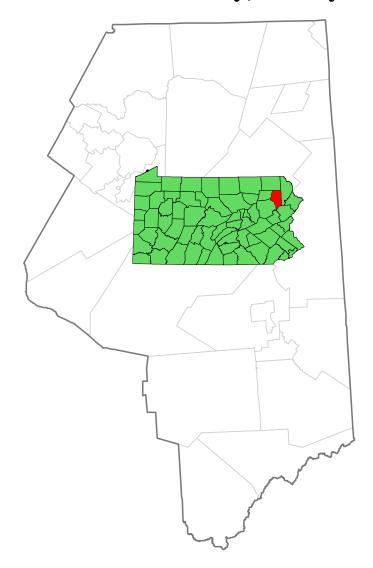
# A Natural Areas Inventory of Lackawanna County, Pennsylvania



Document includes the original 1992 full report followed by the 1998 update addendum.

This Natural Areas Inventory was conducted by

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

for

The Lackawanna Heritage Valley Authority 1300 Old Plank Road Mayfield, PA 18433

# A NATURAL AREAS INVENTORY OF LACKAWANNA COUNTY, PENNSYLVANIA

1997

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The project was funded in part by The Neighborhood Development Trust Fund, by Pennsylvania Heritage Parks Program of the Pennsylvania Department of Conservation and Natural Resources (DCNR), by the National Park Service and by funds provided by the USDA Forest Service, Northeastern Area, State and Private Forestry and with the assistance of the Morris Arboretum of the University of Pennsylvania and DCNR Bureau of Forestry.



**BALD MOUNTAIN** is one of six top sites for conservation in Lackawanna County. This site includes Ridgetop Dwarf-Tree Forest and Acidic Rocky Summit Natural Communities. Three plant species of special concern have been discovered at this site. Photo: PA Science Office of The Nature Conservancy.

#### **PREFACE**

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

Managed areas such as federal, state, county and township lands, private preserves and conservation easements are also provided on the maps. This information is useful in determining where gaps occur in the protection of land with rare species, natural communities and locally significant habitats. However, not all of the information on protected lands was available at the time of this inventory and new sites are always being added.

Implementation of the recommendations is up to the discretion of the landowners. However, cooperative efforts to protect the highest quality natural features through the development of site-specific management plans are greatly encouraged. Landowners working on management 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**

The natural areas inventory study was conducted by The Nature Conservancy, 34 Airport Drive, Middletown, PA 17057 for the Lackawanna Heritage Valley Authority. This natural areas inventory was financed in part by The Neighborhood Development Trust Fund, by Pennsylvania Heritage Parks Program of the Pennsylvania Department of Conservation and Natural Resources (DCNR), by the National Park Service and by funds provided by the USDA Forest Service, Northeastern Area, State and Private Forestry and with the assistance of the Morris Arboretum of the University of Pennsylvania and DCNR Bureau of Forestry.

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 Annette Schultz of the Lackawanna Heritage Valley Authority for her time and effort. We also thank the members of the NAI Review Committee for their comments and review of the document. For help with finding our way around in the wilds of the county we thank Jane Frye. For providing maps and access to PG Energy lands we thank Guy Beh. Doug Gross conducted bird surveys under contract for this project. And many thanks go to those who attended the initial public meeting and shared their insights on the best natural areas in the county and thanks also to the residents of the county who allowed us access to their lands.

The species information utilized in the inventory came from many sources as well as our own field surveys. We wish to acknowledge the work of Ann Rhoads, Ernie Schuyler, Roger Latham, and others for all of the fine botanical survey work they have done over the years. Without their contributions, this survey would have been far less complete. Other 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, the Pennsylvania Game Commission, and the Pennsylvania Fish and Boat Commission were among the contributors for plant and animal records. In addition, many private citizens contributed valuable information that was incorporated into the study. Further, we wish to thank the many landowners who granted us permission to conduct inventories on their lands. The task of inventorying the natural heritage of Lackawanna County would have been far more difficult without this tremendous pool of information gathered by many people over many years.

Julie Lundgren was Coordinator of County Natural Areas Inventories at the start of this project. She planned the inventory, performed background research, and conducted a large part of the field work. She deserves credit for her contributions to this Natural Areas Inventory.

Copies of this document may be obtained from: Lackawanna Heritage Valley Authority 1300 Old Plank Road Mayfield, PA 18433 (717-876-6188)

# TABLE OF CONTENTS

	PAGE
PREF	ACE
ACKN	IOWLEDGMENTSii
GLOS	SARYv
INTRO	DDUCTION
COUN	TTY OVERVIEW
PENN	SYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM 9
NATU	RAL AREAS INVENTORY METHODS
SUMM	MARY AND RECOMMENDATIONS
RESU	LTS OF THE INVENTORY
LITER	ATURE CITED 108
APPE	NDICES
I.	Federal and State Endangered Species Categories, Global and State Element Ranks
II.	Element Occurrence Quality Ranks
III,	Recommended Natural Area Survey Form
IV.	Potential Natural Area Survey Forms
V.	Special Plant Survey Form
VI.	Natural Community Types in Pennsylvania
VII.	Special Plants and Animals in the County
VIII.	Names of Common Plant Species Referred to in Text

# FIGURES AND TABLES

FIGURES	PAGE
1.	Locations of the top sites for the preservation of biological diversity in Lackawanna County
2.	Lackawanna County outline with names and locations of USGS topographic quadrangle maps of the county
3.	Sample USGS topographic map with explanations of the various types of County Natural Areas Inventory information added
TABLES	
1.	The sites of statewide significance for the protection of biological diversity in Lackawanna County
2.	Areas of local significance in Lackawanna County based on size, diversity of wildlife and plant life, water quality protection, and recreation potential
MAP TABLE	S
Carbon Cliffor Dalton Factor Forest Lake A Lenox Mosco Olypha Pittsto Pleasa Ranson Scrante Sterlin Thornl	38         ndale       44         rd       48         cl       52         yville       58         City       62         Ariel       64         ville       68         rw       70         ant       74         n       78         nt View Summit       80         m       84         on       88         g       92         nurst       96         anna       100         art       104

#### **GLOSSARY**

anthropogenic - human caused.

ATV - all-terrain-vehicle.

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

<u>canopy</u> - the layer formed by the tallest vegetation.

circumneutral - pH between 5.5 and 7.

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

<u>DCNR</u> - Pennsylvania Department of Conservation and Natural Resources.

<u>DEP</u> - Pennsylvania Department of Environmental Protection.

diabase - a dark gray igneous rock.

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

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

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

Exceptional Value Waters (EV) - DEP designation for a stream or watershed which constitutes an outstanding national, state, regional or local resource, such as waters of national, State or county parks or forests; or waters which are used as a source of unfiltered potable water supply, or waters of wildlife refuges or State Game Lands, and other waters of substantial recreational or ecological significance. For 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).

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

extant - currently in existence.

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

forb - non-grass herbaceous plant such as goldenrod.

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

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

<u>High-Quality Coldwater Fisheries</u> (HQ-CWF) - DEP 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 <u>Special Protection Waters Implementation Handbook</u> (Shertzer 1992).

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

lepidoptera - moths and butterflies.

littoral - the area where water meets land, shoreline.

Managed Area - public lands.

mesic - moist, not saturated.

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

<u>non-point</u> - refers to diffuse sources of pollution such as storm water runoff contaminated with oil or pesticides.

Odonata - Order of insects that includes dragonflies and damselflies

POSCIP - Plant of Special Concern in Pennsylvania

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

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

riparian - streamside

**ROW** - right-of-way, usually referring to powerlines or pipelines.

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

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

<u>soil series</u> - 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.

<u>succession</u> - natural process of vegetation change through time; over time, the plant species of a site will change in composition and structure as light and soil conditions change (e.g., a field that is left alone may, over time, be taken over by shrubs, then small trees and eventually a woodland).

syncline - a trough like area of bedrock where rock layers incline together from opposite sides.

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

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

xeric - extremely dry or droughty.



Low late season water levels expose a gravel bar on County Line Island in the Susquehanna River. The island harbors a plant species of special concern, and provides potential habitat for herons and osprey. Photo: PA Science Office of The Nature Conservancy.

#### INTRODUCTION

Lackawanna County is situated in north-eastern Pennsylvania, an area rich in historical, scenic, and natural resources. The county's 454 square miles (Eckenrode 1982) are occupied by a mix of forest, agriculture, industry, small towns, suburbs, and urban areas. The majority of the population lives in the heavily developed Lackawanna River Valley while the rest of the county has a relatively low population density. Although census data have indicated an overall population decline in the county over the last three decades, the decline has been largely restricted to the Lackawanna River Valley. Populations in most townships outside of the valley have experienced growth over that time period (Lackawanna Regional Planning Commission, 1996). With Scranton and Wilkes-Barre within commuting distance of most of the county, further growth in these townships is likely. The scenic natural environment of rural Lackawanna County which is attracting residents to settle outside of the Lackawanna River Valley may also be important in attracting tourists to the county.

Lackawanna County has extensive recreational opportunities which are provided by the thousands of acres of state game lands, and state and privately owned forests. The county is also attractive because of the pastoral and wild scenery that dominates much of the landscape, particularly in the northwest and southeast; these natural qualities are important to both the economic and social well-being of county residents. The Susquehanna, Lackawanna, and Lehigh Rivers, along with the lakes and streams in their watersheds, have a wide variety of scenic and recreational values. Bluffs and rugged hills along the Susquehanna River create some of the most striking landscapes to be found in the county. The lakes, rivers, and creeks offer many boating and fishing opportunities, and large areas of forest offer opportunities for a variety of activities such as hiking, hunting, and bird watching. The large contiguous tracts of forest on both public and private lands, with their well buffered wetland systems, still harbor many of the county's best natural areas.

The scenic natural environment that attracts so many people to Lackawanna County can be lost without careful planning of growth and development in the county. Wise planning can maintain open space, including natural environments and the plants and animals associated with them. A balance between growth and conservation of scenic and natural resources can be achieved by guiding development and industry away from the most environmentally sensitive areas.

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

The Natural Areas Inventory report presents Lackawanna County's known outstanding

natural features—floral, faunal and geologic. The Inventory provides maps of the best natural communities (habitats) and all the known locations of animal and plant species of special concern (endangered, threatened, or rare) in the county\*. A written description and a summary table of the sites, including quality, degree of rarity, and last-observed date, accompany each map. Potential threats and some suggestions for protection of the rare plants or animals at the site are included in many of the individual site descriptions. Selected geologic features of statewide significance are also noted. In addition, the inventory describes locations of areas that are significant on a county-wide scale but cannot be deemed exemplary natural communities because of past disturbances. These "locally significant" sites represent good examples of habitats that are relatively rare in the county, support an uncommon diversity of plant species and/or provide valuable wildlife habitat on a local level.

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

The Natural Areas Inventory of Lackawanna County will be provided to each municipality through the Lackawanna Heritage Valley Authority. The inventory is one tool that may aid in the development and implementation of county and municipal comprehensive plans. The inventory should be included in the development of an open space plan for the county. The county, municipalities, and land trusts can use the Natural Areas Inventory to identify potential protection projects that may be eligible for funding through state or community grant programs. Landowners will also find this inventory useful in managing and planning for the use of their land; it gives them the opportunity to explore alternatives that will provide for their needs and still protect the species and habitats that occur on their land. In addition, land managers may wish to consult this report in an effort to avoid potential conflicts in areas with species of special concern and/or identify ways of enhancing or protecting this resource. Users of this document are encouraged to contact the Pennsylvania Science Office of The Nature Conservancy for additional information.

<sup>\*</sup> 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.

#### **COUNTY OVERVIEW**

The climate, geology, topography, and soils in the county have been important in the development of the plant communities (forests, wetlands, etc.) as well as other natural features (e.g., streams and rock formations). Both natural and human-caused 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 combined factors provide the framework for locating and identifying exemplary natural communities and species of special concern within the county. A brief overview of the physiography, geology, soils, and vegetation of Lackawanna County provides the background for the natural areas inventory methodology and findings presented in this report.

# Physiography and Geology

Physiographic Provinces are classified by the characteristic landscapes and distinctive geologic formations that comprise each province. Physiography influences local climate while both physiography and geology (bedrock and glacial) 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). As a result, certain plant communities and species might be expected to occur within some provinces and not in others due to climate, soils and wetness. Physiographic and geologic information has come from a variety of sources including: Geyer and Bolles (1979 and 1987), The Atlas of Pennsylvania (Cuff et al. 1989), the Geologic Map of Pennsylvania (Berg et al. 1980), Soil Survey of Lackawanna and Wyoming Counties, Pennsylvania (Eckenrode 1982) and Physiographic Provinces of Pennsylvania (Berg et al. 1989).

Lackawanna County occurs within two physiographic provinces. The Appalachian Mountain Section of the Valley and Ridge Province extends from the southwest portion of the county to the northeast, an area that correlates to the Lackawanna Valley and the mountains on either side. This part of the county is comprised of a long synclinal trough with the outer rim made up of hard sandstone and conglomerate of the Pocono Formation and the inner rim made up of bedrock of the Pottsville Formation. The northwestern and southeastern portions of the county are located in the Appalachian Plateau Province. The northwestern part falls in the Glaciated Low Plateau Section of the Appalachian Plateau Province while the southeastern part is primarily in the Pocono Section. The Appalachian Plateau Province is underlain predominantly by red to brownish shale and sandstone of the Catskill Formation.

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 rivers and creeks.

#### Soils

The distribution of soils in Lackawanna County reflects both topography and bedrock geology. Eight major soil associations are recognized in the county with several major soil types (series) and some minor soils as well. The types of soils in a given area have led to the distinctive patterns of use that are seen on the landscape today. Much of the Lackawanna County landscape is still forested due to soils that are too wet or stony to support agriculture.

The following brief descriptions of soil characteristics are taken from Eckenrode (1982) and the reader is referred to that document for more detailed information. Additional information on associated vegetation is provided based on field surveys conducted for this Natural Areas Inventory. Soil types are important in the inventory process as some natural communities and rare plant species are closely associated with specific soil types or characteristics.

Wellsboro-Morris-Oquaga association: Nearly level to steep, deep and moderately deep soils that are moderately well drained, somewhat poorly drained, and somewhat excessively drained. This is the most extensive association and consists of soils on broad rolling uplands throughout the county. Dairy farming has been a principal land use, and some areas have been used for truck farming. Areas near small towns and along main roads are being used increasingly for building sites and other urban uses.

Mardin-Lordstown-Volusia association: Nearly level to moderately steep, deep and moderately deep soils that are moderately well drained, well drained and somewhat poorly drained. These soils occur in small patches on rolling uplands throughout the county. The acreage has been used primarily for dairy and truck farming. Much of this land is left wooded because the soils have limitations such as stoniness, steep slopes, restricted permeability, depth to bedrock, and a seasonal high water table.

Oquaga-Lackawanna-Arnot association: Moderately steep and steep, moderately deep, deep, and shallow soils that are somewhat excessively drained and well drained. Although not extensive, these soils occur on mountainsides on the southwestern border of the county. Most of these soils remain wooded due to the steepness of slope, depth to bedrock, and stoniness.

Mardin-Bath-Volusia association: Nearly level to steep, deep soils that are moderately well drained, and somewhat poorly drained. These soils occur on rolling uplands and are located in a large area in the southern part of the county near Fells Corner. Dairy farming and truck farming are the main agricultural uses of the land. An increasingly large portion is being used for urban development. Some of the soils are left wooded because of the limitations of a seasonal high water table and restricted permeability.

Wyoming-Pope association: Nearly level to steep, deep soils that are somewhat excessively drained and well drained; on terraces and floodplains. These soils make up a small area of the county and occur along the Susquehanna River and its tributaries. While dairy farming is the major enterprise in this association, much of the acreage on the floodplains is used

for truck farming. These soils are also important to the sand and gravel industry.

Rock outcrop-Arnot-Dystrochrepts association: Rock outcrop and nearly level to steep, shallow to deep, non-stony and extremely stony soils that are well drained and somewhat excessively drained. These soils are fairly extensive in the central part of the county on mountaintops and mountainsides. About half of this association has little or no vegetation due to the lack of soil material. The other half consists of woodland and scrub vegetation.

Udorthents-Mine dumps association: Nearly level to steep, deep to shallow, well drained to poorly drained soils in the upland areas that have been strip mined, or used as mine dumps; These soils are located in a band extending from Carbondale to the southwestern end of the county. They consist of soil, rock material, and areas of exposed bedrock that have been disturbed during coal mining. Although some of the land is being used for building sites, landfill sites and fill material, most of this association is idle due to erosion and steep slopes.

**Urban land association:** Nearly level to moderately steep, deep to shallow soils that are well drained to somewhat poorly drained; in residential and industrial areas on uplands. These soils can be found in small patches in the center of the county around the towns of Scranton and Dunmore. Most of the soils have been disturbed or altered because urban structures cover more than 85 percent of the land.

<u>Vegetation</u> (See appendix VIII for scientific names of species listed in text)

The vegetation of Lackawanna County reflects the environmental conditions (geology, topography, soils, climate) and disturbance history, both natural and anthropogenic. On a regional scale, Lackawanna County is located within two major forest types —Appalachian Oak Forest and Northern Hardwood Forest (Kuchler 1964, Bailey 1980). Appalachian Oak Forest is more common in the valley and ridge portion of the county, an area that correlates to the Lackawanna Valley and the mountains on either side. This mixed oak forest is analogous to Braun's (1950) Oak-Chestnut Forest and includes black oak (Quercus velutina), red oak (Q. rubra), white oak (O. alba), and chestnut oak (O. montana) as potential dominants or codominants depending on soil moisture and fertility. Other common tree species of this forest type are red maple (Acer rubrum), black cherry (Prunus serotina), gray and black birches (Betula populifolia & B. lenta), white pine (Pinus strobus), pitch pine (Pinus rigida), and aspens (Populus spp.). Shrubs include species of blueberries (Vaccinium spp.), huckleberries (Gaylussacia spp.) and other dry forest species. Variants of the Mixed Oak Forest occur as a result of differing environmental conditions. One common forest type in Lackawanna County is the Chestnut Oak community which is characteristic of dry ridgetops and rocky slopes. Associates include red oak, black oak, scarlet oak (O. coccinea), black birch, and red maple. The understory may be sparse or dominated by ericaceous species such as blueberries, huckleberry and mountain laurel (Kalmia latifolia). Less frequent is the Pitch pine-Scrub oak community found on isolated dry, exposed ridgetops. Characteristic species are pitch pine which may be frequent to dominant, scrub oak (Q. ilicifolia) which typically forms a nearly impenetrable shrub layer and may be the dominant species in the community, and chestnut oak. Other species common to this community include huckleberry, black chokeberry (<u>Aronia melanocarpa</u>), lowbush blueberry, teaberry (<u>Gaultheria procumbens</u>), and bracken fern (<u>Pteridium aquilinum</u>). An example of this community type occurs at **MOOSIC MOUNTAIN BARRENS** (Lake Ariel, Olyphant, & Waymart quads.). Also found on exposed ridge tops is the Acidic Rocky Summit community. This community has many of the same species as the Pitch pine-Scrub oak community. It is characterized by a high percentage of exposed rock, extremely shallow soils, and a small percentage of cover of canopy species. Openings are dominated by a mix of low shrubs, grasses, and mosses such as lowbush blueberry, poverty grass (<u>Deschampsia flexuosa</u>), Pennsylvania sedge (<u>Carex pensylvanica</u>), and haircap moss (<u>Polytrichum spp.</u>). An example of this community type occurs on Panther Hill just southwest of Watres Reservoir (Moscow quad.).

Northern Hardwood Forest is more common in northwestern and southeastern portions of the county. The forest in the northwestern portion of the county is highly fragmented by agriculture. The forest in the southeastern corner which includes most public and private land east of the Moosic Mountains is more intact. Sugar maple (Acer saccharum), red maple, American beech (Fagus grandifolia), yellow birch (Betula alleghaniensis), eastern hemlock (Tsuga canadensis) and white pine are potential dominants in this forest type. This area is second growth forest and regeneration of trees after logging has been slow in some areas because of poor soils.

Wetlands are found throughout the county but are concentrated on the Pocono and Glacial Low Plateau Sections. Many of these are shallow basins where peat has accumulated over time. Boreal Conifer Swamp or Broadleaf-Conifer Swamp appears to be the natural climax community for these wetlands. Boreal Conifer Swamps such as ENGLISH SWAMP (Sterling quad.) are dominated by a relatively open canopy of red spruce (Picea rubens), eastern hemlock, and larch (Larix laricina), with a dense shrub layer of highbush blueberry (Vaccinium corymbosum), rhododendron (Rhododendron maximum), and/or mountain holly (Nemopanthus mucronata). Broadleaf-Conifer Swamps such as Brzostek Swamp (Dalton quad.) occur on mineral rich soils and are characterized by limited peat development. They are dominated by a more closed canopy of yellow birch, red maple, and eastern hemlock. Many of the wetlands within the county are not forested but instead support open shrub swamps dominated by some mix of rhododendron, highbush blueberry, mountain holly, speckled alder (Alnus incana), leatherleaf (Chamaedaphne calvculata), cinnamon fern (Osmunda cinnamomea), sphagnum mosses (Sphagnum spp.) and sedges (Carex spp.). The maintenance of open canopy wetlands is the result of fire, logging, or higher water levels due to beaver and other causes. Some of the forested swamps have not received recent disturbance and have recovered sufficiently to be considered as high quality natural communities. Both forest and shrub dominated wetland community types are important in Lackawanna County as habitat for rare species. One of the rarest wetland communities in the county is the glacial kettlehole bog, exemplified by POTTER CREEK BOG. This community is characterized by concentric bands of vegetation encircling a pond: spruce and/or larch on the outside band, then shrubs, sedges, and a floating sphagnum-dominated bog mat towards the center. Historically, other sites in the county appear to have supported bogs as well. However these were flooded out by beaver and/or human-made dams and possibly impacted by logging and/or fires. For example, remnants of the bog mat can still be found at Elmhurst Mud Pond (Olyphant quad.). Most lakes (deepwater habitats) in the county have been enlarged by damming or are the result of flooding stream valleys. However, the remaining lakes that are relatively natural are habitat for many aquatic plants and animals, 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 Lackawanna 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 Ridgetop Dwarf Tree Forest communities show evidence of past fire and these barrens type communities are important habitat for a variety of rare species. Other examples of natural disturbances are flooding, deer browsing, and beaver. While often regarded as a detrimental impact small-scale flooding can be beneficial to certain communities or rare species. Floodplain forests benefit from the periodic scouring and deposition of sediments as streams overtop their banks. In contrast, deer have been blamed for a number of negative impacts on Pennsylvania flora and fauna (Rhoads et al. 1992): a reduction in the amount of understory, poor regeneration of some species, decreased songbird diversity, and direct loss of rare plants. 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, where beaver become too abundant they may alter 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, human disturbance has been destructive to natural habitats and species associated with them. Although necessary, farming, logging, mining and development are disturbances that have completely eradicated some natural communities and habitats. For example, old-growth forests are virtually non-existent, although occasional old trees may be encountered; many wetland habitats have been filled or altered resulting in the loss of some of the native plants and animals of these sites. Although some species, including several rare species, are aided by on-site disturbance (e.g. clearing or mowing), human disturbance is detrimental to most species. With wide-ranging human disturbance, some plant and animal species may be completely eradicated from an area because they cannot compete or survive under newly created conditions.

An increasing threat to these communities and natural habitats is the introduction and spread of exotic (i.e., non-native), invasive species. These include, among others, the chestnut blight fungus that dramatically changed the composition of our forests; the grass carp that can disrupt native aquatic life; and a multitude of plants that out-compete native species. Non-native plants such as tree-of-heaven (Ailanthus altissima), Oriental bittersweet (Celastrus orbiculatus), and garlic mustard (Alliaria officinalis) have become commonplace in disturbed woodlands, often to the point of excluding some of the native plants. In wetlands and along streams, purple

loosestrife (<u>Lythrum salicaria</u>), wild hops (<u>Humulus japonicus</u>), and Japanese knotweed (<u>Polygonum cuspidatum</u>) are aggressive, weedy species that follow in the wake of disturbance and crowd out native species.

Control of these problematic, non-native species is necessary for the long-term maintenance of high quality natural systems. Discouraging the use of these and other potentially weedy exotics in and around natural areas can help to prevent further encroachment. Some nurseries now carry a selection of tree, shrub and herbaceous species that are native to Pennsylvania, and these are recommended where plantings are necessary in, or adjacent to, natural areas. *The Vascular Flora of Pennsylvania* (Rhoads & Klein 1993) is a helpful reference for determining whether a plant species is native to the state or not.

#### PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to plan the wise use of Lackawanna County's natural features, the Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by the Lackawanna Heritage Valley Authority to provide an inventory of significant flora, fauna and natural communities in Lackawanna County. Critical to this effort is the Pennsylvania Natural Diversity PNDI was established in 1982 as a joint venture of The Inventory (PNDI) data base. Pennsylvania Science Office (PSO) of the Nature Conservancy, the Pennsylvania Department of Conservation of Natural Resources (DCNR), and the Western Pennsylvania Conservancy. In its 14 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 Department of Environmental Protection (DEP) designated Exceptional Value streams (Shertzer 1992) and outstanding geologic features (based on recommendations from Geyer and Bolles 1979). 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 are organized based on 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 PA Science Office has used this systematic inventory approach to identify the areas of highest natural integrity in Lackawanna County. These areas, comprised of natural communities with their characteristic species, represent an estimated 85-90 percent of the biological diversity of a county (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 Lackawanna 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. This is what is described as protecting the last of the least and the best of the rest. 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 Lackawanna 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 are analyzed and mapped.

## Information Gathering

A list of natural features found in Lackawanna County was prepared from the PNDI data base and supplemented with information volunteered by local individuals and organizations familiar with the county. In the Spring of 1996 a public meeting was held in the county and Recommended Natural Area Survey Forms (Appendix III) were distributed to facilitate public input. TNC staff solicited information about potential natural communities, plant species of special concern and important wildlife breeding areas from knowledgeable individuals and local conservation groups. A number of potential natural areas were identified.

# Map and Air Photo Interpretation

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

Work progressed systematically within the area encompassed by each USGS topographic map. The natural area potential of all parcels of land was assessed using aerial photographs. Areas continuing into adjacent counties were examined in their entirety. Topographic maps for use during field surveys were marked to indicate locations and types of potential natural areas based on characteristics observed on the photos. For example, an uneven canopy with tall canopy trees could indicate an older forest; a forest opening, combined with information from geology and soils maps, could indicate a seepage swamp community with potential for several rare plant species. Baseline information on sites appearing to have good quality communities or potential for rare species was compiled on Potential Natural Area Survey Forms (Appendix III) to help prioritize field work.

After an initial round of photo interpretation, field surveys were conducted to determine what was actually on the ground. Locations with minimally disturbed natural communities or with species of special concern were outlined on topographic quadrangle maps. The photo signatures (characteristic patterns, texture, tone of vegetation, and other features on the photos)



Dunmore Bald, a Northern Appalachian Acidic Rocky Summit Natural Community at the southern end of **MOOSIC MOUNTAIN BARRENS**, rises steeply above Roaring Brook. Photo: PA Science Office of The Nature Conservancy.

of these sites were then used as a guide for continued photo interpretation and future field surveys. Photo signatures which led to poor quality sites enabled the elimination of further field work on other sites with similar signatures.

## Field Work

Experienced PSO biologists and contractors conducted numerous field surveys throughout the county from May to November 1995 with some follow-up work from February to September 1996. Biologists evaluated the degree of naturalness of habitats (including assessment of percent of native v. non-native plant species, degree of human disturbance, age of trees, etc.) and searched for plant and animal species of special concern. Workers categorized the vegetation 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. Field forms were completed for all occurrences of sensitive plant and animal species, and natural communities (see sample Plant Survey Form, Appendix V), the quality of each population or community was assessed, and locations were marked on USGS topographic quadrangle maps.

On May 13, 1996, a reconnaissance flight was taken over the county to provide a more accurate overview of the current condition and extent of known natural areas and to assess the potential of any additional areas.

# 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 a species 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, a Pitch pine-Scrub oak barren community, a purple bladderwort (Utricularia purpurea) population, or Northern Goshawk (Accipiter gentilis) nest in the county, as well as the state-wide or world-wide importance of these natural features. Obviously, sites with a greater number of highly-ranked elements merit more immediate attention than sites with a smaller number of lower ranked elements.

Field data for natural communities of C-rank or better, and for all plant and animal species of concern found were combined with existing data and summarized on PNDI Element Occurrence Records for mapping and computerization. Mapped locations of natural features, including approximate watershed or subwatershed boundaries, were then transcribed onto acetate

map overlays for County use and distribution.

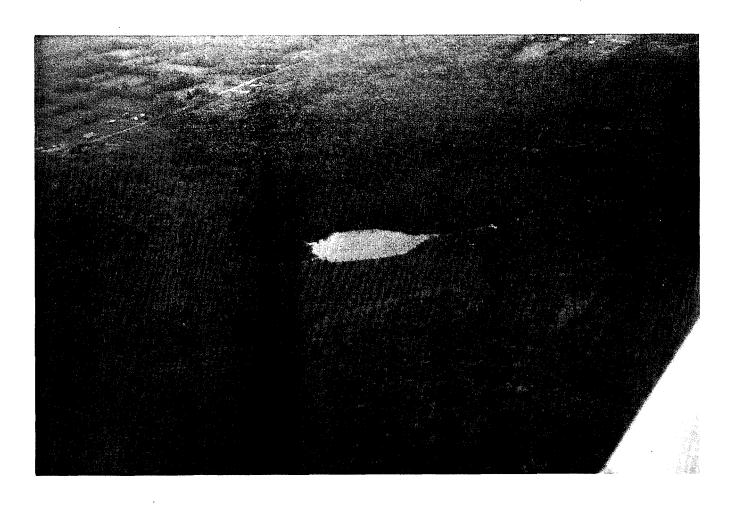
Information on the needs of the rare species in this report has come from a variety of sources, including field guides and research publications. For reptiles and amphibians, the major source is DeGraaf and Rudis (1981); for birds, Brauning (1992); for moths, Covell (1984); for butterflies, Opler and Krizek (1984) and Opler and Malikul (1992); Schweitzer (1981) provided much of the information on moth and butterfly species rarity in Pennsylvania. A list of species of special concern currently known in Lackawanna County is provided in Appendix VII.

#### 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) where applicable.

#### Priorities for Protection

Table 1 with a priority listing of the county's natural community and species locations is presented in the Summary and Recommendations section. This 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 of the element. Some sites of local significance are indicated on the maps and are briefly discussed in the text accompanying each map. These secondary sites are arranged in a separate table (Table 2) 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.



**POTTER CREEK BOG** is a healthy and relatively undisturbed example of an Oligotrophic Glacial Kettlehole Bog Natural Community. Photo: PA Science Office of The Nature Conservancy.

# SUMMARY AND RECOMMENDATIONS

Each year biologists meet to discuss and rank the most important sites for the protection of biodiversity in Pennsylvania. This meeting consists of a review and ranking of all sites within the state, in terms of the rarity and quality of the species or habitats of concern, potential threats, and protection needs. The results of these meetings provide a baseline for the County Natural Areas Inventory sites of statewide significance.

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

# Top Priority Natural Areas in Lackawanna County

All of the natural areas in the county are important to maintaining biodiversity in the region and the state. However, the following seven sites from Table 1 are the most critical at present for maintaining Lackawanna County's 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.

MOOSIC MOUNTAIN BARRENS (Lake Ariel, Olyphant, & Waymart Quads., Carbondale, Jefferson, & Roaring Brook Twps., Jessup, Olyphant, Throop, Dunmore Boros.) This site includes approximately 6000 acres of good to excellent quality barrens communities. It extends along Moosic Mountain from east of Carbondale southwest to Interstate 84. It may be the largest barrens complex in Pennsylvania. The barrens are primarily restricted to the highest most exposed portions of the ridge and are surrounded by slopes and drainages with mixed hardwood forests. The site includes Ridgetop Dwarf-Tree Forest, Heath Barrens, and Northern Appalachian Acidic Rocky Summit Natural Communities. The heath barrens are a newly discovered natural community for Pennsylvania. Moosic Mountain is the only location in the state where they are known to occur. They are characterized by the dominance of low growing ericaceous species, including lowbush blueberry, huckleberry, sheep laurel (Kalmia angustifolia), black chokeberry, and teaberry. Herbaceous species such as Pennsylvania sedge, poverty grass, and Canada mayflower (Maianthemum canadense) are infrequent associates found among the heath shrubs. Large expanses of this ankle to knee high vegetation stretch along the ridgetop creating sweeping views of the ridge and the valleys below. It is uncertain what conditions cause the occurrence and persistence of this community type at this location. Fire and microclimate are important factors in helping to maintain this community type at other locations in the northeastern United States. Some portions of the ridge at Moosic Mountain have been used historically for blueberry harvest which included cutting and burning. The influence of these historical activities on the

maintenance of the heath barrens is uncertain.

The Ridgetop Dwarf-Tree Forest Natural Community consists primarily of scrub-oak barrens, and in some areas Pitch pine-Scrub oak barrens. On some stretches of the ridge it occurs adjacent to the heath barrens, elsewhere it covers the entire width of the ridge. Scrub oak is the dominant canopy species in the dwarf tree forest with pitch-pine, black gum, chestnut oak, and sassafras (Sassafras albidum) occurring in localized patches and infrequently scattered throughout.

Many plant species of heath barrens and scrub-oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain these barrens communities. Portions of this site shows evidence of having burned within the last several decades.

From limited surveys it was discovered that this site supports two animal species of special concern, including a globally rare G3 species. The site has the potential to support a number of other rare animal species as well as several plant species. Further surveys are encouraged. This site is partly in **State Game Lands** #300.

BEAR LAKE/GRASSY POND (Pleasant View Summit & Thornhurst Quads., Thornhurst Twp.) Bear Lake is a good quality Acidic Glacial Lake Natural Community NC523. The lake has a rocky and sandy bottom, clear water, and scattered populations of aquatic plants such as white water-lily, water bulrush (Scirpus subterminalis), bladderworts (Utricularia sp.) and some interesting aquatic varieties of sphagnum moss. The lake is surrounded by a forested buffer, and although some summer houses are present, the private lake association continues to maintain the quality of the water and woodlands at the site. Bear Lake and nearby Grassy Pond support six plant and animal species of special concern. SA508 is an animal species that has been successfully reproducing young at this site since it was first reported in 1986.

POTTER CREEK BOG (Sterling Quad., Madison Twp.) This is a well-structured, 100 acre Oligotrophic Glacial Kettlehole Bog Natural Community (NC543) with a substantial buffer and little disturbance. The bog consists of concentric rings of vegetation, which include, beginning from the pond edge and going outward, a floating sphagnum mat, low shrubs and graminoids, tall shrubs, and a red maple/larch/blueberry swamp forest. This community supports three plant species of special concern (SP523, SP544, & SP545). Due to the healthy condition of the community, and the forested buffer, there is a high potential to maintain the quality of the site. The flooding from beaver dams and future development in close proximity to the site are threats.

BEAR SWAMP (Moscow Quad., Roaring Brook Twp.) This site includes a good quality example of a Broadleaf-Conifer Swamp Natural Community (NC520). Two plant species of special concern (SP521 and SP522) are known from the site. Hemlock, red maple, and yellow birch dominate the canopy and rhododendron forms a dense shrub layer throughout much of the swamp. Cinnamon fern, sensitive fern (Onoclea sensibilis), marsh marigold (Caltha palustris), sedges (e.g., three-seeded sedge (Carex trisperma) and others) and sphagnum mosses are common. Hummocks interspersed with stream channels and low marshy areas provide a variety of microhabitats for these species. The swamp is surrounded by upland woods and keeping this forest intact can help maintain the hydrologic regime and water quality that is important to the integrity of the natural community and the associated native flora at this site.

**BALD MOUNTAIN** (Ransom & Scranton Quads., Newton & Ransom Twps.) This site consists of a high elevation southwest-northeast running ridge which is terminated at the southwest end by a dramatic vertical rock ledge. The ledge and subsequently the ridge behind it receive the full brunt of prevailing weather.

The site includes a good to fair quality Ridgetop Dwarf-Tree Forest Natural Community more commonly known as a "Pitch pine-Scrub oak barren", though it is primarily dominated by scrub-oak. Scrub oak is the dominant woody species with scattered gray birch, and mountain laurel as associates. Low growing species of blueberry, huckleberry, and black chokeberry are common in openings. Many of the plant species of the Pitch pine-Scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire helps to maintain the Pitch pine-Scrub oak community.

Also included in this site is the Northern Appalachian Acidic Rocky Summit Natural Community. This community occurs at the rock ledge at the southwest end of the ridge. It is characterized by large exposed sandstone outcrops with sparse vegetation. Characteristic species include gray birch, black chokeberry, lowbush blueberry, serviceberry, mountain-ash (Sorbus americana), sedge (Carex tonsa), mosses (Polytrichum sp.), and lichens.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens and acidic rocky summit communities. To date two plant species of special concern have been discovered at Bald Mountain, SP502 and SP513. One of these is a PA-Endangered species, and the other, a PA-rare species. This site has potential for additional rare species, including other plant and lepidopteran (butterfly & moth) species.

ENGLISH SWAMP (Sterling Quad., Clifton & Covington Twps.) This site is a 60 acre Boreal Conifer Swamp Natural Community (NC514), which grades into a shrub swamp including a floating sphagnum mat, and open water. The forest consists of red spruce, hemlock, red maple, and blackgum with a thick understory of highbush blueberry. Spruce and larch are dominant near the edge of the shrub swamp, which is dominated by highbush blueberry and includes other shrub species such as mountain holly, winterberry, and rhododendron. Populations of SP515, a PA-Threatened plant species, and SP516, a PA-Rare plant species, occur primarily in the shady areas of the forested swamp. Three additional elements, SP538, SP539, and SP540, occur in the shrub swamp/sphagnum mat part of the site. Associated species included black spruce and larch, leatherleaf, cranberries, and sedges. This is a relatively undisturbed peatland with a diversity of rare and threatened plant elements which is privately owned and threatened by development. Additional threats include degradation of water quality by encroaching development, increased visitation, and spread of water-willow in the open water and floating mat areas.

