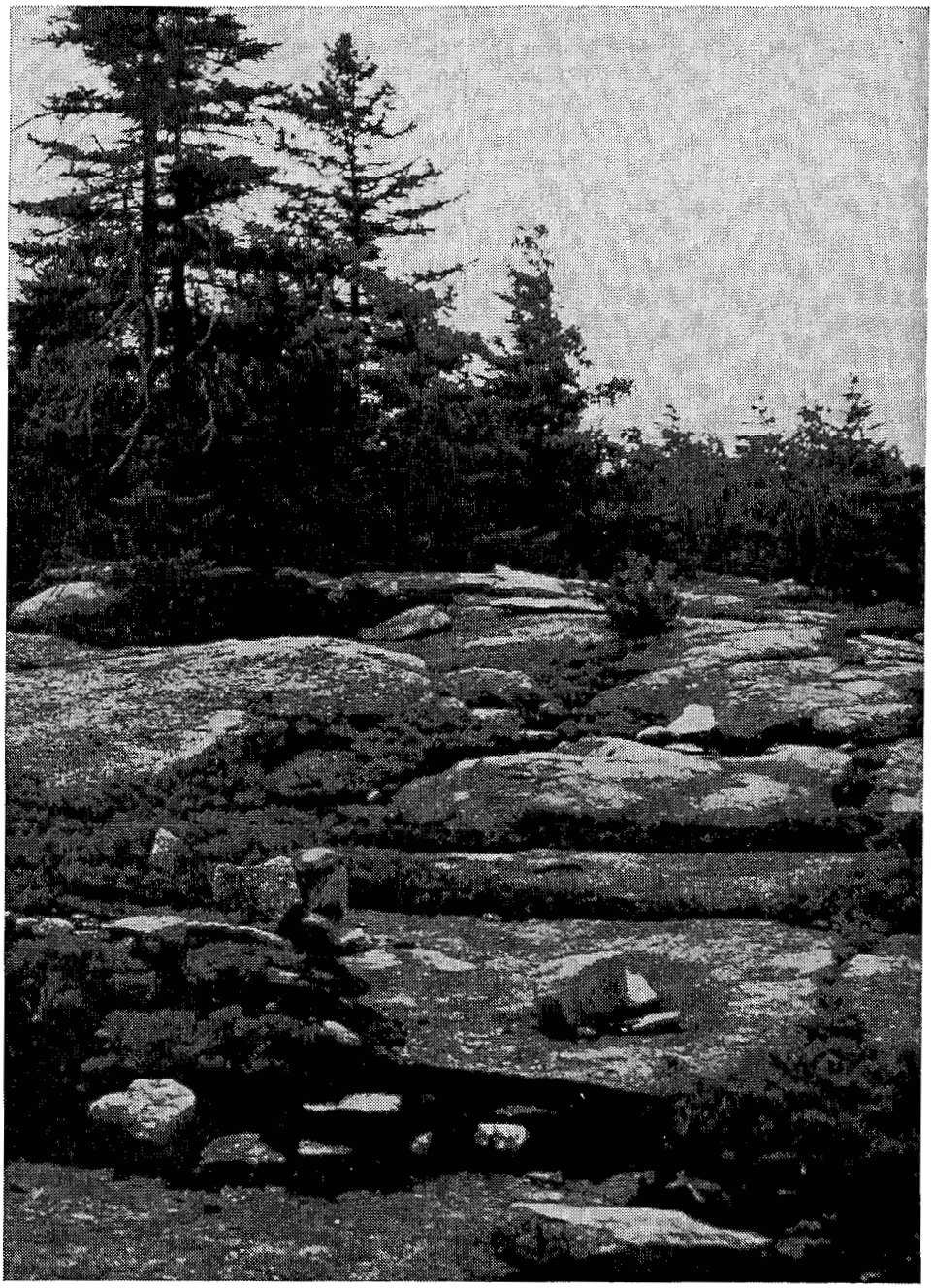
Map Codes

All natural communities, species of special concern and significant geologic features are coded on the maps and described in the text. The codes are PNDI map codes that are unique to each element on a given USGS topographic map. Species are identified by code to prevent unauthorized collection and possible extirpation of the species at the site. Natural Communities are identified by **NC**, plants by **SP**, animals by **SA**, and geologic features by **GE**. All are followed by a three-digit code. Anyone seeking information on an individual site or species location may call or write the Pennsylvania Science Office of TNC; please provide the map code(s) and the corresponding map name(s).

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. Ranks are based on rarity, quality, and threats or management needs of the elements at the site. The table lists the site name, topographic map, and pertinent information on importance, threats, management needs, and recommendations for protection.

Some sites of 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.



Spruce Rocky Summit natural community at Bartlett Mountain, Jenningsville Quadrangle. Bartlett Mountain is the only known site in Pennsylvania for this community type. Photo: Pennsylvania Science Office of The Nature Conservancy.

SUMMARY AND RECOMMENDATIONS

A meeting of TNC personnel is held each year to discuss the most important sites for the protection of biodiversity in Pennsylvania. This meeting consists of a review of all sites within the state and then ranking them in terms of biological diversity (the rarity and abundance of the species or habitats of concern), potential threats, and protection needs. Table 1 is a list of locations regarded as being significant for natural communities and species of special concern; those ranked 1 or 2 contain some of the best natural areas in the state. The following six sites from Table 1 are the most critical in Wyoming County for maintaining biological diversity into the future (see Figure 1 for approximate locations of these sites). Detailed descriptions of all sites are included in the Results section which follows.

BARTLETT MOUNTAIN BALD/FLAT TOP (Jenningsville and Dutch Mountain Quads, North Branch and Forkston Twps.) is one of the top two sites in the county. It is designated as a Spruce Rocky Summit natural community or, spruce bald. This community had not been described for PA until its discovery here in 1993 but similar community types are found north and south of Pennsylvania. This community is typified by red spruce (Picea rubens) although it may not be the dominant species. Red spruce is found scattered across this area both on rocky outcrops of conglomerate and sandstone bedrock and within the numerous small wetlands that abound on Bartlett Mountain and Flat Top. Low heath plants, such as black huckleberry and low-bush blueberry, are common in pockets of soil on the rock outcrops. Hemlocks (Tsuga canadensis) are the dominant trees on most of the rock outcrops and across much of Flat Top and Bartlett Mountain; white pine and red pine are found in places. Many of the conifers have a growth form typical of trees growing on exposed rock outcrops. They have lower branches that sprawl across the rocks and upper branches that display "flagging" from high winds.

COALBED SWAMP (Dutch Mountain Quad, Forkston and North Branch Twps.) is a Boreal Conifer Swamp natural community of about 70 acres that is dominated by red spruce, some of which are estimated to be about 100 years old. Healthy populations of two PA-Rare shrubs are found in some areas the swamp.

The site also provides breeding habitat for at least one bird species that very rarely breeds in the state (**SA523**); it typically breeds farther north. Breeding by this species had never been actually documented in Pennsylvania until observed here in 1994 (Gross 1995). This site also may provide breeding habitat for two other animals of concern but that cannot be confirmed at this time. Because of the breeding of one or more animals of concern and the rare plants, this swamp and the surrounding uplands are important for helping to maintain biological diversity in the Commonwealth.

The Boreal Conifer Swamp community is contained within the 140-acre Coalbed Swamp which also includes a shrub swamp dominated

by blueberries, leatherleaf and various sedges. Coalbed Swamp is part of a complex of wetlands which includes Crane Swamp and Tamarack Swamp to the north. Although apparently logged in the 1890s (Taber 1970), Coalbed Swamp provides the best example in the area of the red spruce swamp community type that once covered the wetlands of the Dutch Mountain area. In most places the wetland is in good shape and appears to be recovering from past logging and other disturbances and has good potential to improve in quality over time if buffered from further disturbances. The site is almost entirely contained within **State Game Lands 57.**

SCHMITTHENNER LAKE (Dutch Mountain Quad, Forkston Twp.) contains four rare plant species; three of them are found nowhere else in the county. The 20-acre lake is natural but has been altered primarily by beaver. The lake itself is in good shape with typical acid lake aquatic species occurring in the shallows of the lake. All of the rare plants are shallow-water species that often occur near bog edges. Schmitthenner Lake constitutes one of the better sites in Pennsylvania for at least one of the four plant species.

Although not listed as rare species currently, there are several animals apparently breeding in the remaining wetland habitat at the west end of Schmitthenner Lake. These are thought of as more northern species and, if breeding, would be firsts for the state. There is no confirmed breeding at this time.

The existence of four plant species of special concern and the possibility of other rare plants and animals make **SCHMITTHENNER LAKE** one of the top sites for conservation in Wyoming County. At this time there do not appear to be any threats. There are few landowners around the lake and only three or four cottages close to the lake. The major landowners are aware of the conservation and recreation values of the lake and are good stewards. The amount of use the lake receives during the summer does not appear to be a threat. Monitoring of the rare species and further inventory are needed. Should the landowners wish it, a stewardship plan to ensure the continued existence of the rare species and the good health of the lake may be warranted.

BROADBENT SWAMP (Factoryville Quad, Clinton Twp.) is a good example of the Broadleaf-Conifer Swamp Natural Community with a canopy of red maple, yellow birch, black ash, and hemlock, scattered thickets of Rhododendron maximum and a diverse herb layer. Peat moss hummocks, cinnamon fern, sensitive fern, dwarf blackberry (Rubus pubescens), azalea, and occasional patches of poison sumac (Rhus vernix) characterize the site. Possibly the best state population of a rare plant is known from the site. A good diversity of species occurs here and, although the area was logged in the past, it is recovering well with good tree regeneration. Flooding (by beaver or humans), changes in hydrology, or increased nutrient input would be detrimental to the quality of the natural community and the rare plant population. The woodland around most of the swamp is a beneficial buffer for water quality and quantity maintenance and the prevention of exotic plant species

encroachment.

FALLS CLIFF (Ransom Quad, Falls Twp.) is a good example of the relatively common Acidic Cliff natural community type. **FALLS CLIFF** is a sandstone cliff comprised of Catskill Formation sandstone, shale and siltstone south of the village of Falls and overlooking the Susquehanna River. At least one plant of special concern was documented in this area in the past and may still be present. The talus slope at the base of the cliff is weedy at the base but weeds drop out on the steep upper cliff. The dry cliff face and crest support scrubby forms of chestnut oak (Quercus montana), juniper (Juniperus virginiana) and other trees, shrubs such as low-bush blueberry (Vaccinium pallidum), and ferns, grasses and sedges. More searching is needed to determine if the rare plant is still present. There is not a lot of buffer at the top of the cliff, but the cliff communities are in good shape. Maintaining the existing woodland buffer will help to maintain the high quality of the Acidic Cliff Community.

TUNKHANNOCK ISLANDS (Tunkhannock Quad, Eaton Twp.) - The site contains the River Gravel natural community and a population of a recently listed plant species of special concern. The natural community is about 5 acres and is found associated with other floodplain communities. Upslope is a forested island where silver maple (Acer saccharinum) dominates. Downslope is a shallow, seasonally-exposed channel of the Susquehanna River that separates the island from the mainland. The channel is dominated by a variety of emergent herbaceous species. The natural community is dominated by a cobble-gravel substrate and a variety of grasses including Indian grass (Sorghastrum nutans) and switch grass (Panicum virgatum). This site may also harbor other rare species and more survey work needs to be done here.

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 sites of greatest biological significance. Table 1 lists all the known sites where exemplary natural communities and species of special concern are located in the approximate order of importance for the protection of biological diversity. The table also summarizes their significance, any potential threats, and some recommendations for protection of the elements listed. Table 2 is a list of secondary (Locally Significant) sites that are significant on a county-wide level but do not contain known rare species and do not have exemplary natural communities. These may be important as sites for local parks or for natural areas and passive recreation. The sites in Table 1 that are not already protected should, in most cases, be given higher priority for protection than sites in Table 2.

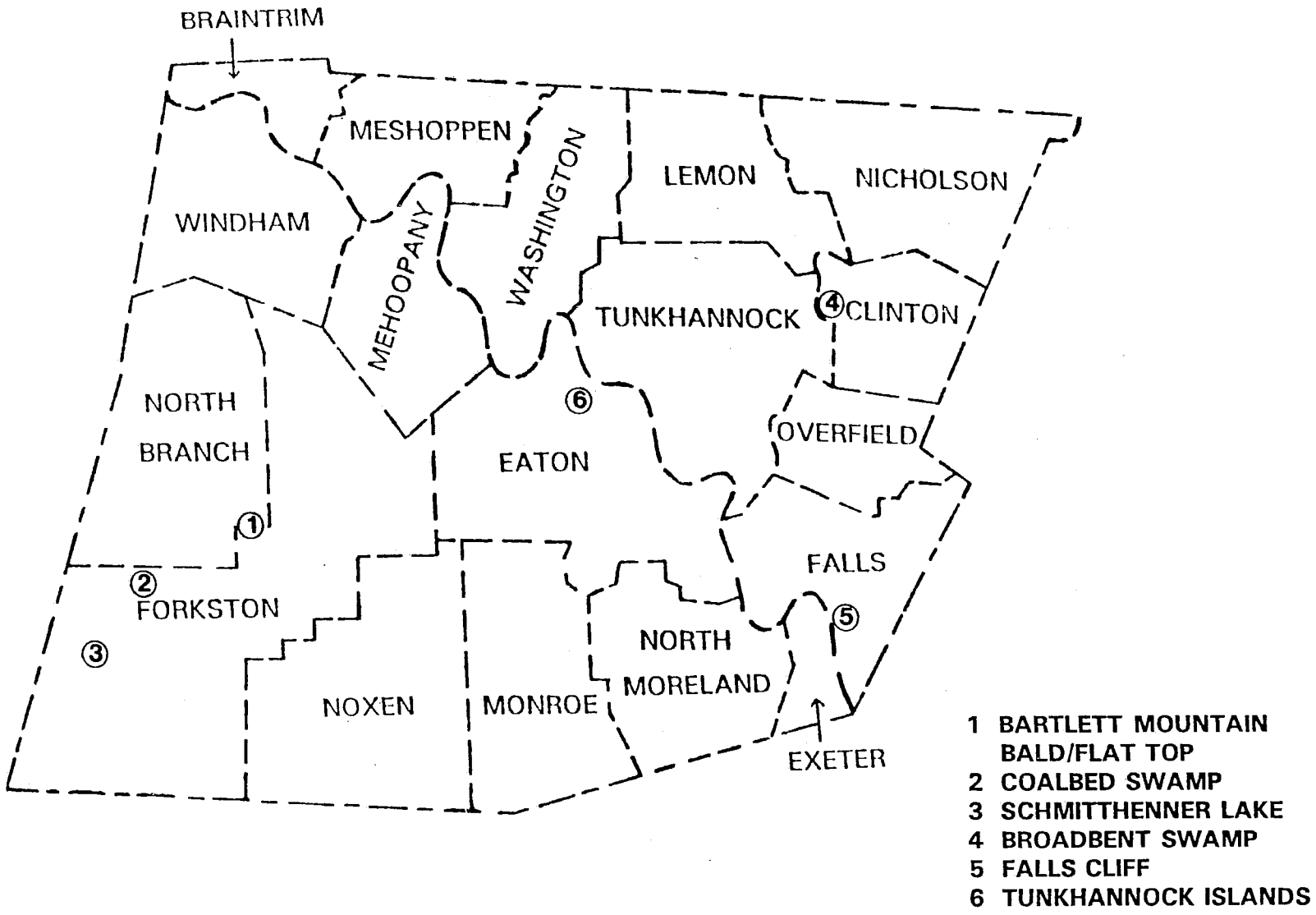


Figure 1. Locations of the top sites for the preservation of biological diversity in Wyoming County.

Table 1. The sites of statewide significance for the protection of biological diversity in Wyoming County in approximate order of priority from the most important to the least. The presence of species of special concern and/or exemplary natural communities has been documented at these sites.

County Rank[1]	Site Name or Code	USGS Topo. Map	Natural Feature, TNC Global and State Ranks[2] Importance and Recommendations[3]
1	**BARTLETT MOUNTAIN BALD/FLAT TOP** (Forkston Twp.)	Jenningsville Dutch Mountain	Only PA Spruce Rocky Summit natural community, a G4S1 element; more inventory work needs to be done; within State Game Lands 57.
1	**COALBED SWAMP** (Forkston & North Branch Twps.)	Dutch Mountain	Fair example of Boreal Conifer Swamp natural community and two rare plants; first nesting record in state for a bird species; at least one listed rare animal species breeding here on SGL 57; forested buffer should be maintained.
2	**SCHMITTHENNER LAKE** (Forkston Twp.)	Dutch Mountain	Glacial lake that has 4 species of rare plants; adjacent wetland has rare species breeding in it; maintain water quality and hydrologic regime.
3	**BROADBENT SWAMP** (Clinton Twp.)	Factoryville	Fair to good example of a Broadleaf-Conifer Swamp with a good population of a PR, G5S2 plant; major landowner wishes to keep land natural.
3	**FALLS CLIFF** (Falls Twp.)	Ransom	Good example of common natural community, Acidic Cliff; uncommon plants and good potential for rare species; excellent view of Susquehanna River; maintain wooded buffer.

Table 1 (continued)

County Rank[1]	Site Name or Code	USGS Topo. Map	Natural Feature, TNC Global and State Ranks[2] Importance and Recommendations[3]
3	**TUNKHANNOCK ISLANDS** (Eaton Twp.)	Tunkhannock	Good example of the River Gravel natural community, and 1 rare species; part of a complex of floodplain communities; potential for other rare species; more survey work needed.
4	**SA501**/Vernon Site (Northmoreland and Eaton Twps.)	Center Moreland	One of only two breeding sites for this species known in the county; need to maintain forest and a buffer around site and monitor breeding success.
4	**SP503**/Perrins Marsh (Northumberland Twp. and Luzerne Co.)	Center Moreland	This large marsh and pond contain one known rare aquatic plant and a diversity of common plants and animals; there is potential for other rarities; no known threats but needs more survey work.
4	**SP524, SP525**/Opossum Swamp (Forkston Twp.)	Dutch Mountain	Large wetland complex with two rare species and potential for others; within SGL 57.
4	**SA503**/Phelps Swamp (Nicholson Twp.)	Hop Bottom	One rare species and potential for others; known for a variety of uncommon breeding and migrating birds.
4	**SA546, SP558**/ Splashdam Pond (Forkston Twp. and Sullivan Co.)	Lopez	This is the only known location for a PA-Rare animal in the county; species needs high quality water with a good vegetated buffer; protected within SGL 57.

Table 1 (continued)

County Rank[1]	Site Name or Code	USGS Topo. Map	Natural Feature, TNC Global and State Ranks[2] Importance and Recommendations[3]
4	**SP567, SP568**/County Line Swamp (Forkston Twp.)	Lopez	Good populations of two PA-Rare shrubs in a swamp that had been forested at one time; the wetland may slowly revert to swamp forest; on SGL 57.
4	**SA504**/Mehoopany Creek Site (Mehoopany Twp.)	Meshoppen	This is one of two breeding sites in the county for this species; occurs in a tree plantation; site needs to be monitored.
4	**SA506**/Meshoppen Creek (Meshoppen Twp.)	Meshoppen	This site represents the only known PA location for a possibly globally rare (G1G3 S1) insect species; maintain water quality; more survey work needs to be done for this species.
4	**SA505**/South Mountain (Forkston and Noxen Twps.)	Noxen	Only recorded site in the county for this species that requires a large territory for hunting; forest management should consider this species' needs.
4	**SP514**/Helman Swamp (Tunkhannock Twp.)	Tunkhannock	Good population of a PA-Rare plant; beaver have altered the swamp but there appear to be no special management needs at present.
5	**SA502**/White Ferry Lake (Eaton Twp.)	Center Moreland	Reintroduced animal is known to utilize this lake.
5	**NC511**/Cider Run (Forkston, Noxen Twps., Luzerne Co.)	Dutch Mountain	DER-designated EV stream within SGL 57.

Table 1 (continued)

County Rank[1]	Site Name or Code	USGS Topo. Map	Natural Feature, TNC Global and State Ranks[2], Importance and Recommendations[3]
5	**SP512**/Crane Swamp (North Branch Twp.)	Dutch Mountain	Relatively large population of a PA-rare shrub; no immediate threats although trees and tall shrubs may eventually shade out the species.
5	**SP513**/Bellasylva Swamp (Forkston Twp.)	Dutch Mountain	Small population of a Pa-Rare plant in a fairly small wetland; potential for other rare species; keep disturbance minimal.
5	**SP514**/Bellas Brook Swamp (Forkston Twp.)	Dutch Mountain	Small population of a PA-Rare plant in a spruce-hemlock swamp within SGL 57.
5	**SP504**/Forkston Woods (Forkston TWP.)	Jenningsville	Small population of a PT plant found by logging road; more survey needs to be done.
5	**NC502**/Skinners Eddy Cliff (Braintrim Twp.)	Laceyville	Fair example of a common community type (Acidic Cliff) excellent view of the Susquehanna River.
5	**NC504**/Sorber Run (Noxen Twp. and Luzerne Co.)	Noxen	DER-designated EV stream mostly within SGL 57.
5	**SP512, SP513** Bartron Pond Swamp (Lemon Twp.)	Tunkhannock	Bog-like swamp with two rare plants; both species will likely be shaded out by shrubs and trees eventually.

Table 1 (concluded)

County Rank[1]	Site Name or Code	USGS Topo. Map	Natural Feature, TNC Global and State Ranks[2], Importance and Recommendations[3]
5	**SP515**/Lake Carey (Lemon and Tunkhannock Twps.)	Tunkhannock	TU aquatic species found in heavily used vacation lake; herbicides and eutrophication may be a problem for the species.

1 Sites are ranked from 1 to 5 with 1 indicating the highest priority sites for protection based on state or national significance, and 5 indicating the lowest priority for protection. Ranks take into account potential threats, management needs and existing protection.

2 TNC Global and State Ranks range from 1 to 5 with G1 or S1 being rarest globally and statewide, respectively, and G5 or S5 being common. State status categories include: PE-Endangered, PT-Threatened, PR-Rare, TU-status Tentatively Undetermined. See Appendix I for detailed explanation of these ranks and state status.

3 Recommendations for protection address the biological needs of the natural communities and/or species of special concern at that site. Recommendations are those of The Nature Conservancy and do not reflect state, local or agency policies (see Preface).

TABLE 2. Areas of local significance in Wyoming County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential. These sites do not include high quality natural communities and no species of special concern have been documented at the sites although several of the areas have potential for rare species to occur.

County Rank*	Site Name	USGS Topo. map	Importance
High	Susquehanna River	Laceyville Jenningsville Meshoppen Tunkhannock Center Moreland Ransom	Excellent recreational and scenic resource; current and historical records for species of special concern.
High	Bowman Creek Ledges (Eaton Twp.)	Center Moreland	Highly diverse northern hardwoods on a steep east-facing slope; scenic setting for park; wooded slopes help protect Bowman Creek.
High	Sharpe Pond (Windham Twp.)	Jenningsville	High diversity of aquatic plants and animals; potential for rare species; needs protection from nutrient enrichment.
Medium	Dixon Floodplain Forest (Tunkhannock Twp.)	Tunkhannock	Example of floodplain forest; habitat for nesting and migratory birds; aggressive weeds need control.
Medium	Fox Hollow Swamp (Windham Twp.)	Meshoppen	Local example of northern broadleaf-conifer swamp in an area with few large wetlands; potential for rare species.
Medium	Jenningsville Ledges (Windham Twp.)	Jenningsville	Steep slopes of hemlock and hardwoods with a diverse flora; historical records for, and potential for, rare species.

Table 2. (continued)

County Rank*	Site Name	USGS Topo. map	Importance
Medium	Tamarack Swamp (North Branch Twp.)	Dutch Mountain	Important as part of the Coalbed-Crane Swamp complex; potential breeding site for rare animals.
Low	Beaumont Kame (Monroe Twp., North Moreland Twp.)	Center Moreland	Interesting glacial geology with some value as wildlife habitat.
Low	Buttermilk Falls (Falls Twp.)	Ransom	A series of low waterfalls in a developed area; considered to be an excellent example of the type.
Low	Casterline Hill Swamp (Nicholson Twp.)	Factoryville	Not surveyed; air photos indicate a fairly large broadleaf-conifer swamp; contributes water to Lake Sheridan; needs to be surveyed for rare species and natural community status.

* These sites are ranked from high to low as an indication of their relative importance at the county or municipal level and with regard to protection needs (sites already under some level of protection may be given lower priority). These sites must be viewed as of lower rank in terms of biodiversity than those in Table 1.

General Summary and Recommendations

Wyoming County residents are fortunate to have so much of the Endless Mountains in the southwestern quadrant of the county protected and accessible as state game land. On public lands, specific conservation needs can be addressed by working with the land managers or developing a management agreement (or reviewing existing ones) to ensure continued protection of any sensitive areas and the associated natural elements. The County, townships or conservation groups may wish to contact private landowners with important sites in the near future to discuss land use and protection of the resources located there. A variety of strategies are open to landowners who desire to conserve rare species and high quality natural areas. These can range from informal arrangements to the PA Forest Stewardship Program to conservation easements and/or acquisition by a conservation group. It is important that the information in this document be used not only to protect biodiversity in the County but also to provide sufficient information to landowners that allows them the use of their land while maintaining Wyoming County's scenic and recreational resources.

The importance of waterbodies to biodiversity is illustrated by the number of rare species in the county associated with water. The Susuquehanna River has many current and historical occurrences of rare animals and plants. Many more common species are also dependent upon it, either entirely or in part. The Susquehanna River can only be maintained as a valuable natural and recreational resource by protecting its water quality and that of its many tributaries. Protection of the wetlands, lakes, rivers, and creeks of Wyoming 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. New housing and commercial development should be evaluated for impacts to nearby waterbodies. In most cases, development can be accommodated without serious impacts to the resource if it is done carefully. Landowners within any particular watershed can act on their own to protect water by providing vegetated buffers along streams and around wetlands and lakes. Landowners can form watershed or lake associations to voluntarily monitor and assess proposals in their localities.

Landowners, government and private conservation organizations can work together to ensure that the county's valuable natural resources are protected into the future. Some of the work that needs to be done to protect biological diversity/resources in Wyoming County can be done by local and regional land trusts and The Nature Conservancy. However, these organizations will not be able to do all of the work because of limited resources and personnel; most land protection and management decisions will fall to the landowners themselves. There is a need for grassroots

organizations like watershed associations to help with natural areas conservation efforts at the local level. These groups can assist with the identification of landowners who wish to protect their land, to provide information to landowners on easements, and to provide help with management and stewardship once the land is protected.

In this report, The Nature Conservancy has outlined the watersheds or subwatersheds where the natural communities and species of special concern are located. 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. Some landowners may not be interested in land protection. 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, the Pennsylvania Science Office of The Nature Conservancy, be consulted.

We wish to emphasize that this Natural Areas Inventory is only a beginning; new sites with good natural communities and species of special concern will be discovered in the future. Plant communities and plant and animal populations are dynamic, constantly changing with time and conditions. Users of this inventory are encouraged to contact our office for up-to-date information.

RESULTS

TNC ecologists began field work for the Wyoming County Inventory in the spring of 1993 and continued through the summer and fall seasons of that year. Contract biologists also conducted some of the field surveys for species of special concern. Sites for field evaluation were selected primarily on historical species location information, air photo interpretation and from information supplied by local citizens. Sites to search for species of concern were based on a combination of historical site location information, the species needs based on literature (*Gray's Manual of Botany* (Fernald 1950), *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada* (Gleason 1952), *The Vascular Flora of Pennsylvania* (Rhoads and Klein 1993), and others) and locating potential habitat using air photos. Mature forest, unusual forest types for the county, wetlands, outcrops (from county soils maps) and steep ravines all received priority for field inspection as potential natural communities and as habitat for rare species. Agricultural fields and other highly disturbed lands were disregarded. Small woodlands and woodlands that consisted of young trees were not considered to have much potential for species of concern and no exemplary natural communities (elements).

Sites that are mapped in this inventory are those with exemplary natural communities or species of special concern. Sites with potential to recover to natural community status, those that have relatively high species diversity and may yet be found to harbor rare species, and sites with examples of uncommon vegetation types for the county are mapped as locally significant. Areas mapped include not only the actual location for the elements but also a buffer which is typically the watershed upstream or upslope of the site. For locally significant areas, the site itself is mapped with only a small buffer. These mapped areas serve two purposes: to obscure the actual location of some species that may be vulnerable to collectors and as an indication that buffers are important for the survival of the rare elements. These buffers are meant only as a guide; smaller buffer zones may be sufficient to protect the resource but all activities within these boundaries should be evaluated for their impacts to the resource mapped.

Additionally, managed areas (whether owned or under easement) that are maintained in a relatively natural state are also mapped. This information provides a guide to the lands that are already protected and those areas that may still be in need of protection.

Site Summaries by USGS Topographic Maps

Portions of Wyoming County are found on 15 USGS topographic quadrangle maps (Figure 2). Communities, species of special concern, significant geologic features, managed open-space lands such as state forest and state game lands, and some areas that may

be of local importance for biological diversity have been located on these base maps. A labeling system has been used to visually indicate the relative importance of the sites on each map (see sample map, Figure 3) and in the text.

The most important areas for preserving biological diversity (Table 1) are represented on the maps in bold type; these sites all contain species of concern and/or exemplary natural communities. The highest quality sites have been given site names in bold upper case type (e.g., **BROADBENT SWAMP**) followed by natural community and/or species map codes (e.g. **NC502, SP507**). Lesser quality sites with poorer representations of communities or species of special concern are noted with bold type map code number(s) only (e.g., **SA506**). Note that the code numbers are specific to that quadrangle; e.g., SP502 on Dutch Mountain may be a different species than SP502 on the Lopez Quadrangle.

The area outlined for these sites represents the species' location and the watershed or subwatershed area where the elements (species or natural communities) are located. We encourage that development activities proposed within the encircled areas be carefully assessed to determine the impact of the project on the species or communities before proceeding. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess the potential impacts.

