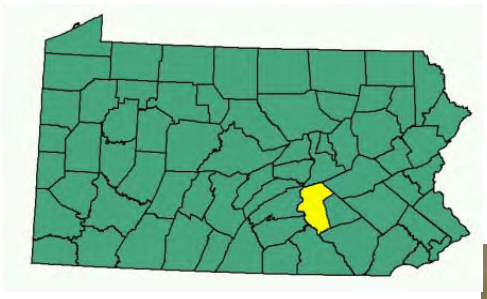
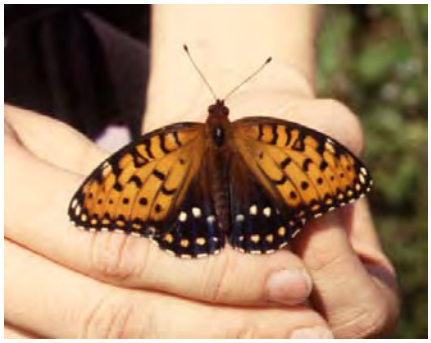
A NATURAL AREAS INVENTORY
OF DAUPHIN COUNTY, PENNSYLVANIA
Update – 2005





A NATURAL AREAS INVENTORY OF DAUPHIN COUNTY, PENNSYLVANIA

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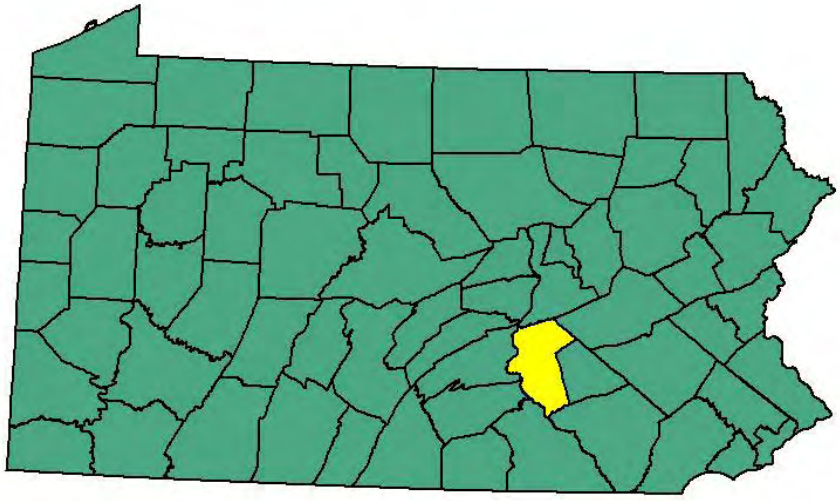


Prepared by:

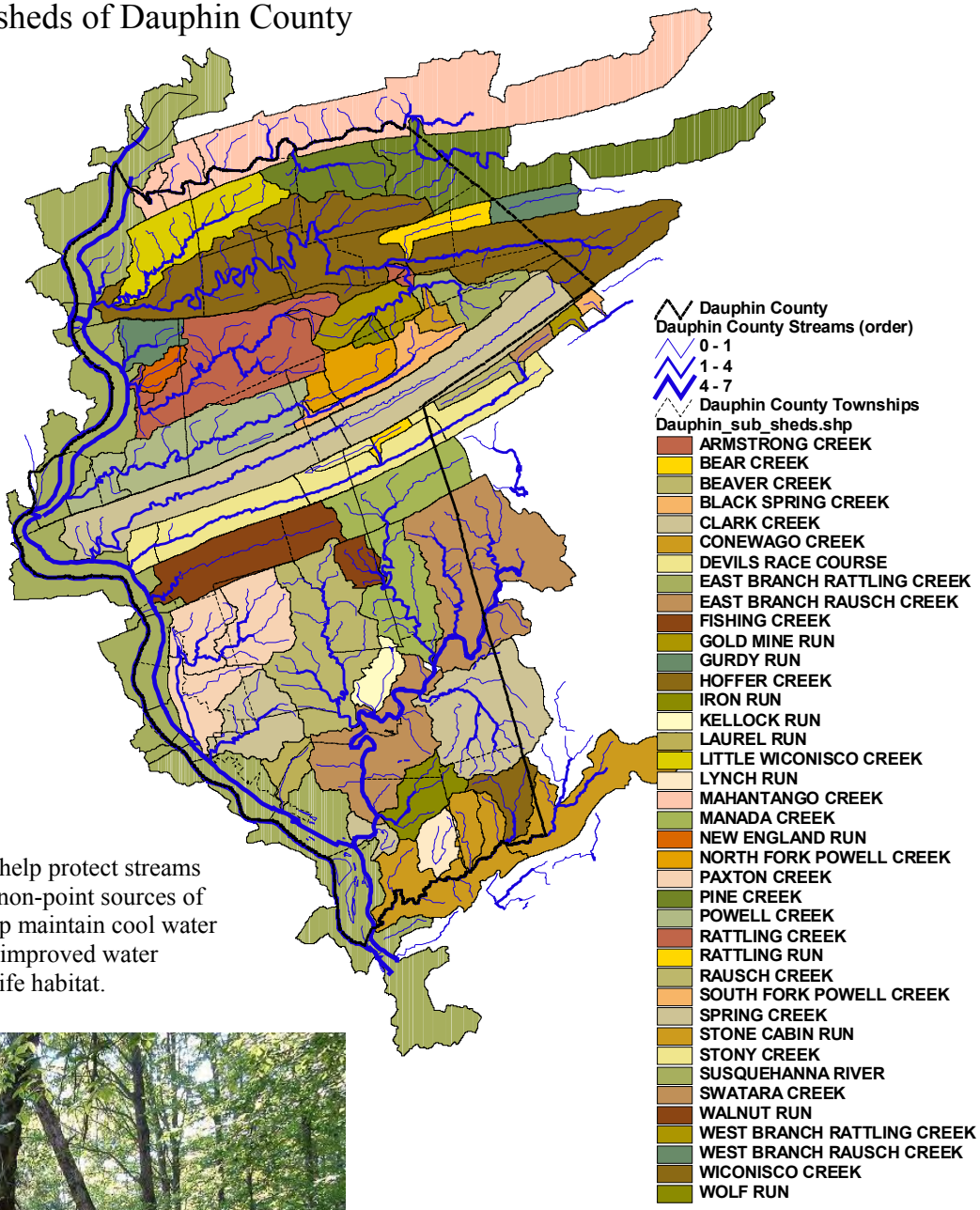
The Pennsylvania Science Office
The Nature Conservancy
208 Airport Drive
Middletown, Pennsylvania 17057

Submitted to:

The Tri-County Regional Planning Commission
Dauphin County Veterans Memorial Office Building
112 Market Street, Seventh Floor
Harrisburg, PA 17101-2015
(717-234-2639)

This project was financed in part by a grant from the Keystone Recreation, Park and Conservation Fund, under the administration of the PA Department of Conservation and Natural Resources, Bureau of Recreation and Conservation and a Community Development Block Grant, under the administration of the PA Department of Community and Economic development, Office of Community Development and Housing.

Sub-watersheds of Dauphin County

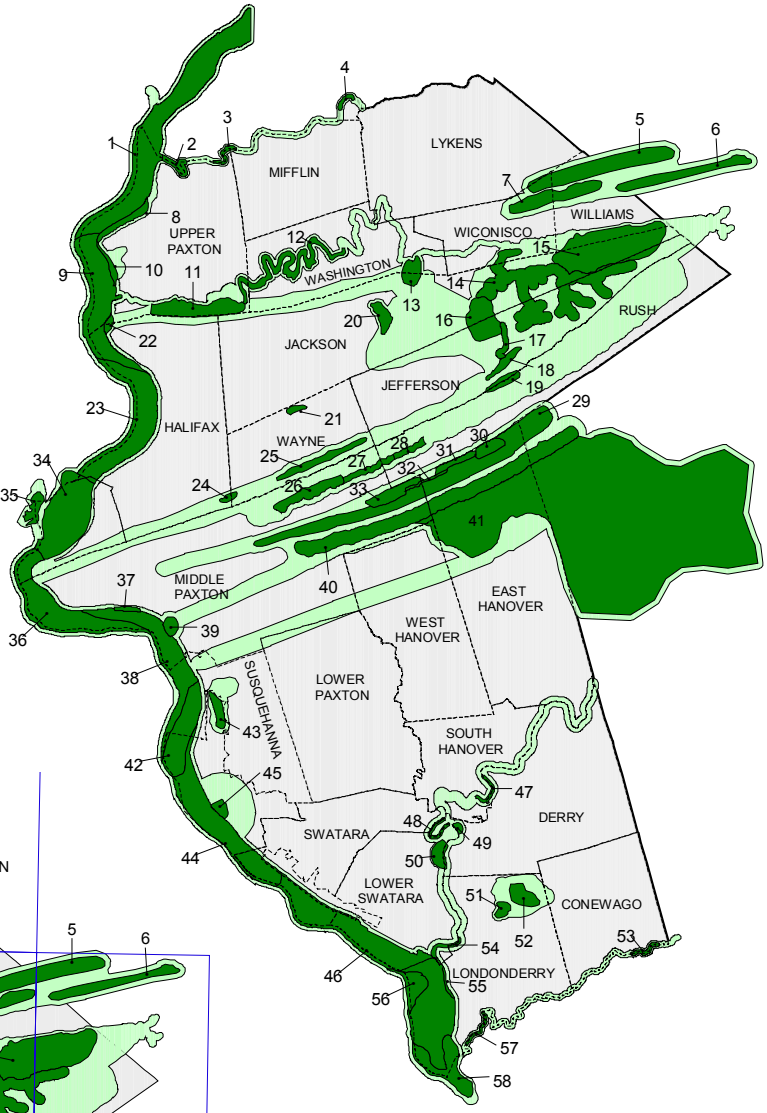


Forested buffers help protect streams and creeks from non-point sources of pollution and help maintain cool water temperatures for improved water quality and wildlife habitat.

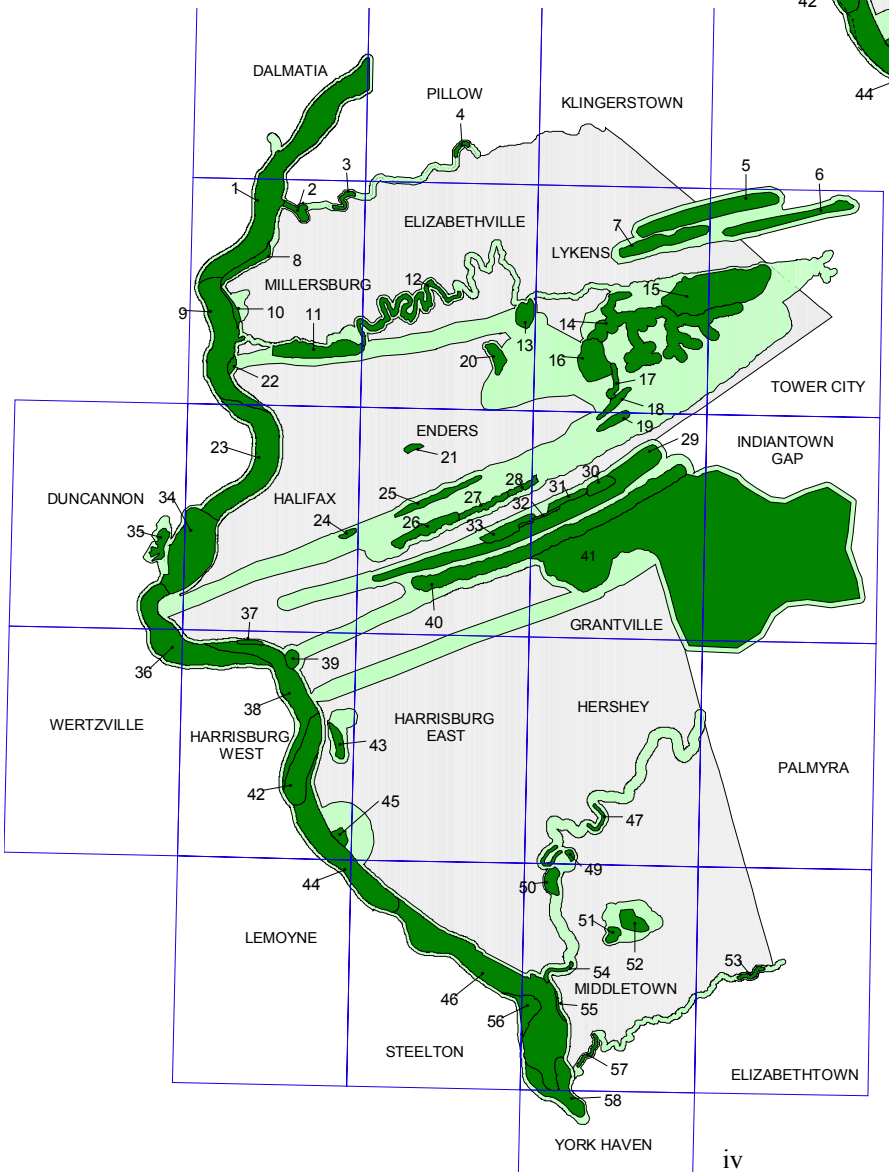
Preservation and repair of forested stream corridors in even heavily urbanized areas can significantly increase protection for water quality and wildlife habitat within the region.

Dauphin County Site Index

Site Index by Township



Site Index by USGS Quadrangle



Index to Dauphin County Sites—Listed by Site Number

- Note that natural areas with species of special concern are in capital letters while locally significant sites are in lower case letters throughout the document.
- Sites numbered from West to East, North to South

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
1	SUSQUEHANNA RIVER AT STATE GAME LANDS #258		Upper Paxton Twp. & Perry Co.	Millersburg, Dalmatia	99
2	MAHANTANGO CREEK OUTCROPS		Upper Paxton Twp. & Northumberland Co.	Millersburg	99
3	MALTA CLIFFS	NEW	Upper Paxton & Mifflin Twps. & Northumberland Co.	Millersburg	99, 84
4	MAHANTANGO CREEK AT PILLOW	NEW	Pillow Boro. & Northumberland Co.	Pillow	84
5	BEAR MOUNTAIN	NEW	Wiconisco, Williams & Lykens Twps. & Schuylkill Co.	Lykens	114, 116, 76
6	BIG LICK MOUNTAIN	NEW	Williams Twp. & Schuylkill Co.	Tower City	116
7	BEAR SWAMP		Wiconisco, Williams Twps.	Lykens	114, 116
8	MAHANTANGO MOUNTAIN SLOPES		Upper Paxton Twp.	Millersburg	99
9	SUSQUEHANNA RIVER AT MILLERSBURG		Upper Paxton & Halifax Twps. & Perry Co.	Millersburg, Halifax	99, 50
10	CUMMINGS SWAMP		Upper Paxton Twp.	Millersburg	99
11	BERRY MOUNTAIN WOODS		Upper Paxton Twp.	Millersburg, Elizabethville	99
12	WICONISCO CREEK OUTCROPS	UPDATED	Upper Paxton, Washington Twps.	Elizabethville, Millersburg	99, 104
13	OAKDALE STATION WOODS		Jackson, Washington Twps.	Elizabethville	53, 104
14	RATTLING CREEK WATERSHED	UPDATED	Jackson, Jefferson Twps. & Lykens Borough	Lykens, Tower City	53, 57, 76
15	WILLIAMSTOWN WOODS/WICONISCO FLOODPLAIN AT WILLIAMSTOWN		Jackson, Jefferson & Williams Twps.	Lykens, Tower City	53, 57, 116
16	DOC SMITH RUN WOODS/ BEAR PUDDLES		Jackson, Jefferson Twps.	Lykens	53, 57
17	SMOKE HOLE RUN		Jefferson Twp.	Lykens	57
18	Powell Creek Swamp		Jefferson Twp.	Grantville, Lykens	57
19	PETERS MOUNTAIN	NEW	Jefferson, Rush Twps.	Grantville, Lykens	57, 88
20	DEEP HOLLOW		Jackson Twp.	Elizabethville	53

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
21	DIVIDING RIDGE	NEW	Wayne Twp.	Enders	106
22	Berry Mountain Slopes		Halifax, Upper Paxton Twps.	Millersburg	50, 99
23	SUSQUEHANNA RIVER AT HALIFAX		Halifax Twp. & Perry Co.	Halifax, Millersburg	50
24	CAMP HEBRON SWAMP		Halifax, Wayne Twps.	Halifax	50, 106
25	PETERS MOUNTAIN WETLAND		Wayne Twp.	Enders	106
26	CLARK CREEK WETLANDS	UPDATED	Middle Paxton Twp.	Enders	77
27	CLARK CREEK WOODS		Middle Paxton & Rush Twps.	Enders	77, 88
28	DEHART DAM SPILLWAY	NEW	Rush Twp.	Enders, Grantville	88
29	ELLENDALE FORGE SITE/SHARP MOUNTAIN	UPDATED	Middle Paxton & East Hanover Twps. & Lebanon Co.	Enders, Grantville	77, 43
30	RATTLING RUN HEADWATERS		East Hanover Twp.	Grantville	43
31	STONY MOUNTAIN	UPDATED	East Hanover Twp.	Grantville	43
32	DEVILS RACE COURSE		East Hanover, Middle Paxton Twps.	Enders, Grantville	43, 77
33	STONY MOUNTAIN PONDS	UPDATED	Middle Paxton Twp.	Enders, Grantville	77
34	STATE GAME LANDS #290		Reed Twp. & Perry Co.	Duncannon, Halifax	86
35	AQUEDUCT BLUFFS/JUNIATA RIVER SCOUR	NEW	Reed Twp. & Perry Co.	Duncannon	86
36	SUSQUEHANNA RIVER AT SPEECEVILLE	NEW	Middle Paxton & Reed Twp.	Duncannon, Harrisburg West, Wertzville	77, 86
37	Dauphin Marsh		Middle Paxton Twp.	Harrisburg West	77
38	SUSQUEHANNA RIVER AT FORT HUNTER/ROCKVILLE	UPDATED	Middle Paxton & Susquehanna Twps. & Cumberland & Perry Cos.	Harrisburg West	77, 92
39	SECOND MOUNTAIN CLIFFS		Middle Paxton Twp. & Perry Co.	Harrisburg West	77
40	STONY CREEK VALLEY	UPDATED	East Hanover, Middle Paxton Twps. & Lebanon Co.	Enders, Grantville	43, 77
41	FORT INDIANTOWN GAP MACROSITE	UPDATED	East Hanover, West Hanover Twps. & Lebanon Co.	Grantville, Indiantown Gap	43, 110
42	SUSQUEHANNA RIVER ISLANDS—MCCORMICKS ISLAND ARCHIPELAGO		Susquehanna Twp., City of Harrisburg & Cumberland Co.	Harrisburg West	92

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
43	Wildwood Lake		Susquehanna Twp. & City of Harrisburg	Harrisburg West	92
44	SUSQUEHANNA RIVER AT HARRISBURG	UPDATED	City of Harrisburg, Swatara Twp., Cumberland & York Cos.	Harrisburg West, Harrisburg East, Steelton, Lemoyne	92, 96
45	HARRISBURG SITE	NEW	City of Harrisburg	Harrisburg West	92
46	SUSQUEHANNA RIVER AT MIDDLETOWN	NEW	Londonderry, Swatara, Lower Swatara Twps. Middletown Boro & York Co.	Middletown, Steelton	63, 96
47	HUMMELSTOWN LIMESTONE BLUFF		Derry & South Hanover Twps. & Hummelstown Boro.	Hershey	40, 90
48	SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS	UPDATED	Derry, Lower Swatara, Swatara Twps.	Hershey, Middletown	40, 72, 96
49	INDIAN ECHO CAVERNS		Derry Twp.	Hershey	40
50	SWATARA CREEK WOODS		Derry, Lower Swatara Twps.	Middletown	40, 72
51	IRON RUN DAM SITE	UPDATED	Londonderry Twp.	Middletown	63
52	ROUNDTOP THICKET	UPDATED	Londonderry Twp.	Middletown	63
53	CONEWAGO CREEK AT KOSER RUN		Conewago Twp. & Lancaster Co.	Elizabethtown	38
54	SWATARA CREEK AT ROYALTON		Londonderry Twp., Royalton & Middletown Boros.	Middletown	63
55	Royalton Rivershore		Londonderry Twp.	Middletown	63
56	PLAINFIELD RIVERSHORE/ HILL ISLAND RAPIDS	UPDATED	Londonderry Twp. & York Co.	Middletown, Steelton	63
57	CONEWAGO CREEK AT T300 COVERED BRIDGE	NEW	Londonderry Twp. & Lancaster Co.	Middletown	63
58	CONEWAGO FALLS	NEW	Londonderry Twp, Lancaster & York Cos.	Middletown, York Haven	63

Index to Dauphin County Sites—Listed Alphabetically by Site Name

- Note that natural areas with species of special concern are in capital letters while locally significant sites are in lower case letters throughout the document.
- Sites numbered from West to East, North to South