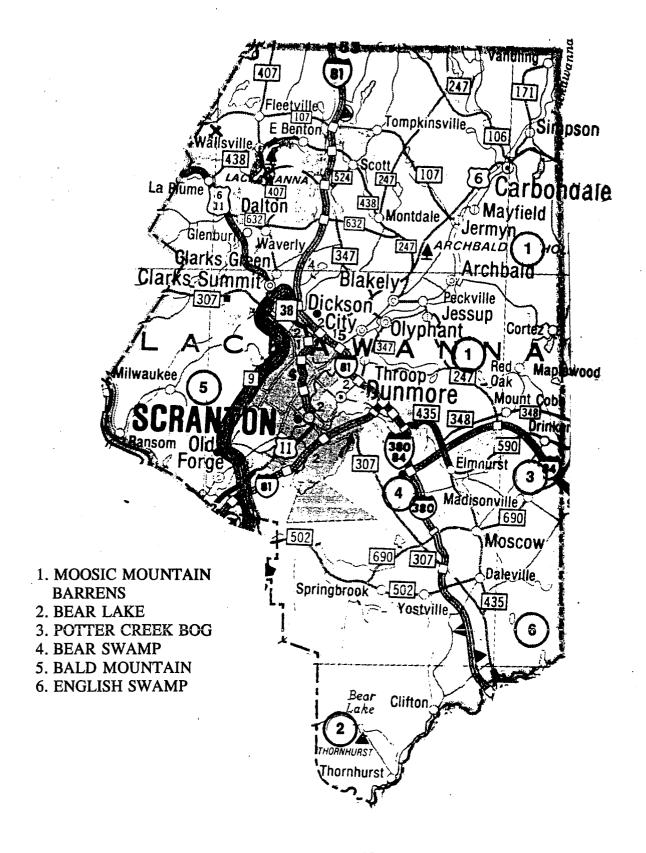


Table 1. The sites of statewide significance for the protection of biological diversity in Lackawanna County in approximate order of priority from the most important (rank = 1) to the least (rank = 5). The presence of species of special concern and/or exemplary natural communities has been documented at these sites.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
. 1	MOOSIC MOUNTAIN BARRENS (Jefferson, Carbondale, Roaring Brook Twps., Jessup, Olyphant, Throop, Dunmore Bord	Lake Ariel/Olyphant Waymart os.)	This site includes an extensive mosaic of high quality barrens communities. It includes a Ridgetop Dwarf-Tree Forest NC, Heath Barrens NC, and Northern Appalachian Acidic Rocky Summit NC. The heath barrens a newly discovered NC for Pennsylvania. Limited surveys of this site uncovered two animal species of special concern, including a G3 species. The site has good potential for other rare species. Further surveys are encouraged. The site is partly in <b>State Game Lands</b> # 300.
1	BEAR LAKE/GRASSY POND (Thornhurst Twp.)	Pleasant View- Summit	This site includes a good quality example of an Acidic Glacial Lake NC (NC523) with clear water and low nutrient levels. Bear Lake and nearby Grassy Pond support six plant and animal species of special concern, including four PR plants, a PT plant, and an S3 animal species.
2	BEAR SWAMP-MOSCOW (Roaring Brook Twp.)	Moscow	This site includes a good quality example of a Broadleaf-Conifer Swamp NC (NC520). It contains populations of two plant species of concern (SP521 & SP522). Keeping the surrounding upland woods intact will help maintain the hydrologic regime and water quality essential to the integrity of this NC.
2	BALD MOUNTAIN (Newton & Ransom Twps.)	Ransom/Scranton	This site includes a good to fair quality Ridgetop Dwarf-Tree Forest NC (NC501/NC501), and an Acidic Rocky Summit NC (NC505). Three plant species of special concern have been discovered at this site, including a PE species and a PR species. This site has potential for additional rare species, including lepidopteran (butterfly & moth) species.
2	ENGLISH SWAMP (Clifton & Covington Twps.)	Sterling	This site includes a Boreal Conifer Swamp NC (NC514). This swamp is a relatively undisturbed peatland with five rare and threatened plant elements. Maintaining a wooded buffer and preventing colonization by invasive species will help maintain the integrity of this site.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
2	POTTER CREEK BOG (Madison Twp.)	Sterling	This site includes a well-structured, 100 acre Oligotrophic Glacial Kettlehole Bog NC (NC543) with a substantial buffer and little disturbance. This NC supports three plant species of special concern. There is a high potential to maintain the quality of the site, provided beaver activity is monitored.
3	NC509, SP508, SA503, & SA518 NC508, NC527, SP534, SA516, & SA517 (Moosic Boro., Scranton City, & Roaring Brook Twp.)	Avoca Scranton	"Stafford Bald" This site includes fair to good quality Ridgetop Dwarf-Tree Forest and Northern Appalachian Acidic Rocky Summit NC's. It occurs on a wide ridgetop surrounded by mixed hardwood forest. Two plants, including a G3 and G4 species, along with two animals of special concern are known from this site.
3	SP504, SP515, SP516, SP517, SP519, SP520, & SP521 SP502, SP509, SP514 (Greenfield Twp.)	Carbondale	"Newton Lake/Mud Pond" site includes an artificially deepened natural lake which is divided into two parts and connected by a narrow strait. Mud Pond, the southern portion, includes several acres of emergent peat mat dominated by graminoids and low shrubs, which grades into red maple swamp. Seven species of special concern occur here.
3	SP509, SP510, SP511, SP512, & SP518 (Fell Twp.)	Carbondale	"Mountain Mud Pond" This site is a lake which includes a peat island. It supports five plant species of special concern. Minimizing disturbance to the island and in the areas of densest aquatic vegetation will help protect these species. This site is within Merli-Sarnoski County Park.
3	NC503, SP519 (Benton Twp.)	Dalton	"Brzostek Swamp" includes a medium-sized, mature, good quality Broadleaf Conifer Swamp NC. It supports a small but healthy population of a PR plant species. Further surveys are encouraged, as the site has good potential for other species of concern.
3	SP515, SP517, & SA520 SP510, SP511, & SA512 (Dalton Boro., Glenburn, & West Abington Twps.)	Dalton Factoryville	"Atherton Pond" This dense shrub swamp is home to three elements (two plant and one animal species), each of which depends on a unique subhabitat type occurring here. The survival of these species depends on minimizing disturbance to the swamp and the adjacent woods.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
3	NC519 (Covington Twp.)	Moscow	"Daleville Swamp" includes a fair quality example of a Broadleaf Conifer Swamp NC that is dominated by eastern hemlock, yellow birch, and red maple, with ash and red spruce also present. Rhododendron forms a dense shrub layer, with winterberry and speckled alder. Herbs, mosses,
			sedges, and grasses cover the ground. The swamp receives little direct disturbance but nutrient input from adjacent developments could be a threat. This site has high potential for rare species.
3	NC525 (Dunmore Boro.)	Olyphant	"Dunmore Bald" This site includes an Acidic Rocky Summit NC (NC525) and is located at the south end of the MOOSIC MOUNTAIN BARRENS. The barrens as a whole are considered to be one of the top priorities for conservation in the county. Dunmore Bald is dominated by low shrubs and herbs. It has a good potential for several species of special concern.
3	SA528 & SA529 (Archbald & Jessup Boros.)	Olyphant	"AD 431 Mine - Riverdrift" This site is a coal mine which supports a G3 and G4 animal species.
3	NC528 & SP526 (Thornhurst Twp.)	Pleasant View- Summit	"Balsam Swamp-Lackawanna" This site includes a Boreal Conifer Swamp NC which also supports a PR plant species. It is characterized by an open canopy of eastern larch and red spruce which grow above the mostly ericaceous shrubs and the sphagnum-covered hummocks. The swamp is located partly within Lackawanna State Forest.
3	SA502 & SA507 (Dunmore Boro. & Scranton City)	Scranton	"Sadler Ave AMLF #2 Site" - This site includes a mine which is habitat for a G3 and a G4 animal.
3	NC524 & SP521 (Thornhurst Twp.)	Thornhurst	"Nines Pond" This site includes a Natural Ponds NC, comprised of two natural ponds set in a mixed hardwood matrix. These ponds support a fair to good quality population of a PE plant species. The ponds will be best protected by leaving them in their current condition and maintaining an adequate forest buffer in their immediate watershed. This site is within Lackawanna State Forest.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
3/4	NC523 (Clifton, Thornhurst, & Spring Brook Twps.)	Moscow	"Panther Hill Site" is located southwest of Watres Reservoir, and includes a fair to good quality Acidic Rocky Summit NC. Only the northern end of the ridge was surveyed for this study and further work is encouraged.
4	NC529 & SP528 (Scranton City)	Avoca	"Montage Rocky Summit" includes a fair quality example of a Northern Appalachian Acidic Rocky Summit NC. It supports a large population of a G4 PT plant species. Development nearby is a potential threat.
4	NC519 & SP527 SP520 (Spring Brook & Thornhurst Twps.)	Avoca Pleasant View- Summit	"Painter Creek Bog", a fair quality Oligotrophic Glacial Kettlehole Bog NC which supports a fair quality population of an S3 plant species, and has good potential for additional rare species. The bog is undisturbed and the main threats are flooding by beaver and logging within the primary watershed. It is located within the Lackawanna State Forest.
4	SA512 (Scott Twp.)	Dalton	"Carpenter Swamp" This wetland includes a swamp which is home to an animal species of special concern. More survey work is needed.
4	SP520, SP521 & SP522 (Jefferson Twp.)	Lake Ariel	"Kizer Pond" Three aquatic plant species of special concern were found near the outlet of this shallow 100-acre pond. The pond has good water quality and is fed by streams flowing down the wooded slopes of Moosic Mountain. Maintaining the woodlands in the watershed will help to preserve the quality of this site.
4	SP517 & SP518 Moscow (Roaring Brook & Spring Brook Twps.)		"Blue Shutter Road Swamp" Small populations of two PR plant species were found growing in this boreal conifer swamp with red spruce, larch, hemlock, and red maple.
4	SP513, SP520, SP521, & SP527 (Jefferson & Roaring Brook T	Olyphant wps.)	"Elmhurst Mud Pond" This site includes the remnant of a bog or swamp community that has been disturbed by the construction of a dam at the outlet. The site supports four plant species of special concern all of which are dependent on remnant peat mat islands.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
4	SP519 (Thornhurst Twp.)	Pleasant View- Summit	"America Swamp" includes a boreal conifer swamp which supports a small but vigorous population of a PR shrub. The swamp is within a large forested area and there is no evidence or immediate threat of disturbance. Located partly within Lackawanna State Forest.
4	SP527 (Thornhurst Twp.)	Pleasant View- Summit	"Horseshoe Swamp" includes a boreal conifer swamp with an open canopy and a dense shrub understory including a few individuals of a PR species. The swamp and surrounding woodlands are state forest lands.
. 4	NC514 (Newton Twp. & Luzerne Co.)	Ransom	"Wyoanna Cliffs" includes a fair to good quality Acidic Cliff NC that rises five hundred feet above the North Branch of the Susquehanna River. One plant species of special concern may occur at the site but further field surveys are needed to verify this occurrence. Maintaining the woodland buffer along the upper edge of the cliffs is critical.
4	SA515 & SA516 SA535 & SA536 (Newton Twp.)	Ransom Scranton	"Corby Swamp" - The open water and marsh habitats of this disturbed site provides breeding habitat for two animal species of special concern. The Lackawanna Audubon Society owns the site and maintains a trail open to the public.
4	SP534, SP535, & SA532 SP522 & SP587 (Clifton, Covington Twps., & Wayne Co.)	Sterling Tobyhanna	"Johnson Pond-Westend Pond Complex" includes a series of artificial ponds along the Lehigh River and adjacent tributaries. The ponds support three plant and one animal species of special concern. A large population of a PR plant species which included thousands of plants was seen 1996.
4	NC511 (Carbondale Twp. & Wayne Co.)	Waymart	"Salem Hill Barren" includes a Ridgetop Dwarf-Tree Forest NC persisting on a disturbed site. Although no species of concern have been identified, the habitat is suitable for rare moth and butterfly species and surveys for these species are recommended.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
5	SP507, SP517 & SP521 (Moosic Boro.)	Avoca	"Montage Mountain Foothills" This site supports a mosaic of hardwood and mixed hardwood-pine forests and shrub thickets. Scattered rock outcroppings and small openings throughout the site support three plant species of special concern, including a G4S2 PT species and an S3 PE species. Rapid development of this site may have degraded or extirpated the occurrences of these three species.
5	GE505 (Archbald Boro.)	Carbondale	"Archbald Pothole" is evidence of the glaciers that once covered Lackawanna County. It was created by the scouring of gravel-laden meltwater. At over 40 feet deep, it is one of the largest natural potholes known in the world (Geyer and Bolles 1979).
5	SP514 (Scott Twp.)	Carbondale	"Chapman Lake" A large population of a PR aquatic plant species occurs in this 90 acre lake. Heavy recreational use of the lake and eutrophication by runoff from adjacent developments are potential threats to this population.
5	SP506, & SP518 (Benton Twp.)	Dalton	"Lake Kewanee Bog" A very small part of this hemlock swamp, perhaps less than a half acre, can be described as a minerotrophic fen. It supports two plant species of special concern.
5	SP511 (Benton Twp.)	Dalton	"Bassett Pond" This site includes a small pond which contains a good quality population of a PA rare aquatic plant species.
5	SP514 (Greenfield Twp.)	Dalton	"Sickler Pond" A roadside survey revealed the presence of a plant species of special concern at this site. If possible, more of this lake and wetlands to the north should be surveyed for species of concern.
5	NC501 (Spring Brook Twp.)	Moscow	"Swartz Road Swamp" includes a fair quality example of a Broadleaf Conifer Swamp NC.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
5	SP512 (Jefferson Twp.)	Olyphant	"Moosic Lake" This site supports an unassessed population of a PR plant species. Further surveys to this site are recommended.
5	SP515 & SP516 (Thornhurst Twp.)	Pleasant View- Summit	"Pittston Road Bog" includes a fairly open swamp which supports a PT plant species and a PR plant species. There is good potential for other species of concern at this site. Located within Lackawanna State Forest.
5	SP517 (Thornhurst Twp. & Luzerne Co.)	Pleasant View- Summit	"Behler Swamp" A small population of a PR plant occurs in open areas at the headwaters of Behler Swamp. Trail use currently maintains some of the openings required by this plant although excessive use could harm some of the population. Located within Lackawanna State Forest.
5	SP512 (Newton Twp., Luzerne & Wyoming Cos.)	Ransom	"County Line Island" This site is located on an island in the Susquehanna River and supports a fair quality population of a PR plant species. It is also good habitat for bird species such as osprey and herons.
5	SP511 (Moosic & Taylor Boros.)	Scranton	"Moosic Bend Lackawanna River" This highly disturbed site on the west shore of the Lackawanna has a population of a PE plant species.
5	SP524, SP525 & SP526 (Newton Twp.)	Scranton	"West Mountain Summit" is located on West Mountain, a knob on the prominent ridge situated on the west side of the city of Scranton. Three plant species of special concern are documented from the site. The conditions of these populations need to be updated.
5	GE519 (Scranton City)	Scranton	"Nay Aug Gorge" Nay Aug Gorge, part of a municipal park, includes a gorge and waterfalls on Roaring Brook. The dark walls of the 75-foot-deep gorge are made of shales and siltstones (Geyer and Bolles 1987).
5	SP525 (Covington Twp.)	Sterling	"Eagle Lake" (a.k.a. Henry Lake) is a glacial lake surrounded by a vacation-home development. The lake is used for recreational purposes and despite heavy use a PT plant species thrives here. Current management of the lake appears compatible with the continued existence of the population.
	* 1		

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>
5	SP508 (Thornhurst Twp.)	Thornhurst	"Sand Springs Woods" This site includes a forest opening, in which a PR plant species occurs among copses of highbush blueberry. The site is part of Lackawanna State Forest and no special protection is recommended.
5	SP517 (Thornhurst Twp.)	Thornhurst	"Tannery Road Swamp" includes a 4-5 acre acidic shrub swamp which grades into a conifer swamp. A PR plant species, is a co-dominant in this swamp. Avoiding the use of roadside herbicides will help this population persist. This site is a State Forest Natural Area in Lackawanna State Forest.
5	SP525 (Thornhurst Twp.)	Thornhurst	"Sassafras Hill Wetlands" A small population of a PR shrub occurs here. This site is located in the Lackawanna State Forest.

<sup>1</sup> 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. Sites of similar rank are listed alphabetically by quadrangle.

<sup>2</sup> 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, N-None. See Appendix I for detailed explanation of these ranks and state status. Other abbreviations used in table: pop. = population, POSCIP = plant species of special concern in PA.

<sup>3</sup> 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).



Mash Creek Marsh, a locally significant area, is the largest example of undisturbed marsh in the county. It is located within State Game Lands #135. Photo: PA Science Office of The Nature Conservancy.

TABLE 2. Areas of local significance in Lackawanna 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 <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature and Importance
HIGH	LONG SWAMP (Roaring Brook Twp. & Dunmore Boro.)	Olyphant	This site is a 60 acre linear wetland occurring in a narrow stand of eastern hemlock. The surrounding slopes provide a considerable buffer of mixed oak forest. The wetland is comprised of a mosaic of cover types including forested swamp, shrub swamp, graminoid marsh, and cattail-sphagnum mat. This site supports a wide diversity of plants due to the variation in habitat types. The dense hemlock which fills the valley adds scenic value making this site a desirable place for hiking.
HIGH	TUNKHANNOCK CREEK (North Abington Twp.)	Dalton	This locally significant area includes a two mile stretch of creek beginning from the dam at Lackawanna State Park and continuing down stream to the Erie-Lackawanna Railroad. The creek channel is some what braided and runs over gravel, sand, and bedrock. The floodplain varies in width from about 100 to 300 feet and is primarily dominated by eastern hemlock, sycamore, and red maple. This site supports a high diversity of nesting and migratory bird species. The sand substrate on certain portions of the floodplain is potential habitat for rare plant species. The water quality of the creek along this stretch has likely declined due to the construction of the dam in the State Park.
HIGH	DUNMORE SWAMPS (Jefferson Twp.)	Olyphant	This locally significant site includes three distinct swamps located in a matrix of scrub-oak and mixed oak forests. Each swamp has a different cover type. The south most swamp is dominated by red spruce and red maple with a dense shrub understory. The north most swamp is dominated by low shrubs and herbs with scattered pitch pine. The third swamp is dominated by eastern larch at one end and by shrubs at the other. Maintaining a forested buffer around these swamps will benefit the species that occur here. Minimal data is available about these wetlands and further surveys are encouraged.

County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature, TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations <sup>3</sup>					
MEDIUM	FALLBROOK SWAMP (Fell Twp.)	Clifford	This locally significant area is a forty acre wetland which includes a mosaic of cover types including forested swamp, shrub swamp, emergent marsh, and aquatic. It supports a wide diversity of plant and animal species. The open water areas of the site are a result of a small dam at the outlet. Maintaining a forest buffer around this site will benefit the species that occur here.					
MEDIUM	MASH CREEK MARSH (Clifton Twp.)	Moscow Thornhurst	This eighty acre marsh occurs near the headwaters of Mash Creek in State Game Lands 135. It is dominated by grasses and sedges with isolated patches of shrubs. The marsh is fed by a stream at the south end and by seeps off the slopes to the west. Mash Creek Marsh is the largest example of undisturbed marsh in the county. Maintaining the forested buffer at this site will benefit the species that occur here.					
MEDIUM	PANTHER GORGE (Fell Twp. & Wayne Co.)	Waymart	This site is a steep sloping, forested stream ravine which includes dramatic waterfalls. A high gradient creek flows over an exposed bedrock stream bed between steep slopes of rhododendron and mixed oak forest. This site has received disturbance in the past from the construction of the now abandoned rail line.					
MEDIUM	BELL MOUNTAIN OUTCROPS (Blakely & Dickson City)	Scranton	This locally significant area is comprised of sandstone and conglomerate outcrops and associated plant communities. The xeric outcrops support associations of stunted trees including chestnut oak, gray birch, red oak, and sweet birch with huckleberries and blueberries. Herbaceous species occurring here are typical of extremely dry conditions. This site has a good potential for species of special concern.					

<sup>1</sup> Ranks are very approximate and are based primarily on the quality of the habitat. Sites with more intact natural communities (on a county-wide scale) are given highest priority. Other sites represent areas with locally significant woodlands or wetlands or sites that support a particularly rich or unusual flora or fauna. Areas that are already protected as park land or open space may be assigned lower rank to reflect lower urgency for protection action. Sites of similar rank are listed alphabetically by quadrangle.

## General Summary and Recommendations

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

- 1. All sites that are ranked 1 or 2 (Table 1) should be targeted immediately for protection and/or management of the site and the surrounding lands. Privately-owned lands at these sites may be protected through a combination of conservation easements and acquisition to encourage current land use or make improvements in land use where needed.
- 2. Management plans on public and private lands should address species of special concern and natural communities and to assess the need for additional acres to complete protection. Each element located will need to be addressed in new management plans for the area. Many of the already-protected sites are in need of additional land to complete protection and/or are in need of management to ensure the continued existence of the associated natural elements.
- 3. Development plans should provide for creating natural buffers between the development and the core preserve area, be it a barrens community, wetland or water body. Care should be taken to ensure that protected natural areas do not become "islands" surrounded by development. When a wetland or woodland is completely surrounded by development, even though there are no direct impacts, the site is effectively isolated and reduces its value for wildlife. Adequate buffers can help to maintain the ecological integrity of a site in a number of ways such as by helping to protect water quality, by preventing colonization of exotic species, or by helping to maintain appropriate habitat for the species that live there. Cluster development could be used to allow the same amount of development but on much less land in such areas but, most importantly, leave much of the land intact as corridors for wildlife and native plants.
- 4. Conservation easements or other low cost protection can be pursued on lower ranked sites. All sites of lower rank but with good to excellent populations of species of special concern or good natural communities on private land (Table 1) should receive protection too, but conservation easement or some type of tax incentive may be more appropriate. Conservation easements are designed to allow landowners the current use of their land while protecting the owner and the resource from outside development pressure. Management plans will be needed to ensure that these sites remain as high quality natural areas. Where easements are not possible any proposals for significant land use changes should be scrutinized carefully by county and municipal planners.
- 5. Low quality sites (e.g., with marginal or poor populations of listed species in marginal areas) should be carefully assessed before pursuing protection or management efforts. The rare elements may be important for the maintenance of

biological diversity at the local level, but costs and efforts for protecting these sites need to be weighed against other sites that will be left unprotected which truly have the potential for long-term viability of elements. (Note: these sites may have other qualities such as scenic or recreation value that make them worth protecting, however.)

- 6. Locally Significant sites (Table 2) may be protected as Table 1 sites are completed or as new information emerges. These are sites in the county that do not have exemplary natural communities or known occurrences of rare species, but that could be excellent sites for county or township parks or as natural areas within existing parks (sites within existing managed areas will need to be included in management plans). Those that can serve more than one purpose—recreation, environmental education, wildlife habitat, flood and sediment control, water supply, etc.—are ideal. Species of special concern which may be found in some of these areas in future surveys can fit into county park or preserve plans.
- 7. Protection of the reservoirs, wetlands, rivers, and creeks of Lackawanna County is vital, especially those that protect biodiversity, supply drinking water, and are attractive recreational resources. Many of the sites containing rare species, natural communities or locally significant habitats in Lackawanna County are associated with water. Protection of these watersheds is the only way to ensure the viability of natural habitats and water quality. Cooperative efforts on land use among municipal, county, state, and federal agencies, developers, and residents can lessen the impact of development on the watersheds and plant communities of the county. Protecting natural areas around municipal water supply watersheds can serve the purposes of providing an additional protective buffer around the water supply, additional open space for wildlife and provide low-impact recreation opportunities.
- 8. Minimize encroachment on the many parks and conservation lands throughout Lackawanna County. For example, they may serve as nesting areas for birds or as stop-over areas during migration. If possible, more land should be added or agreements worked out with abutting landowners to minimize encroachments that may threaten native flora and fauna.
- 9. County and township officials can encourage landowners whose land includes waterways to maintain vegetated buffer zones along shorelines. These buffers help reduce erosion and sedimentation and help to shade and cool the water. These buffers can also provide habitat for wildlife and eventually create a diversity of habitats along the creek or stream.
- 10. Scrutinize development proposals for their impact on entire watersheds not just the immediate impact area. Certainly, new housing and commercial development can be given close scrutiny before it is allowed in the areas outlined in this report and careful review can be required within any watershed in the county. Townships can also require minimum setbacks from all water bodies to help protect water quality. Landowners

within any particular watershed can act on their own to protect water by forming watershed associations to voluntarily monitor and screen proposals in their localities.

11. Grassroots organizations are needed. These groups can assist with the identification of landowners who wish to protect their land, provide information about easements to landowners, perhaps acquire land, and provide management and stewardship once the land is protected. Much of the work that needs to be done to protect and manage land in Lackawanna County can be done by county and municipal governments and groups like the Natural Lands Trust, Wildlands of Emmaus, Audubon Society, or local conservancies. However, these organizations will need the assistance of many grassroots organizations and volunteers.

In this report, we have outlined the watersheds or subwatersheds where the natural communities and species of special concern occur. This area should be viewed as the ideal buffer zone for the communities and species (smaller buffer areas have been designated for locally significant sites). The core areas where the communities and species occur need to be given the most attention and fee title acquisition may be appropriate. Ideally, all of the land within the areas outlined in this report should receive some form of protection. Land uses that do not impact these important sites should be encouraged for the buffer zones.

We wish to emphasize that this Natural Areas Inventory is only a beginning. New sites with good natural communities and species of special concern wait to be discovered. Plant communities and plant and animal populations are dynamic, constantly changing with time and conditions. As this information is received and updated in the PNDI data base, so too will the Lackawanna County Natural Areas Inventory. If there are any questions about the impact of the proposed development or other activity, we suggest that our office, Pennsylvania Science Office of The Nature Conservancy, be consulted. Questions regarding protection methods and tools for planning should be directed to the Lackawanna County Planning Commission.

#### **RESULTS**

TNC ecologists began field work for the Lackawanna County Inventory in the Spring of 1996. Contract biologists familiar with the county 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* (1950), *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada* (1952), *The Vascular Flora of Pennsylvania* (1993), and others), and locating prospective sites using air photos. Large wetlands, especially those with substantial forest buffers, unusual forest types for the county, large rock outcrops, and sites with organic soils (from county soils maps) all received priority for field inspection as potential natural communities and as habitat for rare species. Urban areas, agricultural fields and other highly disturbed lands were disregarded. Small woodlands and woodlands that consisted of young trees were considered to have low potential for species of concern and no potential for exemplary natural communities.

Sites that are mapped in this inventory are those with elements and 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. 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 Lackawanna County are found on 18 USGS topographic quadrangle maps (Figure 2). Communities, species of special concern, significant geologic features, managed open-space lands such as state game lands, and some areas that may be of local importance for wildlife and plant 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 Figure 3) and in the text. Sites with bold capital type indicate the highest priority sites (statewide significance), sites with upper case plain print are of lower priority for preserving biological diversity (county significance) but may have other values associated with them, and sites with bold upper and lower case type are areas that are managed for wildlife, parks or other natural resources. Below is a more detailed description of these labels.

#### **BOLD UPPER CASE TYPE:**

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., BALD MOUNTAIN) followed by natural community and/or species map codes (e.g., NC503, SP501). 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., SA532). Note that the code numbers are specific to that quadrangle; e.g., SP515 on the Moscow Quadrangle may be a different species than SP515 on the Sterling 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. Development activities proposed within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. Consultation with the biologists of the Pennsylvania Science Office of The Nature Conservancy may be necessary to assess these impacts.

#### PLAIN UPPER CASE PRINT:

Some sites have been mapped that do not contain exemplary natural communities and that do not appear to have species of special concern. These are labeled with a site name in plain type, e.g., BELL MOUNTAIN OUTCROPS. At these sites, the vegetation has been disturbed enough that the sites cannot be considered exemplary natural communities on a statewide or rangewide level, but do include habitats that are important for preserving biodiversity on a countywide scale. The area outlined represents the significant habitat or feature at the site (the subwatershed area is not necessarily included). Many of these sites hold potential for parks, nature preserves within parks or passive recreation/open space areas.

# Upper and Lower Case Type:

Managed areas are indicated with names in bold upper and lower case type, e.g., Lackawanna State Park. 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, federal and state protection status (Appendix I), the date last observed, and its quality rank (Appendix II). Sites of local significance are listed separately. Managed lands, state-designated scenic waterways, as well as natural communities and species that are located primarily on adjacent maps are listed within the "Other" category. Key to map codes is on the following page.

# Key to Map Codes

NC = exemplary natural community

**SP** = plant of special concern

SA = animal of special concern

**GE** = significant geologic feature.



Pink Lady's Slipper (<u>Cypripedium acaule</u>) is an orchid found in acidic woods and barrens in Lackawanna County. Photo: PA Science Office of The Nature Conservancy.

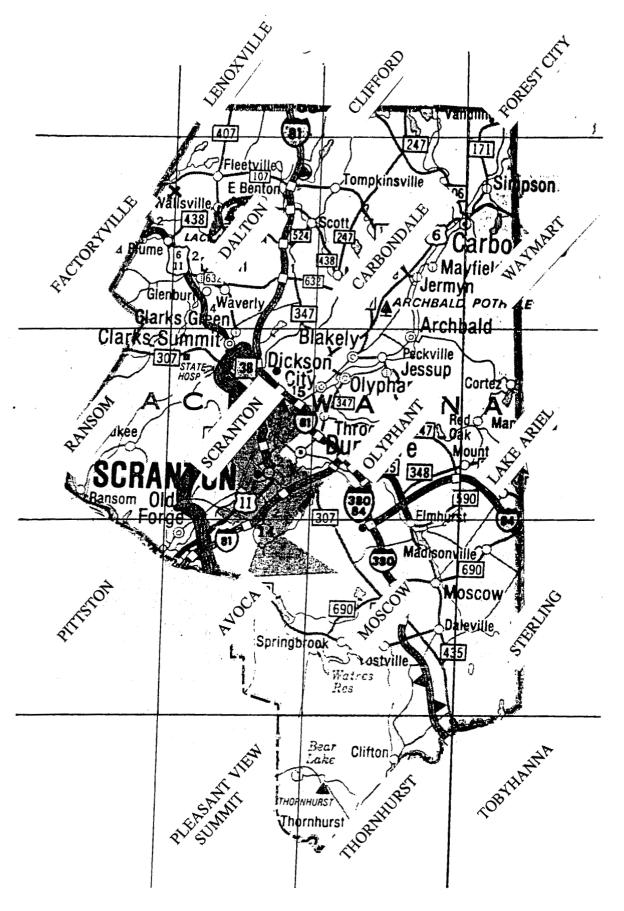


Figure 2. Lackawanna County outline with names and locations of the USGS quadrangle maps of the county.

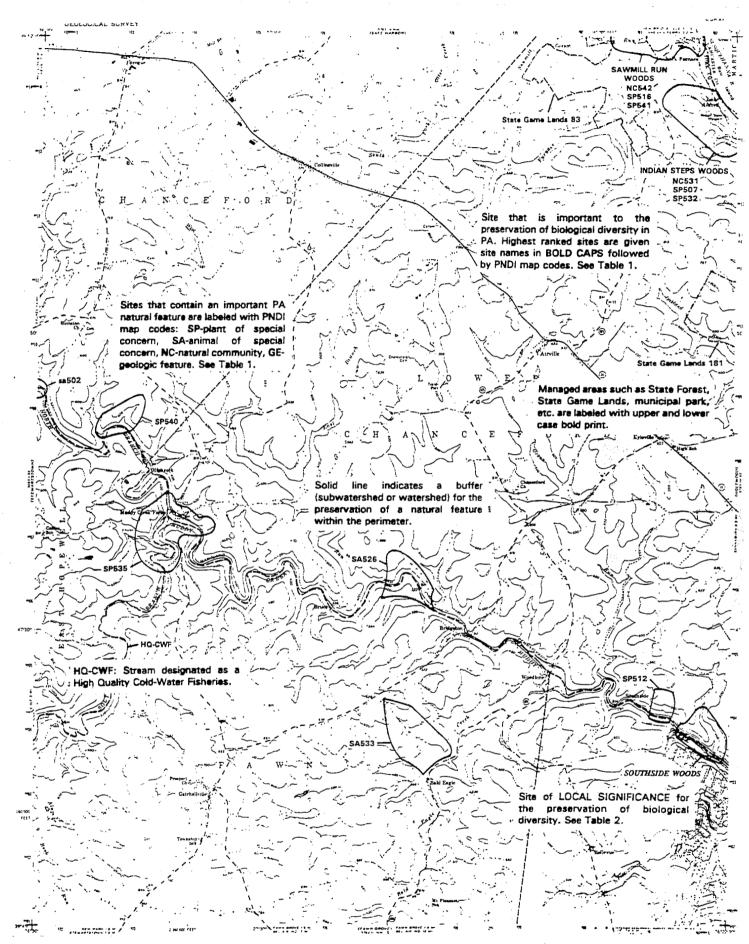


Figure 3. Sample USGS topographic map with explanations of the various types of County Natural Areas Inventory information added.

USGS QUADRANGLE MAP: Avoca

		TNC R	anks*	Legal S	<u>tatus*</u>	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC509	G4	S2S3	N	N	07-10-96	BC
	NC519	G?	S2S3	N	N	07-03-96	C
	NC529	G?	S2	N	N	07-10-96	C
SPECIAL PLANTS:	SP507	G5	<b>S</b> 3	N	PE	06-10-92	C
	SP508	G3	S2	LE	PE	07-10-96	C
	SP517	G4	<b>S</b> 2	N	PT	07-10-91	В
	SP521	G5	S2S3	N	PR	06-10-92	BC
	SP527	G5	S3	N	TU	07-03-96	C
	SP528	G4	S2	N	PT	07-10-96	BC
SPECIAL ANIMALS:	SA503	G4T3	S1S2	N	N .	05-26-88	В
e e	SA518	G4	S2	N	N	05-26-88	В

### LOCALLY SIGNIFICANT:

**HQ-CWF**:

Bear Creek, Stafford Meadow Brook, Spring Brook

**MANAGED AREAS:** 

Lackawanna State Forest, State Game Lands #91

OTHER:

sp515, sp516 - see Pleasant View Summit quadrangle SP515 & SP516.

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



### Avoca Quadrangle

NC509, SP508, SA503 & SA518 (Moosic & Scranton Cities, & Roaring Brook Twp.) - "Stafford Bald" - This site includes a fair to good quality Ridgetop Dwarf-Tree Forest Natural Community, more commonly known as a "Pitch pine-Scrub oak barren". The community occurs on a wide ridge top and is surrounded by mixed hardwood forest. Scrub oak is the dominant woody species with scattered chestnut oak, red maple, and pitch pine found throughout. Low growing woody species such as blueberry and huckleberry are common along with poverty grass (Danthonia spicata). Rock outcrops are frequent and support several uncommon species such as shadbush (Amelanchier sp.) and rock sandwort (Minuartia michauxii). Common birds observed in the barrens included Prairie Warbler (Dendroica discolor), Rufous-sided Towhee (Pipilo erythrophthalmus), Oven Bird (Seiurus aurocapillus), and Chipping Sparrow (Spizella passerina).

Many of the plant species of the Pitch pine-Scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires). Under natural conditions fire helps to maintain the Pitch pine-Scrub oak community. This site shows evidence of having burned within the last 10 years.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens. To date three species of special concern have been discovered at Stafford Bald (Avoca quad.), SP508, SA503, and SA518. One of these species is a PE plant. The other two species are animals of special concern. This site has potential for additional rare species, especially rare lepidopterans (butterflies & moths).

NC519 & SP527 (Thornhurst & Spring Brook Twps.) - "Painter Creek Bog" - This site, located within the Lackawanna State Forest, is an Oligotrophic Glacial Kettlehole Bog Natural Community. The bog itself is about five acres and includes a half acre of open water surrounded by a low growing sphagnum-graminoid dominated floating peat mat. The high shrub perimeter is dominated by highbush blueberry. The shrub zone grades into a dense boreal conifer forest dominated by spruce and larch. This community supports a fair quality population of a plant species of special concern and has a good potential for more rare species. The bog is undisturbed, and the main threats are flooding by beaver and logging within the primary watershed.

NC529 & SP528 (Scranton City) - "Montage Rocky Summit" - This site includes an eighty acre Northern Appalachian Acidic Rocky Summit Natural Community which includes a high percentage of exposed bedrock on both the west facing slope and the ridge top. Patches of stunted trees and scrub oak form an open canopy. The ground cover is a mixture of lowbush blueberry with scattered herbs, grasses, and lichens. A good sized population of a PT plant species occurs at the site. The habitat draws a variety of birds including Prairie Warbler, Rufous-sided Towhee, and Oven Bird. Evidence of small animal activity is abundant. Within the community there was minimal disturbance which consisted mostly of broken bottles and other trash. However, nearby to the east is a large parking lot, and to the north is a ski slope under construction.

SP507, SP517 & SP521 (Moosic Boro.) - "Montage Mountain Foothills" - This site is situated

in the low hills along the western base of Montage Mountain. The vegetation consists of well-drained, acidic, hardwood forest, hardwood-pine forest, and shrub thickets that are usually dominated by scrub oak. Rock outcrops and small openings are scattered throughout the site and these areas support three plant species of special concern. This site and the surrounding area are being rapidly developed and the occurrences of the species of special concern may be degraded in quality or possibly even extirpated. No protection measures are suggested.

sp515 & sp516 - "Pittston Road Swamp" a portion of the buffer area for this site overlaps onto this quadrangle; see Pleasant View Summit quadrangle SP515 & SP516 for a complete description.

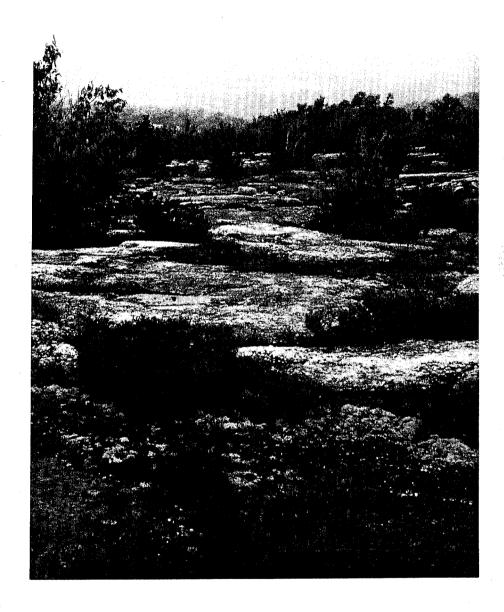
Bear Creek is a HQ-CWF throughout its basin in Lackawanna and Luzerne counties.

Stafford Meadow Brook is a HQ-CWF throughout its basin from its source to the downstream crossing of Scranton/Moosic boundary.

Spring Brook is a HQ-CWF throughout its basin from its source to the Lackawanna/Luzerne County line.



Painter Creek Bog - This site includes an Oligotrophic Glacial Kettlehole Bog Natural Community and supports one PA-Rare plant species. Photo: PA Science Office of The Nature Conservancy.



Exposed bedrock and thin soil are characteristic of Acidic Rocky Summit Natural Communities, such as this one at Montage Rocky Summit, home to a plant species of special concern. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Carbondale

	Code	TNC R Global	anks* State	<u>Legal S</u> Fed.	tatus* State	Last Seen	Quality**		
NATURAL COMMUNITIES:									
SPECIAL PLANTS:	SP504 SP509 SP510 SP511 SP512 SP514 SP515 SP516 SP517 SP518 SP519	G5 G5 G5 G5 G5 G5 G5 G5 G5	S3 S3 S3 S2 S3 S3 S3 S3 S2 S2 S2 S3		PR PR TU PR PR TU PR PR TU PR PR	08-06-96 09-14-92 09-14-92 09-14-92 08-17-93 08-06-96 08-06-96 08-06-96 07-31-96 08-06-96	B B BC C C C C B E BC		
	SP520 SP521	G5 G4G5	S2 S2	N N	PR PT	08-06-96 08-06-96	B B		
SPECIAL ANIMALS:									
GEOLOGIC FEATURE:	GE505	G?	S?	N	N	1979	E		
LOCALLY SIGNIFICANT: HO-CWF:									

HQ-CWF:

MANAGED AREAS:

Archbald Pothole State Park, Merli-Sarnoski County Park, State Game

Lands #300 & #307

OTHER:

sp514 - see Dalton quadrangle SP514

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*</sup> Please refer to Appendix II for Quality ranks.

## Carbondale Quadrangle

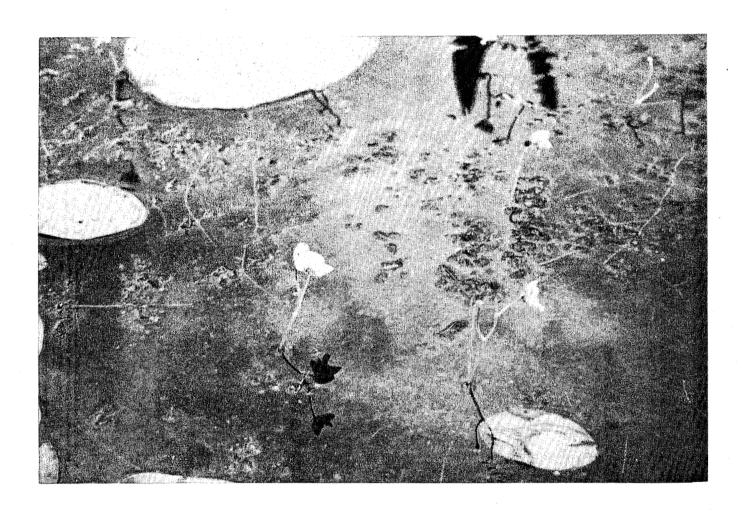
SP504, SP515, SP516, SP517, SP519, SP520, SP521 (Greenfield Twp.) - "Newton Lake/Mud Pond" - This site contains a natural lake which has an artificially increased water level caused by a small dam situated at the outflow. The lake is divided into two parts which are connected by a narrow strait. The larger area, Newton Lake, has a developed shoreline, while the smaller area, Mud Pond, is still surrounded primarily by forest. Both areas support plant species of special concern. The south end of Mud Pond includes several acres of emergent peat mat. The mat is dominated by graminoids and low shrubs, and grades into red maple swamp as distance from the lake increases. Fragments of peat mat are also located scattered along the lake margin and provide a unique habitat for some plant species. This combined lake-peatland complex supports a total of seven species of special concern. For more information on this site see the Clifford Quadrangle.

SP509, SP510, SP511, SP512 & SP518 (Fell Twp.) - "Mountain Mud Pond" - This site includes a natural spring fed lake which is mostly surrounded by forest with a small section of lakeshore developed as a beach and picnic area. It supports five plant species of special concern. The west end of the pond includes a peat island. Common species include leatherleaf, highbush blueberry, water-shield (Brasenia shreberi), fragrant water lily (Nymphaea odorata), bladderwort (Utricularia sp.), and a large number of grasses and sedges. The site also supports a wide diversity of odonate species. Maintaining the peat islands, and minimizing disturbance along the shoreline in the areas with the densest aquatic vegetation will help to maintain the populations of the rare species at this site.

SP514 (Scott Twp.) - "Chapman Lake" - Chapman Lake is a natural lake of over 90 acres. There are residential developments close to the shore around most of the lake. The lake is used for swimming, jet-skiing, and other recreational uses, and has a public access located on its north end. A large population of a PA rare plant species occurs in shallow water on the northwest portion of the lake. Associated plants include arrowhead (Sagittaria sp.), quillwort (Isoetes sp.), and other pondweeds. The northwest corner of the lake is bordered by old fields, and is the only portion of the lake without a shoreline road. Physical damage from boating and eutrophication by runoff from the adjacent developments are potential threats to this population.

GE505 (Archbald Twp.) - "Archbald Pothole" - is striking evidence of the glaciers that once covered Lackawanna County. The pothole, at over 40 feet in depth, was created by the scouring action of gravel-laden meltwater. It is one of the largest known natural potholes in the world (Geyer and Bolles 1979).

sp514 - "Sickler Pond" a portion of the buffer area for this site overlaps onto this quadrangle; see Dalton quadrangle SP514 for a complete description.



Purple bladderwort (<u>Utricularia purpurea</u>), a PA threatened plant species, grows completely submerged except for its flowers. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Clifford

	Code	TNC R Global	anks* State	<u>Legal S</u> Fed.	Status* State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	SP502 SP509 SP514	G4G5 G5 G5	S2 S2 S3	N N N	PT PR PR	08-06-96 08-06-96 08-06-96	B B BC

SPECIAL ANIMALS:

LOCALLY SIGNIFICANT:

FALLBROOK SWAMP

**HQ-CWF:** 

MANAGED AREAS:

OTHER:

sp514 - see Dalton quadrangle SP514.

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

## Clifford Quadrangle

SP502, SP509 & SP514 (Greenfield Twp.) - "Newton Lake/Mud Pond" - This site includes a natural lake which has an artificially increased water level caused by a small dam situated at the outflow. The lake is divided into two parts which are connected by a narrow strait. The larger area, Newton Lake, has a developed shoreline, while the smaller area, Mud Pond, is still surrounded primarily by forest. Both areas of the lake support plant species of special concern. Newton Lake supports large populations of two aquatic plant species, and a moderate size population of an emergent plant species. This combined lake-peatland complex supports a total of seven species of special concern. For more information on this site see the Carbondale Ouadrangle.

FALLBROOK SWAMP (Fell Twp.) - This locally significant area is a forty acre wetland which includes a mosaic of cover types. The varied cover types, which include forested swamp, shrub swamp, emergent marsh, and aquatic, support a wide diversity of plant and animal species. Several Great Blue Herons (<u>Ardea herodias</u>) and other waterfowl were observed using the site in 1996. The open water areas of the site are a result of a small dam at the outlet. Maintaining a forest buffer around this site will benefit the species that occur there.

sp514 - "Sickler Pond" a portion of the buffer area for this site overlaps onto this quadrangle; see Dalton quadrangle SP514 for a complete description.



Rhodora (Rhododendron canadense) is a ericacious shrub species found in acidic bogs and barrens. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: Dalton

		TNC R		Legal S		Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC503	G?	S3S4	N	N	07-24-96	BC
SPECIAL PLANTS:	SP506	G5	<b>S</b> 3	N	PR	05-21-96	C
	SP511	G5	<b>S</b> 3	N	PR	09-11-92	AB
	SP514	G5	<b>S</b> 3	N	PR	08-03-92	В
	SP515	G5	S3	N	PR	07-01-94	D
	SP517	G3	<b>S</b> 2	LE	PE	07-11-96	C
	SP518	G5	S3	N	PR	05-21-96	D
	SP519	G5	S2	N	PR	07-24-96	В
SPECIAL ANIMALS:	SA512	G4	S2S3	N	N	08-10-92	Е
	SA520	G5	S3S4	N	N	07-11-96	C

LOCALLY SIGNIFICANT: TUNKHANNOCK CREEK, SOUTH BRANCH

**HQ-CWF**:

MANAGED AREAS:

Lackawanna State Park

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

### Dalton Quadrangle

NC503 & SP519 (Benton Twp.) - "Brzostek Swamp" - This site supports a fair to good quality, medium sized mature Broadleaf-Conifer Swamp Natural Community. It receives at least some of its water flow from a spring-fed pond. It is a species rich community dominated by yellow birch, hemlock, and red maple with shrubs offering partial to complete cover. One portion of the swamp has an open understory with mossy hummocks, downed trees, and lush growth of ferns and sedges. It supports a small but healthy population of a PR plant species. The site has high potential for other species of special concern therefore further surveys are encouraged. The presence of water and the variety of cover and vegetation typical of a swamp makes this site good habitat for many types of wildlife.

SP506 & SP518 (Benton Twp.) - "Lake Kewanee Bog" - The part of this hemlock swamp that can be described as a minerotrophic fen is very small, perhaps less than a half acre. It includes a small floating peat mat dominated by sedges and sphagnum moss which is surrounded by a ring of taller shrubs. The site is likely to succeed to a forested swamp. The bog is not large enough to be identified as a good example of a minerotrophic fen and therefore has a D ranking. It supports two plant species of special concern, SP506 & SP518. Both populations are relatively small and may eventually be shaded out with the closing of the canopy.

**SP511** (Benton Twp.) - "Bassett Pond" - This site includes a small pond which contains a large population of a PA-Rare aquatic plant species. The species occurs near the shore in shallow water with a sandy or occasionally rocky shoreline. Associates include pondweeds (<u>Potamogeton sp.</u>), naiad (<u>Najas sp.</u>), pickerel-weed (<u>Pontederia cordata</u>), water-lilies (<u>Nymphaea sp.</u>), and burreed (<u>Sparganium sp.</u>). There are houses along the eastern shore of the pond. The western shore is undeveloped, and the pond has no public access. Some recreational use of the site is evident. The condition of the population and its habitat was good at last observation. Potential threats include degradation of water quality from pollution, agricultural runoff, or aquatic herbicides.

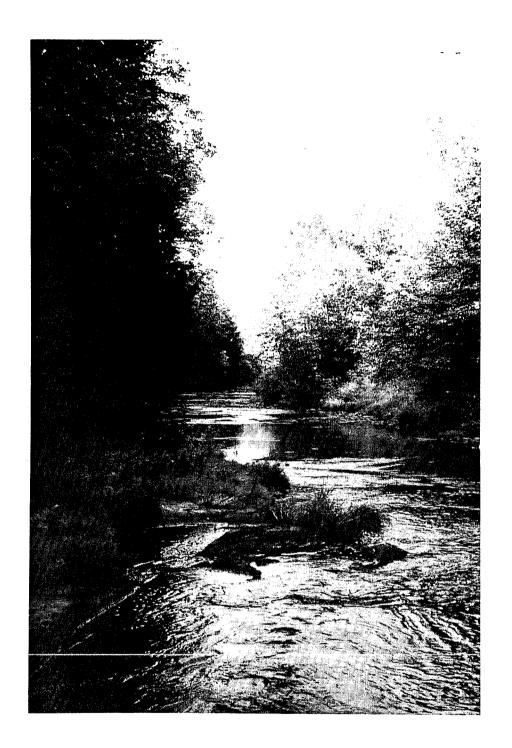
SP514 (Greenfield Twp.) - "Sickler Pond" - This is a large shallow pond with a contiguous wetland at its north end. It is surrounded by a mix of forest and agricultural lands. The water level has been artificially elevated through the construction of a small dam at the outlet. A survey from the road revealed the presence of a plant species of special concern. Associated species include tape-grass (Vallisneria americana), water-milfoil (Myriophyllum sp.), water-weed (Elodea sp.), water-shield, and water-lilies. Some evidence of nutrient enrichment was present. This site has good potential for other POSCIP species. If possible, more of the site should be surveyed.

SP515, SP517, & SA520 (Dalton Boro., Glenburn & West Abington Twps.) - "Atherton Pond" - This site contains a dense shrub swamp and is dominated by highbush blueberry, speckled alder, mountain holly, and the invasive alder buckthorn (Rhamnus frangula). Patches of trees such as red maple, white pine, and hemlock are scattered throughout. At the center of the swamp is a pond which is ringed on its edges by unstable hummocks of water-willow (Decodon verticillata), buttonbush (Cephalanthus occidentalis, and leatherleaf. Openings in the shrub canopy support

sphagnum carpets with cotton-grass (<u>Eriophorum</u> sp.), cranberry (<u>Vaccinium</u> sp.), pitcher-plant (<u>Sarracenia purpurea</u>), and roundleaf sundew (<u>Drosera rotundifolia</u>). The site also includes a vernal pool which is located in the adjacent woods. This site is home to three elements, each of which depends on a unique sub-habitat type occurring here. Two of these species are plants. One requires the relatively open patches of moist peat soils for survival, while the other requires the seasonal patterns of inundation found in the vernal pool. The animal species found here uses the adjacent forest for nesting and the pond area with the nearby white pines for roosting and cover. The continued survival of these species depends on minimizing disturbance to the swamp and the adjacent woods. The invasive shrub species, alder buckthorn, is very common at this site and may become dominant to the exclusion of native species.

SA512 (Scott Twp.) - "Carpenter Swamp" - This wetland includes a marsh altered by peat mining at its north end, and a less disturbed swamp dominated by red maple, yellow birch, and eastern hemlock at its south end. The south end is also home to an animal species of special concern. Previous peat mining operations have changed the condition of the site, and a few houses exist near the edges of the swamp. A change in water level could deteriorate the habitat of this species.

TUNKHANNOCK CREEK, SOUTH BRANCH (North Abington Twp.) - This locally significant area includes a two mile stretch of creek beginning from the dam at Lackawanna State Park and continuing down stream to the Erie-Lackawanna Railroad. The creek channel is somewhat braided and runs over gravel, sand, and bedrock. The floodplain varies in width from about 100 to 300 feet and is primarily dominated by a forest of eastern hemlock, sycamore, and red maple. This site supports a high diversity of nesting and migratory bird species. The sand substrate on certain portions of the floodplain is potential habitat for rare plant species. The water quality of the creek along this stretch has probably declined due to the construction of the dam in the State Park.



South Branch Tunkhannock Creek - This locally significant area includes a two mile stretch of creek beginning from the dam at **Lackawanna State Park** and continuing down stream to the Erie-Lackawanna Railroad. The floodplain is primarily dominated by eastern hemlock, sycamore, and red maple. This site supports a high diversity of nesting and migratory bird species. Photo: PA Science Office of The Nature Conservancy.



Bee-balm (Monarda didyma), a member of the mint family, is one of a wide diversity of plant species found in the riparian areas along the south branch of Tunkhannock Creek. Photo: PA Science Office of The Nature Conservancy.