Locally Significant sites (Table 2) have also been mapped, but are labeled with a site name in plain type, e.g., DIXON FLOODPLAIN FOREST. These sites have no documented species of special concern and the vegetation has been disturbed enough that the sites cannot be considered exemplary natural communities on a statewide or rangewide level. Communities of county significance, sites with good potential for species of concern (requiring further survey work), and habitats that are important for preserving biodiversity on a countywide scale are included in this category. The area outlined represents the significant habitat or feature at the site and a small buffer (the subwatershed area is not necessarily included). Many of these sites hold potential for parks, nature preserves within parks or sites suited to passive recreation.

Managed areas are indicated with names in bold upper and lower case type, e.g., **State Game Lands 57.** The approximate tract boundaries are also shown (— · —). These areas include sites that may contribute to the biological diversity of the county but that may be managed for a variety of interests (e.g. parks, State Game Lands, private preserves, etc.). In some cases the managed areas do contain species of special concern in which case the map codes (in bold upper case type) appear on the map as well.

Each topographic map is accompanied by a table that lists all of the exemplary natural communities and species of special concern

located on the map. The communities and species are identified by a PNDI map code unique to each element on that map. Following each of these elements is its global and state ranks (Appendix I), federal and state protection status (Appendix I), the date last observed, and its quality rank (Appendix II). Sites of local significance are listed separately as are managed lands and High Quality-Coldwater Fisheries (HQ-CWF). Other features such as major trail systems as well as natural communities and species that are located primarily on adjacent maps are listed within the "Other" category.

Key to Map Codes

NC = exemplary natural community
SP = plant of special concern
SA = animal of special concern
GE = significant geologic feature.

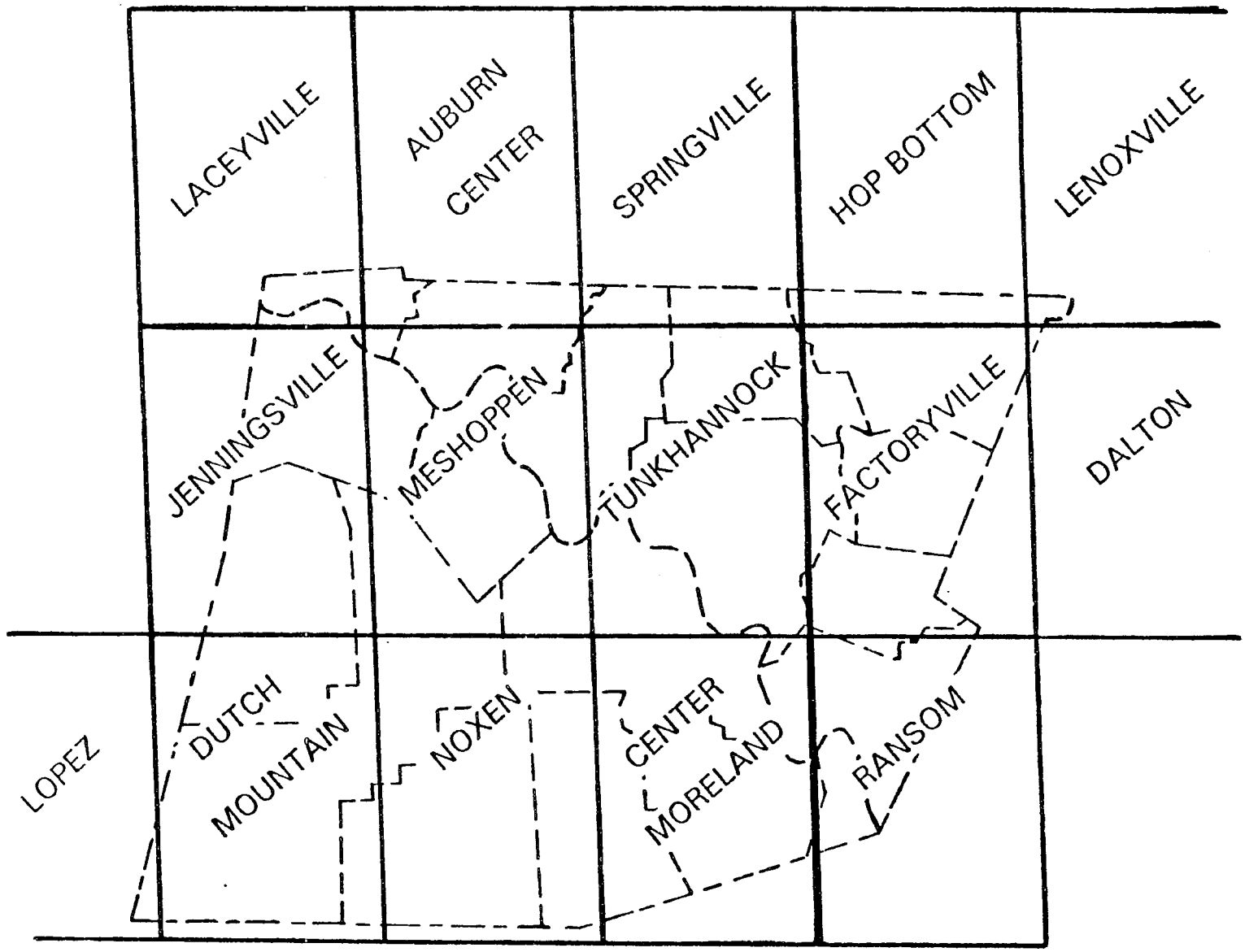


Figure 2. Wyoming County outline with names and locations of the USGS topographic quadrangle maps of the county.

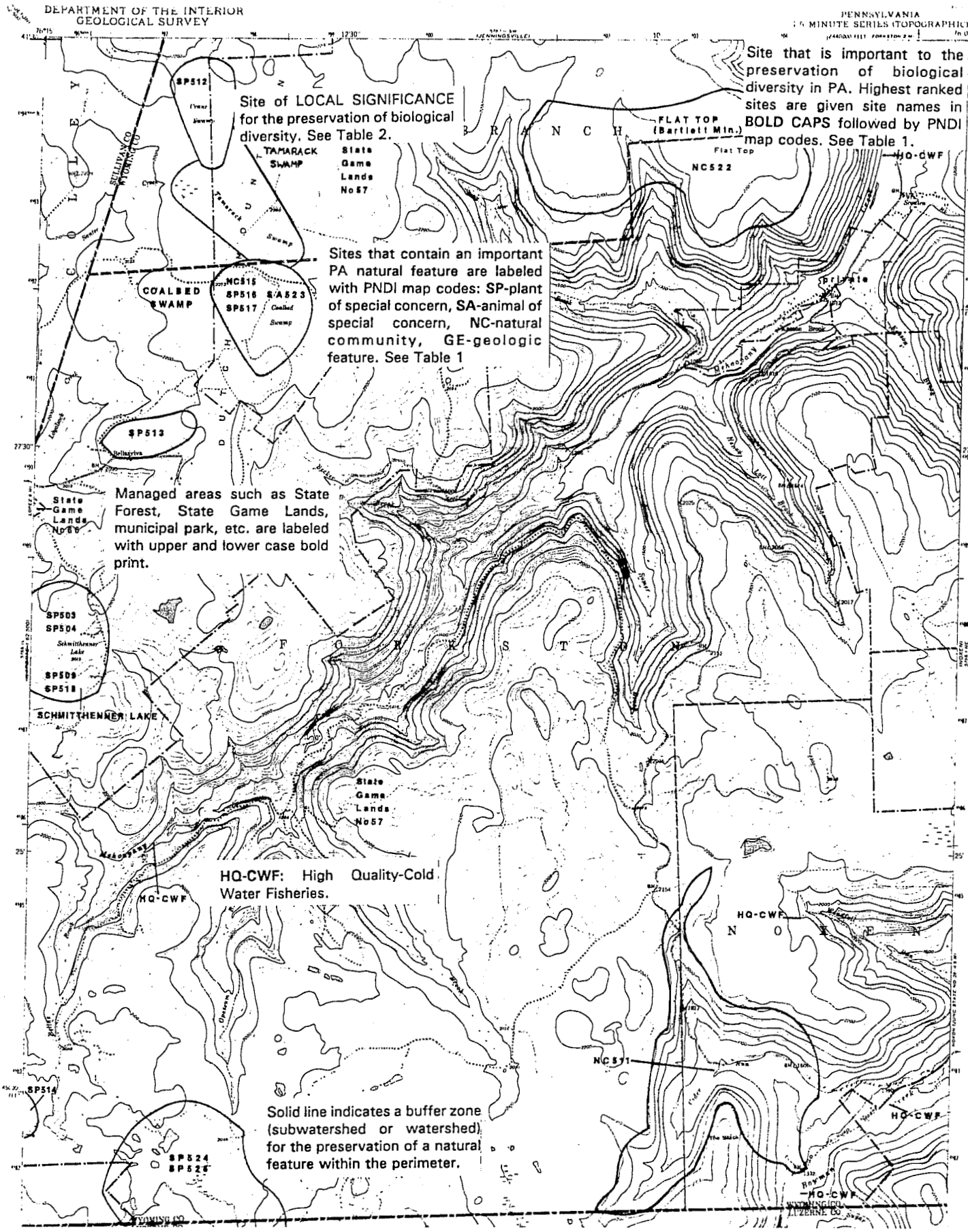


Figure 3. Sample USGS topographic map with explanations of the various types of County Natural Areas Inventory information added.

USGS QUADRANGLE MAP: Auburn Center

	TNC Ranks*		Legal Status*			
	Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:						
LOCALLY SIGNIFICANT:						
HQ-CWF:						
MANAGED AREAS:						
OTHER:						

No exemplary natural communities, species of special concern or sites of local significance have been identified from the Wyoming County portion (lower 10%) of this map.

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PENNSYLVANIA
AUBURN CENTER QUADRANGLE
7½-MINUTE SERIES

Mapped by the Geological Survey
1945

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Polyconic projection. 1927 North American datum
5000 yard grid based on U. S. zone system, A
10 000 foot grid based on Pennsylvania (North)
rectangular coordinate system
1000 meter Universal Transverse Mercator grid
ticks, zone 18, shown in blue

AUBURN CENTE

1945

FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

USGS QUADRANGLE MAP: Center Moreland

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	503	G5	S3	N	PR	10-26-93	E
SPECIAL ANIMALS:	501	G5	S3	N	N	10-26-93	C
	502	G5	S3	N	N	03-15-90	E

LOCALLY SIGNIFICANT: BEAUMONT KAME, BOWMAN CREEK LEDGES, SUSQUEHANNA RIVER

HQ-CWF: Bowman Creek, Leonard Creek, Marsh Creek

MANAGED AREAS:

OTHER:

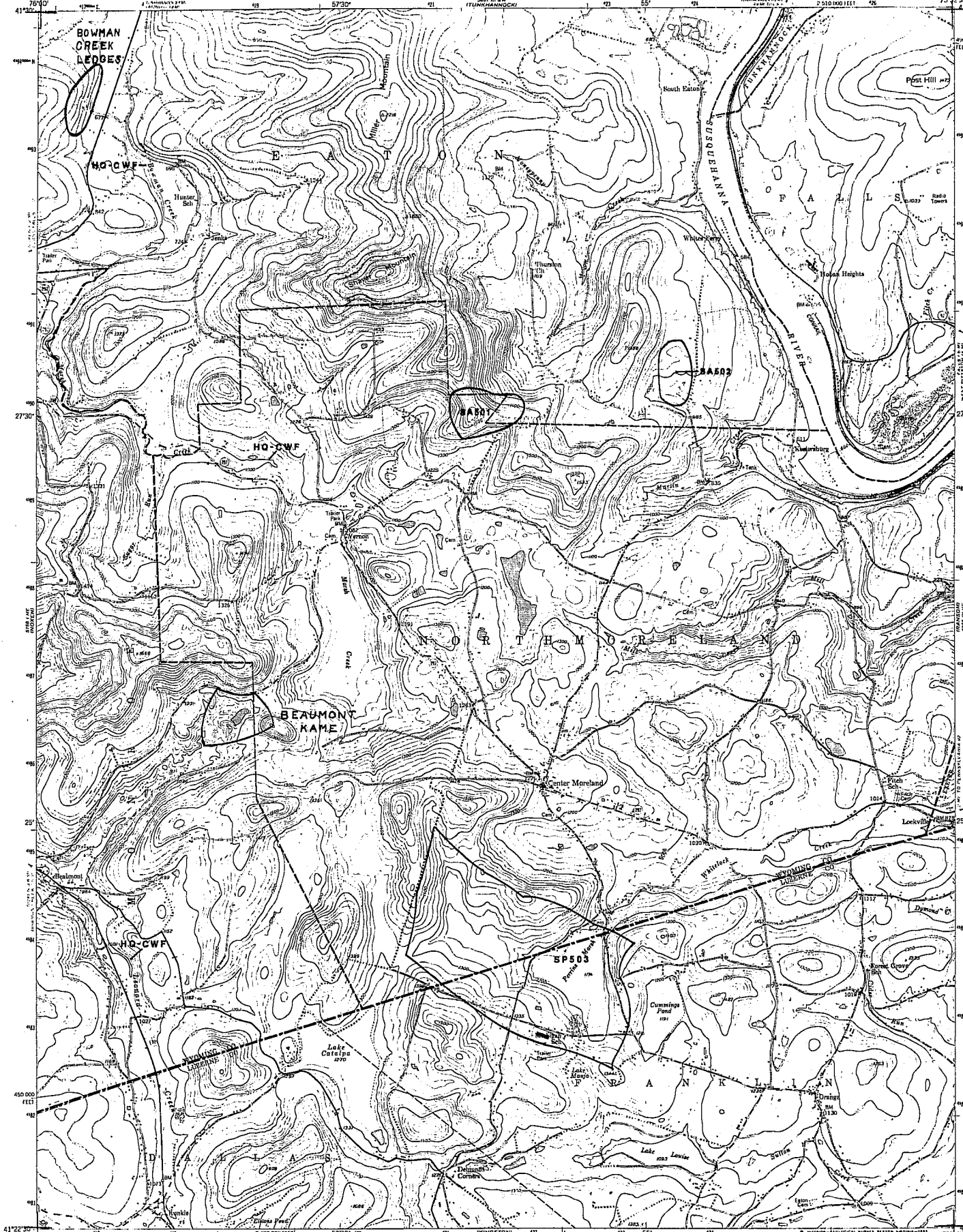
* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CENTER MORELAND QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1942. Field checked 1946

Polyconic projection. 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. To place on the predicted North American Datum 1983 move the projection lines 5 meters south and 30 meters west as shown by dashed corner ticks

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

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

ROAD CLASSIFICATION

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

Pennsylvania
Quadrangle location

CENTER MORELAND, PA.
41075-D8-TF-024

1946
PHOTOREVISED 1983

Center Moreland Quadrangle

SA501 (Eaton & Northmoreland Twps.) - "Vernon Site" represents an animal breeding within the area outlined on the map. It was found by the Game Commission in 1987 and seen again in 1993 after the breeding season. Since the site was visited in the fall, breeding success could not be ascertained. Some recent logging has occurred near the site. Maintaining the forest, including a substantial buffer, will help to ensure that the site continues to be used.

SA502 (Eaton Twp.) - White Ferry Lake is the only known Wyoming County site for this species. It was reintroduced to PA after having been eliminated by trappers and is apparently adapting and spreading from the original release points. One individual was seen at White Ferry Lake in 1990. There is no information as to whether the species is using the pond to raise young or to hunt. The species is probably utilizing a much larger area for hunting and raising young.

SP503 (Northumberland Twp. and Luzerne Co.) - Perrins Marsh comtains this PA-Rare aquatic species. Remnants were located at the outlet of the marsh at the end of the growing season. The large emergent marsh and shallow aquatic beds suggest the potential for other rarities. The area was surveyed for odonates (damselflies and dragonflies) on August 9, 1994. Fourteen different odonate species were found including eight new records for Wyoming county but no rare species were seen on that date; further surveys are needed throughout the summer months to search for other rare species of plants and animals. Since there is little development around the marsh or in the watershed there probably are few current threats to the site.

BEAUMONT KAME (Monroe Twp.) is a locally significant geological feature. It consists of mixed hardwood-conifer forest over glacial stratified drift. Beaver are making use of a small manmade pond within the site. Although the glacial geology may be of most interest, the woodland and pond are attractive additions. The pond also adds to wildlife habitat diversity.

BOWMAN CREEK LEDGES (Eaton Twp.) - This is a locally significant woodland on steep sandstone and shale ledges along Bowman Creek. Sugar maple, hemlock, beech and yellow birch dominate the canopy with striped maple and witch hazel in the shrub layer. The site is particularly significant for the diversity of ferns and wildflowers it supports including Christmas fern, marginal wood fern, maidenhair fern, columbine, wild geranium, wild ginger and many other wildflowers. There has been little recent disturbance at this site although the lower slopes get some use by visitors to the park directly across from the ledges. The ledges and the creek provide a very scenic setting for the park. Leaving Bowman Creek Ledges as is, with the dense canopy of mixed age trees, will best safeguard the natural and scenic qualities of the area and help to

maintain the quality of this HQ-CWF designated creek (described below).

Bowman Creek - The main stem of this creek is designated as a HQ-CWF (High Quality Coldwater Fisheries) from Luzerne County to the confluence with the North Branch SUSQUEHANNA RIVER. See also Dutch Mountain, Noxen and Tunkhannock quadrangles.

Leonard Creek is a HQ-CWF throughout its basin from its source in Luzerne County to the confluence with Bowman Creek. See also Noxen quadrangle.

Marsh Creek is a HQ-CWF throughout its basin. It is a tributary to Bowman Creek.

USGS QUADRANGLE MAP: Dalton

	TNC Ranks*		Legal Status*			
	Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:						
LOCALLY SIGNIFICANT:						
HQ-CWF:						
MANAGED AREAS:						
OTHER:						

Only a small portion of Wyoming County occurs in the northwest corner of this quadrangle. No natural communities, species of concern, or locally significant natural areas have been identified in this section of the county.

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
ENT OF THE INTERIOR
OLOGICAL SURVEY

DALTON QUADRANGL
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1942. Field check 1945

tion. 1927 North American datum
l based on Pennsylvania coordinate system,

versal Transverse Mercator grid ticks,
zone 18, shown in blue

UTM GRID AND 1969 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

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

PENNSYLVANIA
QUADRANGLE LOCATION

Map photoinspected 1980
No major culture or drainage changes observed

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS	DRY WEATHER ROADS
Heavy-duty	4 LANES 1 LANE Impr
Medium-duty	4 LANES 1 LANE Unimr
Loose-surface, graded, or narrow hard-su	
U. S. Route	State
Interstate Route	

DALTON, PA.
N4130—W7537.5/7.5
PHOTOINSPECTED 1980
1945
PHOTOREVISED 1944

USGS QUADRANGLE MAP: Dutch Mountain

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	511	G?	S?	N	N	------	E
	515	G?	S2	N	N	07-01-93	C
	522	G4	S1	N	N	04-25-95	AB
SPECIAL PLANTS:	503	G4G5	S2	N	PT	07-14-93	B
	504	G5?	S1	N	PE	07-14-93	C
	509	G4	S2	N	TU	07-14-93	E
	512	G5	S3	N	PR	07-07-91	BC
	513	G5	S3	N	PR	06-30-93	D
	514	G5	S3	N	PR	06-30-93	D
	516	G5	S3	N	PR	07-01-93	C
	517	G5	S3	N	PR	07-01-93	C
	518	G5	S2	C2	PT	07-14-93	E
	524	G5	S3	N	PR	04-05-95	C
	525	G5	S3	N	PR	04-05-95	D
SPECIAL ANIMALS:	523	G5	S?	N	N	06-29-94	E

LOCALLY SIGNIFICANT: TAMARACK SWAMP

HQ-CWF: Baker Run (Windfall Run), Bowman Creek, Mehoopany Creek, Sugar Run

MANAGED AREAS: State Game Lands 57, State Game Lands 66

OTHER:

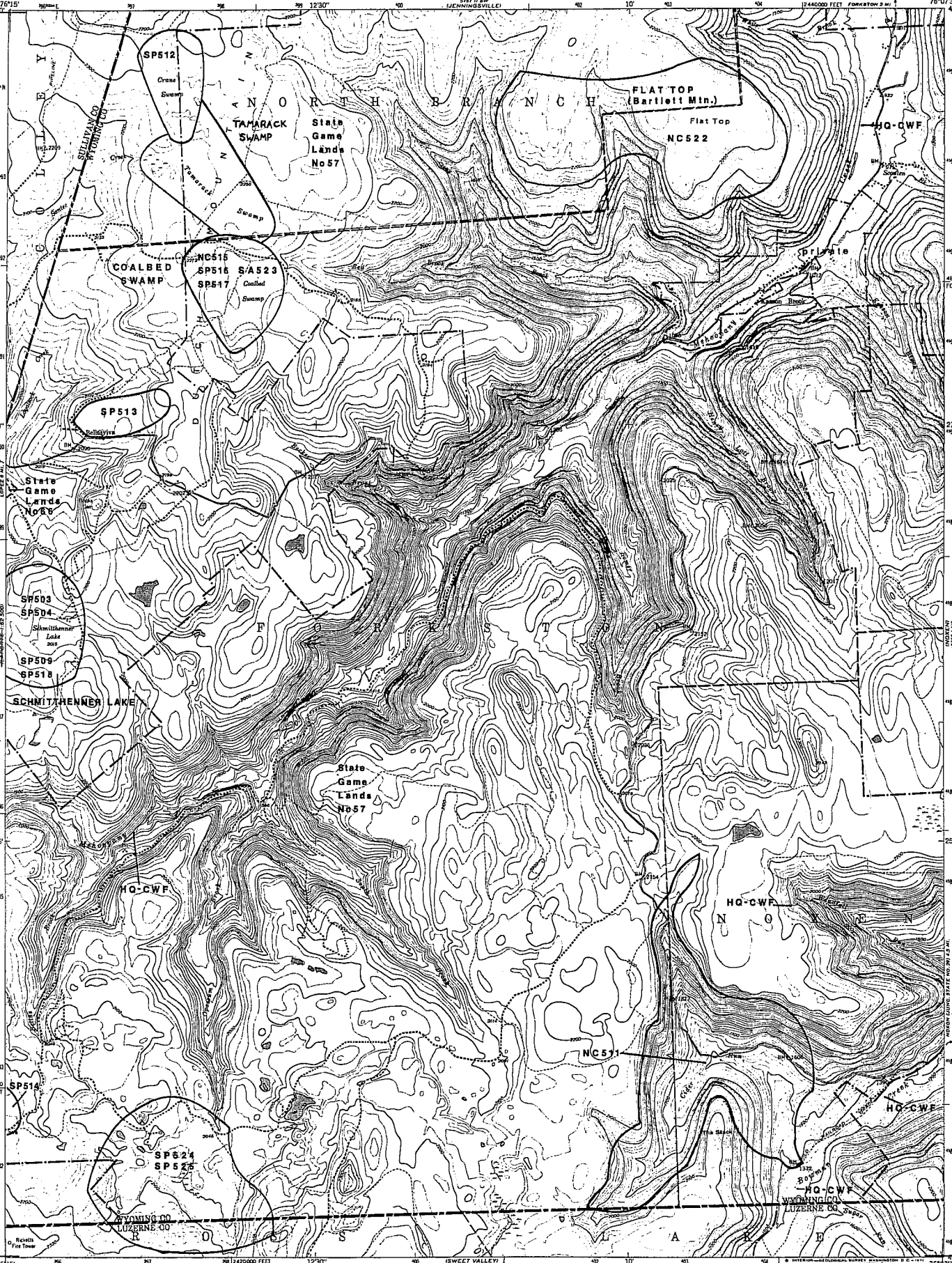
* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1942. Field check 1946

Polyconic projection. 1927 North American datum
100 foot grid based on Pennsylvania coordinate system, [illegible] zone
10-meter Universal Transverse Mercator grid ticks, [illegible] 19, shown in blue

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

ROAD CLASSIFICATION
Light-duty ——— Unimproved dirt .....

PENNSYLVANIA
QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

DUTCH MTN., PA.
N4122.5—W7607.5/7.5

1946
PHOTOREVISED 1969

Dutch Mountain Quadrangle

NC511 (Forkston and Noxen Twps.) Cider Run is an EV stream throughout its basin from its headwaters to its confluence with Bowman Creek.

NC522 (North Branch and Forkston Twps.) **FLAT TOP (BARTLETT MOUNTAIN BALD)** is one of the top two sites in the county. It is designated as a Spruce Rocky Summit natural community or, spruce bald. This community had not been described for PA until its discovery in 1993. These communities are known as Spruce-fir Rocky Summits in the Catskills and Adirondacks of New York (Reschke 1990) and, in North Carolina (Schafale and Weakley 1990), they are called High Elevation Rocky Summits. Different assemblages of plants and animals are found in the different regions from New York to North Carolina.

This community is typified by red spruce (Picea rubens) although it may not be the dominant species. Red spruce is found scattered across this area both on rocky outcrops of conglomerate and sandstone bedrock and within the numerous small wetlands that abound on Bartlett Mountain and Flat Top. Low heath plants, such as black huckleberry and low-bush blueberry, are common in pockets of soil on the rock outcrops. Trees and tall shrubs have become established in cracks in the bedrock. Hemlocks (Tsuga canadensis) are the dominant trees on most of the rock outcrops and across much of Flat Top and Bartlett Mountain. Many of the red spruce and other conifers (hemlock, white pine and red pine) have lower branches that sprawl across the rocks and upper branches that display "flagging" from high winds. Mosses and lichens are numerous on the exposed bedrock. The community on this quad is mapped along the southwestern perimeter of Bartlett Mountain in the area known as Flat Top. Spruce balds are most likely to occur near the edges of the escarpment where the species are exposed to high winds.

No rare plants or animals are known from the area but several rare species are known to utilize these habitats. More survey work is planned to look for rare species, to age trees, and to better understand the dynamics of this community in **State Game Lands 57.** See also NC503 on Jenningsville quadrangle.

SCHMITTHENNER LAKE (Forkston Twp.) contains four rare plant species; all of them are found nowhere else in the county. The 20-acre lake is natural but has been altered primarily by beaver. The water level has been raised which has flooded out most of the glacial bog that was here. Only small remnants of leatherleaf "bog" remain as fringes along parts of the shoreline and as a fairly large area near the inlet. Several rare bog species were once thought to have occurred here but none have been found in recent years. The lake itself is in good shape with typical acid lake aquatic species occurring in the shallows of the lake. The four rare species are designated as: **SP503**, **SP504**, **SP509**, and **SP518** and are discussed below.

SP503 is a shallow-water species that often occurs near bog edges. This species and the next were originally found by a team of botanists from the University of Pennsylvania and the Academy of Natural Sciences in 1984. Schmitthenner Lake constitutes one of the better sites for this species in Pennsylvania.

SP504 is also a shallow-water species but it may be declining at this site; where once it had been found over much of the lake, it seems to be concentrated in one corner now. It is a PA-Endangered plant and should be monitored yearly.

SP509 was originally found here in 1913 but was not located again until 1993. It is an aquatic species that is not easily recognized and not easily found without a boat. Given its longevity in the lake, it would appear to be secure but a better assessment of the population and yearly monitoring are suggested.

SP518 is another aquatic species but it was not discovered at this site until 1993 while searching for the other rare species. Its population needs better assessment as well.

Although not listed as a rare species currently, at least one northern species is apparently breeding in the remaining wetland habitat at the west end of Schmitthenner Lake. It is the first confirmed breeding occurrence in Pennsylvania (Conant 1995).

The existence of four plant species of special concern and the possibility of other rare plants and animals make **SCHMITTHENNER LAKE** one of the top sites for conservation in Wyoming County. At this time there do not appear to be any threats. There are few landowners around the lake and only three or four cottages close to the lake. The major landowners are aware of the conservation and recreation values of the lake and are good stewards. The amount of use the lake receives during the summer does not appear to be a threat. Monitoring of the rare species and further inventory are needed. Should the landowners wish it, a stewardship plan to ensure the continued existence of the rare species and the good health of the lake may be warranted.

SP512 (North Branch Twp.) is found in Crane Swamp. Several hundred plants of a PA-Rare shrub occur here with highbush blueberry, leatherleaf, sheep laurel (Kalmia angustifolia), cottongrass (Eriophorum spissum) and cranberry (Vaccinium oxycoccos). Young red spruce (Picea rubens) and birch (Betula populifolia) are scattered throughout. Logging records from 1911-1916 report cutting of 30-40,000 feet per day of "mostly spruce" from Crane Swamp and the headwaters of Stony Brook (Taber 1970). At that time, most of the surrounding land had already been cut over except for some spruce at Tamarack Swamp (see site description below). Crane Swamp may continue its slow succession back to a more forested state. There are no immediate threats to **SP512**.

SP513 (Forkston Twp.) - A small population of a PA-Rare plant was found on low hummocks in Bellasylva Swamp. Red spruce is the dominant canopy species while cinnamon fern, blueberry, peat moss and other mosses are common in the understory. Although there has been some disturbance from past logging and powerlines cut through

the site, the wetland is fairly diverse and there is some potential for additional individuals of this species to be found with further surveys.

SP514 (Forkston Twp.) - "Bellas Brook Swamp" - Two small sub-populations of a PA-Rare plant were found under red spruce in a spruce-hemlock swamp on **State Game Lands 57.** The area has been disturbed by past logging, beaver activity and a nearby road; there is little potential for a larger population to be found with further searches.

COALBED SWAMP (Forkston and North Branch Twps.) - **NC515** is a Boreal Conifer Swamp natural community of about 70 acres that is dominated by red spruce, some of which are estimated to be about 100 years old. A healthy population of a G5S3 PA-Rare shrub (**SP516**) is found in some of the shadiest portions of the swamp growing on old windthrown timber. A second PA-Rare shrub (**SP517**) grows in the more open and younger parts of the swamp. This population is also doing quite well and is found scattered over several acres of the swamp.

The site also provides breeding habitat for at least one bird species that very rarely breeds in the state (**SA523**); it typically breeds farther north. Territorial behavior was observed in the species in July 1993 and June 1994, and there was at least one unsuccessful breeding attempt in 1994. Breeding by this species had never been actually documented in Pennsylvania until observed here in 1994 (Gross 1995). This site also may provide breeding habitat for two other animals of concern but that could not be confirmed at the time. Because of the breeding of one or more animals of concern and the rare plants, this swamp and the surrounding uplands are important for helping to maintain biological diversity in the Commonwealth.