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
35	AQUEDUCT BLUFFS/JUNIATA RIVER SCOUR	NEW	Reed Twp. & Perry Co.	Duncannon	86
5	BEAR MOUNTAIN	NEW	Wiconisco, Williams & Lykens Twps. & Schuylkill Co.	Lykens	114, 116, 76
7	BEAR SWAMP		Wiconisco, Williams Twps.	Lykens	114, 116
22	Berry Mountain Slopes		Halifax, Upper Paxton Twps.	Millersburg	50, 99
11	BERRY MOUNTAIN WOODS		Upper Paxton Twp.	Millersburg, Elizabethville	99
6	BIG LICK MOUNTAIN	NEW	Williams Twp. & Schuylkill Co.	Tower City	116
24	CAMP HEBRON SWAMP		Halifax, Wayne Twps.	Halifax	50, 106
26	CLARK CREEK WETLANDS	UPDATED	Middle Paxton Twp.	Enders	77
27	CLARK CREEK WOODS		Middle Paxton & Rush Twps.	Enders	77, 88
53	CONEWAGO CREEK AT KOSER RUN		Conewago Twp. & Lancaster Co.	Elizabethtown	38
57	CONEWAGO CREEK AT T300 COVERED BRIDGE	NEW	Londonderry Twp. & Lancaster Co.	Middletown	63
58	CONEWAGO FALLS	NEW	Londonderry Twp, Lancaster & York Cos.	Middletown, York Haven	63
	County Line Swamp	see STONY CREEK VALLEY			
10	CUMMINGS SWAMP		Upper Paxton Twp.	Millersburg	99
37	Dauphin Marsh		Middle Paxton Twp.	Harrisburg West	77
20	DEEP HOLLOW		Jackson Twp.	Elizabethville	53
28	DEHART DAM SPILLWAY	NEW	Rush Twp.	Enders, Grantville	88
32	DEVILS RACE COURSE		East Hanover, Middle Paxton Twps.	Enders, Grantville	43, 77
21	DIVIDING RIDGE	NEW	Wayne Twp.	Enders	106
16	DOC SMITH RUN WOODS/ BEAR PUDDLES		Jackson, Jefferson Twps.	Lykens	57, 63
29	ELLENDALE FORGE SITE/SHARP MOUNTAIN	UPDATED	Middle Paxton & East Hanover Twps. & Lebanon Co.	Enders, Grantville	77, 43

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
	FIDDLER'S ELBOW BLUFFS	see SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS			
41	FORT INDIANTOWN GAP MACROSITE	UPDATED	East Hanover, West Hanover Twps. & Lebanon Co.	Grantville, Indiantown Gap	43, 110
45	HARRISBURG SITE	NEW	City of Harrisburg	Harrisburg West	92
47	HUMMELSTOWN LIMESTONE BLUFF		Derry & South Hanover Twps. & Hummelstown Boro.	Hershey	40. 90
49	INDIAN ECHO CAVERNS		Derry Twp.	Hershey	40
51	IRON RUN DAM SITE	UPDATED	Londonderry Twp.	Middletown	63
4	MAHANTANGO CREEK AT PILLOW	NEW	Pillow Boro. & Northumberland Co.	Pillow	84
2	MAHANTANGO CREEK OUTCROPS		Upper Paxton Twp. & Northumberland Co.	Millersburg	99
8	MAHANTANGO MOUNTAIN SLOPES		Upper Paxton Twp.	Millersburg	99
3	MALTA CLIFFS	NEW	Upper Paxton & Mifflin Twps. & Northumberland Co.	Millersburg	99, 84
	MANADA CREEK WOODS	see FORT INDIANTOWN GAP MACROSITE			
13	OAKDALE STATION WOODS		Jackson, Washington Twps.	Elizabethville	57, 104
19	PETERS MOUNTAIN	NEW	Jefferson, Rush Twps.	Grantville, Lykens	57, 88
25	PETERS MOUNTAIN WETLAND		Wayne Twp.	Enders	106
56	PLAINFIELD RIVERSHORE/HILL ISLAND RAPIDS	UPDATED	Londonderry Twp. & York Co.	Middletown, Steelton	63
18	Powell Creek Swamp		Jefferson Twp.	Grantville, Lykens	57
14	RATTLING CREEK WATERSHED	UPDATED	Jackson, Jefferson Twps. & Lykens Borough	Lykens, Tower City	53, 57
30	RATTLING RUN HEADWATERS		East Hanover Twp.	Grantville	43
52	ROUNDTOP THICKET	UPDATED	Londonderry Twp.	Middletown	63
55	Royalton Rivershore		Londonderry Twp.	Middletown	63
39	SECOND MOUNTAIN CLIFFS		Middle Paxton Twp. & Perry Co.	Harrisburg West	77
	SHARP MOUNTAIN	see ELLENDALE FORGE SITE/SHARP MOUNTAIN			
17	SMOKE HOLE RUN		Jefferson Twp.	Lykens	57

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
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34	STATE GAME LANDS #290		Reed Twp. & Perry Co.	Duncannon, Halifax	86
40	STONY CREEK VALLEY	UPDATED	East Hanover, Middle Paxton Twps. & Lebanon Co.	Enders, Grantville	43, 77
	STONY CREEK-WHITE SPRINGS	see STONY CREEK VALLEY			
31	STONY MOUNTAIN	UPDATED	East Hanover Twp.	Grantville	43
33	STONY MOUNTAIN PONDS	UPDATED	Middle Paxton Twp.	Enders, Grantville	77
38	SUSQUEHANNA RIVER AT FORT HUNTER/ROCKVILLE	UPDATED	Middle Paxton & Susquehanna Twps. & Cumberland & Perry Cos.	Harrisburg West	77, 92
23	SUSQUEHANNA RIVER AT HALIFAX		Halifax Twp. & Perry Co.	Halifax, Millersburg	50
44	SUSQUEHANNA RIVER AT HARRISBURG	UPDATED	City of Harrisburg, Swatara Twp., Cumberland & York Cos.	Harrisburg West, Harrisburg East, Steelton, Lemoyne	92, 96
	SUSQUEHANNA RIVER AT INDEPENDENCE ISLAND	UPDATED-Combined Susquehanna River at Independence Island and Susquehanna River at Steelton into "SUSQUEHANNA RIVER AT HARRISBURG"			
46	SUSQUEHANNA RIVER AT MIDDLETOWN	NEW	Londonderry, Swatara, Lower Swatara Twps. Middletown Boro & York Co.	Middletown, Steelton	63, 96, 72
9	SUSQUEHANNA RIVER AT MILLERSBURG		Upper Paxton & Halifax Twps. & Perry Co.	Millersburg, Halifax	99, 50
	SUSQUEHANNA RIVER AT MONTGOMERY FERRY	UPDATED-Combined Susquehanna River at Montgomery Ferry and Susquehanna River at Millersburg into "SUSQUEHANNA RIVER AT MILLERSBURG"			
	SUSQUEHANNA RIVER AT ROCKVILLE	UPDATED-Combined with Susquehanna River at Fort Hunter into one site "Susquehanna River at Fort Hunter/Rockville"			
36	SUSQUEHANNA RIVER AT SPEECEVILLE	NEW	Middle Paxton & Reed Twp.	Duncannon, Harrisburg West, Wertzville	77, 86
1	SUSQUEHANNA RIVER AT STATE GAME LANDS #258		Upper Paxton Twp. & Perry Co.	Millersburg, Dalmatia	99
	SUSQUEHANNA RIVER ISLANDS AT STEELTON	UPDATED-Combined Susquehanna River at Independence Island and Susquehanna River at Steelton into "SUSQUEHANNA RIVER AT HARRISBURG"			
42	SUSQUEHANNA RIVER ISLANDS—MCCORMICKS ISLAND ARCHIPELAGO		Susquehanna Twp., City of Harrisburg & Cumberland Co.	Harrisburg West	92
48	SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS	UPDATED	Derry, Lower Swatara, Swatara Twps.	Hershey, Middletown	40, 72, 96

Site #	Site Name	Changes Since 2000	Municipality	USGS Quadrangle(s)	Page #(s)
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43	Wildwood Lake		Susquehanna Twp. & City of Harrisburg	Harrisburg West	92
15	WILLIAMSTOWN WOODS/WICONISCO FLOODPLAIN AT WILLIAMSTOWN		Jackson, Jefferson & Williams Twps.	Lykens, Tower City	53, 57, 116

A NATURAL AREAS INVENTORY
OF DAUPHIN COUNTY, PENNSYLVANIA
UPDATE 2005

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for

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2005 UPDATE SUMMARY

The original Tri-County Natural Areas Inventory (NAI), which was completed in 2000, 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. This NAI update is a thorough revision to the original report. It includes new information based on fieldwork that was completed since the original NAI was written. Many of the new sites have resulted from inventories of neighboring counties. Additionally, several sites of geologic importance were included in order to be consistent with newer methodology adopted by the authors. The sites that were not visited since completion of the original NAI were not reevaluated. Even with additional fieldwork completed since the original Tri-County 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 counties. 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 any new sites discovered since the original inventories. The rankings are based on the same criteria used 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 have been reorganized from the original Tri-County NAI. There are tables for each township in the counties rather then for each USGS quadrangle map. Additionally, the tables have been organized by natural area and the species occurring within each site rather than comprehensively for the quad. Each table provides 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 natural area or an UPDATED site description.

All original natural communities and species of concern are described in the tables and text. Species codes used in the original report have been replaced by the species name in most cases. Sensitive species are not identified in order 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, as well as most animals.

Maps of each township accompany the text, showing the location of each site identified. 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. Additional information about how this report was designed and how it can be used is detailed in the Introduction and Natural Areas Inventory Methods in the body of the report.

(Title Page of First Edition)

A NATURAL AREAS INVENTORY OF CUMBERLAND, DAUPHIN, AND PERRY COUNTIES, PENNSYLVANIA 2000

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All of Dauphin County drains into the Susquehanna River. Activities within the County have a significant impact on the river and ultimately, the Chesapeake Bay.
Photo: PA Science Office of The Nature Conservancy

Preface to the First Edition

The Cumberland, Dauphin, and Perry 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 three counties; it is not an inventory of all open space. It is intended as a conservation tool and should in no way be treated or used as a field guide. 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 three counties 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 where that information was available to us. This information is useful in determining where gaps occur in the protection of land with rare species, natural communities and locally significant habitats. The mapped boundaries are approximate and our list of managed areas may be incomplete, as new sites are always being added.

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

Although an attempt was made through advertising, public meetings, research, and informal communications to locate the sites most important to the conservation of biodiversity within the three counties, it is possible that something was missed. Anyone with information on sites that may have been overlooked should contact the Tri-County Regional Planning Commission (see address on following page). This Natural Areas Inventory will be updated within five years, and additional sites may be included at that time.

ACKNOWLEDGMENTS

This project was financed in part by a grant from the Keystone Recreation, Park and Conservation Fund, under the administration of the PA Department of Conservation and Natural Resources, Bureau of Recreation and Conservation and a Community Development Block Grant, under the administration of the PA Department of Community and Economic development, Office of Community Development and Housing. Additional funding came from Cumberland, Dauphin, and Perry Counties, and from contributions by Gregory H. Knight, Esq., and from anonymous donors.

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 all of those who have carried out botanical and zoological survey work over the years. Without their contributions, this survey would have been far less complete. 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 Conservation and Natural Resources (formerly DER), the Pennsylvania Game Commission, the Pennsylvania Fish and Boat Commission, Shippensburg University, and Dickinson College were among the contributors for plant and animal records. Rob Criswell conducted surveys for rare fish species and Larry Klotz conducted surveys for rare plant species under contract for this report. Gene Wingert and Randy Cassell of Cumberland Valley High School provided valuable information on vernal pond communities of South Mountain. The foresters of Tuscarora State Forest provided information and maps of areas of interest in Tuscarora State Forest and elsewhere in Perry County. Dan Brauning of the PA Game Commission DCNR provided information on sites for rare bird species. Steve Spangler provided information and assistance on surveys State Game Lands in Cumberland County. Many thanks go to those who reviewed the draft of this report. Finally, we especially wish to thank the many landowners who granted us permission to conduct inventories on their lands. The task of inventorying the natural heritage of Cumberland, Dauphin, and Perry Counties would have been far more difficult without this tremendous pool of information gathered by many people over many years.

Donald Cameron was the Coordinator of County Natural Areas Inventories at the start of this project. He planned the inventory, performed background research, and conducted much of the fieldwork. He deserves much credit for his contributions to this Inventory.

Copies of this document may be obtained from:

The Tri-County Regional Planning Commission
Dauphin County Veterans Memorial Office Building
112 Market Street, Seventh Floor
Harrisburg, PA 17101-2015
(717)-234-2639

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INTRODUCTION

The Tri-County Region of Cumberland, Dauphin, and Perry counties is located in south-central Pennsylvania, centered about the Susquehanna River. Together, the three counties area is approximately 1,625 square miles (Tri-County Regional Planning Commission). The region encompasses a mix of forest, agriculture, small towns, suburbs, and urban areas. From 1990 to 2000, the combined population of the three counties increased more than seven percent, to 509,074 people (U.S. Bureau of Census), a continuation of the trend illustrated in the 1980's. In 2004, the population of each county was estimated at 221,397 people in Cumberland County, 253,282 people living in Dauphin County, and 44,652 people living in Perry County. Dauphin County illustrated the lowest percentage of growth among the three counties from 2000 to 2004.

Development patterns in the three counties have been greatly influenced by the dominant features of the landscape itself. The Great Valley, incorporating central Cumberland and Lower Dauphin counties, contains the majority of the urban and intensely agricultural areas, while the more rugged topography of Perry and northern Dauphin counties has a more sparsely settled mixture of forests and small farms. Each of the three counties still contain a patchwork of natural and human-dominated habitats, including cropland, pasture, young and old forests, ponds, streams, and rivers. These areas are used for hunting, fishing, hiking, birdwatching, and other activities that make the region an attractive place to live. The same pieces of the landscape that provide scenic and recreational opportunities also function as habitat for a great diversity of plants and animals, including some which are rare, threatened and endangered species. Cumberland, Dauphin, and Perry County each contain intact examples of natural communities and sites for species rare in the state or even globally rare.

Much of the recent population growth in the region has occurred through new developments and the expansion of small towns and suburbs into previously rural areas. Recent changes such as the expansion of Route 322 and the growth of suburbs in the Cumberland Valley have affected the entire region. As growth continues, the natural areas that comprise the Tri-County Region's native natural heritage can be easily lost without careful planning of growth and development. Protecting the integrity of these natural systems provides benefits to humans as well as providing for the survival of wildlife, rare and otherwise. The danger of losing rare species and habitats is more intense in a region experiencing growth as rapidly as the Tri-County area. Wise planning can maintain open space, including natural environments and the plants and animals associated with them. A balance between growth and the conservation of scenic and natural resources can be achieved by guiding development away from the most environmentally sensitive areas.

In order to achieve such a balance and ensure protection of critical natural areas, county and municipal governments, the public, and developers must know the location and importance of these sites. This knowledge can help prevent conflicts over land use as well as help to direct protection efforts and limited conservation dollars to the most vulnerable areas. The Pennsylvania Science Office of The Nature Conservancy, under contract to the Tri-County Planning Commission, 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 these three counties' 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 Cumberland, Dauphin, and Perry Counties. 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 no species of concern were documented at these sites. 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. Locally significant sites are referenced in lowercase lettering throughout this report, whereas natural area sites are referenced in uppercase lettering.

Particular species names, common and scientific, are provided in coordination with the state agency with jurisdiction over those species. Plants are under the jurisdiction of the PA Department of Conservation and Natural Resources (DCNR). Mammals and birds are under the jurisdiction of the PA Game Commission (PGC). Fish, aquatic invertebrates, reptiles, and amphibians are under the jurisdiction of the PA Fish and Boat Commission (PFBC) and are considered vulnerable to unauthorized collection. They are therefore not identified in the text of this report, at the request of the PFBC, in order to provide some measure of protection for the species. Terrestrial invertebrates are currently not regulated by a jurisdictional agency in Pennsylvania, though the Natural Heritage Program keeps track of many taxa that are considered rare in the state. Scientific names of associated species referenced in the site descriptions are provided in an appendix (Appendix VIII) in order to simplify the site descriptions.

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

The Natural Areas Inventory will be provided to each municipality through the Tri-County Planning Commission. The inventory is one tool that will aid in the implementation of county and municipal comprehensive plans. The counties, municipalities, land trusts, and other organizations 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.

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

NATURAL HISTORY OVERVIEW OF THE COUNTIES

The climate, geology, topography, and soils have been important in the development of the plant communities (forests, wetlands, etc.) as well as other natural features (e.g., streams and geologic features) in the three counties. Both natural and human disturbances have played an important role in the development and alteration of those plant communities and have caused the extirpation of some species and the introduction of others. These combined factors provide the framework for locating and identifying exemplary natural communities and species of special concern within the region. A brief overview of the physiography, geology, soils, and vegetation of Cumberland, Dauphin, and Perry Counties 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 relates in part to a region's topography and climate, two factors that significantly influence soil development, hydrology, and land use patterns of an area. Bedrock type also influences soil formation and hydrology. Therefore, both physiography and geology are important to the patterns of plant community distribution, which is in turn important to animal distribution (see Vegetation). Certain plant communities and species might be expected to occur within some provinces and not in others, due to differences in climate, soils, and moisture regime. Physiographic and geologic information has come from a variety of sources, including Geyer and Bolles (1979 and 1987), Berg et al. (1981), *The Atlas of Pennsylvania* (Cuff et al. 1989), the *Geologic Map of Pennsylvania* (Socolow 1980), *Glacial Deposits of Pennsylvania* (Socolow 1981), and *Physiographic Provinces of Pennsylvania* (Berg et al. 1989).

The Tri-County region is situated within parts of three Physiographic Provinces: the Ridge and Valley Province, the Blue Ridge Province, and the Piedmont Province (Berg *et al* 1989). Each of these provinces has characteristic rock formations and topography (Geyer and Bolles 1979). The Ridge and Valley Province, underlain by wrinkled layers of sedimentary rock, contains most of the land in the three counties. This Province is divided into two Sections: the Appalachian Mountain Section and the Great Valley Section. The northwest-to-southeast running ridges of northern Perry and northern Dauphin Counties are part of the Appalachian Mountain section. These sandstone ridges typically range from 800 to 1200 feet in elevation and are fairly uniform. The valleys between these ridges may be more different from each other, reflecting differences in the underlying bedrock. South of the Appalachian Mountain Section is the Great Valley Section. This section occurs in a broad band across most of Cumberland County and the central part of Dauphin County. The Great Valley Section has a flat to rolling topography underlain by limestone and shale.

The Blue Ridge Physiographic Province (South Mountain Section) is represented by the portion of South Mountain that is located in southwestern Cumberland County. This portion of South Mountain represents the northern most tip of the Blue Ridge Physiographic Province, which continues south into Maryland and Virginia. The topography consists of steep ridges and narrow valleys, and the underlying rocks are erosion-resistant granite, sandstones, quartzite, and diabase.

The Piedmont Physiographic Province, Gettysburg-Trenton Section, extends into the south end of Dauphin County and into a very small part of Cumberland County near the town of Lisburn.

This Section has steep-sided diabase ridges and rolling hills underlain by conglomerates, sandstones, and shales.

Soils

The distribution of soils in these three counties reflects both local topography and bedrock geology. The physiographic regions outlined above tend to have similar soils, which in turn influence land use patterns. The Great Valley Section is mostly in agriculture, while the Appalachian Mountain and South Mountain Sections contain many woodlands and reservoirs, with small farms in the valleys.

The following brief descriptions of soil characteristics are taken from USDA soil surveys of each county, cited below, and the reader is referred to those documents for more detailed information. Additional information on associated vegetation is provided based on image interpretation and 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.

The soil associations of the three counties have been described in two soil surveys: one for Cumberland and Perry Counties (Zarichansky 1983), and one for Dauphin County (Kunkle *et al* 1972). These are described below, grouped by physiographic section. An association is a group of soils with a distinctive, proportional pattern of occurrence in the landscape (Carey and Yaworksi 1963). Eight soil associations have been described for Cumberland County, eight for Dauphin county, and seven for Perry County. Each soil association contains one or more major soils and minor soils. The soils of the three counties are described together, arranged by physiographic section. Additional information on associated vegetation types is provided based on field surveys conducted for this Natural Areas Inventory.

Appalachian Mountain Section--The ridges of this section have soils derived from resistant quartzite, sandstone, siltstone, and shale. The **Hazleton-Laidig-Buchanan** association in Perry Co. and the **Dekalb-Lehew** association in Dauphin Co. are deep soils of stony sandy loam, on level to very steep upper slopes and ridgetops. This land is almost all in woodland. The valleys of this section are more variable, depending on their parent material. The **Weikert-Calvin-Berks** association, which covers the most area in Perry Co., and the **Cavin-Leck Kill-Klinesville** association in Dauphin Co., are shallow to deep soils derived from shales and sandstone. They are found in coves and on lower hills and ridges. These soils are used for a mixture of cropland, pasture, and woodland.

The **Elliber-Kreamer** association in Perry Co. consists of deep, gently sloping to steep soils on low ridges and valleys, derived from cherty limestone. These soils are suited to use as cropland. The **Murrill-Laidig-Buchanan** association in Perry Co. and the **Laidig-Buchanan-Andover** association in Dauphin Co. are deep soils of lower mountain slopes, formed from colluvium. These soils have fragipans from accumulated clay, and are well-drained to poorly drained. They are used for agriculture where not too stony or poorly drained. The valleys of the *Appalachian Mountain Section* also contains small areas of soil associations found in the *Great Valley Section*, as described below.

Great Valley Section--The northern portion of this section is underlain by shale, siltstone, and sandstone, from which the **Berks-Weikert-Bedington** (Cumberland Co.) and **Berks-Bedington-**Weikert (Dauphin Co.) are derived. These soils, which extend in a band across both

counties, are used mainly for agriculture. Immediately to the south is the **Hagerstown-Duffield** association, derived from weathered limestone. These soils are mostly on level to sloping terrain, and are very fertile. Few natural areas remain. Sinkholes and limestone outcrops may occur in these areas.

South Mountain Section--Three soil associations are found in this Section, south of the Great Valley in southwestern Cumberland County. The **Highfield-Glenville** association, formed in weathered schist and rhyolite, occurs on the tops and upper slopes of mountains and ridges. These are deep soils used for croplands, orchards, and pasture where not too steep or stony. The **Hazleton-Clymer** association occurs on ridgetops and sideslopes of sandstone and quartzite. They are deep, well-drained soils, nearly entirely forested because of their slope and stoniness. Downslope of South Mountain to the north is the **Murrill-Laidig-Buchanan** association. This is the same association, formed in colluvium, discussed in the Appalachian Mountain Section.