USGS QUADRANGLE MAP: 1	Factoryville
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	Code	TNC Radiobal		Legal S Fed.	tatus* State	Last Seen	Quality**
NATURAL COMMUNITIES:							
SPECIAL PLANTS:	SP510 SP511	G5 G3	S3 S2	N N	PR PE	07-01-94 07-11-96	D C
SPECIAL ANIMALS:	SA512	G5	S3S4	N	N	07-11-96	С

LOCALLY SIGNIFICANT:

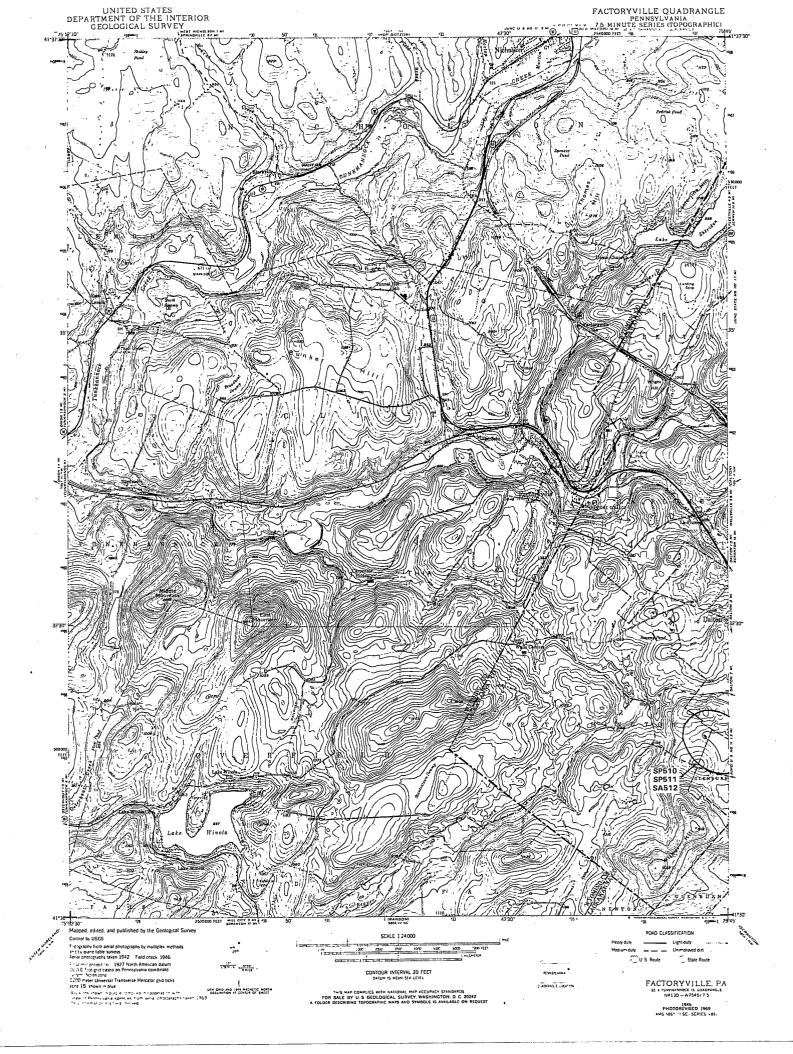
**HQ-CWF:** 

MANAGED AREAS:

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34) for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

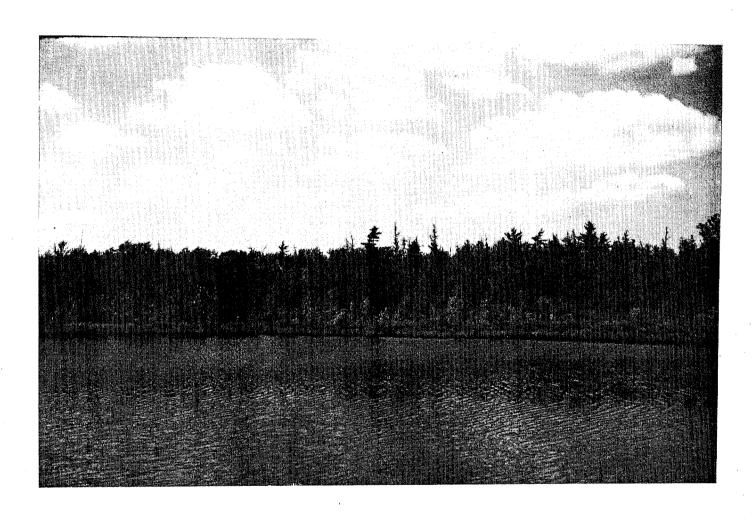
<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



# Factoryville Quadrangle

SP510, SP511 & SA512 (Dalton Boro., Glenburn & West Abington Twps.) - "Atherton Pond" - This site supports a dense shrub swamp and is dominated by highbush blueberry, speckled alder, mountain holly, and the invasive alder buckthorn. Patches of trees such as red maple, white pine, and hemlock are scattered throughout. At the center of the swamp is a pond which is ringed on its edges by unstable hummocks of water-willow, buttonbush, and leatherleaf. Openings in the shrub canopy support sphagnum carpets with cotton-grass, cranberry, pitcher-plant, and roundleaf sundew. The site also includes a vernal pool which is located in the adjacent woods. This site is home to three elements, each of which depends on a unique sub-habitat type occurring here. Two of these species are plants. One requires the relatively open moist peat soils for survival, while the other requires the seasonal patterns of inundation found in the vernal pool. The animal species found here uses the adjacent forest for nesting and the pond area with the nearby white pines for roosting and cover. The continued survival of these species depends on minimizing disturbance to the swamp and the adjacent woods. The invasive shrub species, alder buckthorn, is very common at this site and may become dominant to the exclusion of native species.



Atherton Pond and the adjacent swamp and woodlands are home to three species of special concern. Photo: PA Science Office of The Nature Conservancy.

	Code	TNC R Global	<u>Legal S</u> Fed.	Status* State	Last Seen	Quality**
NATURAL COMMUNITIES:						
SPECIAL PLANTS:						
SPECIAL ANIMALS:						
LOCALLY SIGNIFICANT:						
HQ-CWF:						
MANAGED AREAS:						

Forest City

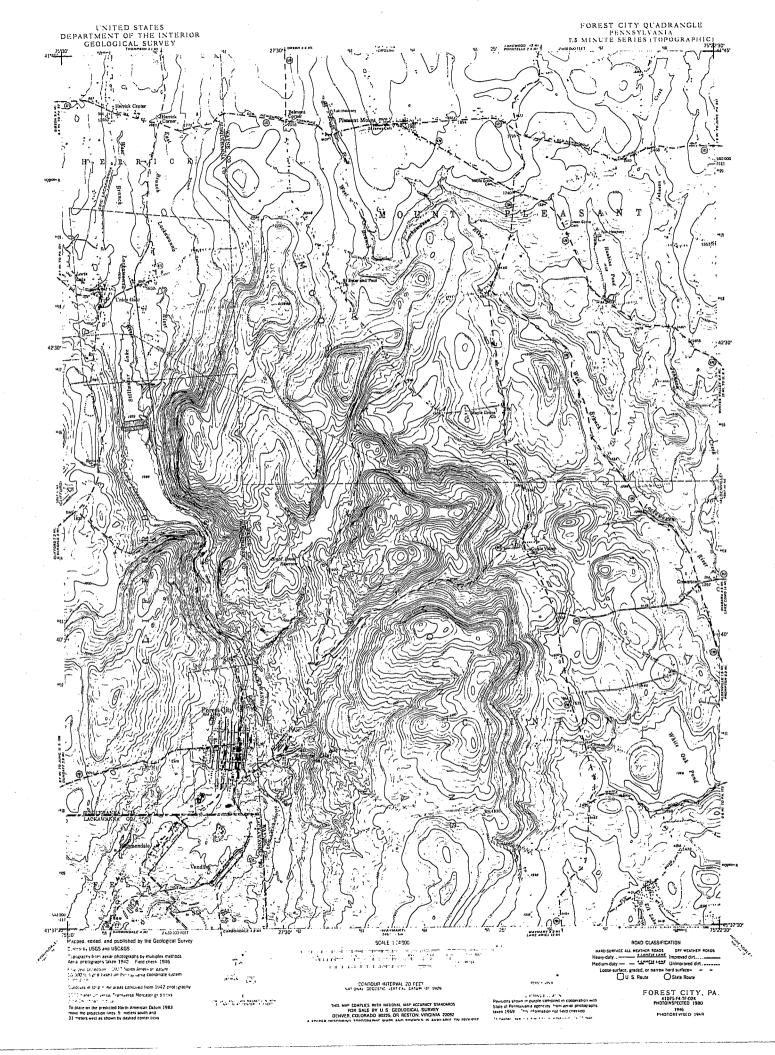
Only a small portion of Lackawanna County appears on this quadrangle. No species of special concern, exemplary natural communities, or Locally Significant sites (i.e., sites of countywide significance) were identified in this part of the county. However, other areas that are important to natural diversity on a township level (e.g., woodlands, streams, wetlands) may occur in townships on this quadrangle.

USGS QUADRANGLE MAP:

Forest City Quadrangle

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



USGS (	DUADRANGI	E MAP.	Lake Ariel
		<i>-//</i> 1714 11 .	

		TNC Ra	anks*	Legal St	tatus*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC523	G?	S1?	N	N	08-08-96	AB
	NC525	G4	S2S3	N	N	08-08-96	В
SPECIAL PLANTS:	SP520	G5	S3	N	PR	08-13-96	BC
	SP521	G5	S2	N	TU	08-13-96	C
	SP522	G5	S2	N	PR	08-13-96	В
SPECIAL ANIMALS:	SA519	G5	S2S3	N	N	10-03-96	В

# LOCALLY SIGNIFICANT:

**HQ-CWF:** 

Middle Creek, West Branch Wallenpaupack Creek

MANAGED AREAS:

State Game Lands #300

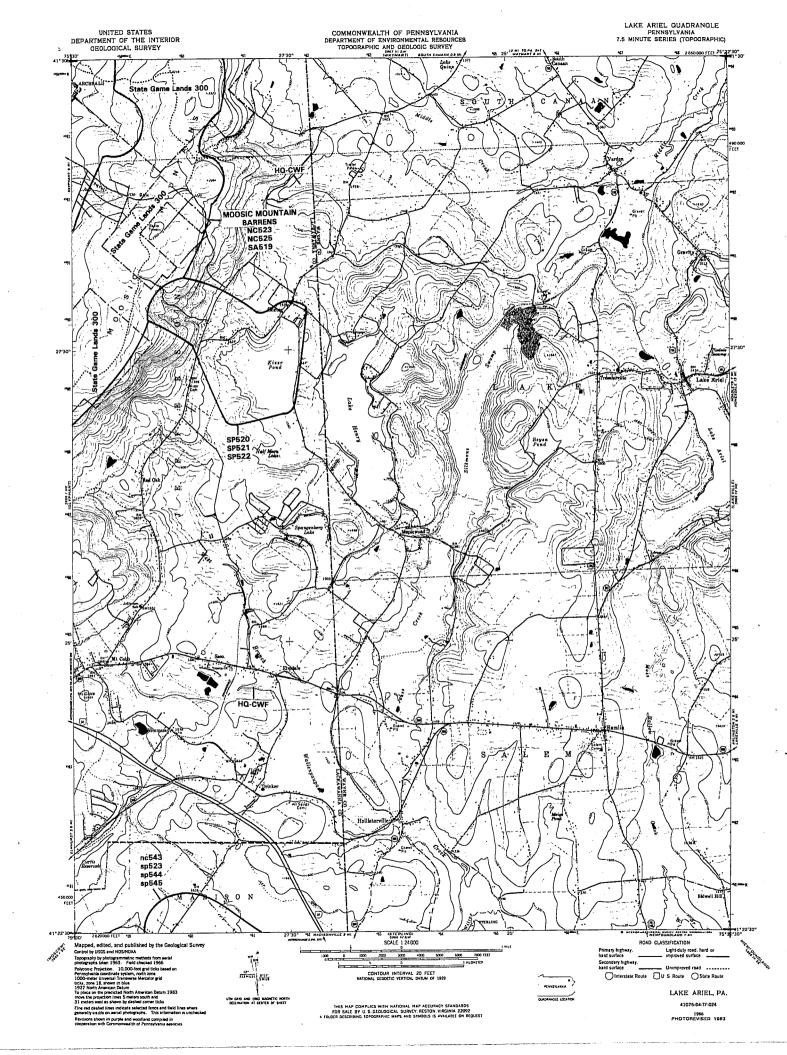
OTHER:

nc543,sp523,sp544,sp545 - see Sterling quadrangle NC543, SP523,

SP544, SP545.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



NC523, NC525, & SA519 (Jefferson Twp.) - MOOSIC MOUNTAIN BARRENS - This site is one of the top priorities for conservation in the county. It is an extensive mosaic of good to excellent quality barrens communities. The barrens are primarily restricted to the highest most exposed portions of the ridge and are surrounded by slopes and drainages with mixed hardwood The site includes both Ridgetop Dwarf-Tree Forest and Heath Barrens Natural Communities along with unassessed amounts of Northern Appalachian Acidic Rocky Summit The heath barrens are a newly discovered natural community for Natural Community. Pennsylvania. Moosic Mountain is the only location in the state where they are known to occur. They are characterized by a dominance of low growing ericaceous species which include lowbush blueberry, huckleberry, sheep laurel, black chokeberry (Aronia melanocarpa), and teaberry (Gaultheria procumbens). Herbaceous species such as Pennsylvania sedge(Carex pennsylvanica), poverty grass, and Canada mayflower (Maianthemum canadense) are infrequent associates found among the heath shrubs. Large expanses of this ankle to knee-high vegetation stretch along the ridgetop creating sweeping views of the ridge and the valleys below. It is uncertain what conditions cause the occurrence and persistence of this community type at this location. Fire and microclimate are important factors in helping to maintain this community type at other locations in the northeastern United States. Some portions of the ridge at Moosic Mountain have been used historically for blueberry harvest which included cutting and burning. The influence of these historical activities on the maintenance of the heath barrens is uncertain.

The Ridgetop Dwarf-Tree Forest Natural Community consists primarily of scrub-oak barrens, and in some areas pitch-pine - scrub-oak barrens. On some stretches of the ridge it occurs adjacent to the heath barrens, elsewhere it covers the entire width of the ridge. Scrub oak is the dominant canopy species in the dwarf tree forest with pitch-pine, black gum (Nyssa sylvatica), chestnut oak, and sassafras (Sassafras albidum) occurring in localized patches and infrequently scattered throughout. Common birds observed in the barrens included Common Yellowthroat (Geothlypis trichas), Prairie Warbler, Chestnut-sided Warbler (Dendroica pensylvanica), Rufous-sided Towhee, and Chipping Sparrow.

Many plant species of heath barrens and scrub-oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain these barrens communities. Portions of this site shows evidence of having burned within the last several decades.

From limited surveys it was discovered that this site supports two animal species of special concern, including a globally rare G3 species. The site has the potential to support a number of other rare animal species as well as several plant species. Further surveys are encouraged. (See also Waymart Quad. - MOOSIC MOUNTAIN BARRENS, and Olyphant Quad. - "Dunmore Bald")

SP520, SP521 & SP522 (Jefferson Twp.) - "Kizer Pond" - Three aquatic plant species of special concern were found near the outlet of this shallow 100-acre pond south of the village of Cortez. Further surveys by boat would be encouraged to better assess the extent of the populations of these rare species. Associated plants include water lilies (Nymphaea odorata) and bladderwort (Utricularia sp.) in the open water, and sedges (e.g., Carex scoparia), rushes (Juncus spp.), grass-

leaved goldenrod (<u>Euthamia graminifolia</u>), three-way sedge (<u>Dulichium arundinaceum</u>), and other plants along the marshy shoreline. More extensive swamp and marsh habitat occur along the west side of the pond (clearly visible on aerial photographs) and make the site important for a diversity of bird species as well. Kizer Pond is fed by streams originating along the wooded slopes of Moosic Mountain. It flows out to the north and east into Lake Henry, a larger recreational lake in Wayne County. Maintaining existing woodlands in the watershed area of Kizer Pond can help to maintain the water quality to the benefit of local residents, the fisheries, and the plant species of concern at this site.

nc543, sp523, sp544, & sp545 - POTTER CREEK BOG, a portion of the buffer area for this site overlaps onto this quadrangle; see Sterling quadrangle NC543, SP523, SP544, & SP545 for a complete description.

Middle Creek is a HQ-CWF throughout its basin in Lackawanna and Wayne counties.

West Branch Wallenpaupack Creek is a HQ-CWF throughout its basin from its source to Lake Wallenpaupack Dam.

USGS QUADRANGLE MAP: Lenoxvil	ille	enoxv	L	<b>P</b> :	A.	$I_{A}$	. 1	ĴΕ	[G]	II	$\mathbf{R}$	AD	)U.	0	GS	U
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Legal Status\* TNC Ranks\* Last Code Global State Fed. State Seen Ouality\*\* **NATURAL COMMUNITIES: SPECIAL PLANTS:** SPECIAL ANIMALS: LOCALLY SIGNIFICANT: **HO-CWF: MANAGED AREAS:** OTHER: nc503 & sp519 - see Dalton quadrangle NC503 & SP519

# Lenoxville Quadrangle

Only a small portion of Lackawanna County appears on this quadrangle. No species of special concern, exemplary natural communities, or Locally Significant sites (i.e., sites of countywide significance) were identified in this part of the county. However, other areas that are important to natural diversity on a township level (e.g., woodlands, streams, wetlands) may occur in townships on this quadrangle.

nc503 & sp519 - "Brzostek Swamp" a portion of the buffer area for this site overlaps onto this quadrangle; see Dalton quadrangle NC503 & SP519 for a complete description.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

USGS QUADRANGLE MAP: Moscow

•		TNC R	anks*	Legal S	Status*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC501	G?	S3S4	Ņ	N	04-24-96	C
	NC519	G?	S3S4	N	N	08-21-96	C
	NC520	G?	S3S4	N	N	06-25-96	В
	NC523	G?	S2	N	N	06-26-96	BC
SPECIAL PLANTS:	SP517	G5	<b>S</b> 3	N	PR	06-18-96	ВС
	SP518	G5	S3	N	PR	06-18-96	C
	SP521	G5	S3	N	PR	06-25-96	C
	SP522	G5	S2	N	PR	06-25-96	BC

# SPECIAL ANIMALS:

LOCALLY SIGNIFICANT: MA

MASH CREEK MARSH

**HQ-CWF:** 

Ash Creek, Roaring Brook, Stafford Meadow Brook, Spring Brook

MANAGED AREAS:

Lackawanna State Forest, State Game Lands #135

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

### Moscow Quadrangle

BEAR SWAMP - MOSCOW/NC520, SP521 & SP522 (Roaring Brook Twp.) - includes a good quality example of a Broadleaf-Conifer Swamp Natural Community (NC520). Two plant species of special concern (SP521 and SP522) are known from the site. Hemlock, red maple, and yellow birch dominate the canopy and rhododendron forms a dense shrub layer throughout much of the swamp. Cinnamon fern, sensitive fern (Onoclea sensibilis), marsh marigold (Caltha palustris), sedges (e.g., three-seeded sedge and others) and sphagnum mosses are common. Hummocks interspersed with stream channels and low marshy areas provide a variety of microhabitats for these species. The swamp is surrounded by upland woods and keeping this forest intact can help maintain the hydrologic regime and water quality that is important to the integrity of the natural community and the associated native flora at this site.

NC501 (Spring Brook Twp.) - "Swartz Road Swamp" - includes a fair quality example of a Broadleaf Conifer Swamp Natural Community. The 60 acre wetland is dominated by red maple with lesser amounts of yellow birch, serviceberry (<u>Amelanchier sp.</u>), red spruce and hemlock. rhododendron, winterberry (<u>Ilex verticillata</u>), and highbush blueberry form a dense shrub layer and cinnamon fern, marsh marigold, sedges and other herbs grow on and around the mossy hummocks. Some beaver activity has occurred here in the past and open water dominates the north end of the wetland complex. The mosaic of wetlands types found here is good habitat for birds and other wildlife.

NC519 (Covington Twp.) - "Daleville Swamp" - includes a fair quality example of a Broadleaf Conifer Swamp Natural Community. The overstory in this swamp is dominated by eastern hemlock, yellow birch, and red maple, with ash and red spruce also present. Rhododendron forms a dense shrub layer, along with patches of winterberry and speckled alder. Canada mayflower, cinnamon fern, skullcap (Scutellaria sp.), mosses, sedges, grasses, and other herbs cover the ground. Hummocky microtopography and abundant downed woody debris provide habitat for a diversity of Sphagnum spp. and other mosses. The swamp receives little direct disturbance but nutrient input from adjacent developments could be a threat to this community. This site has high potential for rare species.

NC523 (Clifton, Thornhurst, & Spring Brook Twps.) - "Panther Hill Site" - This site is southwest of Watres Reservoir, and includes a fair to good quality Northern Appalachian Acidic Rocky Summit Natural Community (NC523). The community consists of sparsely vegetated sandstone and conglomerate outcrops scattered along the high points of the ridge. The vegetation is dominated by stunted trees (pitch pine, cherry, and grey birch) with ericaceous shrubs including lowbush blueberry, huckleberry, black chokeberry, with various herbs and grasses (e.g. <a href="Deschampsia flexuosa">Deschampsia flexuosa</a> and <a href="Danthonia spicata">Danthonia spicata</a>). The Acidic Rocky Summit community is contained within a matrix of chestnut oak, pitch pine, and serviceberry forest along the top of the ridge and surrounded by oak woodlands on all sides. Common birds at this site included Common Yellowthroat and Rufous-sided Towhee, with Hermit Thrushes (<a href="Catharus guttatus">Catharus guttatus</a>) and Ravens (<a href="Corvus corax">Corvus corax</a>) also being observed. Only the northern end of the ridge was surveyed during this study and further field work is encouraged. Retaining the forest along the ridge can

help to maintain the quality of the community.

SP517 & SP518 (Roaring Brook & Spring Brook Twps.) - "Blue Shutter Road Swamp" - SP517 is a good quality population of a PA-Rare plant species. SP518 is a small population of a swamp plant species. Both species were found growing in a boreal conifer swamp with red spruce, larch, hemlock, and red maple. The surrounding land is forested with paved roads close by; however there is no evidence of disturbances or threats to the site. Further surveys are encouraged to determine the full extent of these two populations.

MASH CREEK MARSH (Clifton Twp.) is a locally significant wetland located in Lackawanna State Forest. This eighty acre marsh occurs near the headwater of Mash Creek. It is primarily dominated by Canada bluejoint grass (Calamagrostis canadensis) and a robust sedge (Carex rostrata) with some isolated patches of shrubs. The marsh edge is lined with eastern hemlock and red spruce with an understory of highbush blueberry. The marsh is fed by a stream at the south end and by seeps off the slopes to the west. It is likely that beaver play a role in helping to maintain the open character of this marsh. Mash Creek Marsh is the largest example of undisturbed marsh in the county. Maintaining the forested buffer at this site will benefit the species that occur here.

Ash Creek is a HQ-CWF throughout its basin.

Roaring Brook is a HQ-CWF throughout its basin from its source to the Elmhurst Reservoir in Lackawanna and Wayne counties.

Stafford Meadow Brook is a HQ-CWF throughout its basin from its source to the downstream crossing of the Scranton/Moosic boundary.

Spring Brook is a HQ-CWF throughout its basin from its source to the Lackawanna/Luzerne County line.

USGS QUADRANGLE MAP: Olyphant

		TNC R	anks*	Legal S	tatus*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC525	G?	S2	N	N	06-22-94	В
	NC531	G4	S2/S3	N	N	08-08-96	В
SPECIAL PLANTS:	SP512	G5	S2S3	N	PR	09-14-94	BC
	SP513	G4	S3	N	PR	08-13-96	C
	SP520	G5	S2	N	PR	08-13-96	C
	SP521	G5	S3	N	PR	08-13-96	C
	SP527	G5	S3	N.	TU	08-13-96	С
SPECIAL ANIMALS:	SA528	G3	<b>S</b> 1	C2	PT	04-15-93	E
	SA529	G4	S2S3	N	N	04-15-93	E

LOCALLY SIGNIFICANT: LONG SWAMP

**DUNMORE SWAMPS** 

HQ-CWF: Grassey Island Creek, Stafford Meadow Brook

MANAGED AREAS: State Game Lands #300,

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

# Olyphant Quadrangle

NC525 (Dunmore Boro.) - "Dunmore Bald" - This site includes a Northern Appalachian Acidic Rocky Summit Natural Community which occurs at the south end of MOOSIC MOUNTAIN BARRENS. MOOSIC MOUNTAIN BARRENS is one of the top priorities for conservation in the county (See MOOSIC MOUNTAIN BARRENS on Lake Aerial & Waymart Quads.). Dunmore Bald occupies 75-80 acres from 1600 to 1850 feet in elevation. Dominant species include black chokeberry, low-sweet blueberry, and hairgrass, and the site is potential habitat for species of concern such as sand cherry (Prunus pumila), slender mountain ricegrass (Oryzopsis pungens), and Appalachian sandwort (Minuartia glabra). The community grades into adjacent scrub oak and scrub oak-pitch pine-black huckleberry communities. Downslope sites have been degraded by railroads, logging, litter, and strip-mining. No field visit was made to this site during the inventory. Further surveys are encouraged.

**SP512** (Jefferson Twp.) - "Moosic Lake" - This site supports an unassessed population of a PARare plant species. This species requires shallow relatively clean water for survival. Further surveys to this site are recommended.

SP513, SP520, SP521, & SP527 (Jefferson & Roaring Brook Twps.) - "Elmhurst Mud Pond" - This site is the remnant of a bog or swamp community that has been disturbed by the construction of a dam at the outlet. It is characterized by open water thick with aquatic vegetation and slowly decaying stumps. Remnants of the peat mat still exist as islands and are dominated by leatherleaf with scattered groves of eastern larch. The islands still support a suite of plant species common to the open peat mat of bogs such as cotton-grass, sundew, wild calla (Calla palustris), and several species of sedges. The site is habitat for a number of bird species including Wood Duck (Aix sponsa), Spotted Sandpiper (Actitis macularia), Eastern Kingbird (Tyrannus tyrannus), Killdeer (Charadrius vociferus), Cedar Waxwing (Bombycilla cedrorum), and other common species. Beaver have been actively cropping the woody vegetation along the island shores and exposing unvegetated peat. The site supports four plant species of special concern all of which are dependent on the peat substrate of the remnant islands.

SA528 & SA529 (Archbald & Jessup Boros.) - "AD 431 Mine - Riverdrift" - This site includes a coal mine where a G3 PT animal species and a G4 animal species have been observed. The closing of the mine entrance is a threat to these species.

LONG SWAMP (Roaring Brook Twp. & Dunmore boro.) - This site contains a 60 acre linear wetland occurring in a narrow stand of eastern hemlock. The surrounding slopes provide a considerable buffer of mixed oak forest. The wetland is comprised of a mosaic of cover types including forested swamp, shrub swamp, graminoid marsh, and sphagnum mat. The forested swamp is dominated by red spruce, eastern hemlock, red maple, and yellow birch, while the shrub swamp is dominated by a mix of the above tree species and rhododendron, mountain holly, and alder. The marsh is dominated by sedges, grasses, and cattail. This site supports a wide diversity of plants due to the variation in habitat types. Common birds observed include Black-throated Blue Warbler (Dendroica caerulescens), Yellow Warbler (Dendroica petechia), Common

Yellowthroat, and Gray Catbird (<u>Dumetella carolinensis</u>). The site is disturbed at the northeastern end by a utility R.O.W., and the surrounding forest is still recovering from past cutting. The dense hemlock canopy which fills the valley along the stream adds scenic value to this site making it a desirable place for hiking.

DUNMORE SWAMPS (Jefferson Twp.) - This locally significant site includes three distinct swamps located in a matrix of scrub-oak and mixed oak forests. Each swamp has a different cover type. The south most swamp is dominated by red spruce and red maple with a dense shrub understory. It has the characteristics of a Boreal Conifer Swamp Natural Community, but would need further surveying to determine its quality. The north most swamp is dominated by low shrubs and herbs with scattered pitch pine. This swamp may be in its current condition as a result of fire. The third swamp is dominated by a stand of eastern larch at one end and by shrubs at the other. Maintaining a forested buffer around these swamps will benefit the species that occur here. Minimal data is available about these wetlands and further surveys are encouraged.

Grassey Island Creek is a HQ-CWF throughout its basin from its source to elevation 1100.

Stafford Meadow Brook is a HQ-CWF throughout its basin from its source to the downstream crossing of the Scranton/Moosic boundary.

	Code	TNC R		<u>Legal S</u> Fed.	Status* State	Last Seen	Quality**
NATURAL COMMUNITIES:	Code	Global	Suite	r cu.	State	Seen	Quanty
SPECIAL PLANTS:							
SPECIAL ANIMALS:							
LOCALLY SIGNIFICANT:							
HQ-CWF:							
MANAGED AREAS:	•						
				<del></del>			

Pittston

Only a small portion of Lackawanna County appears on this quadrangle. No species of special concern, exemplary natural communities, or Locally Significant sites (i.e., sites of countywide significance) were identified in this part of the county. However, other areas that are important to natural diversity on a township level (e.g., woodlands, streams, wetlands) may occur in townships on this quadrangle.

Status.

USGS QUADRANGLE MAP:

Pittston Quadrangle

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

USGS QUADRANGLE MAP: Pleasant View Summit

		TNC R	anks*	Legal S	tatus*	Last	
•	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC523	G?	S2S3	N	N	08-20-96	В
	NC528	G?	S3	N	N	06-11-96	BC
SPECIAL PLANTS:	SP504	G5	S2	Ň	PR	08-20-96	В
	SP506	G5	S2	N	PT	08-20-96	CD
	SP507	G5	S3	N	PR	06-08-86	D
	SP515	G5	S2	N	TU	08-28-96	C
	SP516	G5	S3	N	PR	09-24-91	D
	SP517	G5	S3	N	PR	07-25-96	D
	SP519	G5	S3	N	PR	07-02-96	В
	SP520	G5	S3	N	TU	07-03-96	C
	SP521	G5	S2	N	PR	08-20-96	C
	SP522	G5	S2S3	N	PR	08-20-96	C
	SP524	G5	S2	N <sup>°</sup>	PR	08-20-96	AB
	SP525	G5	S2	N	PR	08-20-96	C
	SP526	G5	S3	N	PR	06-11-96	AB
	SP527	G5	S3	N	PR	07-25-96	E
SPECIAL ANIMALS:	SA508	G5	S3	N	N	08-20-96	E

# LOCALLY SIGNIFICANT:

**HQ-CWF:** 

Choke Creek

MANAGED AREAS:

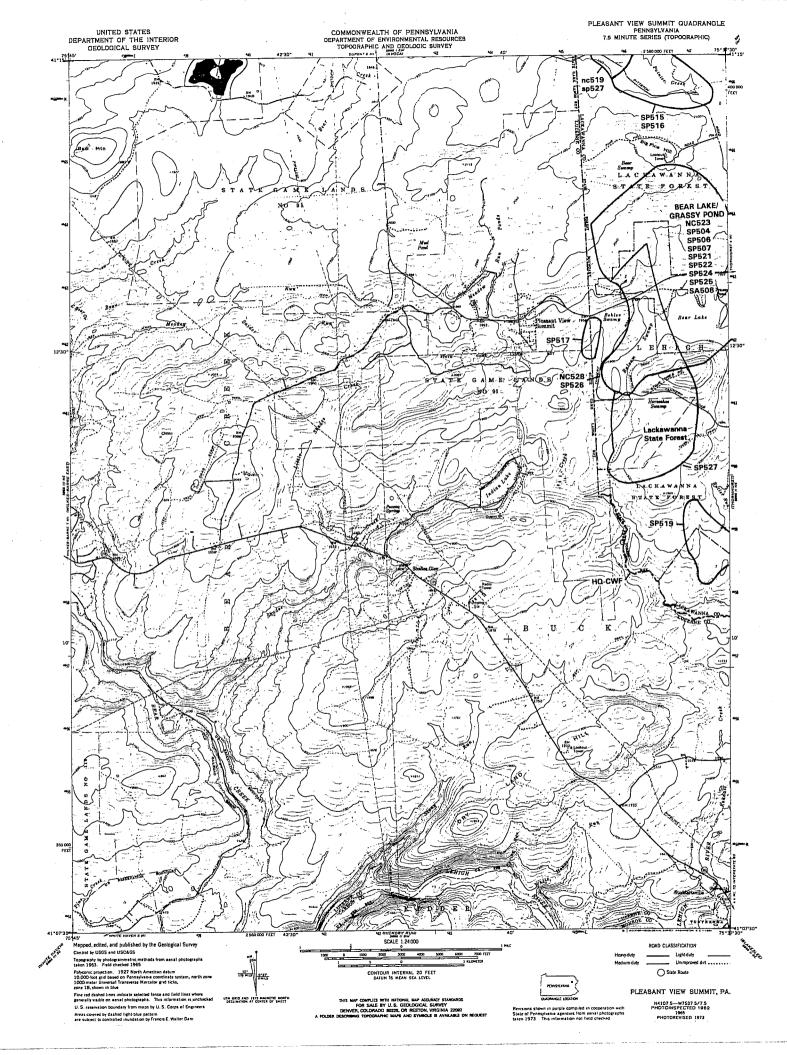
Lackawanna State Forest, State Game Lands #91

OTHER:

nc519 & sp527 - see Avoca quadrangle NC519 & SP527

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



BEAR LAKE/GRASSY POND/NC523, SP504, SP506, SP507, SP521, SP522, SP524, SP525 & SA508 (Thornhurst Twp.) - includes a good quality Acidic Glacial Lake Natural Community. The lake is low in nutrients, with a rocky and sandy bottom, clear water, and scattered populations of aquatic plants such as white water-lily, water bulrush (Scirpus subterminalis), bladderworts (Utricularia sp.) and some interesting aquatic varieties of sphagnum moss. The lake is surrounded by a forested buffer, and although some summer houses are present, the private lake association continues to maintain the quality of the water and woodlands at the site. Bear Lake and nearby Grassy Pond support six plant and animal species of special concern. SA508 is an animal species that has been successfully reproducing young at this site since it was first reported in 1986.

"Grassy Pond" is a 15 acre natural pond which supports two PA-Rare plant species. SP524 occurs over most of the pond amongst thick aquatic vegetation, including water-milfoil and pondweeds. SP525 is found on an island in the northeast end of the swamp. The island is made up chiefly of peat and leatherleaf and is currently the site of a beaver lodge. Although the pond has been disturbed by raised water levels, shoreline tree-cutting, and excavation, these populations do not appear threatened by current management. Eutrophication is a potential threat.

NC528 & SP526 (Thornhurst Twp.) - "Balsam Swamp-Lackawanna" - This site includes a Boreal Conifer Swamp Natural Community and supports a PA rare plant species. The most abundant tree species in the swamp are eastern larch and red spruce, with red maple and white pine also present. Highbush blueberry and mountain holly are the predominant shrub species, along with speckled alder, black huckleberry (Gaylussacia baccata), rhododendron, sheep laurel, and pinxter-flower (Rhododendron pericylmenoides). The canopy is fairly open, and the ground hummocky and dominated by sphagnum moss. Groundcover plants include cinnamon fern, bunchberry, Canada mayflower, three-seeded sedge, and other herbs and sedges. SP554 occurs both in the forested portion of the swamp and in an open area at its south end associated with leatherleaf, rhodora, highbush blueberry, cranberries, false solomon's seal (Smilacina trifolia), and cottongrass.

Balsam Swamp is excellent habitat for several bird species of special concern though none were observed during two 1996 field visits. A number of species with affinities for northern community types were observed including Alder Flycatcher (Empidonax alnorum), Yellow-bellied Sapsucker (Sphyrapicus varius), Magnolia Warbler (Dendroica magnolia), Canada Warbler (Wilsonia canadensis), Dark-eyed Junco (Junco hyemalis), White-throated Sparrow (Zonotrichia albicollis), and Purple Finch (Carpodacus purpureus).

There is no evidence of recent disturbance to the swamp itself, although the adjacent uplands had been clearcut on a portion of the west edge. This site is partly within Lackawanna State Forest.

SP515 & SP516 (Thornhurst Twp.) - "Pittston Road Swamp" - is located on the headwaters of Painter Creek. This wetland has an open aspect and is dominated by herbaceous vegetation, particularly by a lush cover of sphagnum moss overlying the peat substrate. Snags are found in parts of the site, suggesting that the area was originally wooded and that flooding by beavers

killed the trees. The site supports two plant species of special concern, a state-endangered herb and a state-rare shrub, and there is potential for additional species of special concern. The current management of the wetland appears favorable for the continued presence of the two species of special concern. This site is within **Lackawanna State Forest**.

SP517 (Thornhurst Twp. & Luzerne Co.) - "Behler Swamp" - A small population of a PA-Rare plant occurs in open areas at the headwaters of Behler Swamp. Trail use currently maintains some of the openings required by this plant although excessive use could eliminate some of the plants. Associated plants include mosses (Sphagnum spp., Polytrichum), cinnamon fern, and lowbush blueberry. This site is within Lackawanna State Forest.

SP519 (Thornhurst Twp.) - "America Swamp" - is a boreal conifer swamp which supports a population of a PA-Rare shrub. The swamp has an open canopy of red maple, larch, and red spruce, with a thick shrub understory of highbush blueberry and mountain holly underneath. The surface topography is hummocky and sphagnum-covered. Herbs include cinnamon fern and various sedges. A small but vigorous population of SP519 occurs in a shrub-dominated area in the eastern most corner of the swamp, and is associated with scattered american larch, rhodora, leatherleaf, sheep laurel, false solomon's seal, and sphagnum. The swamp is within a large forested area and there is no evidence or immediate threat of disturbance. This site is within Lackawanna State Forest.

SP520 (Thornhurst & Spring Brook Twps.) - "Painter Creek Bog" - A healthy and relatively small population of this species was found in a glacial bog of about five acres, with approximately one half acre of open water. Threats include logging within the primary watershed and flooding by beavers. This site is partly within Lackawanna State Forest. (See also NC519 & SP527 Avoca Quad).

SP527 (Thornhurst Twp.) - "Horseshoe Swamp" - includes a boreal conifer swamp with an open canopy and a dense shrub understory. Overstory dominants are red spruce, eastern white pine, and red maple, with blackgum, balsam fir (Abies balsamea), and eastern hemlock also present. Mountain holly, rhododendron, highbush blueberrry, winterberry, and sheep laurel are common shrubs, along with a few individuals of SP527, a PA rare species. Cinnamon fern, sedges, and sphagnum make up the groundcover. Much of this site may be too shaded for this species of special concern. The swamp and surrounding woodlands are within Lackawanna State Forest.

nc519 & sp527 - "Painter Creek Bog" a portion of the buffer area for this site overlaps onto this quadrangle; see Avoca quadrangle NC519 & SP527 for a complete description.

Choke Creek is a HQ-CWF throughout its basin in Lackawanna and Luzerne counties.

USGS QUADRANGLE MAP: Ransom

		TNC R	<u>anks*</u>	Legal S	tatus*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC501	G?	<b>S</b> 2	N	N	05-28-96	В
	NC505	G4	S2S3	N	N	05-28-96	BC
	NC514	G?	S5	N	N	05-22-96	C
SPECIAL PLANTS:	SP502	G5	<b>S</b> 1	N	PE	05-28-96	A
	SP512	G5	S3	N	PR	08-29-96	C
	SP513	G5	S3	N	PR	05-28-96	BC
SPECIAL ANIMALS:	SA515	G5	S3S4	N	N	06-12-96	E
	SA516	G5	S3	N	N	06-12-96	E

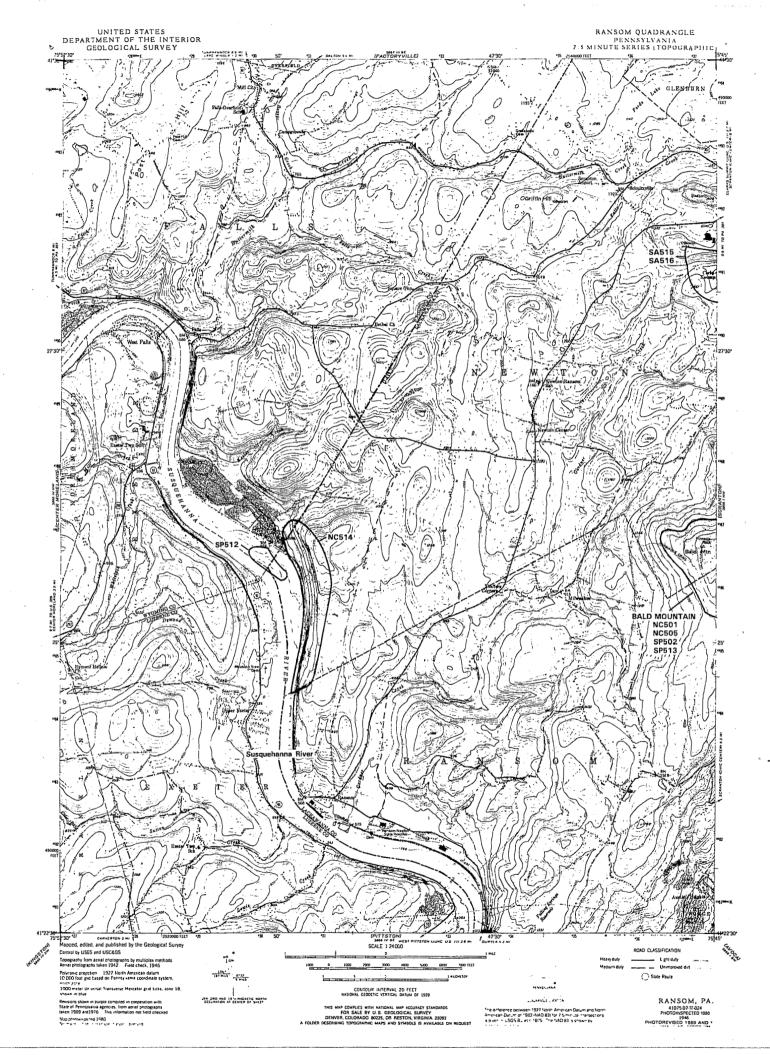
LOCALLY SIGNIFICANT:

**HQ-CWF:** 

MANAGED AREAS:

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



### Ransom Quadrangle

BALD MOUNTAIN/NC501, NC505, SP502 & SP513 (Newton & Ransom Twps.) - This site consists of a high elevation southwest-northeast running ridge which is terminated at the southwest end by a dramatic vertical rock ledge. The ledge and subsequently the ridge behind it receive the full brunt of prevailing weather.

The site includes a good to fair quality Ridgetop Dwarf-Tree Forest Natural Community, more commonly known as a "Pitch pine-Scrub oak barren", though it is primarily dominated by scrub-oak. Scrub oak is the dominant woody species with scattered gray birch, and mountain laurel as associates. Low growing species of blueberry, huckleberry, and black chokeberry are common in openings. Many of the plant species of the Pitch pine-Scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain the Pitch pine-Scrub oak community.

Also included in this site is the Acidic Rocky Summit Natural Community. This community occurs at the rock ledge at the southwest end of the ridge. It is characterized by large exposed sandstone outcrops with sparse vegetation. Characteristic species include gray birch, black chokeberry, lowbush blueberry, serviceberry, mountain-ash (Sorbus americana), sedge (Carex tonsa), mosses (Polytrichum sp.), and lichens.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens and acidic rocky summit communities. To date two plant species of special concern have been discovered at Bald Mountain, SP502 and SP513, one of which is a PA-Endangered species, and the other, a PA-rare species. This site has potential for additional rare species, including other plant and lepidopteran (butterfly & moth) species.

NC514 (Newton Twp.) - "Wyoanna Cliffs" - is a fair to good quality Northern Appalachian Acidic Cliff Natural Community that rises five hundred feet above the North Branch of the Susquehanna River. The rock outcrops support an open canopy of oak, hickory, red maple, and red-cedar (Juniper virginiana), and a sparse shrub and herb layer. Lowbush blueberry, wild phlox (Phlox subulata), wild pinks (Silene caroliniana), Pennsylvania sedge, saxifrage (Saxifraga virginica), and rockcap fern (Polypodium virginianum) are among the characteristic plants here. One plant species of special concern may occur at the site but further field surveys are needed to verify this occurrence. Maintaining the woodlands at Wyoanna Cliffs is critical to maintaining the current condition of the cliff community and also serves to maintain the scenic qualities of this river-corridor site. Similar sites also occur up river in Wyoming County at Falls Cliffs and Skinners Eddy (Wyoming County Natural Areas Inventory, 1995).

SP512 (Falls & Newton Twps., Luzerne & Wyoming Counties) - "County Line Island" - This site is located on an island in the Susquehanna River. The island includes two primary habitat types. One is the higher elevation forested portion which is infrequently flooded and has deep alluvial soil. It is dominated by silver maple (Acer saccharinum), sycamore (Platanus occidentalis), hackberry (Celtis occidentalis), and elm (Ulmus sp.) in the overstory, and ostrich fern (Matteucia struthiopteris), Japanese hops (Humulus japonicus), Japanese knotweed (Polygonum cuspidatum), and impatiens (Impatiens sp.) in the robust herb layer. The other

habitat type is the lower elevation gravelly area occurring at the head of the island. This habitat is characterized by seasonal scouring and vegetation here occurs in zones reflective of the duration of inundation. Highest areas, least frequently flooded, support shrubs and stunted trees with a high diversity of herbs. Slightly lower areas support fewer shrubs, and a less robust assemblage of herbs with several species of grass being common. Even lower areas support fewer species and these are interspersed with patches of unvegetated gravel. The two species most common in this zone are the grasses, turkey foot (Andropogon gerardii) and Indian grass (Sorghastrum nutans). Beyond this area and to the water line (in the late season) is mostly unvegetated gravel with a few scattered weedy species. This site supports a fair quality population of a PA-Rare plant species. It is also good habitat for bird species such as osprey and herons. Leaving this site in its current condition will help the rare plant persist here.