The Boreal Conifer Swamp community is contained within the 140-acre Coalbed Swamp which also includes a shrub swamp dominated by blueberries, leatherleaf and various sedges. Although apparently logged in the 1890s (Taber 1970), Coalbed Swamp provides the best example in the area of the red spruce swamp community type that once covered the wetlands of the Dutch Mountain area. The southeastern corner is a shrub swamp that has been impacted by blocked drainage due to a road across the outlet. However, in most places the wetland is in good shape and appears to be recovering from past logging and other disturbances and has good potential to improve in quality over time if buffered from further disturbances. Coalbed Swamp is part of a complex of wetlands which includes Crane Swamp and Tamarack Swamp to the north. The site is almost entirely contained within **State Game Lands 57.**

SP524 and **SP525** (Forkston Twp.), both PA-Rare shrubs, are found in Opossum Swamp within **State Game Lands 57.** Although the population of neither species is considered to be very high quality, more extensive searches may yield more information which could increase the quality rank of one or both. Opossum Swamp is

a large wetland mostly composed of low shrubs less than 2 meters tall. Leatherleaf and highbush blueberry are the dominants with an assortment of grasses and sedges that indicate shallow peat deposits and low pH soil and water. The size of the wetland (along with the high density of wetlands on this plateau) make this area of Wyoming County significant. There is good potential for other rare species including birds, mammals and more rare plants within this wetland and in the others found on the plateau. Fortunately, these wetlands are on lands protected by the Pennsylvania Game Commission.

TAMARACK SWAMP (North Branch Twp.) is locally significant as part of the wetland complex that includes Coalbed Swamp and Crane Swamp (see above). Although no species of special concern have been verified at Tamarack Swamp, the site provides habitat for a diversity of plant and animal species and potential breeding habitat for a PA-Threatened animal. According to logging records, Tamarack Swamp was one of the last tracts to be logged out of this area; one tract of virgin spruce was reportedly still present as late as 1942 (Taber 1970). The site was logged out when a rail line was constructed into the area. Today, the site is primarily shrub swamp dominated by highbush blueberry and may slowly revert back to forested swamp.

Baker Run (aka Windfall Run) is a HQ-CWF throughout its basin (see also Noxen quadrangle). It is a tributary to Bowman Creek.

Bowman Creek - The main stem of this creek is designated as a HQ-CWF (High Quality Coldwater Fisheries) from Luzerne County to the confluence with the North Branch SUSQUEHANNA RIVER. See also Center Moreland, Noxen and Tunkhannock quadrangles.

Mehoopany Creek is a HQ-CWF throughout its basin from the headwaters in Sullivan County to the North Branch of Mehoopany Creek in Forkston. See also Jenningsville, Lopez and Meshoppen quadrangles.

Sugar Run is a HQ-CWF throughout its basin to its confluence with Bowman Creek.

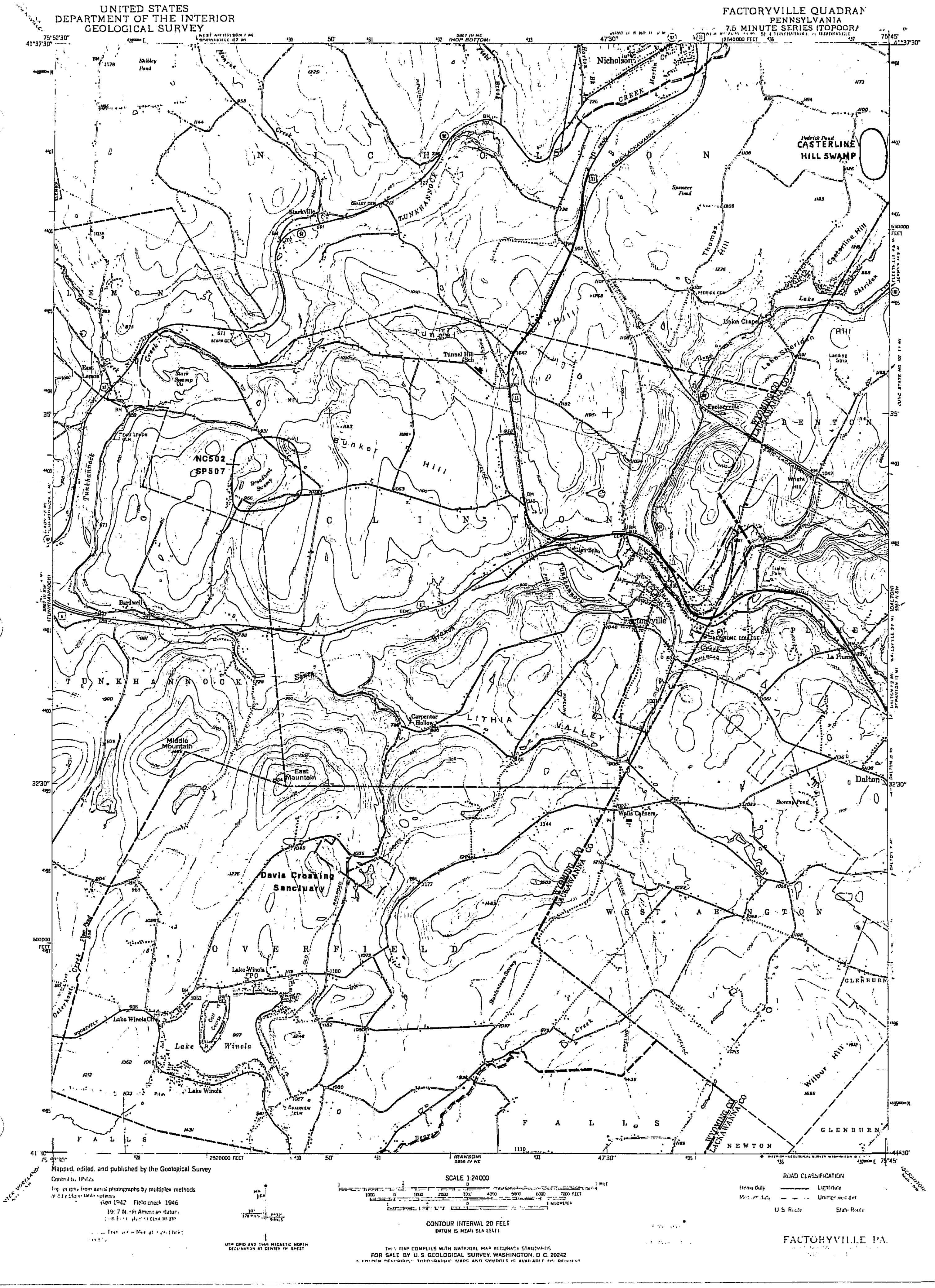
USGS QUADRANGLE MAP: Factoryville

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	502	G?	S3S4	N	N	05-27-93	BC
SPECIAL PLANTS:	507	G5	S2	N	TU	05-27-93	B
SPECIAL ANIMALS:							
LOCALLY SIGNIFICANT:	CASTERLINE HILL SWAMP						
HQ-CWF:							
MANAGED AREAS:	Davis Crossing Audubon Sanctuary						
OTHER:							

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

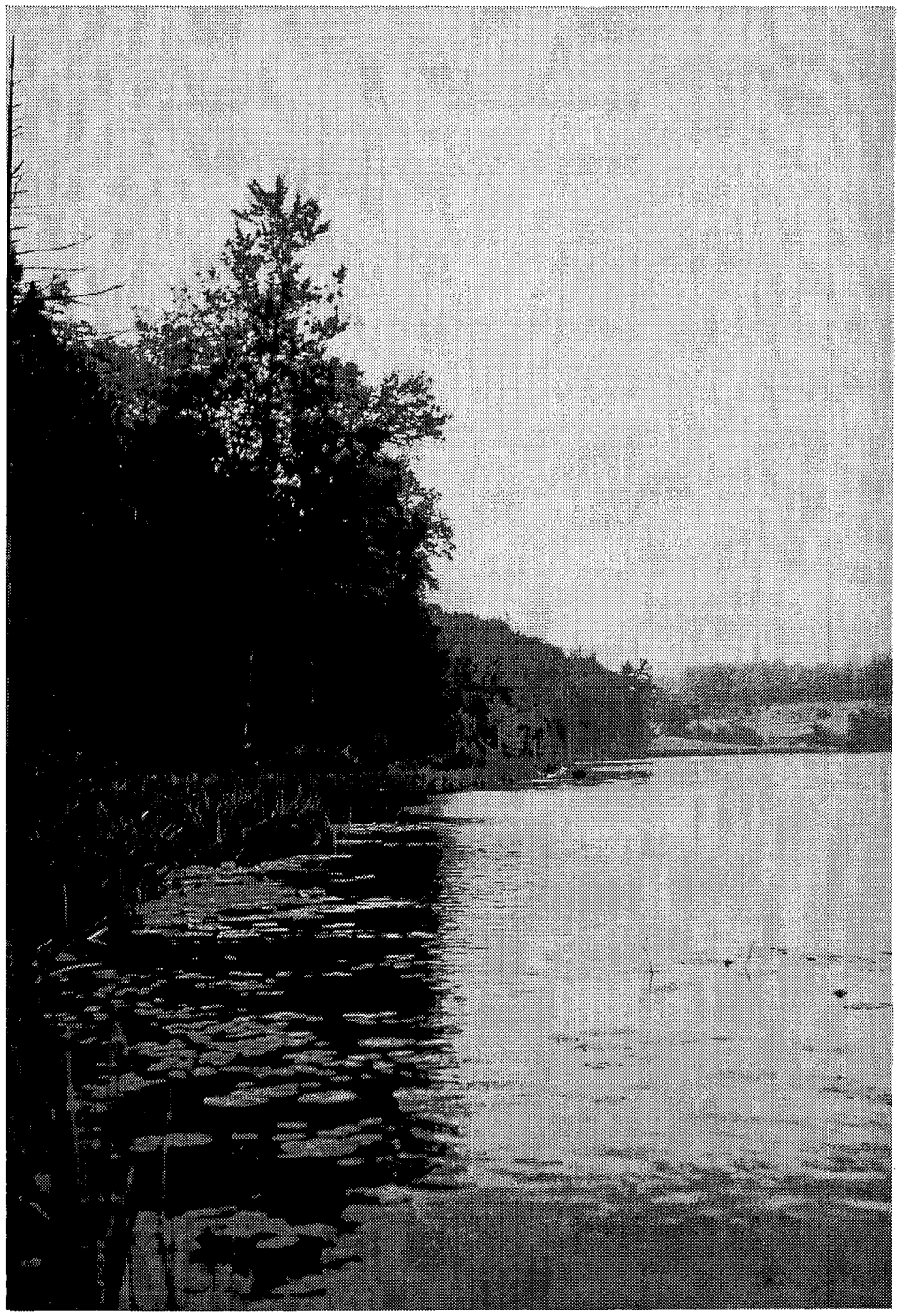
(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FACTORYVILLE QUADRAN
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRA
Nicholson
CASTERLINE HILL SWAMP
Starkville
Tunkhannock Creek
Bunker Hill
NC502
SP507
Broadbent Swamp
Stark Swamp
East Lemon
Tunnel Hill Sch
Factoryville
Keystone College
La Plume
Wright Hill
Lake Sheridan
Union Chapel
Thomas Hill
Casterline Hill
Spencer Pond
Bardwell
Carpenter Hollow
Lithia Valley
Middle Mountain
East Mountain
Dalton
Wallis Corners
Davis Crossing Sanctuary
Lake Winola
Wilbur Hill
WYOMING CO
LACKAWANNA CO
CLINTON
TUNKHANNOCK
OVERFIELD
WEST ABINGTON
BENTON
GLENBURN
FALLS
NEWTON
Mapped, edited, and published by the Geological Survey
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
ROAD CLASSIFICATION
FACTORYVILLE PA.

Factoryville Quadrangle

BROADBENT SWAMP (Clinton Twp.) is a fair to good quality Broadleaf-Conifer Swamp Natural Community (**NC502**) with a canopy of red maple, yellow birch, black ash, and hemlock, scattered thickets of Rhododendron maximum and a diverse herb layer. Peat moss hummocks, cinnamon fern, sensitive fern, dwarf blackberry (Rubus pubescens), azalea, and occasional patches of poison sumac (Rhus vernix) characterize the site. Possibly the best state population of a rare plant, **SP507**, is known from the site, with two sub-populations totaling several hundred plants growing on sphagnum hummocks. A good diversity of species occurs here and, although the area was logged in the past (up to the 1950's), it is recovering well with good tree regeneration. Flooding (by beaver or humans), changes in hydrology, or increased nutrient input would be detrimental to the quality of the natural community and the rare plant population. The woodland around most of the swamp is a beneficial buffer for water quality and quantity maintenance and the prevention of exotic plant species encroachment.

CASTERLINE HILL SWAMP (Nicholson Twp.) is a locally significant site. It was not visited in the field but its size and its contribution to Lake Sheridan make it important. Based on color infra-red photography, the swamp is dominated by a mix of conifers and deciduous trees. The canopy appears to be relatively uniform which indicates past logging. If permission is granted, a field survey should be conducted to describe the site and to look for rare species.



Locally Significant sites, such as Sharpe Pond (Jenningsville Quadrangle) often maintain a highly diverse fauna and flora and may harbor rare species. Photo: Pennsylvania Science Office of The Nature Conservancy.

QUADRANGLE MAP: Hop Bottom

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:							
SPECIAL ANIMALS:	503	G5	S3	N	N	1994	E
LOCALLY SIGNIFICANT:							
HQ-CWF:							
MANAGED AREAS:							
OTHER:							

Hop Bottom Quadrangle

SA503 (Nicholson Twp.) has been observed breeding in Phelps Swamp. The site was not visited in the field by our biologists but the site is known to local naturalists as habitat for this species and several uncommon migrating and breeding birds. Disturbance during the nesting season should be avoided and as much buffer as possible should be provided to avoid impacts to water quality and vegetation in the swamp.

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 TUCKHANNOCK 15' QUADRANGLE

Mapped by the Geological Survey
1946

ROAD CLASSIFICATION

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

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Polyconic projection. 1927 North American datum
10000 foot grid based on Pennsylvania (North) rectangular coordinate system
1000 meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

PENNSYLVANIA
QUADRANGLE LOCATION

HOP BOTTOM, PA.
NE/4 TUCKHANNOCK 15' QUADRANGLE
N4137.5—W7545/7.5

1946
PHOTOREVISED 1969

USGS QUADRANGLE MAP: Jenningsville

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	503	G4	S1	N	N	05-24-95	AB
SPECIAL PLANTS:	504	G4G5	S3	N	PT	05-24-95	E
SPECIAL ANIMALS:							

LOCALLY SIGNIFICANT: SHARPE POND, JENNINGSVILLE LEDGES, SUSQUEHANNA RIVER

HQ-CWF: Mehoopany Creek

MANAGED AREAS: State Game Lands 57

OTHER:

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

Mapped by the Geological Survey
1945

Polyconic projection. 1927 North American datum
5000 yard grid based on U. S. zone system, A
10000 foot grid based on Pennsylvania (North) rectangular coordinate system
1000 meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

JENNINGSVILLE, PA.

1945

Jenningsville Quadrangle

BARTLETT MOUNTAIN BALD (NC503) - (North Branch and Forkston Twps.) is designated as a Spruce Rocky Summit natural community or, spruce bald, and is one of the top two sites in the county. This community had not been described for PA until its discovery in 1993. These communities are known as Spruce-fir Rocky Summits in the Catskills and Adirondacks of New York (Reschke 1990) and, in North Carolina (Schafale and Weakley (1990), they are called High Elevation Rocky Summits. Different assemblages of plants and animals are found in the different regions from New York to North Carolina.

This community is typified by red spruce (Picea rubens) although it is rarely the dominant species. Red spruce is found scattered across this area both on rocky outcrops and within the numerous small wetlands that abound on Bartlett Mountain and Flat Top. Low heath plants, such as black huckleberry and low-bush blueberry, are common in pockets of soil on the rock outcrops. Trees and tall shrubs, such as mountain ash (Sorbus americana), become established in cracks in bedrock. Many of the spruce and other conifers have lower branches that sprawl across the rocks and display "flagging" from high winds. Mosses and lichens are numerous on the exposed bedrock. The community on this quad is mapped along the northern perimeter of Bartlett Mountain. The community is most extensive in this area but is also found along the southwestern edge of the escarpment (See Dutch Mountain **NC522, FLAT TOP**). This spruce community appears to occur near the edges of the escarpment where there is exposure to high winds.

Information has been received recently about rare animals and plants on the mountain. It is too sketchy currently to map. More survey work is planned to look for rare species, to age trees, and to better understand the dynamics of this community. The community is located mostly within **State Game lands 57.**

SP504 (Forkston Twp.) is found in "Forkston Woods" west of the Forkston on the steep east-facing slope of Bartlett Mountain. The species was located in only one spot adjacent to a logging road. The few plants that were found are healthy and flowering. More survey work needs to be done to assess the population here and determine its needs.

SHARPE POND (Windham Twp.) - This locally significant pond supports a variety of aquatic plants such as water lilies (Nuphar lutea and Nymphaea odorata) and water shield (Brasenia schreberi) as well as a fringe of emergent vegetation including sedges (Carex spp.), bullrushes (e.g., Scirpus cyperinus), leatherleaf (Chamaedaphne calyculata), cattails (Typha latifolia), burreed (Sparganium americanum) and others. Several small islands are also present with poison sumac (Rhus vernix) and buttonbush (Cephalanthus occidentalis). The site provides habitat for a diversity of odonate (dragonfly and damselfly) species: a survey for odonates in 1994 turned up a total of 15 different species including two that

were new records for the county. No rare species have been located but the diversity of the site makes it significant within the county.

The northern shore of Sharpe Pond is bordered by hemlock-yellow birch-maple forest while fields, pasture and a campground surround the remainder of the lake. Eutrophication (nutrient input) has impacted this shallow pond as evidenced by a heavy algae bloom in some years. Maintaining wooded buffers at the lake edge and encouraging other means of reducing runoff would help to maintain or restore the natural qualities of the pond. Heavy use of the pond by Canada geese may also contribute to the nutrient load. Sharpe Pond is the first in a series of connected ponds.

JENNINGSVILLE LEDGES (Windham Twp.) is along the south side of the SUSQUEHANNA RIVER. The steep upper slopes are dominated by hemlocks and mixed hardwoods and contain prominent shale outcrops that support a locally significant flora including a diversity of ferns, wild ginger, herb robert, meadow rue, gooseberry, and many other wildflowers and shrubs. The site has potential for one or two plant species of special concern; one rare species was historically known from this vicinity but has not been found recently. Maintaining the forest canopy can prevent invasion by weedy plants and allow this interesting flora to persist.

Mehoopany Creek is a HQ-CWF throughout its basin from the headwaters in Sullivan County to the North Branch of Mehoopany Creek. See also Dutch Mountain, Lopez and Meshoppen quadrangles.

USGS QUADRANGLE MAP: Laceyville

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	502	G?	S5	N	N	04-05-95	C
SPECIAL PLANTS:							
SPECIAL ANIMALS:							
LOCALLY SIGNIFICANT:	SUSQUEHANNA RIVER						
HQ-CWF:							
MANAGED AREAS:							
OTHER:							

Laceyville Quadrangle

NC502 (Braintrim Twp.) - "Skinners Eddy Cliffs" - is an Acidic Cliff natural community dominated by vertical bedrock outcrops of Catskill Formation sandstone. The cliff faces west, rising more than 400 ft. above the Susquehanna River, at the village of Skinners Eddy. Plants have become established on horizontal shelves and in fissures in the bedrock. Dominant tree species include juniper (Juniperus virginiana), white ash (Fraxinus americana), and chestnut oak (Quercus montana). These trees appear stunted because of the harsh growing conditions. All of the trees, shrubs, grasses and herbs growing here are adapted to dry conditions. No rare species are known to occur here but the potential does exist for both rare plants and animals. Development to the edge of the cliff is unlikely but removing the wooded buffer could be detrimental to the species inhabiting the community.

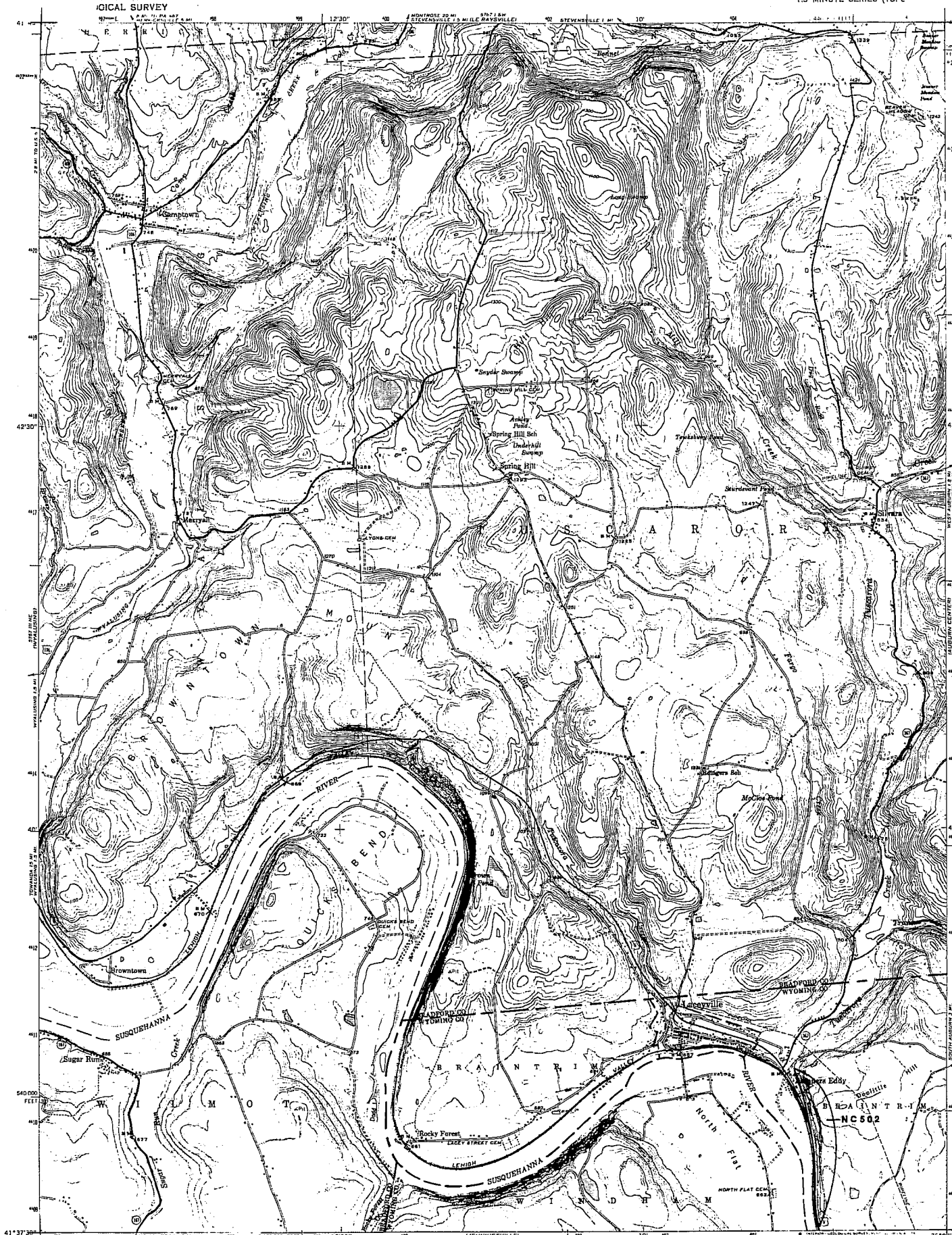
* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPART[illegible]IT OF THE INTERIOR
[illegible]GICAL SURVEY

[illegible]
PENNSYLVANIA
7.5 MINUTE SERIES (TOPO[illegible]



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

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

[illegible]n. 1927 North American datum
[illegible]ased on Pennsylvania coordinate system, north zone
[illegible]sal Transverse Mercator projection, zone 18.

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty
Medium-duty - - - Unimprov.
U S Route ○ St.

LACEYVILLE, PA.

[illegible]

1945
PHOTOREVISED 1968

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

USGS QUADRANGLE MAP: Lenoxville

	TNC Ranks*		Legal Status*		
	Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:						
LOCALLY SIGNIFICANT:						
HQ-CWF:						
MANAGED AREAS:						
OTHER:						

Lenoxville Quadrangle

Only a small portion of Wyoming County occurs on this map (southwestern corner). No exemplary natural communities, species of special concern or locally significant natural areas have been identified in this locale.

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GICAL SURVEY

LENOXVILLE QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS

Topography, from aerial photographs by multiplex methods
Aerial photographs taken 1942. Field check 1946

Polyconic 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

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS	DRY WEATHER ROADS
Heavy-duty	Improved dirt
Medium-duty	Unimproved dirt
Loose-surface, graded, or narrow hard-surface	

U. S. Route State Route

PENNSYLVANIA
QUADRANGLE LOCATION

LENOXVILLE, PA.
N4137.5—7537.5/7.5
1946

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

USGS QUADRANGLE MAP: Lopez

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	558	G5	S3	N	PR	11-28-90	D
	567	G5	S3	N	PR	07-14-93	B
	568	G5	S3	N	PR	07-14-93	C
SPECIAL ANIMALS:	546	G5T5	S3	N	PR	11-02-84	B

LOCALLY SIGNIFICANT:

HQ-CWF: Mehoopany Creek

MANAGED AREAS: State Game Lands 57

OTHER: sp566 (Splashdam Pond, Sullivan County)

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

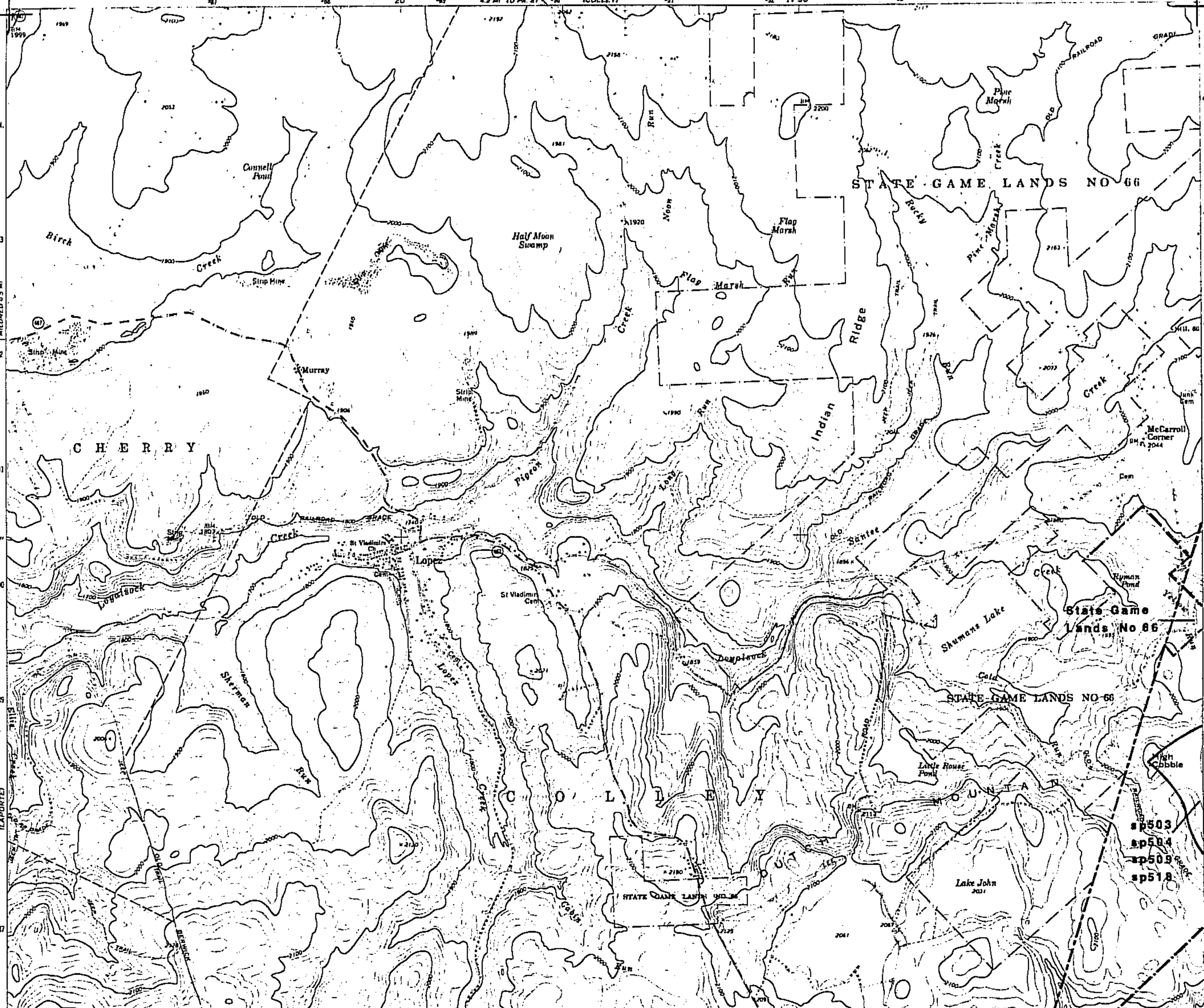
** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
TOPOGRAPHIC AND GEOLOGIC SURVEY

PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1969. Field checked 1969

North American datum
Pennsylvania coordinate system, north zone
Transverse Mercator grid ticks, zone 18.