Gettysburg-Newark Section--This section, occurring in southern Dauphin and a small portion of southern Cumberland Counties, contains three soil associations. The **Athol-Neshaminy** association contains deep soils on undulating terrain, formed from conglomerate, breccias, and diabase. These soils are suitable for crops and pasture. Stony Ridge, which runs north-south across the *Great Valley,* is an extension of this association. The **Lewisberry-Penn-Athol** association in Dauphin Co. contains deep and moderately deep soils on undulating terrain, formed from red sandstone and shale. Most of this area has been cleared for farm crops. The **Brecknock-Neshaminy Association** is associated with ridges formed from intrusive diabase dikes; Neshaminy soils are derived from diabase, and Brecknock soils from adjacent, metamorphosed sandstones and shales. Most of the Brecknock areas have been cleared for croplands, while most of the Neshaminy soils are still wooded.

Two soil associations related to river valleys are found in the Tri-Counties. The **Monongahela-Atkins-Middlebury** association is formed from alluvium along the Susquehanna River and major tributaries in Perry and Cumberland Counties, and the **Duncannon-Chavies-Tioga** association is made up of sandy or silty loams along Susquehanna River terraces and floodplains in Dauphin Co.

Vegetation

The vegetation of Cumberland, Dauphin, and Perry Counties reflects the environmental conditions (geology, topography, soils, climate) and disturbance history, both natural and anthropogenic that occur within the counties. The three counties are located in the original Oak-Chestnut Forest Region (Braun 1950). The American chestnut (*Castanea dentata*) was once a dominant feature of the Oak-Chestnut Forest, but was virtually eliminated with the introduction to North America of the chestnut blight fungus (*Endothia parasitica*) in 1904. Today the forest of this region is more aptly classified as Appalachian Oak Forest (Bailey 1980) or Mixed Oak Forest (Monk et al. 1990), dominated by white, red, scarlet, and black oaks (*Quercus alba*, *Q. rubra*, *Q.coccinea*, and *Q. velutina*), often mixed with tulip poplar (*Liriodendron tulipifera*), red maple *Acer rubrum*), and/or beech (*Fagus grandifolia*). This forest type occurs on the slopes and tops of all the mountain ridges within the counties as well as in some of the narrower valleys of central Dauphin and western Perry Counties, and throughout the more convoluted mountain ridges of South Mountain. At some of the higher elevation, cooler north-facing slopes in western Perry County, Tulip Tree (beech) maple forest may predominate, with tulip tree, red and sugar maple (*Acer*

saccharum), hickories, and sweet birch (*Betula lenta*) mixing with or replacing most of the oaks and heaths.

Several notable variations in the typical "Mixed Oak Forest" composition (Monk et al. 1990) occur with relationship to soil, soil moisture, and topography. Drier ridge tops with shallow nutrient poor soils are characterized by chestnut oak (*Quercus montana*) and black gum (*Nyssa sylvatica*) with red maple and other oaks as associates, and an understory of ericaceous shrubs including blueberries (*Vaccinium* spp.), huckleberries (*Gaylussacia* spp.), and mountain laurel (*Kalmia latifolia*). Some of these ridgetop woodlands also contain a significant component of pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*); these areas are known as Pitch pine-scrub oak barrens (Smith 1983). "Big Flat Barrens" is an example of this community type. Another distinct variant is the Mesic Central Forest community type, which occurs on slopes and in ravines adjacent to the Susquehanna River. Examples of this community type occur at Mahantango Mountain and along Shermans Creek at Cove Mountain. This broadly defined community type is characterized by some combination of the following species: sugar maple, red oak, basswood (*Tilia americana*), sweet birch, hemlock (*Tsuga canadensis*), tulip poplar, maple-leaved viburnum (*Viburnum acerifolium*), and witch hazel (*Hamamelis virginiana*), and has many additional woody and herbaceous associates. Yet another variant occurs along some of the small stream corridors and adjacent north-facing slopes of the region, and is dominated by hemlock with a minor component of yellow birch (*Betula alleghaniensis*) and an understory of ericads and witch hazel. Because of the dense shade and acidic litter, these hemlock-dominated forests typically have a depauperate herbaceous layer, often limited to several species of fern and sedges.

Only a small fraction of the forest cover of the Piedmont section remains, most having been cleared for agriculture and development, or repeatedly logged for lumber and fuel (Keever 1973). On the Piedmont Section tulip poplar often becomes the dominant tree after logging, seeding in on the openings and then growing more quickly than other trees. As the forest matures, however, shade-tolerant species (such as red oak) replace tulip poplar because it does not regenerate under a closed canopy (Tryon 1980). Currently forested lands of the piedmont such as State Game Lands 246 exist on areas such as rocky slopes and wetlands that are poorly suited to other uses. Some of the unforested Piedmont lands, particularly areas that were seldom or never plowed, support native vegetation similar to sites in Virginia as described by Braun (1950). These contain native grasses such as little blue stem (*Schizachyrium scoparium*), big blue stem (*Andropogon* spp.), and Indian grass (*Sorghastrum nutans*), and scattered small trees such as sassafras (*Sassafras albidum*) and/or red cedar (*Juniperus virginiana*).

The majority of the forests in the three counties have past histories of logging and are currently in some stage of regrowth. The largest stands of older regrowth observed during the inventory were located in Tuscarora State Forest in western Perry County. The oldest forest known in the three-county area is thought to be the virgin stand growing in Hemlocks Natural Area of Tuscarora S. F. Some areas historically cleared for agriculture have been succeeding back to forest. On drier soils in Perry County and northern Cumberland County, these successional forests are characterized by significant stands of Virginia pine (*Pinus virginiana*).

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

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

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

Graminoid marshes are wetlands dominated by grasslike plants such as cattails (*Typha latifolia*), sedges (*Carex* spp.), and grasses. These wetlands may be found in association with streams or in areas with ground water seepages. Graminoid marshes are uncommon in the Tricounty region, except as successional communities following beaver dams or other impoundments.

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

Because wetlands are relatively rare in south-central Pennsylvania, they are important refugia for plants as well as important habitat for nesting and migrating birds. Many other animals groups such as amphibians, reptiles, odonates, and lepidopterans also depend on specific wetland habitats for all or a portion of their life cycles.

Disturbance

The nature, scale and frequency of disturbance are influential in the evolution and appearance of natural communities and associated rare species. Disturbance can be beneficial or destructive to the development and persistence of natural communities.

Some examples of natural disturbances are flooding, fire, and deer browsing. While often regarded as a detrimental impact, both fire and small-scale flooding can be beneficial to certain communities or rare species. Floodplain forests benefit from the periodic scouring and deposition

of sediments as streams overtop their banks. At the same time, streamside wetland communities hold excess water, thus reducing the scale of flooding downstream. In contrast, deer have been blamed for a number of negative impacts on Pennsylvania flora and fauna (Rhoads et al. 1992): a reduction in the amount of understory, poor regeneration of some species, decreased songbird diversity, and direct loss of rare plants.

In many cases, human disturbance has been clearly destructive to natural habitats and species associated with them. Although necessary, farming, mining and development are disturbances that have completely eradicated some natural communities and habitats. For example, old-growth forests are all but 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 across the landscape. 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 long list of plants that out-compete native species. Non-native plants such as Japanese honeysuckle (*Lonicera japonica*), tree-of-heaven (*Ailanthus altissima*), Oriental bittersweet (*Celastrus orbiculatus*), 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 (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), and mile-a-minute weed (*Polygonum perfoliatum*) are aggressive, weedy species that follow in the wake of disturbance and crowd out native species. The natural disturbances of flooding and scouring that occur along the Juniata and Susquehanna river corridors have helped to facilitate the invasion and colonization of many exotic species. There are few if any plant communities along the two major river corridors that do not have significant components of exotic species. The species with the greatest impact in these communities tend to be robust herbs such as purple loosestrife and Japanese knotweed, although vines such as Japanese hops are also serious problems. Aquatic habitats of the rivers, streams, and lakes are also vulnerable to invasion by exotics. Curly pondweed (*Potamogeton crispus*), a native of Europe, has become the dominant plant species in some of the regions waterways, and Asiatic clam (*Corbicula fluminea*) has become the most common mussel in some of the regions' streams.

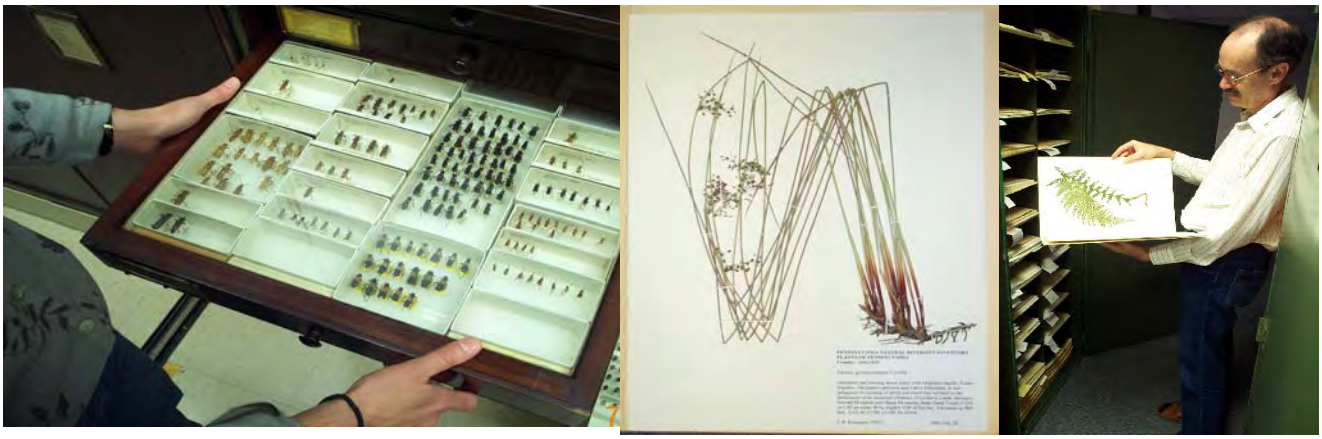
Control of these problematic, non-native species is necessary for the long-term maintenance of high quality natural systems. Discouraging the use of these and other potentially weedy exotics in and around natural areas can help to prevent further encroachment. Some nurseries now carry a selection of 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* (1993) is a helpful reference for determining whether a plant species is native to the state or not.

PENNSYLVANIA NATURAL HERITAGE PROGRAM DATA SYSTEM

In order to plan for the protection and stewardship of Cumberland, Dauphin, and Perry Counties' natural features, the Pennsylvania Science Office (PSO) of The Nature Conservancy (TNC) was contracted by the Tri-County Regional Planning Commission to provide an inventory of significant flora, fauna and natural communities in the three counties. Critical to this effort is the Pennsylvania Natural Heritage Program (PNHP) database. PNHP was established in 1982 as a joint venture of The 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 PNHP database has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (called natural communities in PNHP terminology), sensitive plant and animal species (species of special concern), and heron rookeries. Several other noteworthy natural features are also mapped including DEP designated Exceptional Value streams (Shertzer 1992) and outstanding geologic features (based on recommendations from Geyer and Bolles 1979). 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, and about 650 managed areas, and are organized according to each of Pennsylvania's 881 7½' USGS topographic quadrangle maps.

Beginning in 1982, PSO has 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 Cumberland, Dauphin, and Perry Counties. These areas, comprised of natural communities with their characteristic species, represent an estimated 85-90 percent of the biological diversity of an area (The Nature Conservancy, 1988); the other 10-15 percent consists of sensitive plant and animal species, which occur both within and outside these natural communities. The full range of biological diversity in the three counties can be conserved by protecting both sites with the best occurrences of the counties' natural communities and good populations of their sensitive plants and animal species. The natural community and sensitive species data are the basis for judging the biological values of sites within the county.



The Pennsylvania Natural Diversity Inventory database has collected existing data on occurrences of species and communities (elements) of special concern, drawing from publications, herbarium and museum specimens, and the knowledge of expert botanists, zoologists, ecologists, and naturalists.

NATURAL AREAS INVENTORY METHODS

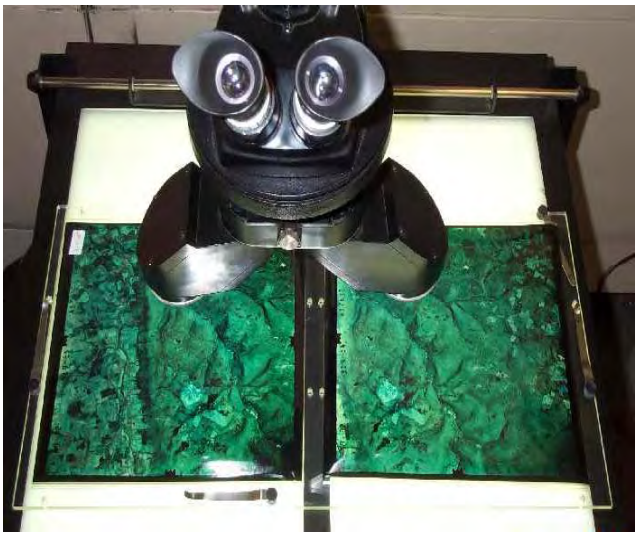
Methods used in the Tri-County Natural Areas Inventory followed PNHP procedures, and those developed in Illinois (White 1978) and Indiana (Anonymous 1985). The inventory proceeds in three stages: 1) information is gathered from the PNHP database files, local experts, and map and air photo interpretation;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

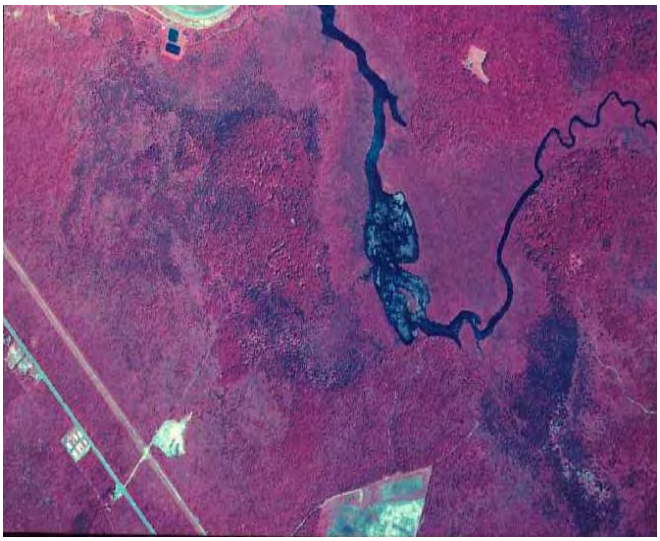
Information Gathering

A list of natural features found in each county was prepared from the PNHP database and supplemented with information volunteered by local individuals and organizations familiar with the three counties. In the spring of 1996 a public meeting was held and Recommended Natural Area Survey Forms (Appendix III) were distributed to facilitate public input. PSO 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 three counties' 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, and it was therefore critical that an ecologist or person with similar training interpret the maps and aerial photos.





Work progressed systematically within the area encompassed by each USGS topographic map. The natural area potential of all parcels of land was assessed using aerial photographs. Areas continuing into adjacent counties were examined in their entirety. Topographic maps 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) 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 three counties from winter 1997 to spring 1999. Biologists evaluated the degree of naturalness of habitats (including assessment of percent of native vs. non-native plant species, degree of human disturbance, age of trees, etc.) and searched for plant and animal species of special concern. Workers categorized the vegetation 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 5, and Dec. 16, 1997, and in April 1998, low altitude reconnaissance flights were taken over the counties 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.

Small Mammal Surveys

Invertebrate Surveys

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, rough-leaved aster, or giant swallowtail in the three counties, 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 PNHP Element Occurrence Records for mapping and computerization. Mapped locations of natural features, including approximate watershed or subwatershed boundaries, were then transcribed on to acetate map overlays for 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 the three counties is provided in Appendix VII. The scientific (Latin) names of non-listed species referred to in the report are given the first time they are mentioned in the body of the report.

Landscape Analysis

Background: Fragmentation of the landscape by roads, utility lines, and other human disturbances can impact the surrounding landscape significantly. A road or utility line cut through a forested block cleaves the large block into two smaller blocks and significantly increases the amount of edge habitat within the forest. When a forest with a closed canopy is disturbed by road building activities, the newly disturbed soil and open canopy favor the establishment of invasive species of plants and animals. Many of these will out-compete and displace native species in this disturbed habitat. These smaller forest fragments will have significantly more edge habitat and less forest interior than the original forest block. Furthermore, fragmentation of large forest blocks decreases the ability of many species to migrate across manmade barriers such as roads. Migration corridors, once severed, isolate populations of species one from another, limit the gene flow between populations and create islands of suitable habitat surrounded by human activity. Much of the native biological diversity of an area can be preserved by avoiding further fragmentation of these large forested areas.

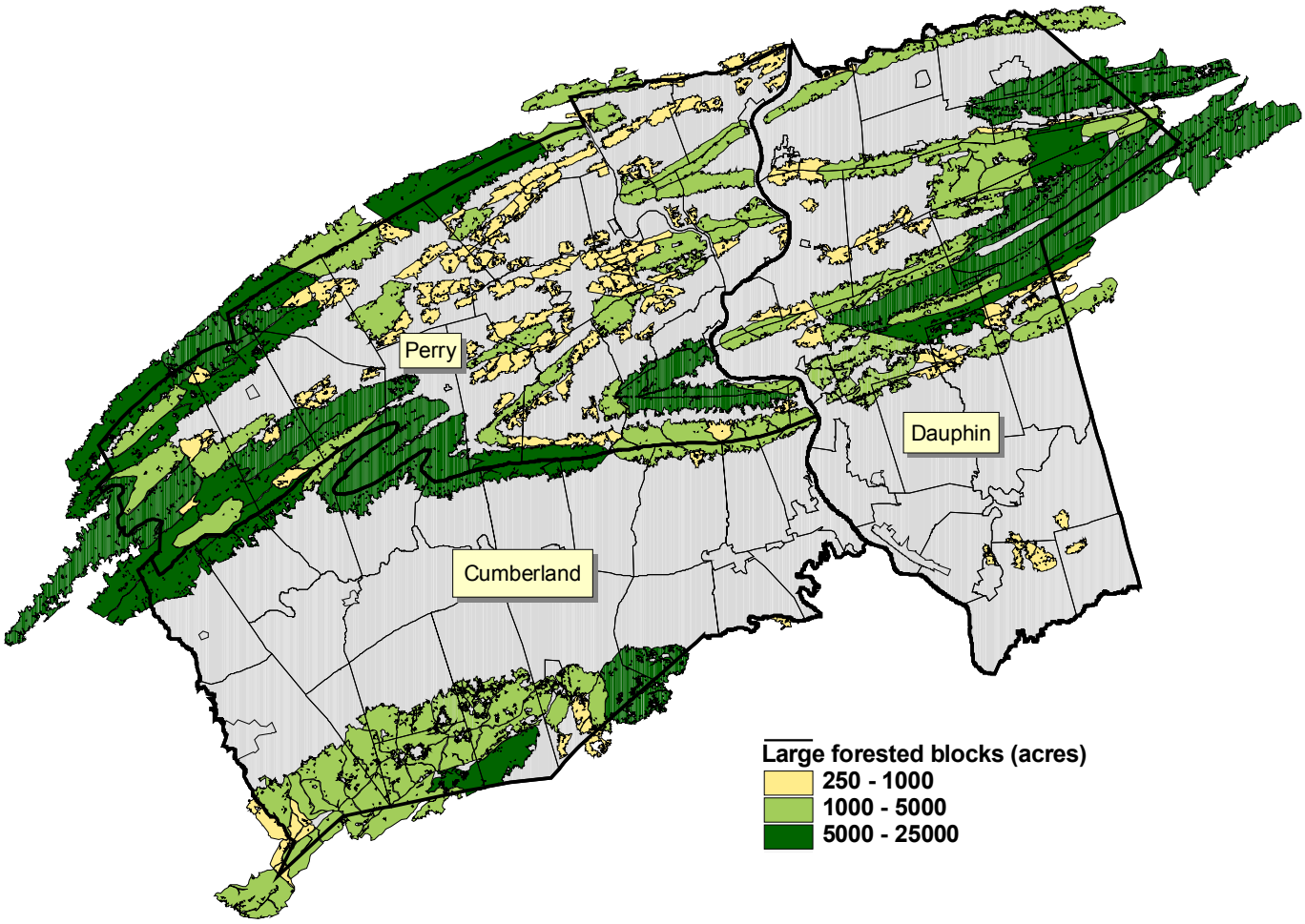
The larger forested blocks in the County (those of at least one acre in area) have been highlighted in an effort to draw attention to the significance of contiguous forested blocks within the County. Besides being habitat suitable for many native species, unfragmented forest blocks in close proximity to each other become natural corridors for species movement within and through the county. In many cases, by highlighting the larger forested blocks, the most natural landscape corridors become evident.

GIS Methodology: Creating NAI Forest Block Layers

The Pennsylvania portion of the National Land Cover Dataset (NLCD) was created as part of land cover mapping activities for Federal Region III that includes the states of Maryland, Delaware, Pennsylvania, Virginia, West Virginia, and the District of Columbia. The NLCD classification contains 21 different land cover categories with a spatial resolution of 30 meters. The NLCD was produced as a cooperative effort between the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (US EPA) to produce a consistent, land cover data layer for the conterminous U.S. using early 1990s Landsat thematic mapper (TM) data. The analysis and interpretation of the satellite imagery was conducted using very large, sometimes multi-state image mosaics (i.e. up to 18 Landsat scenes). Using a relatively small number of aerial photographs for 'ground truth', the thematic interpretations were necessarily conducted from a spatially-broad perspective. **This evaluation must be made remembering that the NLCD represents conditions in the early 1990s** (The Nature Conservancy 1999).