SA515 & SA516 (Newton Twp.) - "Corby Swamp" - This site provides breeding habitat for two animal species of special concern. The swamp has been disturbed by beaver activity and human intervention, both of which have altered water levels over the years. The standing dead trees throughout the pond are evidence of these disturbances. However, the site now provides open water and marsh habitat that supports a diversity of wildlife including great blue heron, green heron (Butorides striatus), wood ducks, red-winged blackbirds (Agelaius phoeniceus), and abundance of odonates (dragonflies and damselflies), and other species. Common plant species at the site include cattails (Typha latifolia), tussock sedge (Carex stricta), blueflag iris (Iris versicolor), highbush blueberry, yellow pond-lily (Nuphar lutea), and duckweed (Lemna sp.). The Lackawanna Audubon Society manages the site and maintains a trail open to the public.

USGS QUADRANGLE MAP: Scranton

		TNC R	anks*	Legal S	tatus*	Last	
NATURAL COMMUNITIES:	Code NC501 NC508 NC527	Global G4 G4 G?	State S2S3 S2S3 S2	Fed. N N N	State N N N	Seen 05-28-96 09-10-91 05-22-96	Quality** AB BC BC
SPECIAL PLANTS:	SP506 SP511 SP524 SP525 SP526 SP534	G5 G5 G5 G5 G5 G4	S3 S2 S2S3 S3 S3 S2	N N N N N	PE PE PR PR PE PT	06-02-91 08-08-90 06-02-91 06-02-91 06-02-91 05-22-96	C CD D C D
SPECIAL ANIMALS:	SA502 SA507 SA516 SA517 SA535 SA536	G4 G3 G4 G4T3 G5 G5	S2S3 S1 S2 S1S2 S3S4 S3	N C2 N N N	N PT N N N	04-25-93 04-25-93 05-26-88 05-26-88 06-12-96	E E B B E E
GEOLOGIC FEATURE	GE519	G?	S?	N	N	1979	E

LOCALLY SIGNIFICANT:

**BELL MOUNTAIN OUTCROPS** 

**HQ-CWF**:

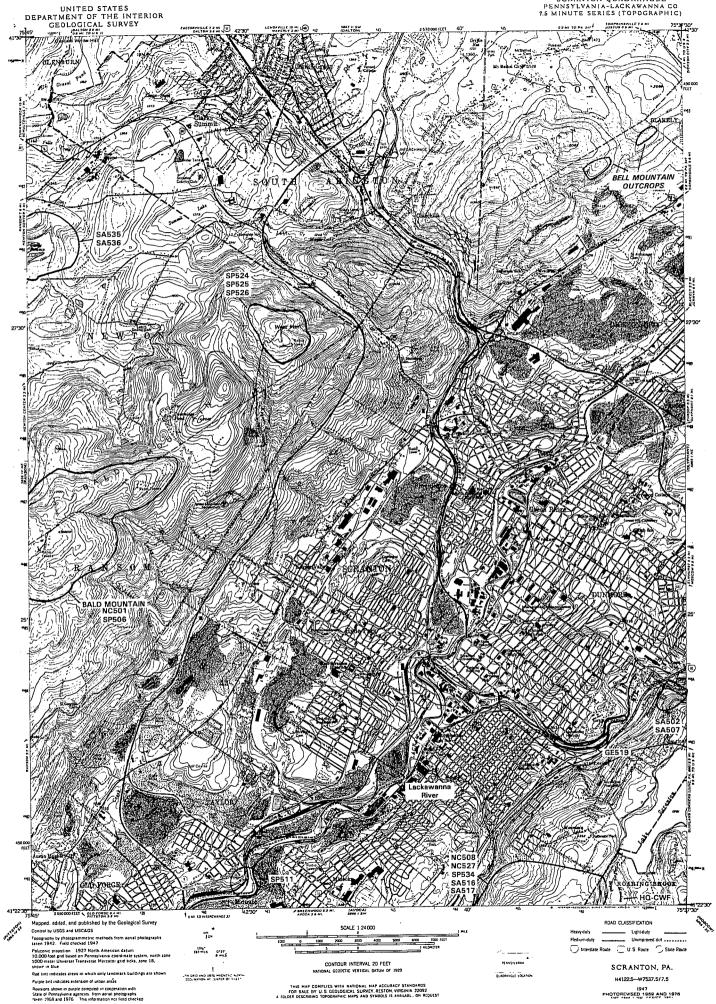
Stafford Brook Meadow

MANAGED AREAS:

McDade County Park

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



#### Scranton Quadrangle

**BALD MOUNTAIN/NC501 & SP506** (Newton & Ransom Twps.) - This site consists of a high elevation southwest-northeast running ridge which is terminated at the southwest end by a dramatic vertical rock ledge. The ledge and subsequently the ridge behind it receive the full brunt of prevailing weather.

The site includes a good to fair quality Ridgetop Dwarf-Tree Forest Natural Community, which is primarily dominated by scrub-oak. Other taller woody species are scattered infrequently over the site and include gray birch and mountain laurel. Low growing species of blueberry, huckleberry, and black chokeberry are common in openings. Common birds observed in the barrens included Prairie Warbler and Rufous-sided Towhee. Many of the plant species of the Pitch pine-Scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain the Pitch pine-Scrub oak community.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens and acidic rocky summit natural communities. To date one plant species of special concern, SP506, has been discovered on the portion of Bald Mountain falling on the Scranton quadrangle. It is a PA-Endangered plant species. This site has potential for additional rare species, including other plant and lepidopteran (butterfly & moth) species.

NC508, NC527, SP534, SA516 & SA517 (Roaring Brook Twp. & Scranton City) - "Stafford Bald" - This site includes fair to good quality examples of Ridgetop Dwarf-Tree Forest and Northern Appalachian Acidic Rocky Summit Natural Communities. The communities occur on a wide ridge top and which is surrounded by slopes of mixed hardwood forest.

Scrub oak is the dominant woody species with scattered chestnut oak, red maple, and pitch pine found throughout. Low growing species of blueberry and huckleberry are common along with poverty grass. Rock out crops are frequent and support several uncommon species such as shadbush and rock sandwort. Common birds observed in the barrens included Prairie Warbler, Rufous-sided Towhee, Oven Bird, and Chipping Sparrow.

Many of the plant species of the Ridgetop Dwarf-Tree Forest also known as "Pitch pine-Scrub oak barrens" are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain the Pitch pine-Scrub oak community. This site shows evidence of having burned within the last 10 years.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens communities. To date three species of special concern have been discovered at Stafford Bald (Scranton quad.), SP534, SA516, and SA517. One of these species is a PT plant. The other two species are animals of special concern. This site has potential for additional rare species, especially rare lepidopteran (butterfly & moth) species.

SA535 & SA536 (Newton Twp.) - "Corby Swamp" - provides breeding habitat for two animal species of special concern. The swamp has been disturbed by beaver activity and human intervention. The water level has been altered as a result, as evidenced by the standing dead trees throughout the pond. However, the site now provides open water and marsh habitat that supports

a diversity of wildlife including great blue heron, green heron, wood ducks, red-winged blackbirds, and abundance of odonates (dragonflies and damselflies), and other species. Common plant species at the site include cattails, tussock sedge, blueflag iris, highbush blueberry, yellow water-lily, and duckweed. The Lackawanna Audubon Society manages the site and maintains a trail open to the public.

SP511 (Moosic & Taylor Boros.) - "Moosic Bend Lackawanna River" - This highly disturbed site on the west shore of the Lackawanna River has a population of a PA-Endangered plant species (SP 511). The species occurs on a low gravel terrace along the river with patchy vegetation including aspen and cottonwood trees (Populus sp.), grasses, goldenrods, tansy (Tanacetum vulgare), whorled loosestrife (Lysimachia quadrifolia), spotted St.-John's-wort (Hypericum punctatum), and white-snakeroot (Eupatorium rugosum). The site is surrounded by urban areas and dissected by railroad tracks, making protection difficult or impossible.

SP524, SP525 & SP526 (Newton Twp.) - "West Mountain Summit" - is located on West Mountain, a knob on the prominent ridge situated on the west side of the city of Scranton. The elevation at the summit of West Mountain is 2160 feet and several transmission towers are present. The higher parts of the mountain are rocky and have a vegetation consisting of shrub thickets and scrub woodland that are interspersed with small openings. Conspicuous members of the flora are various heaths, scrub oak, sweet-fern (Comptonia peregrina), and chokeberry. Three plant species of special concern - a state-threatened grass, a state-rare shrub, and a state-rare perennial herb - are documented from the site. The vegetation of the mountain has probably been maintained over the years by a combination of rigorous growing conditions, such as the thin acidic soil and the effects of wind, and various natural and unnatural disturbances. Fire was undoubtedly a frequent occurrence in the past.

SA502 & SA507 (Dunmore Boro. & Scranton City) - "Sadler Ave AMLF #2 Site" - This site is a mine. Occurrences of SA502, a G4 animal species, and SA507, a G3 animal species, have been identified at this site.

GE519 "Nay Aug Gorge" (Scranton City) Nay Aug Gorge, part of a municipal park, includes a gorge and waterfalls on Roaring Brook. The dark walls of the 75-foot-deep gorge are made of shales and siltstones (Geyer and Bolles 1979).

BELL MOUNTAIN OUTCROPS (Blakely Boro. & Dickson City) is a locally significant area comprised of sandstone and conglomerate outcrops and associated plant communities. These xeric outcrops support associations of stunted trees including chestnut oak, gray birch, red oak, and sweet birch with patches of low growing huckleberries and blueberries. Herbaceous species occurring here are typical of extremely dry conditions. This site has a good potential for species of special concern.

Stafford Meadow Brook is a HQ-CWF throughout its basin from its source to the downstream crossing of the Scranton/Moosic boundary.

USGS QUADRANGLE MAP: Sterling

		TNC R	anks*	Legal S	tatus*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC514	G?	S3	N	N	07-22-93	В
	NC543	G?	S2S3	N	N	07-11-96	BC
SPECIAL PLANTS:	SP515	G5	S2	N	PT	06-18-96	E
	SP516	G5	S3	N	PR	07-22-93	В
	SP523	G5	S3	N	PR	07-11-96	C
	SP525	G5	S2	N	TU	09-14-95	BC
	SP534	G5	S2	N	PT	07-27-92	В
	SP535	G5	S2	N	PR	08-14-96	C
	SP538	G5	<b>S</b> 3	N	TU	07-22-93	C
	SP539	G5	S3	N	PR	07-22-93	C
	SP540	G5	<b>S</b> 2	N	PT	07-22-93	В
	SP544	G5	S3	N	PR	07-11-96	BC
	SP545	G5	S2	N	PT	07-11-96	BC
SPECIAL ANIMALS:	SA532	G5	S2	N	N	08-24-89	В
	SA542	G5	S?	N	N	06-11-96	E

### LOCALLY SIGNIFICANT:

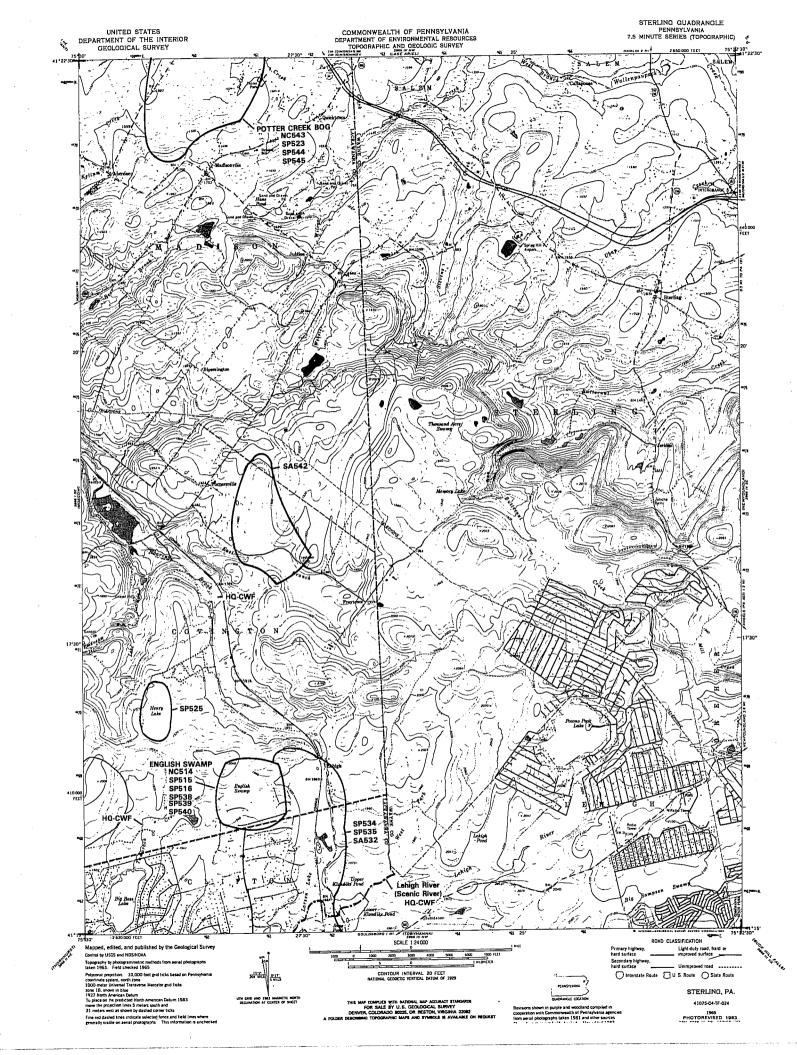
**HQ-CWF**:

Lehigh River, Roaring Brook, Tamarack Creek

**MANAGED AREAS:** 

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



### Sterling Quadrangle

ENGLISH SWAMP/NC514, SP515, SP516, SP538, SP539 & SP540 (Clifton & Covington Twps.) - This site includes is a 60 acre Boreal Conifer Swamp Natural Community which grades into a shrub swamp including a floating sphagnum mat, and open water. The forest consists of red spruce, hemlock, red maple, and blackgum with a thick understory of highbush blueberry. Spruce and larch are dominant near the edge of the shrub swamp, which is dominated by highbush blueberry and includes other shrub species such as mountain holly, winterberry, and rhododendron. Populations of SP515, a PA-Threatened plant species, and SP516, a PA-Rare plant species, occur primarily in the shady areas of the forested swamp. Three additional elements, SP538, SP539, and SP540 occur in the shrub swamp/sphagnum mat part of the site. Associated species included black spruce, larch, leatherleaf, cranberries, and sedges. This is a relatively undisturbed peatland with a diversity of rare and threatened plant elements which is privately owned and threatened by development. Additional threats include degradation of water quality by existing developments to the south and northwest, increased visitation, and spread of water-willow in the open water and floating mat areas.

NC543, SP523, SP544 & SP545 (Madison Twp.) - "Potter Creek Bog" - This is a well-structured, 100 acre Oligotrophic Glacial Kettlehole Bog Natural Community with a substantial buffer and little disturbance. The bog consists of concentric rings of vegetation, which include, beginning from the pond edge and going outward, a floating sphagnum mat, low shrubs and graminoids, tall shrubs, and a red maple/larch/blueberry swamp forest. This community supports three plant species of special concern. Due to the healthy condition of the community, and the forested buffer, there is a high potential to maintain the quality of the site, provided beaver activity is monitored. The beaver, and the potential for development in close proximity to the site are threats.

SP525 (Covington Twp.) - "Eagle Lake" - (a.k.a. Henry Lake) is a glacial lake surrounded by a vacation-home development. Portions of the shoreline have been developed with homes, boat accesses, beaches, and a dam, or have been impacted by the deposition of stone or sand fill. The lake is used for recreational purposes, including boating, fishing, and swimming. Despite the disturbances to the shoreline, a state-threatened aquatic plant occurs in shallow parts of the lake. The population seems to be thriving and has been known from this site for at least fifty years. The current management of the lake appears to be compatible with the continued existence of the population.

SP534, SP535 & SA532 (Clifton, Covington Twps. & Wayne County) - "Johnson Pond-Westend Pond Complex" - This series of ponds was artificially created by placing small dams along the Lehigh River and adjacent tributaries. The portion of the ponds on this quad. support two plant and one animal species of special concern. A large population of a PA-Rare plant species, SP535, which included thousands of plants was seen carpeting areas of the ponds in 1996. The pond systems have decreased in quality due to eutrophication and the increase in exotics such as Cabomba. Johnson Pond and the extensive wetland acreage around it are a major headwater to the Lehigh River. Much of the peatland area of this site has been impacted by beaver. Other

disturbances include a railroad bisecting the wetlands, recreational use of the pond, and development occurring on adjacent lands. (See also SP522 and SP587 Tobyhanna Quad.)

SA542 (Covington & Madison Twps.) - "Freytown Marsh" - This site includes extensive streamside marshes which occur along the meanders of the creek. The marshes are dominated by robust graminoids with shrubs at the edges and mixed hardwood forest on the adjacent uplands. The site supports an unassessed population of an S2 animal species. Further surveys are encouraged to determine the extent of this population.

Lehigh River is a HQ-CWF along the main branch from its source to the town of Jim Thorpe (Carbon Co.). Portions also occur in Wayne, Luzerne, and Monroe counties.

Roaring Brook is a HQ-CWF throughout its basin from its source to the Elmhurst Reservoir in Lackawanna and Wayne counties.

Tamarack Creek is a HQ-CWF throughout its basin.

USGS QUADRANGLE MAP: Thornhurst

		TNC Ranks*		<u>Legal Status*</u>		Last		
•	Code	Global	State	Fed.	State	Seen	Quality**	
NATURAL COMMUNITIES:	NC524	G?	S2S3	N	N	07-30-96	В	
SPECIAL PLANTS:	SP508	G4	S2	N	PR	07-30-96	В	
	SP517	G5	<b>S</b> 3	N	PR	05-23-91	C	
	SP521	G5	S2	N	PE	07-02-96	BC	
	SP522	G5	S2	N	PR	08-20-96	AB	
	SP523	G5	S2	N	PR	08-20-96	C	
	SP525	G5	S3	N	PR	06-18-96	C	

SPECIAL ANIMALS:

LOCALLY SIGNIFICANT: MASH CREEK MARSH

**HQ-CWF**:

Ash Creek, Buckey Run, Choke Creek, Lehigh River, Pond Creek, Rucks

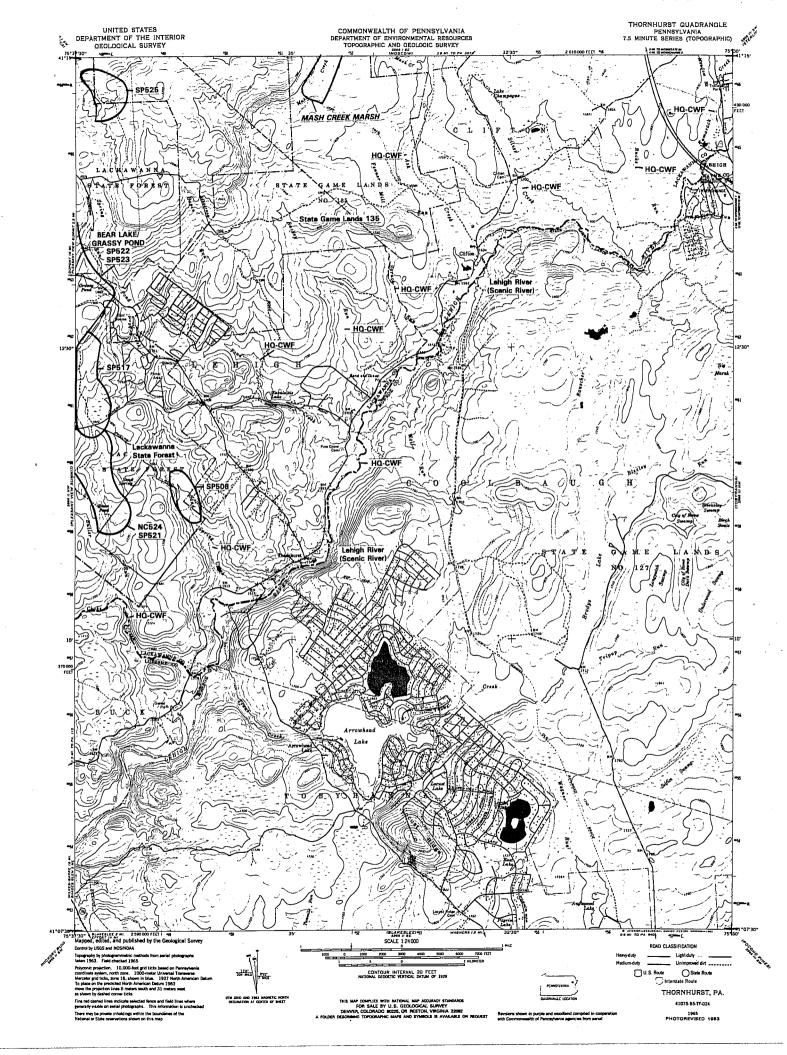
Run, Sand Spring Creek, Silver Creek, Spruce Run, Tamarack Creek

MANAGED AREAS:

Lackawanna State Forest, State Game Lands #135

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



# Thornhurst Quadrangle

BEAR LAKE/GRASSY POND/SP522 & SP523 (Thornhurst Twp.) - The portion of this site on the Thornhurst quadrangle contains part of Grassy Pond. The pond is roughly 15-20 acres and its water levels may have been changed slightly by humans and/or beaver. The pond is thick with aquatic vegetation and includes a small floating peat island. This site supports populations of two plant species of special concern, SP522 & SP523. Both of these species also occur in Bear Lake which is immediately upstream (see Pleasant View Quadrangle, BEAR LAKE/GRASSY POND). These populations could be considered as sub-populations of those in Bear Lake. The pond is surrounded by a mixed hardwood-conifer forest and has a dirt road along the south shore. It is used for fishing and nature appreciation by residents of the Bear Lake Association. This site will be best protected by leaving it in its current condition.

NC524 & SP521 (Thornhurst Twp.) - "Nines Pond" - This site includes a Natural Pond Natural Community and includes two ponds set in a mixed hardwood forest matrix. The first pond is approximately one acre in size with open water in the center ringed by emergent graminoid species such as sharp-fruited manna grass (Glyceria acutiflora), short-awned foxtail grass (Alopecurus aequalis), and several species of sedges. Red maples and highbush blueberry occur on the hummocks that make up the pond margin. Downstream is a shrub-swamp which is bisected by a gravel road. The second pond, located 1/4 mile upstream from the first, is smaller and has emergent vegetation throughout. These ponds support a population of a PA-Endangered plant species. They are also excellent breeding habitat for amphibians. These ponds will be best protected by leaving them in their current condition and maintaining an adequate forest buffer in their immediate watershed. This site occurs in Lackawanna State Forest.

SP508 (Thornhurst Twp.) - "Sand Springs Woods" - This is an open forest site dominated by quaking aspen (<u>Populus tremuloides</u>) in the overstory, with blueberry, rhododendron, maleberry (<u>Lyonia ligustrina</u>), spiraea (<u>Spiraea spp.</u>), and viburnum (<u>Viburnum sp.</u>) in the shrub layer, and swamp dewberry (<u>Rubus pubescens</u>), brachyelytrum grass (<u>Brachyelytrum erectum</u>) in the herb layer. SP508, a PA rare plant species, occurs in a blueberry patch and occasionally under taller shrubs. The site is part of **Lackawanna State Forest** and has been disturbed by logging and more recently by deer browsing. There are no immediate threats to this species at this site, although succession to a more closed canopy could degrade its habitat.

SP517 (Thornhurst Twp.) - "Tannery Road Swamp" - is a 4-5 acre acidic shrub swamp which grades into a conifer swamp. It supports a PA-Rare plant species, SP517, which occurs as a codominant in the swamp along with rhododendron (Rhododendron canadense), sheep laurel, and leatherleaf. Sphagnum moss dominates the groundcover. This site occurs in Lackawanna State Forest.

SP525 (Thornhurst Twp.) - "Sassafras Hill Wetlands" - It is a low shrub thicket dominated by members of the heath family, particularly rhodora, leatherleaf, and sheep-laurel. A small population of a state-rare shrub also occurs here. The substrate is rather rocky and is covered by a very thin layer of sphagnum moss. There is probably standing water during certain periods

of the year. The current shrub-dominated habitat may have resulted from logging or forest fires that destroyed the original forest. This site is located in **Lackawanna State Forest**.

MASH CREEK MARSH (Clifton Twp.) is a locally significant wetland located in Lackawanna State Forest. This eighty acre marsh occurs near the headwater of Mash Creek. It is primarily dominated by Canada bluejoint grass and a robust sedge with some isolated patches of shrubs. The marsh edge is lined with eastern hemlock and red spruce with an understory of highbush blueberry. The marsh is fed by a stream at the south end and by seeps off the slopes to the west. It is likely that beaver play a role in helping to maintain the open nature of this marsh. Mash Creek Marsh is the largest example of undisturbed marsh in the county. Maintaining the forested buffer at this site will benefit the species that occur here. (See also Moscow quad.)

Ash Creek is a HQ-CWF throughout its basin.

Buckey Run is a HQ-CWF throughout its basin.

Choke Creek is a HQ-CWF throughout its basin in Lackawanna and Luzerne counties.

Lehigh River is a HQ-CWF along the main branch from its source to the town of Jim Thorpe (Carbon Co.). Portions also occur in Wayne, Luzerne, and Monroe counties.

Pond Creek is a HQ-CWF throughout its basin.

Rucks Run is a HQ-CWF throughout its basin.

Sand Spring Creek is a HQ-CWF throughout its basin.

Silver Creek is a HQ-CWF throughout its basin.

Spruce Run is a HQ-CWF throughout its basin.

Tamarack Creek is a HQ-CWF throughout its basin.

USGS QUADRANGLE MAP: Tobyhanna

NATURAL COMMUNITIES:	Code	TNC R Global	anks* State	<u>Legal S</u> Fed.	Status* State	Last Seen	Quality**
SPECIAL PLANTS:	SP522	G5	S2	N	PR	08-14-96	C
	SP587	G5	S2	N	PT	08-14-96	E

SPECIAL ANIMALS:

LOCALLY SIGNIFICANT:

**HQ-CWF**:

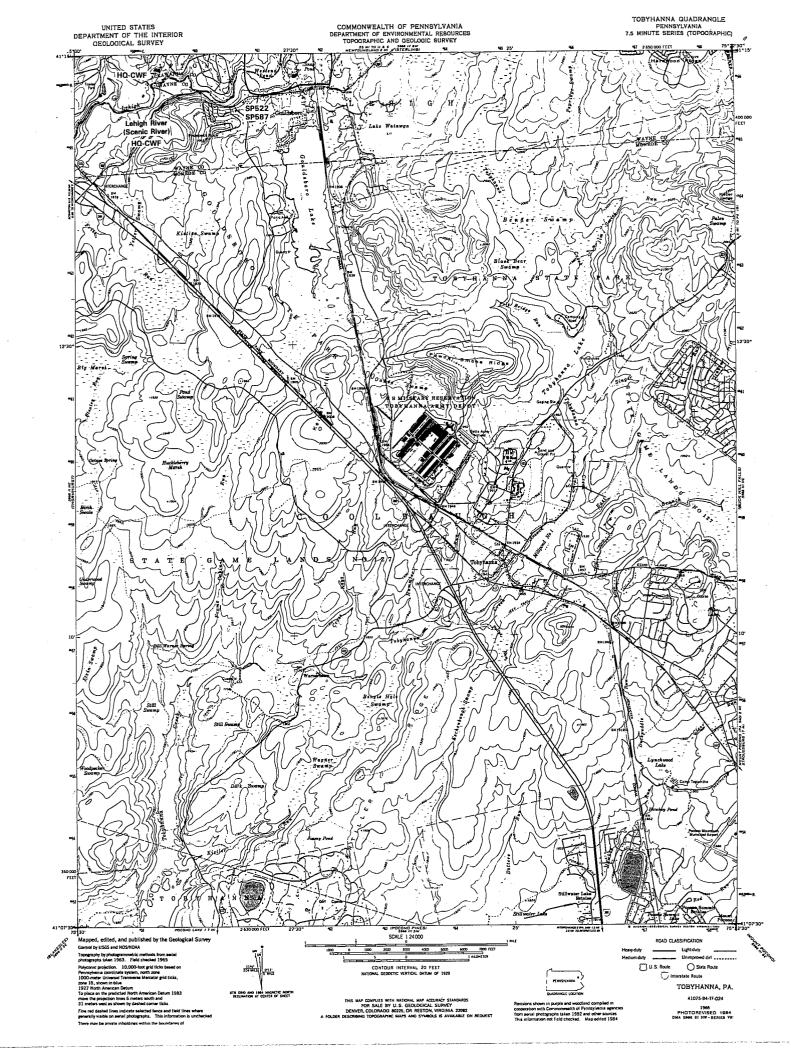
Lehigh River, Tamarack Creek

MANAGED AREAS:

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.



# Tobyhanna Quadrangle

SP522 & SP587 (Clifton Twp. & Wayne Co.) - "Johnson Pond-Westend Pond Complex" - This series of ponds was artificially created by placing small dams along the Lehigh River and adjacent tributaries. The portion of the ponds on the Tobyhanna quadrangle support two plant species of special concern. A large population of a PA-Rare species, SP522, including thousands of plants was observed in 1996. SP587 represents a smaller population of a PT species for which more survey work is recommended. The ponds systems have decreased in quality due to eutrophication and the increase in exotics such as Cabomba. Johnson Pond and the extensive wetland acreage around it are a major headwater to the Lehigh River. Much of this peatland has been impacted by beaver. Other disturbances include a railroad bisecting the wetlands, recreational use of the pond, and development occurring on adjacent lands. (See also SP534, SP535, and SA532 Sterling Quad.)

Lehigh River is a HQ-CWF along the main branch from its source to the town of Jim Thorpe (Carbon Co.). Portions also occur in Wayne, Luzerne and Monroe counties.

Tamarack Creek is a HQ-CWF throughout its basin.



Pitcher plants (<u>Sarracenia purpurea</u>), carnivorous plants adapted to highly acid peat soils, thrive at several sites in Lackawanna County. Photo: PA Science Office of The Nature Conservancy.

USUS QUADICANULLINAI. Wayillai	USGS	QUADRANGLE MAP:	Waymart
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		TNC R	anks*	Legal S	tatus*	Last	
	Code	Global	State	Fed.	State	Seen	Quality**
NATURAL COMMUNITIES:	NC511	G4	S2S3	N ·	N	08-01-89	BC
heath barren	NC513	G?	S1?	N	N	08-08-96	AB
	NC515	G4	S2S3	N	N	08-08-96	В
SPECIAL PLANTS:			e ji se ji				
SPECIAL ANIMALS:	SA502	G5	S2S3	N	N	10-03-96	В
	SA512	G3G4	<b>S</b> 1	N	N	10-03-96	E

LOCALLY SIGNIFICANT:

PANTHER GORGE

**HQ-CWF:** 

**MANAGED AREAS:** 

State Game Lands #300

Note: Outlined areas represent watershed or subwatershed areas that encompass the element(s) of concern. Activities within this area could potentially impact these elements (see pages 32-34 for more information). Full size maps are available at the Lackawanna Heritage Valley Authority.

<sup>\*</sup> Please refer to Appendix I for an explanation of Ranks and Legal Status.

<sup>\*\*</sup> Please refer to Appendix II for Quality ranks.

# Waymart Quadrangle

NC511 (Canaan & Carbondale Twps., Wayne Co.) - "Salem Hill Barren" includes a Ridgetop Dwarf-Tree Forest Natural Community. It contains areas dominated by scrub oak as well as areas of low shrub barrens with blueberry, huckleberry, and black chokeberry. This community is maintained by fires and the dry, nutrient poor soils. Although no species of concern have been identified from this site, the habitat is suitable for rare lepidopteran species (moths and butterflies) and surveys for these species are recommended. This site has been heavily disturbed by recreational vehicle use, dumping, and quarrying.

NC513, NC515, SA502, & SA512 (Carbondale & Jefferson Twps.) - MOOSIC MOUNTAIN BARRENS - This site is one of the top priorities for conservation in the county. It is an extensive mosaic of good to excellent quality barrens communities. The barrens are primarily restricted to the highest most exposed portions of the ridge and are surrounded by slopes and drainages with mixed hardwood forest. The site includes both Ridgetop Dwarf-Tree Forest and Heath Barrens Natural Communities along with unassessed amounts of Northern Appalachian Acidic Rocky Summit Natural Community. The heath barrens are a newly discovered natural community for Pennsylvania. Moosic Mountain is the only location in the state they are known to occur. They are characterized by a dominance of low growing ericaceous species which include lowbush blueberry, huckleberry, sheep laurel, black chokeberry, and teaberry. Herbaceous species such as Pennsylvania sedge, poverty grass, and Canada mayflower are infrequent associates. Large expanses of this ankle to knee high vegetation stretch along the ridgetop creating sweeping views of the ridge and the valleys below. It is uncertain what conditions cause the occurrence and persistence of this community type, but it is likely that fire has played a role. The Ridgetop Dwarf-Tree Forest Natural Community consists primarily of scrub-oak barrens, and in some areas, Pitch pine-Scrub oak barrens. On some stretches of the ridge it occurs adjacent to the heath barrens, elsewhere it completely covers the width of the ridge. Though pitch-pine, black gum, chestnut oak, and sassafras are infrequently scattered throughout, scrub oak is the dominant canopy species in the dwarf tree forest. Common birds observed in the barrens included Common Yellowthroat, Prairie Warbler, Chestnut-sided Warbler, Rufous-sided Towhee, and Chipping Sparrow.

Many of the plant species of heath barrens and scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain these barrens communities. Portions of this site shows evidence of having burned within the last several decades.

From limited surveys it was discovered that this site supports two animal species of special concern, including a globally rare G3 animal species. The site has the potential to support a number of other rare animal species as well as several plant species. Further surveys are encouraged. (See also Lake Ariel Quad., "Moosic Mountain Barrens", and Olyphant Quad., "Dunmore Bald")

PANTHER GORGE (Fell Twp. & Wayne Co.) is a steep sloping, forested stream ravine which includes dramatic waterfalls. A high gradient creek flows over an exposed bedrock stream bed between steep slopes of rhododendron and mixed oak forest. The rock outcrops at the base of

the waterfalls are an unusual habitat type which support forbs, ferns, and mosses that thrive in the spray of the falls. This site has received disturbance in the past from the construction of the now abandoned rail line.



This aerial view shows a portion of MOOSIC MOUNTAIN BARRENS, the top site for conservation within the county. Photo: PA Science Office of The Nature Conservancy.

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### 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 <u>Listed Endangered</u> Taxa in danger of extinction throughout all or a significant portion of their ranges.
- LT <u>Listed Threatened</u> 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.
- N Taxa not currently listed by the U.S. Fish and Wildlife Service

### STATE STATUS-NATIVE PLANT SPECIES

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

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

### Appendix I (Continued.)

- PT <u>Pennsylvania Threatened</u> 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 <u>Pennsylvania Rare</u> 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 <u>Pennsylvania Extirpated</u> 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 <u>Pennsylvania Vulnerable</u> 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  $\underline{\text{None}}$  Plant species which are believed to be endangered, rare, or threatened, but which are being considered by the required regulatory review processes for future listing.

#### STATE STATUS-ANIMALS

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

## PE - Pennsylvania Endangered

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

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

### PT - Pennsylvania Threatened

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

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

### TNC GLOBAL ELEMENT RANKS

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

#### TNC STATE ELEMENT RANKS

- S1 = Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.
- S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
- S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences).
- S4 = Apparently secure in state, with many occurrences.
- S5 = Demonstrably secure in state and essentially ineradicable under present conditions.
- SA = Accidental in state, including species which only sporadically breed in the state.
- 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 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 Arank 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.

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

### APPENDIX III

# THE NATURE CONSERVANCY RECOMMENDED NATURAL AREA SURVEY FORM

Surveyor:	Address & Phone
Date of Observation	Site Name
Quadrangle NameSite (please be specific & include	Exact Location of e a map or sketch)
Owner: 'Owners Attitude Toward Conservation	on:
Site Elevation:	Size of Site (acres):
Source of Lead:	
Current Land Use:	
Type of Area:Old Growth ForestForested Swamp; Written Description: Try to convert features (including vegetation, aquatic features, land forms, geologicalities, etc.):	Bog;Natural Pond. y a mental image of the site significant animals & plants, logic substrata, scenic
Evidence of Disturbance:  Site Condition Compared to Your La	

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

# APPENDIX IV

# THE NATURE CONSERVANCY POTENTIAL NATURAL AREA SURVEY FORM

COUNTY	NO.		QUAD	NAME/CODE:	
Site Name:				PHOTO NO./I	DATE:
Location:					
Air Survey Sur	veyors:				Date:
FOREST AGE	CUTTING	GRAZ:	ING	RECVRY POT	PRIORITY*
yng mat old lt			hvy	gd fr pr	hi med lo
Wetland	2		-	-	
Marsh				-	
Meadow				-	
Shrub			." .	-	
Seep	_			-	
Fen				-	-
Bog					_
Pond Shore	_				
Conifer				_	-
Hdw-Cnfr				-	-
Hardwood				-	-
Floodpln				-	_
				_	
	-				
Upland					
Ser Barr	-				
Gras Land	-			-	
Lim Barr					
Rck Glade				-	-
Pine Sav					_ · <u></u>
Oak Sav	<u> </u>				_ :
Pine For	-			_	
Oak For	. <del>-</del>			-	_
Hdw For		<u> </u>		-	
Hdw-Cnfr	: <u></u>				<del>-</del>
Cliff				-	_
				-	
		<del>-</del>			
<b>a a a a</b>	Q	.~			Dato
Ground Survey			Motoba	<u>e Natural</u>	Date: Ouality-Rank
Community Type	<u>Eli</u>	ш <u>шпате</u>	NOCADI	E Marat	Onattra-Vally
Commonta	<del></del>				•
Comments:					

# 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 V.

# THE NATURE CONSERVANCY SPECIAL PLANT SURVEY FORM

Site Name:		•	Date:	Source	Code:
					Code:
			-		Code:
State: Cou	nty:				
	,			Source	Code:
Full extent of EO kno	own and mapped? yes _	no		<del>-</del> -	
	ndividuals or groups mapped		ap? y	es no	
		<b>BIOLOGY</b>			
Element Name:		Flement	Code:		Occ. #:
	Approx. #			Age Structure	Vigor
in leaf	Ramets Genets	1 yd <sup>2</sup>		% seedlings	very feeble
in bud	1-10			% immature	feeble
in flower	11-50			% 1st year	normal
immature fruit	51-100	10-100	00vd²	% mature	vigorous
mature fruit	101-1000			% senescent	exceptionally
_seed dispersing	1001-10,000	2 ac+			vigorous
	10K +	est. ar	ea	÷.	ete.
	est. #				0
Comments on above					
Evidence of reproduc	tion?yesno Explain	):			
	:sexuall				
-	c or parasitic relationships?_				
Evidence of disease,	predation, etcyesn	o Explain:_		<del></del>	
					,
		Each Stage o	of Life C	<u>ycle</u>	
	good fair poor none	uncertain			
reproduction				Comments:	
	<del></del>				
			•		· · · · · · · · · · · · · · · · · · ·
<u>maintenance</u>					
		HABITAT			
			•		
Aspect	Slope <u>Light</u>	Topogra	phic pos	sition Moi	<u>isture</u>
NNE	FlatOpen	Crest		lr	nundated(Hydric)
ENW	0-10Partial	Upper	slope	_s	aturated(Wet-mesic)
SSE	10-35Filtered	Mid-sl	ope		loist(Mesic)
WSW	35 +Shade	Lower	-slope		ry-Mesic
	Vertical	Bottor	n	D	ry(Xeric)
			•		
Elevation:	_feet tofeet		_		
CROSS SECTION	ON OF TOPOGRAPHY (HABI	TAT)-include	<u>e scale, </u>	<u>directions, element</u>	position:

Appendix v (C	oncluded.)
Associated na	tural community/plant community:
Natural commi	unity form completed?yesno
Associated pla	nt species:
Substrate/Soils	s:
	acres of potential habitat for element in immediate area:
	<u>IDENTIFICATION</u>
Photograph tal	ken?yesno
Specimen take	n?yesno If yes, give coll. # & repository:
	bers of this genus occur at this site?yesno If yes, complete below:
Hybridiz	ation?yesno
Identific	ation problems?yesno
	<u>CONSERVATION</u>
Evidence of dis	sturbance:
Threats to EO:	
How large an a	area is needed to provide species survival here?
Exp	lain:
Conservation/r	management needs:
Research need	s:
	yesno If yes, explain:
	<u>SUMMARY</u>
EO Quality:	(i.e., how representative is this occurrence on rangewide scale? Consider the size &
	productivity of the population & the vitality & vigor of the individuals.)
	<u>A</u> -Excellent <u>B</u> -Good <u>C</u> -Marginal <u>D</u> -Poor
EO Condition:	Comments:  (i.e., is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat
LO CONGIGION.	to recover from past disturbances?)
	<u>A</u> -Excellent <u>B</u> -Good <u>C</u> -Marginal <u>D</u> -Poor
	Comments:
EO Viability:	(i.e., what are the long-term prospects for continued existence of this occurrence at the
	indicated level of quality?) <u>A</u> -Excellent <u>B</u> -Good <u>C</u> -Marginal <u>D</u> -Poor
	Comments:
EO Defensibilit	<u>v</u> : (i.e., can this occurrence be protected from extrinsic human factors?) <u>A</u> -Excellent <u>B</u> -Good <u>C</u> -Marginal <u>D</u> -Poor
	Comments:
EO Rank:	(i.e., a summary of all the factors listed above) $\underline{A}  \underline{B}  \underline{C}  \underline{D}$
	Comments:

# APPENDIX VI. CLASSIFICATION OF NATURAL COMMUNITIES IN PENNSYLVANIA (1995 DRAFT)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
ESTUARINE COMMUNITIES			
DEEPWATER SUBTIDAL COMMUNITY SHALLOW-WATER SUBTIDAL COMMUNITY FRESHWATER INTERTIDAL MUDFLAT FRESHWATER INTERTIDAL MARSH	EAA EAB EBA ECA	G? G? G3G4 G3G4	S1 S1 S1 S1
RIVERINE COMMUNITIES			
LOW-GRADIENT EPHEMERAL/INTERMITTENT CREEK LOW-GRADIENT CLEARWATER CREEK LOW-GRADIENT CLEARWATER RIVER LOW-GRADIENT BROWNWATER CREEK MEDIUM-GRADIENT EPHEMERAL/INTERMITTENT CREEK MEDIUM-GRADIENT CLEARWATER CREEK MEDIUM-GRADIENT CLEARWATER RIVER MEDIUM-GRADIENT BROWNWATER CREEK HIGH-GRADIENT EPHEMERAL/INTERMITTENT CREEK HIGH-GRADIENT CLEARWATER CREEK HIGH-GRADIENT CLEARWATER RIVER HIGH-GRADIENT CLEARWATER RIVER HIGH-GRADIENT BROWNWATER CREEK WATERFALL AND PLUNGEPOOL SPRING COMMUNITY	RAA RAB RAC RAD RBA RBB RBC RCA RCB RCC RCD RDA REA REB	G G G G G G G G G G G G G G G G G G G	S5 S3S4 S2S3 S5 S3 S7 S3 S5 S3 S7 S3 S7 S3 S2 S3 S2 S3 S5 S3 S5 S3 S5 S3 S5 S3 S5 S5 S5 S5 S5 S5 S5 S5 S5 S5 S5 S5 S5
LACUSTRINE			
ACIDIC GLACIAL LAKE CALCAREOUS GLACIAL LAKE NONGLACIAL LAKE ARTIFICIAL LAKE NATURAL POND ARTIFICIAL POND STABLE NATURAL POOL EPHEMERAL/FLUCTUATING NATURAL POOL ARTIFICIAL POOL EPHEMERAL/FLUCTUATING LIMESTONE	LAAA LAAB LAC LBA LBB LCA LCB	G? G? * G? * G? * G?	S2S3 S1 S2 * S2S3 * S? S2
SINKHOLE	LCD	G?	S1

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
PALUSTRINE COMMUNITIES			
ACIDIC BROADLEAF SWAMP CIRCUMNEUTRAL BROADLEAF SWAMP BOREAL CONIFER SWAMP NORTHERN CONIFER SWAMP BROADLEAF-CONIFER SWAMP FLOODPLAIN SWAMP EASTERN CALCAREOUS SEEPAGE SWAMP ACIDIC SHRUB SWAMP CIRCUMNEUTRAL SHRUB SWAMP GRAMINOID MARSH ROBUST EMERGENT MARSH MIXED GRAMINOID-ROBUST EMERGENT MARSH CALCAREOUS MARSH OLIGOTROPHIC GLACIAL KETTLEHOLE BOG WEAKLY MINEROTROPHIC LAKESIDE BOG NONGLACIAL BOG RECONSTITUTED BOG POOR (GRAMINOID) FEN SHRUB (CALCAREOUS) FEN BASIN GRAMINOID-FORB (CALCAREOUS) FEN HILLSIDE GRAMINOID-FORB (CALCAREOUS) FEN NORTHERN APPALACHIAN CIRCUMNEUTRAL SEEP NORTHERN APPALACHIAN CALCAREOUS SEEP RIVERSIDE SEEP	PAA PAB PAC PAD PAE PAF PAG PAH PAJ PBA PBB PBC PCAA PCB PCD PCDA PDB PCC PDA PDB PCC PDA PDB PEC PED	G? G?? G?? G.? G.? G.? G.? G.? G.? G.? G	\$2\$3 \$2\$3 \$3\$4 \$3\$4 \$3\$4 \$1 \$3 \$3 \$2 \$2 \$3 \$3 \$3 \$2 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3
TERRESTRIAL COMMUNITIES  NORTHERN CONIFER FOREST  NORTHERN HARDWOOD (DECIDUOUS) FOREST	TBA TBB	G5 G?	S3S4 S3S4
NORTHERN HARDWOOD-CONIFER FOREST XERIC CENTRAL HARDWOOD (DECIDUOUS) FOREST XERIC CENTRAL CONIFER FOREST XERIC CENTRAL HARDWOOD-CONIFER FOREST RIDGETOP DWARF-TREE FOREST DRY-MESIC ACIDIC CENTRAL FOREST DRY-MESIC CALCAREOUS CENTRAL FOREST MESIC CENTRAL FOREST TALUS SLOPE FOREST COASTAL PLAIN FOREST FLOODPLAIN FOREST RIVER GRAVEL COMMUNITY MESIC SCRUB OAK-HEATH-PITCH PINE BARRENS EASTERN SERPENTINE BARRENS	TBC TCA TCB TCC TCD TCE TCF TCG TCH TEA TFA TGA TCDA THA	G? G? G4 G? G?	S3 S5 S3S4 S3 S2S3 S5 S2S3 S2 S2? S1 S2 S4S5 S1 S1

Appendix VI (Continued.)