To place on the predicted North American Datum 1983, move the projection lines 5 meters south and 28 meters west as shown by dashed corner ticks

Map photoinspected 1983
No major culture or drainage changes observed

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

ROAD CLASSIFICATION

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

LOPEZ, PA.
NE/4 LAPORTE 15' QUADRANGLE
41076-D3-TF-024

1969
PHOTOINSPECTED 1983

Lopez Quadrangle

SA546, SP558 & sp566 (Forkston Twp. and Sullivan Co.) - "Splashdam Pond" - A good quality occurrence of a PA-Rare animal (**SA546**) is of primary importance since it is the only documented site for the species in Wyoming County. The species was first documented here in 1949 and was found again in 1984 by the PA Game Commission. This animal is dependent on the wetland and stream habitats; maintaining good water quality serves to protect the rare species as well as the fisheries value of Mehoopany Creek (a HQ-CWF stream) and the pond. **SP558** is a very poor occurrence of a PA-Rare plant found in the boggy area of the pond. No management specifically for this plant is warranted without further searching for more plants. The species represented by **sp566** is a PA-Rare shrub found in a small shrub swamp on the west side of Splashdam Pond in Sullivan Co. Better populations of both of these plant species exist nearby. The site is protected within **State Game Lands 57** (Wyoming Co.) and **SGL 66** (Sullivan Co.).

SP567, SP568 (Forkston Twp.) - County Line Swamp is a site on **SGL 57.** The swamp was apparently logged in the late 1800s or the early part of this century (Taber 1970) and has remained a shrub swamp with little encroachment by trees since that time. The populations of both PA-Rare species are healthy and there do not appear to be any threats at this time.

Mehoopany Creek is a HQ-CWF throughout its basin from the headwaters in Sullivan County to the North Branch Mehoopany Creek in Forkston. See also Dutch Mountain, Jenningsville and Meshoppen quadrangles.

The Atlas of Breeding Birds in Pennsylvania (Brauning 1992) indicates that northern goshawks (G4S2, suggested for PA Vulnerable status) have nested in the southwestern part of the county and/or southeastern Sullivan County. The precise location is not identified to protect the birds. This species needs large areas of mature mixed hardwood-conifer forest for breeding. The Atlas recommends no logging within 300 meters (about 1000 feet) of any nest. Timber management plans should incorporate known breeding sites and the plans should also recommend surveys for nests at the appropriate season to avoid encroachment on them.

Indian Plantain (Cacalia suaveolens) is a Pennsylvania plant of special concern. It is in the aster family. Photo: Pennsylvania Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Meshoppen

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:							
SPECIAL ANIMALS:	504	G5	S3S4	N	N	06-01-91	E
	506	G1G3	S1	N	N	07-20-89	E
LOCALLY SIGNIFICANT:	FOX HOLLOW SWAMP, SUSQUEHANNA RIVER						
HQ-CWF:	Mehoopany Creek, Roaring Run, Sugar Hollow						
MANAGED AREAS:							
OTHER:							

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

(WYOMING COUNTY)
MESHOPPEN QUADRA
7½-MINUTE SERIES

Mapped by the Geological Survey
1945

SCALE 1:24000

Contour interval 20 feet
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092

Polyconic projection. 1927 North American datum
5000 yard grid based on U.S. zone system, A
10000 foot grid based on Pennsylvania (North)
rectangular coordinate system

ROAD CLASSIFICATION
Heavy duty
Medium duty
Light duty

MESHOPPEN, PA.

1945

Meshoppen Quadrangle

SA504 (Mehoopany Twp.) - Mehoopany Creek Site is one of two breeding areas for this species in Wyoming County. The site utilized is a pine plantation in an agricultural area and thus may not be permanent. Monitoring should be done every year or two in late spring or early summer but with a minimum of intrusion. The site should be given as much buffer as possible during the breeding season.

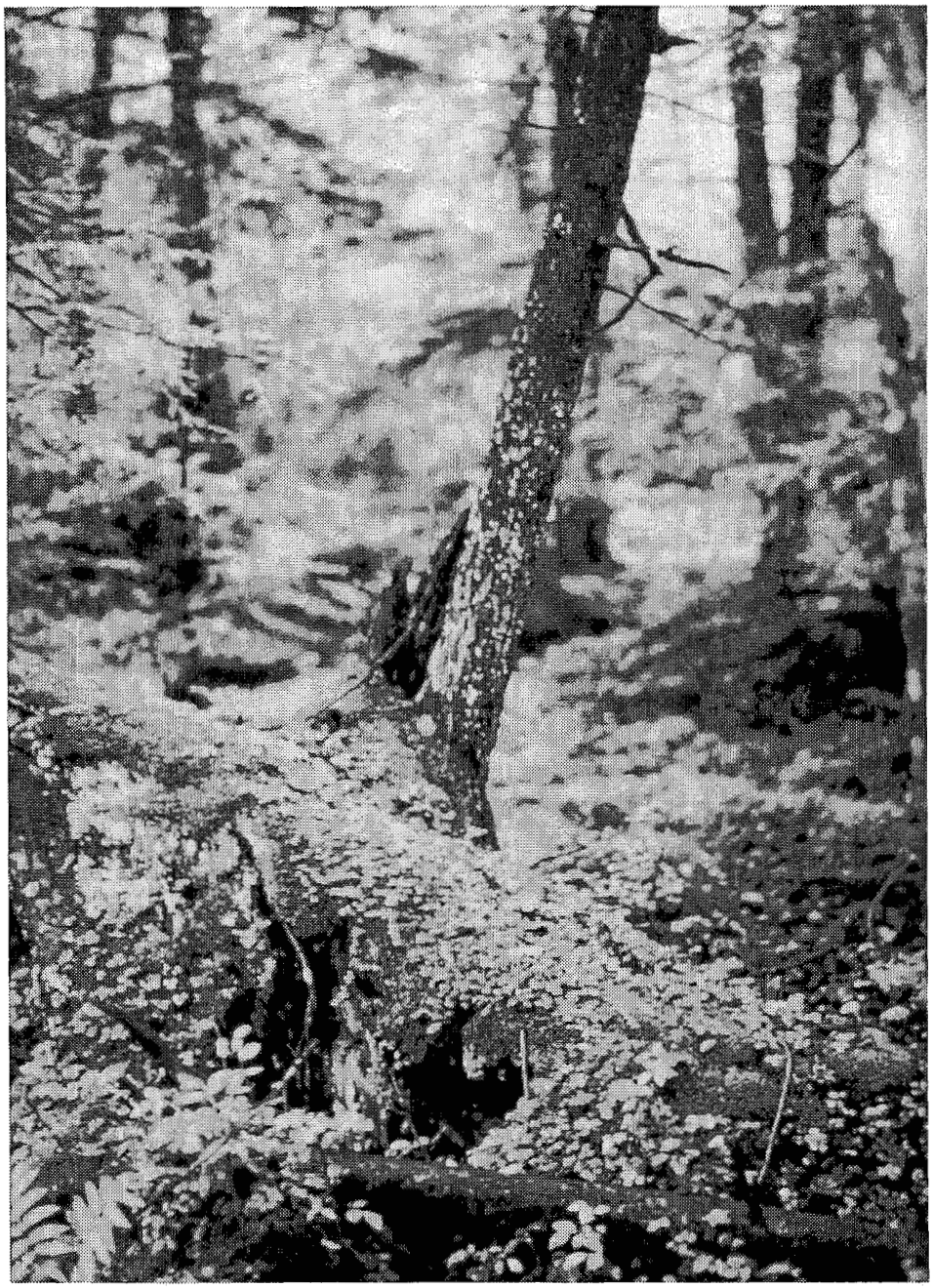
SA506 (Meshoppen Twp.) Meshoppen Creek is the only location for this species in Pennsylvania and it is currently considered globally rare (its global range is the entire East Coast, so G rank may change). Only a few individuals were observed at the time so the population status is unknown. Defensibility is difficult for aquatic species in running waters. Maintaining or improving existing water quality in the creek and its tributaries is the best method of protecting this species.

FOX HOLLOW SWAMP (Windham Twp.) - This is a locally significant 40-50 acre hemlock-yellow birch-black ash swamp, most of which was probably logged within the past 60 years. The area has reforested and contains some older hemlocks, windthrows, mossy hummocks and a diversity of herb species representative of this community type. Cinnamon fern (Osmunda cinnamomea), golden ragwort (Senecio aureus), swamp saxifrage (Saxifraga pensylvanica), and sedges (Carex spp.) are frequent. The habitat has potential to support species of special concern although none were found during this survey.

Mehoopany Creek is a HQ-CWF throughout its basin from the headwaters in Sullivan County to the North Branch Mehoopany Creek in Forkston. See also Dutch Mountain, Jenningsville and Lopez quadrangles.

Roaring Run is a HQ-CWF throughout its basin (see also Noxen quadrangle).

Sugar Hollow is a HQ-CWF throughout its basin to its confluence with Bowman Creek. See also Tunkhannock quadrangle.



Boreal Conifer Swamp natural communities are restricted to higher elevation areas of northern Pennsylvania. They often harbor species that are rare in the state but are common in more northern climates. Creeping snowberry (Gaultheria hispidula), a plant of special concern, is growing on the upturned root of a conifer. Photo: Pennsylvania Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Noxen

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	504	G?	S?	N	N	-----	E
SPECIAL PLANTS:							
SPECIAL ANIMALS:	505	G5	S3	N	N	08-11-91	E

LOCALLY SIGNIFICANT:

HQ-CWF: Baker Run (Windfall Run), Beaver Run, Bowman Creek, Broad Hollow Run, Hettesheimer Run, Leonard Creek, Roaring Run, South Run, Stone Run, York Run

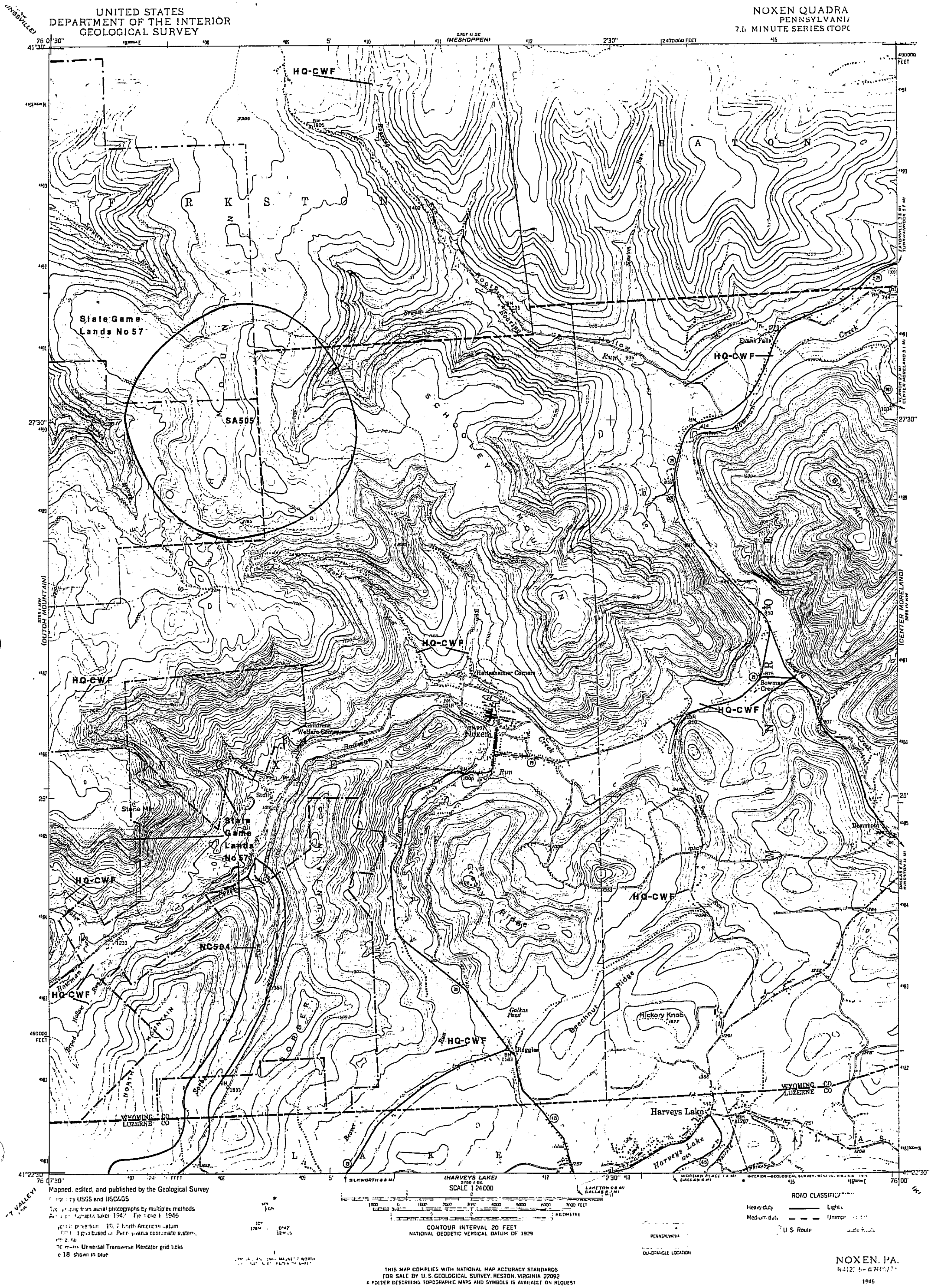
MANAGED AREAS: State Game Lands 57

OTHER:

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
NOXEN QUADRA
PENNSYLVANI
7.5 MINUTE SERIES (TOPO
(MESHOPPEN)
HQ-CWF
State Game Lands No 57
SA505
F O R K S T O N
E A T O N
N O X E N
L A K E
SCHOOLEY MOUNTAIN
Roaring Run
Bowman Creek
Evans Falls
Hettesheimer Corners
Childrens Welfare Center
Noxen
Stull
Stone Hill
NC504
Sorber Mountain
North Mountain
Beechnut Ridge
Grassy Ridge
Golkas Pond
Ruggles
Hickory Knob
Harveys Lake
WYOMING CO
LUZERNE CO
Bowman Creek
Beaumont
(DUTCH MOUNTAIN)
(CENTER MORELAND)
(HARVEYS LAKE)
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
Mapped, edited, and published by the Geological Survey
ROAD CLASSIFICATION
Heavy duty
Medium duty
U S Route
PENNSYLVANIA
QUADRANGLE LOCATION
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
NOXEN, PA.
1946

Noxen Quadrangle

NC504 (Noxen Twp.) - Sorber Run is an EV stream throughout its basin from the Wyoming/Luzerne county line to its mouth. It is primarily on state game lands.

SA505 (Forkston Twp., Noxen Twp.) - this species, found on South Mountain, requires a large home range for hunting and raising young. The area mapped is the minimum documented for this species in the northeastern U.S. (Chapman and Feldhamer 1982); the species may require as much as five or six times as much area in which to hunt and breed. Management of the forest in this region of the county should take into consideration the food and habitat needs of this rare species. This is the only documented record of this species in the county. There is also potential for other rare animals in the vicinity.

Baker Run (Windfall Run) is a HQ-CWF (High Quality Coldwater Fisheries) throughout its basin (see also Dutch Mountain quadrangle). It is a tributary to Bowman Creek.

Beaver Run is a HQ-CWF throughout its basin from Luzerne County to the confluence with Bowman Creek in Wyoming County.

Bowman Creek - The main stem of this creek is designated as a HQ-CWF from Luzerne County to the confluence with the North Branch SUSQUEHANNA RIVER. See also Center Moreland, Dutch Mountain and Tunkhannock quadrangles.

Broad Hollow Run is a HQ-CWF throughout its basin and a tributary to Bowman Creek.

Hettesheimer Run is a HQ-CWF throughout its basin and a tributary to Bowman Creek.

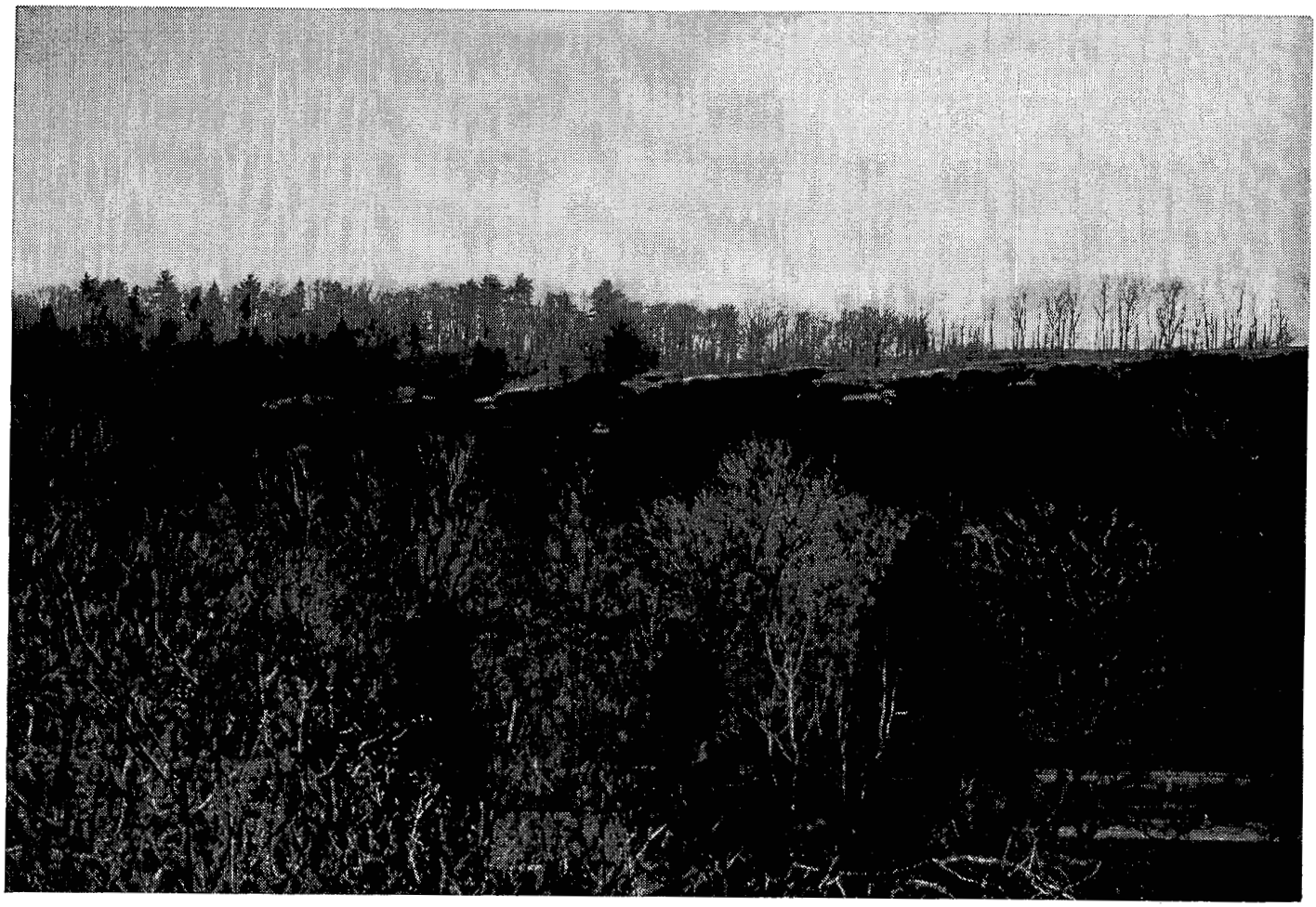
Leonard Creek is a HQ-CWF throughout its basin from its source in Luzerne County to the confluence with Bowman Creek. See also Center Moreland quadrangle.

Roaring Run is a HQ-CWF throughout its basin (see also Meshoppen quadrangle).

South Run, a tributary to Bowman Creek, is a HQ-CWF throughout its basin.

Stone Run, a tributary to Bowman Creek, is a HQ-CWF throughout its basin.

York Run is a HQ-CWF throughout its basin and a tributary to Bowman Creek.



Falls Cliff, south of the village of Falls is an Acidic Cliff natural community comprised of sandstone and shale. This view is from the village of West Falls. Photo: Pennsylvania Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Ransom

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	511	G?	S5	N	N	04-05-95	B
SPECIAL PLANTS:							
SPECIAL ANIMALS:							
LOCALLY SIGNIFICANT:	BUTTERMILK FALLS, SUSQUEHANNA RIVER						
HQ-CWF:							
MANAGED AREAS:							
OTHER:							

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RANSOM QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1942 Field check, 1946

Polyconic 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 compiled in cooperation with State of Pennsylvania agencies, from aerial photographs taken 1969 and 1976 This information not field checked

UTM GRID AND 1976 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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

ROAD CLASSIFICATION

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

The difference between 1927 North American Datum and North American Datum of 1983 (NAD 83) ...

RANSOM, PA.
41075-D7-TF-024
PHOTOINSPECTED 1980
1946

FALLS CLIFF (**NC511**) (Falls Twp.) is a good example of the relatively common Acidic Cliff natural community type. **FALLS CLIFF** is a sandstone cliff comprised of Catskill Formation sandstone, shale and siltstone south of the village of Falls and overlooking the SUSQUEHANNA RIVER. At least one plant of special concern was documented in this area in the past and may still be present. The talus slope at the base of the cliff is weedy near the bottom but weeds drop out away from the road. The dry cliff face and crest support scrubby forms of chestnut oak (Quercus montana), juniper (Juniperus virginiana) and other trees, shrubs such as low-bush blueberry (Vaccinium pallidum), and ferns, grasses and sedges. More searching is needed to determine if the rare plant is still present. Another species that is uncommon in the Commonwealth, American yew (Taxus canadensis), is abundant on the cliff. There is not a lot of buffer at the top of the cliff, but the cliff communities are in good shape. Maintaining the existing woodland buffer will help to maintain the high quality of the Acidic Cliff Community (**NC511**).

BUTTERMILK FALLS (Falls Twp.) is a series of low waterfalls about 0.3 miles above the mouth of Buttermilk Creek at the village of Falls (Geyer and Bolles 1987). The falls cascade over sandstone of the Catskill formation and range from 10 to 35 feet high. Hemlocks overhang the creek and falls, adding to the scenic value of the falls. Geyer and Bolles (1987) suggest that Buttermilk Falls is the most outstanding example of this kind of waterfall system in Pennsylvania.

Tunkhannock Islands (Tunkhannock Quadrangle) contains a mosaic of plant communities, each determined primarily by river flood levels and duration. The River Gravel natural community, here dominated by late summer grasses and forbs, is the most most intact. Photo: Pennsylvania Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Springville

	TNC Ranks*		Legal Status*		
	Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:						
LOCALLY SIGNIFICANT:						
HQ-CWF:						
MANAGED AREAS:						
OTHER:						

Springville Quadrangle

Only a small portion of Wyoming County is represented along the southern edge of this map. No species of special concern, natural communities or Locally Significant sites are known to occur here.

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SPRINGVILLE QUADRANGL
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHI
NW/4 TUNKHANNOCK 15 QUADRANGLE
25000 FEET

Mapped, edited, and published by the Geological Survey

Control by USGS and USC & GS

Topography from aerial photographs by multiplex methods
[illegible] photographs taken 1942. Field check, 1946

Projection. 1927 North American datum
grid based on Pennsylvania coordinate
in Zone
Universal Transverse Mercator grid ticks,
shown in blue

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt

State Route

PENNSYLVANIA
QUADRANGLE LOCATION

SPRINGVILLE, PA.
NW/4 TUNKHANNOCK 15 QUADRANGLE
N4137.5 W7552.5/7.5

USGS QUADRANGLE MAP: Tunkhannock

		TNC Ranks*		Legal Status*			
		Global	State	Fed.	State	Last Seen	Quality**
NATURAL COMMUNITIES:	517	G?	S4S5	N	N	09-14-93	BC
SPECIAL PLANTS:	512	G5	S3	N	PR	08-04-93	C
	513	G5	SU	N	N	08-04-93	D
	514	G5	S2	N	PR	08-19-93	BC
	515	G5	S3S4	N	TU	08-25-93	E
	518	G4?	S3	N	N	09-14-93	E

SPECIAL ANIMALS:

LOCALLY SIGNIFICANT: DIXON FLOODPLAIN FOREST, SUSQUEHANNA RIVER

HQ-CWF: Benson Hollow, Bowman Creek, Sugar Hollow

MANAGED AREAS:

OTHER:

* Please refer to Appendix I for an explanation of Ranks and Legal Status.

** Please refer to Appendix II for Quality ranks.

(FULL SIZE MAPS ARE AVAILABLE AT THE WYOMING CO. PLANNING OFFICE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TUNKHANNOCK QUADRANGLE
PENNSYLVANIA–WYOMING CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1942. Field checked 1946

Polyconic projection. 10,000-foot grid ticks based on Pennsylvania

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road
Interstate Route	U S R

QUADRANGLE LOCATION

TUNKHANNOCK, PA

41075-E8-TF-024

SP512, SP513 (Lemon Twp.) Bartron Pond Swamp has small populations of two PA-Rare plants typical of bog communities. This bog-like area is the result of past disturbances which have raised water levels and killed the trees. Many of the dead trees are still standing while highbush blueberries and gray birch and other trees and shrubs have become established below them. Typical bog plants invaded or became more abundant when the trees died; these include leatherleaf (Chamaedaphne calyculata) and pitcherplant (Sarracenia purpurea). These species dominate the interior of the swamp in a narrow swath that is about 0.25 acre in size. However, the blueberries and birches are moving in and may eventually displace the leatherleaf. The wetland would then become a tall shrub swamp and, eventually, a forested swamp once again.

NC517 (Eaton Twp.) - The **TUNKHANNOCK ISLANDS** site represents a fair to good example of the River Gravel natural community and contains a population of a recently listed plant species of special concern (**SP518**). The natural community is about 5 acres and is found associated with two other floodplain/river communities. Upslope is a forested island where silver maple (Acer saccharinum) dominates. Downslope is a shallow, seasonally-exposed channel of the SUSUQUEHANNA RIVER that separates the island from the mainland. The channel is dominated by a variety of emergent herbaceous species. The natural community is dominated by a cobble-gravel substrate and a variety of grasses including Indian grass (Sorghastrum nutans) and switch grass (Panicum virgatum). This site should be considered important in any strategy to maintain the quality and natural heritage of the SUSQUEHANNA RIVER. It may also harbor other rare species and more survey work needs to be done here for **SP518** and the community.

The SUSQUEHANNA RIVER, throughout its length, is an important ecological, recreational and scenic resource. Many species, including man, utilize the river and some are completely dependent upon it. Protecting the Susquehanna River is a task that requires the cooperation of many counties and three states, but Wyoming County can do its part by maintaining water quality in its tributaries, by encouraging landowners to maintain vegetated buffer zones on floodplains, and by carefully scrutinizing new activities that may adversely impact the river.

SP514 (Tunkhannock Twp.) - Helman Swamp contains one of the best populations known in the state of a PA-Rare sedge. Hundreds of stems of this plant were discovered in 1993 growing on mossy hummocks with yellow birch, hemlock, red maple, poison sumac and a large diversity of shrubs, ferns, sedges and native wildflowers. Beaver have influenced the swamp in the past and much of the area is now a marsh dominated by sedges and grasses. There appear to be no special management needs at present. The surrounding woodlands protect water quality and quantity in the swamp. The area is also

an important breeding area for amphibians as evidenced by the large numbers of red efts (juveniles) of the spotted newt seen during the survey. Also contained within the Helman Swamp boundary, on both sides of Whippoorwill Hollow road, is a nice example of a cool moist hemlock-mixed hardwood forest. In addition to serving as a buffer to the swamp, this woodland has potential for at least one rare plant species that historically occurred in the vicinity.

SP515 (Lemon & Tunkhannock Twps.) - Two stems of a pondweed of undetermined status (TU) were found along the shore of Lake Carey while searching for a historical record of another rare pondweed. Further surveys are needed to assess the extent and size of the population. Eutrophication and herbicides could be detrimental to this population. The lake is surrounded by houses and is a popular recreation area in the summer. The lake is stocked with trout and their is access via a PA Fish and Boat Commission boat ramp.

DIXON FLOODPLAIN FOREST (Tunkhannock Twp.) in Tunkhannock Creek just north of Dixon is a locally significant floodplain forest with open-grown sycamore, river birch (Betula nigra), slippery elm (Ulmus rubra), and box elder (Acer negundo) interspersed with small meadows of ostrich fern (Matteucia struthiopteris), coneflower (Rudbeckia laciniata), goldenrods (Solidago spp.), grasses and other herbs. The site also provides habitat for resident and migratory bird species. Some non-native aggressive plants such as Japanese knotweed and multiflora rose are present and may crowd out the native species unless managed.

Benson Hollow is a HQ-CWF (High Quality Coldwater Fisheries) throughout its basin.

Bowman Creek - The main stem of this creek is designated as a HQ-CWF from Luzerne County to the confluence with the North Branch SUSQUEHANNA RIVER. See also Center Moreland, Dutch Mountain and Noxen quadrangles.

Sugar Hollow is a HQ-CWF throughout its basin to the confluence with Bowman Creek. See also Meshoppen quadrangle.

LITERATURE CITED

Anonymous. 1985. A Preliminary Inventory of Natural Areas on the Hoosier National Forest. Indiana Department of Natural Resources, Indianapolis, IN. Unpubl. Rept. 197 pp.

Bailey, R.G. 1980. Descriptions of the Ecoregions of the United States. U.S. Dept. Agriculture., Misc. Publ. No. 1391. 77 pp.

Berg, T.M., W.E. Edwards, A.R. Geyer, A.D. Glover, D.M. Hoskins, D.B. Maclachlan, S.I. Root, W.D. Savon and A.A. Socolow. 1980. Geologic Map of Pennsylvania. PA Dept. Environ. Resources, Bureau of Topo. and Geol. Survey, Harrisburg, PA.

Berg, T.M. and C.M. Dodge, eds. 1981. Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania. PA Geologic Survey, Harrisburg, PA. 636 pp.

Berg, T.M., J.H. Barnes, W.D. Sevon, V.W. Skema, J.P. Wilshusen, D.S. Yannuci. 1989. Physiographic Provinces of Pennsylvania. Map #13. PA Dept. of Environ. Resources, Bureau of Topo. & Geol. Survey, Harrisburg, PA.

Braun, E.L. 1950. Deciduous Forests of Eastern North America. The Free Press, MacMillan Publ. Co., New York, NY. 596 pp.

Brauning, D.W., ed. 1992. Atlas of Breeding Birds in Pennsylvania. Univ. of Pittsburgh Press, Pittsburgh, PA. 484 pp.