Deciduous, evergreen and mixed forest land cover types were grouped to provide a single "forested" cover type. This forest block layer was overlain by the Penn DOT road layer to identify forest blocks fragmented by roads. The Penn DOT right-of-way (ROW) distance was applied as a buffer to roads: Interstates have a 500-foot ROW, PA and US designated roads have a 150-foot ROW, local roads have a 100-foot ROW. Forest blocks with an area of greater than one acre were selected from the forest land cover type. This process highlights interior forest blocks greater than one acre in area as presented below.

Large Unfragmented Forest Blocks of Cumberland, Dauphin and Perry Counties



Large, relatively unfragmented forested areas cross the Tri-county area, providing valuable habitat for many species of plants and animals. The connected forest blocks also act as important migration corridors for dispersal throughout the region.

Fragmenting features, such as roads, powerlines and buildings, greatly diminish the long-term viability of these areas. A concerted effort should be made to guide such projects away from these remaining large forested areas.

CONSERVATION RECOMMENDATIONS

The following are general recommendations for protection of natural areas within a county. Approaches to protecting a natural area are wide-ranging and factors such as land ownership, time constraints, and tools/resources available should be considered when prioritizing protection of these sites. Prioritization works best within a planning situation, however, opportunities may arise that do not conform to a plan and the decision on how to manage or protect a natural heritage area may be made on a site-by-site basis. Keep in mind that personnel in our program or staff from state natural resource agencies are available to discuss more specific options as needed.

1. Consider conservation initiatives for natural areas on private land.

Conservation easements protect land while leaving it in private ownership. A conservation easement is a legal agreement between a landowner and a conservation or government agency that permanently limits a property's use in order to protect its conservation values. It can be tailored to the needs of both landowner and conservation organization. Tax incentives apply to conservation easements.

Leases, management agreements, and mutual covenants also allow the landowner to retain ownership and ensure permanent protection of land, though in a much more limited way. There are no tax deductions for these conservation methods. A lease to a land trust or government agency can protect land temporarily and ensure that its conservation values will be maintained. This can be a first step to help a landowner decide if they want to pursue more permanent protection methods. Management agreements require landowner and land trust to work together to develop a plan for managing resources such as plant or animal habitat, or protecting a watershed. Mutual covenants can be appropriate where land protection is important to several landowners but not of sufficient benefit to the general public to warrant a conservation easement.

Land acquisition can be at fair market value, as a last resort by conservation organization, or as a bargain sale in which a sale is negotiated for a purchase price below fair market value with tax benefits that reduce or eliminate the disparity. The NAI will help to pinpoint areas that may be excellent locations for new county or township parks. Sites that can serve more than one purpose such as wildlife habitat, flood and sediment control, water supply, recreation, and environmental education would be particularly ideal. Private lands adjacent to public should be examined for acquisition when a priority site is present on either property and there is a need of additional land to complete protection of the associated natural features.

Fee simple acquisition gives landowner maximum control over the use and management of the property and its resources. This conservation initiative is appropriate when the property's resources are highly sensitive and protection cannot be guaranteed using other conservation approaches.

Local zoning ordinances are one of the best-known regulatory tools available to municipalities. Examples of zoning ordinances a municipality can adopt include: overlay districts where the boundary is tied to a specific resource or interest such as riverfront protection and floodplains, and zoning to protect stream corridors and other drainage areas using buffer zones.

2. Prepare management plans that address species of special concern and natural communities.

Many of the already-protected natural areas are in need of additional management recommendations to ensure the continued existence of the associated natural elements. We hope that managers will incorporate specific recommendations into existing plans or prepare new plans. These may include: removal of exotic plant species; leaving the area alone to mature and recover from previous disturbance; creating natural areas within existing parks; limiting land-use practices such as mineral extraction, residential or industrial development, agriculture and certain forestry practices.

Existing parks and conservation lands provide important habitat for plants and animals at both the county level and on a regional scale. For example, these lands may serve as nesting or wintering areas for birds or as stopover areas during migration. Management plans for these areas should emphasize a reduction in activities that fragment habitat. Adjoining landowners should be educated about the importance of their land as it relates to species of special concern and their habitat needs and agreements should be worked out to minimize encroachments that may threaten native flora and fauna.

3. Protect bodies of water.

Protection of reservoirs, wetlands, rivers, and creeks is vital; especially those that protect biodiversity, supply drinking water, and are attractive recreational resources. Many sites that include rare species, unique natural communities or locally significant habitats are associated with water. Protection of high quality watersheds is the only way to ensure the viability of natural habitats and water quality. Land managers and township officials should scrutinize development proposals for their impact on entire watersheds not just the immediate project area. Cooperative efforts in land use planning among municipal, county, state, and federal agencies, developers, and residents can lessen the impact of development on watersheds.

4. Provide for buffers around natural areas.

Development plans should provide for natural buffers between disturbances and natural areas, be it a barrens community, wetland, water body, or forest. Disturbances may include construction of new roads and utility corridors, non-conservation timber harvesting, and disruption of large pieces of land. County and township officials can encourage landowners to maintain vegetated buffer zones within riparian zones. Vegetated buffers (preferably of PA-native plant species) help reduce erosion and sedimentation and shade/cool the water. This benefits aquatic animal life, provides habitat for other wildlife species, and creates a diversity of habitats along the creek or stream.

Watersheds or subwatersheds where natural communities and species of special concern occur (outlined on the Township maps in this report) should be viewed as areas of sensitivity, although all portions of the watershed may not be zones of potential impact. As an example, conserving natural areas around municipal water supply watersheds provides an additional protective buffer around the water supply, habitat for wildlife, and may also provide low-impact recreation opportunities.

5. Reduce fragmentation of surrounding landscape.

Residents and township officials should encourage development in sites that have already seen past disturbances. Care should be taken to ensure that protected natural areas do not become "islands" surrounded by development. In these situations, the site is effectively isolated

and its value for wildlife is reduced. Careful planning can maintain natural environments and the plants and animals associated with them. A balance between growth and the conservation of natural and scenic resources can be achieved by guiding development away from the most environmentally sensitive areas.

The reclamation of previously disturbed areas, or brownfields development, for commercial and industrial projects presents one way to encourage economic growth while allowing ecologically sensitive areas to remain undisturbed. Cluster development could be used to allow the same amount of development on much less land and leave much of the remaining land intact for wildlife and native plants. By compressing development into already disturbed areas with existing infrastructure (villages, roads, existing ROW's), large pieces of the landscape can be maintained intact. If possible, networks or corridors of woodlands or greenspace should be preserved linking sensitive natural areas to each other.

6. Encourage the formation of grassroots organizations.

County and municipal governments can do much of the work necessary to plan for the protection and management of natural areas identified in this report. However, grassroots organizations are needed to assist with obtaining funding, identifying landowners who wish to protect their land, providing information about easements, land acquisition, and management and stewardship of protected sites. Increasingly, local watershed organizations and land trusts are taking proactive steps to accomplish conservation at the local level. When activities threaten to impact ecological features, the responsible agency should be contacted. If no agency exists, private groups such as conservancies, land trusts and watershed associations should be sought for ecological consultation and specific protection recommendations.

7. Manage for invasive species.

Invasive species threaten native diversity by dominating habitat used by native species and disrupting the integrity of the ecosystems they occupy. Management for invasives depends upon the extent of establishment of the species. Small infestations may be easily controlled or eliminated but more well established populations might present difficult management challenges. Below is a list sources for invasive species information.

The ***Mid-Atlantic Exotic Plant Pest Council*** (MA-EPPC) is a non-profit organization (501c3) dedicated to addressing the problem of invasive exotic plants and their threat to the Mid-Atlantic region's economy, environment, and human health by: providing leadership; representing the mid-Atlantic region at national meetings and conferences; monitoring and disseminating research on impacts and controls; facilitating information development and exchange; and coordinating on-the-ground removal and training. A membership brochure is available as a pdf file at http://www.ma-eppc.org .

Several excellent web sites exist to provide information about invasive exotic species. The following sources provide individual species profiles for the most troublesome invaders, with information such as the species' country of origin, ecological impact, geographic distribution, as well as an evaluation of possible control techniques. The Nature Conservancy's Weeds on the Web at http://tncweeds.ucdavis.edu/. The Virginia Natural Heritage Program's invasive plant page at http://www.dcr.state.va.us/dnh/invinfo.htm. The Missouri Department of Conservation's Missouri Vegetation Management Manual at http://www.conservation.state.mo.us/nathis/exotic/vegman/. The following site is a national invasive species information clearinghouse listing numerous other resources on a variety of related topics: http://www.invasivespecies.gov/.

RESULTS

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 evaluating the statewide significance of the sites recognized in the Natural Areas Inventory.

Priorities for Protection

The Natural Areas Inventory recognizes sites at two primary levels of significance for the protection of biological diversity: 1) sites of statewide importance and 2) sites of local significance.

Table 1 in this section lists all sites identified within the county with natural communities and species of concern by order of priority for protection. These sites are displayed in UPPER CASE LETTERS throughout the report. 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. Sits in this category that are ranked 1 or 2 may contain some of the best natural areas in the state. Table 1 lists the site name, local jurisdiction(s), and pertinent information about the site's significance. A more detailed description of each site is included in the text for each Township in which it occurs.

Locally significant sites are indicated in Title Case Letters throughout the document, and are briefly discussed in the text accompanying each map. These are sites at which species of special concern or high-quality natural communities could not be documented during the survey period. These areas are not exemplary at the state level, but may be important at the county level. Examples would include relatively intact forested areas, large wetlands, and other areas significant for maintaining local biodiversity. Additionally, sites from the 2000 NAI report that supported species of plants or animals that have since been removed from the species of concern list due to a reevaluation of their state status are retained as locally significant sites in this update. These secondary sites are listed in Table 2 accompanied by 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.

Exceptional Natural Feature: The Susquehanna River

In considering the value of specific sites for the preservation of biological diversity it is important to note that these sites are dependent on the integrity of larger scale systems such as the Susquehanna River and its tributary watersheds. The Susquehanna River and its adjacent forested watersheds comprise one of the major corridors for the movement of biota in central Pennsylvania. This includes the habitat for resident species, habitat required for migrating birds on a biannual basis, habitat for resident and migratory aquatic animals, habitat needed for the long term survival of plant species, and more. Conserving the best sites as highlighted in this report must be considered as part of the effort to conserve the greater natural functional value of the river corridor. In reviewing the report it is evident that many of the best natural sites within the three counties are along the river and its major tributaries. Along with these sites are many areas that were beyond the scope of this project to fully investigate. Any intact natural area in or adjacent to these waterways

should be considered potential important habitat. The development of a comprehensive conservation plan for the portions of the three counties adjacent to the river and its major tributaries, conducted in conjunction with other counties in the lower Susquehanna River Basin, may be the best tool for conserving this important natural resource. Nearly the entire region is in the Susquehanna watershed, and soil and groundwater conservation and protection throughout the three counties will benefit biological diversity in the counties as well as downstream.

Susquehanna River near Harrisburg

Kittatinny Ridge at Stony Creek Valley

Exceptional Natural Feature: The Kittatinny Ridge

The ridgeline of Blue Mountain, part of the Kittatinny Ridge, which includes Stony Creek Valley, cuts through the center of Dauphin County. This mountain range stretches southwesterly from southern New York and northwestern New Jersey, continuing through southeastern Pennsylvania and terminating near the Maryland border. The ridge is world-renowned as a transportation corridor for migrating raptors and songbirds as well as for the movement of other biota in the northeastern United States. The ridge functions as an interstate greenway, linking many of southeastern Pennsylvania's most biologically important areas with each other. Without this resulting connectivity, these biologically rich areas would become functional islands in a sea of farmland, suburban development and other lands modified by human activity, effectively severing modes of reproductive mingling and dispersal for many species of plants and animals. The Dauphin County portion of this interstate wildlife dispersal route is a significant component of an Appalachian Region Landscape Corridor. The Kittatinny Ridge Project, led by Audubon Pennsylvania, is a collaborative effort of local, regional, and state organizations and agencies to focus public attention on the importance of the Ridge through Pennsylvania and to promote conservation activities to protect the Ridge from further habitat loss, fragmentation, and inappropriate land use.

Species of Concern: Timber Rattlesnake

The ridges and boulder fields of the Appalachian Mountains have historically provided extensive habitat for the PA-candidate G4, S3S4 timber rattlesnake (*Crotalus horridus*). The Pennsylvania Fish and Boat Commission (PFBC) has been gathering information regarding the status of the timber rattlesnake in the state, in particular the South Mountain region, for several years. In order to enhance the protection of the timber rattlesnake in Pennsylvania, the locations of known den and breeding sites are not identified in this report. However, important habitats for the timber rattlesnake occur the length of the mountains in northern Dauphin County. Some of these habitats are included in the sites identified in this report for other species or communities, but persistence of this species in the county and region will depend on maintaining connectivity of the rocky forested ridges that provide habitat for den and breeding sites.

Timber rattlesnakes primarily occur on south or southwest-facing slopes, on rocky slopes where they can find refuge in spaces between the boulders as well as thermoregulate in the sunny openings. Hibernacula, or dens, often are found under canopy cover but are usually located within several hundred meters of an open basking site. Persistence of these sites relies on forestry practices that maintain a diversity of open areas adjacent to forested foraging habitat. Additionally, these habitats should be buffered and protected from development to reduce human-snake encounters.

Top Priority Natural Areas in Dauphin County:

The following sections contain brief descriptions outlining the top priority sites for each county, and tables listing all sites in the county. Complete descriptions for all sites, arranged by township in alphabetical order, are presented in the Results.

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

DOC SMITH RUN WOODS/ BEAR PUDDLES (Jackson and Jefferson Townships) This site includes one plant and one animal species of concern from two different habitats. A population of a globally imperiled **G2G3, S2 flypoison borer moth (Papaipema sp. 1**) has been confirmed here. This species of moth is currently only known to occur in Pennsylvania with its largest documented populations in the Pocono region. The larval stage of this animal species feeds exclusively on fly-poison, a frequent component in the understory of this area. More survey work is needed to assess the full extent of this population. Also at this site is a small population of the **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)**, which occurs in a series of shallow woodland pools (Bear Puddles) and wet depressions at the headwaters of Doc Smith Run. This site is within State Game Lands #210 and the Weiser State Forest. Disturbances to the site include logging in the surrounding woods, and a culvert draining the sites to the south, though the impact on the pools appears to be minimal. The largest threat to the species of concern is probably deer. Nearly all specimens of the species of concern had been browsed, some down to ground level, and the pools had many deer tracks and signs of browse.

FORT INDIANTOWN GAP MACROSITE—UPDATED—(East Hanover and West Hanover Townships and Lebanon County). This site is a valley located between Blue Mountain and Second Mountain on both sides of the Dauphin/Lebanon county line. Historically, parts of the valley were kept open by wildfires and other disturbance. In recent times, the valley has been used as a military reservation. Bombing and other exercises by the military have maintained an unusual, prairie-like habitat in parts of the valley. Currently the Fort is a mosaic of second-growth mixed oak and conifer forests, woodlands and open areas dominated by little bluestem, other grasses, goldenrods, milkweeds, asters, and blueberries. Periodic environmental impact surveys of the military base have documented **two plant species of concern** and **eight animal species of concern**.

Of primary importance is the population of the **G3, S1 regal fritillary (*Speyeria idalia*)**. The Fort Indiantown Gap population of this butterfly species is one of only two populations known to remain east of the Mississippi. This species has very specific habitat requirements, and has been found at several separate locations in the Gap where pockets of appropriate early-successional habitat exist. Larval forms of this species depend exclusively upon arrow-leaved violet for food, and butterfly-weed is the preferred nectar plant for the adults, although other flowers may also be used. Five other invertebrate animal species of concern have also been documented in the various habitats on the Fort. These include the **G4, S3S4 Leonard's skipper (*Hesperia leonardus*),** the **G3, S2 frosted elfin butterfly (*Incisalia irus*),** the **G3G4, S1 hand-maid moth (*Datana ranacaeps*)** (the first documented occurrence in Pennsylvania in many decades), the **G3, S1 Pine barrens Zale moth (*Zale* sp. 1)** and the **G3G5, SU earwig scorpionfly (*Merope tuber*)** (the first record of this species in Pennsylvania).

Evidence of 10 current populations of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)** was found during surveys in 1999 and 2002 along the ridgeline of Second Mountain, including areas within the Fort Indiantown Gap site and extending into Lebanon County. This species utilizes rocky outcrops along the ridgetop. Also documented at this site is the **G4, S3BS3N northern myotis bat (*Myotis septentrionalis*)** which was captured within the training center, but the relationship of this location to a maternity site or roost is unknown. Additional surveys for this species are recommended.

Some recent human disturbances at FIG have benefited the species of concern, while others have eliminated sites for the species. Exotic plant species, particularly spotted knapweed, and natural succession to forest are also threats to the habitat and therefore to the listed species. The persistence of the regal fritillary and associated species in the human-managed habitats of Fort Indiantown Gap depends upon maintaining the food plants used by both the larval and adult forms. To do this requires controlling the amount and type of disturbance to the early-successional habitat to favor the survival of the species of concern and its food plants. The Nature Conservancy is working with the Fort Indiantown Gap National Guard Training Center facility managers to actively manage the habitats of the regal fritillary and assess how future military operations might coexist with and facilitate the survival of the rare species at this site.

PETERS MOUNTAIN WETLAND (Wayne Township) Peters Mountain Wetland is situated between the northern base of the main ridge of Peters Mountain and a smaller foothill ridge to the north. The site is a headwaters swamp, drained by tributaries of Powell Creek, which flow out both East and West. A variety of plant habitats are present, including swamp forest, wet thickets of shrubs and small trees, graminoid-dominated marshes, vigorous stands of the Virginia chain-fern, small ponded areas, and sphagnous wetlands. It supports four plant

species of special concern, including good populations of **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*), G5, S2 mud sedge (*Carex limosa*), and G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*).** The site also supports **G5, S1, PA-endangered pod-grass (*Scheuchzeria palustris*)**, believed to occur here at its southernmost extant population in eastern North America. In addition to the species of special concern, the site is noteworthy in having a mixture of plant species unusual for this region of the state, including such species as yellow-eyed-grass and spatulate-leaved sundew. Also occurring at this site is the plant species golden club (*Orontium aquaticum*), which has been removed from the species of concern list since the 1997 report. The site is primarily used for hunting and does not appear to have any unnatural threats. Recent surveys revealed heavy use of the site by bear and deer. The site should be monitored for habitat changes from browse or changing water levels.

MAHANTANGO MOUNTAIN SLOPES (Upper Paxton Township) This site is located on the northwest slope of Mahantango Mountain extending from the ridge's terminus at the Susquehanna River for about two miles to the east. The site supports a fair-to-good quality **Mesic Central Forest Natural Community** and a fair to good quality **Northern Appalachian Acidic Cliff Natural Community**. The Mesic Central Forest Natural Community is located on the lower third to half of the slope. This steeply sloping area is dominated by a canopy of mature trees including sugar maple, basswood, and red oak with lesser amounts of black birch, hop-hornbeam, and hemlock.

The Northern Appalachian Acidic Cliff Natural Community is located in a band occurring primarily along the top of the slope, but also extending nearly down to the river at the ridge's terminus. This natural community is characterized by large escarpments of exposed rock and talus, which support a sparse canopy of table-mountain pine, pitch pine, Virginia pine, and chestnut oak with scattered individuals of serviceberry. The road and rail line at the toe of the slope and the recent disturbance due to logging on the south face of the slope have both exposed this area to a variety of exotic species. Although current occupation of the site by exotics is minimal, several species, including tree-of-heaven and garlic mustard, have gotten a foothold. If the site remains undisturbed colonization of these species should progress slowly.

RATTLING CREEK WATERSHED—UPDATED—(Jackson and Jefferson Townships) Several small rocky streams flow north out of Broad Mountain and join to form the Rattling Creek. **Screw-stem (*Bartonia paniculata*, G5, S3)** was observed along the creek during surveys in 2000. Timber harvesting may pose a threat to this species and a buffer should remain along the waters edge to protect this plant and other species of concern. A large population of **G4G5, S3 minniebush (*Menziesia pilosa*)** occurs in the understory of this forest, along the East Branch of Rattling Creek. A good-quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** is found in the upper reaches of the Creek and its small tributaries. In 1992, active signs of **Allegheny woodrats (*Neotoma magister*, G3G4, S3, PA-threatened)** were observed in a boulder field near Rattling Creek. Additional surveys are needed to determine the extent and current quality of this population. Surveys in 2001 identified an **invertebrate animal species of concern** along the creek and aquatic habitats in this site. Portions of this site are owned by the Lykens Borough Watershed authority, and portions are part of State Game Lands 210. There is abundant evidence of deer browse in the forests adjacent to Rattling Creek, and deer browse extensively on the plants of concern. A small dam on the creek at the confluence of the East and

West branches creates a reservoir, which serves as a source of drinking water for the borough of Lykens.