COMMUNITY NAME	MAP CODE	GLOBAL RANK*	STATE RANK*
CENTRAL APPALACHIAN SHALE BARREN NORTHERN APPALACHIAN SHALE BARREN NORTHERN APPALACHIAN SAND BARREN NORTHERN APPALACHIAN BOULDER FIELD NORTHERN APPALACHIAN CALCAREOUS CLIFF NORTHERN APPALACHIAN ACIDIC CLIFF NORTHERN APPALACHIAN SHALE CLIFF RIVERSIDE OUTCROP/CLIFF NORTHERN APPALACHIAN TALUS WOODLAND	THBA THBB THC THD THE THF THG THJ	G; G; G;	S1 S2 S? S5 S2 S5 S2 S1S2 S?
NORTHERN APPALACHIAN ACIDIC ROCKY SUMMIT		G?	S2
NORTHERN APPALACHIAN CALCAREOUS ROCKY SUMMIT CALCAREOUS ROCKY SLOPE CALCAREOUS RIVERSIDE OUTCROP LAKE SEDIMENT SLUMP EASTERN GREAT LAKES BEACH COMMUNITY EASTERN GREAT LAKES DUNE COMMUNITY EASTERN GREAT LAKES SAND PLAINS COMMUNITY EASTERN GREAT LAKES BLUFF/CLIFF COMMUNITY SUBTERRANEAN COMMUNITIES  SOLUTION CAVE TERRESTRIAL COMMUNITY SOLUTION CAVE AQUATIC COMMUNITY	TJD SAA SAB	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	S1 S? S1 S? S? S? S?
TECTONIC CAVE COMMUNITY TALUS CAVE COMMUNITY	SAC SAD	G? G?	S3S4 S2S4
DISTURBED COMMUNITIES			i.
BARE SOIL MEADOW/PASTURELAND CULTIVATED LAND SUCCESSIONAL FIELD YOUNG MISCELLANEOUS FOREST CONIFER PLANTATION	DAA DAB DAC DAD DAE DAF	  	  

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

## APPENDIX VII SPECIAL PLANTS AND ANIMALS OF LACKAWANNA COUNTY

#### PLANTS

## SCIENTIFIC NAME

<u>Andromeda</u> polifolia Arceuthobium pusillum <u>Carex</u> <u>disperma</u> <u>Carex lasiocarpa</u> Carex limosa Carex paupercula Elatine minima Eleocharis olivacea Eleocharis robbinsii <u>Epilobium</u> palustre Gaultheria hispidula Glyceria borealis Helianthemum bicknellii Juncus filiformis Ledum groenlandicum Lupinus perennis Lygodium palmatum Minuartia glabra Myrica gale Najas gracillima Orontium aquaticum <u>Oryzopsis</u> <u>pungens</u> Potamogeton perfoliatus Potamogeton robbinsii Potentilla tridentata Prunus pumila Scirpus ancistrochaetus <u>Utricularia</u> purpurea

### COMMON NAME

Bog-rosemary Dwarf Mistletoe Soft-leaved Sedge Slender Sedge Mud Sedge Bog Sedge Small Waterwort Capitate Spike-rush Robbins' Spike-rush Marsh Willow-herb Creeping Snowberry Small-floating Manna-grass Bicknell's Hoary Rockrose Thread Rush Common Labrador-tea Lupine Hartford Fern Appalachian Sandwort Sweet Bayberry Bushy Naiad Golden Club Slender Mountain-ricegrass Clasping-stemmed Pondweed Flat-leaved Pondweed Three-toothed Cinquefoil Sand Cherry Northeastern Bullrush Purple Bladderwort Northern Yellow-eyed Grass

## ANIMALS

### SCIENTIFIC NAME

Xyris montana

Ardea herodias
Carterocephalus palaemon
Chaetaglaea cerata
Chaetaglaea tremula
Dorocordulia lepida
Epiglaea apiata
Erynnis persius persius
Gallinula chloropus
Incisalia irus
Lutra canadensis

## COMMON NAME

Great Blue Heron
Artic Skipper
A Sallow Moth
Barrens Chaetaglaea
Elegant Skimmer
Pointed Sallow
Persius Duskywing
Common Gallinule
Frosted Elfin
River Otter

Myotis leibii Myotis septentrionalis Podilymbus podiceps Tachopteryx thoreyi Eastern Small-footed Bat Northern Long-eared Bat Pied-Billed Grebe Thorey's Grayback Dragonfly

### APPENDIX VIII

# NAMES OF COMMON PLANT SPECIES REFERRED TO IN TEXT

# COMMON NAME/NATIVE PLANTS

alder buckthorn American beech American chestnut arrowhead ash aspens quaking aspen balsam fir birches: black/sweet gray yellow black gum black huckleberry blueberry highbush blueberry lowbush blueberry blueflag iris bur-reed brachyelytrum grass buttonbush Canada mayflower cattail cherries black cherry sand cherry cottonwood cotton-grass cranberry duckweed eastern hemlock (=hemlock) false Solomon's seal ferns: cinnamon fern ostrich fern sensitive rockcap fern fragrant water-lily goldenrods grass-leaved goldenrod hackberry hickory huckleberry black huckleberry impatiens

Indian grass

### SCIENTIFIC NAME

Rhamnus franqula Fagus grandifolia Castanea dentata <u>Sagittaria</u> Fraxinus spp. Populus sp. Populus tremuloides Abies balsamea Betula spp. <u>Betula lenta</u> Betula populifolia Betula alleghaniensis Nyssa sylvatica Gaylussacia baccata <u>Vaccinium</u> spp. Vaccinium corymbosum Vaccinium angustifolium <u>Iris versicolor</u> Sparganium sp. Brachyelytrum erectum Cephalanthus occidentalis Maianthemum canadense Typha latifolia

Prunus serotina
Prunus pumila
Populus deltoides
Eriophorum sp.
Vaccinium sp.
Lemna sp.
Tsuga canadensis
Smilacina trifolia

Osmunda cinnamomea

Matteucia struthiopteris
Onoclea sensibilis
Polypodium virginianum
Nymphaea odorata
Solidago spp.
Solidago graminifolia
Celtis occidentalis
Carya spp.
Gaylussacia spp.
Gaylussacia baccata
Impatiens sp.
Sorghastrum nutans

maleberry	<u>Lyonia ligustrina</u>
maples:	
red	Acer rubrum
silver	Acer saccharinum
sugar	Acer saccharum
marsh marigold	Caltha palustris
mountain-ash	Sorbus americana
mountain laurel	Kalmia latifolia
naiad	Najas sp.
oaks:	najas sp.
black	<u>Quercus velutina</u>
chestnut	Quercus montana (=Q. prinus)
red	Quercus rubra
scrub	Quercus ilicifolia
white	Quercus alba
pickerel-weed	Pontederia cordata
pines ,	Pinus spp.
pitch pine	Pinus rigida
white pine	Pinus sylvestris
pinxter-bush	Rhododendron periclymenoides
pitcher-plant	Sarracenia purpurea
pond-lilies	Nuphar sp.
yellow pond-lily	Nuphar lutea
poverty grass	Danthonia spicata
quillwort	Isoetes spp.
red-cedar	Juniperus virginiana
reed-canary grass	Phalaris arundinacea
rhododendron	Rhododendron maximum
rhodora	Rhododendron canadense
rock sandwort	Minuartia michauxii
sassafras	Sassafras albidum
saxifrage	Saxifraga virginica
sedges	Carex spp., Dulichium spp.
Pennsylvania sedge	Carex pennsylvanica
three-seeded sedge	Carex trisperma
three-way sedge	Dulichium arundinaceum
tussock sedge	Carex stricta
serviceberry	Amelanchier spp.
shadbush	Amelanchier spp. Glyceria acutiflora
sharp-fruited manna grass	Alopecurus aequalis
short-awned foxtail grass	
skullcap	<u>Scutellaria</u> spp. <u>Alnus incana</u>
speckled alder	Sphagnum spp.
sphagnum (mosses)	
spiraea	<u>Spiraea</u> spp. <u>Hypericum punctatum</u>
spotted StJohn's-wort	<u>Drosera</u> spp.
sundews roundleaf	<u>Drosera</u> rotundidfolia
swamp dewberry	Rubus pubescens
<del>-</del>	Comptonia peregrina
sweet-fern	Platanus occidentalis
sycamore	Tanacetum vulgare
tansy	Tanacecum varyare

tape-grass
teaberry
viburnum
water-lily
water-milfoil
water shield
water-weed
water-willow
white snakeroot
whorled loosestrife
wild phlox
wild pinks
winterberry

# COMMON NAME/NON-NATIVE PLANTS

garlic mustard
Japanese honeysuckle
japanese hops
Japanese knotweed
Oriental bittersweet
purple loosestrife
tree-of-heaven

Vallisneria americana
Gaultheria procumbens
Viburnum
Nymphaea spp.
Myriophyllum spp.
Brasenia schreberi
Elodea spp.
Decodon verticillatus
Eupatorium rugosum
Lysimachia quadrifolia
Phlox subulata
Silene caroliniana
Ilex verticillata

Alliaria officinalis
Lonicera japonica
Humulus japonicus
Polygonum cuspidatum
Celastrus orbiculatus
Lythrum salicaria
Ailanthus altissima



# A NATURAL AREAS INVENTORY OF LACKAWANNA COUNTY, PENNSYLVANIA UPDATE 2003

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

for

The Lackawanna Heritage Valley Authority 1300 Old Plank Road Mayfield, PA 18433

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# **Lackawanna County Natural Areas Inventory Update**

### Introduction

The original Lackawanna County Natural Areas Inventory (NAI), which was completed in 1997, 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 Federally, or 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. Even with additional fieldwork completed since the original Lackawanna NAI report was written, the top sites listed as top priorities in the original report are still considered 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 two new sites discovered since 1997. 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.

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. Appendix 1 contains descriptions of state and global rank codes, and Appendix 2 contains descriptions of population quality ranks.

The results presented in the update follow that of the original Lackawanna County NAI. There are tables for each USGS quadrangle map listing all new or updated elements by their PA Natural Diversity Inventory (PNDI) code. The corresponding page number from the original NAI is given for each USGS quadrangle table. Each table provides the original report code, global and state rarity ranks, state legal status, site quality, date last observed for each element, and the status of each element occurrence (i.e. delisted, new, rank change). Following the table is a brief narrative for each site, noting whether it is a NEW occurrence or an UPDATE. Original sites in the report not containing any UPDATES were not included in the narrative section under the respective quadrangle.

All original natural communities and species of concern are coded and described in the tables and text. The codes are PNDI map codes that are unique to each element on a given USGS topographic map. Sensitive species are identified by code to prevent unauthorized collection and possible extirpation

of the species at the site. Where the original report did not name any element occurrences, the update names all plants and natural communities under the USGS Quadrangle table and responding text. The natural communities are identified by NC, plants by SP, and animals by SA. All are followed by a three-digit code. New element occurrences do not contain these codes. Areas not updated are included in the table for each quad but not included in the text.

Sections of USGS maps accompany the text, showing the location of each NEW site identified (e.g.,) or sites whose boundaries have been changed to include a new species (e.g.,). The maps for updated sites with unchanged boundaries are only included as supplemental information within maps of sites where borders have been changed. 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. This report is intended to be used as a reference for general planning purposes. It is not a replacement for consultation of the PNDI database for environmental review. 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 Bud Sechler, County Inventory Ecologist, at the address on the title page.

Table 1. The sites of statewide significance for the protection of biological diversity in Lackawanna 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.

New Rank <sup>1</sup>	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
1	1	BEAR LAKE/GRASSY POND (Thornhurst Twp.)	Pleasant View Summit/ Thornhurst	This site includes a new population of Serviceberry (Amelanchier humilis), a S1 plant species found on a scrub oak-heath barrens with thin rocky dry acidic soil. It also includes a good quality example of an Acidic Glacial Lake NC (NC523) with clear water and low nutrient levels. Bear Lake and nearby Grassy Pond support a small population of Common Labrador Tea (Ledum groenlandicum), and Sweet Gale (Myrica gale), two plant species of concern. In addition, an undetermined population of G5 S3 animal species of special concern was found here. Also occurring here are two populations of Bright Green Spike-Rush (Eleocharis olivacea), a delisted plant, two populations of Purple Bladderwort (Utricularia purpurea), another delisted plant, and one population of Goldenclub (Orontium aquaticum), an additional delisted plant species. These species will be removed from the species of concern list for this site.
1	2	ENGLISH SWAMP (Clifton and Covington Twps.)	Sterling	This site contains a <b>Boreal Conifer Swamp NC</b> (NC514). This swamp is a relatively undisturbed peatland with five rare and threatened plant elements. Maintaining a wooded buffer and preventing colonization by invasive species will help maintain the integrity of the site.
2	2	BALD MOUNTAIN (Newton and Ransom Twps.)	Ransom/Scranton	This site includes a good to fair quality Ridgetop Dwarf-Tree Forest NC (NC501), and an Acidic Rocky Summit (NC505). One new plant species, Serviceberry (Amelanchier humilis), has been added to the list of plants of special concern since the original report was written. Three additional plant species of special concern have been documented at Bald Mountain, including Slender Mountain-Ricegrass (Oryzopsis pungens), an S2 Pennsylvania plant species of concern, Three-toothed Cinquefoil (Potentilla tridentata), an S1 Pennsylvania endangered plant, and Appalachian Sand Cherry (Prunus pumila var susquehanae), a G5 S3 plant species of concern.
2	2	BEAR SWAMP- MOSCOW (Roaring Brook Twp.)	Moscow	This site includes a good quality example of a <b>Broadleaf-Conifer Swamp NC</b> (NC520). It contains fair to good and fair populations of two plant species of concern, <b>Soft-leaved Sedge</b> ( <i>Carex disperma</i> ), and <b>Common Labrador-Tea</b> ( <i>Ledum groenlandicum</i> ), respectively (SP521 & SP522). Keeping the surrounding upland woods intact will help maintain the hydrologic regime and water quality essential to the integrity of this NC.

New Rank <sup>1</sup>	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
3	3	AD 431 MINE- RIVERDRIFT (Archbald and Jessup Boros.)	Olyphant	This site is a coal mine which supports a <b>G3 and G4 animal species</b> of concern.
3	3	ATHERTON POND (Dalton Bor., Glenburn, and West Abington Twps.)	Dalton Factoryville	This site contains a dense shrub swamp and is home to two plant species of concern, <b>Bog-Rosemary</b> ( <i>Andromeda polifolia</i> ), a G5 S3 species, and another plant species of concern, a G3 S3 species. In addition, <b>an S3S4B, S4 animal species of concern</b> was found here as well. All these species depend upon a unique sub-habitat type occurring here. The survival of these species depends on minimizing disturbance to the swamp and to the adjacent woods.
3	3	BALSAM SWAMP- Lackawanna (Thornhurst Twp.)	Pleasant View Summit	This site includes a <b>Boreal Conifer Swamp NC</b> and also supports an excellent to good population of <b>Common Labrador-Tea</b> ( <i>Ledum groenlandicum</i> ), a PR plant species. It is characterized by an open canopy of Eastern Larch and Red Spruce which grow above the mostly ericaceous shrubs and the sphagnum-covered hummocks. The swamp is located partly within <b>Lackawanna State Forest</b> .
3	3	BRZOSTEK SWAMP (Benton Twp.)	Dalton	This site includes a medium-sized, mature, good quality <b>Broadleaf Conifer Swamp NC.</b> It supports a small but healthy population of <b>Soft-leaved Sedge</b> ( <i>Carex disperma</i> ), a PR plant species. Further surveys are encouraged, as the site has good potential for other species of concern.
3	3	DALEVILLE SWAMP (Covington Twp.)	Moscow	This site includes a fair quality example of a <b>Broadleaf Conifer Swamp NC</b> that is dominated by Eastern Hemlock, Yellow Birch, and Red Maple, with ash and Red Spruce also present. Rhododendron forms a dense shrub layer, with winterberry and speckled alder. Herbs, mosses, sedges, and grasses cover the ground. The swamp receives little direct disturbance but nutrient input form adjacent developments could be a threat. This site has high potential for rare species
	3	DUNMORE BALD (Dunmore Boro.)	Olyphant	Once a separate site, this area is now contained within the super site <b>Moosic Mountains Barrens</b> and will no longer stand alone as a statewide significant site. Within this site is an <b>Acidic Rocky Summit NC</b> (NC525) and is located at the south end of the <b>Moosic Mountain Barrens</b> . The barrens as a whole are considered to be one of the top priorities for conservation in the county. Dunmore Bald is dominated by low shrubs and herbs. It has a good potential for several species of concern.

New Rank¹	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
3	3	NEWTON LAKE/MUD POND (Greenfield Twp.)	Carbondale Clifford	This site includes an artificially deepened natural lake that is divided into two parts and connected by a narrow strait. Mud Pond, the southern portion, includes several acres of emergent peat mat dominated by graminoids and low shrubs, which grades into a red maple swamp. This site has three former Pennsylvania plant species of concern that are now delisted. Included as delisted species are Bright Green Spike-Rush (Eleocharis olivacea), Fern-leaved Pondweed (Potamogeton robbinsii), and Purple Bladderwort (Utricularia purpurea). This site contains a fair population of Slender Sedge (Carex lasiocarpa), and a good population of Mud Sedge (Carex limosa). This site still contains a good-quality population of Robbins Spike-rush (Eleocharis robbinsii), a S2 Pennsylvania threatened plant species of concern on one side of Mud Pond. A good population of Bog-Rosemary (Andromeda polifolia), a G5 S3 Pennsylvania plant species of concern, was found at an acidic glacial lake.
3	3	NINES POND (Thornhurst Twp.)	Thornhurst	This site includes a <b>Natural Pond NC</b> , comprised of two natural ponds set in a mixed hardwood matrix. These ponds support a fair to good population of <b>Small-floating Manna Grass</b> ( <i>Glyceria borealis</i> ), a PA-Endangered plant species. This site also contains a marginal population of <b>Short-awned foxtail grass</b> ( <i>Alopecurus aequalis</i> ), a species recorded here in 1996, but since has been listed as a Pennsylvania plant species of concern. These ponds will be best protected by leaving them in their current condition and maintaining an adequate forest buffer in their immediate watershed. This site is within <b>Lackawanna State Forest</b> .
3	3	POTTER CREEK BOG (Madison Twp.)	Sterling	This site includes a well-structured, 100 acre Oligotrophic Glacial Kettlehole Bog NC (NC543) with a substantial buffer and little disturbance. This natural community supports a fair to good population of Slender Sedge (Carex lasiocarpa), an S3 plant species of concern, a fair to good population of Bog Sedge (Carex paupercula), an S3 plant species of concern, and a fair population of Common Labrador-Tea (Ledum groenlandicum), an S3 plant species of concern. There is a high potential to maintain the quality of the site, provided beaver activity is monitored.
3	3	SADLER AVE AMLF #2 SITE (Dunmore Boro. and Scranton City)	Scranton	This site includes a mine that is habitat for a G3 and G4 anin species.

New Rank <sup>1</sup>	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
3	NEW	SUSQUEHANNA RIVER/WOODS (Ransom Twp, Newton Twp, and Luzerne & Wayne Counties)	Ransom, Pittston	An undetermined population of a <b>Pennsylvania animal species of concern</b> was found on this site in the uplands next to the Susquehanna River. More surveys are needed to assess the population of the species. In addition, a fair population of a <b>S3S4 Pennsylvania animal species of concern</b> was found in parts of the Susquehanna River. This site also contains a fair to good quality population of <b>Prostrate Sand Cherry</b> ( <i>Prunus pumila var. depressa</i> ), an S1 Pennsylvania plant species of concern.
3	3	STAFFORD BALD (Moosic Boro., Scranton City and Roaring Brook Twp.)	Avoca Scranton	This site includes a fair to good quality Ridgetop Dwarf-Tree Forest and Northern Appalachian Acidic Rocky Summit NC's. It occurs on a wide ridgetop surrounded by mixed hardwood forest. Two plants, including a fair population of Appalachian Sandwort (Minuartia glabra), a G4 S2 plant species of concern, and a G3 S3 plant species of concern, occur at this site. In addition, a good population of Persius duskywing (Erynnis persius persius), an S1S2 animal species of concern, and a good population of Frosted Elfin (Incisalia irus), an S2 animal species of concern, were found at this site.
4	4	AMERICA SWAMP (Thornhurst Twp.)	Pleasant View Summit	This site includes a boreal conifer swamp that supports a small but vigorous population of <b>Common Labrador-Tea</b> ( <i>Ledum groenlandicum</i> ), a G5 S3 plant species of concern. This swamp is within a large forested area and there is no evidence or immediate threat of disturbance. It is located within <b>Lackawanna State Forest</b> .
4	4	CARPENTER SWAMP (Scott Twp.)	Dalton	This wetland includes a swamp that is home to a G4 S3 animal species of special concern. More survey work is needed.
4	4	CORBY SWAMP (Newton Twp.)	Ransom Scranton	The open water and marsh habitats of this disturbed site provides breeding habitat for one G5 S3B animal species of concern, and one S3B, S4N animal species of concern. The Lackawanna Audubon Society owns the site and maintains a trail open to the public.
4	4	ELMHURST MUD POND (Jefferson and Roaring Brook Twps.)	Olyphant	This pond contains one former Pennsylvania S4 plant species of concern, Bright Green Spike-Rush ( <i>Eleocharis olivacea</i> ), which is now delisted and will be removed from the species of concern list for this site. However, this site still supports a fair population of Slender Sedge ( <i>Carex lasiocarpa</i> ), a G5 S3 Pennsylvania plant species of concern, Mud Sedge ( <i>Carex limosa</i> ), a G5 S2 Pennsylvania plant species of concern, and Northern Yellow-eyed Grass ( <i>Xyris montana</i> ), a G4 S3 Pennsylvania Rare plant species. This site also includes the remnant of a bog or swamp community that has been disturbed by the construction of a dam at the outlet.

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4	4	MONTAGE ROCKY SUMMIT (Scranton City)	Avoca	This site includes a fair-quality example of a "Northern Appalachian Acidic Rocky Summit NC". It supports a large population of Appalachian Sandwort ( <i>Minuartia glabra</i> ), a G4 S2 Pennsylvania-threatened plant species. Development nearby is a potential threat.
4	3	disturbance to the island and in the area vegetation will help protect these speciarea also contains three former Pennsyl of concern, Fern-leaved Pondwe robbinsii), Bright Green Spike-olivacea), and Purple Bladderw purpurea) that are all now delisted SP518). The site still contains two		olivacea), and Purple Bladderwort (Utricularia purpurea) that are all now delisted (SP512, SP509, SP518). The site still contains two Pennsylvania plant species of concern, Slender Sedge (Carex lasiocarpa), and
4	4	PAINTER CREEK BOG (Spring Brook and Thornhurst Twps.)	Avoca Pleasant View Summit	This site contains a fair quality <b>Oligotrophic Glacial Kettlehole Bog NC</b> that supports a fair quality population of <b>Mud Sedge</b> ( <i>Carex limosa</i> ), an S3 plant species, and has good potential for additional rare species. The bog is undisturbed and the main threats are flooding by beaver and logging within the primary watershed. It is located within the <b>Lackawanna State Forest.</b>
4	3/4	PANTHER HILL SITE (Clifton, Thornhurst, & Spring Brook Twps.)	Moscow	This site is located southwest of Watres Reservoir, and includes a fair to good quality <b>Acidic Rocky Summit NC</b> . Only the northern end of the ridge was surveyed for this study and further work is encouraged.
	4	SALEM HILL BARREN (Carbondale Twp and Wayne Co.)	Waymart	Once a separate site, this area is now contained within the super site Moosic Mountains Barrens and will no longer stand alone as a statewide significant site. This site includes a <b>Ridgetop Dwarf-Tree Forest</b> NC persisting on a disturbed site. Although no species of concern have been identified, there is potential habitat for rare moth and butterfly species and surveys for these species are recommended.
4	4	WYOANNA CLIFFS (Newton Twp. And Luzerne Co.)	Ransom	This site contains a new small population of <b>Round-leafed Serviceberry</b> ( <i>Amelanchier sanguinea</i> ), an S1 Pennsylvania plant species of concern. This plant was found along a cliff community w/ open rock outcrops & open canopy of oaks, red maple & a sparse shrub layer dominated by lowbush blueberry. Also included here is a fair to good quality <b>Acidic Cliff NC</b> that rises five hundred feet above the North Branch of the Susquehanna River. One plant species of special concern may occur at the site but further surveys are needed to verify this occurrence. Maintaining the woodland buffer along the upper edge of the cliffs is critical.

New Rank¹	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
5	5	ARCHBALD POTHOLE (Archbald Boro.)	Carbondale	This <b>geologic feature</b> has evidence of the glaciers that once covered Lackawanna County. It was created by the scouring of gravel-laden meltwater. At over 40 feet deep, it is one of the largest natural potholes known in the world (Geyer and Boyles, 1979).
5	5	(Thornhurst Twp. and Luzerne Co.)  Summit  filiformis), a PA rare plant whose q from a small population to a good po observations. In addition, since the written, an undetermined populate Gentian (Gentiana linearis), an concern, was found in the swam maintains some of the openings requirencessive use could harm some of the		This site contains a population of <b>Thread Rush</b> ( <i>Juncus filiformis</i> ), a PA rare plant whose quality rank has changed from a small population to a good population based on recent observations. In addition, since the original report was written, an undetermined population of <b>Narrow-leafed Gentian</b> ( <i>Gentiana linearis</i> ), an S3 plant species of concern, was found in the swamp. Trail use currently maintains some of the openings required by the rush although excessive use could harm some of the population. This site is located within Lackawanna State Forest.
5	4	BLUE SHUTTER ROAD SWAMP (Roaring Brook & Spring Brook Twps.)	Moscow	This site contains small populations of two PR plant species, Creeping Snowberry ( <i>Gaultheria hispidula</i> ), and Common Labrador-Tea ( <i>Ledum groenlandicum</i> ), that were found growing in the boreal conifer swamp with red spruce, larch, hemlock, and red maple.
5	4	HORSESHOE SWAMP (Thornhurst Twp.)	Pleasant View Summit	This site includes a boreal conifer swamp with an open canopy and a dense shrub understory including a small population of <b>Common Labrador-Tea</b> ( <i>Ledum groenlandicum</i> ), an S3 plant species of concern. The swamp and surrounding woodlands area state forest lands.
5	4	JOHNSON POND- WESTEND POND COMPLEX (Clifton, Covington Twps, and Wayne Co.)	Sterling Tobyhanna	This site includes a series of artificial ponds along the Lehigh River and adjacent tributaries. A good population of <b>Bog Sedge</b> ( <i>Carex paupercula</i> ), and a good population of an S2 animal species of concern were found on this site. On the Tobyhanna quadrangle, a large population of a former PA-Rare species, Purple Bladderwort ( <i>Utricularia purpurea</i> ), was found on this site but since has been delisted. Thousands of individual plants of this delisted species were observed in 1996. In addition, an undetermined population of <b>Bushy Naiad</b> ( <i>Najas gracillima</i> ) was found on this site.
5	5	LAKE KEWANEE BOG (Benton Twp.)	Dalton	A very small part of this hemlock swamp, perhaps less than a half acre, is described as a small to fair occurrence of an <b>Oligotrophic Glacial Kettlehole Bog</b> , a G? S3 natural community. Also included in this site are two small populations of plant species of concern, <b>Bog-Rosemary</b> ( <i>Andromeda polifolia</i> ) and <b>Slender Sedge</b> ( <i>Carex lasiocarpa</i> ).
5	NEW	MEYERS MOUNTAIN (Archbald and Scott Twps.)	Carbondale	This new site contains a small population of <b>Serviceberry</b> ( <i>Amelanchier humilis</i> ), a G5 S1 Pennsylvania plant species of concern, and was found on a dry opening on Meyers Mountain Summit in State Game Lands #307.

New Rank¹	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
5	5	MONTAGE MOUNTAIN FOOTHILLS (Moosic Boro.)	Avoca	This site supports a mosaic of hardwood and mixed hardwood-pine forests and shrub thickets. Scattered rock outcroppings and small openings throughout the site support three plant species of special concern. A fair to good population of <b>Lupine</b> ( <i>Lupinus perennis</i> ), a G5 S3 plant species of concern, occurs on this site. Other species of concern in this site include <b>Appalachian Sandwort</b> ( <i>Minuartia glabra</i> ), a G4 S2 plant species, and <b>Slender Mountain-Ricegrass</b> ( <i>Oryzopsis pungens</i> ), a G5 S2 plant species. Rapid development of this site may degrade or extirpate the occurrences of these three plant species.
5	5	MOOSIC BEND LACKAWANNA RIVER (Moosic and Taylor Boros.)	Scranton	This highly disturbed site on the west shore of the Lackawanna River has a small to fair population of <b>Bicknell's Hoary Rockrose</b> ( <i>Helianthemum bicknellii</i> ), a PE plant species.
5	5	NAY AUG GORGE (Scranton City)	Scranton	This <b>geologic feature</b> is part of a municipal park, and includes a gorge and waterfalls on Roaring Brook. The dark walls of the 75 foot deep gorge are made of shales and siltstones (Geyer and Boiles 1987).
5	5	PITTSTON ROAD BOG (Thornhurst Twp.)	Pleasant View Summit	This site contains a fairly open swamp which supports Marsh Willow-Herb ( <i>Epilobium palustre</i> ), a G5 S1 plant species, and Creeping Snowberry ( <i>Gaultheria hispidula</i> ), a G5 S3 plant species of concern. There is good potential for other species of concern at this site. This site is located within Lackawanna State Forest.
5	5	SAND SPRINGS WOODS (Thornhurst Twp.)	Thornhurst	This site includes a forest opening, in which a good population of <b>Hartford Fern</b> ( <i>Lygodium palmatum</i> ), a G4 S3 plant species of concern, and occurs among copses of highbush blueberry. The site is part of the Lackawanna State Forest and no special protection is recommended.
5	5	SASSAFRAS HILL WETLANDS (Thornhurst Twp.)	Thornhurst	A small population of a <b>Common Labrador-Tea</b> ( <i>Ledum groenlandicum</i> ) occurs here. The site is located within Lackawanna State Forest.
5	5	SWARTZ ROAD SWAMP (Spring Brook Twp.)	Moscow	This site contains a fair quality example of a <b>Broadleaf</b> Conifer Swamp Natural Community.
5	5	WEST MOUNTAIN SUMMIT (Newton Twp.)	Scranton	This site is located on West Mountain, a knob on the prominent ridge situated on the west side of the city of Scranton. This site contains populations of <b>Appalachian Sand-Cherry</b> ( <i>Prunus pumila var. susquehanae</i> ), and <b>Slender Mountain Rice-grass</b> ( <i>Oryzopsis pungens</i> ). The populations of these species need to be updated.

New Rank <sup>1</sup>	Original County Rank1	Site Name (Municipality)	USGS Topo. Map	TNC Global and State Ranks <sup>2</sup> , Importance and Recommendations
NONE- Site Removed	5	CHAPMAN LAKE (Scott Twp.)	Carbondale	This site contains a former plant species of concern, Fern-leaved Pondweed ( <i>Potamogeton robbinsii</i> ), which is now delisted and will be removed from the plant species list. This site will be removed from the significant sites in the county.

TABLE 2. Areas of local significance in Lackawanna 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).

Original Rank	County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature and Importance
HIGH	HIGH	LONG SWAMP (Roaring Brook Twp. and Dunmore Boro.)	Olyphant	This site is a 60-acre linear wetland occurring in a narrow stand of eastern hemlock. The surrounding slopes provide a considerable buffer of mixed oak forest. The wetland is comprised of a mosaic of cover types including forested swamp, shrub swamp, graminoid marsh, and cattail-sphagnum mat. This site supports a wide diversity of plants due to the variation in habitat types. The dense hemlock which fills the valley adds scenic value making this site a desirable place for hiking.
HIGH	HIGH	TUNKHANNOC K CREEK (North Abington Twp.)	Dalton	This locally significant area includes a two-mile stretch of creek beginning from the dam at Lackawanna State Park and continuing down stream to the Erie-Lackawanna Railroad. The creek channel is somewhat braided and runs over gravel, sand, and bedrock. The floodplain varies in width from about 100 to 300 feet and is primarily dominated by eastern hemlock, sycamore, and red maple. This site supports a high diversity of nesting and migratory bird species. The sand substrate on certain portions of the floodplain is potential habitat for rare plant species. The water quality of the creek along this stretch has likely declined due to the construction of the dam in the State Park.
HIGH	HIGH	DUNMORE SWAMPS (Jefferson Twp.)	Olyphant	This locally significant site includes three distinct swamps located in (Jefferson Twp.) and is a matrix of scrub-oak and mixed oak forests. Each swamp has a different cover type. The south most swamp is dominated by red spruce and red maple with a dense shrub understory. The north most swamp is dominated by low shrubs and herbs with scattered pitch pine. The third swamp is dominated by eastern larch at one end and by shrubs at the other. Maintaining a forested buffer around these swamps will benefit the species that occur here. Minimal data is available about these wetlands and further surveys are encouraged.
Statewide Significance 4	HIGH	KIZER POND (Jefferson Twp.) UPDATE	Lake Ariel	The three plant species, Small Waterwort (Elatine minima), Fern-leaved Pondweed (Potamogeton robbinsii), and Purple Bladderwort (Utricularia purpurea), have been delisted since the original NAI report was written. However, due to the diversity of birds, being an important watershed and the proximity of this pond to Moosic Mountain, it is deemed locally significant to the county. This pond also has good water quality and is fed by streams flowing down the wooded slopes of Moosic Mountain. Maintaining the woodlands in the watershed will help preserve the quality of this site.

Original Rank	County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature and Importance			
MEDIUM	MEDIUM	FALLBROOK SWAMP (Fell Twp.)	Clifford	This locally significant area is a forty-acre wetland that includes a (Fell Twp.) mosaic of cover types including forested swamp, shrub swamp, emergent marsh, and aquatic. It supports a wide diversity of plant and animal species. The open water areas of the site are a result of a small dam at the outlet. Maintaining a forest buffer around this site will benefit the species that occur here.			
MEDIUM	MEDIUM	MASH CREEK MARSH (Clifton Twp.)	Moscow Thornhurs t	C - 1 '- (Cl'C - T ) The - 1 1 C4-4- C I			
MEDIUM	MEDIUM	PANTHER GORGE (Fell Twp. and Wayne Co.)	Waymart	This site is a steep sloping, forested stream ravine which includes dramatic waterfalls. A high gradient creek flows over an exposed bedrock stream bed between steep slopes of rhododendron and mixed oak forest. This site has received disturbance in the past from the construction of the now abandoned rail line.			
MEDIUM	MEDIUM	BELL MOUNTAIN OUTCROPS (Blakely & Dickson City)	Scranton	This locally significant area is comprised of sandstone and conglomerate outcrops and associated plant communities. The xeric outcrops support associations of stunted trees including chestnut oak, gray birch, red oak, and sweet birch with huckleberries and blueberries. Herbaceous species occurring here are typical of extremely dry conditions. This site has a good potential for species of special concern.			
Statewide Significance 5	MEDIUM	BASSETT POND (Benton Twp.) UPDATE	Dalton	The plant species of concern <b>SP511</b> , <b>Fern-leaved Pondweed</b> ( <i>Potamogeton robbinsii</i> ), which listed in the original NAI report has been removed from the species of concern list. This <b>delisting</b> has consequently resulted in the removal of the site from Table 1, and added to Table 2 as a site of local significance. This natural lake is an important source of water for the Moosic Mountain area. Future site surveys may reveal additional species of concern.			
Statewide Significance 5	MEDIUM	SICKLER POND (Greenfield Twp.) UPDATE	Dalton	The plant species of concern <b>SP514</b> , <b>Fern-leaved Pondweed</b> ( <i>Potamogeton robbinsii</i> ), which listed in the original NAI report has been removed from the species of concern list. This <b>delisting</b> has consequently resulted in the removal of the site from Table 1, and added to Table 2 as a site of local significance. This natural lake is an important source of water for the Moosic Mountain area. Future site surveys may reveal additional species of concern.			

Original Rank	County Rank <sup>1</sup>	Site Name or Code (municipality)	USGS Topo. Map	Natural Feature and Importance
Statewide Significance 5	MEDIUM	MOOSIC LAKE (Jefferson Twp.) UPDATE	Olyphant	The plant species of concern SP512, Goldenclub ( <i>Orontium aquaticum</i> ), listed in the original NAI report has been removed from the species of concern list. This delisting has consequently resulted in the removal of the site from Table 1, and added to Table 2 as a site of local significance. This natural lake is an important source of water for the Moosic Mountain area. Future site surveys may reveal additional species of concern.
Statewide Significance 5	LOW	EAGLE LAKE (a.k.a Henry Lake) UPDATE	Sterling	This site contains a glacial lake surrounded by a vacation-home development. The lake is used for recreational purposes and has heavy use. The plant species of concern SP525, Long-stemmed Waterwort (Elatine americana), listed in the original NAI report has been removed from the species of concern list. This delisting has consequently resulted in the removal of the site from Table 1, and added to Table 2 as a site of local significance. This site contains a "Glacial Natural Lake", and future site surveys may reveal additional species of concern.

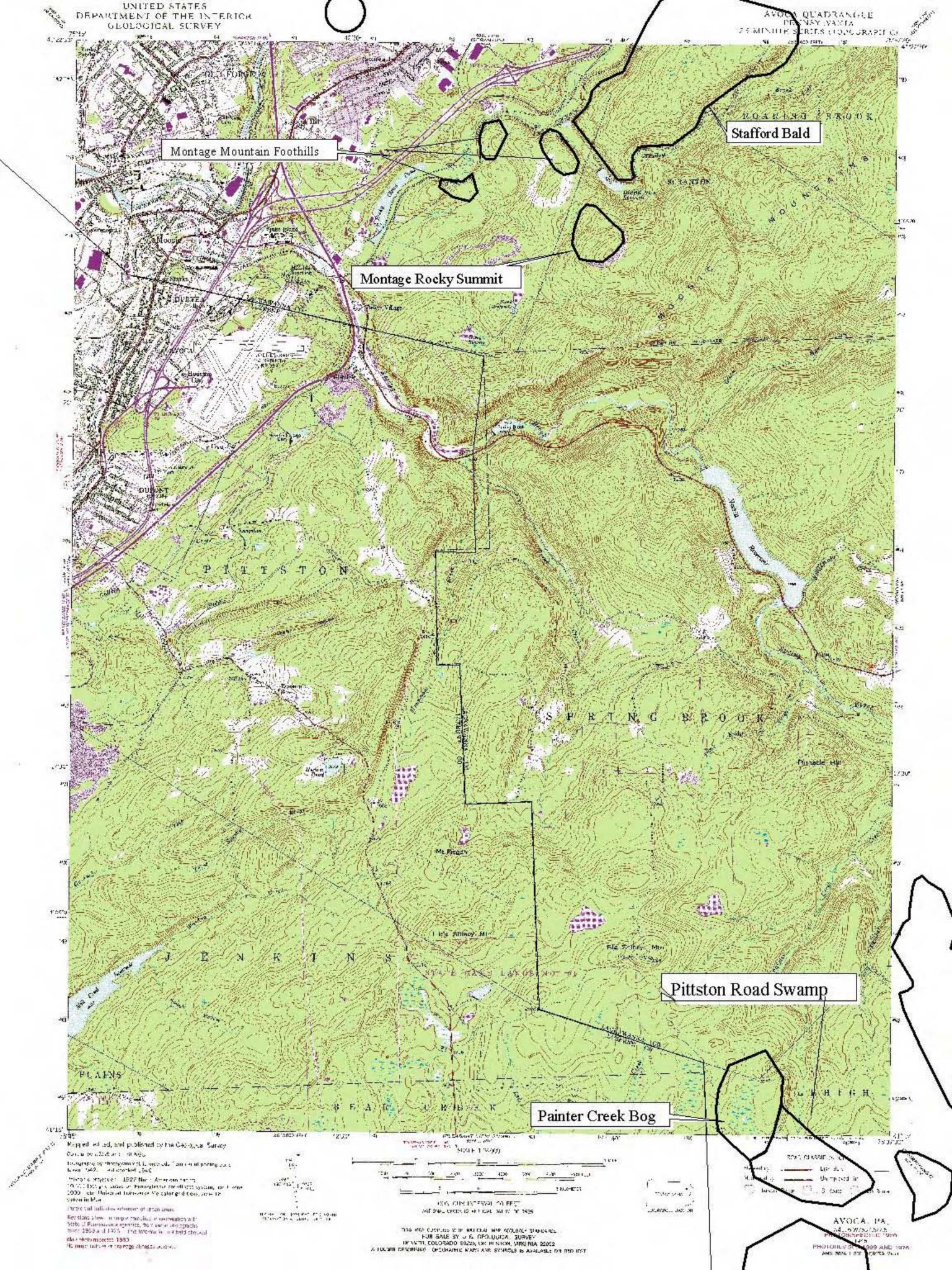
## USGS QUADRANGLE MAP: Avoca

TNC Ranks*							
	Original						Update
Species/Type	Report Code	Global	State	State Status	Last Seen	Quality	Status
Northern Appalachian Acidic	Community						
Rocky Summit Community	NC509	G4	S2S3	N	07-10-96	BC	
	1,000	0.	~_~~		0, 10, 0	Be	
	Community						
Ridgetop Dwarf-tree Forest	NC519	G?	S2S3	N	07-03-96	C	
NI	C						
Northern Appalachian Acidic Rocky Summit Community	Community NC529	G?	S2	N	07-10-96	С	
Rocky Summit Community	11(C32)	0.	52	11	07-10-70		
Slender mountain ricegrass	Plant						
(Oryzopsis pungens)	SP507	G5	S3	PE	06-10-92	C	
	71						
Northeastern bulrush	Plant SP508	G3	S2	PE	07-10-96	C	
(Scirpus ancistrochaetus)	31308	GS	32	PE	07-10-90	C	
Appalachian sandwort	Plant						
(Minuartia glabra)	SP517	G4	S2	PT	07-10-91	В	
Blue lupine	Plant	05	0202		06 10 00	D.C.	
(Lupinus perennis)	SP521	G5	S2S3	PR	06-10-92	BC	
Mud sedge	Plant						
(Carex limosa)	SP527	<i>G5</i>	<b>S</b> 3	TU	07-03-96	С	
·							
Appalachian Sandwort	Plant	~ .	~~		0= 10 0 =		
(Minuartia glabra)	SP528	G4	S2	PT	07-10-96	BC	
	Animal						
Animal	SA503	G5T2	S1S2	N	05-26-88	В	
	Animal						
Animal	SA518	G3	S2	N	05-22-96	В	