Carpenter, V. 1991. Dragonflies and Damselflies of Cape Cod. Cape Cod Museum of Natural History, Brewster, MA. 79 pp.

Chapman, J.A. and G.A. Feldhammer (eds.). 1982. Wild Mammals of North America: Biology, Management and Economics. The Johns Hopkins University Press, Baltimore. 1147 pp.

Conant, S. 1995. First confirmed evening grosbeak nest in Pennsylvania—Wyoming County. Pennsylvania Birds 8(3):133-135.

Cuff, D.J., W.J. Young, E.K. Muller, W. Zelinsk, R.F. Abler, eds. 1989. The Atlas of Pennsylvania. Temple Univ. Press, Philadelphia, PA 288 pp.

Dunkle, S.W. 1989. Dragonflies of the Florida Peninsula, Bermuda and the Bahamas. Scientific Publishers, Inc. Gainesville, FL. 155 pp.

Eckenrode, J.J. 1982. Soil Survey of Lackawanna and Wyoming Counties, Pennsylvania. U.S. Department of Agriculture, Soil Conservation Service.

Fernald, M.L. 1950. Gray's Manual of Botany. D. Van Nostrand Co., New York, NY. 1632 pp.

Geyer, A.R. and W.H. Bolles. 1979. Outstanding Scenic Geological Features of Pennsylvania (Volume 1). Environ. Geol. Report 7, PA Dept. Environ. Resour., Bureau of Topo. & Geol. Survey, Harrisburg, PA. 508 pp.

Geyer, A.R. and W.H. Bolles. 1987. Outstanding Scenic Geological Features of Pennsylvania (Volume 2). Environ. Geol. Report 7, PA Dept. Environ. Resour., Bureau of Topo. & Geol. Survey, Harrisburg, PA. 270 pp.

Gleason, H.A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. Hafner Press, New York, NY. 3 volumes.

Gross, D.A. 1995. Discovery of a blackpoll warbler (Dendroica striata) nest, a first for Pennsylvania–Wyoming COunty. Pennsylvania Birds 8(3):128-132.

Kuchler, A.W. 1964. Potential Natural Vegetation of the Conterminous United States. Amer. Geograph. Soc., Special Publ. No. 36.

Reschke, C. 1990. Ecological Communities of New York. NY Natural Heritage Prog., NYS Dept. Envir. Conserv. Latham, NY. 96 pp.

Rhoads, A.W. and W.M. Klein, Jr. 1993. The Vascular Flora of Pennsylvania: Annotated Checklist and Atlas. American Philosophical Society, Philadelphia, PA. 636 pp.

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina - Third Approx. NC Natural Heritage Prog., Div. Parks and Recreation, NC Dept Environ., Health, and Natural Resour. 325 pp.

Shertzer, R.H., ed. 1992. Special Protection Waters Implementation Handbook. PA Dept. Environ. Resources, Harrisburg, PA.

Smith, T.L. 1983. Natural Ecological Communities of Pennsylvania (draft). Pennsylvania Natural Diversity Inventory-East, Pennsylvania Science Office of The Nature Conservancy, Middletown, PA. Revised 1991.

Taber, T.T., III. 1970. Ghost Lumber Towns of Central Pennsylvania. Lycoming Printing Co., Williamsport, PA.

The Nature Conservancy. 1988. Natural Heritage Operations Manual. The Nature Conservancy, Arlington, VA.

White, J. 1978. Illinois Natural Areas Inventory Technical Report. Volume I: Survey methods and results. Illinois Natural Areas Inventory, Urbana, Illinois. 426 pp.

APPENDIX I.
FEDERAL AND STATE STATUS, AND THE NATURE CONSERVANCY (TNC) RANKS

FEDERAL STATUS

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

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

LE - Listed Endangered - Taxa in danger of extinction throughout all or a significant portion of their ranges.

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

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

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

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

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

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

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

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

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

STATE STATUS-NATIVE PLANT SPECIES

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

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

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

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

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

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

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

N - None - Plant species which are believed to be endangered, rare, or threatened, but which are being considered by the required regulatory review processes for future listing.

STATE STATUS-ANIMALS

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

PE - Pennsylvania Endangered

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

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

Appendix I (Continued.)

PT - Pennsylvania Threatened

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

Fish and Boat Commission - Threatened Species are all species and subspecies: (1) declared by the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on a Threatened Species List published in the Federal Register; or, (2) have been declared by the Executive Director (PaFC) to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin.

TNC GLOBAL ELEMENT RANKS

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

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

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

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

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

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

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

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

Appendix I (Concluded.)

TNC STATE ELEMENT RANKS

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

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

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

S4 = Apparently secure in state, with many occurrences.

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

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

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

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

SN = Regularly occurring, usually migratory and typically 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.

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

APPENDIX 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; further distinguished by being an extensive, well-buffered occurrence. An A-rank population of a sensitive species is large in area and number of individuals, stable, if not growing, shows good reproduction, and exists in natural habitat.
B	Good occurrence: protection of the occurrence is important to the survival of the element in Pennsylvania, especially if very few or no A-rank occurrences exist. A B-rank community is still recovering from early disturbance or recent light disturbance, or is nearly undisturbed but is less than A-rank because of significantly smaller size, poorer buffer, etc. A B-rank population of a sensitive species is at least stable, in a minimally disturbed habitat, and of moderate size and number.
C	Fair occurrence: protection of the occurrence helps conserve the diversity of a region's or county's biota and is important to 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 of dying out or being destroyed, and exists in a highly disturbed and vulnerable habitat.
E	Verified as extant, but has not been given a rank; additional information needed to evaluate quality.

* Intermediate ranks may also be assigned.

APPENDIX III

THE NATURE CONSERVANCY
POTENTIAL NATURAL AREA SURVEY FORM

COUNTY_____ NO.____

QUAD NAME/CODE:_____

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

Air Survey Surveyors:_____ Date:_____

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

*E=Eliminate

Ground Survey Surveyors:_____ Date:_____

Community Type	Eliminate	Notable	Natural	Quality-Rank

Comment:

Appendix III (Concluded.)

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

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

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

DOMINANTS OF THE PLANT COMMUNITIES (PC) IN THE NATURAL COMMUNITY:
1._____
2._____
3._____
4._____
SIGNS OF DISTURBANCE:_____
_____
_____
_____
SPECIAL PLANT (map) FREQUENCY/HOW MANY? IN HOW MUCH AREA? PC#
_____
_____
_____
_____
_____
_____
ANIMALS:_____
_____
_____

APPENDIX IV

RECOMMENDED NATURAL AREA FIELD SURVEY FORM

Surveyor:_____ Address & Phone_____

_____

Date of Observation_____Site Name_____

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

_____

_____

Owner:_____

Owners Attitude Toward Conservation:_____

_____

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

Source of Lead:_____

Current Land Use:_____

_____

Type of Area: ___Old Growth Forest; ____Marsh; ____Shrub Swamp; ___Forested Swamp; ____Bog; ____Natural Pond.

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

_____

_____

_____

_____

_____

Evidence of Disturbance:_____

_____

Site Condition Compared to Your Last Visit:_____

_____

Please attach any additional information, species list, etc. Please send completed report forms to CNAI Specialist, 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 (1995 DRAFT)

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

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
PALUSTRINE COMMUNITIES			
ACIDIC BROADLEAF SWAMP	PAA	G5	S2S3
CIRCUMNEUTRAL BROADLEAF SWAMP	PAB	G?	S2S3
BOREAL CONIFER SWAMP	PAC	G?	S3
NORTHERN CONIFER SWAMP	PAD	G?	S3S4
BROADLEAF-CONIFER SWAMP	PAE	G?	S3S4
FLOODPLAIN SWAMP	PAF	G?	S1
EASTERN CALCAREOUS SEEPAGE SWAMP	PAG	G?	S1
ACIDIC SHRUB SWAMP	PAH	G5	S3
CIRCUMNEUTRAL SHRUB SWAMP	PAJ	G?	S3
GRAMINOID MARSH	PBA	G?	S3
ROBUST EMERGENT MARSH	PBB	G?	S2
MIXED GRAMINOID-ROBUST EMERGENT MARSH	PBC	G?	S2S3
CALCAREOUS MARSH	PBD	G?	S1
OLIGOTROPHIC GLACIAL KETTLEHOLE BOG	PCAA	G?	S3
WEAKLY MINEROTROPHIC LAKESIDE BOG	PCAB	G?	S2
NONGLACIAL BOG	PCB	G?	S3
RECONSTITUTED BOG	PCC	*	*
POOR (GRAMINOID) FEN	PCD	G?	S1
SHRUB (CALCAREOUS) FEN	PDA	G2G3	S1
BASIN GRAMINOID-FORB (CALCAREOUS) FEN	PDB	G?	S1
HILLSIDE GRAMINOID-FORB (CALCAREOUS) FEN	PDC	G?	S1
NORTHERN APPALACHIAN CIRCUMNEUTRAL SEEP	PEA	G?	S3?
NORTHERN APPALACHIAN CALCAREOUS SEEP	PEB	G?	S1
NORTHERN APPALACHIAN ACIDIC SEEP	PEC	G?	S3?
RIVERSIDE SEEP	PED	G?	S2?
TERRESTRIAL COMMUNITIES			
NORTHERN CONIFER FOREST	TBA	G5	S3S4
NORTHERN HARDWOOD (DECIDUOUS) FOREST	TBB	G?	S3S4
NORTHERN HARDWOOD-CONIFER FOREST	TBC	G?	S3
XERIC CENTRAL HARDWOOD (DECIDUOUS)FOREST	TCA	G?	S5
XERIC CENTRAL CONIFER FOREST	TCB	G?	S3S4
XERIC CENTRAL HARDWOOD-CONIFER FOREST	TCC	G?	S3
RIDGETOP DWARF-TREE FOREST	TCD	G4	S2S3
DRY-MESIC ACIDIC CENTRAL FOREST	TCE	G?	S5
DRY-MESIC CALCAREOUS CENTRAL FOREST	TCF	G?	S2S3
MESIC CENTRAL FOREST	TCG	G?	S2
TALUS SLOPE FOREST	TCH	G?	S2?
COASTAL PLAIN FOREST	TEA	G?	S1
FLOODPLAIN FOREST	TFA	G?	S2
RIVER GRAVEL COMMUNITY	TGA	G?	S4S5
MESIC SCRUB OAK-HEATH-PITCH PINE BARRENS	TCDA	G1	S1
EASTERN SERPENTINE BARRENS	THA	G2	S1

Appendix V (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
CENTRAL APPALACHIAN SHALE BARREN	THBA	G?	S1
NORTHERN APPALACHIAN SHALE BARREN	THBB	G?	S2
NORTHERN APPALACHIAN SAND BARREN	THC	G?	S?
NORTHERN APPALACHIAN BOULDER FIELD	THD	G?	S5
NORTHERN APPALACHIAN CALCAREOUS CLIFF	THE	G?	S2
NORTHERN APPALACHIAN ACIDIC CLIFF	THF	G?	S5
NORTHERN APPALACHIAN SHALE CLIFF	THG	G?	S2
RIVERSIDE OUTCROP/CLIFF	THJ	G?	S1S2
NORTHERN APPALACHIAN TALUS WOODLAND	TCHA	G?	S?
NORTHERN APPALACHIAN ACIDIC ROCKY SUMMIT	THK	G?	S2
NORTHERN APPALACHIAN CALCAREOUS ROCKY SUMMIT	THM	G?	S1
NORTHERN APPALACHIAN SPRUCE ROCKY SUMMIT	THN	G4	S1
CALCAREOUS ROCKY SLOPE	TFG	G?	S?
CALCAREOUS RIVERSIDE OUTCROP	THH	G?	S1
LAKE SEDIMENT SLUMP	TGB	G?	S1
EASTERN GREAT LAKES BEACH COMMUNITY	TJA	G?	S?
EASTERN GREAT LAKES DUNE COMMUNITY	TJB	G?	S?
EASTERN GREAT LAKES SAND PLAINS COMMUNITY	TJC	G?	S?
EASTERN GREAT LAKES BLUFF/CLIFF COMMUNITY	TJD	G?	S?
<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 MISCELLANEOUS FOREST	DAE	--	--
CONIFER PLANTATION	DAF	--	--

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

Appendix V (Continued.)

The following is a brief description and list of species typically found in the natural communities of Wyoming County, Pennsylvania (based on Smith 1983).

High-gradient Clearwater Creek (RCC): This stream community drains a watershed of less than 200 square miles, is less than 50 feet wide, and has a drop of more than 10 feet per mile. The substrate is composed of bedrock, boulders, and alluvial deposits of sand and gravel; riffles and pools are common. The water is generally highly oxygenated and relatively cold. For the purposes of this study, streams classified as Exceptional Value (EV status) by D.E.R. are mapped as High-gradient Clearwater Creeks (for example Sorber Run, Noxen quadrangle in Wyoming County). The best examples of this community type are the mountain streams that occur in more remote, less disturbed forested areas of the state.

Brook trout (Salvelinus fontinalis)
Mayflies (order Ephemeroptera)

Northern Appalachian Spruce Rocky Summit (THN): Thi high-elevation community is dominated by conifers such as red spruce, hemlock, white pine and red pine. Grey birch, red maple, mountain holly and mountain ash are present. Low-bush blueberry and black huckleberry dominate the low shrub layer. Lichens and mosses are abundant on the exposed rocks. Exposed bedrock (sandstone and conglomerate) is the predominant feature of these "spruce balds".

Red spruce (Picea rubens)
Eastern hemlock (Tsuga canadensis)
Low-bush blueberry (Vaccinium pallidum)
Black huckleberry (Gaylussacia baccata)
Mountain ash (Sorbus americana)
Lichens (Cladonia spp.)

Northern Appalachian Acidic Cliff (THF): This community inhabits vertical exposures of resistant bedrock, associated ledges, and open talus. Soil is nearly nonexistent except as pockets on ledges and fissures. The bedrock is commonly sandstone, schist or quartzites. Plant community variants exist depending on slope, aspect and specific rock types.

Juniper (Juniperus virginiana)
Hop-Hornbeam (Ostrya virginiana)
White ash (Fraxinus americana)
Marginal shield fern (Dryopteris marginalis)
Rock polypody (Polypodium virginianum)

Maidenhair spleenwort (Asplenium trichomanes)
Black huckleberry (Gaylussacia baccata)
Lowbush blueberry (Vaccinium pallidum)
Poverty grass (Danthonia spicata)
Common hairgrass (Deschampsia flexuosa)
Early saxifrage (Saxifraga virginiensis)

Boreal Conifer Swamp (PAC): A forested swamp dominated by conifers such as red and black spruce, balsam fir and yellow birch in the overstory and ericaceous shrubs like mountain holly and highbush blueberry. The water influencing the wetland is usually acidic.

Red spruce (Picea rubens)
Black spruce (Picea mariana)
Yellow birch (Betula allegheniensis)
Balsam fir (Abies balsamifera)
Speckled alder (Alnus rugosa)
Highbush blueberry (Vaccinium corymbosum)
Mountain holly (Nemopanthus mucronatus)
Sedge (Carex trisperma)
Goldthread (Coptis trifolia)
Cinnamon fern (Osmunda cinnamomea)
Peat moss (Sphagnum spp.)

Broadleaf-Conifer Swamp (PAE): A forested permanent or semi-permanent body of water, co-dominated by broadleaf and coniferous trees and influenced by acidic to circumneutral waters. In boreal habitats red spruce, larch and balsam fir are frequent components whereas hemlock and white pine occur in the temperate variant of this community type. The shrub and herb layer may be well-developed, containing a variety of ericaceous shrubs, ferns, sedges, and wildflowers such as swamp saxifrage, violets, wild calla, etc. Broadbent Swamp on Factoryville quadrangle (**NC502**) is the best example of this community type in Wyoming County.

Red maple (Acer rubrum)
Yellow birch (Betula allegheniensis)
Hemlock (Tsuga canadensis)
Red spruce (Picea rubrum)
White pine (Pinus strobus)
Winterberry (Ilex verticillata)
Highbush blueberry (Vaccinium corymbosum)

APPENDIX VI

SPECIAL PLANTS AND ANIMALS OF WYOMING COUNTY

PLANTS

SCIENTIFIC NAME	COMMON NAME
Andromeda polifolia	Bog rosemary
Cacalia suaveolens	Sweet-scented Indian-plaintain
Carex disperma	Soft-leaved sedge
Carex limosa	Mud sedge
Eleocharis robbinsii	Robbins' spikerush
Gaultheria hispidula	Creeping snowberry
Lathyrus ochroleucus	Wild pea
Ledum groenlandicum	Labrador tea
Potamogeton confervoides	Tuckerman's pondweed
Potamogeton oakesianus	Oakes' pondweed
Potamogeton perfoliatus	Clasping-stem pondweed
Potamogeton robbinsii	Flat-leaved pondweed
Scirpus torreyi	Torrey's bullrush

ANIMALS

Accipiter gentilis	Northern goshawk
Ardea herodias	Great blue heron
Cheumatopsyche helma	Helma's caddisfly
Coccothraustes vespertinus	Evening grosbeak
Crotalus horridus	Timber rattlesnake
Dendoica striata	Blackpoll warbler
Empidonax flaviventris	yellow-bellied flycatcher
Felis rufus	Bobcat
Lutra canadensis	River otter
Rallus limicola	Virginia rail
Sorex palustris albibarbis	northern water shrew

Appendix VI (Continued.)

Vertebrate Characterization Abstracts

Accipiter gentilis — northern goshawk

The northern goshawk breeds from western Alaska to northeastern Manitoba, Labrador and Newfoundland south to central California, southeastern Arizona, the eastern foothills of the Rocky Mountains and locally to Mexico in the West and in New England and the Appalachians in the East. This hawk winters throughout its breeding range and sometimes southward. Northern goshawks also

occur in the Old World. In Pennsylvania, it is present statewide in fall, winter and spring. During the breeding season, northern goshawks are found mostly in the northern and mountainous counties of the state. Its habitat is both decidous and coniferous forests, forest edges and open woodland. Nests are in heavily wooded areas in trees and are found anywhere from six to 23 meters above the ground. The same nest may be used in successive years. Clutch size ranges from two to five eggs and incubation lasts 36 to 38 days. The young fledge at 41 to 43 days, begin hunting by 50 days of age and are independent by 70 days. Food consists of small mammals, ducks and other birds.

Ardea herodias — great blue heron

The great blue heron breeds from southeastern Alaska and southern Canada to southern Mexico and the Greater Antilles. It winters mostly from the central United States and southern New England south to northern South America. In Pennsylvania, it is present statewide during migration and may remain in southeastern and western parts of the state during the winter until open water freezes over. Its habitat is near fresh or brackish water, including lakes, rivers and bays. Nests are commonly high in the trees in swamps or upland woods, usually in colonies of several to 100 pairs, and are often with nests of other heron species. Breeding occurs at scattered locations throughout the state. Clutch size ranges from three to seven eggs, usually four, and incubation lasts 25-59 days. The young fledge at 60-90 days. Great blue herons typically forage while standing in water, but also may use fields and wet meadows. They feed on fish, insects, crustaceans, amphibians and reptiles, mice, shrews and other small animals.

Coccothraustes vespertinus — evening grosbeak

A common breeder of Canada, the mountains of California and Mexico and northern Minnesota, New York and New England. In Pennsylvania, it is a common winter inhabitant of much of the state but its numbers may vary widely from year to year. It may also be an irruptive breeder, moving into PA in years of abundant food in this area or scarce resources in its typical range. Its food is primarily buds and seeds of deciduous trees and shrubs and some insects. Nesting is typically in conifers or dense foliage of deciduous trees. Clutch size is usually 3-4 eggs with incubation by the female for 12-14 days. Young are tended by both adults and leave the nest at 13-14 days.

Crotalus horridus timber rattlesnake

Timber rattlesnakes occur from central New England south to Florida and west to Texas and Minnesota. This snake is present is most of the northern-tier counties and mountainous regions of Pennsylvania but den sites are difficult to locate and map. They inhabit wooded rocky hillsides in the north, usally away from man. They hibernate communally and often with other snake species in burrows and crevices of rock outcrops. They are active from April to October, during the day in cooler weather and at night in hot weather. Young are born in dens in late summer to early fall. Females reach sexual maturity at 4-5 years and lay 5 to 17 eggs, possibly every other year. Slow growth and low breeding potential make this species vulnerable to over-hunting and collection. Food is comprised of small mammals.

Dendroica striata blackpoll warbler

Blackpolls are a common breeder of northern conifer swamps and forests of the northern eastern U.S., Alaska and Canada. In Pennsylvania, it is primarily a late spring migrant but has been recently confirmed as a breeding species. It may not be a consistent breeder, but occur only during years of high insect densities or when breeding densities are high in its normal range. Nests are usually in a small tree and fairly close to the ground. Eggs are laid from late June into July with clutches of 3 to 5 eggs. Incubation is 11 days and the nest is attended by the female. Young fledge in 11 to 12 days and are attended by both parents. Adults usually return to previously used breeding sites.

Empidonax flaviventris yellow-bellied flycatcher

A common breeder in the boreal conifer forests of Canada, the yellow-bellied flycatcher also breeds in similar habitat across the Great Lakes states and northeastern United States. The yellow-bellied flycatcher reaches the southern edge of its breeding range in northern Pennsylvania, within the Appalachian Plateau Province, usually at elevations above 1,900 feet. Most breeding pairs in the state have been found in shrub swamps and bog-like habitats associated with forested wetlands within more extensive areas of northern hardwood forest. These sites may include natural openings as well as wetland areas recovering from past disturbance from logging or beaver activity. Young conifers (hemlock, red spruce, black spruce, larch or white pine), highbush blueberry, leatherleaf, sedges and sphagnum moss (Sphagnum spp.) are typical components of the habitat. Unlike most of the other flycatchers, this species nests on the ground, building its nest in sphagnum moss hidden at the base of a conifer or among tree roots. A clutch

of 3-4 eggs is laid in June-July and incubated for 15 days by the female. Young are tended by both parents and fledge in about 15 days. The species forages close to the ground, feeding mostly on insects. The yellow-bellied flycatcher is secretive and notoriously difficult to distinguish from other Empidonax species.

Sorex palustris albibarbis — water shrew

The water shrew ranges from southern Alaska to California, the Rockies, the northern Great Lakes region, and New England with a disjunct population occurring in the middle Appalachians. In Pennsylvania, the species occurs in small pockets of optimal habitat primarily in the northeastern part of the state. The water shrew is most abundant along small cold streams with thick overhanging riparian growth. Den sites are near water in underground burrows, rafted logs, beaver lodges, and other areas providing shelter. The surrounding forests are most often characterized by hemlock, spruce, and rhododendron. The water shrew depends primarily on aquatic insects and may take small invertebrates when available. It hunts under and on top of the water. Reportedly, it has been seen running across the water surface. Generally, it is active throughout the day and in every season.

Felis rufus — bobcat

Bobcats range from Mexico to southern Canada and within Pennsylvania they inhabit the mountainous and sparsely populated areas of the state. The utilize various habitats including mixed deciduous and coniferous woodlands and forests, swamps, scrub habitats and any areas with dense undergrowth. They occupy caves, rock clefts, hollow logs and other sheltered areas. Young are born in dens made in these types of shelters. Breeding takes place from mid-winter into spring with litters being born after a 50-60 day gestation period. Litters typically consist of 2-3 kittens but may be as many as 7. Sexual maturity is reached in one to two years. Prey consists of small mammals, birds, other vertebrates and sometimes carrion. Cottontail rabbits and snowshoe hares are favored prey species. Bobcats are very intolerant of human activity.

Rallus limicola — Virginia rail

This species breeds throughout southern Canada south through California into South America and east through the South and the Midwest. In Pennsylvania, it breeds in suitable habitat at scattered localities throughout the state. It arrives in April or

May and departs in October or November. Its habitat is freshwater marshes with cattails, reeds and tall grasses. It places its nest in the marsh in drier areas or occasionally over water. Clutch size may vary from 5 to 12 eggs; eggs may be laid from May through July. Incubation is about 20 days and the young leave the nest soon after hatching and are tended by both adults. Food consists of insects and other invertebrates, seeds of aquatic plants, and duckweed.

A NATURAL AREAS INVENTORY OF WYOMING COUNTY, PENNSYLVANIA

Update –2001

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

Anthony F. Davis, Director
Aura L. Stauffer, County Inventory Coordinator
Jenni L. Farber, Information Manager

Submitted to:
The Wyoming County Planning Commission
1 Courthouse Square
Tunkhannock, PA18657

Table of Contents

Table of Contents (continued)

Tables

Maps

Table of Contents (continued)

Page Number

Appendices

Wyoming County Natural Areas Inventory Update

Introduction

The original Wyoming County Natural Areas Inventory (NAI), which was completed in 1995, included descriptions, maps, and rankings of sites of ecological significance in the county. The emphasis of the report was upon locations of species listed as rare, threatened, or endangered in Pennsylvania and exemplary natural communities. The NAI update is simply an addendum to the original report. It includes new information based on fieldwork that was completed since the original NAI was written. The sites that were not visited since completion of the original NAI were not reevaluated. The two sites listed as top priorities in the original report remain the most important sites for conservation in the county. Based upon the results of new field visits, the update includes changes in the rankings of sites listed in the original report, as well as new sites discovered since 1995. The rankings are based on the same criteria used in the original report. Table 1 from the original report has been updated to include all sites from the original report and the update. For your convenience, you may insert this table in place of Table 1 in the original report. One site, Tamarack Swamp, was removed from Table 2 and added to Table 1 (see page 18 for the description).

There is also updated information about elements reported in the original document. In some cases the state rarity rank (S rank), global rank (G rank), state and federal legal status, and/or the quality for an element has changed.

The results presented in the update follow that of the original Wyoming County NAI. There are tables for each USGS quadrangle map listing all new or updated elements by their PA Natural Diversity Inventory code. The corresponding page number from the original NAI is given for each USGS quadrangle table. Each table provides the global and state rarity ranks, state legal status, site quality, and the date last observed for each element. Following the table is a brief narrative for each site, noting whether it is a NEW occurrence or an UPDATE.

All updated or new natural communities and species of special concern are coded on the maps and described in the text. The codes are PNDI map codes that are unique to each element on a given USGS topographic map. Species are identified by code to prevent unauthorized collection and

possible extirpation of the species at the site. The natural communities are identified by **NC**, plants by **SP**, and animals by **SA**. All are followed by a three-digit code.

Sections of USGS maps accompany the text, showing the location of each NEW site identified (e.g., Keelersburg Islands) or sites whose boundaries have been changed to include a new species (e.g., Perrins Marsh). The maps for updated sites with unchanged boundaries are not included. The area outlined on a map represents the general location of a species as well as the watershed or subwatershed area where the elements are located. Proposed development activities within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess potential impacts. Questions about this supplement or the original NAI can be directed to Aura Stauffer, County Inventory Ecologist, at the address on the title page.