STONY CREEK VALLEY—UPDATED—(East Hanover and Middle Paxton Townships and Lebanon County)

This site includes much of the Stony Creek valley in Dauphin and Lebanon Counties. The valley and adjacent slopes represents one of Pennsylvania's largest roadless areas and provides valuable habitat for a variety of animal and plant species. This large continuous forest also acts as a migration corridor, offering an important dispersal passageway through the mid-state. A good stand of **American holly (*Ilex opaca*, G5, S2 PA-threatened)** occurs intermittently on the Stony Creek floodplain and the adjacent lower slopes of Sharp Mountain. This population of American holly may be the northern most location for this species, which occurs much more frequently along the mid-Atlantic coast. The holly appears to be doing well, and no special management is recommended. Also occurring within this site is the golden club (*Orontium aquaticum*), which has been delisted since the 1997 report. Additionally, specimens identified as a **G4 S2S3 Pennsylvania animal species of concern** were documented at a spring leading to Stony Creek. The terrestrial "Hemlock-Red Oak-Mixed Hardwood Terrestrial Forest" gradually opens into a "Hemlock-Mixed Hardwoods palustrine forest" where the water table is higher. This area opens into a large and extensive "Alder-Sphagnum Wetland" along Stony Creek. The uninterrupted forest cover of Stony Creek valley provides important habitat for nesting neo–tropical songbirds, many of which depend on interior forest habitats for nesting locations. The creek valley includes a site formerly named **County Line Swamp**. This swamp on the Dauphin/Lebanon County border is bisected by a slow-moving portion of Stony Creek. This area extends vastly into Lebanon County as well and should be considered an important natural area for both Dauphin and Lebanon Counties.

STONY MOUNTAIN PONDS—UPDATED—(Middle Paxton Township) This site is a good quality occurrence of an **Ephemeral/Fluctuating Natural Pool** community. It includes 12 ponds, which occur in a high valley between Stony Mountain and Sharp Mountain. The **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)** occurs in open habitat in several of the ponds. The site also supports a population of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**. The woods surrounding the ponds have been logged. The wooded buffer between the pools and the mowed area to the south should be maintained. This site occurs on State Game Lands #211.

SUSQUEHANNA RIVER ISLANDS—MCCORMICKS ISLAND ARCHIPELAGO (Susquehanna Township and City of Harrisburg). This site encompasses a series of islands in the Susquehanna River on the north side of Harrisburg. McCormick's Island, the largest of the series, is characterized by a rare **floodplain forest natural community**. This silver maple and tulip poplar-dominated forest is relatively mature and contains many canopy gaps with scattered subcanopy trees and shrubs. The site supports a fair-to-poor population of the PA-threatened **umbrella magnolia (Magnolia tripetala, G5, S2).** This site has been disturbed by logging and campfires in the past but has recovered well. Its quality as a natural community should continue to improve over time.

This island is one of a series of islands occurring along this stretch of the river, which together make up a greater system of habitats including riparian forest, sloughs and shrub swamps, a littoral zone, and several types of aquatic habitats such as riffles, sand bars, and pools.

Several listed bird species are found here, including the **G5, S1B PA-endangered yellow-crowned night heron (*Nyctanassa violacea*), the G5, S1B PA-endangered great egret (*Casmerodius albus*), and the G5, S2S3B black-crowned night heron (*Nyctanassa nyctanassa*).** The birds are colonial nesters and their rookeries may contain hundreds of nests in small areas of floodplain forest. Rookeries are known from McCormick's Island as well as from several smaller nearby islands with mature floodplain forests. These rookeries are critical to the continued well-being of these species in PA. Both the nesting trees and the surrounding mosaic of feeding habitats are required to protect the bird colonies. This site has been identified by the PA Audubon Society as one of the most important areas in the state for supporting bird diversity. This rookery and all of the habitat associated with the McCormicks Island Archipelago would be threatened by an increase of the water level along this stretch of the river through the construction of an elevated Dock Street Dam. Increased water levels would kill trees on the islands, destroying their utility for nesting, and likely drown many of the smaller islands and sand bars used for feeding. In addition, increased recreational use of the river in this area may disturb the birds' breeding and roosting activities. The abundant diversity that helps retain the wild character of the river in this urban area exists primarily due to these islands and the shallow water surrounding them.

Large forested islands in the Susquehanna River are home to breeding colonies of Great Egrets, Yellow-Crowned Night Herons, and Black-Crowned Night Herons.
Photo: PA Science Office of The Nature Conservancy.

Table 1. The sites of statewide significance for the protection of biological diversity in Dauphin County in approximate order of priority from the most important (rank = 1) to the least (rank = 5). The presence of species of special concern and/or exemplary natural communities has been documented at these sites. More in-depth information on each site including detailed site descriptions and management recommendations where appropriate can be found in the text of the report following the maps for each municipality. Quality ranks, legal status, and last observation dates for species of special concern and natural communities are located in the table that precedes each map page.

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
1	DOC SMITH RUN WOODS/ BEAR PUDDLES #16	Jackson, Jefferson Twps.	A population of a globally imperiled **G2G3, S2 flypoison borer moth (Papaipema sp. 1**) has been confirmed here. Also at this site is a poor to fair quality population of **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)**, which occurs in a series of shallow woodland pools (Bear Puddles) and wet depressions at the headwaters of Doc Smith Run.
1	FORT INDIANTOWN GAP MACROSITE #41 **UPDATED**	East Hanover, West Hanover Twps. & Lebanon Co.	This site is a valley located between Blue Mountain and Second Mountain on both sides of the Dauphin/ Lebanon county line. Periodic environmental impact surveys have documented two plant species of concern, two mammal species of concern and five invertebrate species of concern. One of these is the **G3, S1 regal fritillary (*Speyeria idalia*)**, and the Fort Indiantown Gap population is one of only two populations known to remain east of the Mississippi. Other rare species occurring within the fort, primarily on the Lebanon County side, are the **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)**, the **G4, S3BS3N northern myotis bat (*Myotis septentrionalis*);** the **G5, S2 PA-threatened American holly (*Ilex opaca*)**. the **G5, S1S2 forked chickweed (*Paronychia fastigiata var. nuttalli*);** the **S3S4 Leonard's skipper butterfly (*Hesperia leonardus*);** the **G3, S2 frosted elfin butterfly (*Incisalia irus*);** the **G3G4, S1 hand-maid moth (*Datana ranacaeps*);** the **G3, S1 Pine barrens Zale moth (*Zale* sp. 1);** and the **G3G5, SU earwig scorpionfly (*Merope tuber*).**

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
1	PETERS MOUNTAIN WETLAND #25	Wayne Twp.	This site is a headwaters swamp, drained by tributaries of Powell Creek, which flow out both East and West. It supports four plant species of special concern, including good populations of **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*), G5, S2 mud sedge (*Carex limosa*), and G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*).** The site also supports **G5, S1, PA-endangered pod-grass (*Scheuchzeria palustris*)**, believed to occur here at its southernmost extant population in eastern North America. Also occurring at this site is the plant species golden club (*Orontium aquaticum*), which has been removed from the species of concern list since the 1997 report.
2	MAHANTANGO MOUNTAIN SLOPES #8	Upper Paxton Twp.	The site supports a fair-to-good quality **Mesic Central Forest Natural Community** and a fair to good quality **Northern Appalachian Acidic Cliff Natural Community**.
2	STONY CREEK VALLEY #40 **UPDATED**	East Hanover, Middle Paxton Twps. & Lebanon Co.	This site consists of a narrow band of forest along Stony Creek. A good stand of **American holly (*Ilex opaca*, G5, S2 PA-threatened)** occurs intermittently on the Stony Creek floodplain and the adjacent lower slopes of Sharp Mountain. Also, specimens identified as a **G4 S2S3 Pennsylvania animal species of concern** were taken from a spring leading to Stony Creek.
2	STONY MOUNTAIN PONDS #33 **UPDATED**	Middle Paxton Twp.	This site is a good quality occurrence of an **Ephemeral/Fluctuating Natural Pool** community. It includes 12 ponds, which occur in a high valley between Stony Mountain and Sharp Mountain. The **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)** occurs in open habitat in several of the ponds. The site also supports a population of the **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)**.
2	SUSQUEHANNA RIVER ISLANDS -- McCORMICKS ISLAND ARCHIPELAGO #42	Susquehanna Twp. & City of Harrisburg	This site encompasses a series of islands in the Susquehanna River on the north side of Harrisburg. McCormick's Island, the largest of the series, is characterized by a rare **floodplain forest natural community**. The site supports a fair-to-poor population of the PA-threatened **umbrella magnolia (Magnolia tripetala, G5, S2).** Several listed bird species are found here, including the **G5, S1B PA-endangered yellow-crowned night heron (*Nyctanassa violacea*), the G5, S1B PA-endangered great egret (*Casmerodius albus*), and the G5, S2S3B black-crowned night heron (*Nyctanassa nyctanassa*).**

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
3	AQUEDUCT BLUFFS/ JUNIATA RIVER SCOUR #35 NEW	Reed Twp. & Perry Co.	**The S2, PA-threatened jeweled shooting star (*Dodecatheon radicatum*)** occupies moist limestone cliffs on the west side of the Juniata. The **G4, S1 PA-endangered flat-stemmed spike rush (*Eleocharis compressa*)** occurs along a scoured area of riverbank, growing on sparsely populated bedrock ridges at the water's edge. Also occurring with the spike rush is the **G5, S4 lance fog fruit (*Phyla lanceolata*)**, which has been delisted since the 2000 report.
3	CONOWAGO FALLS #58	Londonderry Twp, Lancaster & York Counties	The exposed bedrock and isolated pools of the lower portion of the Susquehanna River in Dauphin County are characteristic of a Riverside Outcrop Natural Community. This community type is subject to several natural disturbances including extreme fluctuations in water level between winter and summer; ice and water scour; and very little soil in the exposed bedrock of the riverbed. **Four plant species of concern** are adapted to these disturbances and thrive in this location. **Two animal species of concern** have also been documented at this location.
3	ELLENDALE FORGE SITE / SHARP MOUNTAIN #29 **UPDATED**	Middle Paxton Twp.	This site consists of the forested crest and steep upper slopes of a south-facing section of Third Mountain. It supports a good quality population of **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**.
3	PLAINFIELD RIVERSHORE/ HILL ISLAND RAPIDS #56 **UPDATED**	Londonderry Twp. & York Co.	This site is located on the west side of Hill Island and consists of a rock outcrop rivershore. **Three plant species of concern** were documented at this site including a small, but globally significant population of the **G2, S2 PA-Endangered Virginia mallow (*Sida hermaphrodita)***.
3	RATTLING CREEK WATERSHED #14 **UPDATED**	Jackson, Jefferson Twps.	Several small rocky streams flow north out of Broad Mountain and join to form the Rattling Creek. **Screw-stem (*Bartonia paniculata*, G5, S3)** was observed along the creek during surveys in 2000. A large, good quality population of **G4G5, S3 minniebush (*Menziesia pilosa*)** occurs in the understory of this forest, along the East Branch of Rattling Creek. A good-quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** is found in the upper reaches of the Creek and its small tributaries. In 1992, active signs of **Allegheny woodrats (*Neotoma magister*, G3G4, S3, PA-threatened)** were observed in a boulder field near Rattling Creek. Surveys in 2001 identified an invertebrate animal species of concern along the creek and aquatic habitats in this site.

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
3	SECOND MOUNTAIN CLIFFS #39	Middle Paxton Twp.	The site supports an **Acidic Cliff Natural Community** with an open forest of chestnut oak, red oak, Virginia pine, black birch, and sassafras, with witch-hazel, blackberry, and greenbriar in the understory. The site also supports a population of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**.
3	SUSQUEHANNA RIVER AT FORT HUNTER/ROCKVILLE #38 - **UPDATED**	Middle Paxton Twp.	This site is located in the Susquehanna River and is characterized by a bedrock bottom covered with gravel and cobbles with boulders. It supports four species of rare aquatic animals.
3	SUSQUEHANNA RIVER AT SPEECEVILLE #36	Middle Paxton Twp.	A pair of nesting Bald Eagles was found among the river islands at this site.
3	SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS #48 **UPDATED**	Derry, Lower Swatara, Swatara Twps.	This site is an approximately one-mile section of Swatara Creek below Hummelstown. A fair to good-quality population of a **G3G4, S2S3 aquatic animal species** was found here in 1997, along with two other rare aquatic animals.
3	WICONISCO CREEK OUTCROPS #12 **UPDATED**	Upper Paxton, Washington Twp.	This site consists of a series of calcareous shale and limestone outcrops along Wisconisco Creek below Elizabethville. The **S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*)** occurs on seven separate outcrops.
4	BEAR MOUNTAIN #5 **NEW**	Wiconisco, Williams Twps. & Schuylkill Co.	In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain.
4	BEAR SWAMP #7	Wiconisco, Williams Twps.	This site includes wetlands and riparian areas along a two-mile stretch of Bear Creek in the valley between Bear Mountain and Big Lick Mountain. This site supports a poor quality population of **minniebush (*Menziesia pilosa*).** Also occurring here are over 400 individuals of formerly-listed golden club (*Orontium aquaticum*).
4	BERRY MOUNTAIN WOODS #11	Upper Paxton Twp.	This site consists of a portion of the lower slopes of Berry Mountain along Wiconisco Creek. A good-quality population of **G4G5, S3 PA-Rare minniebush (*Menziesia pilosa*)** occurs at several locations within the site.
4	BIG LICK MOUNTAIN #6 **NEW**	Williams Twp. & Schuylkill Co.	In 1991 and again in 2001 a good-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Big Lick Mountain.

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
4	CAMP HEBRON SWAMP #24	Halifax, Wayne Twps.	This site is an approximately five-acre swamp located at the headwaters of a tributary to Powell Creek. A good quality population of the **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*)** shrub species is found in growing in dense thickets with the other shrub species listed above. A fair-to-good-quality population of the golden club (*Orontium aquaticum*), delisted since the 1997 report, occurs in the slow-moving streamlets and wet depressions.
4	CLARK CREEK WETLANDS #26 **UPDATED**	Middle Paxton Twp.	This site is a small, damp to seepy, sandy opening on the roadbank/woods border interface along PA Route 325 in State Game Lands # 211. Periodic roadside clearing activities have resulted in an interesting plant habitat that includes marginal and small populations of two plant species of special concern: **yellow-fringed orchid (*Platanthera ciliaris*) and grass-leaved rush (*Juncus biflorus*)**. The habitat also includes a good population of **G4, S2 Vasey's eupatorium (*Eupatorium godfreyanum*)** along the roadside.
4	CLARK CREEK WOODS #27	Middle Paxton Twp.	This site consists of two small pools along a blocked streamlet at the base of Third Mountain. A fair to good population of **G5, S2 PA-endangered cattail sedge (*Carex typhina*)** was discovered in these pools in 1997.
4	CUMMINGS SWAMP #10	Upper Paxton Twp.	This site consists of a swampy forest on the floodplain of the Susquehanna River. It supports a good quality population of **G5, S2 purple fringeless orchid (*Platanthera peramoena*).**
4	HUMMELSTOWN LIMESTONE BLUFF #47	Derry Twp. & Hummelstown Boro.	This site consists of a series of small north-facing limestone bluffs. It supports a fair quality population of **G4, S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*).**
4	INDIAN ECHO CAVERNS #49	Derry Twp.	This site is a commercially- operated cave. A fair-quality population of a globally rare animal species has been observed in the room, occupying rimstone pools on top of a flowstone mound.
4	MAHANTANGO CREEK AT PILLOW #4 **NEW**	Pillow Boro. & Northumberland Co.	The site is a very steep east-southeast facing shale (Weikert soil series) cliff area along the Mahantango Creek. During a survey of the creek by boat, a marginal to good-quality population of **PA-Threatened jeweled shooting star (*Dodecatheon* radicatum)** was identified on the cliffs.
4	MAHANTANGO CREEK OUTCROPS #2	Upper Paxton Twp.	This site consists of two shale cliffs exposed by erosion of Mahantango Creek. This site has a good quality population of **G4, S2 PA-threatened Jeweled shooting-star (*Dodecatheon radicatum*).**

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
4	MALTA CLIFFS #3 **NEW**	Upper Paxton Twp. & Northumberland Co.	A new excellent-quality population of a **Pennsylvania-Threatened plant species, the jeweled shoot star (*Dodecatheon* radicatum)**, was identified in a steep shale cliff area along the creek.
4	OAKDALE STATION WOODS #13	Jackson, Washington Twps.	This site is a north-facing ravine with a dry-mesic, acidic soil. The **G4G5, S3 minniebush (*Menziesia pilosa*)** is found in the understory at this site.
4	PETERS MOUNTAIN #19 **NEW**	Jefferson, Rush Twps.	Evidence of **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)** was found in this area during surveys in 1995.
4	RATTLING RUN HEADWATERS #30	East Hanover Twp.	Rattling Run flows out of a small headwaters swamp are in a high, narrow valley between Sharp Mountain and Stony Mountain. Just northwest of the headwaters swamp an open boulder field supports an animal species of concern in PA. Additionally, above the headwaters on Sharp Mountain is an extant population of the **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)**.
4	SMOKE HOLE RUN #17	Jefferson Twp.	Smoke Hole Run is a clear, sandy-bottomed stream which flows south from Broad Mountain. **G5, S2 rough-leaved aster (*Eurybia radula*)** occurs in partial sunlight along the stream.
4	STONY MOUNTAIN #31 **UPDATED**	East Hanover Twp.	This site consists of the steep forested slope of a south-facing mountain. It supports a good population of **Allegheny woodrats (*Neotoma magister*; G3G4, S3 PA-Threatened)**.
4	SUSQUEHANNA RIVER AT HALIFAX #23	Halifax Twp.	This site is located in the Susquehanna River at a series of large islands, part of which is included in State Game Lands #254. Two animal species of special concern were found here in 1998.
4	SUSQUEHANNA RIVER AT HARRISBURG #44	City of Harrisburg, Swatara Twp, & Cumberland Co.	This site is a portion of the Susquehanna River within and adjacent to the city of Harrisburg. Three rare animal species are found here in shallow quickwater and riffles. Independence Island and other forested islands in the vicinity are also potential habitat for wading bird colonies; in 1989 nests of the **G5, S1B PA-endangered yellow-crowned night heron (*Nyctanassa violacea*)** were documented at this site, but a survey of the site in 1997 failed to find any active nests of this species.
4	SUSQUEHANNA RIVER AT MILLERSBURG #9 **UPDATED**	Halifax & Upper Paxton Twps., Millersburg Borough & Perry Co.	Three animal species of concern were found here during field surveys in 1997.
4	SUSQUEHANNA RIVER AT STATE GAME LANDS #258 #1	Upper Paxton Twp.& Perry Co.	This site consists of an archipelago of islands in the Susquehanna River near the Dauphin/Northumberland Co. line. An animal species of concern was found on the southern half Craft's Island.

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
4	SWATARA CREEK WOODS #50	Derry, Lower Swatara Twps.	This forested site along the Swatara Creek occurs on limestone-derived soils and creates habitat that supports a rich diversity of herbaceous species including two plant species of special concern. A large good quality population of **G5, S2 PA-Threatened *Elissia nyctelea*** occurs on and adjacent to the floodplain of the creek. Additionally, a smaller poor quality population of **G4G5, S2 PA-Threatened limestone petunia (*Ruellia strepens*)** occurs higher up on the slopes.
4	WILLIAMSTOWN WOODS/WICONISCO CREEK FLOODPLAIN #15	Jackson, Jefferson, Williams Twps.	A fair to good population of **G4G5, S3 minniebush (*Menziesia pilosa*)** inhabits the margins of the streamlets and rocky places, especially talus slopes, in the gaps. A fair population of **yellow-fringed orchid (*Platanthera ciliaris*)** occupies a portion of the site where a powerline/pipeline ROW was established in the recent past. Also found at this site is a fair population of the **showy goldenrod (*Solidago speciosa var. speciosa*)**, occurring in the floodplain in a mix of open, overgrown former sand quarries.
5	CONEWAGO CREEK AT KOSER RUN #53	Conewago Twp. & Lancaster Co.	Two aquatic animal species of concern were found in this portion of Conewago Creek. The full extent of the population in the creek is unknown.
5	CONEWAGO CREEK AT T300 COVERED BRIDGE #57 - **NEW**	Londonderry Twp. & Lancaster Co.	Surveys in 1995 documented a G3G4 animal species of concern in the creek.
5	DEEP HOLLOW #20	Jackson Twp.	This site is a forested north-facing drainage, located within Haldeman State Forest. A fair quality population of the **G4G5, S3 minniebush (*Menziesia pilosa*)** shrub species is found at this site.
5	DEVILS RACE COURSE #32	East Hanover, Middle Paxton Twps.	This site represents an **outstanding geologic feature** of Pennsylvania. It consists of a boulder field about 40 meters wide and over 1000 meters long.
5	HARRISBURG SITE #45 **NEW**	City of Harrisburg	The **PA-Endangered Peregrine Falcon (*Falco peregrinus*)** has been found at this site in downtown Harrisburg.
5	IRON RUN DAM SITE #51 **UPDATED**	Londonderry Twp.	A fair to poor quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** occurs at this site. A fair to poor population of **G5, S3 tooth-cup (*Rotala ramosior*)** was found in a wet-mesic area along the lake shore in open light. Also located along the lakeshore is a small occurrence of **G5, S3 eastern coneflower (*Rudbeckia fulgida*)** in disturbed openings created by fishing trails. In 2004 an individual **invertebrate species of concern** was collected at the site, but not in breeding habitat.

County Rank[1]	Site Name (site #)	Municipality	PA Heritage Ranks[2] and Site Importance
5	ROUNDTOP THICKET #52 **UPDATED**	Conewago, Londonderry Twp.	This site is an "old field" type habitat situated on a powerline right-of-way in State Game Lands # 242 in the Iron Run drainage. Although the mowing, the presence of the powerline, and the numerous exotic species make the site low quality, it does support populations of two plant species of special concern: **G5, S1 sand blackberry (*Rubus cuneifolius*) and G5, S3 eastern coneflower (*Rudbeckia fulgida*).**
5	STATE GAME LANDS #290 #34	Reed Twp.& Perry Co.	This site is at the confluence of the Juniata and Susquehanna Rivers. A fair population of **G4, S1 PA-endangered false loosestrife seedbox (*Ludwigia polycarpa*)** was discovered in 2001. An unknown quality population of an aquatic animal species of concern was found in the west channel of the Susquehanna around Haldeman Island. Another aquatic animal species of concern was observed at the site in 1995. An additional animal species of concern has been breeding at this site since 1991.
5	SWATARA CREEK AT ROYALTON #54	Londonderry Twp., Royalton, Middltown Boros.	This site is located in the lower reaches of Swatara Creek at Royalton just before the creek's confluence with the Susquehanna River. It supports an aquatic animal species of special concern.