## No additional updates or new sites occurred on this quad

HQ-CWF: Bear Creek, Stafford Meadow Brook, Spring Brook

MANAGED AREAS: Lackawanna State Forest, State Game Lands #91



# USGS QUADRANGLE MAP: Carbondale

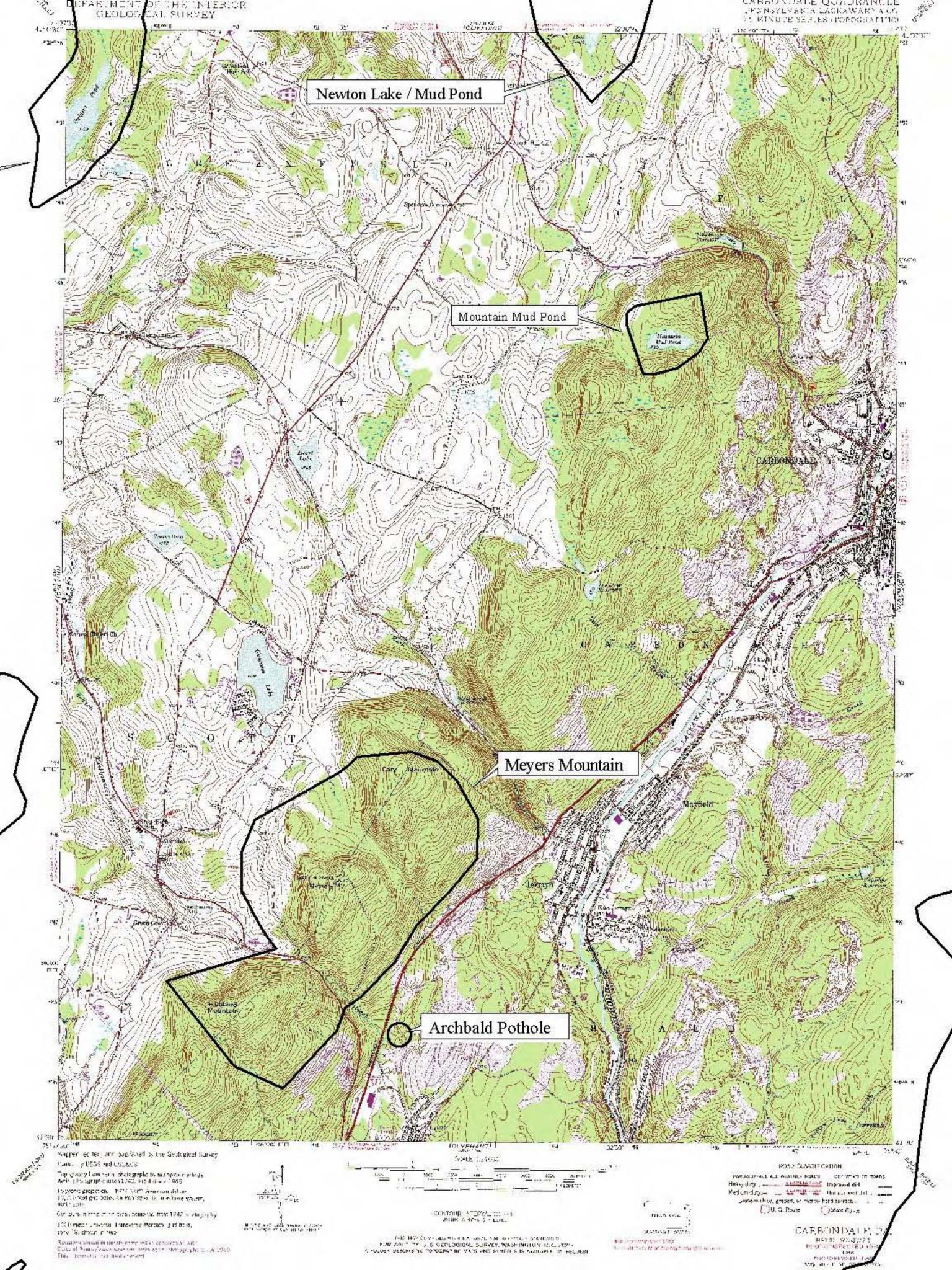
		TNC	Ranks*				
Species/Type	Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Bog-Rosemary (Andromeda polifoia)	SP504	G5	<b>S</b> 3	N	08-06-96	В	
Fern-leaved Pondweed (Potamogeton robbinsii)	SP509	G5	<b>S3</b>	DL	09-14-92	В	Delisted
Slender Sedge (Carex lasiocarpa)	SP510	G5	<b>S</b> 3	N	09-14-92	ВС	
Mud Sedge (Carex limosa)	SP511	G5	S2	N	09-14-92	С	
Bright Green Spike- rush (Eleocharis olivacea)	SP512	<b>G5</b>	S4	N	08-17-93	C	Delisted
Fern-leaved Pondweed (Potamogeton robbinsii)	SP514	G5	S3	DL	08-06-96	C	Delisted
Slender Sedge (Carex lasiocarpa)	SP515	G5	S3	N	08-06-96	С	
Mud Sedge (Carex limosa)	SP516	G5	<b>S</b> 3	N	08-06-96	В	
Bright Green Spike-rush (Eleocharis olivacea)	SP517	<b>G5</b>	<b>S2</b>	DL	08-06-96	E	Delisted
Purple Bladderwort (Utricularia purpurea)	SP518	G5	<b>S4</b>	DL	07-31-96	ВС	Delisted
Fern-leaved Pondweed (Potamogeton robbinsii)	SP519	G5	<b>S3</b>	DL	08-06-96	ВС	Delisted
Purple Bladderwort (Utricularia purpurea)	SP520	G5	<b>S2</b>	DL	08-06-96	В	Delisted
Robbins Spike-Rush (Eleocharis robbinsii)	SP521	G4G5	S2	N	08-06-96	В	
Serviceberry (Amelanchier humilis)		G5	S1	N	08-28-98	D	NEW
Geologic features	GE505	G?	S?	N	1979	Е	

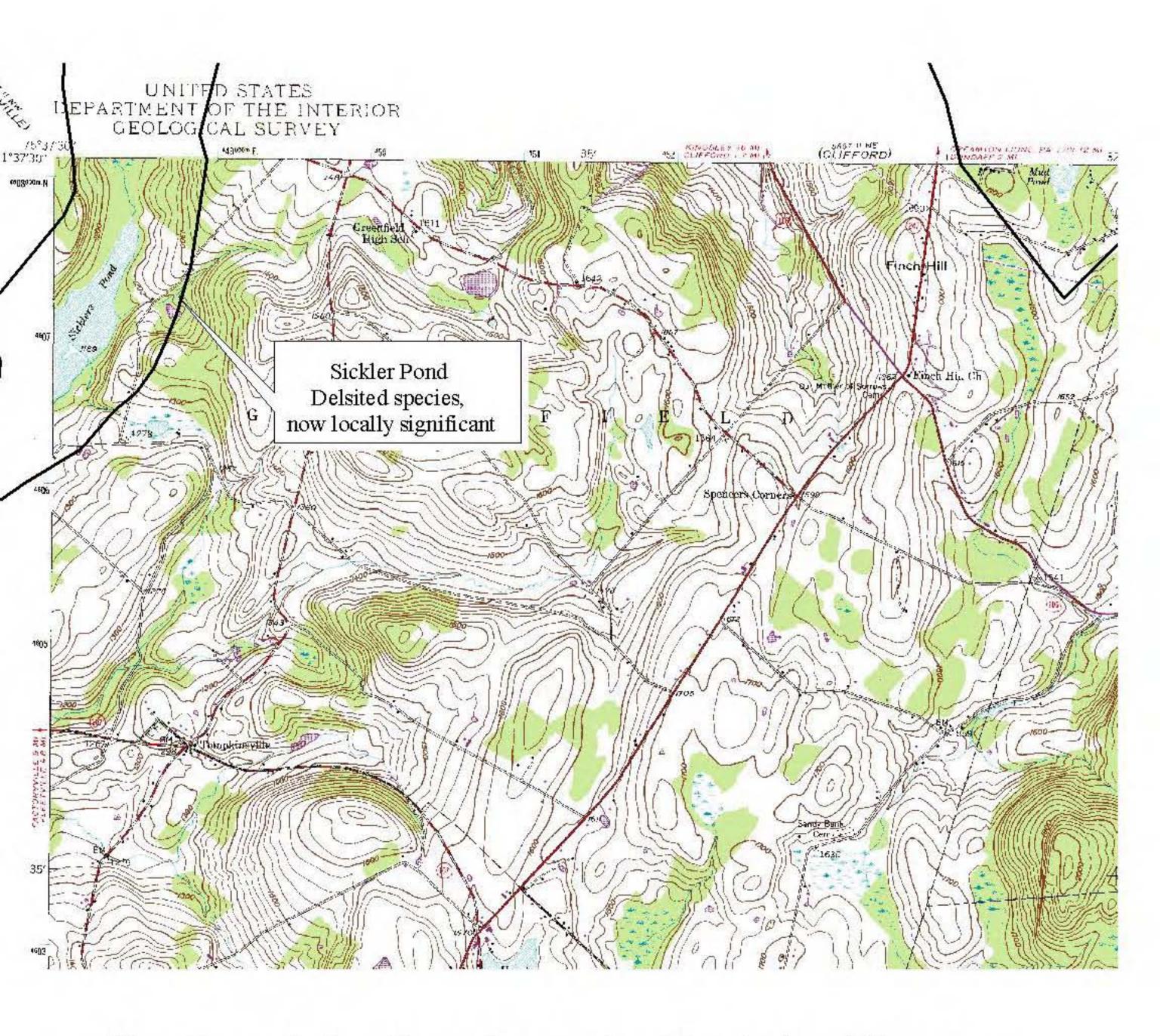
MANAGED AREAS: Archbald Pothole State Park, Merli-Sarnoski County Park, State Game Lands

#300 & #307

OTHER: sp514 - see Dalton quadrangle SP514

Carbondale Map Update Changes Closeup





Carbondale Quadrangle Update Closeup Sickler Pond (Update)

#### Carbondale Quadrangle:

#### Chapman Lake-Update- (Scott Twp.)-SP514

A former Pennsylvania plant species of concern, **Fern-leaved Pondweed** (*Potamogeton robbinsii*), has been removed from the plant species of special concern list, and this site has been removed from the statewide significant sites in the county.

#### **MEYERS MOUNTAIN-NEW- (Archbald and Scott Twps)-**

This site contains a small population of **Serviceberry** (*Amelanchier humilis*), a G5 S1 Pennsylvania plant species of concern, was found on a dry opening on Meyers Mountain Summit in State Game Lands #307. The habitat is described as oak-hardwood-heath vegetation with steep wooded down slopes. Associated species included Oak (*Quercus sp.*), Red Maple (*Acer rubrum*), Mountain Laurel (*Kalmia latifolia*), Maple-leafed Viburnum (*Viburnum acerifolium*), Black Hucklberry (*Gaylussacia baccata*), and Chokeberry (*Aronia sp.*). This site is itself partly due to an unnatural disturbance. Threats to this site include deer overbrowsing, trampling, succession and fire (which may also benefit the species).

#### MOUNTAIN MUD POND-UPDATE- (Fell Twp.)-

This site contains three former Pennsylvania plant species of concern, Fern-leaved Pondweed (Potamogeton robbinsii), Bright Green Spike-rush (Eleocharis olivacea), and Purple Bladderwort (Utricularia purpurea) that are all now delisted (SP512, SP509, SP518). The site still contains two Pennsylvania plant species of concern, Slender Sedge (Carex lasiocarpa), and Mud Sedge (Carex limosa). This site includes a natural spring fed lake that is mostly surrounded by forest with a small section of lakeshore developed as a beach and picnic area. It supports two plant species of special concern. The west end of the pond includes a peat island. Common species include leatherleaf, highbush blueberry, water-shield (Brasenia shreberi), fragrant water lily (Nymphaea odorata), bladderwort (Utricularia sp.), and a large number of grasses and sedges. The site also supports a wide diversity of odonate species. Maintaining the peat islands, and minimizing disturbance along the shoreline in the areas with the densest aquatic vegetation will help to maintain the populations of the rare species at this site. The delisting of the three species of concern may change the rank of statewide significance in the county.

NEWTON LAKE/MUD POND-UPDATE- (Greenfield Twp.)- This site contains three former Pennsylvania plant species of concern, Bright Green Spike-Rush (Eleocharis olivacea), Fern-leaved Pondweed (Potamogeton robbinsii), and Purple Bladderwort (Utricularia purpurea), which are now delisted (SP519, SP520). This site contains a fair population of Slender Sedge (Carex lasiocarpa), and a good population of Mud Sedge (Carex limosa). This site still contains a good-quality population of Robbins Spike-rush (Eleocharis robbinsii), a S2 Pennsylvania threatened plant species of concern on one side of Mud Pond, located on Clifford Quadrangle (See Clifford Quad for additional information). A good population of Bog-Rosemary (Andromeda polifolia), a G5 S3 Pennsylvania plant species of concern, was found at an acidic glacial lake. This site is described as a natural lake that has an artificially increased water level caused by a small dam situated at the outflow. The lake is divided into two parts that are connected by a narrow strait. The larger area, Newton Lake, has a developed shoreline, while the smaller area, Mud Pond, is still surrounded primarily by forest. The south end of Mud Pond includes several acres of emergent peat mat. The mat is dominated by graminoids and low shrubs, and grades into a red maple swamp as distance from the lake increases. Fragments of peat mat are also located scattered along the lake margin and provide a unique habitat for some plant species. This combined lake-peatland complex still supports a total of four species of special concern, and three delisted species. The delisting of these three species may change the rank of the statewide significance to the county. For more information on this site see the Clifford Quadrangle.

#### USGS OUADRANGLE MAP: Clifford

		TNC Ranks*					
Species	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Robbins Spike-Rush (Eleocharis robbinsii)	Plant SP521	G4G5	S2	N	08-06-96	В	
Purple Bladderwort (Utricularia purpurea)	Plant SP509	G5	<b>S</b> 3	DL	09-14-92	C	Delisted
Fern-leaved Pondweed (Potamogeton robbinsii)	Plant SP514	G5	<b>S</b> 3	DL	08-06-96	C	Delisted

LOCALLY SIGNIFICANT: FALLBROOK SWAMP

**HQ-CWF**:

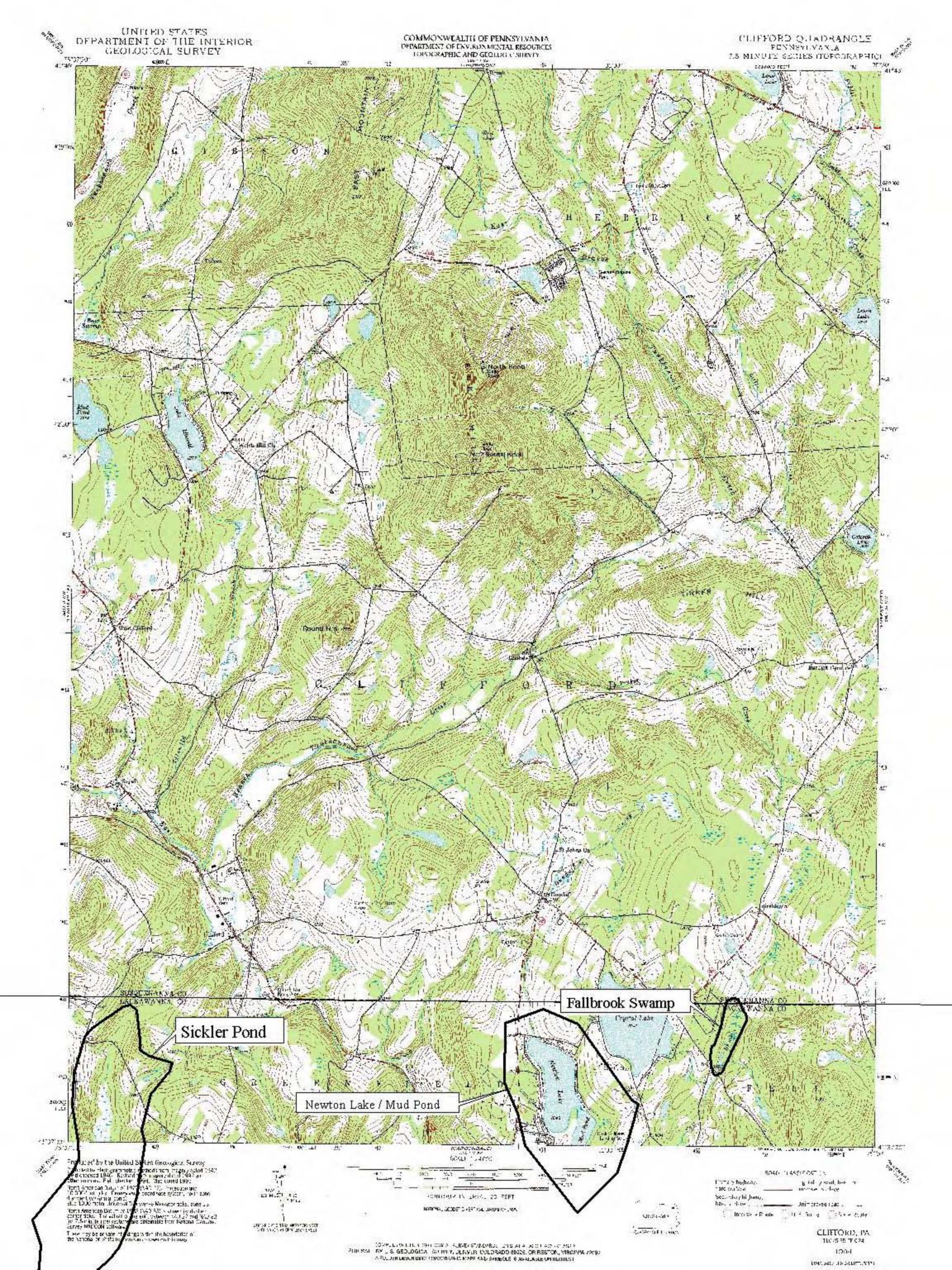
**MANAGED AREAS:** 

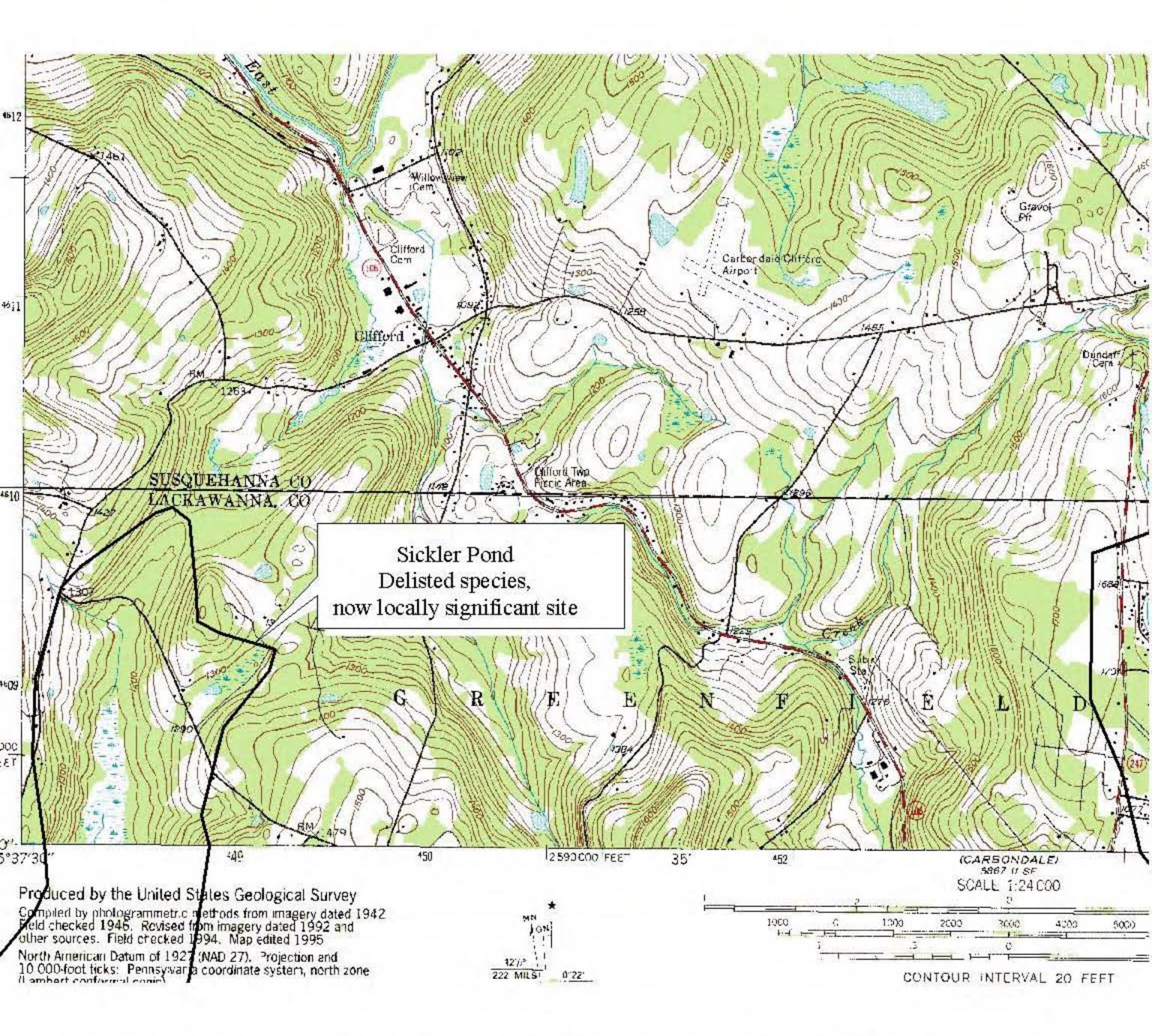
OTHER: sp514 - see Dalton quadrangle SP514.

Clifford Map Update Changes Closeup

#### NEWTON LAKE/MUD POND (Greenfield Twp.)-UPDATE- SP502 -

This site contains two former Pennsylvania plant species of concern, **Purple Bladderwort** (*Utricularia purpurea*), and Fern-leaved Pondweed (*Potamogeton robbinsii*) that are now delisted. This site still contains a good-quality population of **Robbins Spike-rush** (*Eleocharis robbinsii*), an S2 Pennsylvania threatened plant species of concern on one side of Mud Pond. This area includes a natural lake which has an artificially increased water level caused by a small dam situated at the outflow. The lake is divided into two parts that are connected by a narrow strait. The larger area, Newton Lake, has a developed shoreline, while the smaller area, Mud Pond, is still surrounded primarily by forest. Both areas of the lake support former plant species of special concern. Newton Lake supports large populations of two aquatic plant species, and a moderate size population of an emergent plant species. This combined lake-peatland complex supports a total of seven species of special concern. The delisting of these two plant species did not change the statewide significance rank of this site in the county. For more information on this site see the Carbondale Quadrangle.





Clifford Quadrangle Update Closeup Sickler Pond (update)

# **USGS QUADRANGLE MAP: DALTON**

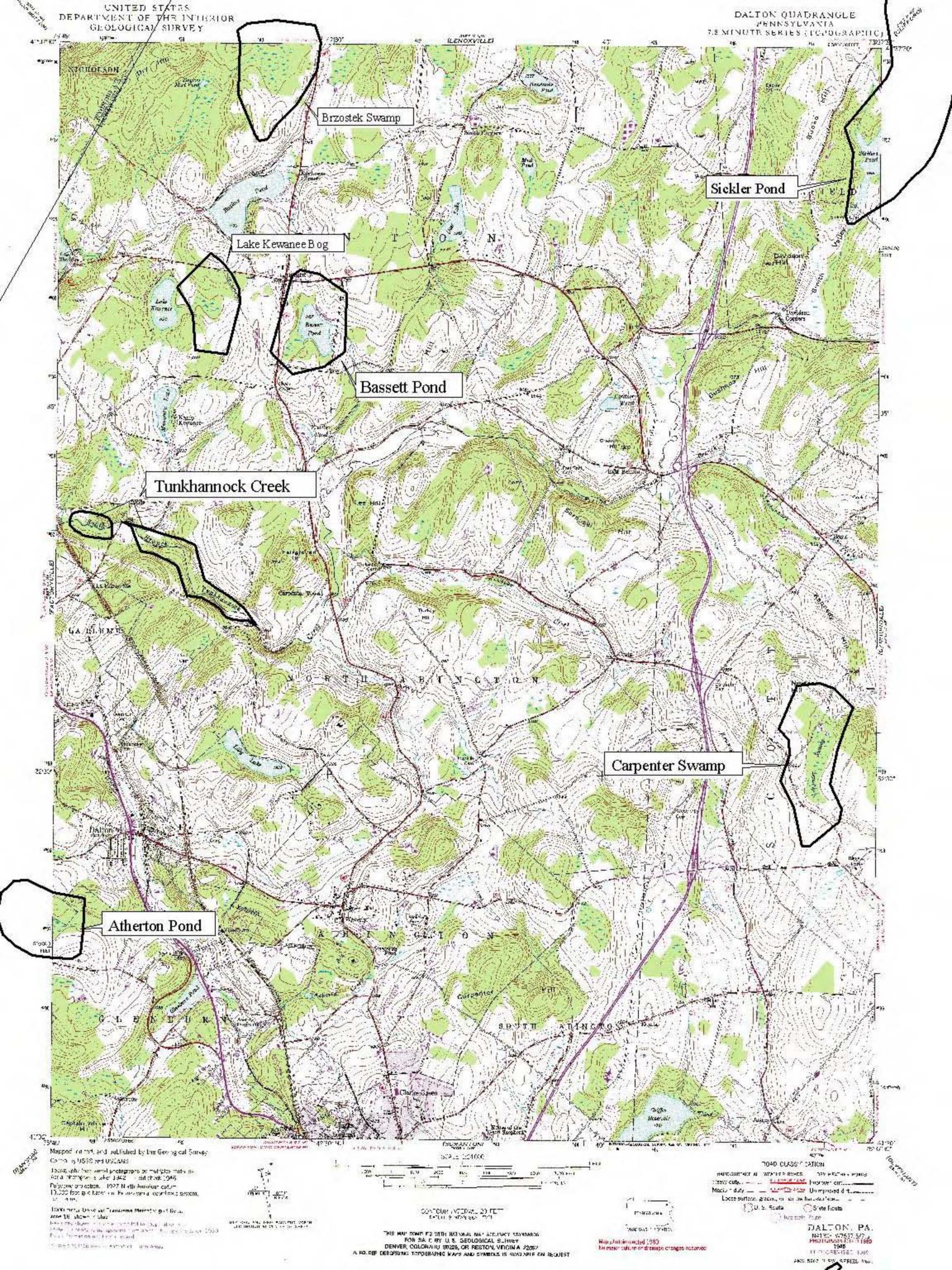
	TNC Ranks*						
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Broadleaf-Conifer Swamp	NC503	G?	S3S4	N	07-24-96	ВС	
Oligotrophic Glacial Kettlehole Bog		G?	S3	N	08-05-86	CD	NEW
Bog-Rosemary (Andromeda polifolia)	Plant SP506	G5	S3	N	05-21-96	С	
Fern-leaved Pondweed (Potamogeton robbinsii)	Plant SP511	G5	S3	N	09-11-92	AB	Delisted
Fern-leaved Pondweed (Potamogeton robbinsii)	Plant SP514	G5	<b>S</b> 3	N	08-03-92	В	Delisted
Bog-Rosemary (Andromeda polifolia)	Plant SP515	G5	S3	N	07-01-94	D	
Plant species	Plant SP517	G3	S2	LE	07-11-96	С	
Slender Sedge (Carex lasiocarpa)	Plant SP518	G5	S3	N	05-21-96	D	
Soft-leaved Sedge (Carex disperma)	Plant SP519	G5	S2	N	07-24-96	В	
Animal species	Animal SA512	G4	S2S3	N	08-10-92	E	
Animal species	SA520	G5	S3S4	N	07-11-96	С	

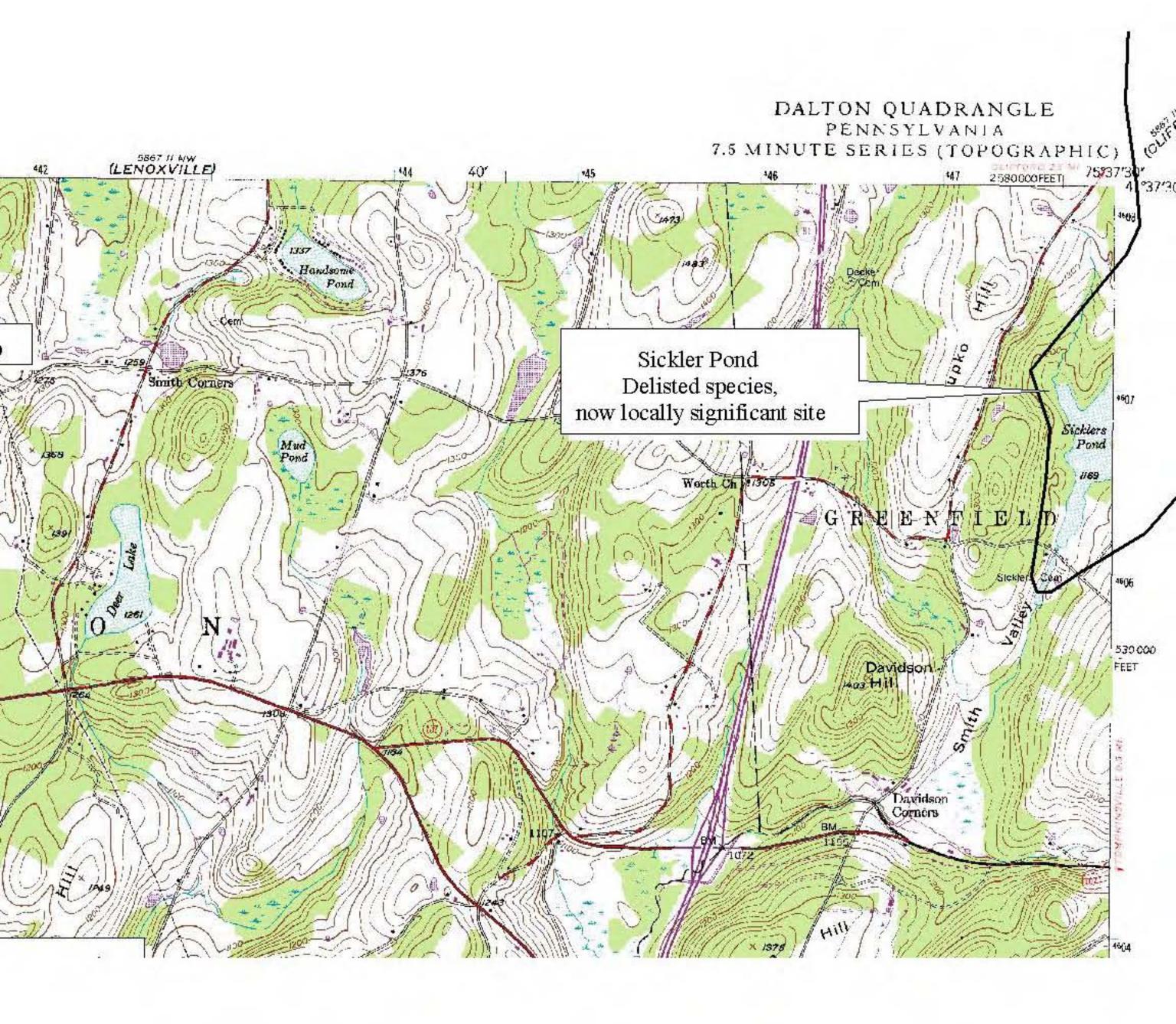
LOCALLY SIGNIFICANT: TUNKHANNOCK CREEK, SOUTH BRANCH

HQ-CWF:

MANAGED AREAS: Lackawanna State Park

Dalton Map Update Changes Closeup





Dalton Quadrangle Update Closeup Sickler Pond (Update)

#### **USGS QUADRANGLE MAP: DALTON**

LAKE KEWANEE BOG (Benton Twp.)-UPDATE- SP506 & SP518 - The part of this hemlock swamp that can be described as a minerotrophic fen is very small, perhaps less than a half acre. It includes a small floating peat mat dominated by sedges and sphagnum moss that is surrounded by a ring of taller shrubs. Within this hemlock swamp is an "Oligotrophic Glacial Kettlehole Bog", a listed S3 natural community. This community is a 0.25 acre floating peat with plant species such as Sheep's Laurel (Kalmia angustifolia), Poison-Sumac (Toxicodendron vernix), Leatherleaf (Chamaedaphne calyculata), and Sphagnum (Sphagnum sp.). The site is likely to succeed to a forested swamp. The bog is not large enough to be identified as a good example of a minerotrophic fen and therefore it is ranked as a small bog. It supports two plant species of special concern, Bog Rosemary (Andromeda polifolia), and Slender Sedge (Carex lasiocarpa), SP506 & SP518. Both populations are relatively small and may eventually be shaded out with the closing of the canopy. The surrounding area is cleared and development is a threat.

**Bassett Pond** (Benton Twp.)- **UPDATE**-This site contains an excellent to good-quality former Pennsylvania-plant species of concern, **Fern-leaved Pondweed** (*Potamogeton robbinsii*), and is now **delisted**. This site is now removed from the statewide significant ranked sites and is now considered locally significant.

**Sickler Pond** (Greenfield Twp.)-**UPDATE**- This site contains an excellent to good-quality former Pennsylvania-plant species of concern, **Fern-leaved Pondweed** (*Potamogeton robbinsii*), and is now **delisted**. This site is now removed from the statewide significant sites and is now locally significant due to the good potential for Pennsylvania plant species of concern.

# USGS QUADRANGLE MAP: FACTORYVILLE

		TNC R	anks*				
Species	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Status
Bog Rosemary (Andromeda polifolia)	Plant SP510	G5	<b>S</b> 3	N	07-01-94	D	
Plant	Plant SP511	G3	S2	N	07-11-96	C	
Animal	Animal SP512	G5	S3S4	N	07-11-96	С	

No additional updates or new sites occurred on this quad:

## **USGS QUADRANGLE MAP: LAKE ARIEL**

		TNC F	Ranks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
	Natural						
Heath Barrens	Community NC523	G?	S1?	N	06-03-97	A	
Ridgetop Dwarf Tree Forest	Natural Community NC525	G4	<b>S</b> 3	N	08-08-96	A	
Fern-leaved Pondweed (Potamogeton robbinsii)	Plant SP520	G5	S3	N	08-13-96	ВС	Delisted
Small Waterwort (Elatine minima)	Plant SP521	G5	S4	N	08-13-96	C	Delisted
Purple Bladderwort (Utricularia purpurea)	Plant SP522	<b>G5</b>	S4	N	08-13-96	В	Delisted
Pointed Sallow (Epliglaea apiata)	Animal SA519	G5	S3S4	N	10-13-97	ВС	
Pointed Sallow ( <i>Epliglaea</i> apiata)	Animal SA526	G5	S3S4	N	10-03-96	E	
Footpath Sallow Moth (Metaxaglaea semitaria)	Animal	<b>G5</b>	S2	N	09-29-97	C	NEW
Pink Sallow (Psectraglaea carnosa)	Animal	G3	S1	N	10-05-97	AB	NEW
Barrens Buckmoth (Hemileuca maia)	Animal	G5	S1S2	N	10-06-97	AB	NEW

#### LOCALLY SIGNIFICANT:

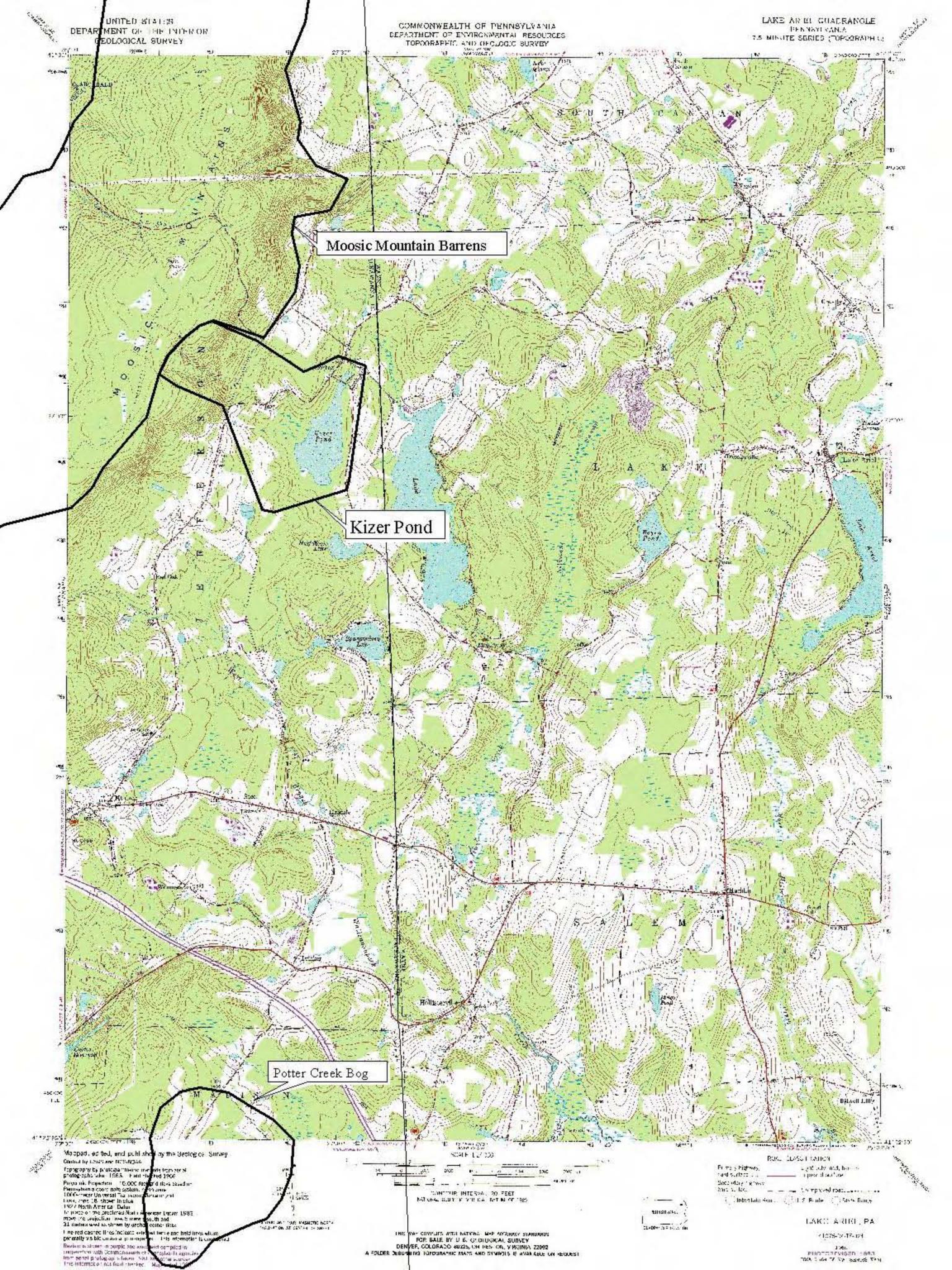
HQ-CWF: Middle Creek, West Branch Wallenpaupack Creek, Kizer Pond

MANAGED AREAS: State Game Lands #300

OTHER: nc543,sp523,sp544,sp545 - see Sterling quadrangle NC543, SP523, SP544,

SP545.

Lake Ariel Map Update Changes Closeup



# Lake Ariel Quadrangle Moosic Mountain Barrens (update) Kinzer Pond (update)

#### USGS QUADRANGLE MAP: LAKE ARIEL

KIZER POND (Jefferson Twp.)-UPDATE- SP520, SP521 & SP522 – Three former aquatic plant species of concern were found near the outlet of this shallow 100-acre pond south of the village of Cortez. The three species, Small Waterwort (Elatine minima), Fern-leaved Pondweed (Potamogeton robbinsii), and Purple Bladderwort (Utricularia purpurea), have been delisted since the original NAI report was written. However, due to the diversity of birds, being an important watershed and the proximity of this pond to Moosic Mountain, it could be deemed locally significant to the county. Aquatic plants recorded in addition to the above species include water lilies (Nymphaea odorata) and bladderwort (Utricularia sp.) in the open water, and sedges (e.g., Carex scoparia), rushes (Juncus spp.), grass-leaved goldenrod (Euthamia graminifolia), three-way sedge (Dulichium arundinaceum), and other plants along the marshy shoreline. More extensive swamp and marsh habitat occur along the west side of the pond (clearly visible on aerial photographs) and make the site important for a diversity of bird species as well. Kizer Pond is fed by streams originating along the wooded slopes of Moosic Mountain. It flows out to the north and east into Lake Henry, a larger recreational lake in Wayne County. Maintaining existing woodlands in the watershed area of Kizer Pond can help to maintain the water quality to the benefit of local residents, the fisheries, and the plant species of concern at this site.

MOOSIC MOUNTAIN BARRENS (Jefferson Twp.)- UPDATE- NC523, NC525, & SA519 – In this quad, three additional animal species have been recorded since the original NAI report. A good to excellent quality population of Barrens Buckmoth (*Hemileuca maia*), a S1S2 Pennsylvania animal species of concern, was found in this area. A fair population of Footpath Sallow Moth (*Metaxaglaea semitaria*), a S2 Pennsylvania animal species of concern, was found in the Ridgetop Dwarf Tree Forest. This species may be breeding in the acid scrub swamps, forest swamps, or bogs and is not especially indicative of cold barrens. Also, a good to excellent population of the globally rare Pink Sallow (*Psectraglaea carnosa*), a G3 S1 Pennsylvania animal species of concern, was found in the extensive heath barrens.

This site is one of the top priorities for conservation in the county. It is an extensive mosaic of good to excellent quality barrens communities. The barrens are primarily restricted to the highest most exposed portions of the ridge and are surrounded by slopes and drainages with mixed hardwood forest. The site includes both Ridgetop Dwarf-Tree Forest and Heath Barrens Natural Communities along with unassessed amounts of Northern Appalachian Acidic Rocky Summit Natural Community. The heath barrens are a newly discovered natural community for Pennsylvania. Moosic Mountain is the only location in the state where they are known to occur. The Nature Conservancy of Pennsylvania has recently purchased 1,200 acres of land on Moosic Mountain. This parcel is part of an approximately 6,000-acre ridgetop barrens complex, one of the largest and most diverse in the northeastern United States. They are characterized by a dominance of low growing ericaceous species which include lowbush blueberry, huckleberry, sheep laurel, black chokeberry (Aronia melanocarpa), and teaberry (Gaultheria procumbens). Herbaceous species such as Pennsylvania sedge (Carex pennsylvanica), poverty grass, and Canada mayflower (Maianthemum canadense) are infrequent associates found among the heath shrubs. Large expanses of this ankle to knee-high vegetation stretch along the ridgetop creating sweeping views of the ridge and the valleys below. It is uncertain what conditions cause the occurrence and persistence of this community type at this location. Fire and microclimate are important factors in helping to maintain this community type at other locations in the northeastern United States. Some portions of the ridge at Moosic Mountain have been used historically for blueberry harvest which included cutting and burning. The influence of these historical activities on the maintenance of the heath barrens is uncertain.

The Ridgetop Dwarf-Tree Forest Natural Community consists primarily of scrub-oak barrens, and in some areas pitch pine - scrub-oak barrens. On some stretches of the ridge it occurs adjacent to the heath barrens, elsewhere it covers the entire width of the ridge. Scrub oak is the dominant canopy species in the dwarf tree forest with pitch-pine, black gum (*Nyssa sylvatica*), chestnut oak, and sassafras (*Sassafras albidum*) occurring in localized patches and infrequently scattered throughout. Common birds observed in the barrens included Common Yellowthroat (*Geothlypis trichas*), Prairie Warbler (*Dendroica discolor*), Chestnut-sided Warbler (*Dendroica pensylvanica*), Rufous-sided Towhee (*Pipilo erythrophthalmus*), and Chipping Sparrow (*Spizella passerina*).

Many plant species of heath barrens and scrub-oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain these barrens communities. Portions of this site show evidence of having burned within the last several decades.

From limited surveys it was discovered that this site supports two animal species of special concern, including a globally rare G3 species. The site has the potential to support a number of other rare animal species as well as several plant species. Further surveys are encouraged. (See also Waymart Quad. - MOOSIC MOUNTAIN BARRENS, and Olyphant Quad. - "Dunmore Bald") for additional updates for this site.

Once considered a separate site in the original report, **Salem Hill Barren** is now a part of Moosic Mountains Barrens and will not be considered a separate statewide significant site for Lackawanna County. This area includes a Ridgetop Dwarf-Tree Forest Natural Community. It contains areas dominated by scrub oak as well as areas of low shrub barrens with blueberry, huckleberry, and black chokeberry. This community is maintained by fires and the dry, nutrient poor soils. Although no species of concern have been identified from this site, the habitat is suitable for rare lepidopteran species (moths and butterflies) and surveys for these species are recommended. This site has been heavily disturbed by recreational vehicle use, dumping, and quarrying.

Also once considered a separate site, **Dunmore Bald** is now contained within the super site Moosic Mountains Barrens and will no longer stand alone as a statewide significant site. This site includes a Northern Appalachian Acidic Rocky Summit Natural Community which occurs at the south end of **MOOSIC MOUNTAIN BARRENS**. **MOOSIC MOUNTAIN BARRENS** is one of the top priorities for conservation in the county (See **MOOSIC MOUNTAIN BARRENS** on Lake Aerial & Waymart Quads.). Dunmore Bald occupies 75-80 acres from 1600 to 1850 feet in elevation. Dominant species include black chokeberry, low-sweet blueberry, and hairgrass, and the site is potential habitat for species of concern such as sand cherry (*Prunus pumila*), slender mountain ricegrass (*Oryzopsis pungens*), and Appalachian sandwort (*Minuartia glabra*). The community grades into adjacent scrub oak and scrub oak-pitch pine-black huckleberry communities. Downslope sites have been degraded by railroads, logging, litter, and strip-mining. No field visit was made to this site during the inventory. Further surveys are encouraged.

Within this site is an Acidic Rocky Summit NC (NC525) and is located at the south end of the **MOOSIC MOUNTAIN BARRENS.** The barrens as a whole are considered to be one of the top priorities for conservation in the county. Dunmore Bald is dominated by low shrubs and herbs. It has a good potential for several species of concern.