Table 1. Sites of statewide significance for the protection of biological diversity in Wyoming County. This table replaces Table 1 from the original NAI. Sites are listed in approximate order of priority from the most important (rank=1) to the least (rank=5). The revised table includes sites from the original NAI; sites updated since the NAI; and newly identified sites.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
1	Bartlett Mountain Bald/Flat Top (Forkston Twp.) UPDATE	Jenningsville Dutch Mountain	April of 1995 - Only PA Spruce Rocky Summit Natural Community (**NC503**); a G4S1 element. Site is within **State Game Lands 57**; more inventory work needs to be completed. . June of 1995 - a G4, S3S4 PA Candidate animal species (**SA528**) was observed on the mountain. Additional visits to the mountain are necessary in order to determine the quality of this animal population. Heavy deer browse is evident. Because low-density residential development is occurring near the site, further development is one potential threat.
1	Coalbed Swamp (North Branch Twp.) UPDATE	Dutch Mountain	1987, 1993, & 1994 - Fair example of Boreal Conifer Swamp Natural Community (**NC515**) and two rare plants (**SP516 & SP517**) on **SGLs 57**; first nesting record in state for a bird species (**SA523**). 1994 through 2000 - Two additional animal species of concern (**SA529b** and **SA530**) were identified. **SA529a** continues to be monitored. Coalbed Swamp is best nesting site in the state for **SA529a & SA529b**. Logging of the site and nearby uplands, mining, and the interruption of hydrology are potential threats.
1	Indefatigable Swamp (Ross Twp. and Luzerne	Dutch Mountain Sweet Valley	2000 - Indefatigable Swamp is a large and diverse Boreal Conifer Swamp Natural Community (**NC534**) with a variety of different habitats, three rare plant species (**SP532, SP533**, and **SP534**) and one rare animal species (**SA533**) on **SGL 57**. The

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

[2] See Appendix I of the original NAI for an explanation of Global and State vulnerability ranks.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
	County) NEW		population of **SP532** is one of the best in the state. There is no sign of current human activity in the swamp, and portions of the second growth spruce forest are beginning to mature. Heavy logging, road- building or other direct disturbance would be a threat to the continued recovery of these natural communities as would disturbance to the surrounding hydrology
1	Tamarack Swamp (North Branch Twp.) UPDATE	Dutch Mountain	1995 through 1997 - This site was labeled as Locally Significant in the original NAI report. Two animal species of concern (**SA531a** and **SA531b**) were identified at this site in **State Game Lands 57**. For this reason, the site has been changed from Locally Significant to an important site for conservation. Additional surveys are needed. Logging and ATV traffic were identified as past disturbances. Potential threats include additional logging, changes in hydrolgy by beaver or for waterfowl management, fire, and ATVs. Management recommendations are preservation of the swamp and a buffer area. The site should continue to be monitored. Tamarack Swamp is just north of Coalbed Swamp. Coalbed Swamp has the best breeding population of theses two animal species in the state. Consequently, both swamps are a top priority for conservation in the county.
2	Becker Brook Swamp (Forkston & North Branch Twps.) NEW	Dutch Mountain	1997 - A new breeding population of PA-Threatened animal species (**SA536**) was identified at the site located on State Game Lands 57. This animal species is also found in Coalbed and Tamarack Swamps. The best breeding population of this species in the state occurs in adjacent Coalbed Swamp. The threats to the site include logging, changes in hydrology (e.g., beaver activity), and ATV traffic. To insure the protection of the breeding population of the animal species of concern, the swamp as well as a buffer around the site should be protected from logging and ATV use.
2	Perrins Marsh (Northumberland Twp & Luzerne County) UPDATE	Center Moreland	1993 - This large marsh and pond contain one known rare aquatic plant (**SP503a**) and a diversity of common plants and animals; there is potential for other rarities; no known threats but needs more survey work. 1999 - **SP503a** is still present. A new good-quality PA-Endangered, S1 plant

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
			(**SP503b**) population, which is the first known extant occurrence of the plant species in Eastern Pennsylvania, was identified. A 1994 survey of the site identified twelve species of dragonflies and two species of damselflies. Eleven of the species observed were county records. Disturbances include a high Canada goose population. The site should continue to be monitored and surrounding locations (e.g., Cummings Pond) should be visited to search for additional populations of the plants of concern.
2	Schmitthenner Lake (North Branch Twp.) UPDATE	Dutch Mountain Lopez	1993 - Glacial lake that has 4 species of rare plants (**SP503a, SP503b, SP509**, & **SP518**); adjacent wetland has rare species breeding in it; maintain water quality and hydrologic regime. 1997 - The quality of the populations of the plant species **SP503a**, **SP503b**, and **SP509** has remained unchanged since the original report. One plant species that was not tracked when the original report was written was **SP510**. **SP510** is now tracked as an S3 plant species of concern. This species has been present at the lake since 1913, but it was seen as recently as 1993. An S3B,S4N animal species of concern (**SA535**) was observed. Additional surveys are needed to determine the quality of both **SP510** & **SA535**. No obvious threats were noted. A stewardship plan would ensure the survival of the rare species found at this site.
2	Turkey-foot Island (Windham Twp.) NEW	Jenningsville	1997 - Mapped as a good – quality example of a River Gravel Natural Community (**NC506**). A good-quality population of a S3, PA-Rare plant species (**SP506**) and two animal species of concern (**SA508a** and **SA508b**) were found. Potential threats include a change in the flooding regime (e.g., dams), an increase in exotic plant species (e.g., purple loostrife), and changes in water quality (e.g., siltation).
3	Broadbent Swamp (Clinton Twp.)	Factoryville	1993 - Fair to good example of a Broadleaf-Conifer Swamp Natural Community (**NC502**) with a good population of a PA-Rare, G5S2 plant (**SP507**); major landowner wishes to keep land natural.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
3	Falls Cliff (Falls Twp.)	Ransom	1995 - Good example of an Acidic Cliff Natural Community (**NC511**); uncommon plants and good potential for rare species; excellent view of Susquehanna River; maintain wooded buffer.
3	Keelersburg Island (Eaton, Falls, & Northmoreland Twps.) NEW	Center Moreland	1997 - Good-quality examples of a PA-Rare plant (**SP533**) population and a River Gravel Community (**NC503**) are found at this site along with a good to moderate population of a G3G4 animal species (**SA504**). Maintaining good water quality is important for the survival of the animal species. Disturbances include natural flooding; however, a change in the flooding regime (e.g., construction of new dams) would threaten the unique flora and fauna of these islands.
3	Scottsville Islands (Meshoppen Twp.) NEW	Meshoppen	1997 – A good-quality River Gravel Natural Community (**NC507**), a population of a G3, S2 animal species (**SA509**), and a good to marginal – quality population of a PA-Rare plant species (**SP507**) were identified at this site. Potential threats include a change in the flooding regime (e.g., dams), an increase in exotic plant species (e.g., purple loostrife), deer browse, and changes in water quality (e.g., siltation).
3	Splashdam Pond (Forkston Twp. & Sullivan County) UPDATE	Lopez	1984 and 1990 - This is the only known location for a PA-Rare animal (**SA546**) in the county; species needs high quality water with a good vegetated buffer; PA-Rare plants (**SP558** & **SP566**) also occur; protected within **SGL 57** in Wyoming County and **SGL 13** in Sullivan County. 1995, 1997, & 1998 – Four animal species of concern (**SA580, SA585a, SA585b, & SA585c**) were observed. Preservation of snags and older trees would benefit **SA580**. The protection of existing water levels, water quality, and the marsh/shrub border of the pond are important for the survival of the animal species currently using the site. Periodic monitoring of the pond and marsh is warranted
3	Tunkhannock Islands (Eaton Twp.)	Tunkhannock	1993 - Good example of the River Gravel Natural Community (**NC517**), and 1 rare plant species (**SP518**); part of a complex of floodplain communities; potential for other rare species; more survey work needed.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
4	County Line Swamp (Forkston Twp.)	Lopez	1993 - Good populations of two PA-Rare shrubs (**SP567** & **SP568**) in a swamp that had been forested at one time; the wetland may slowly revert to swamp forest; on **SGL 57.** 1995 – An S3B, S3 animal species (**SA581**) was identified. Additional surveys are needed to determine the numbers of this species present in the SGLs. Preservation of snags and older trees would benefit this animal.
4	Forkston Ravine (Forkston Twp.) NEW	Dutch Mountain	1995 - A good-quality population of a G4, S2 animal species (**SA527**) was discovered at this site on State Game Lands 57. Disturbances and threats include off-road vehicles (e.g., ATVs), trails, and logging. The site should continue to be periodically monitored.
4	Helman Swamp (Tunkhannock Twp.)	Tunkhannock	1993 - Good population of a PA-Rare plant (**SP514**); beaver have altered the swamp but there appears to be no special management needs at present.
4	La Grange Island Tunkhannock Twp. NEW	Tunkhannock	2000 - This site has a good-quality River Gravel Natural Community (**NC525**) and a good-quality population of a PA-Rare plant species (**SP525**). The upstream end of the island is subject to frequent scouring from flooding and ice, and deposition. The vegetation of the natural community consists of bunch-grasses interspersed with trailing shrubs and occasional stunted tree saplings. Deer browse is a disturbance and threat to the rare plant species on the island.
4	Laceyville Islands (Braintrim and Windham Twps.)	Laceyville	1997 - Two animal species of concern (**SA504a and SA504b**) were found at this site. Additional surveys are needed. No disturbances were noted during the survey. Changes in the water regime and water pollution are potential threats to these animal species.
4	Mehoopany Creek Site (Mehoopany Twp.)	Meshoppen	1991 - This is one of two breeding sites in the county for this species (**SA504**); occurs in a tree plantation; site needs to be monitored.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
4	Meshoppen Creek (Meshoppen Twp.)	Meshoppen	1989 - This site represents the only known PA location for a possibly globally rare (G1G3 S1) insect species (**SA506**); maintain water quality; more survey work needs to be done for this species.
4	Oppossum Swamp (Forkston Twp.)	Dutch Mountain	1995 - Large wetland complex within **SGL 57**.with two rare species (**SP524** & **SP525**) and potential for others.
4	Phelps Swamp (Nicholson Twp.)	Hop Bottom	1994 - One rare species (**SA503**) and potential for others; known for a variety of uncommon breeding and migratory birds.
4	Ricketts Village Woods (Colley Twp. in Wyoming County & Forkston Twp. in Wyoming County) NEW	Lopez	1995 & 1998 - This site on State Game Lands 13 contains a wide variety of habitats including a hardwood/hemlock forest, blueberry thickets, scrub-shrub wetland, and mowed fields. Two animal species of concern were observed; one in 1995 (**SA586a**) and one in 1997 (**SA586b**). These species are probably also using the adjacent Splashdam Pond site. For both species, additional surveys are needed to determine the quality of the populations. The animal species of concern can be helped by delayed mowing of the fields (August), by preserving snags, and by preserving the mosaic of habitats (e.g., woods, scrub-shrub wetland, and thicket).
4	South Mountain (Forkston and Noxen Twps.)	Noxen	1991 - Only recorded site in the county for this species (**SA505**) that requires a large territory for hunting; forest management should consider this species' needs.
4	Vernon Site (Northmoreland & Eaton Twps.)	Center Moreland	1993 - One of only two breeding sites for this species (**SA501**) known in the county; need to maintain forest and a buffer around site and monitor breeding success.
5	Bartron Pond Swamp (Lemon Twp.)	Tunkhannock	1993 - Bog-like swamp with two rare plants (**SP512** & **SP513**); both species will likely be shaded out by shrubs and trees eventually.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
5	Bellas Brook Swamp (Forkston Twp.)	Dutch Mountain	1993 - Small population of a PA-Rare plant (**SP514**) in a spruce-hemlock swamp within SGL 57.
5	Bellasylva (Forkston Twp.)	Dutch Mountain	1993 - Small population of a PA-Rare plant (**SP513**) in a fairly small wetland; potential for other rare species; keep disturbance minimal.
5	Cider Run Forkston, Noxen Twps., Luzerne Co.)	Dutch Mountain	DEP-designated EV stream (**NC511**) within **SGL 57**.
5	County Line Island (Falls Twp., Lackawanna County, and Luzerne County) NEW	Ransom	1996 - A marginal population of a PA-Rare plant species (**SP512**) occurs in an open, scour area of the island. Threats include competition with invasive plant species and changes in hydrology (e.g., construction of new dams) 1999 - **SP524** was found once again along with a new marginal population of a G3G4 animal species (**SA525**). The animal species was found in a riffle area in a. cobble/gravel substrate along with ridged-wedge mussel (*Alasmidonta marginata*). Many exotic plant species such as crown vetch (*Coronilla varia*) are growing on the island. Any changes in hydrology and water pollution would affect the animal species
5	Crane Swamp (North Branch Twp.)	Dutch Mountain	1991 - Relatively large population of a PA-Rare shrub (**SP512**); no immediate threats although trees and tall shrubs may eventually shade out the species.
5	Forkston Woods (Forkston Twp.)	Jenningsville	1995 - Small population of a PA-Threatened plant (**SP504**) found by logging road; more surveys need to be done.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
5	Harveys Lake (Monroe Twp. in Wyoming County & Lake Twp. in Luzerne County) NEW	Noxen Harveys Lake	1999 - Harveys Lake is one of the largest natural lakes in Pennsylvania. Only a small portion of the boundary for the lake occurs on the Noxen quadrangle. The majority of the site and the plant species of concern (**sp509 & sp510**) are found in Luzerne County on the Harveys Lake quadrangle.
5	Lake Carey (Lemon & Tunkhannock Twps.)	Tunkhannock	1993 – Tenatively Undetermined aquatic species (**SP515**) found in heavily used vacation lake; herbicides and eutrophication may be a problem for the species.
5	Lake Catalpa Swamp (Monroe & Northmoreland Twps.) NEW	Center Moreland	1997 – Site contains a good to marginal-quality example of a Broadleaf-Conifer Swamp Natural Community (**NC507**) and a marginal-quality PA-Rare plant species (**SP508**). Disturbances include logging upslope of the swamp. Threats include the continuation of logging directly adjacent to the wetland and changes in hydrology (e.g., beaver). Additional surveys and monitoring of the site are needed.
5	Miller Mountain Outcrop\ Eaton Twp. NEW	Tunkhannock	2000 - The site is an area of scoured, calcareous bedrock undercut by the Susquehanna River. A marginal-quality example of a Calcareous Riverside Outcrop natural Community (**NC526**) was mapped. The site contains some exotic plant species (e.g., Asiatic honeysuckles), but the exotics are not dominant. The disturbances to the site appear to be natural (e.g., scour). No threats to the site are apparent, but additional surveys to monitor the site are recommended.
5	Skinners Eddy Cliff (Braintrim Twp.)	Laceyville	1995 - Fair example of an Acidic Cliff Natural Community type (**NC502**) with excellent view of the Susquehanna River.
5	Sorber Run (Noxen twp. & Luzerne County)	Noxen	DEP-designated EV stream (**NC504**) mostly within **SGL 57**.

County Rank[1]	Site Name or Code (municipality)	USGS Topo. Map	TNC and Ranks[2], Importance and Recommendations
5	Susquehanna River at Mouth of Mehoopany Creek (Mehoopany Twp.) NEW	Meshoppen	1995 - Three animal species of concern (**SA510a, SA510b,** and **SA510c**) were found in cobble/gravel/sand substrate at this site in the Susquehanna River. Disturbances and threats to the animal populations include increased siltation.
5	Tunkhannock Creek at Highway 92 Bridge (Tunkhannock Twp.) NEW	Tunkhannock	1995 - A small population of a G3G4, S3S4 animal species (**SA523**) was found in mats of algae in shallow water with a cobble/gravel substrate in Tunkhannock Creek. Disturbances and threats to the animal population include increased siltation. Additional surveys of the site are needed
5	White Ferry Lake (Eaton Twp.)	Center Moreland	1990 - Reintroduced animal (**SA502**) is known to utilize this lake.

USGS QUADRANGLE MAP: Center Moreland (34)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITIES:	NC504	G?	S4S5	N/A	8/28/97	B
	NC507	G?	S3S4	N/A	7/19/97	BC
SPECIAL PLANTS:	SP503a	G5	S3	PR	8/20/99	B
	SP503b	G4G5	S1	PE	8/20/99	B
	SP504	G5	S3	PR	8/28/97	B
	SP508	G5	S3	PR	7/19/97	C
SPECIAL ANIMAL:	SA506	G3G4	S3S	N/A	8/28/97	BC

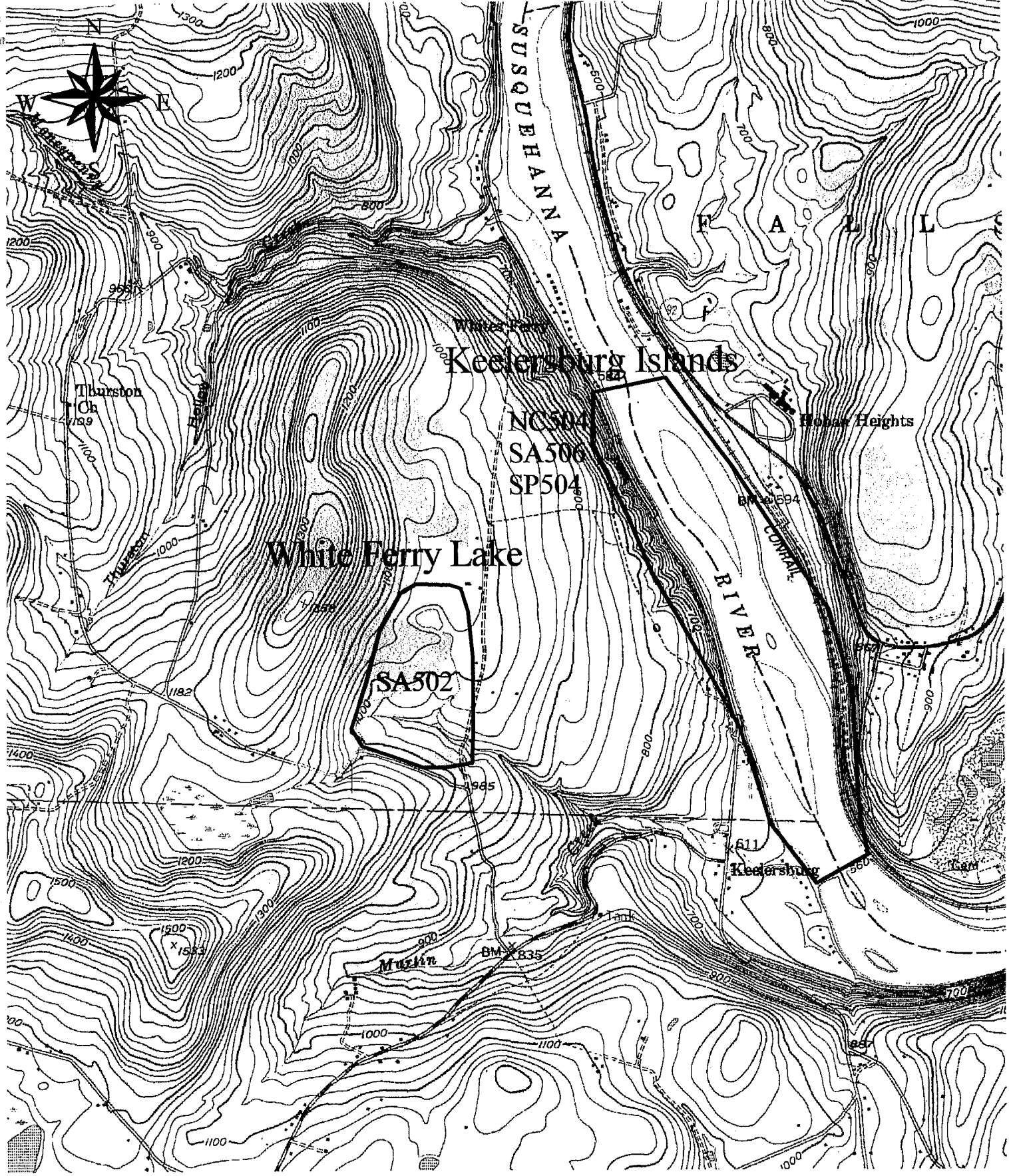
Center Moreland Quadrangle:

NC504, SA506, and SP504 – NEW –"Keelersburg Islands" (Eaton, Falls, & Northmoreland Twps.) The site, which was visited in 1997, consists of two islands in the Susquehanna River and the gravel/coble riverbeds surrounding the islands. The upstream half of the islands are dominated by tall grasses and grape, while the downstream end is floodplain forest. The dominant vegetation includes grape (*Vitis riparia*), turkey foot (*Andropogon gerardi*), indian grass (*Sorghastrum nutans*), switch grass (*Panicum virgatum*), willow (*Salix sp.*), sycamore (*Platanus occidentalis*), and white ash (*Fraxinus americana*). The islands are exceptional for the relative lack of exotic vegetation. Animals observed include freshwater mussels, great blue herons (*Ardea herodias*), green herons (*Butorides striatus*), and red - breasted mergansers (*Mergus serrator*). Good-quality examples of a PA-Rare plant (SP504) population and a River Gravel Community (NC504) are found at this site along with a good to moderate population of a G3G4 animal species (SA506). Maintaining good water quality is important for the survival of the animal species. Disturbances include natural flooding; however, a change in the flooding regime (e.g., construction of new dams) would threaten the unique flora and fauna of these islands.

NC507 and SP508 – NEW – "Lake Catalpa Swamp" (Monroe & Northmoreland Twps.) A good to marginal-quality example of a Broadleaf-Conifer Swamp Natural Community (NC507) and a marginal-quality PA-Rare plant species (SP508) were identified at this site in 1997. The swamp contains diverse plant species including Eastern hemlock (*Tsuga canadensis*), cucumber tree (*Magnolia acuminata*), red spruce (*Picea rubens*), yellow birch (*Betula alleghaniensis*), paper birch (*Betula papyrifera*), white pine (*Pinus strobus*), winterberry (Ilex verticillata), maleberry (*Lyonia ligustrina*), sphagnum moss (Sphagnum sp.), and sedges (*Carex sp.*). Disturbances include logging upslope of the swamp. Threats include the continuation of logging directly adjacent to the wetland and changes in hydrology (e.g., beaver). Additional surveys and monitoring of the site are needed.

SP503a and SP503b – UPDATE – "Perrins Marsh" (Northumberland Twp. and Luzerne County) Perrins Marsh is a shallow (1-2 meters deep) man-made pond located on private property. The pond has

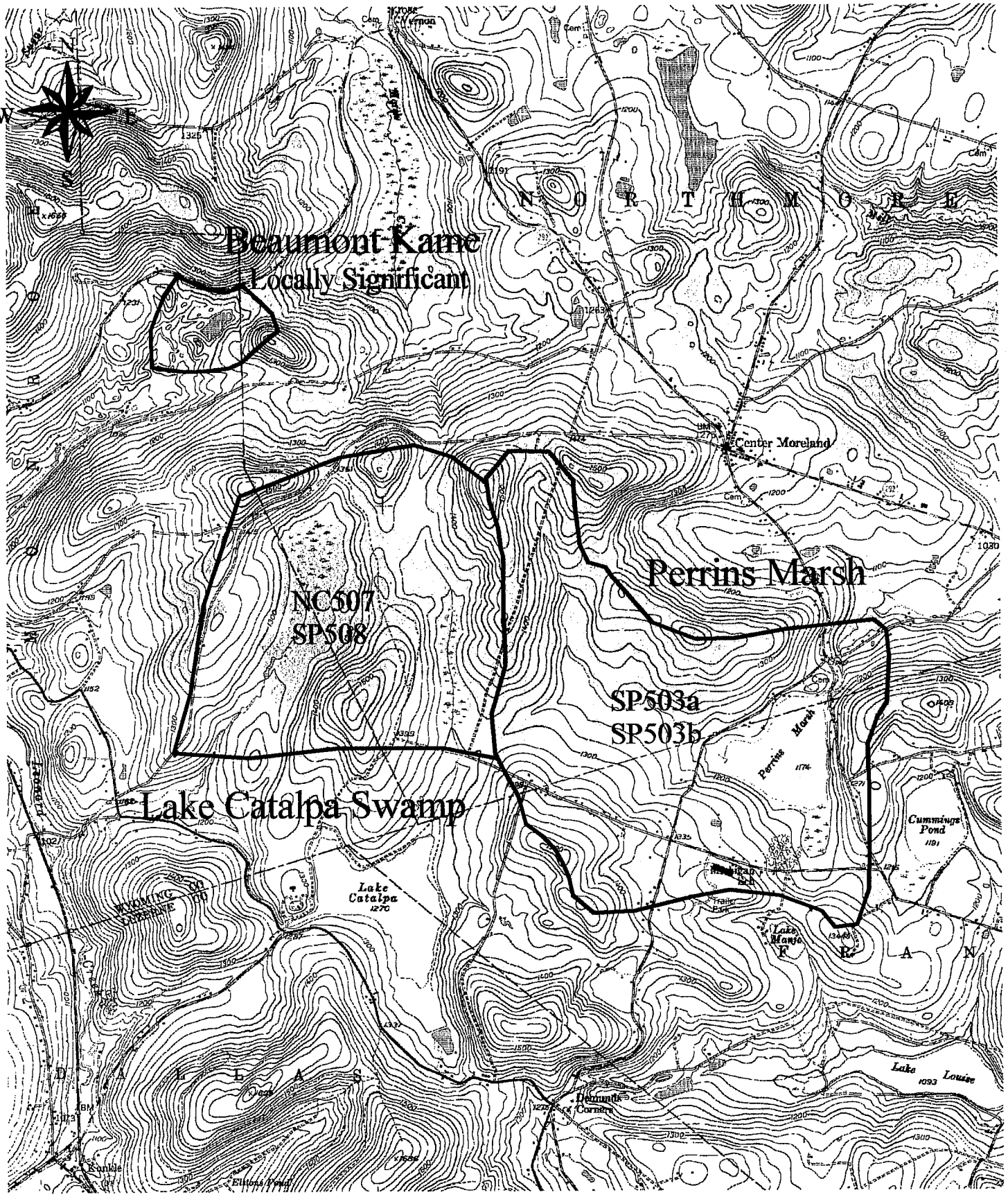
been dammed for over 50 years. A good-quality population of a PA-Rare plant (SP503a) species was first identified at the site in 1993. The site was revisited in 1999 and SP503a is still present. A new good-quality PA-Endangered, S1 plant (SP503b) population was identified at the site during the 1999 visit. This thriving population is the first known extant occurrence of the plant species in Eastern Pennsylvania. The dominant plant species at this site include spatterdock (*Nuphar variegatum*), hornwort (*Ceratophyllum carolinianum*), watershield (*Brasenia schreberi*), water lily (*Nyphaea odorata*), and pondweed (*Potamogeton sp.*). Perrins Marsh also provides habitat for a diverse population of dragonflies and damselflies. A 1994 survey of the site identified twelve species of dragonflies and two species of damselflies. Eleven of the species observed were county records. Disturbances include a high Canada goose population, but the geese do not appear to be impacting the plant species of concern. The site should continue to be monitored and surrounding locations (e.g., Cummings Pond) should be visited to search for additional populations of these plants of concern.



Center Moreland Quadrangle

Keelersburg Islands (New)

Scale 1:22,145



Center Moreland Quadrangle

Lake Catalpa Swamp (New)

Scale 1:33,000

Perrins Marsh (Update)

USGS QUADRANGLE MAP: Dutch Mountain (40)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITY:	NC534	G?	S?	N/A	6/13/00	BC
SPECIAL PLANTS:	SP503a	G4G5	S2	PT	10/02/97	B
	SP503b	G5?	S1	PE	10/02/97	C
	SP509	G4	S2	PT	10/02/97	E
	SP510	G4G5	S3	N/A	7/14/93	E
	SP532	G3	S1	PE	7/12/00	A
	SP533	G5	S1S2	N/A	7/12/00	BC
	SP534	G5	S3	PR	6/13/00	D
SPECIAL ANIMALS:	SA527	G4	S2	N/A	6/19/95	B
	SA528	G4	S3S4	PC	6/15/95	E
	SA529a	G5	S1S2B	PT	7/31/97	B
	SA529b	G5	SAB	N/A	7/5/97	E
	SA530	G5	S3B,S3	N/A	4/26/95	E
	SA531a	G5	S1S2B	PT	7/25/97	BC
	SA531b	G5	SAB	N/A	7/04/97	E
	SA533	G5	S1S2B	PT	6/13/00	E
	SA535	G5	S3B,S4N	N/A	7/29/97	E
	SA536	G5	S1S2B	PT	7/31/97	E

Dutch Mountain Quadrangle:

SA528 – UPDATE – "Bartlett Mountain Bald/Flat Top" (North Branch and Forkston Twps.). Bartlett Mountain is dominated by red spruce (*Picea rubens*), pine (*Pinus sp.*), and hemlock (*Tsuga Canadensis*) on it's north side. On the south side, the mountain is dominated by pitch pine (*Pinus rigida*), red pine (*Pinus resinosa*), and hemlock (*Tsuga Canadensis*). The mountain also contains patches of exposed bedrock and rock ledges. In April of 1995, this area was designated as a good to excellent example of a Spruce Rocky Summit Natural Community (NC522-see original NAI report) and was designated as one of the top sites for conservation in the county. During June of 1995, a G4, S3S4 PA Candidate animal species (SA528) was observed on the mountain. Additional visits to the mountain are necessary in order to determine the quality of this animal population. Heavy deer browse is evident. Because low-density residential development is occurring near the site, further development is one potential threat.

SA536 – NEW – "Becker Brook Swamp" (Forkston and North Brach Twps.). In 1997, a new breeding population of PA-Threatened animal species (SA536) was identified at the site located on State Game Lands 57. The swamp is dominated by red spruce (*Picea rubrens*), dense highbush blueberry (*Vaccinium*

corymbosum), red maple (*Acer rubrum*), sphagnum moss (*Sphagnum sp.*), and cinnamon fern (*Osmunda cinnamomea*). Additional surveys of the swamp are needed to determine the quality of the population. This animal species is also found in nearby Coalbed and Tamarack Swamps. The best breeding population of this species in the state occurs in adjacent Coalbed Swamp. The associated animal species include black-throated blue warbler (*Dendroica caerulescens*), white-throated sparrow (*Zonotrichia albicollis*), and dark-eyed junco (*Junco hyemalis*). The threats to the site include logging, changes in hydrology (e.g., beaver activity), and ATV traffic. To insure the protection of the breeding population of the animal species of concern, the swamp as well as a buffer around the site should be protected from logging and ATV use.

SA529a, SA529b, and SA530 – UPDATE – "Coalbed Swamp" (Forkston and North Branch Twps.). This site, which is located in State Game Lands 57, has been regularly visited since the 1995 report. In 1995, a new animal species of concern (SA530) was identified. In 1997 the nests of an animal of species of concern (SA529b) was finally confirmed in the swamp. More surveys are needed to determine the quality of the populations of SA529b and SA530. Additionally, the population of SA529a (listed as SA523 in the 1995 report) has been monitored and upgraded from an extant population to a good-quality population. Coalbed Swamp is the best breeding location in the state for SA529a and SA529b, and is one of the top priority sites in the county for conservation. The boreal conifer swamp and a buffer area should be preserved to insure the continued success of the animal species. Logging of the site and nearby uplands are potential threats. Mining and the interruption of hydrology are additional threats.

SA527 – NEW – "Forkston Ravine" (Forkston Twp.). A good-quality population of a G4, S2 animal species (SA527) was discovered at this site on State Game Lands 57 in June of 1995. The site is characterized as a moderate gradient unnamed tributary to Mehoopany Creek with rocky stream banks in a northern hardwood forest. The dominant plant species include black birch (*Betula lenta*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), American basswood (*Tilia americana*), white ash (*Fraxinus americana*), witch hazel (*Hamamelis virginiana*), striped maple (*Acer pensylvanicum*), along with a variety of ferns and mosses. Associated animal species include woodland jumping mouse (*Napaeozapus insignis*), white-footed mouse (*Peromyscus leucopus*), masked shrew (*Sorex cinereus*), short-tailed shrew (*Blarina brevicauda*), and red-backed vole (*Clethrionomys gapperi*). Disturbances and threats include off-road vehicles (e.g., ATVs), trails, and logging. The site should continue to be periodically monitored.