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

County Rank[1]	Site Name (site #)	Municipality	Natural Feature and Importance
HIGH	Powell Creek Swamp #18	Jefferson Twp.	This site is a hardwood swamp near the confluence of the North Fork of Powell's Creek and Smoke Hole Run. The streams have multiple, meandering channels cutting into the deep sandy substrate. The sandy soil is gleyed, indicating a widely fluctuating water level. Some areas likely dry out completely in late summer. The overstory is young and open, and may have been logged in the past, but is recovering. There is potential habitat for rare plant species in this wetland. Additional surveys are recommended.
MED	Berry Mountain Slopes #22	Halifax, Upper Paxton Twps.	This site consists of a very steep, undercut shaly slope at the west end of Berry Mountain south of Millersburg. The steepness of the slope, the southwestern aspect, and the shaly soil have created hot, dry condition and an unusual forest composition. The lower slope is eroding and has been disturbed by road-building, but the upper slope has a largely intact (and unusual) forest of table-mountain pine, Virginia pine, and chestnut and black oaks, with blueberry the dominant understory. Exposed boulders and ledges are also present. Access to the site is limited due to the steepness of the slope. The unusual forest type may serve as habitat for rare plant or animal species.
MED	Dauphin Marsh #37	Middle Paxton Twp.	This site is an approximately two acre marsh located in the floodplain of the Susquehanna River. It historically supported a small but good quality population of PA-endangered false loosestrife seedbox (*Ludwigia polycarpa*). Surveys in 1995 and 1997 failed to find this rare plant, but it likely still exists in the seed bank, and favorable conditions may encourage growth in future years.
MED	Wildwood Lake #43	Susquehanna Twp.	This site has been changed from site of state-wide significance to locally significance due to removal of American lotus (*Nelumbo lutea*) from the species of concern list**,** an aquatic emergent plant, which is found growing densely over much of the site.
LOW	Royalton Rivershore #55	Londonderry Township	This is a disturbed site just below small rapids on the east shore of the Susquehanna River. A small quality population of G5, S4 lance fog-fruit (*Phyla lanceolata*), which has been delisted since the 1997 report. With this species delisting, the site has been moved from the sites of state-wide significance to the locally significant sites. The species of concern requires disturbance and the present artificial and natural disturbances appear to favor its persistence at this site.

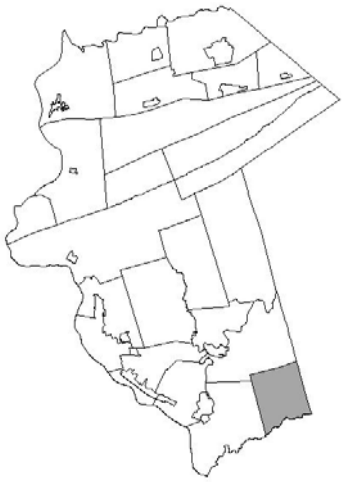
Natural Areas of Dauphin County by Township

Several populations of the jeweled-shooting star (*Dodecatheon radicatum*), a PA-threatened species of concern, occur on rocky outcrops in Dauphin County. Photo: Trina Morris

CONEWAGO TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Conewago Creek at Koser Run (5)	Animal Species of Concern	G3G4	S3S4	N	08-08-95	E
	Animal Species of Concern	G4	S3S4	N	08-08-95	E

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



Locally Significant: None

Managed Lands: None

Conewago Township primarily drains to the Conewago Creek at the southern border of the county. The majority of the township is in agriculture. Several fragments of forest blocks are found throughout the township but do not appear to coincide with stream corridors. Forested riparian corridors should be restored and maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. The forested blocks of the township appear to be clustered in a few areas, lending themselves to protection and connectivity.

CONEWAGO CREEK AT KOSER RUN (Conewago Township and Lancaster County)

Two aquatic animal species of concern were found in this portion of Conewago Creek. The full extent of the population in the creek is unknown.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

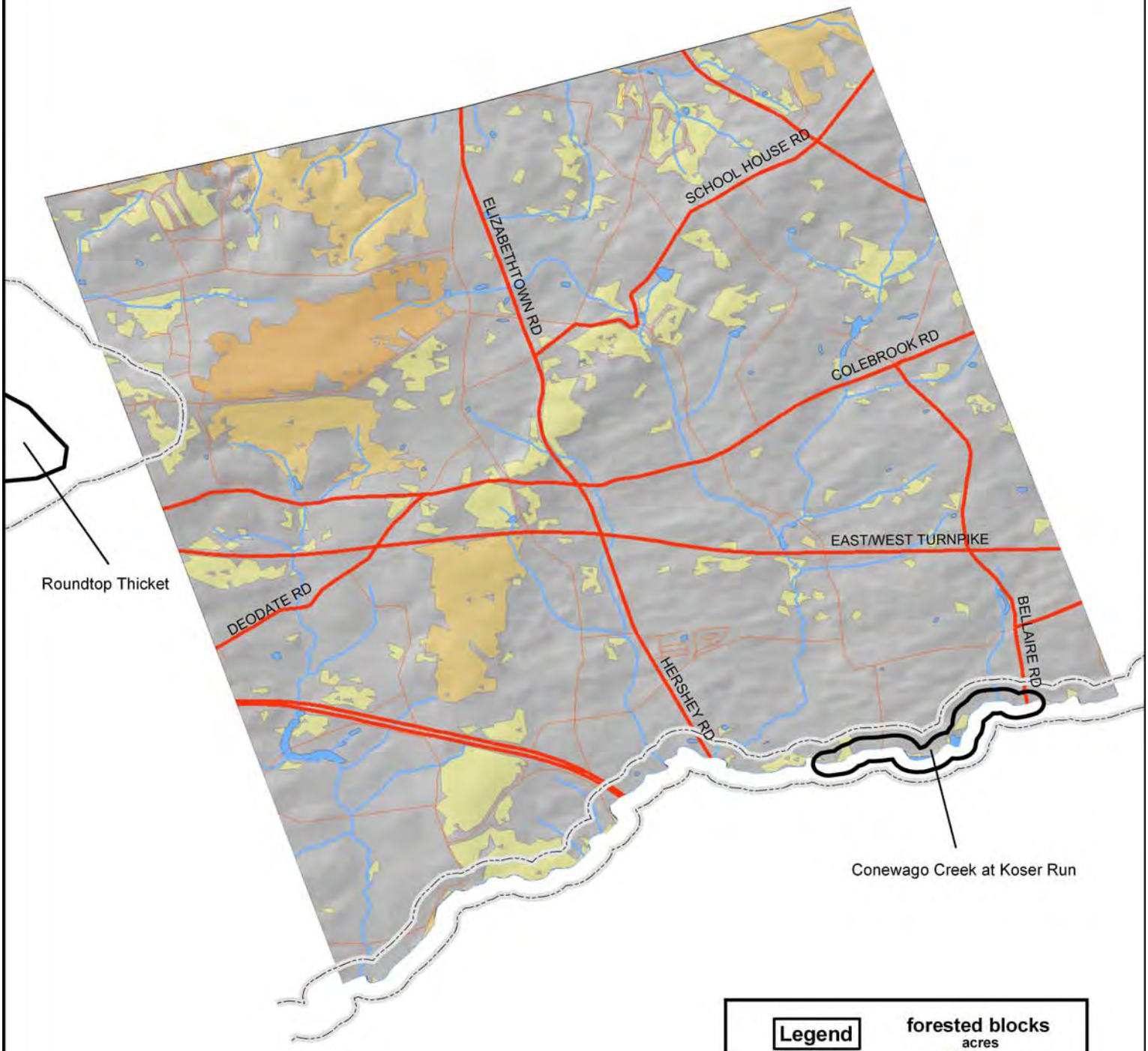
Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

CONEWAGO TOWNSHIP MAP

Conewago Township

Pennsylvania Natural Heritage Program



Forested buffers along waterways serve many purposes. They provide ground and surface water purification, provide shade for trout and other cold-water species, and help to control erosion. They are reservoirs of biological diversity and sanctuaries for common, sensitive and declining species. Enrolment in the Conservation Reserve Enhancement Program (CREP) can provide financial incentive to repair and protect streamside buffers.

DERRY TOWNSHIP, HUMMELSTOWN BOROUGH

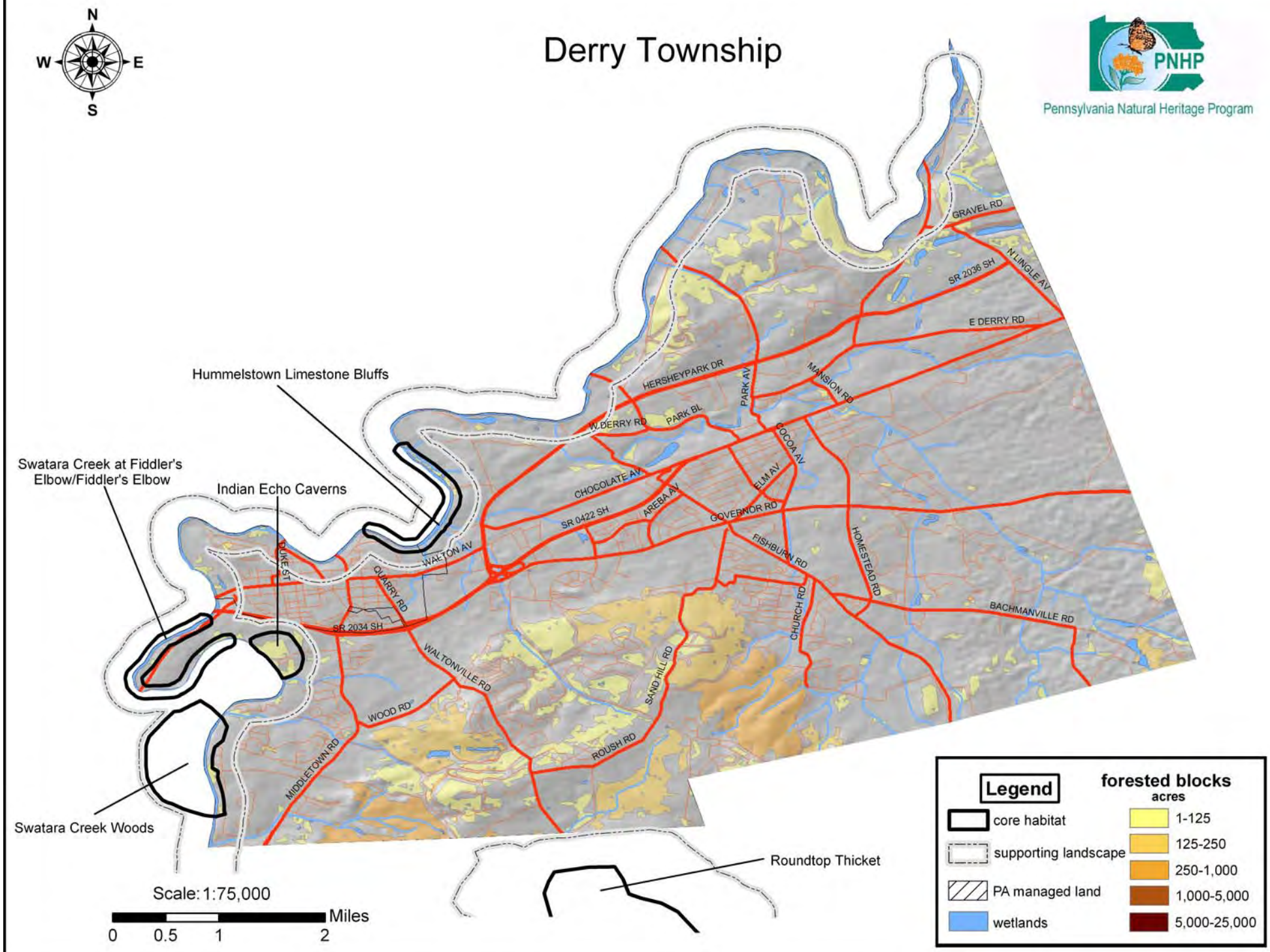
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Hummelstown Limestone Bluffs (4)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G4	S2	PT	05-01-97	C
Indian Echo Caverns (4)	Animal Species of Concern	G5	S2S3	N	08-25-95	C
Swatara Creek at Fiddler's Elbow/Fiddler's Elbow Bluffs (3)	Animal Species of Concern	G3G4	S3S4	N	05-13-97	C
	Animal Species of Concern	G4	S4	N	05-13-97	E
	Animal Species of Concern	G4	S3S4	N	05-13-97	E
Swatara Creek Woods (4)	Plant: Ellisia *Ellisia nyctelea*	G5	S2	PT	05-20-93	B
	Plant: Limestone Petunia *Ruellia strepens*	G4G5	S2	PT	05-20-93	D

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

Locally Significant: None

Managed Lands: None

DERRY TOWNSHIP MAP


N
W
E
S
Derry Township
PNHP
Pennsylvania Natural Heritage Program
Hummelstown Limestone Bluffs
Swatara Creek at Fiddler's Elbow/Fiddler's Elbow
Indian Echo Caverns
Swatara Creek Woods
Roundtop Thicket
GRAVEL RD
N LINGLE AV
SR 2036 SH
E DERRY RD
HERSHEYPARK DR
MANSION RD
PARK AV
W DERRY RD
PARK BL
COCOA AV
ELM AV
CHOCOLATE AV
AREBA AV
SR 0422 SH
GOVERNOR RD
FISHBURN RD
HOMESTEAD RD
BACHMANVILLE RD
CHURCH RD
SAND HILL RD
ROUSH RD
WALTON AV
DUKE ST
QUARRY RD
SR 2034 SH
WALTONVILLE RD
WOOD RD
MIDDLETOWN RD
Scale: 1:75,000
Miles
0
0.5
1
2
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

Derry Township supports important aquatic resources in the Swatara Creek, under the influence of ever-expanding developed areas and shrinking agricultural lands. Forested riparian corridors should be maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. Derry Township is divided by the boundary of the Ridge and Valley Geographic Province and the Piedmont. South of this division lie several intact blocks of forest interspersed with residential development. These forest blocks contain several headwater streams and should be protected for maintenance of water quality and wildlife habitat.

HUMMELSTOWN LIMESTONE BLUFF (Derry & South Hanover Townships and Hummelstown Borough)

This site consists of a series of small north-facing limestone bluffs. It supports a fair quality population of **G4, S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*).** This species, last observed here in 1997, has been known from this site for at least 60 years. It is found growing with wild columbine, rock polpody, and maidenhair spleenwort. The adjacent slopes support a very diverse spring flora under a canopy of sugar maple and hackberry.

Threats and Disturbances:

Threats to this site include trash dumping and clearing of trees. Clearing of the trees along these slopes may expose this unique outcrop habitat to too much sun possibly causing the outcrops to become too hot and dry for the continued persistence of this species.

Conservation Recommendations:

Maintenance of forested buffer along the creek will help minimize erosion and will help provide habitat for the rich flora and animal species that occur there.

INDIAN ECHO CAVERNS (Derry Township)

This site is a commercially-operated cave. It is a solutional cave, in limestone, with one large room and two passages. A fair-quality population of a globally rare animal species has been observed in the room, occupying rimstone pools on top of a flowstone mound. There are also pools in one of the passages. The species of concern appears to be reproducing successfully, and no immediate threats are apparent.

Threats and Disturbances:

Potential disturbances from commercial use of the cave include higher temperatures due to body heat and light bulbs, and tossing of coins or trash into the pools (no longer permitted).

SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS—UPDATED—(Derry, Lower Swatara, and Swatara Townships)

This site is an approximately one-mile section of Swatara Creek below Hummelstown. The portion of the river surveyed included several quickwater riffles with gravelly to stony substrates. A fair to good-quality population of a **G3G4, S2S3 aquatic animal species** was found here in 1997, along with two other rare aquatic animals. This section of Swatara Creek is often bounded by limestone cliffs and ledges with a diverse native flora. Round-leaved hare's bells, bloodroot, hepatica, ragwort, columbine, and cliff-brake are among the native species present; wineberry, Norway Maple, and tree-

of-heaven are among the invasives. Swallows nest on muddy portions of the steep riverbanks. Despite disturbances, there is potential for rare plants or animals to colonize this site.

Threats and Disturbances:
Threats to these populations as well as to other common species that occupy Swatara Creek include thermal and chemical pollution, impoundment, and excessive sedimentation. Disturbances to the site include invasive plants as well as old trash and mulch that have been thrown over the bank from above.

Conservation Recommendations:
Maintaining the best quality water possible will help these species persist at this site in the future.

SWATARA CREEK WOODS (Derry and Lower Swatara Townships)

This forested site along the Swatara Creek occurs on limestone derived soils and creates habitat that supports a rich diversity of herbaceous species including two plant species of special concern. On the upper slopes hackberry is a dominant tree species with pawpaw in the understory. On the floodplain of the creek sycamore is dominant with a few scattered copses of multiflora rose in the understory. Native herbs such as waterleaf, cutleaf toothwort, bluebells, jewelweed, false mermaid weed, and Dutchman's breeches are common. A large good quality population of **G5, S2 PA-Threatened *Elissia nyctelea*** occurs on and adjacent to the floodplain of the creek. Additionally, a smaller poor quality population of **G4G5, S2 PA-Threatened limestone petunia (*Ruellia strepens*)** occurs higher up on the slopes.

Threats and Disturbances:
This site has not seen any recent disturbance, but it may have been used for grazing at one time. Exotic species such as garlic mustard, multiflora rose, and Japanese honeysuckle degrade the site.

EAST HANOVER TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Devils Race Course (5)	Geologic Feature: Boulder Belts	G?	S?	N	N/A	E
Ellendale Forge Site/Sharp Mountain (3)	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	11-21-02	B
Fort Indiantown Gap Macrosite (1)	Plant: American Holly *Ilex opaca*	G5	S2	PT	09-20-99	D
	Plant: Forked Chickweed *Paronychia fastigiata var. nuttalli*	G5T3T5	S1S2	TU	09-08-99	C
	Animal: Earwig Scorpionfly *Merope tuber*	G3G5	SU	N	07-15-99	E
	Animal: Regal Fritillary *Speyeria idalia*	G3	S1	N	2005	AB
	Animal: Leonard's Skipper *Hesperia leonardus*	G4	S3S4	N	09-09-99	B
	Animal: Frosted Elfin Butterfly *Incisalia irus*	G3	S2	N	05-10-99	E
	Animal: A Hand-Maid Moth *Datana ranacaeps*	G3G4	S1	N	05-17-99	E
	Animal: Pine Barrens Zale Moth *Zale sp.1*	G3Q	S1	N	05-17-99	E
	Animal: Northern Myotis *Myotis septentrionalis*	G4	S3BS3N	CR	07-15-99	E
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	10-15-02	E
	Animal Species of Concern	G5	S3S4	N	06-22-98	E
Rattling Run Headwaters (4)	Animal Species of Concern	G4	S3S4	CA	08-25-94	E
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	10-30-96	B

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	State	State Status	Last Seen (m-d-y)	Quality**
Stony Creek Valley (2)	Plant: American Holly *Ilex opaca*	G5	S2	PT	06-19-02	BC
	Animal Species of Concern	G5	S2S3	N	06-16-02	E
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	08-29-97	C
Stony Mountain (4)	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	10-30-96	B

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

Locally Significant: None

Managed Lands: State Game Land #211
State Game Land #210
Weiser State Forest
Fort Indiantown Gap National Guard Training Center

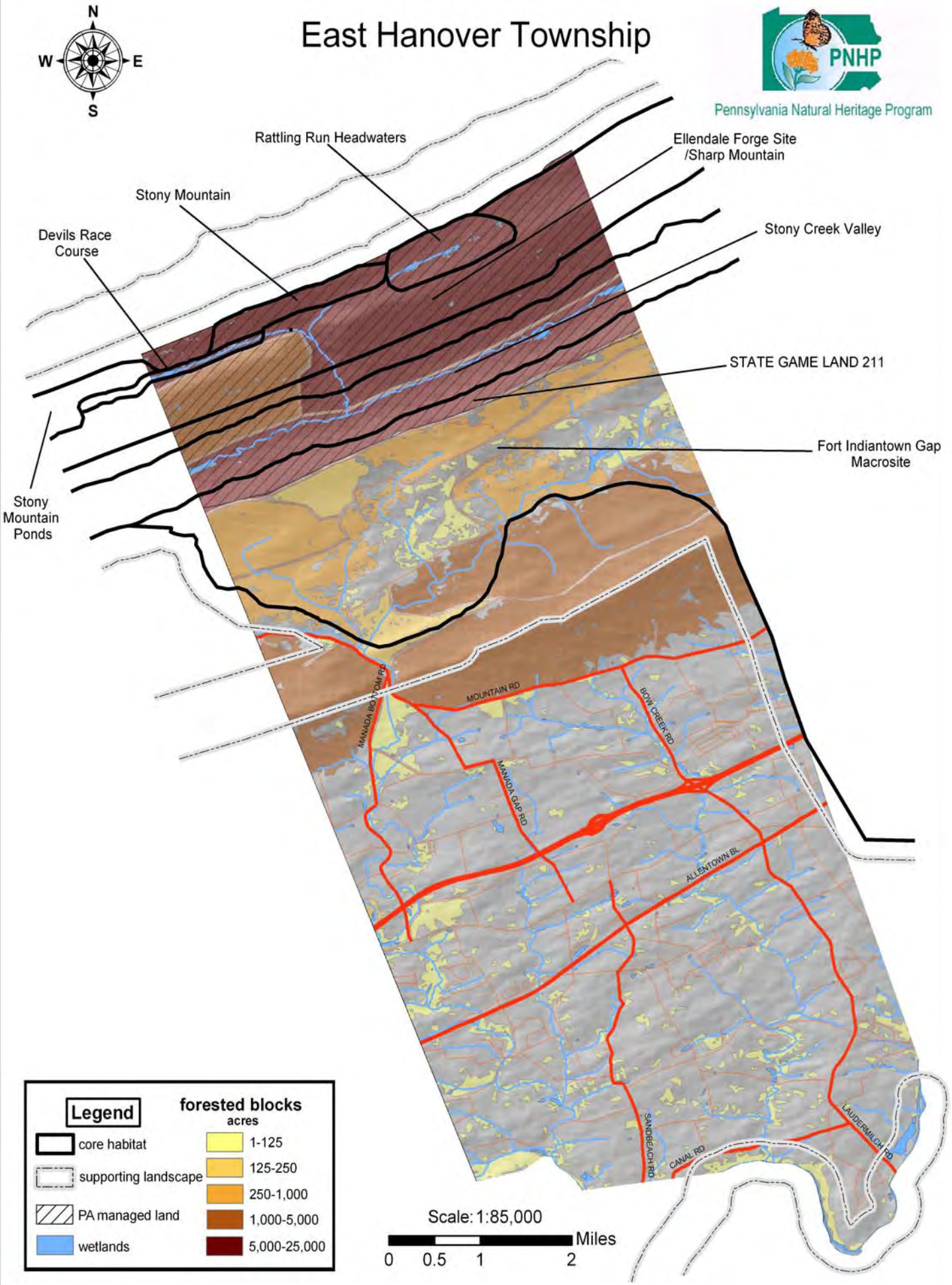
Other: High Quality Cold Water Fisheries—Stony Creek

East Hanover Township transitions from the Kittatinny Ridge in the north to a mixture of agriculture and developed areas in the valley portion, bisected by interstate highway. Forested riparian corridors should be maintained where they remain, in particular along the Swatara Creek at the southern border of the Township. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. Protection of the continuous forested ridge along Blue Mountain is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below.