## **USGS QUADRANGLE MAP: MOSCOW**

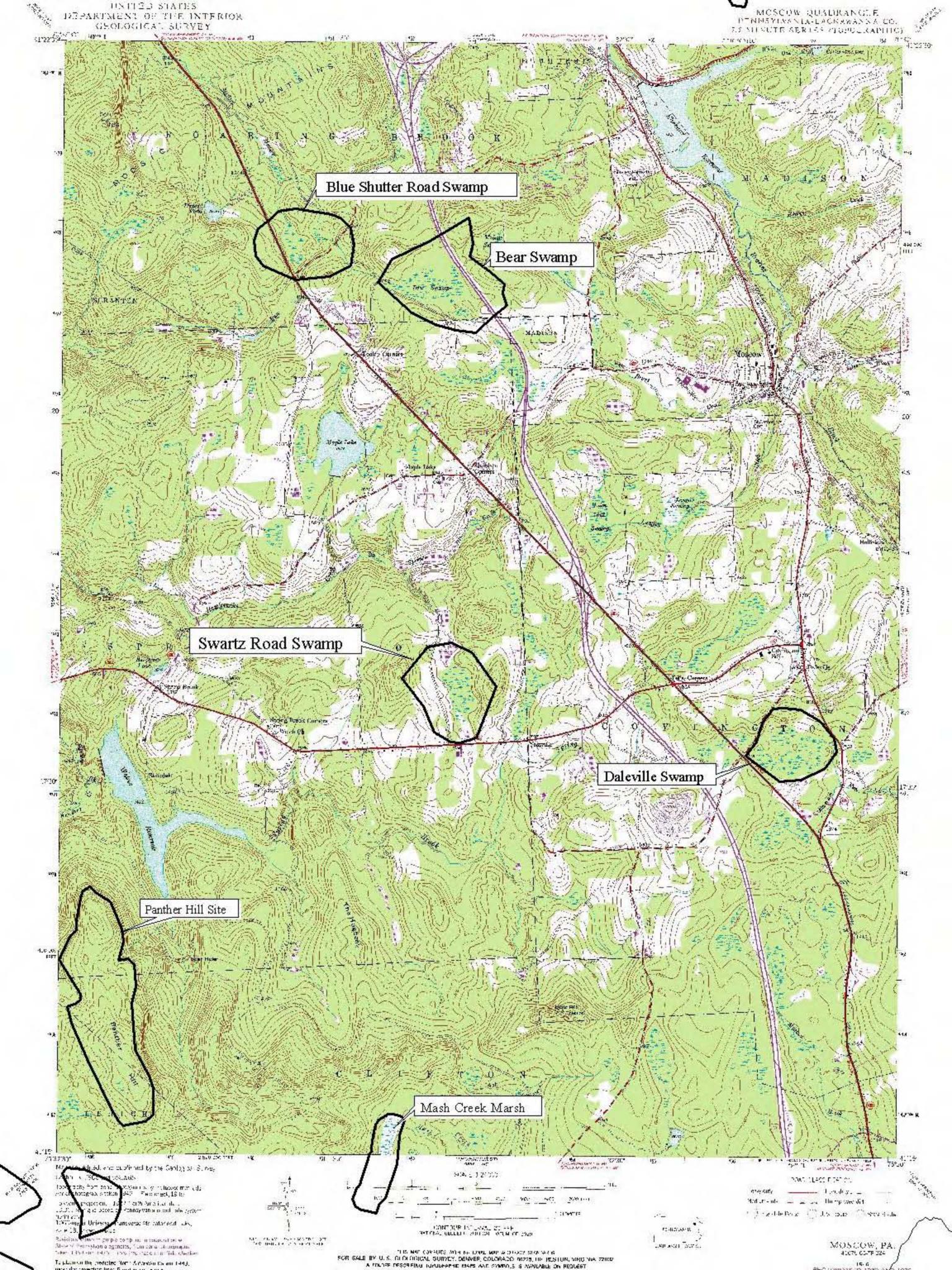
		TNC Rai	nks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Broadleaf-Conifer Swamp	Community NC520	G?	S3S4	N	06-25-96	В	
Broadleaf-Conifer Swamp	Community NC501	G?	S3S4	N	04-24-96	D	
Broadleaf-Conifer Swamp	Community NC519	G?	S3S4	N	08-21-96	С	
Northern Appalachian Acidic Rocky Summit Community	Community NC523	G?	S2	N	06-26-96	ВС	
Creeping Snowberry (Gaultheria hispidula)	Plant SP517	G5	<b>S</b> 3	N	06-18-96	ВС	
Labrador-Tea ( <i>Ledum</i> groenlandicum)	Plant SP518	G5	<b>S</b> 3	N	06-18-96	С	
Labrador-Tea ( <i>Ledum</i> groenlandicum)	Plant SP521	G5	S3	N	06-25-96	С	
Soft-leaved Sedge (Carex disperma)	Plant SP522	G5	<b>S</b> 3	N	06-25-96	ВС	

# No further updates or new sites occurred in this quadrangle

LOCALLY SIGNIFICANT: MASH CREEK MARSH

HQ-CWF: Ash Creek, Roaring Brook, Stafford Meadow Brook, Spring Brook

MANAGED AREAS: Lackawanna State Forest, State Game Lands #135



## **USGS QUADRANGLE MAP: OLYPHANT**

		TNC	Ranks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Northern Appalachian Acidic Rocky Summit	Natural Community NC525	G?	S2	N	06-94	В	
Ridgetop Dwarf-Tree Forest							
Goldenclub (Orontium aquaticum)	Plant SP512	<b>G5</b>	S4	N	09-14-94	ВС	Delisted
Northern Yellow-eyed Grass (Xyris Montana)	Plant SP513	G4	S3	N	08-13-96	С	
Bright Green Spike-rush (Eleocharis olivacea)	Plant SP520	G5	<b>S4</b>	N	08-13-96	C	Delisted
Slender Sedge (Carex lasiocarpa)	Plant SP521	G5	<b>S</b> 3	N	08-13-96	С	
Mud Sedge (Carex limosa)	Plant SP27	G5	S2	N	08-13-96	С	
	Animal SA528	G3	S1B, S1N	N	04-15-93	E	
	Animal SA529	G4	S3B, S3N	N	04-15-93	E	

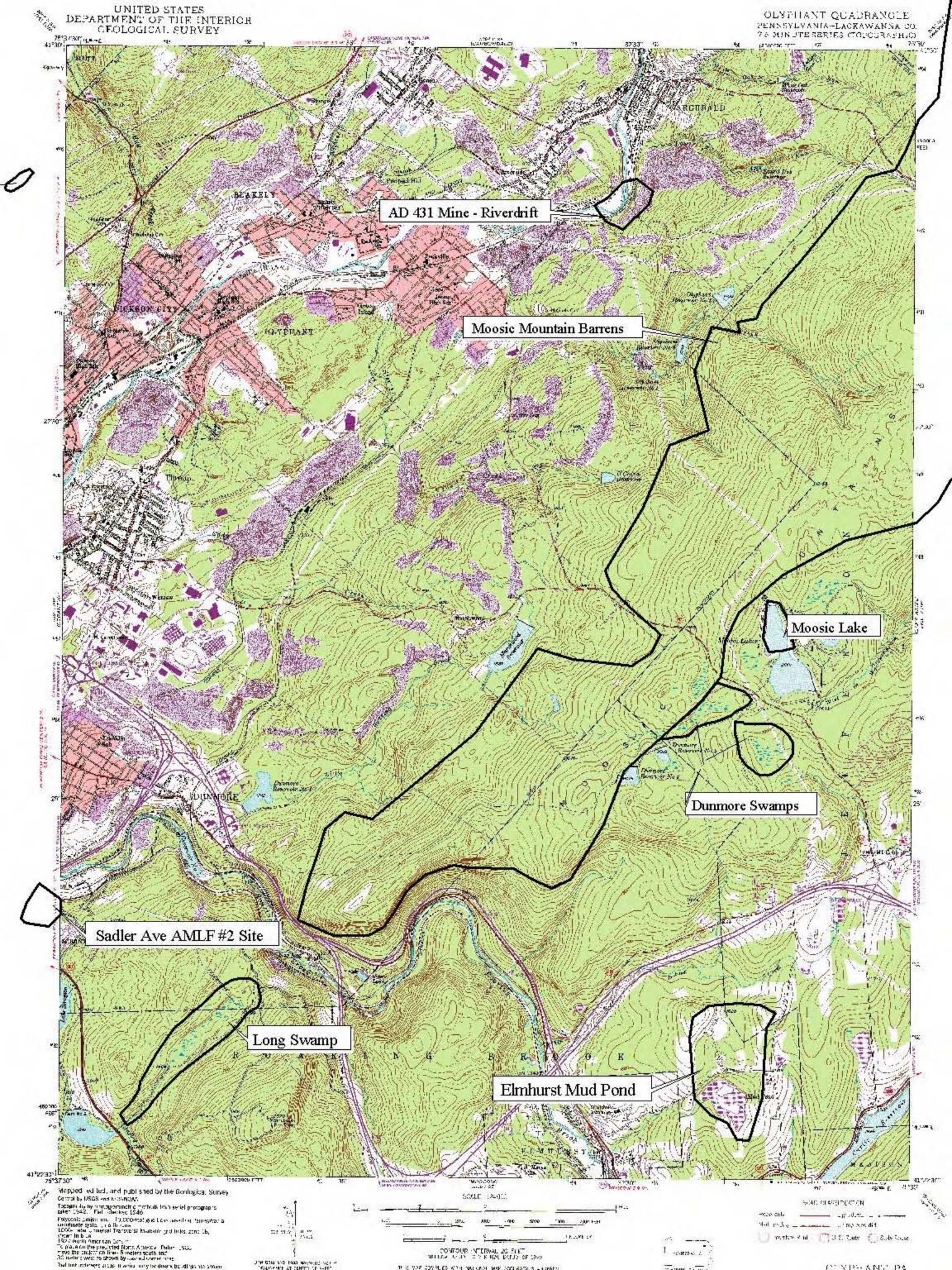
LOCALLY SIGNIFICANT: LONG SWAMP

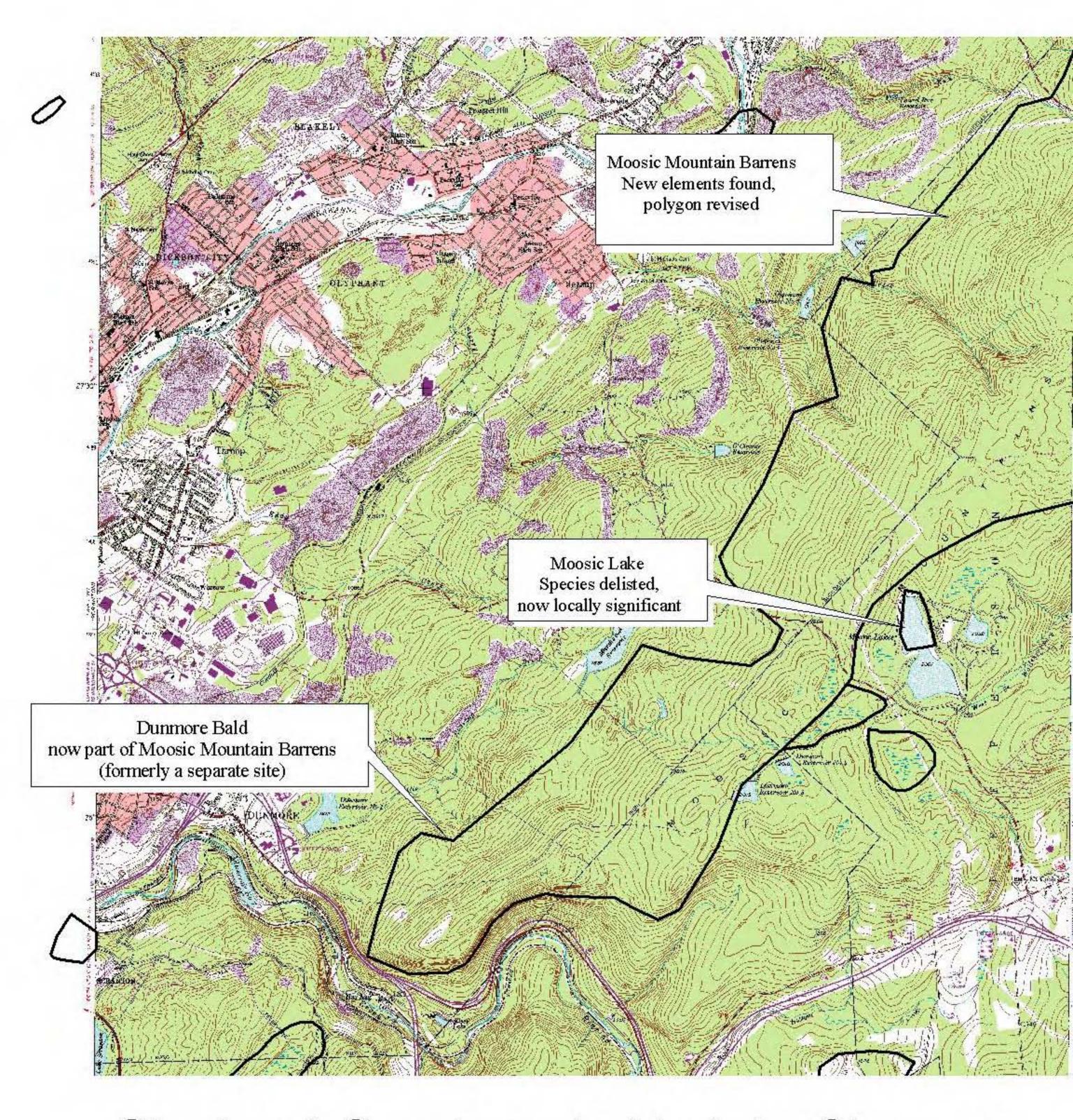
**DUNMORE SWAMPS** 

HQ-CWF: Grassey Island Creek, Stafford Meadow Brook

MANAGED AREAS: State Game Lands #300,

Olyphant Map Update Changes Closeup





Olyphant Quadrangle Update Closeup Moosic Mountain Barrens (update) Moosic Lake (update) Dunmore Bald (update)

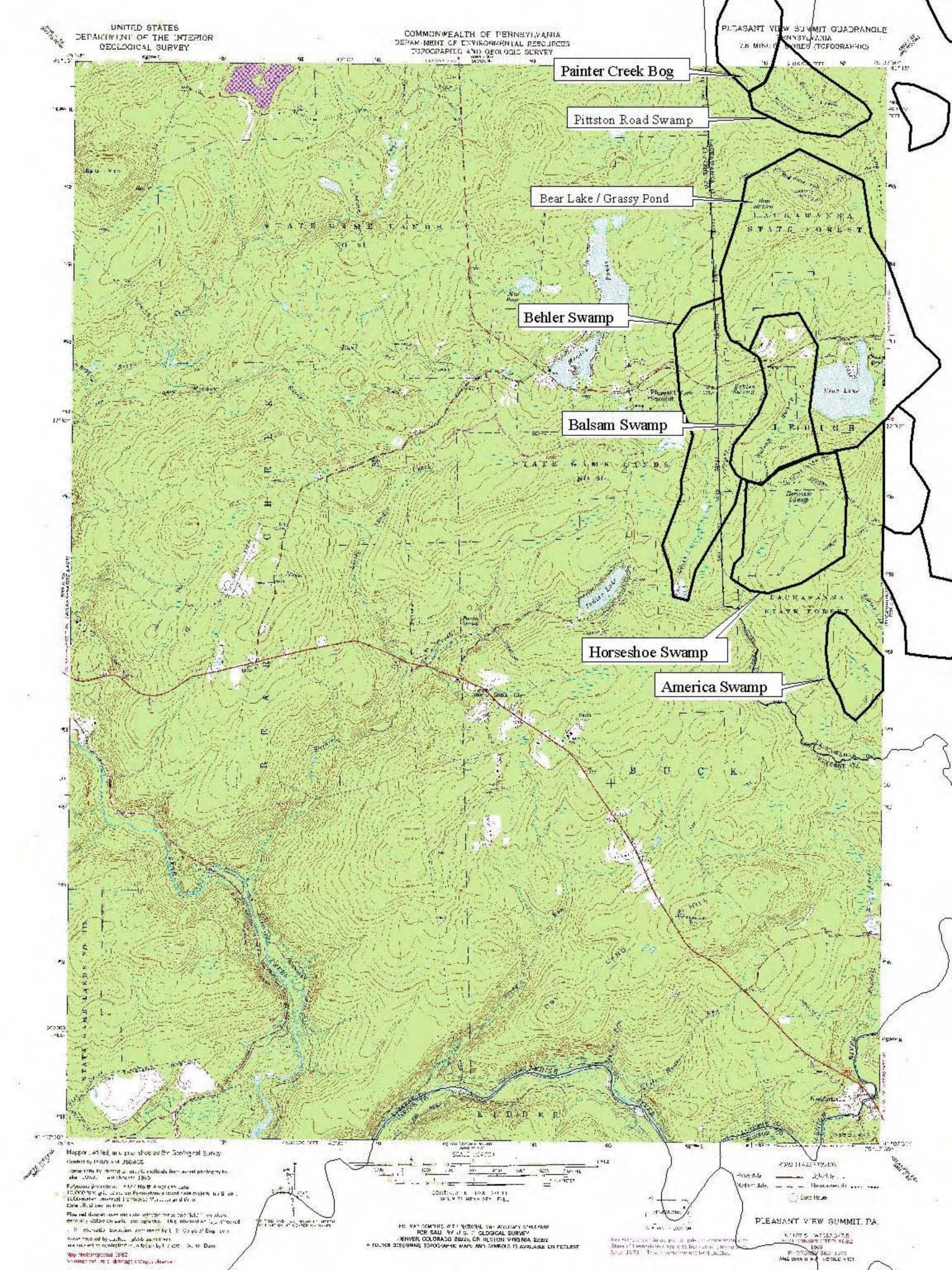
### US QUADRANGLE MAP: OLYPHANT

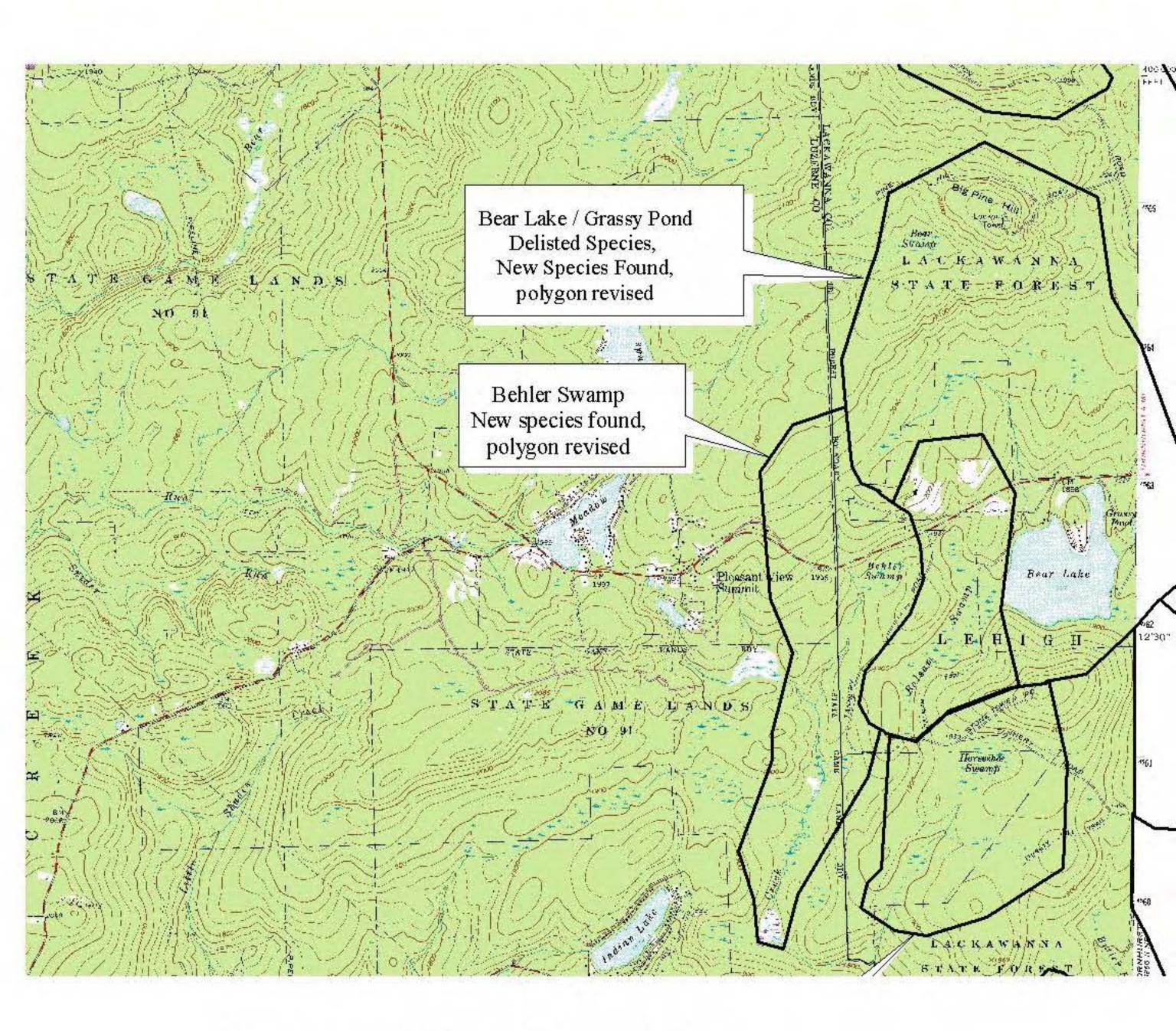
ELMHURST MUD POND (Jefferson & Roaring Brook Twps.) – UPDATE- SP513, SP520, SP521, & SP527 - This pond contains one former Pennsylvania S4 plant species of concern, Bright Green Spike-Rush (Eleocharis olivacea), which is now delisted and will be removed from the species of concern list for this site. However, this site still supports fair populations of Slender Sedge (Carex lasiocarpa), a S3 G5 Pennsylvania plant species of concern, Mud Sedge (Carex limosa), a G5 S2 Pennsylvania plant species of concern, and Northern Yellow-eyed Grass (Xyris montana), a G4 S3 Pennsylvania Rare plant species. This site is the remnant of a bog or swamp community that has been disturbed by the construction of a dam at the outlet. It is characterized by open water thick with aquatic vegetation and slowly decaying stumps. Remnants of the peat mat still exist as islands and are dominated by leatherleaf with scattered groves of eastern larch. The islands still support a suite of plant species common to the open peat mat of bogs such as cotton-grass, sundew, wild calla (Calla palustris), and several species of sedges. The site is habitat for a number of bird species including Wood Duck (Aix sponsa), Spotted Sandpiper (Actitis macularia), Eastern Kingbird (Tyrannus tyrannus), Killdeer (Charadrius vociferus), Cedar Waxwing (Bombycilla cedrorum), and other common species. Beaver have been actively cropping the woody vegetation along the island shores and exposing unvegetated peat. The site supports four plant species of special concern all of which are dependent on the peat substrate of the remnant islands.

**Moosic Lake—(Jefferson Twp.)** — **UPDATE- SP512** - This site supports a good-quality population of a former **Pennsylvania S4 plant species of concern, Goldenclub** (*Orontium aquaticum*), and the species is now delisted. Since this species is delisted and this site contains no additional species of concern, this site will be removed from the list of sites for the county. There is still potential for species of concern to occur at this site and the area could be considered locally significant. Further surveys to this site are recommended.

# USGS QUADRANGLE MAP: PLEASANT VIEW SUMMIT

		TNC F	Panks*				
Species/Comm	_			State			Update
unity Name	Code	Global	State	Status	Last Seen	Quality	Status
Acidic Glacial Lake	Natural Community NC523	G?	S2S3	N	08-20-96	В	
Boreal Conifer	Natural Community NC528	G?	S3	N	06 11 06	ВС	
Purple Bladderwort (Utricularia	Plant			N	06-11-96		Delicated
purpurea)	SP504	G5	S4	N	08-20-96	В	Delisted
Sweet-Gale (Myrica gale)	Plant SP506	G5	S2	N	08-20-96	CD	
Common Labrador- Tea ( <i>Ledum</i> groenlandicum)	Plant SP507	G5	S3	N	06-08-96	D	
Marsh Willow- Herb ( <i>Epilobum</i> palustre)	Plant SP515	G5	S1	N	08-28-96	C	
Creeping Snowberry (Gaultheria	Plant						
hispidula)	SP516	G5	S3	N	09-24-91	D	
Thread Rush (Juncus filiformis)	Plant SP517	G5	S3	N	08-31-99	В	RANK CHANGE
Narrow-leafed Gentian ( <i>Gentiana</i> <i>linearis</i> )	Plant	G4G5	S3	N	08-31-99	E	NEW
Common Labrador- Tea ( <i>Ledum</i> groenlandicum)	Plant SP519	G5	S3	N	07-02-96	В	
Mud Sedge (Carex limosa)	Plant SP520	G5	S2	N	07-03-96	С	
Bright Green Spike-rush (Eleocharis olivacea)	Plant SP521	G5	S4	N	08-20-96	C	Delisted
Goldenclub (Orontium aquaticum)	Plant SP522	G5	S4	N	08-20-96	C	Delisted
Common Labrador- Tea ( <i>Ledum</i> groenlandicum)	Plant SP526	G5	<b>S</b> 3	N	06-11-96	AB	





Pleasant View Summit Bear lake / Grassy Pond (update) Behler Seamp (update)

		TNC F	Ranks*				
Species/Comm unity Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Common Labrador- Tea ( <i>Ledum</i> groenlandicum)	Plant SP527	G5	<b>S</b> 3	N	07-25-96	E	
Serviceberry (Amelanchier humilis)	Plant SP529	G5	<b>S</b> 1	N	08-27-98	D	
Animal	Animal SA508	G5	<b>S</b> 3	N	08-20-96	E	
Bright Green Spike-Rush (Eleocharis olivacea)	Plant SP525	<b>G</b> 5	<b>S4</b>	N	08-20-96	C	Delisted
Serviceberry (Amelanchier humilis)	Plant	G5	S1	N	08-27-98	D	NEW

# LOCALLY SIGNIFICANT:

HQ-CWF: Choke Creek

MANAGED AREAS: Lackawanna State Forest, State Game Lands #91

OTHER: nc519 & sp527 - see Avoca quadrangle NC519 & SP527

Pleasant View Summit Map Update Changes Closeup

# USGS QUADRANGLE MAP: PLEASANT VIEW SUMMIT

BEAR LAKE/GRASSY POND- NC523, SP504, SP506, SP507, SP521, SP522, SP524, SP525 & SA508 (Thornhurst Twp.)- UPDATE- – Bear Lake contains a fair population of a former S4 Pennsylvania plant species of concern, Bright Green Spike-Rush (*Eleocharis olivacea*), but is now delisted and will be removed from the species of concern list for this site. Another fair population of a former S4 Pennsylvania plant species of concern, Goldenclub (*Oronotium aquaticum*), occurs at this site but is now delisted and will be removed from the plant species of concern for this site. In addition, a good population of Purple Bladderwort (*Utricularia purpurea*), a delisted S4 plant species, is found in this area but will be removed from the species of concern for this site. At Big Pine Hill, on the north side of this site, a new population of Serviceberry (*Amelanchier humilis*), a G5 S1 plant species of concern, was found in a scrub oak-heath barren with thin rocky dry acidic soil.

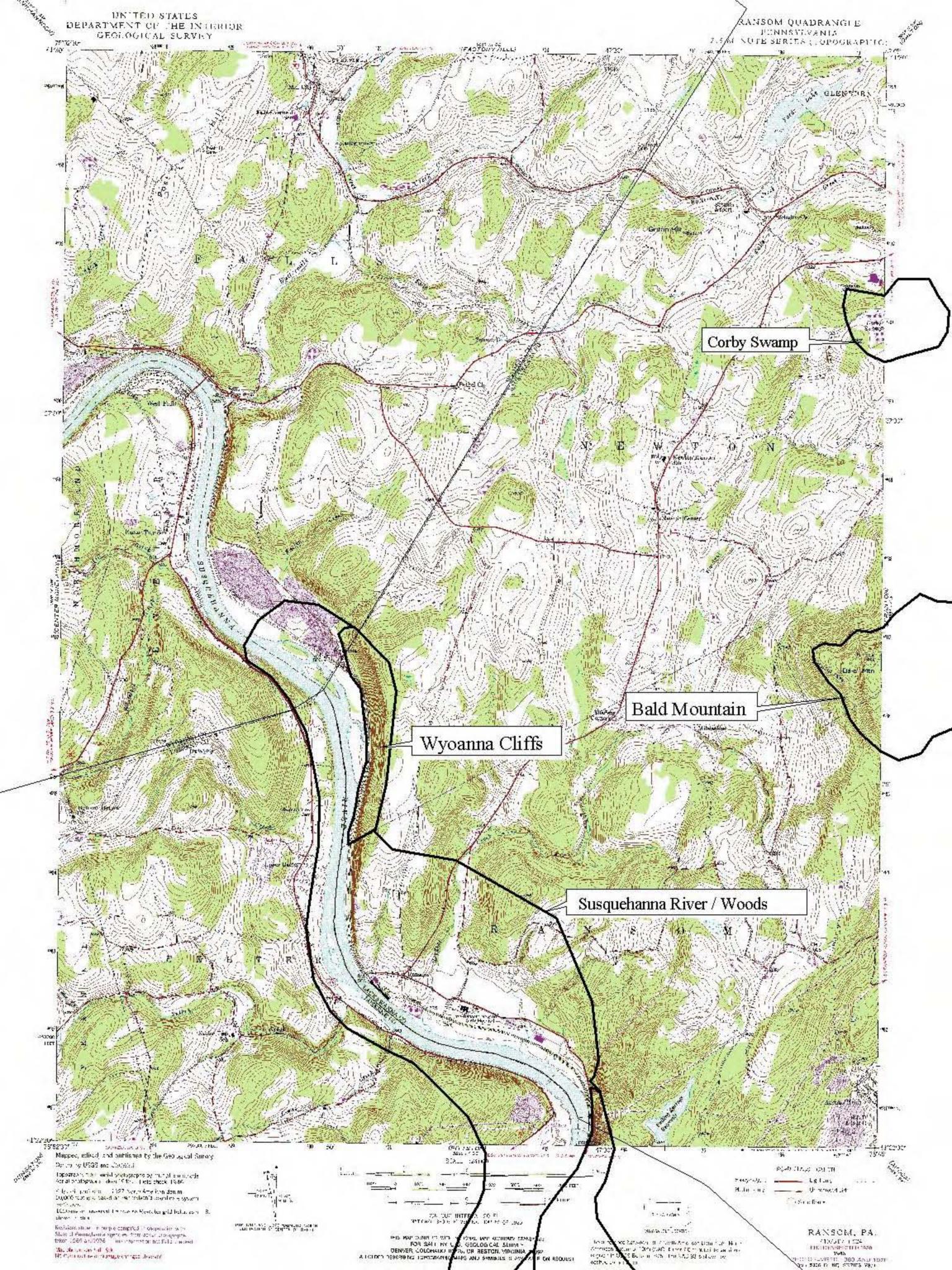
This area still includes a good quality Acidic Glacial Lake Natural Community and several other species of concern. The lake is low in nutrients, with a rocky and sandy bottom, clear water, and scattered populations of aquatic plants such as white water-lily, water bulrush (*Scirpus subterminalis*), bladderworts (*Utricularia sp.*) and some interesting aquatic varieties of sphagnum moss. The lake is surrounded by a forested buffer, and although some summer houses are present, the private lake association continues to maintain the quality of the water and woodlands at the site. **SA508** is an animal species that has been successfully reproducing young at this site since it was first reported in 1986.

"Grassy Pond" is a 15-acre natural pond that supports one PA-Rare plant species and a fair population of one former S4 Pennsylvania plant species of concern. **Bright Green Spikerush** (*Eleocharis olivacea*) is now a delisted plant and will be removed from the list of plant species of concern for this site. **SP524** occurs over most of the pond amongst thick aquatic vegetation, including water-milfoil and pondweeds. The island is made up chiefly of peat and leatherleaf and is currently the site of a beaver lodge. Although the pond has been disturbed by raised water levels, shoreline tree-cutting, and excavation, these populations do not appear threatened by current management. Eutrophication is a potential threat. The delisting of these plant species may change the statewide rank of this site for the county.

**BEHLER SWAMP-SP517** (Thornhurst Twp. & Luzerne Co.)-**UPDATE** – This site contains a population of **Thread Rush** (*Juncus filiformis*), a PA-Rare plant occurring in open areas at the headwaters of Behler Swamp. The rank of this species' population has changed from a small population to a good-quality population based on observances of 1999. Also, since the original report was written, an undetermined population of **Narrow-leafed Gentian** (*Gentiana linearis*) was found in this swamp. The polygon associated with this site has been modified to represent this new information. Associated plant species included Sphagnum Moss (*Sphagnum sp.*), Cinnamon Fern (*Osmunda cinnomomea*), Fly-poison (*Amianthium muscatoxicum*), Poverty grass (*Aristida dichotoma*), and Mountain Laurel (*Kalmia latifolia*). Potential threats to this population include overpicking by hikers, overbrowsing by deer, and changes in the nature of the creek from beaver activity. Trail use currently maintains some of the openings required by this plant although excessive use could eliminate some of the plants. Associated plants of Thread Rush include mosses (*Sphagnum* spp., *Polytrichum*), cinnamon fern, and lowbush blueberry.

# **USGS QUADRANGLE MAP: RANSOM**

-		TNC R	Ranks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Animal	Animal	G5T4T5	SU	N	2000		NEW
Animal	Animal SA515	G5	S3B, S4N	N	06-12-96	E	
Animal	Animal SA516	G5	S3B	N	06-12-96	Е	
Animal	Animal	G3G4	S3S4	N	09-02-99	C	NEW
Northern Appalachian Acidic Cliff Community	Natural Community NC514	G5	S5	N	05-22-96	С	
Northern Appalachian Acidic Rocky Summit	Natural Community NC501	G?	S2	N	09-17-86	В	
Prostrate Sand Cherry (Prunus pumila var. depressa)	Plant SP512	G5	S1	N	09-01-99	ВС	RANK CHANGE
Ridgetop Dwarf-Tree Forest	Natural Community NC508	G4	S3	N	09-17-86	AB	
Roundleaf Serviceberry (Amelanchier sanguinea)	Plant	G5	S1	N	08-19-97	D	NEW
Serviceberry (Amelanchier humilis)	Plant	G5	S1	N	08-27-98	D	NEW
Three-toothed Cinquefoil (Potentilla tridentata)	Plant SP502	G5	S1	N	05-28-96	A	
Appalachian Sand Cherry (Prunus humilis var susquehanae)	Plant SP513	G5T4	S2	РТ	07-19-96	ВС	



# **USGS QUADRANGLE MAP: RANSOM**

**BALD MOUNTAIN/NC501, NC505, SP502 & SP513 (Newton & Ransom Twps.)** – **UPDATE-** A new small population of **Serviceberry** (*Amelanchier humilis*), a S1 Pennsylvania plant species of concern, was found on a prominent facing cliff on this site. Associated species included American Mountain-Ash (*Sorbus americana*), Blueberry (*Vaccinium sp.*), Cherry (*Prunus sp.*), Black Huckleberry (*Gaylussacia baccata*), Serviceberry (*Amelanchier arborea*), and **Three-toothed Cinquefoil** (*Potentilla tridentata*), an S1 Pennsylvania plant species of concern. This site consists of a high elevation southwest-northeast running ridge that is terminated at the southwest end by a dramatic vertical rock ledge. The ledge and subsequently the ridge behind it receive the full brunt of prevailing weather. There are no present threats at this site, but development (houses) may present a long-term threat. This area probably has a long history of fire.

The site includes a good to fair quality **Ridgetop Dwarf-Tree Forest Natural Community**, more commonly known as a "Pitch pine-Scrub oak barren", though it is primarily dominated by scrub-oak. Scrub oak is the dominant woody species with scattered gray birch, and mountain laurel as associates. Low growing species of blueberry, huckleberry, and black chokeberry are common in openings. Many of the plant species of the Pitch pine-Scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain the Pitch pine-Scrub oak community.

Also included in this site is the **Northern Appalachian Acidic Rocky Summit Natural Community**. This community occurs at the rock ledge at the southwest end of the ridge. It is characterized by large exposed sandstone outcrops with sparse vegetation. Characteristic species include gray birch, black chokeberry, lowbush blueberry, serviceberry, mountain-ash (*Sorbus americana*), sedge (*Carex tonsa*), mosses (*Polytrichum sp.*), and lichens.

Several rare plant and animal species are associated with Pitch pine-Scrub oak barrens and acidic rocky summit communities. Two plant species of special concern were documented at Bald Mountain, including an excellent population of **Three-toothed Cinquefoil** (*Potentilla tridentata*), a S1 Pennsylvania endangered plant, and a good to fair population of **Appalachian Sand Cherry** (*Prunus pumila var susquehanae*), **SP513**. This site has potential for additional rare species, including other plant and lepidopteran (butterfly & moth) species.

SUSQUEHANNA RIVER WOODS – NEW SITE- (Ransom Twp, Duryea Twp and Luzerne County) An undetermined population of a **Pennsylvania animal species of concern** was found on this site in the uplands next to the Susquehanna River. More surveys are needed to assess the population of the species. In addition, several populations of an S3S4 Pennsylvania animal species of concern were found in various locations in this stretch of the Susquehanna River. Associated species include Small-mouthed Bass (Micropterus dolomieu), Elktoe (Alasmidonta marginata), Algae, Water-Stargrass (Heteranthera dubia), and Triangle Floater (Alasmidonta undulata). The river is bordered to the east by railroad tracks and to the west by a sand/cobble/boulder shelf area. No disturbances are apparent in the immediate area. Siltation and degradation of water quality from surrounding land use are potential threats. The site previously referred to as COUNTLY LINE ISLAND has been included in this new, expanded polygon. This site is located on an island in the Susquehanna River. An updated survey of this site in 1999 found a fair to good quality population of **Prostrate Sand Cherry** (*Prunus pumila var. depressa*), a PA-Rare plant species. This population is upgraded from a fair population that was surveyed in 1996. It is also good habitat for bird species such as osprey and herons. Leaving this site in its current condition will help the rare plant persist here. The island includes two primary habitat types. One is the higher elevation forested portion that is infrequently flooded and has deep alluvial soil. It is dominated by silver maple (Acer saccharinum), sycamore (Platanus occidentalis), hackberry (Celtis occidentalis), and elm (Ulmus sp.) in the overstory, and ostrich fern (Matteucia struthiopteris), Japanese hops (Humulus japonicus), Japanese knotweed (Polygonum cuspidatum), and impatiens (Impatiens sp.) in the robust herb layer. The other habitat type is the lower

elevation gravelly area occurring at the head of the island. This habitat is characterized by seasonal scouring and vegetation here occurs in zones reflective of the duration of inundation. Highest areas, least frequently flooded, support shrubs and stunted trees with a high diversity of herbs. Slightly lower areas support fewer shrubs, and a less robust assemblage of herbs with several species of grass being common. Even lower areas support fewer species and these are interspersed with patches of unvegetated gravel. The two species most common in this zone are the grasses, turkey foot (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Beyond this area and to the water line (in the late season) is mostly unvegetated gravel with a few scattered weedy species. It is good habitat for bird species such as osprey and herons. Leaving this site in its current condition will help the rare plant persist here.

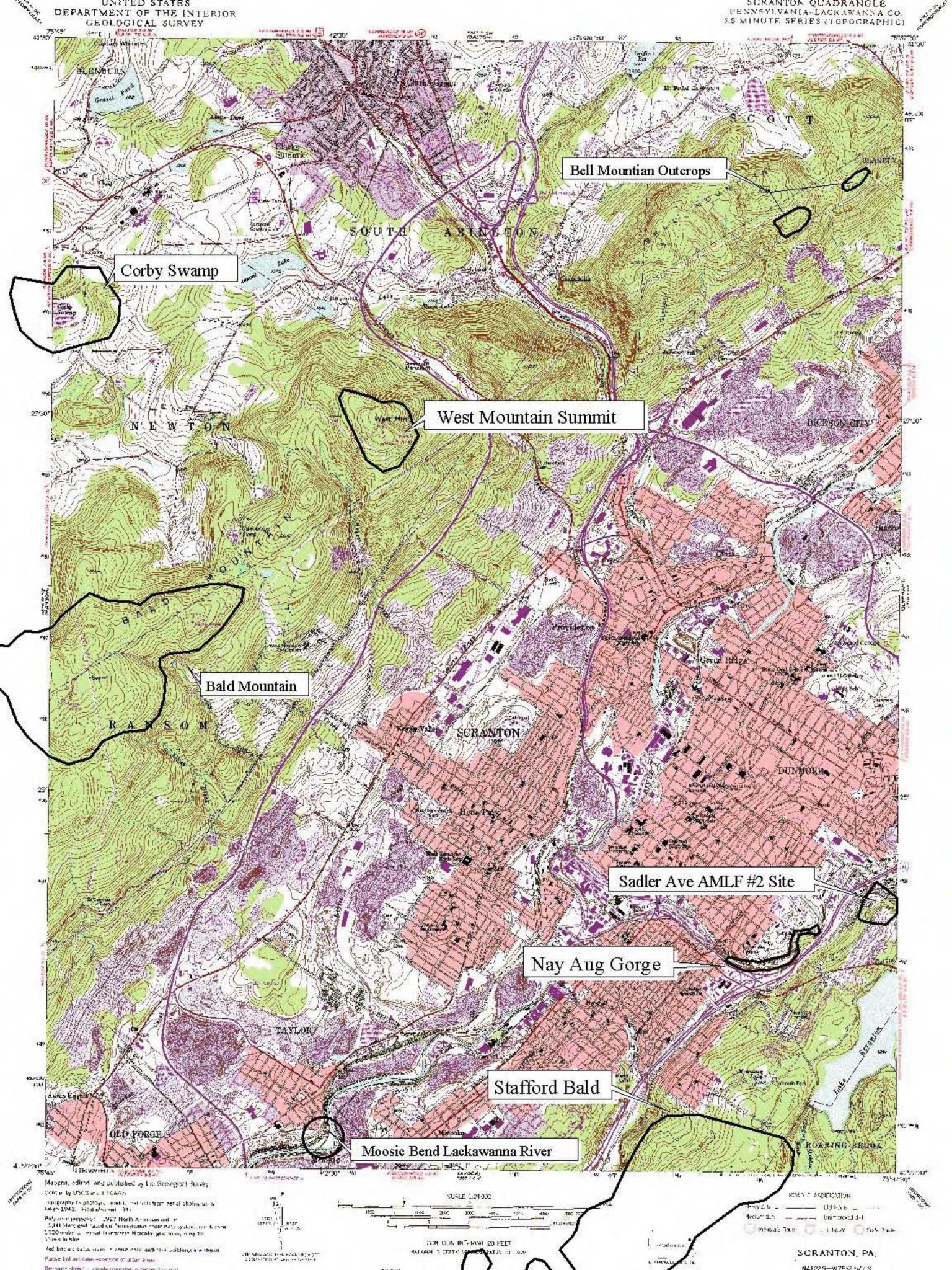
The surrounding land use is mainly business, residential, and industrial. It is recommended that a forested buffer be left in the area where these species has been found.

WYOANNA CLIFFS- UPDATE- NC514 (Newton Twp.) - is a fair to good quality Northern Appalachian Acidic Cliff Natural Community that rises five hundred feet above the North Branch of the Susquehanna River. The rock outcrops support an open canopy of oak, hickory, red maple, and red-cedar (Juniper virginiana), and a sparse shrub and herb layer. Lowbush blueberry, wild phlox (Phlox subulata), wild pinks (Silene caroliniana), Pennsylvania sedge, saxifrage (Saxifraga virginica), and rockcap fern (Polypodium virginianum) are among the characteristic plants here. A new small population of Round-leafed Serviceberry (Amelanchier sanguinea), a S1 Pennsylvania plant species of concern, was found along a cliff community w/ open rock outcrops & open canopy of oaks, red maple & a sparse shrub layer dominated by lowbush blueberry. Characteristic herbaceous plants include Moss Pink (Phlox subulata), Wild Pink (Silene caroliniana) and Club-Rush (Scirpus verecundus). Disturbances in this area include past logging & occasional trail use. The surrounding land is rural with residential housing and agriculture. Potential threats include clearing of the woods at the top of the cliff & the buffer on the sides of the cliff, and expansion of the road/railroad below the cliff. One plant species of special concern may occur at the site but further field surveys are needed to verify this occurrence. Maintaining the woodlands at Wyoanna Cliffs is critical to maintaining the current condition of the cliff community and also serves to maintain the scenic qualities of this river-corridor site. Similar sites also occur up river in Wyoming County at Falls Cliffs and Skinners Eddy (Wyoming County Natural Areas Inventory, 1995).