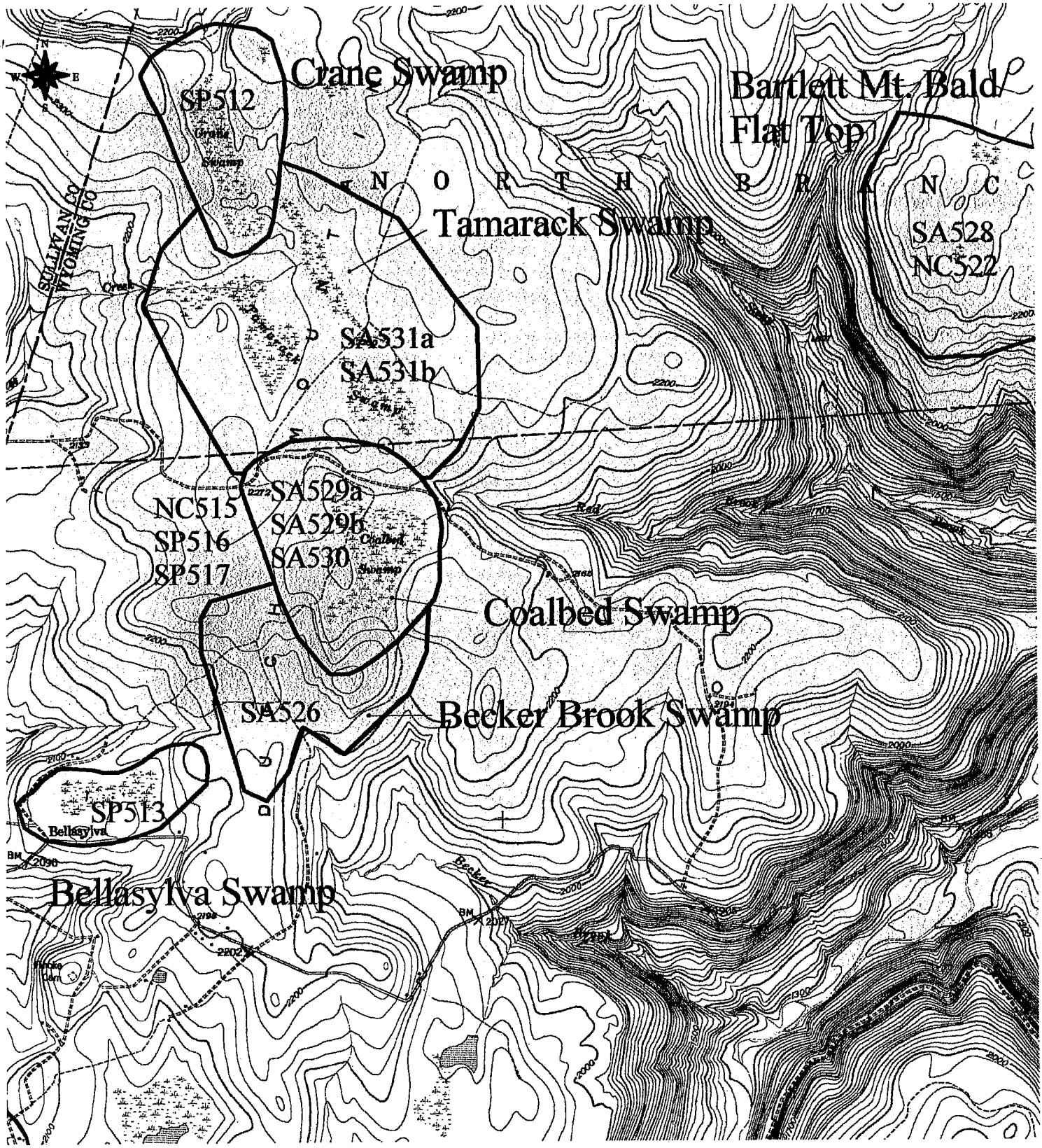
NC534, SP532, SP533, SP534, and SA533 – NEW – "Indefatigable Swamp" (Forkston Twp. in Wyoming County and Ross Twp. in Luzerne County). Indefatigable Swamp is a large and diverse forested seepage swamp with a variety of different habitats, three rare plant species (SP532, SP533, and SP534) and one animal species of concern (SA533) on State Game Lands 57. A portion of this site continues into Luzerne County on the Sweet Valley quadrangle. The swamp was designated as a marginal to good - quality Boreal Conifer Swamp Natural Community (NC534). Red spruce (*Picea rubens*) and red maple (*Acer rubrum*) are the most abundant overstory species. Portions of the swamp have deep sphagnous peat and a depauperate strongly acidophilic vegetation, while others have evident springs and seeps and a more diverse flora. Species seen in more open, springy, presumably minerotrophic areas include red maple (*Acer rubrum*), mountain holly (*Nemopanthus mucronatus*), highbush blueberry (*Vaccinium corymbosum*), fowl mannagrass (*Glyceria striata*), mannagrass (*Glyceria melicaria*), jewelweed (*Impatiens sp.*), buttercup (*Ranunculus sp.*), a sedge (*Carex leptalea*),

bugleweed (*Lycopus sp.*), violet (*Viola sp.*), false hellebore (*Veratrum viride*), smartweed (*Polygonum sp.*), dwarf red bramble (*Rubus pubescens*), cinnamon fern (*Osmunda cinnamomea*), marsh marigold (*Caltha palustris*), goldthread (*Coptis groenlandica*), star violet (*Dalibarda repens*), wild lily of the valley (*Maianthemum canadense*), crested shield fern (*Dryopteris cristata*), and sphagnum moss (*Sphagnum sp*). The more completely spruce and sphagnum dominated areas had pitcher plant (*Sarracenia purpurea*), a sedge (*Carex trisperma*), and a small population of SP534 (PA-Rare). An approximately 15m radius spring-fed pool in the center of the swamp is dominated by buckbean (*Menyanthes trifoliata*). Numerous canopy openings, often dominated by cinnamon fern (*Osmunda cinnamomea*), provide habitat for the state's best population of SP532 (G3, S1, PA-Endangered). These openings and associated tall shrub areas are likely breeding habitat for the listed animal species SA533 (S1S2B, PA-Threatened), heard at the site along with other species typical of boreal wetlands, including brown creepers (*Certhia familiaris*), yellow-rumped warblers (*Dendroica coronata*), magnolia warblers (*Dendroica magnolia*), Canada warblers (*Wilsonia canadensis*), and common raven (*Corvis corax*). SA533 is potentially using nearby wetlands and forest lands. Additional surveys for SA533 are needed to monitor the site and to check for evidence of reproduction. Another plant species seen at the swamp includes a marginal to good-quality population of an S1S2 species (SP533). There is no sign of current human activity in the swamp, and portions of the second growth spruce forest are beginning to mature. Heavy logging, road- building or other direct disturbances would be a threat to the continued recovery of this site as would disturbances to the surrounding hydrology.

SA535, SP503a, SP503b, SP509, and SP510– UPDATE - "Schmitthenner Lake" (Forkston Twp.). The lake, which was listed as one of the top sites for conservation in Wyoming County in the NAI report, was revisited in 1997. The quality of the populations of the plant species SP503a, SP503b, and SP509 has remained unchanged since the original report. One plant species that was not tracked when the original report was written was SP510. SP510 is now tracked as an S3 plant species of concern. This species has been present at the lake since 1913, but it was seen as recently as 1993. An S3B,S4N animal species of concern (SA535) was observed in 1997. The animal uses a mix of habitat types including hayfield, pasture, blueberry thickets, and the shrub swamp next to the lake. Additional surveys are needed to determine the quality of both SP510 and SA535. The privately owned natural lake continues to be a location for low-intensity recreation with vacation homes. No obvious threats were noted. A stewardship plan would ensure the survival of the rare species found at this site. This site continues on to the Lopez quadrangle.

SA531a and SA531b – UPDATE - "Tamarack Swamp"(North Branch Twp.). This site was labeled as **Locally Significant** in the original NAI report. In 1995, two animal species of concern (SA531a and SA531b) were identified at this site in State Game Lands 57 and were last seen in 1997. For this reason, the site was removed from Table 2 and added to Table 1. SA531a is a marginal to good population of a PA-Threatened animal species. Additional surveys for SA531b are needed to determine the quality of the population. The associated animal species include Canada warbler (*Wilsonia canadensis*), yellow-rumped warbler (*Dendroica coronata*), brown creeper (*Certhia familiaris*), yellow-bellied sapsucker (*Sphyrapicus varius*), white-throated sparrow (*Zonotrichia albicollis*), solitary vireo (*Vireo solitarius*), dark-eyed junco (*Junco hyemalis*), and hermit thrush (*Catharus guttatus*). Tamarack Swamp is just north of Coalbed Swamp. Coalbed Swamp has the best breeding population of theses two animal species in the state. Consequently, both swamps are a top priority for conservation in the county. Logging and ATV traffic were identified as past disturbances.

Potential threats include additional logging, changes in hydrolgy by beaver or for waterfowl management, fire, and ATVs. Management recommendations are preservation of the swamp and a buffer area. The site should continue to be monitored.

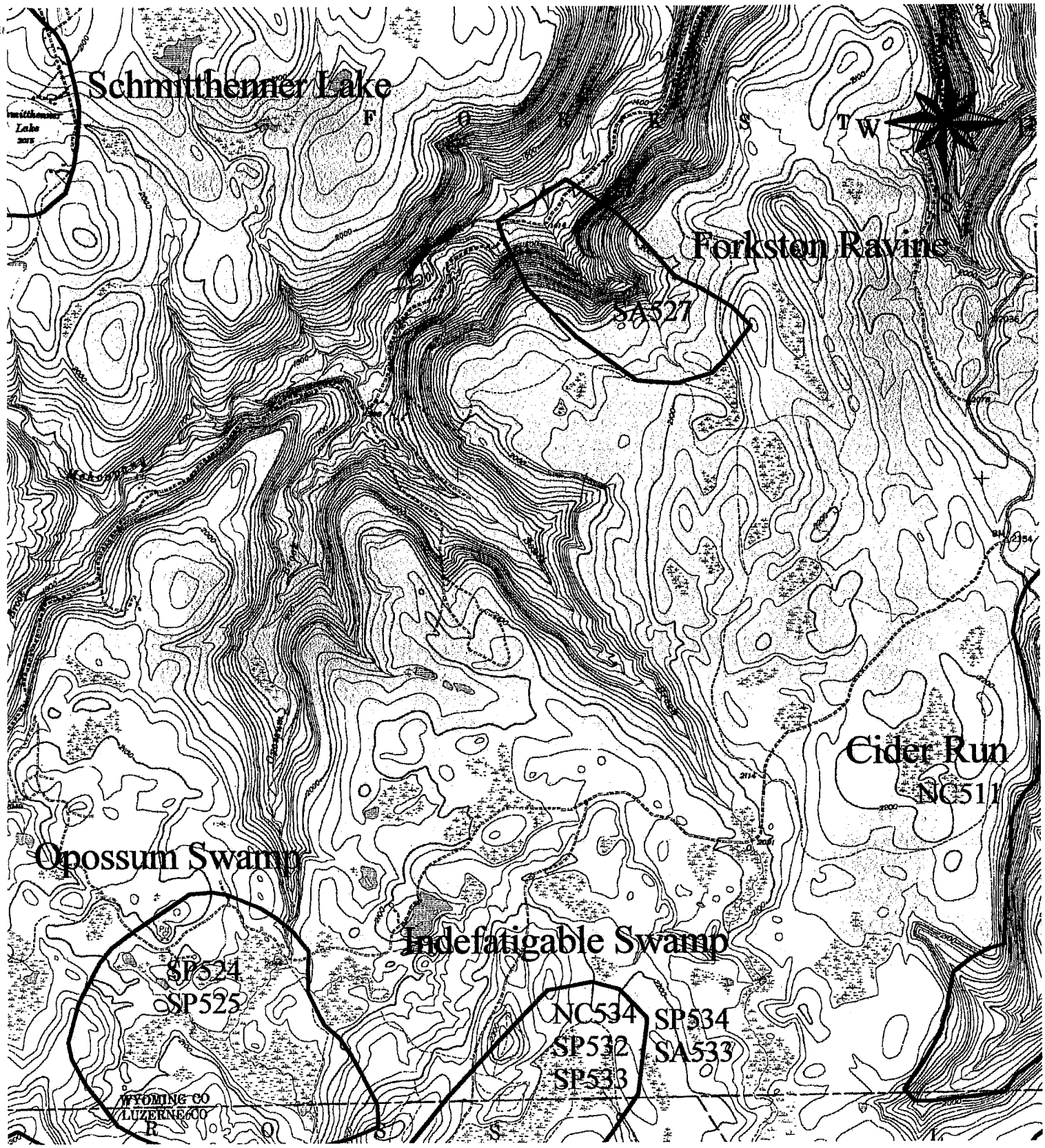


Dutch Mountain Quadrangle

Becker Brook Swamp (New)

Scale 1:25,227

Tamarack Swamp (New)



Dutch Mountain Quadrangle

Forkston Ravine (New)

Indefatigable Swamp (New)

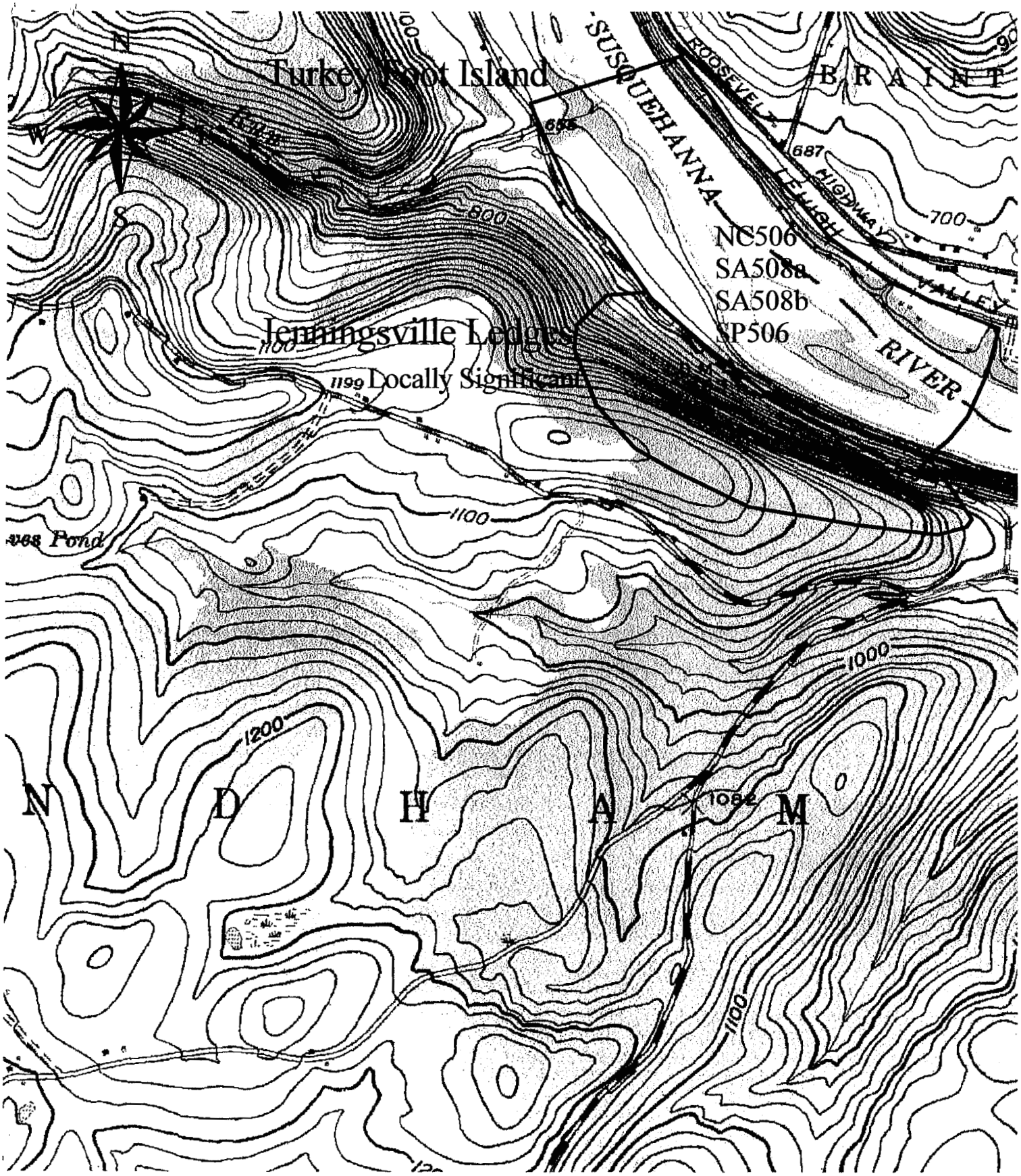
Scale 1:30,000

USGS QUADRANGLE MAP: Jenningsville (52)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITY:	NC506	G?	S4S5	N/A	8/22/97	B
SPECIAL PLANT:	SP506	G5	S3	N/A	8/22/97	B
SPECIAL ANIMALS:	SA508a	G3G4	S3S4	N/A	8/22/97	E
	SA508b	G3	S2	N/A	8/22/97	E

Jenningsville Quadrangle:

NC506, SP506, SA508a, and SA508b – NEW – "Turkey-Foot Island" (Windham Twp.) Turkey – Foot Island was visited in 1997 and was mapped as a good – quality example of a River Gravel Natural Community (NC506). This site includes a 30-40 acre island and the adjacent gravel/cobble areas of the Susquehanna River. The upstream 1/3 to 1/2 of the island is a scour area dominated by tall grasses including turkeyfoot (*Andropogon gerardi*) and switch grass (*Panicum virgatum*). Grape (*Vitis riparia*) and some garden loostrife (*Lysimachia vulgaris*) were also dominant plant species. The center part of the island was dominated by red-osier dogwood (*Cornus stolonifera*); while downstream the island becomes forested. A good-quality population of a S3, PA-Rare plant species (SP506) occurs at this site. Additionally, two animal species of concern (SA508a and SA508b) were found. SA508a is a G3G4, S3S4 species, and SA508b is a G3, S2 species. A second survey of the site is necessary to determine the quality of these two animal populations. No disturbances were noted during the survey. The surrounding landuse is forested. Potential threats to the natural community, plants, and animals include a change in the flooding regime (e.g., dams), an increase in exotic plant species (e.g., purple loostrife), and changes in water quality (e.g., siltation).



Jenningsville Quadrangle

Turkey Foot Island (New)

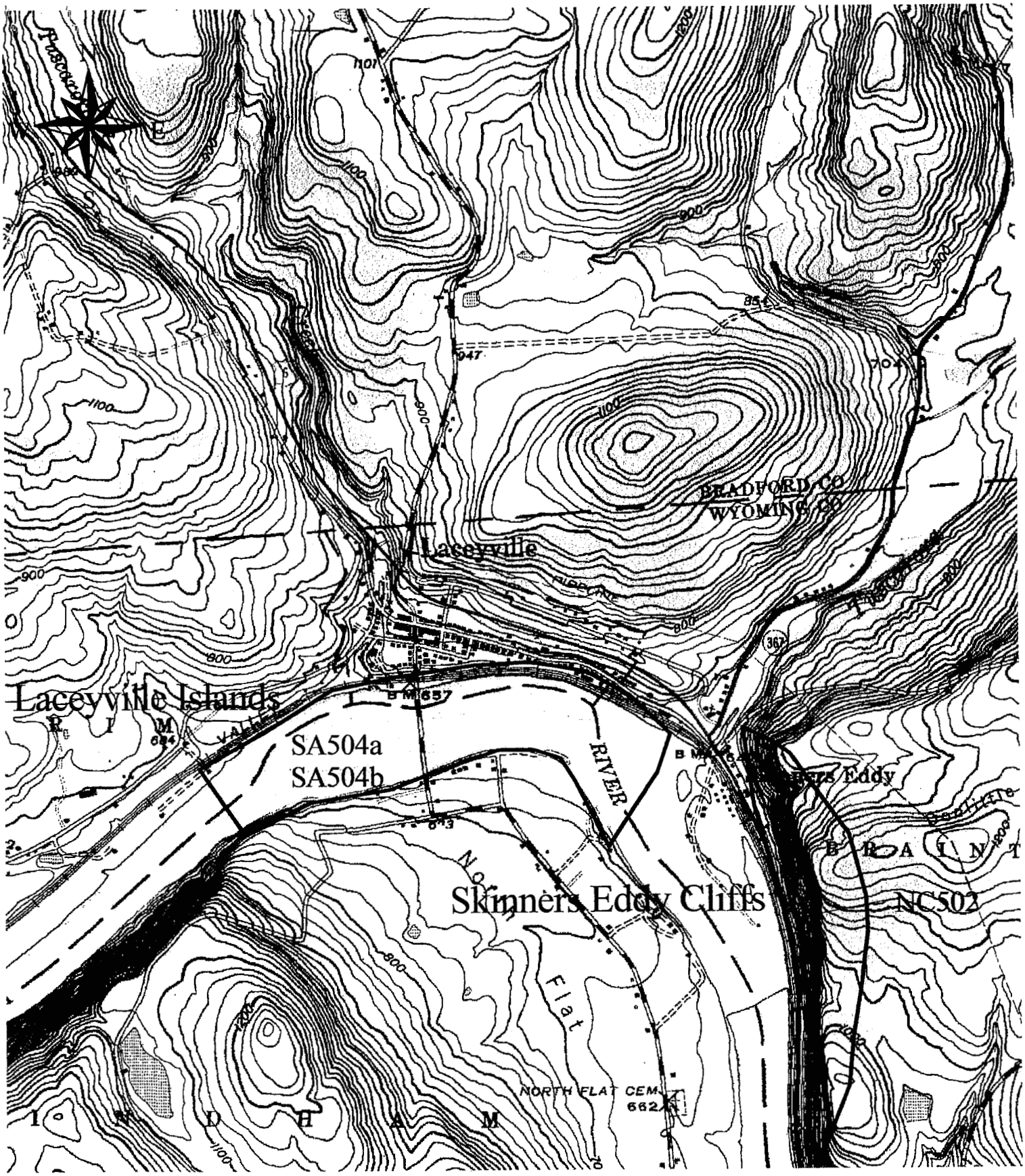
Scale 1:15,603

USGS QUADRANGLE MAP: Laceyville (56)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
SPECIAL ANIMALS:	SA504a	G3G4	S3S	N/A	8/27/97	BC
	SA504b	G3	S2	N/A	8/27/97	E

Laceyville Quadrangle:

SA504a and SA504b – NEW – "Laceyville Islands" (Braintrim and Windham Twps.). This site, which was first visited in 1997, is a series of islands and gravel bars in the Susquehanna River. There are small riffles occurring between and along some of the islands. At low water, there are extensive shallow stretches and some unvegetated gravel bars are present. Two animal species of concern (SA504a and SA504b) were found at this site. SA504a is a marginal to good-quality population of a G3G4, S3S species, and SA504b is a G3, S2 species. Additional surveys are needed to assess the quality of the population of SA504b. Common plant species identified include algae, water stargrass (*Heteranthera dubia*), and water-milfoil (*Myriophyllum spicatum*). The surrounding landuse is a mixture of forest, agriculture, transportation, and residences. No disturbances were noted during the survey. Changes in the water regime and water pollution are potential threats to these animal species.



Laceyville Quadrangle

Scale 1:21,113

Laceyville Islands (New)

USGS QUADRANGLE MAP: Lopez (60)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
SPECIAL ANIMALS:	SA580	G5	S3B,S3	N/A	4/26/95	E
	SA581	G5	S3B,S3	N/A	4/26/95	E
	SA585a	G5	S1S2B, S3N	N/A	7/05/97	C
	SA585b	G4	S1B	PE	7/16/98	C
	SA585c	G5	S3B	N/A	8/09/97	E
	SA586b	G5	S3B, S3N	N/A	4/26/95	E
	SA586b	G5	S3B, S4N	N/A	7/16/97	E

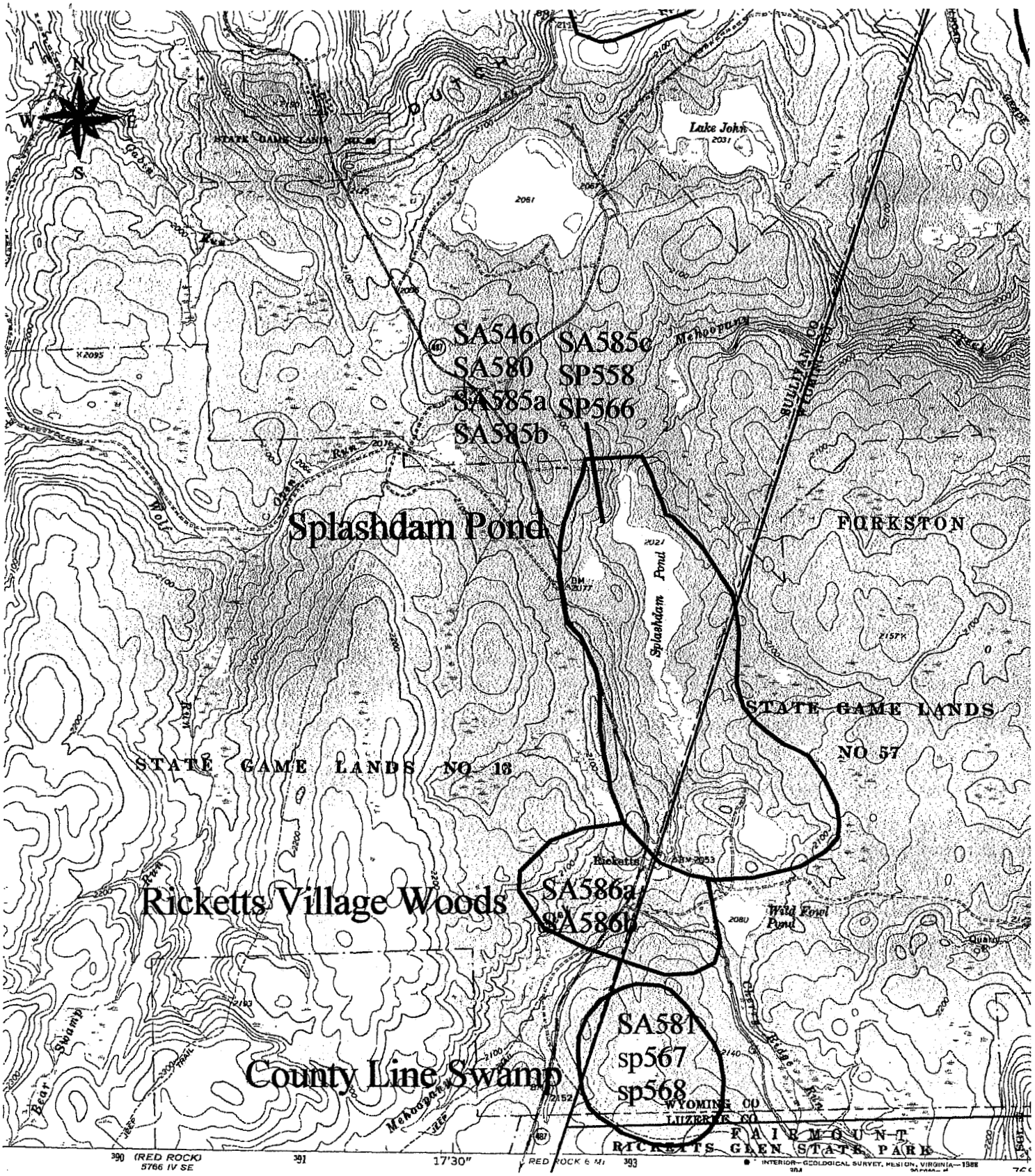
Lopez Quadrangle

SA581 – UPDATE – "County Line Swamp" (Forkston Twp in Wyoming County, Colley Twp. in Sullivan County, & Fairmont Twp. in Luzerne County). New locations of an S3B, S3 animal species (SA581) were discovered in State Game Lands 57 in April of 1995. Additional surveys are needed to determine the numbers of this species present in the SGLs. The preservation of snags and older trees would benefit this animal. The majority of this site lies in Wyoming County.

SA586a and SA586b – NEW – "Ricketts Village Woods" (Colley Twp. in Wyoming County & Forkston Twp. in Wyoming County). This site on State Game Lands 13 contains a wide variety of habitats including a hardwood/hemlock forest, blueberry thickets, scrub-shrub wetland, and mowed fields. Two animal species of concern were observed; one in 1995 (SA586a) and one in 1997 (SA586b). These species are probably also using the adjacent Splashdam Pond site. For both species, additional surveys are needed to determine the quality of the populations. Additional animal species that were identified include red-shouldered hawk (*Buteo lineatus*), common raven (*Corvus corax*), dark-eyed junco (*Junco hyemalis*), common yellowthroat (*Geothlypis trichas*), scarlet tanager (*Piranga olivacea*), white-throated sparrow (*Zonotrichia albicollis*), and cedar waxwing (*Bombycilla cedrorum*). The animal species of concern can be helped by delayed mowing of the fields (August), by preserving snags, and by preserving the mosaic of habitats (e.g., woods, scrub-shrub wetland, and thicket).

SA580, SA585a, SA585b, and SA585c – UPDATE – "Splashdam Pond" (Forkston Twp in Wyoming County & Colley Twp. in Sullivan County). Splashdam Pond and the adjacent Long Marsh provide important breeding habitat for waterfowl and wading birds, as well as many other bird species. New locations of an S3B, S3 animal species (SA580) was discovered in this State Game Lands 57 site in April of 1995. In 1997, two additional animal species of concern (SA585a & SA585c) were observed in Splashdam Pond and Long Marsh. A fourth PA-Endangered animal species of concern (SA585b) was identified at the site in 1998. Other animal species that were observed include wood

duck (*Aix sponsa*), hooded merganser (*Lophodytes cucullatus*), mallard (*Anas platyrhynchos*), American black duck (*Anas rubripes*), swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), common yellowthroat (*Geothlypis trichas*), alder flycatcher (*Empidonax alnorum*), yellow warbler (*Dendroica petechia*), and eastern towhee (*Pipilo erythrophthalmus*). Additional surveys are needed to determine the numbers of SA580 and SA585c present in the SGLs. SA585a and SA585b were mapped as marginal-quality populations. The preservation of snags and older trees would benefit SA580. The protection of existing water levels, water quality, and the marsh/shrub border of the pond are important for the survival of the animal species currently using the site. Periodic monitoring of the pond and marsh is warranted.