EAST HANOVER TOWNSHIP MAP

East Hanover Township

Pennsylvania Natural Heritage Program



DEVILS RACE COURSE (East Hanover and Middle Paxton Townships)

This site represents an **outstanding geologic feature** of Pennsylvania. It consists of a boulder field about 40 meters wide and over 1000 meters long. It is formed by angular boulders from the two adjacent ridges, broken off by successive freezing and thawing when the glacial front was nearby to the north. The boulder field is of Pottsville conglomerate (Pennsylvanian Age) and sandstone derived from ridges of sharp and stony mountains (Geyer and Bolles 1979).

ELLENDALE FORGE SITE/SHARP MOUNTAIN—UPDATED—(Middle Paxton and East Hanover Townships, Lebanon County)

This site consists of the forested crest and steep upper slopes of a south-facing section of Third Mountain. It is dominated by chestnut oak, red oak, black birch, eastern hemlock, red maple, and sassafras with an understory of scattered witch hazel, striped maple, mountain laurel, and blueberry. It supports a good quality population of **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**. This site received extensive surveys by the PA Game Commission between 1992 and 1994. Their surveys showed this species to be active and fairly abundant at the site. This site is located in State Game Lands #211.

FORT INDIANTOWN GAP MACROSITE—UPDATED—(East Hanover and West Hanover Townships and Lebanon County)

This site is a valley located between Blue Mountain and Second Mountain on both sides of the Dauphin/Lebanon county line. Historically, parts of the valley were kept open by wildfires and other disturbance. In recent times, the valley has been used as a military reservation. Bombing and other exercises by the military have maintained an unusual, prairie-like habitat in parts of the valley. Currently the Fort is a mosaic of second-growth mixed oak and conifer forests, woodlands, open areas dominated by little bluestem and other grasses, goldenrods, milkweeds, asters, and blueberries. Surveys in 1999 revealed one poor population of **G5, S2 PA-Threatened American holly (*Ilex opaca*)** located in St. Pauls Cemetery Woods. This species is found in mixed-hardwood habitat and appears healthy despite evidence of repeated deer browse. Also located in 1999 in the Lebanon County portion of the site was a small population of **G5, S1S2 forked chickweed (*Paronychia fastigiata var. nuttalli*)** surviving in an area of frequent disturbance from military operations.

This site includes the Manada Creek Woods, an upland forest growing on a well-drained, shaly soil on the east side of Manada Creek. Another poor-quality population of **G5, S2 PA-Threatened American holly (*Ilex opaca*)** occurs at the site. Associated tree and shrub species are red oak, white oak, red maple, black-gum, hemlock, witch-hazel, serviceberry, highbush blueberry, and mountain laurel.

Evidence of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)** was found in this area during surveys in 1999 and was confirmed again more recently in 2002. Evidence of extant populations was found at 10 locations along Second Mountain, including areas within the Fort Indiantown Gap site and extending into Lebanon County. This species utilizes rocky outcrops along the ridgetop.

Populations of three rare animal species occur together in the open habitats within the Fort. One of these is the **G3, S1 regal fritillary (*Speyeria idalia*)**, and the Fort Indiantown Gap population is one of only two populations known to remain east of the Mississippi. This species has very specific habitat requirements, and has been found at several separate locations in the Gap where pockets of

appropriate early-successional habitat exists. Larval forms of this species depend exclusively upon arrow-leaved violet for food, and butterfly-weed is the preferred nectar plant for the adults, although other flowers may also be used. Associated with the regal fritillary in the old field habitats are the **G4, S3S4 Leonard's skipper (*Hesperia leonardus*)** and the **G3, S2 frosted elfin butterfly (*Incisalia irus*).**

An individual **G4, S3BS3N northern myotis (*Myotis septentrionalis*)** was captured within the training center, but the relationship of this location to a maternity site or roost is unknown. A survey of nocturnal insects with blacklight traps yielded several rare species. A **G3G4, S1 hand-maid moth (*Datana ranacaeps*)** was the first documented occurrence in Pennsylvania in many decades. The host plant for this moth appears to be maleberry; it was found in woods adjacent to a large disturbed opening. Another moth species, the **G3, S1 Pine barrens Zale moth (*Zale* sp. 1)** was located in a wooded area abundant with scrub oak, the host plant for the larval form. The first Pennsylvania record of the **G3G5, SU earwig scorpionfly (*Merope tuber*)** was also captured in the black lights at Fort Indiantown Gap.

Threats and Disturbances:
Some recent human disturbances at FIG have benefited the species of concern, while others have eliminated sites for the species. Exotic species, particularly spotted knapweed, and natural succession to forest are also threats to the habitat and therefore to the listed species.

Conservation Recommendations:
The persistence of the regal fritillary and associated species in the human-managed habitats of Fort Indiantown Gap depends upon maintaining the food plants used by both the larval and adult forms. To do this requires controlling the amount and type of disturbance to the early-successional habitat to favor the survival of the species of concern and its food plants. The Nature Conservancy is working with the Fort Indiantown Gap National Guard Training Center facility managers to actively manage the habitats of the regal fritillary and assess how future military operations might coexist with and facilitate the survival of the rare species at this site.

RATTLING RUN HEADWATERS (East Hanover Township)

Rattling Run flows out of a small headwaters swamp in a high, narrow valley between Sharp Mountain and Stony Mountain. The headwaters swamp itself has red maple, black-gum, and pitch pine scattered throughout, with highbush blueberry, dangleberry, and bayberry forming shrub thickets, as well as open areas dominated by Sphagnum mosses, cinnamon fern, round-leaved sundew, and graminoids such as three-way sedge, woolly bulrush, and reedgrass. A good population of Coville's rush, once listed as state rare, is found in these headwater swamps. Just northwest of the headwaters swamp an open boulder field supports an animal species of concern in PA. Additionally, above the headwaters on Sharp Mountain is an extant population of the **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)**.

Threats and Disturbances:
No threats or special management needs are apparent for this species.

Conservation Recommendations:
Protecting the swamp and nearby boulder fields from disturbances such as logging will benefit both species of concern.

STONY CREEK VALLEY—UPDATED—(East Hanover and Middle Paxton Townships and Lebanon County)

This site consists of a narrow band of forest along Stony Creek. A good stand of **American holly (*Ilex opaca*, G5, S2 PA-threatened)** occurs intermittently on the Stony Creek floodplain and the adjacent lower slopes of Sharp Mountain. Associated species include hemlock, yellow birch, sweet birch, white pine, black-gum, red maple, chestnut and other oaks, witch-hazel, mountain laurel, and rhododendron. The holly appears to be doing well, and no special management is recommended. Also occurring within this site is the golden club (*Orontium aquaticum*), which has been delisted since the 1997 report.

Also, specimens identified as a **G4 S2S3 Pennsylvania animal species of concern** were taken from a spring leading to Stony Creek. Part of the overall habitat of this area is described as a rocky substrate "Hemlock-Red Oak-Mixed Hardwood Terrestrial Forest" (Fike, 1999).

The terrestrial "Hemlock-Red Oak-Mixed Hardwood Terrestrial Forest" gradually opens into a "Hemlock-Mixed Hardwoods palustrine forest" where the water table is higher. This area opens into a large and extensive "Alder-Sphagnum Wetland" along Stony Creek. The species associated with this wetland include meadowsweet, highbush blueberry, maleberry, smooth alder, red maple, buttonbush, poison sumac, jewelweed, mannagrass, swamp candles, cinnamon fern, royal fern, sensitive fern, winterberry holly, arrow-wood, sedges, grasses and water horsetail.

The creek valley includes a site formerly named **County Line Swamp**. This swamp on the Dauphin/Lebanon County border is bisected by a slow-moving portion of Stony Creek. It contains areas of shrub-swamp dominated by alder as well as graminoid areas, and appears to have been dammed and flooded in the past, possibly by beavers. Sedges, Sphagnum moss, bulrushes, bur-reed, and rushes are present in the groundcover, with aquatic vegetation in the Creek channel and in isolated small pools. The area is potential habitat for plant species of concern as well as for odonate species--further surveys for rare odonates are recommended.

The Stony Creek valley provides important habitat for nesting neo–tropical songbirds. The survey was conducted in mid to late June, which is optimal time for detecting breeding birds. The species recorded on this site included Gray Catbird, American Redstart, Common Yellowthroat, Blue-gray Gnatcatcher, Red-eyed Vireo, Blue-headed Vireo, Scarlet Tanager, Worm-eating Warbler, Black-and-white Warbler, Black-throated Green Warbler, Acadian Flycatcher, Wood Thrush, and Ovenbird. This area extends vastly into Lebanon County as well and should be considered an important wetland area for both Dauphin and Lebanon Counties.

Threats and Disturbances:

Disturbances in this area include trails and paths used for outdoor recreation and some exotic plant species but there are not any imminent threats to the population of the S2S3 plant species. The site is used for hunting, fishing, and recreation, and is within State Game Lands #211. There are concerns about the hemlock woolly adelgid that is continuing to attack eastern hemlock forests and is a real threat to these trees. This aphid has the potential to destroy most hemlock forests in the area and wipe out critical habitat for wildlife, especially hemlock-dependent bird species.

Conservation Recommendations:

Buffers should be placed adjacent to Stony Creek and around the wetland. It is recommended that biological control measures be used to reduce the impact of the growing threat of the hemlock woolly adelgid.

STONY MOUNTAIN—UPDATED—(East Hanover Township)

This site consists of the steep south-facing forested upper slope of Stony Mountain. It is dominated by chestnut oak, red oak, white pine, eastern hemlock, sweet birch, black gum, and sassafras, with witch hazel and mountain laurel in the understory. It supports a good population of **Allegheny woodrats (*Neotoma magister*; G3G4, S3 PA-Threatened)**. This site is located in State Game Lands #211.

Stony Creek Valley contains a robust population of American holly (*Ilex opaca*), which is a much more common species along the mid-Atlantic coast.
Photo: PA Science Office of The Nature Conservancy

The last populations in the eastern United States of the **Regal Fritillary Butterfly (*Speyeria idalia*),** a G3 animal species of concern, occur at Fort Indiantown gap. This species has very specific habitat requirements, and has been found at several separate locations where pockets of appropriate early-successional habitat exist.
(Photo by the Pennsylvania Science of The Nature Conservancy)

HALIFAX TOWNSHIP, HALIFAX BOROUGH

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Camp Hebron Swamp (4)	Plant: Swamp Dog-hobble *Leucothoe racemosa*	G5	S2S3	N	05-26-92	B
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	05-26-92	BC
Susquehanna River at Halifax (4)	Animal Species of Concern	G3G4	S3S4	N	08-28-98	CD
	Animal Species of Concern	G4	S4	N	08-28-98	E
Susquehanna River at Millersburg (4)	Animal Species of Concern	G3G4	S3S4	N	10-24-97	AB
	Animal Species of Concern	G4	S4	N	10-24-97	E
	Animal Species of Concern	G4	S3S4	N	10-24-97	E

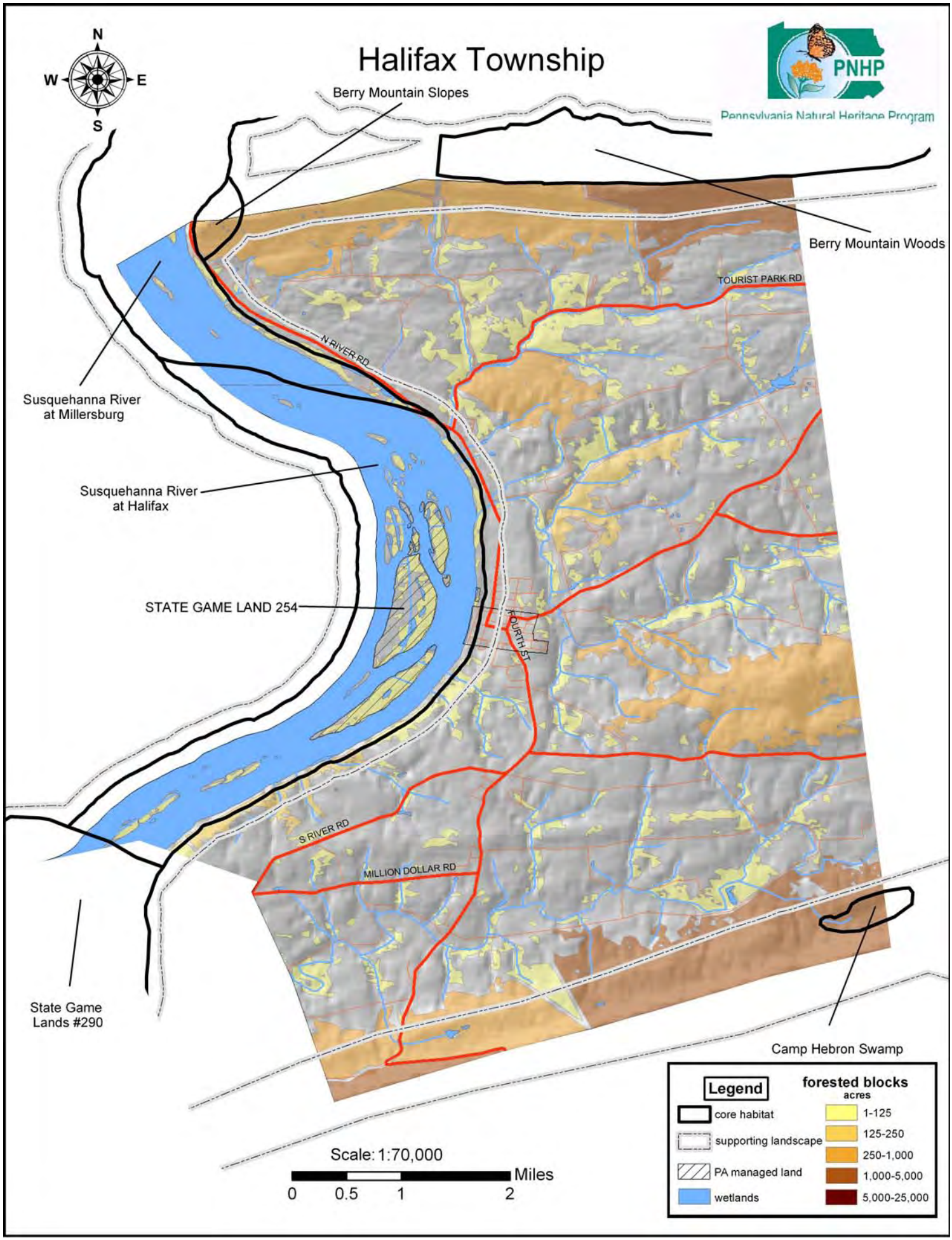
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: Berry Mountain Slopes

Managed Lands: State Game Land #254

Halifax Township drains directly to the Susquehanna River along its western border. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. Increasing riparian buffers along the Susquehanna and its tributaries will help reduce agricultural runoff and erosion and protect the watershed from degradation. The Susquehanna River in this area is peppered with small islands that provide diversity in the river's topography and are important habitats for wildlife. Forested ridges make up the northern and southern borders of the township, including the Appalachian Scenic Trail. Protection of these continuous forested ridges of the Appalachian Mountain Section is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the downstream watersheds.

HALIFAX TOWNSHIP MAP


Halifax Township
N
W
E
S
PNHP
Pennsylvania Natural Heritage Program
Berry Mountain Slopes
Berry Mountain Woods
TOURIST PARK RD
N RIVER RD
Susquehanna River at Millersburg
Susquehanna River at Halifax
STATE GAME LAND 254
FOURTH ST
S RIVER RD
MILLION DOLLAR RD
State Game Lands #290
Camp Hebron Swamp
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:70,000
Miles
0
0.5
1
2

CAMP HEBRON SWAMP (Halifax and Wayne Townships)

This site is an approximately five-acre swamp located at the headwaters of a tributary to Powell Creek. Tree species present include pin oak, red maple, black-gum, swamp-white oak, and black and yellow birch. Shrubs include winterberry, highbush blueberry, spicebush, dangleberry, and arrow-wood. A good quality population of the **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*)** shrub species is found in growing in dense thickets with the other shrub species listed above. A fair-to-good-quality population of the golden club (*Orontium aquaticum*), delisted since the 1997 report, occurs in the slow-moving streamlets and wet depressions. Associated species include halberd-leaved tearthumb, jack-in-the-pulpit, cinnamon fern, sensitive fern, violets, Sphagnum mosses, and various grasses and sedges. Both species of concern appear healthy and are reproducing.

Threats and Disturbances:

The site has been selectively logged in the past, which may have benefited the shrub species of concern.

Conservation Recommendations:

No special management is recommended.

SUSQUEHANNA RIVER AT HALIFAX (Halifax Township)

This site is located in the Susquehanna River at a series of large islands, part of which is included in State Game Lands #254. Two animal species of special concern were found here in 1998. The river bottom has a bedrock bottom with areas of sand and gravel.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT MILLERSBURG (Halifax & Upper Paxton Townships, Millersburg Borough and Perry County)

This site is a portion of the Susquehanna River just upstream of the confluence of the Susquehanna adjacent to Millersburg Borough. A forested island is present in the western half of the river. The river is shallow with low intensity riffles flowing over large cobbles and gravel. Algae and water-stargrass grow scattered on the river bottom. Three animal species of concern were found here during field surveys in 1997.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

Locally Significant Site:
Berry Mountain Slopes (Halifax and Upper Paxton Townships)
This site consists of a very steep, undercut shaly slope at the west end of Berry Mountain south of Millersburg. The steepness of the slope, the southwestern aspect, and the shaly soil have created hot, dry condition and an unusual forest composition. The lower slope is eroding and has been disturbed by road-building, but the upper slope has a largely intact (and unusual) forest of table-mountain pine, Virginia pine, and chestnut and black oaks, with blueberry the dominant understory. Exposed boulders and ledges are also present. Access to the site is limited due to the steepness of the slope. The unusual forest type may serve as habitat for rare plant or animal species.

Threats and Disturbances:
There are no obvious threats or management concerns to the site.

GOLDEN CLUB (*Orontium aquaticum*) has recently been removed from the plant species of concern list do to updated state-wide population estimates. This conspicuous wetland plant is known from several locations in Cumberland and Dauphin Counties. Photo: PA Science Office of The Nature Conservancy.