# **USGS QUADRANGLE MAP: SCRANTON**

		TNC	Ranks*				
Species/Community	Species type/ Original Report			State			Update
Name	Code	Global	State	Status	Last Seen	Quality	Status
	Geologic						
Waterfalls and Rapids		G?	S?	N		Е	
	Natural						
	Community						
Ridgetop Dwarf Tree Forest	NC501	G4	S3	N	09-17-93	AB	
	Natural						
	Community						
Ridgetop Dwarf Tree Forest	NC508	G4	S3	N	09-10-91	В	
	Natural						
Northern Appalachian	Community						
Acidic Rocky Summit	NC527	G?	S2	N	05-22-96	BC	
·	Plant						
Lupine (Lupinus perennis)	SP514	G5	<b>S</b> 3	N	06-02-91	D	
Appalachian Sand Cherry (Prunus pumila var. susquehanae)	Plant SP525	G5T4	S2	N	06-02-91	С	
Slender Mountain- RiceGrass ( <i>Oryzopsis</i> pungens)	Plant SP526	G5	S2	N	06-02-91	D	
Bicknell's Hoary Rockrose (Helianthemum bicknellii)	Plant SP511	G5	S2	N	08-08-90	CD	
Appalachian Sandwort	Plant						
(Minuartia glabra)	SP534	G4	S2	N	05-22-96	С	
(Hillian tia giaora)	Animal	<u> </u>	22	11	05 22 70		
Animal	SA517	G5T2	S1S2	N	05-26-88	В	
Aiiiiigi	Animal	0312	5152	11	03 20 00	В	
Animal	SA507	G3	S1B, S1N	N	04-25-93	Е	
Allillai		03	טוט, טווי	14	UT-23-73	ட	
Animal	Animal SA502	G4	S3B, S3N	N	04-25-93	Е	
Animal	Animal SA535	G5	S3B, S4N	N	06-12-96	Е	
/ Millingi	Animal		552,511	11	001270		
Animal	SA536	G5	S3B	N	06-12-96	Е	
Amiliai	Animal	UJ.	מכט	1.4	00-12-90	L	
Animal	SA516	G3	S2	N	05-22-96	В	

No further updates or new sites occurred in this quadrangle

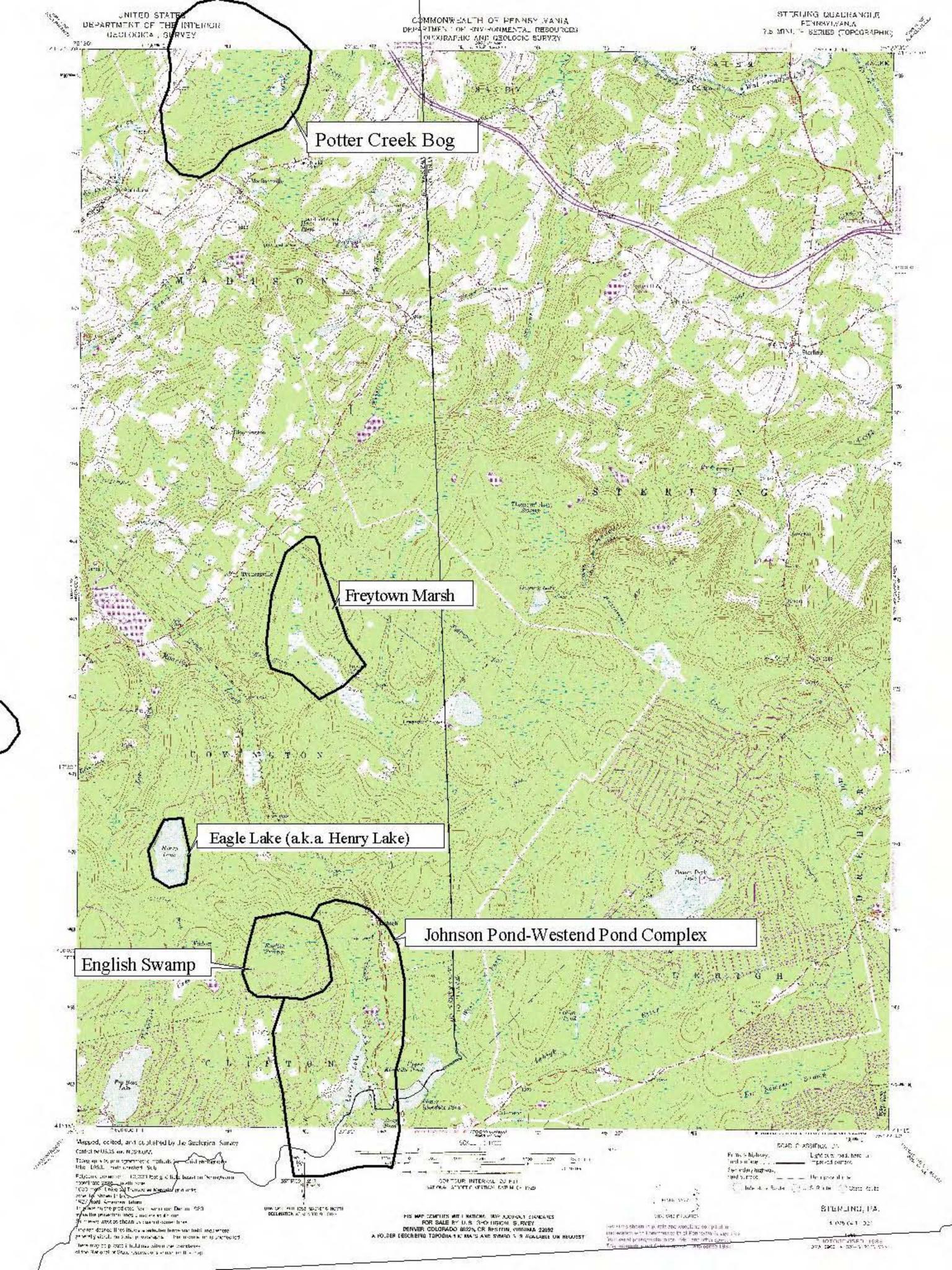


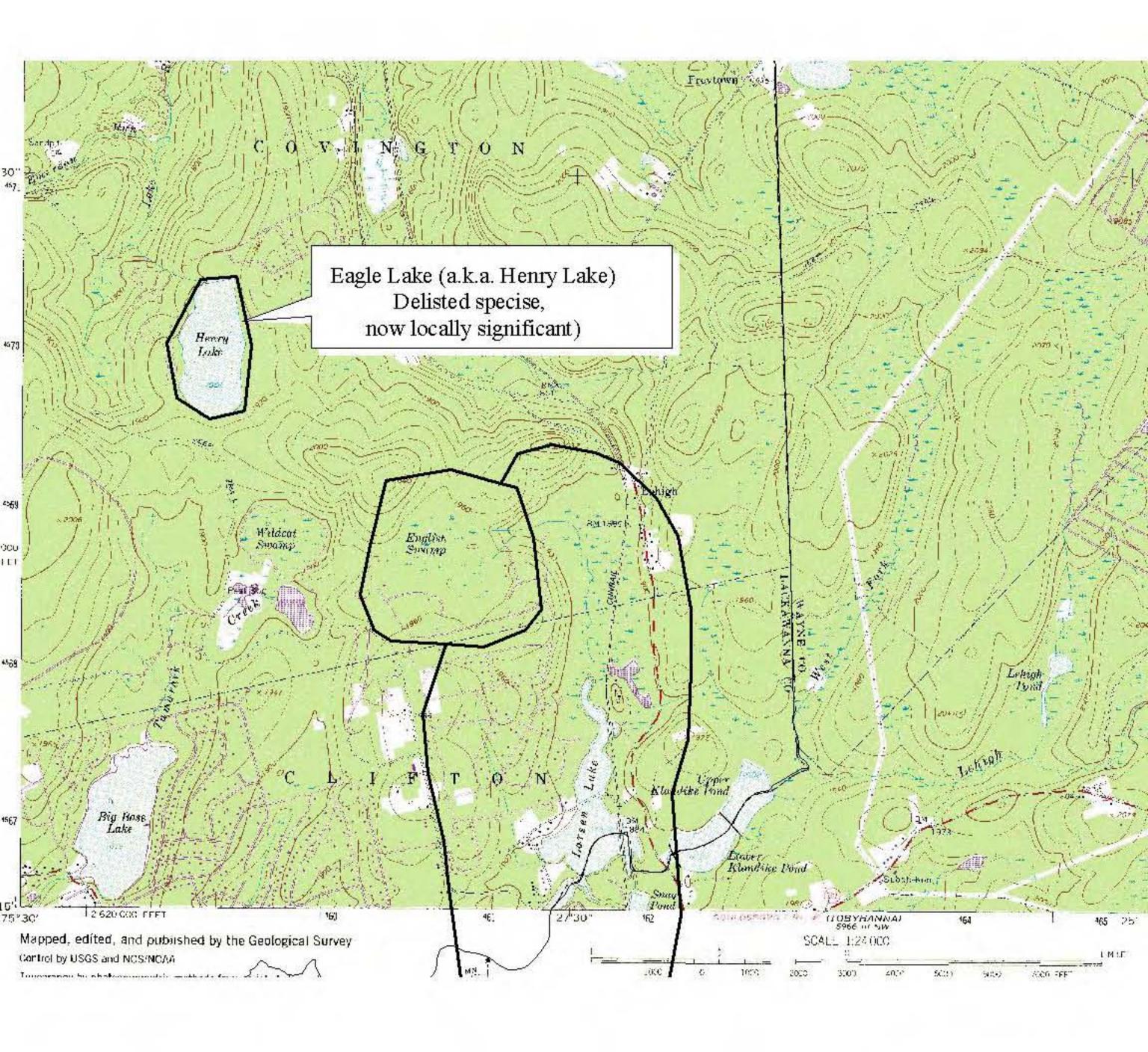
# **USGS QUADRANGLE MAP: STERLING**

		TNC	Ranks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
	Natural					Quinties,	
Boreal Conifer Swamp	Community NC514	G?	S3	N	07-22-93	В	
Oligotrophic Glacial Kettlehole Bog	Natural Community NC543	G?	S3	N	07-11-96	BC	
Animal Animal	Animal SA532	G5	S2	N	08-24-89	В	
Animal	Animal SA542	G5	S?	N	06-11-96	Е	
Bog Sedge (Carex paupercula)	Animal SP515	G5	S3	N	06-18-96	Е	
Labrador-Tea ( <i>Ledum</i> groenlandicum)	Plant SP516	G5	S3	N	07-22-93	В	
Labrador-Tea ( <i>Ledum</i> groenlandicum)	Plant SP523	G5	S3	N	07-11-96	С	
Long-stemmed Waterwort ( <i>Elatine</i> <i>minima</i> )	Plant SP525	<b>G5</b>	S4	N	09-14-95	ВС	Delisted
Bog Sedge (Carex paupercula)	Plant SP534	G5	<b>S</b> 3	N	09-14-95	BC	
Mud Sedge (Carex limosa)	Plant SP538	G5	S2	N	07-22-93	C	
Creeping Snowberry (Gaultheria hispidula)	Plant SP539	G5	S3	N	07-22-93	Е	
Dwarf Mistletoe (Arceuthobium pusillum)	Plant SP540	G5	S2	N	07-22-93	В	
Slender Sedge ( <i>Carex</i> lasiocarpa)	Plant SP523	G5	S2	N	07-11-96	ВС	
Bog Sedge (Carex paupercula)	Plant SP533	G5	<b>S</b> 3	N	07-11-96	BC	

LOCALLY SIGNIFICANT: Henry Lake- "Eagle Lake" HQ-CWF: Lehigh River, Roaring Brook, Tamarack Creek MANAGED AREAS:

Sterling Map Update Changes Closeup





Sterling Quadrangle Update Closeup Eagle Lake (a.k.a. Henry Lake) (Update)

# USGS QUADRANGLE MAP: STERLING

# HENRY LAKE- "EAGLE LAKE"- SP525- UPDATE- (Covington Twp.) –

This lake contains a marginal to good population of **Long-stemmed Waterwort** (*Elatine americana*), a former Pennsylvania plant species of concern that is now delisted. This site has been removed from the statewide significant list due to delisting of this species, and is now considered locally significant.

This site is a glacial lake surrounded by a vacation-home development. Portions of the shoreline have been developed with homes, boat accesses, beaches, and a dam, or have been impacted by the deposition of stone or sand fill. The lake is used for recreational purposes, including boating, fishing, and swimming. Despite the disturbances to the shoreline, a state-threatened aquatic plant occurs in shallow parts of the lake. The population seems to be thriving and has been known from this site for at least fifty years. The current management of the lake appears to be compatible with the continued existence of the population.

JOHNSON POND-WESTEND POND COMPLEX- SP522 & SP587-UPDATE- (Clifton Twp. & Wayne Co.) - This series of ponds was artificially created by placing small dams along the Lehigh River and adjacent tributaries. The portion of these ponds on the Sterling quadrangle support one plant species of concern and one animal species of concern. A good population of Bog Sedge (Carex paupercula), and a good population of an animal species of concern were found on this site. On the Tobyhanna quadrangle, a large population of a former PA-Rare species, Purple Bladderwort (Utricularia purpurea), was found on this site but since has been delisted. Thousands of individual plants of this delisted species were observed in 1996. In addition, an undetermined population of Bushy Naiad (Najas gracillima), an S2 plant species of concern, was found on this site. The ponds systems have decreased in quality due to eutrophication and the increase in exotics such as Cabomba. Johnson Pond and the extensive wetland acreage around it are major headwaters to the Lehigh River. Much of this peatland has been impacted by beaver. Other disturbances include a railroad bisecting the wetlands, recreational use of the pond, and development occurring on adjacent lands. (See Tobyhanna Quadrangle for changes to this site)

# **USGS QUADRANGLE MAP: THORNHURST**

		TNC Ra	nks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Natural Pond	Natural Community NC524	G?	S2S3	N	07-30-96	В	
Hartford Fern (Lygodium palmatum)	Plant SP508	G4	S3	PR	07-30-96	В	
Common Labrador-Tea (Ledum groenlandicum)	Plant SP543	G5	S3	PR	10-04-01	В	
Small-floating Manna Grass ( <i>Glyceria borealis</i> )	Plant SP521	G5	S2	PE	07-30-96	ВС	
Short-awn Foxtail (Alopecurus aequalis)	Plant SP521	G5	S3	N	07-30-96	C	NEW
Purple Bladderwort (Utricularia purpurea)	Plant SP522	G5	S4	N	08-20-96	AB	Delisted
Bright Green Spike- Rush ( <i>Eleocharis</i> olivacea)	Plant SP523	<b>G5</b>	S4	N	08-20-96	C	Delisted
Common Labrador-Tea (Ledum groenlandicum)	Plant SP525	G5	S3	PR	06-18-96	С	

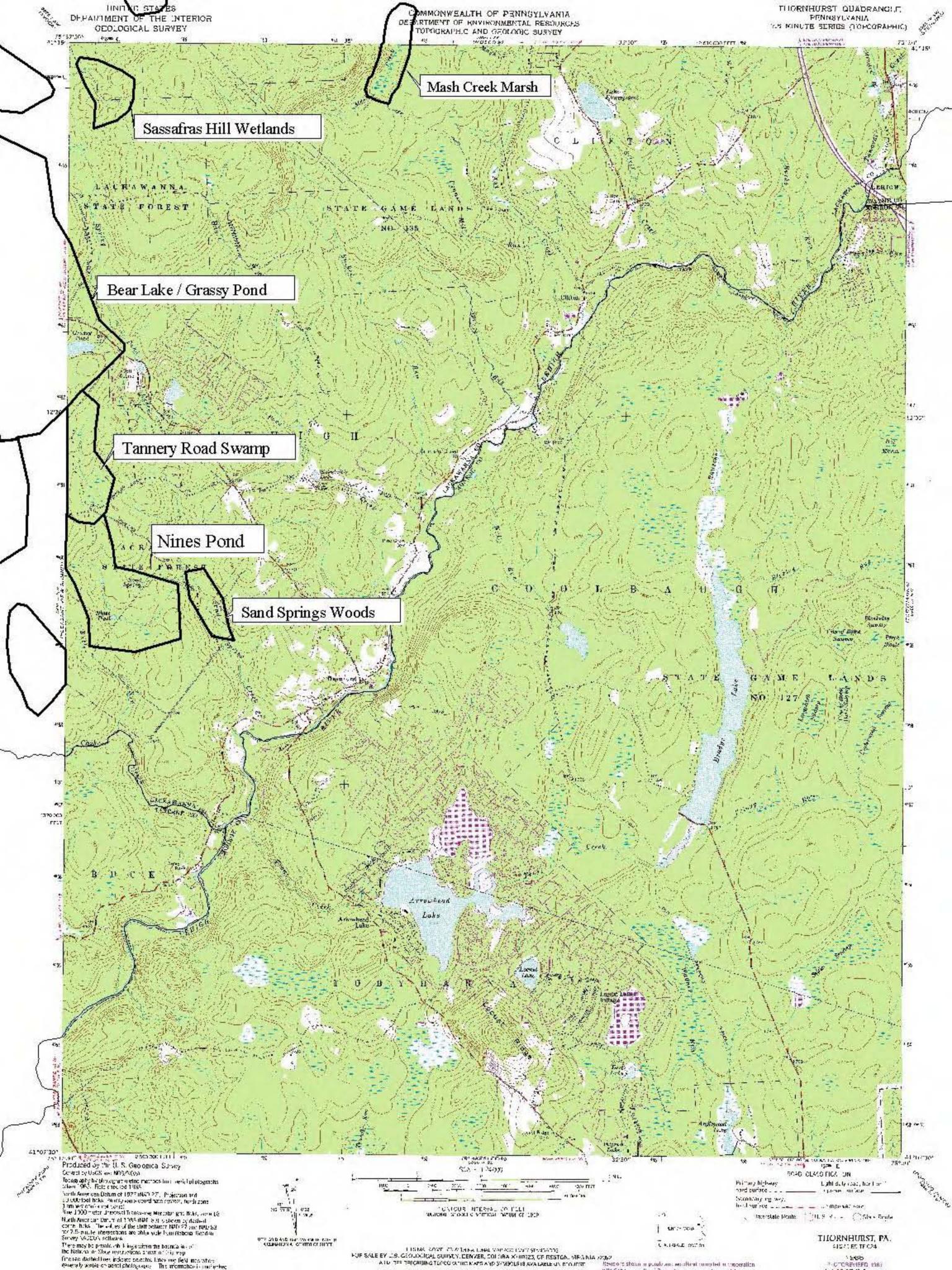
LOCALLY SIGNIFICANT: MASH CREEK MARSH

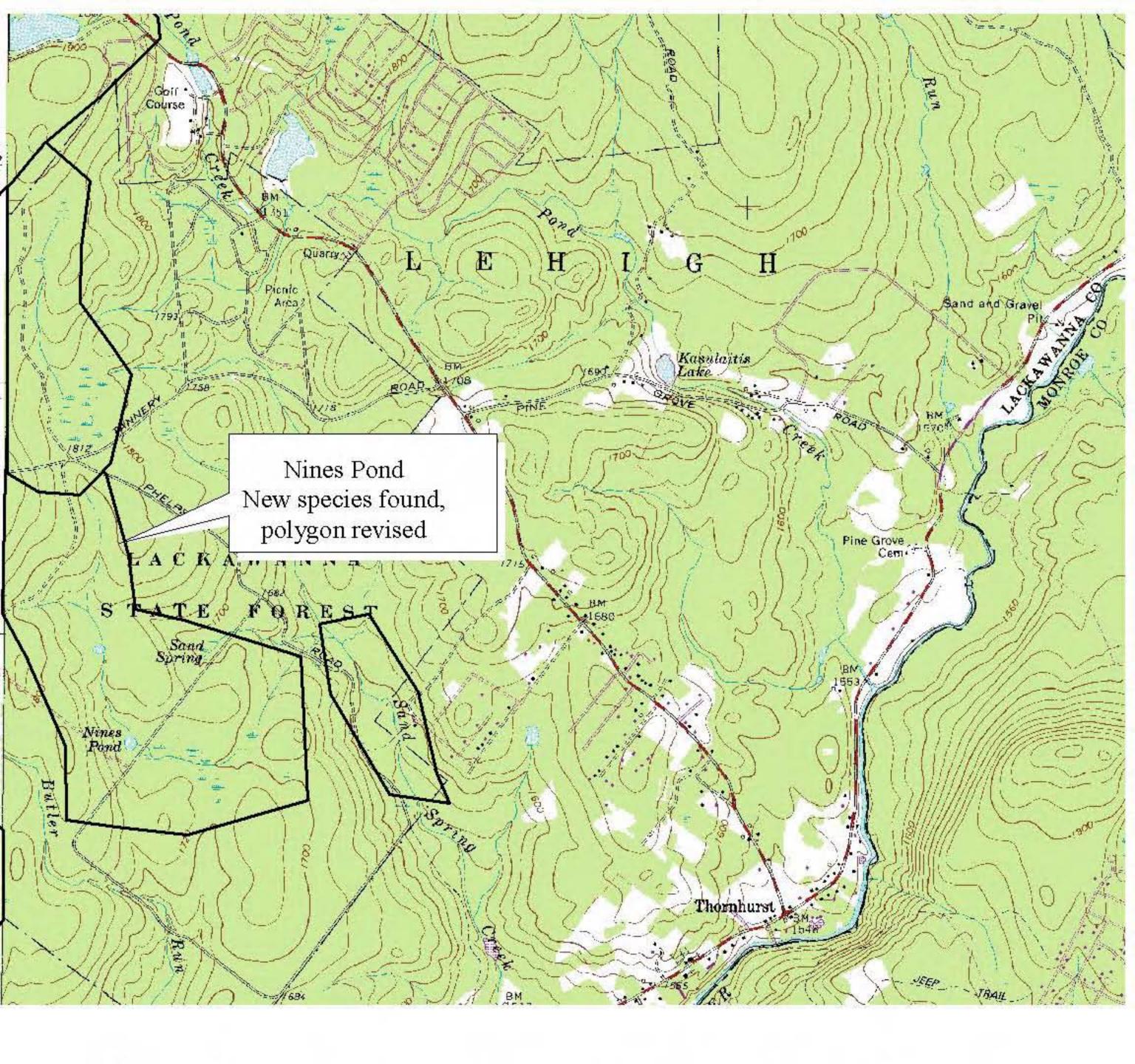
HQ-CWF: Ash Creek, Buckey Run, Choke Creek, Lehigh River, Pond Creek, Rucks Run, Sand

Spring Creek, Silver Creek, Spruce Run, Tamarack Creek

MANAGED AREAS: Lackawanna State Forest, State Game Lands #135

Thornhurst Map Update Changes Closeup





Thornhurst Quadrangle Update Closeup Nines Pond (update)

# **USGS QUADRANGLE MAP: THORNHURST**

BEAR LAKE/GRASSY POND/SP522 & SP523- UPDATE- (Thornhurst Twp.) – Now delisted, former Pennsylvania plant species of concern, Bright Green Spike-Rush (*Eleocharis olivacea*), and Purple Bladderwort (*Utricularia purpurea*) occur at this site. A portion of this site still contains many species of concern in Pleasant View Quadrangle (See previous description). The portion of this site on the Thornhurst quadrangle contains part of Grassy Pond. The pond is roughly 15-20 acres and its water levels may have been changed slightly by humans and/or beaver. The pond is thick with aquatic vegetation and includes a small floating peat island. These delisted species also occur in Bear Lake which is immediately upstream (see Pleasant View Quadrangle, BEAR LAKE/GRASSY POND). These populations could be considered as sub-populations of those in Bear Lake. The pond is surrounded by a mixed hardwood-conifer forest and has a dirt road along the south shore. It is used for fishing and nature appreciation by residents of the Bear Lake Association. This site will be best protected by leaving it in its current condition.

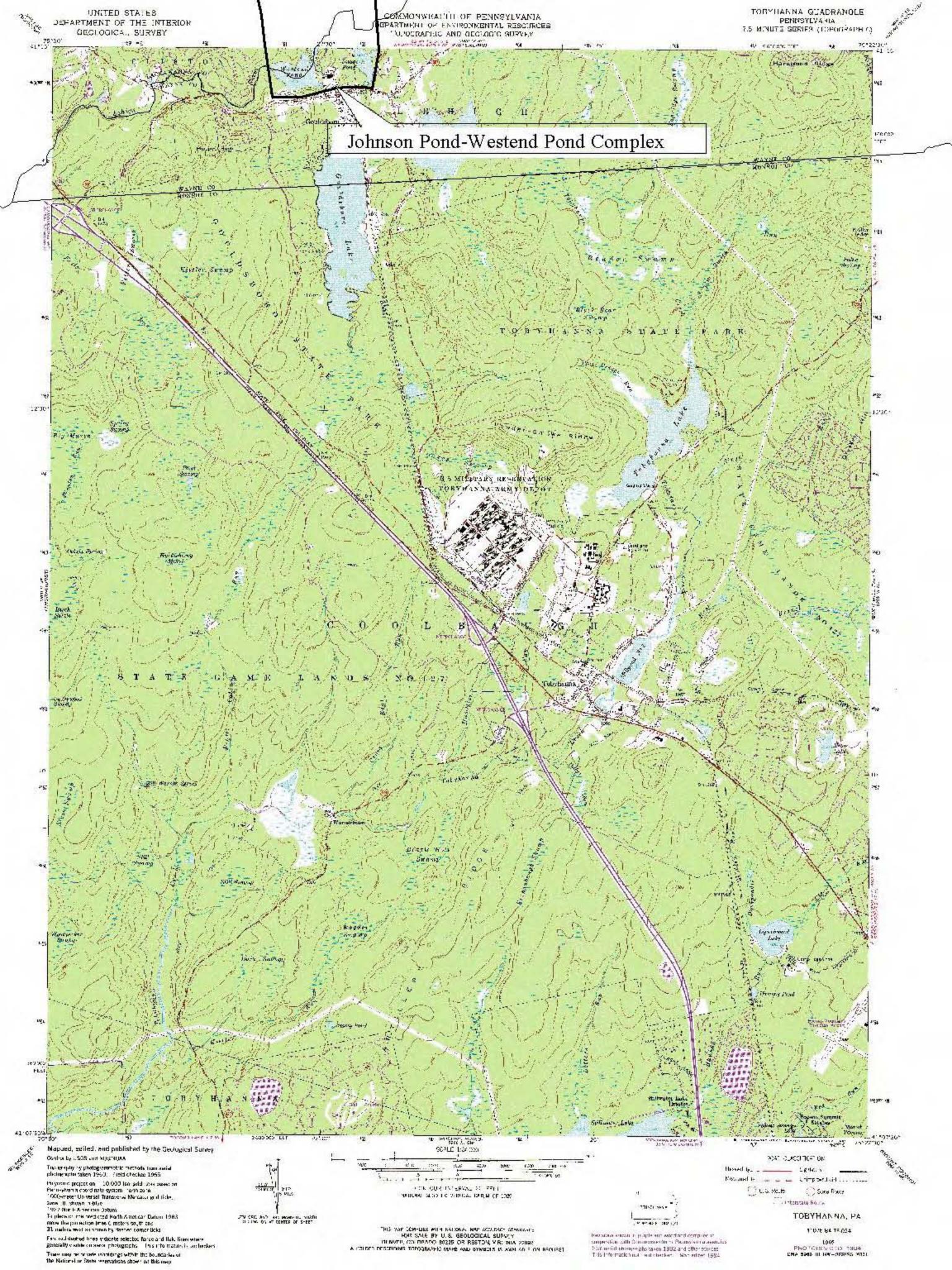
NINES POND -NC524 & SP521- UPDATE- (Thornhurst Twp.) - This site includes a Natural Pond Natural Community and includes two ponds set in a mixed hardwood forest matrix. The first pond is approximately one acre in size with open water in the center ringed by emergent graminoid species such as sharp-fruited manna grass (*Glyceria acutiflora*), and several species of sedges. Red maple and highbush blueberry occur on the hummocks that make up the pond margin. Downstream is a shrub-swamp which is bisected by a gravel road. The second pond, located 1/4 mile upstream from the first, is smaller and has emergent vegetation throughout. These ponds support a marginal to good population of Small-floating Manna Grass (*Glyceria borealis*), a PA-Endangered plant species. This site also contains a marginal population of Shortawned foxtail grass (*Alopecurus aequalis*), a species recorded here in 1996, but since has been listed as a Pennsylvania plant species of concern. Associated species include Pale meadowgrass (*Torreyochloa pallida*), Sedge (*Carex vesicaria*), Canada Bluejoint (*Calamagrostis canadensis*), and Water-Parsnip (*Sium suave*). These ponds are also excellent breeding habitat for amphibians. These ponds will be best protected by leaving them in their current condition and maintaining an adequate forest buffer in their immediate watershed. This site occurs in Lackawanna State Forest.

# **USGS QUADRANGLE MAP: TOBYHANNA**

		TNC Ranks*					
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Bushy Naiad (Navas marina)	Plant SP587	G5?	S2	РТ	08-14-96	E	
Purple Bladderwort (Utricularia purpurea)	Plant SP522	<b>G5</b>	S4	N	08-14-96	C	Delisted

HQ-CWF: Lehigh River, Tamarack Creek

JOHNSON POND-WESTEND POND COMPLEX- SP522 & SP587-UPDATE- (Clifton Twp. & Wayne Co.) - This series of ponds was artificially created by placing small dams along the Lehigh River and adjacent tributaries. The portion of these ponds on the Tobyhanna quadrangle support one current and one former plant species of special concern. A large population of a **former PA-Rare species**, **Purple Bladderwort** (*Utricularia purpurea*), was found on this site, but since has been delisted. Thousands of individual plants of this delisted species were observed in 1996. In addition, an undetermined population of **Bushy Naiad** (*Najas gracillima*) was found on this site. The pond systems have decreased in quality due to eutrophication and the increase in exotics such as Fanwort (*Cabomba caroliniana*). Johnson Pond and the extensive wetland acreage around it are a major headwater to the Lehigh River. Much of this peatland has been impacted by beaver. Other disturbances include a railroad bisecting the wetlands, recreational use of the pond, and development occurring on adjacent lands. (See also SP534, SP535, and SA532 Sterling Quad.)



# **USGS QUADRANGLE MAP: WAYMART**

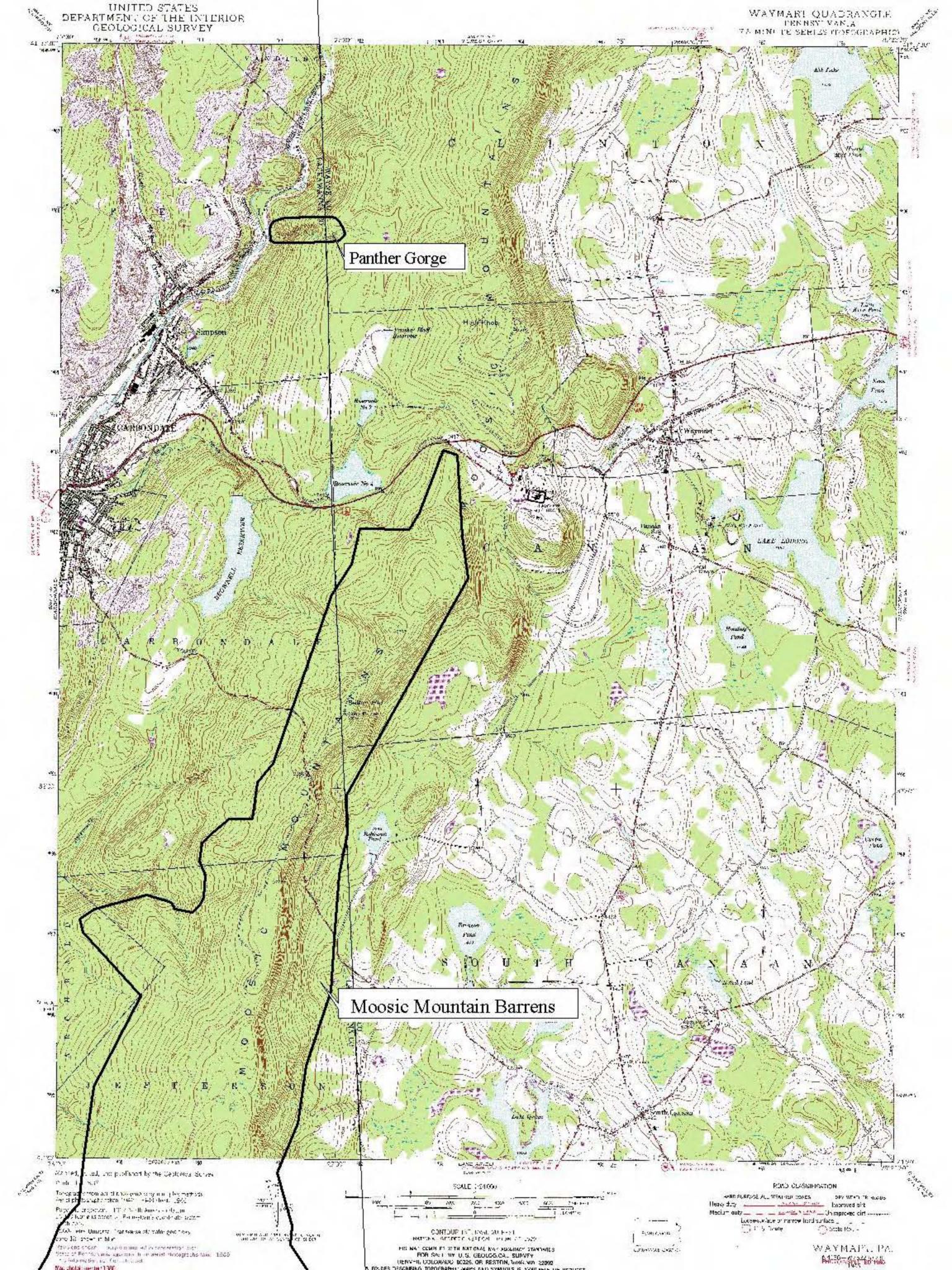
		TNC R	anks*				
Species/Community Name	Species type/ Original Report Code	Global	State	State Status	Last Seen	Quality	Update Status
Ridgetop Dwarf-Tree Forest	Natural Community NC519	G4	S3	N	08-01-89	ВС	
Ridgetop Dwarf-Tree Forest	Natural Community NC515	G4	S3	N	08-08-96	A	
Heath Barrens	Natural Community NC513	G?	S1	N	06-03-97	A	
A Sallow Moth (Chaetaglaea cerata)	Animal SA512	G3G4	S1	N	10-03-96	Е	
Barrens Chaetaglaea (Chaetaglaea tremula)	Animal	<b>G</b> 5	S1	N	10-05-97	ВС	NEW
Pointed Sallow ( <i>Epliglaea</i> apiata)	Animal SA502	G5	S3S4	N	10-05-97	A	
Footpath Sallow Moth (Metaxaglaea semitaria)	Animal	<b>G</b> 5	S2	N	10-05-97	ВС	NEW
Pink Sallow (Psectraglaea carnosa)	Animal	G3	S1	N	10-05-97	A	NEW

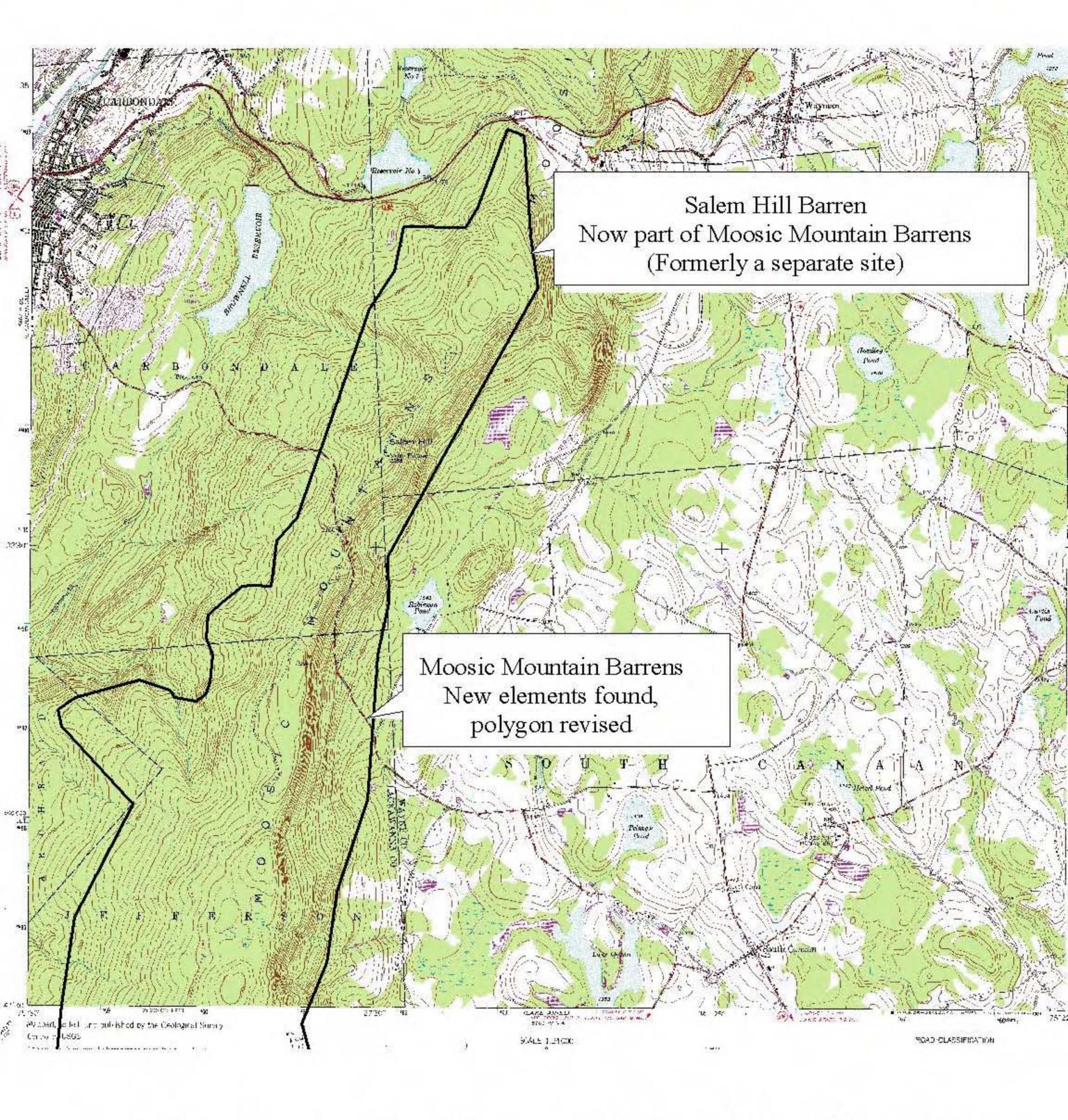
LOCALLY SIGNIFICANT: Panther Gorge

HQ-CWF:

MANAGED AREAS: State Game Lands #300

**Waymart Map Update Changes Closeup** 





Waymart Quadrangle Update Closeup Moosic Mountain Barrens (update) Salem Hill Barren (update)

# **USGS QUADRANGLE MAP WAYMART:**

MOOSIC MOUNTAIN BARRENS- NC513, NC515, SA502, & SA512- UPDATE- (Carbondale & Jefferson Twps.) - This site is one of the top priorities for conservation in the county and three new element occurrences are known for this site. A good to fair population of Barrens Chaetaglaea (Chaetaglaea tremula), a G5 S1 Pennsylvania animal species of concern, was found in the heath barrens area of this site. This population is the first extant record of this species for Pennsylvania. More surveys are needed for this species to determine the extent of the population. A fair to good population of Foothpath Sallow Moth (Metaxaglaea semitaria), a G5 S2 Pennsylvania animal species of concern, was found along with two subpopulations in the heath barrens and Ridgetop Dwarf-tree habitats. In addition, an excellent population and good to excellent subpopulations of Pink Sallow (Psectraglaea carnosa), a G3 S1 Pennsylvania animal species of concern, were also found in the heath barrens and Ridgetop Dwarf-tree Forest habitats.

This site is an extensive mosaic of good to excellent quality barrens communities. The barrens are primarily restricted to the highest most exposed portions of the ridge and are surrounded by slopes and drainages with mixed hardwood forest. The site includes both Ridgetop Dwarf-Tree Forest and Heath Barrens Natural Communities along with unassessed amounts of Northern Appalachian Acidic Rocky Summit Natural Community. The heath barrens are a newly discovered natural community for Pennsylvania. Moosic Mountain is the only location in the state they are known to occur. They are characterized by a dominance of low growing ericaceous species which include lowbush blueberry, huckleberry, sheep laurel, black chokeberry, and teaberry. Herbaceous species such as Pennsylvania sedge, poverty grass, and Canada mayflower are infrequent associates. Large expanses of this ankle to knee high vegetation stretches along the ridgetop creating sweeping views of the ridge and the valleys below. It is uncertain what conditions cause the occurrence and persistence of this community type, but it is likely that fire has played a role. The Ridgetop Dwarf-Tree Forest Natural Community consists primarily of scrub-oak barrens, and in some areas, Pitch pine-Scrub oak barrens. On some stretches of the ridge it occurs adjacent to the heath barrens, elsewhere it completely covers the width of the ridge. Though pitch-pine, black gum, chestnut oak, and sassafras are infrequently scattered throughout, scrub oak is the dominant canopy species in the dwarf tree forest. Common birds observed in the barrens included Common Yellowthroat, Prairie Warbler, Chestnut-sided Warbler, Rufous-sided Towhee, and Chipping Sparrow.

Many of the plant species of heath barrens and scrub oak barrens are fire tolerant (e.g., with thick protective bark and/or the capability to resprout and to germinate after fires), and under natural conditions fire has helped to maintain these barrens communities. Portions of this site show evidence of having burned within the last several decades.

The Nature Conservancy of Pennsylvania has recently purchased 1,200 acres of land on Moosic Mountain. This parcel is part of an approximately 6,000-acre ridgetop barrens complex, one of the largest and most diverse in the northeastern United States.

From limited surveys it was discovered that this site supports two animal species of special concern, including a globally rare G3 animal species. The site has the potential to support a number of other rare animal species as well as several plant species. Further surveys are encouraged. (See also Lake Ariel Quad., **MOOSIC MOUNTAIN BARRENS**, and Olyphant Quad., "Dunmore Bald").

Once considered a separate site in the original report, **Salem Hill Barren** is now a part of Moosic Mountains Barrens and will not be considered a separate statewide significant site for Lackawanna County. This area

includes a Ridgetop Dwarf-Tree Forest Natural Community. It contains areas dominated by scrub oak as well as areas of low shrub barrens with blueberry, huckleberry, and black chokeberry. This community is maintained by fires and the dry, nutrient poor soils. Although no species of concern have been identified from this site, the habitat is suitable for rare lepidopteran species (moths and butterflies) and surveys for these species are recommended. Recreational vehicle use, dumping, and quarrying have heavily disturbed this site.

Also once considered a separate site, **Dunmore Bald** is now contained within the super site Moosic Mountains Barrens and will no longer stand alone as a statewide significant site. This site includes a Northern Appalachian Acidic Rocky Summit Natural Community which occurs at the south end of **MOOSIC MOUNTAIN BARRENS**. **MOOSIC MOUNTAIN BARRENS** is one of the top priorities for conservation in the county (See **MOOSIC MOUNTAIN BARRENS** on Lake Aerial & Waymart Quads.). Dunmore Bald occupies 75-80 acres from 1600 to 1850 feet in elevation. Dominant species include black chokeberry, low-sweet blueberry, and hairgrass, and the site is potential habitat for species of concern such as sand cherry (*Prunus pumila*), slender mountain ricegrass (*Oryzopsis pungens*), and Appalachian sandwort (*Minuartia glabra*). The community grades into adjacent scrub oak and scrub oak-pitch pine-black huckleberry communities. Downslope sites have been degraded by railroads, logging, litter, and strip-mining. No field visit was made to this site during the inventory. Further surveys are encouraged.

Within this site is an Acidic Rocky Summit NC (NC525) and is located at the south end of the **MOOSIC MOUNTAIN BARRENS.** The barrens as a whole are considered to be one of the top priorities for conservation in the county. Dunmore Bald is dominated by low shrubs and herbs. It has a good potential for several species of concern.

#### **SUMMARY**

Since the original Natural Areas Inventory for Lackawanna County was completed in 1997, two new sites have been mapped. One new site, **Meyers Mountain**, was given a statewide significance rank of five while another site, **Susquehanna River/Woods**, was given a rank of three/four. Several sites will be removed from the statewide significant sites of Lackawanna County due to the delisting of the species of concern found in them. Most of these sites were reranked as locally significant due to the potential of finding additional species of concern, importance of conserving exceptional flora and/or fauna, and/or the importance of watershed protection. **Kizer Pond**, with its bird diversity, watershed protection, and close proximity to Moosic Mountain, was reranked as local significant. **Moosic Lake** was reranked as locally significant due to the potential for species of concern. Other sites with former species of concern, such as **Sickler Pond**, **Bassett Pond**, **and Eagle Lake (a.k.a. Henry Lake)**, originally ranked as five in statewide significance, were also reranked as locally significant. One site, **Chapman Lake**, originally ranked as five in statewide significance, will be removed from the sites of ecological significance in the county due to its low potential for finding species of concern, and for the existing landscape conditions.

Some statewide significant sites contain species of concern that have become delisted yet still harbor additional species of concern. In one case, a delisting affected the rank change of the site. The rank of **Mountain Mud Pond** changed from three to four while **Johnson Pond-Westend Pond Complex** changed from four to five. However, sites such as **Newton Lake/Mud Pond**, **Elmhurst Mud Pond**, **Bear Lake/Grassy Pond**, **Nines Pond**, did not change ranks due to the delisting of certain species of concern.

A few sites changed ranks due to new information gathered in this report or from new discussion concerning the conditions of the landscape and species of the site. **Blue Shutter Road Swamp** changed ranks from four to five, **Horseshoe Swamp** changed ranks from four to five, and **English Swamp** changed ranks from 2 to 1.

A few sites with species of concern in 1997 were further surveyed after the report was written and additional species of concern were found. One site, **Moosic Mountain Barrens**, is an important conservation priority for the county and for the state. Several additional species of concern have been found here since the original report was written in 1997. More surveys are needed for this site, which represents the best example of Barrens habitat in the state. Two former separate sites, **Dunmore Bald** and **Salem Hill Barren**, are now joined with **Moosic Mountain Barrens** as one super site. **Salem Hill Barren**, formerly separately ranked as a four, is now ranked as a one with **Moosic Mountain Barrens**. **Dunmore Bald**, formerly separately ranked as three in statewide significant sites, is also now ranked as a one. Other sites, including **Behler Swamp**, **Bald Mountain**, **Lake Kewanee Bog** and **Wyoanna Cliffs**, also yielded additional species of concern and/or natural community occurrences since the original report was written. However, the statewide significance rank of these sites did not change.

In addition, a few sites contained species of concern that changed ranks since the last report was written. **County Line Island** and **Behler Swamp** are sites where at least one of the species of concern had a change in species quality rank. However, the change in rank of this species did not change the overall rank of the site.

In summary, the top conservation priorities in Lackawanna County did not change significantly with the additional information provided within this report. **English Swamp**, with a new rank of one, is now one of the top conservation priorities for the county. Sites **Dunmore Bald and Salem Hill Barren**, now combined with **Moosic Mountain Barrens**, are now part of a high conservation priority for the county. Many sites that

were dropped from statewide significance to local significance are still important from a biodiversity standpoint, as many of these sites contain populations of species that are still relatively uncommon. These sites also have potential to contain further species of concern.

With future new information and the delisting of certain species within the sites of statewide significance, certain sites are likely to change in rank and some be dropped to the local significance status, and some will be dropped from all criteria of ecologically significant sites in the county. This information will be an amendment to the original report and will provide valuable information to the county for planning purposes.

# 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** <u>Listed Endangered</u> Taxa in danger of extinction throughout all or a significant portion of their ranges.
- **LT** <u>Listed Threatened</u> 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.
- N Taxa not currently listed by the U.S. Fish and Wildlife Service

# **STATE STATUS-NATIVE PLANT SPECIES**

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

- **PE** Pennsylvania Endangered Plant species which are in danger of extinction throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.
- **PT** <u>Pennsylvania Threatened</u> 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** <u>Pennsylvania Vulnerable</u> 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** <u>Tentatively Undetermined</u> 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 <u>None</u> Plant species which are believed to be endangered, rare, or threatened, but which are being considered by the required regulatory review processes for future listing.

# **STATE STATUS-ANIMALS**

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

# PE - Pennsylvania Endangered

Game Commission - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme

rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public law 93-205 (87 Stat. 884), as amended.

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

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 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 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.

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