Lopez Quadrangle

Ricketts Village Woods (New)

Scale 1:30,000

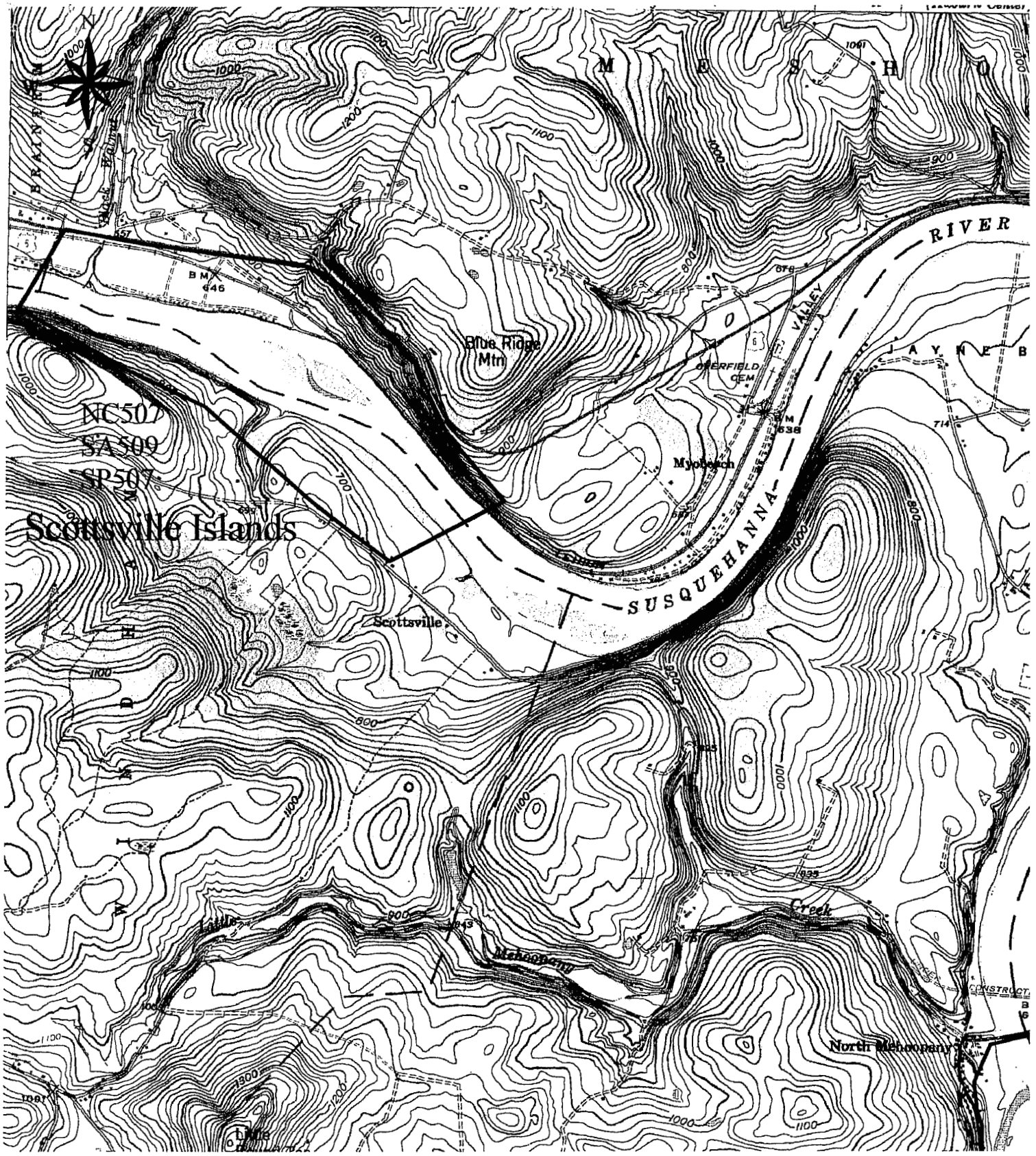
USGS QUADRANGLE MAP: Meshoppen (64)

	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITY:	NC507	G?	S4S5	N/A	8/27/97	B
SPECIAL PLANT:	SP507	G5	S3	PR	8/27/97	BC
SPECIAL ANIMALS:	SA509	G3	S2	N/A	8/27/97	E
	SA510a	G3G4	S3S	N/A	9/21/95	CD
	SA510b	G3	S2	N/A	9/21/95	CD

Meshoppen Quadrangle

NC507, SA509, and SP507 – NEW – "Scottsville Islands" (Meshoppen Twp.). This good-quality River Gravel Natural Community (NC507) was first visited in 1997. The site includes two islands, which are separated by a narrow intermittent channel, and the surrounding cobble/gravel bars in the Susquehanna River. A population of a G3, S2 animal species (SA509) and a good to marginal – quality population of a PA-Rare plant species (SP507) were identified at this site. Additional surveys are needed to determine the status of the animal species. Tall grasses [e.g., turkeyfoot (*Andropogon gerardi*) and switch grass (*Panicum virgatum*)] and grape (*Vitis riparia*) dominate the upstream side of the island, while the downstream side is forested. The surrounding landuse is a mixture of forest and agriculture. Disturbances to the plant species of concern include heavy deer browse. Potential threats to the natural community, plants, and animal species include a change in the flooding regime (e.g., dams), an increase in exotic plant species (e.g., purple loostrife), deer browse, and changes in water quality (e.g., siltation).

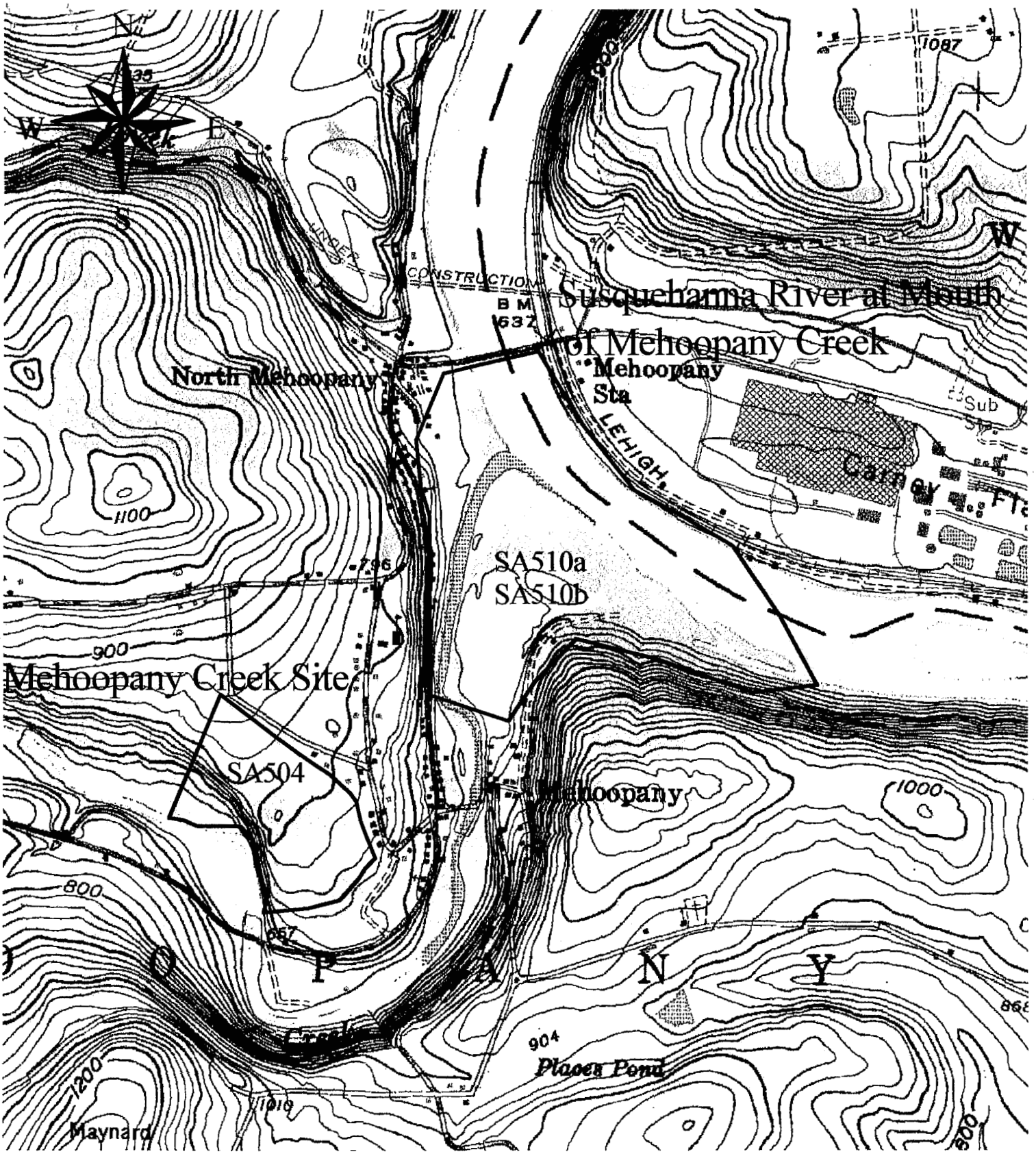
SA510a and SA510b – NEW – "Susquehanna River at Mouth of Mehoopany Creek" (Mehoopany Twp.). Two animal species of concern were found in cobble/gravel/sand substrate at this site in the Susquehanna River in 1995. SA510a is a G3G4, S3S animal and SA510b is a G3, S2 animal. Both of the populations are of marginal to poor quality. The aquatic vegetation in the river is covered with massive algal growth. Associated animal species include crayfish, snails, and freshwater mussels. Disturbances and threats to the animal populations include increased siltation.



Meshoppen Quadrangle

Scottsville Islands (New)

Scale 1:26,703



Meshoppen Quadrangle

Susquehanna River at Mouth of Mehoopany Creek (New)

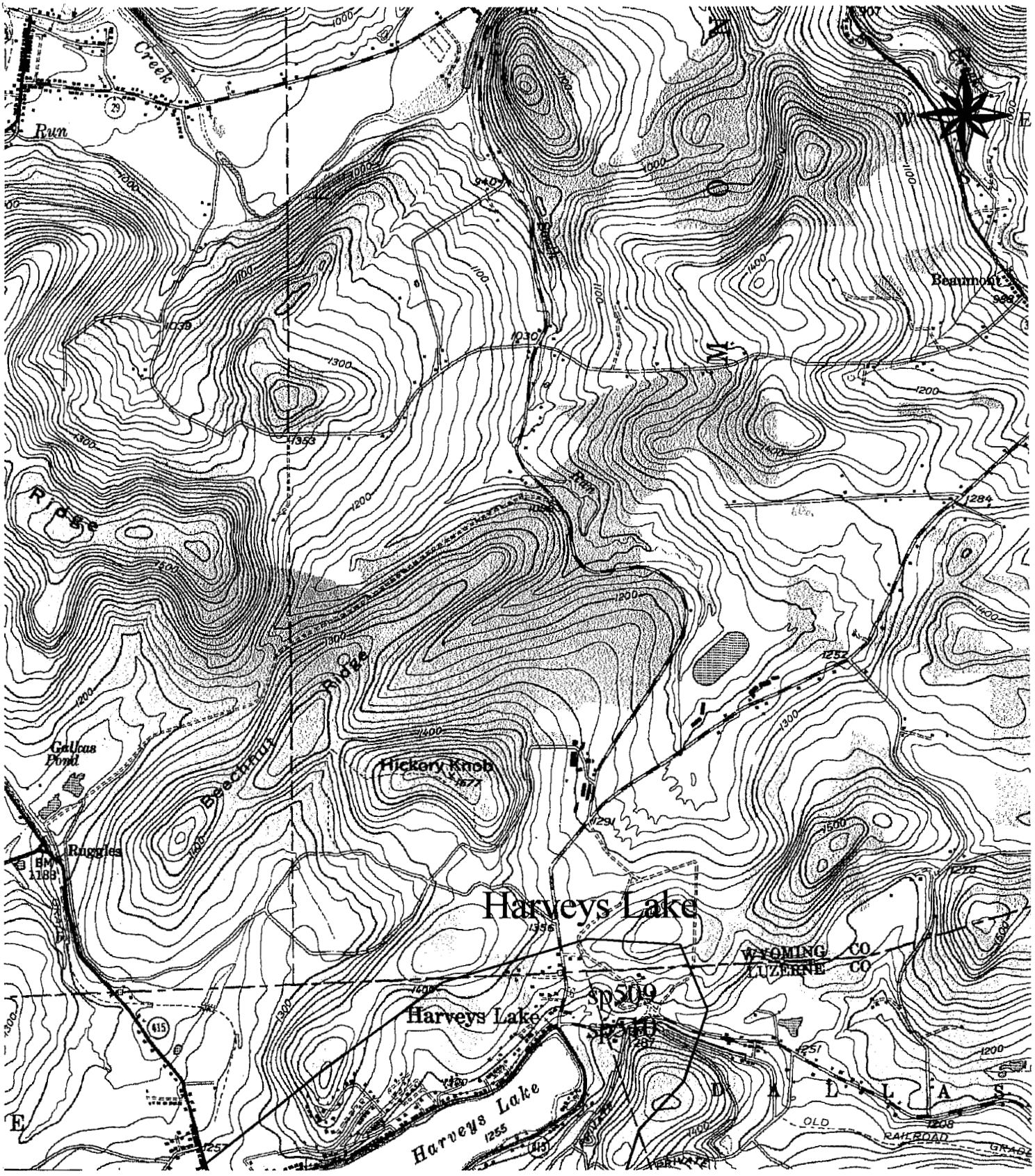
Scale 1:22,293

USGS QUADRANGLE MAP: Noxen (68)

Other: sp509 & sp510

Noxen Quadrangle

sp509 & sp510 – NEW – "Harveys's Lake" (Monroe Twp. in Wyoming County & Lake Twp. in Luzerne County). Harveys Lake is one of the largest natural lakes in Pennsylvania and there are numerous historical records from the lake of plant species now considered rare or endangered. The majority of the shoreline is now developed and impact from this as well as from exotic plant species [e.g., fanwort, (*Cabomba caroliniana*)] has changed the habitat dramatically. Populations of one PA-Rare (SP510) and one PA-Endangered plant (SP509) species have been collected from the site by PNDI biologists. These plants were not rediscovered in a survey of the lake in 1999, but much additional habitat remains and it is possible that the species of concern are persisting. Additional surveys are needed to assess these populations. Only a small portion of the boundary for the lake occurs on the Noxen quadrangle. The majority of the site and the plant species of concern are found in Luzerne County on the Harveys Lake quadrangle.



Noxen Quadrangle

Harveys Lake (New)

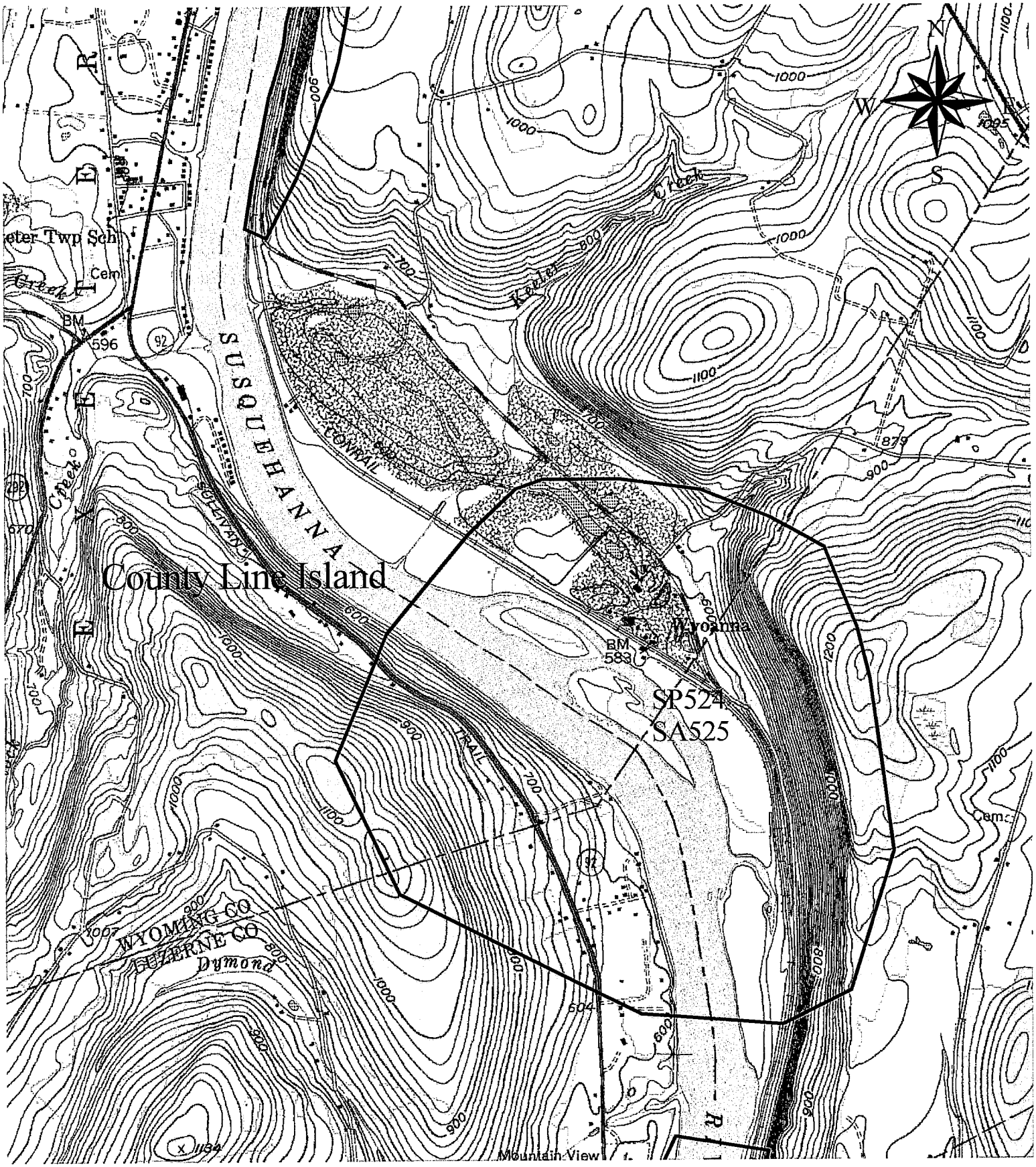
Scale 1:34,177

USGS QUADRANGLE MAP: Ransom (72)

	Code	TNC Ranks Global	State	State Status	Last Seen	Quality
SPECIAL PLANT:	SP524	G5	S3	PR	9/01/99	C
SPECIAL ANIMA:	SA525	G3G4	S3S4	N/A	9/01/99	C

Ransom Quadrangle

SP524 & SA525 – NEW – "County Line Island" (Falls & Exeter Twps. in Wyoming County, Newton Twp. in Lackawanna County, and Exeter Twp. in Luzerne County). This island/river gravel community was first visited in 1996. A marginal population of a PA-Rare plant species (SP524) occurs in an open, scour area of the island. Associated plant species include turkeyfoot (*Andropogon gerardi*), switch grass (*Panicum virgatum*), grape (*Vitis riparia*), indian grass (*Sorghastrum nutans*), and cocklebur (*Xanthium echinatum*). The site was revisited in 1999, SP524 was found once again along with a new marginal population of a G3G4 animal species (SA525). The animal species was found in a riffle area in a cobble/gravel substrate along with ridged-wedge mussel (*Alasmidonta marginata*). Many exotic plant species such as crown vetch (*Coronilla varia*) are growing on the island. Threats to the plant species include competition with invasive plant species, deer browse, and changes in hydrology (e.g., construction of new dams). Any changes in hydrology and water pollution would affect the animal species.



Ransom Quadrangle

County Line Island (New)

Scale 1:17,000

USGS QUADRANGLE MAP: Tunkhannock (78)

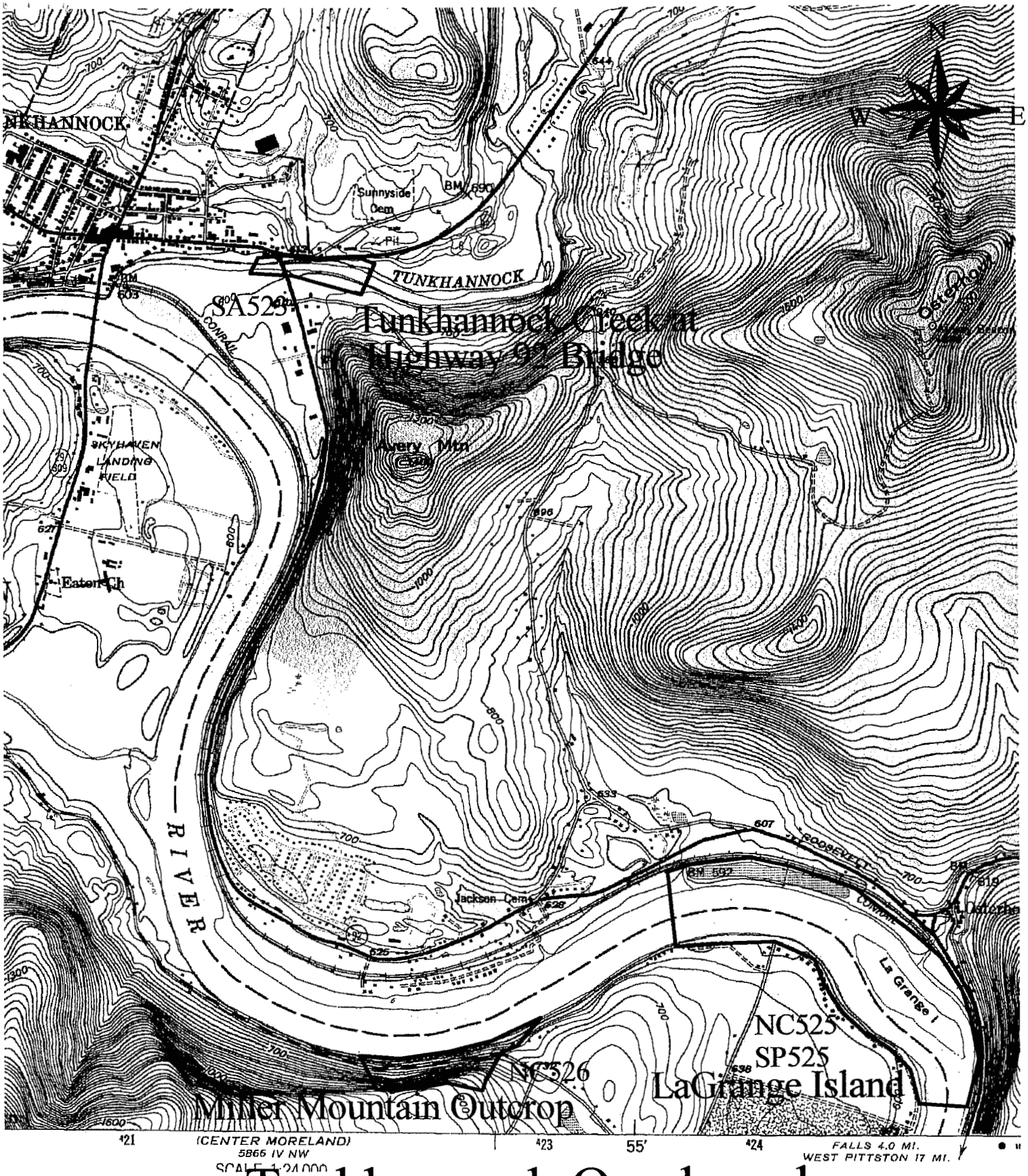
	Code	TNC Ranks Global	TNC Ranks State	State Status	Last Seen	Quality
NATURAL COMMUNITIES	NC525	G?	S4S5	N/A	8/03/00	B
	NC526	G?	?	N/A	8/03/00	C
SPECIAL PLANT	SP525	G5	S3	PR	8/03/00	B
SPECIAL ANIMAL:	SA523	G3G4	S3S4	N/A	9/22/95	D

Tunkhannock Quadrangle

NC525 & SP525 – NEW – "La Grange Island" (Tunkhannock Twp.). This site, which was mapped in 2000, has a good-quality River Gravel Natural Community (NC525) and a good-quality population of a PA-Rare plant species (SP525). The upstream end of the island is subject to frequent scouring from flooding and ice, and deposition. The vegetation of the natural community consists of bunch-grasses interspersed with trailing shrubs and occasional stunted tree saplings. The dominant plant species include turkeyfoot (*Andropogon gerardi*), switch grass (*Panicum virgatum*), grape (*Vitis sp.*), goldenrod (*Solidago sp.*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), and spreading dogbane (*Apocynum androsaemifolium*). The downstream portion of the island becomes a scrubby floodplain sycamore and ash forest with some overstory trees. Deer browse is a disturbance and threat to the rare plant species on the island.

NC526 – NEW – "Miller Mountain Outcrop" (Eaton Twp.). The site is an area of scoured, calcareous bedrock undercut by the Susquehanna River. A marginal-quality example of a Calcareous Riverside Outcrop natural Community (NC526) was mapped here in 2000. The plant species identified include include turkeyfoot (*Andropogon gerardi*), switch grass (*Panicum virgatum*), poison ivy (*Toxicodendron radicans*), Virginia wild rye (*Elymus virginicus*), purple loostrife (*Lythrium salicaria*), lizard's tail (*Saururus cernuus*), Eastern hemlock (*Tsuga canadensis*), mossy stonecrop (*Sedum acre*), early saxifrage (*Saxifraga virginiensis*), and American basswood (Tilia americana). The site contains some exotic plant species (e.g., Asiatic honeysuckles), but the exotics are not dominant. The disturbances to the site appear to be natural (e.g., scour). No threats to the site are apparent, but additional surveys to monitor the site are recommended.

SA523 – NEW - "Tunkhannock Creek at Highway 92 Bridge" (Tunkhanock Twp.). In 1995, a small population of a G3G4, S3S4 animal species (SA523) was found in mats of algae in shallow water with a cobble/gravel substrate in Tunkhannock Creek. Small crayfish and snails were abundant. Disturbances and threats to the animal population include increased siltation. Additional surveys of the site are needed.



Tunkhannock Quadrangle

Tunkhannock Creek at Highway 92 Bridge (New)

Miller Mountain Outcrop (New)

LaGrange Island (New)

Scale 1:22,690

SUMMARY

Since the original Natural Areas Inventory for Wyoming County was completed in 1995, fifteen new sites were mapped. The Keelersburg Islands and the Scottsville Islands in the Susquehanna River were given a rank of 3. The Turkey Foot Islands were ranked 2. The Lake Catalpa Swamp, which is located on private property, was given a rank of 5. On State Game Lands 57, the new sites Becker Brook Swamp, Indefatigable Swamp, and Forkston Ravine were given ranks of 2, 1, and 4, respectively. The Laceyville Islands and the La Grange Island, which are found in the Susquehanna River, were both given a rank of 4. County Line Island was ranked 5. Ricketts Village Woods is ranked 4. The Susquehanna River at the Mouth of Mehoopany Creek site, Harveys Lake, which is mostly in Luzerne County, Tunkhannock Creek at Highway 92 Bridge site, and Miller Mountain Outcrop are ranked 5.

Tamarack Swamp was listed in the original Natural Areas Inventory report in Table 2 as a Locally Significant site. In 1995, two animal species of concern (SA531a and SA531b) were identified at this site in State Game Lands 57. Consequently, this site was removed from Table 2 and added to Table 1 as a site of statewide significance for the protection of biological diversity in Wyoming County. The site was given a rank of 1.

In addition to Tamarack Swamp, six other existing sites were revisited. A new good-quality PA-Endangered, S1 plant (SP503b) population was identified in Perrins Marsh during the 1999 visit. During June of 1995, a G4, S3S4 PA Candidate animal species (SA528) was observed on Bartlett Mountain Bald/Flat Top. In 1995, two additional animal species of concern (SA529b and SA530) were identified in Coalbed Swamp. At Schmitthenner Lake one plant species that was not tracked when the original report was written was SP510. SP510 is now tracked as an S3 plant species of concern. This species has been present at the lake since 1913, but it was seen as recently as 1993. An S3B,S4N animal species of concern (SA535) was observed in 1997 at the lake. In the Splashdam Pond site, four additional animal species of concern (SA580, SA585a, SA585b, & SA585c) were observed. New locations of an S3B, S3 animal species (SA581) were discovered in County Line Swamp in State Game Lands 57 during April of 1995.

Bartlett Mountain Bald/Flat Top and Coalbed Swamp, both in Forkston Township, remain as number 1 ranked sites for the protection of biological diversity in Wyoming County. In addition, the site Tamarack Swamp, which was formerly locally significant, was given a rank of 1 because of the

proximity of Tamarack Swamp to Coalbed Swamp. Indefatigable Swamp was given a rank of 1 because the swamp is a diverse boreal conifer swamp natural community with three rare plants and one animal species of concern. One of these plant species (SP532) is the best population in the state.

Perrins Marsh, which was ranked as 4 in the 1995 report, was given a new rank of 2. The change in rank was made because a new population of a Pennsylvania Endangered plant (SP503b) was identified at the site. This population is the first known extant occurrence of the plant species in Eastern Pennsylvania. Because four additional animal species of concern were found at Splashdam Pond, the site rank was changed from 4 to 3. The ranks remain unchanged for the remainder of the sites listed in the 1995 report.

The sites that are ranked 1 or 2 should remain the priority sites for ongoing and future conservation efforts. However, all of the sites listed in the report, which contain populations of species of concern or exemplary natural communities, should be conserved. The staff of the PA Science Office of The Nature Conservancy is available for consultation on all of the sites listed in the report.

Appendix 1

FEDERAL AND STATE STATUS, AND THE NATURE CONSERVANCY (TNC) RANKS

FEDERAL STATUS

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

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

LE - Listed Endangered - Taxa in danger of extinction throughout all or a significant portion of their ranges.

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

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

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

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

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

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

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

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

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

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

Appendix 1 (Continued)

STATE STATUS-NATIVE PLANT SPECIES

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

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

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

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

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

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

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

N - None - Plant species which are believed to be endangered, rare, or threatened, but which are being considered by the required regulatory review processes for future listing.

Appendix 1 (Continued)

STATE STATUS-ANIMALS

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

PE - Pennsylvania Endangered

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

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

PT - Pennsylvania Threatened

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

Fish and Boat Commission - Threatened Species are all species and subspecies: (1) declared by the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on a Threatened Species List published in the Federal Register; or, (2) have been declared by the Executive Director (PaFC) to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin.

Appendix 1 (Continued)

TNC GLOBAL ELEMENT RANKS

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

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

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

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

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

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

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

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

TNC STATE ELEMENT RANKS

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

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

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

S4 = Apparently secure in state, with many occurrences.

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

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

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

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

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

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

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

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

SX = Apparently extirpated from the state.

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

Appendix 2

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

---

* Intermediate ranks may also be assigned.