JACKSON TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Deep Hollow (5)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	09-23-97	C
Doc Smith Run Woods/Bear Puddles (1)	Plant: Northeastern Bulrush *Scirpus ancistrochaetus*	G3	S3	PE	08-30-92	CD
	Animal: Flypoison Borer Moth *Papaipema* sp. 1	G2G3	S2	N	09-23-98	B
Oakdale Station Woods (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	09-23-97	BC
Rattling Creek Watershed (3)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	10-01-98	B
	Plant: Screw-stem *Bartonia paniculata*	G5	S3	TU	11-02-00	BC
	Plant: Rough-leaved Aster *Eurybia radula*	G5	S2	N	10-01-98	C
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	11-19-92	E
	Animal Species of Concern	G5	S3	N	2001	E

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Williamstown Woods/Wiconisco Creek Floodplain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	10-15-98	BC
	Plant: Showy goldenrod *Solidago speciosa var. speciosa*	G5T5?	S?	N	10-04-97	CD
	Plant: Yellow-fringed orchid *Platanthera ciliaris*	G5	S2	TU	08-05-98	BC

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

Locally Significant: None

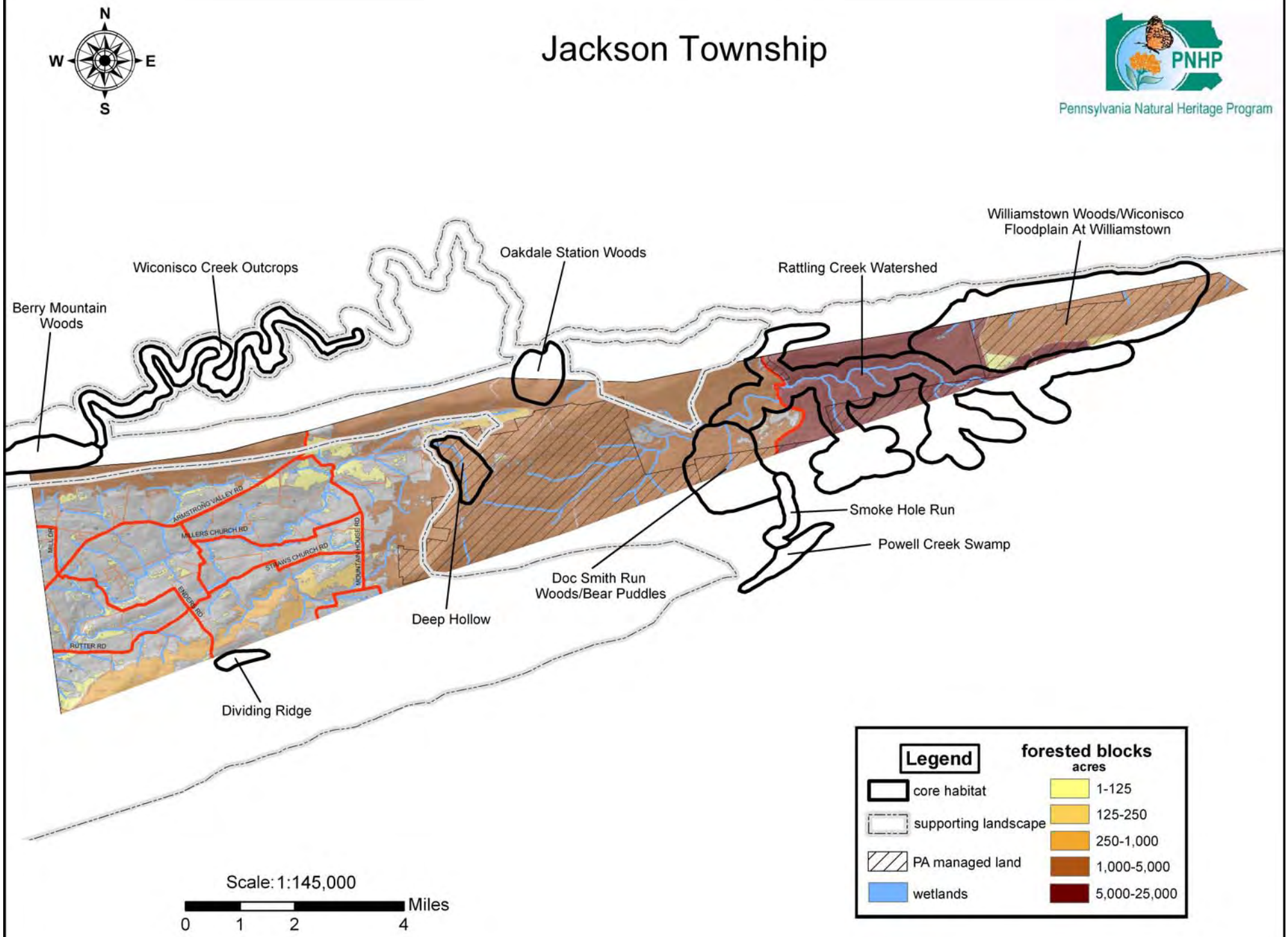
Managed Lands: Weiser State Forest
State Game Land #210
Lykens Glen

Jackson Township is largely forested, with the entire eastern portion lying within a few large contiguous forested blocks, much of which is within state land. Expanded protection of the continuous forested Kittatinny Ridge is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural western portions of the Township, forested riparian corridors should be maintained where they remain along Armstrong Creek. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor.

JACKSON TOWNSHIP MAP

Jackson Township

Pennsylvania Natural Heritage Program



DEEP HOLLOW (Jackson Township)

This site is a forested north-facing drainage, located within Haldeman State Forest. The soil is sandy and rocky, with chestnut oak, sassafras, and sweet birch the dominant tree species. There is a dense shrub layer of serviceberry, mountain laurel, maple-leaved viburnum, and hazelnut. Asters, whorled loosestrife, and wild sarsparilla are present in the ground cover. A fair quality population of the **G4G5, S3 minniebush (*Menziesia pilosa*)** shrub species is found at this site.

Threats and Disturbances:

This species has been heavily browsed at this site and only small individuals were present; no flowering or fruiting specimens were observed. Over-browsing by deer is a potential threat to the survival of this species at the site.

DOC SMITH RUN WOODS/ BEAR PUDDLES (Jackson and Jefferson Townships)

This site includes one plant and one animal species of concern from two different habitats. A population of a globally imperiled **G2G3, S2 flypoison borer moth (Papaipema sp. 1**) has been confirmed here. It occurs in even-aged stand of white oak with mountain laurel in the understory and a sparse groundcover with fly-poison. More survey work is needed to assess the full extent of this population. Also at this site is a poor to fair quality population of **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)**, which occurs in a series of shallow woodland pools (Bear Puddles) and wet depressions at the headwaters of Doc Smith Run. The surrounding woods have well-drained, sandy acid soil, and an oak-heath dominated forest. Black gum and red maple are common around the margins of the pools, which are also surrounded by dense shrub thickets. Most of the pools are largely shaded and have substrate of mud and dead leaves, sparsely vegetated with cinnamon fern, royal fern, Sphagnum and other mosses. Associated species include three-way sedge, floating mannagrass, woolly bulrush, and various sedge species. This site is within State Game Lands #210 and the Weiser State Forest.

Threats and Disturbances:

Disturbances to the site include logging in the surrounding woods, and a culvert draining the sites to the south, though the impact on the pools appears to be minimal. The largest threat to the species of concern is probably deer. Nearly all specimens of the species of concern had been browsed, some down to ground level, and the pools had many deer tracks and signs of browse.

OAKDALE STATION WOODS (Jackson and Washington Townships)

This site is a north-facing ravine with a dry-mesic, acidic soil. The overstory is open and dominated by various oaks, red maple, black-gum, hemlock, and sweet birch. The **G4G5, S3 minniebush (*Menziesia pilosa*)** is found in the understory at this site, associated with rhododendron, huckleberry, highbush blueberry, mountain laurel, spicebush, and witch hazel. This is a fair to good quality population with many mature and reproducing individuals.

Threats and Disturbances:

The site has been disturbed by logging, a railroad grade, and small dams in the past, but the population appears healthy. Severe logging or browsing by deer are potential threats.

RATTLING CREEK WATERSHED—UPDATED—(Jackson and Jefferson Townships)

Several small rocky streams flow north out of Broad Mountain and join to form the Rattling Creek. The surrounding slopes have sandy or rocky well-drained soils, which support a dry-mesic forest

consisting of various oak species, sweet birch, witch hazel, hemlock, and white pine. **Screw-stem (*Bartonia paniculata*, G5, S3)** was observed along the creek during surveys in 2000. More surveys are needed to determine health of the population. Timber harvesting may pose a threat to this species and a buffer should remain along the waters edge to protect this plant and other species of concern.

A large, good quality population of **G4G5, S3 minniebush (*Menziesia pilosa*)** occurs in the understory of this forest, along the East Branch of Rattling Creek. It is associated with low-sweet blueberry, black huckleberry, gooseberry, mountain laurel, azalea, and bush-honeysuckle. A good-quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** is found in the upper reaches of the Creek and its small tributaries. It occurs in wet, sandy soil in streamside seeps and old stream channels, usually in at least partial light. Associates include Sphagnum mosses, watchlist species Coville's rush, sedges (especially *Carex folliculata*), turtlehead, cinnamon fern, sensitive fern, royal fern, white wood aster, and grasses.

In 1992, active signs of **Allegheny woodrats (*Neotoma magister*, G3G4, S3, PA-threatened)** were observed in a boulder field near Rattling Creek. Additional surveys are needed to determine the extent and current quality of this population.

Surveys in 2001 identified a rare invertebrate animal along the creek and aquatic habitats in this site. Portions of this site are owned by the Lykens Borough Watershed authority, and portions are part of State Game Lands 210.

Threats and Disturbances:
There is abundant evidence of deer browse in the forests adjacent to Rattling Creek, and deer browse extensively on the plants of concern. A small dam on the creek at the confluence of the East and West branches creates a reservoir, which serves as a source of drinking water for the borough of Lykens.

WILLIAMSTOWN WOODS/WICONISCO FLOODPLAIN AT WILLIAMSTOWN (Jackson, Jefferson, and Williams Townships)

Williamstown Woods consists of a 3.5 mile rectangular block situated on the lower north slope of Berry Mountain between Wiconisco and Tower City. Except for a small private tract, the area is contained within the Weiser State Forest. The terrain is rugged, consisting of steep rocky slopes broken here and there by small gaps that are drained by intermittent or small permanent streamlets that flow into Wiconisco Creek. The predominant vegetation is upland mixed hardwood-heath forest. A fair to good population of **G4G5, S3 minniebush (*Menziesia pilosa*)** inhabits the margins of the streamlets and rocky places, especially talus slopes, in the gaps. This species is well established and should do well over the long term, although it is currently suffering from excessive deer browse. A fair population of **yellow-fringed orchid (*Platanthera ciliaris*)** occupies a portion of the site where a powerline/pipeline ROW was established in the recent past. The habitat here is the result of disturbance, but provides the proper environmental conditions- full sun, damp or seepy, acidic soil, and an early successional state-that the plant requires. Also found at this site is a fair population of the **showy goldenrod (*Solidago speciosa var. speciosa*)**, occurring in the floodplain in a mix of open, overgrown former sand quarries.

Threats and Disturbances:
The succession of woody plants in the formerly more open habitat is shading these plants and inhibiting their reproduction.

JEFFERSON TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Doc Smith Run Woods/Bear Puddles (1)	Plant: Northeastern Bulrush *Scirpus ancistrochaetus*	G3	S3	PE	08-30-92	CD
	Animal: Flypoison Borer Moth *Papaipema* sp. 1	G2G3	S2	N	09-23-98	B
Peters Mountain (4)	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	06-01-95	E
Rattling Creek Watershed (3)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	10-01-98	B
	Plant: Screw-stem *Bartonia paniculata*	G5	S3	TU	11-02-00	BC
	Plant: Rough-leaved Aster *Eurybia radula*	G5	S2	N	10-01-98	C
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	11-19-92	E
	Animal Species of Concern	G5	S3	N	2001	E
Smoke Hole Run (4)	Plant: Rough-leaved Aster *Eurybia radula*	G5	S2	N	09-12-97	C

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Williamstown Woods/Wiconisco Creek Floodplain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	10-15-98	BC
	Plant: Showy goldenrod *Solidago speciosa var. speciosa*	G5T5?	S?	N	10-04-97	CD
	Plant: Yellow-fringed orchid *Platanthera ciliaris*	G5	S2	TU	08-05-98	BC

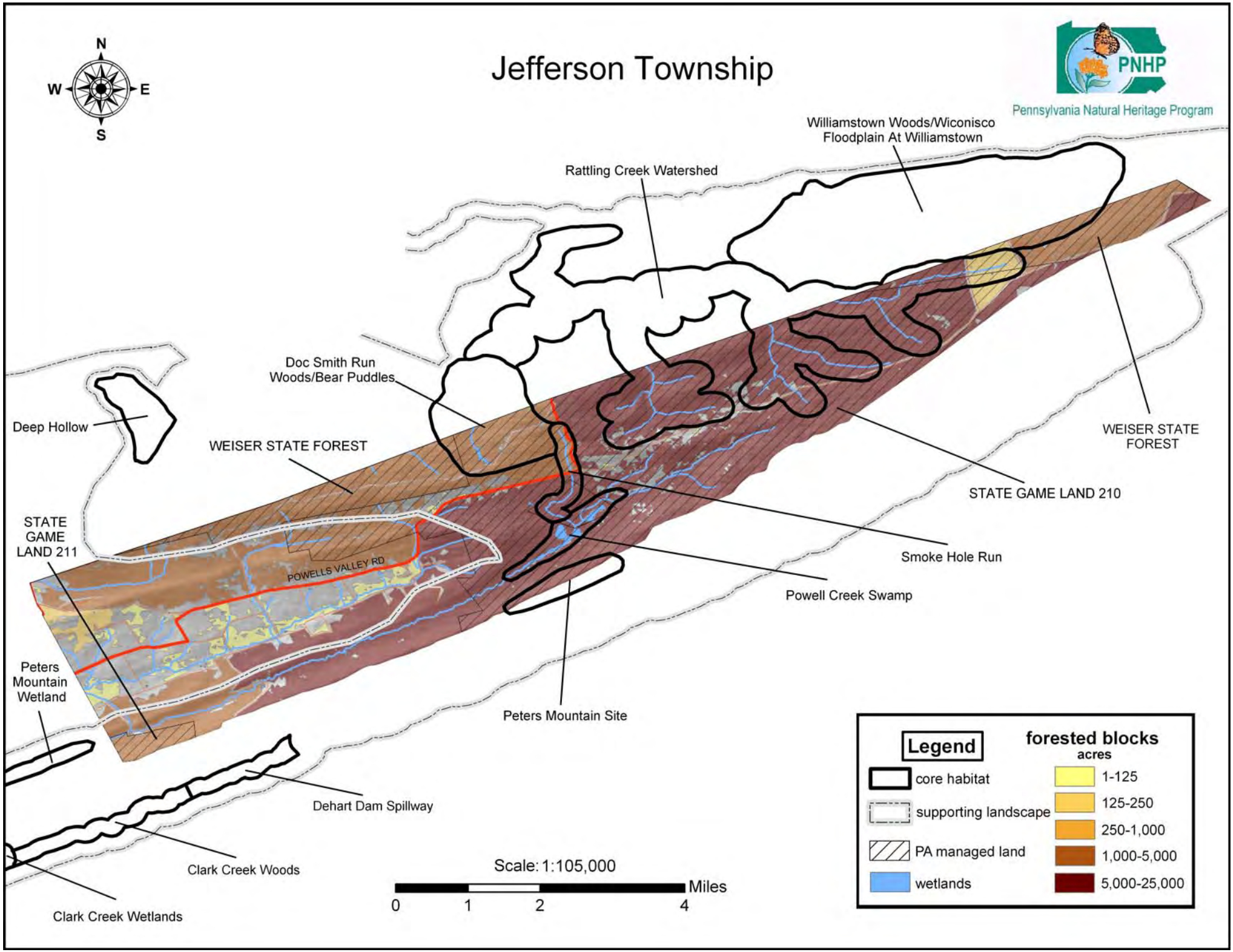
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: Powell Creek Swamp

Managed Lands: State Game Land #210
State Game Land #211
Weiser State Forest

Jefferson Township is almost entirely forested, part of the Kittatinny Ridge, and largely within state land. Expanded protection of the continuous forested Kittatinny Ridge is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural western portions of the Township, forested riparian corridors should be maintained where they remain along the headwaters to Powell Creek. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor.

JEFFERSON TOWNSHIP MAP


Jefferson Township
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PNHP
Pennsylvania Natural Heritage Program
Williamstown Woods/Wiconisco Floodplain At Williamstown
Rattling Creek Watershed
Doc Smith Run Woods/Bear Puddles
Deep Hollow
WEISER STATE FOREST
WEISER STATE FOREST
STATE GAME LAND 210
STATE GAME LAND 211
POWELLS VALLEY RD
Smoke Hole Run
Powell Creek Swamp
Peters Mountain Wetland
Peters Mountain Site
Dehart Dam Spillway
Clark Creek Woods
Clark Creek Wetlands
Scale: 1:105,000
0 1 2 4 Miles
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

DOC SMITH RUN WOODS/ BEAR PUDDLES (Jackson and Jefferson Townships)

This site includes one plant and one animal species of concern from two different habitats. A population of a globally imperiled **G2G3, S2 flypoison borer moth (Papaipema sp. 1**) has been confirmed here. It occurs in even-aged stand of white oak with mountain laurel in the understory and a sparse groundcover with fly-poison. More survey work is needed to assess the full extent of this population. Also at this site is a poor to fair quality population of **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)**, which occurs in a series of shallow woodland pools (Bear Puddles) and wet depressions at the headwaters of Doc Smith Run. The surrounding woods have well-drained, sandy acid soil, and an oak-heath dominated forest. Black gum and red maple are common around the margins of the pools, which are also surrounded by dense shrub thickets. Most of the pools are largely shaded and have substrate of mud and dead leaves, sparsely vegetated with cinnamon fern, royal fern, Sphagnum and other mosses. Associated species include three-way sedge, floating mannagrass, woolly bulrush, and various sedge (*Carex*) species. This site is within State Game Lands #210 and the Weiser State Forest.

Threats and Disturbances:

Disturbances to the site include logging in the surrounding woods, and a culvert draining the sites to the south, though the impact on the pools appears to be minimal. The largest threat to the species of concern is probably deer. Nearly all specimens of the species of concern had been browsed, some down to ground level, and the pools had many deer tracks and signs of browse.

PETERS MOUNTAIN—NEW—(Jefferson and Rush Townships)

Evidence of **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)** was found in this area during surveys in 1995. Evidence of extant populations was found at a location at the crest of Peters Mountain. This species utilizes rocky outcrops along the ridgetop and requires a mosaic of forested and open areas. The habitat is within State Game Lands #210.

RATTLING CREEK WATERSHED—UPDATED—(Jackson and Jefferson Townships)

Several small rocky streams flow north out of Broad Mountain and join to form the Rattling Creek. The surrounding slopes have sandy or rocky well-drained soils, which support a dry-mesic forest consisting of various oak species, sweet birch, witch hazel, hemlock, and white pine. **Screw-stem (*Bartonia paniculata*, G5, S3)** was observed along the creek during surveys in 2000. More surveys are needed to determine health of the population. Timber harvesting may pose a threat to this species and a buffer should remain along the waters edge to protect this plant and other species of concern.

A large, good quality population of **G4G5, S3 minniebush (*Menziesia pilosa*)** occurs in the understory of this forest, along the East Branch of Rattling Creek. It is associated with low-sweet blueberry, black huckleberry, gooseberry, mountain laurel, azalea, and bush-honeysuckle. A good-quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** is found in the upper reaches of the Creek and its small tributaries. It occurs in wet, sandy soil in streamside seeps and old stream channels, usually in at least partial light. Associates include Sphagnum mosses, watchlist species Coville's rush, sedges (especially *Carex folliculata*), turtlehead, cinnamon fern, sensitive fern, royal fern, white wood aster, and grasses.

In 1992, active signs of **Allegheny woodrats (*Neotoma magister*, G3G4, S3, PA-threatened)** were observed in a boulder field near Rattling Creek. Additional surveys are needed to determine the extent and current quality of this population.

Surveys in 2001 identified a rare invertebrate animal along the creek and aquatic habitats in this site. Portions of this site are owned by the Lykens Borough Watershed authority, and portions are part of State Game Lands 210.

Threats and Disturbances:
There is abundant evidence of deer browse in the forests adjacent to Rattling Creek, and deer browse extensively on the plants of concern. A small dam on the creek at the confluence of the East and West branches creates a reservoir, which serves as a source of drinking water for the borough of Lykens.

SMOKE HOLE RUN (Jefferson Township)

Smoke Hole Run is a clear, sandy-bottomed stream that flows south from Broad Mountain. The site is along the banks of Smoke Hole Run as it flows through a scrubby and dry oak-heath forest. **G5, S2 rough-leaved aster (*Eurybia radula*)** occurs in partial sunlight along the stream, associated with interrupted fern, cinnamon fern, turtlehead, swamp dewberry, deer-tongue grass, autumn-bent, Sphagnum and other mosses, and asters. Highbush blueberry, southern arrow-wood, mountain laurel, red maple, white oak, and black-gum provide partial shade. A few fishing or hunting paths occur along the creek, which may benefit this light-requiring species.

WILLIAMSTOWN WOODS/WICONISCO FLOODPLAIN AT WILLIAMSTOWN (Jackson, Jefferson, and Williams Townships)

Williamstown Woods consists of a 3.5-mile rectangular block situated on the lower north slope of Berry Mountain between Wiconisco and Tower City. Except for a small private tract, the area is contained within the Weiser State Forest. The terrain is rugged, consisting of steep rocky slopes broken here and there by small gaps that are drained by intermittent or small permanent streamlets that flow into Wiconisco Creek. The predominant vegetation is upland mixed hardwood-heath forest. A fair to good population of **G4G5, S3 minniebush (*Menziesia pilosa*)** inhabits the margins of the streamlets and rocky places, especially talus slopes, in the gaps. This species is well established and should do well over the long term, although it is currently suffering from excessive deer browse. A fair population of **yellow-fringed orchid (*Platanthera ciliaris*)** occupies a portion of the site where a powerline/pipeline ROW was established in the recent past. The habitat here is the result of disturbance, but provides the proper environmental conditions- full sun, damp or seepy, acidic soil, and an early successional state-that the plant requires. Also found at this site is a fair population of the **showy goldenrod (*Solidago speciosa var. speciosa*)**, occurring in the floodplain in a mix of open, overgrown former sand quarries.

Threats and Disturbances:
The succession of woody plants in the formerly more open habitat is shading these plants and inhibiting their reproduction.

Locally Significant Site:

Powell Creek Swamp (Jefferson Township)

This site is a hardwood swamp near the confluence of the North Fork of Powell's Creek and Smoke Hole Run. The streams have multiple, meandering channels cutting into the deep sandy substrate. Red maple is the dominant overstory species, with sweet birch, black gum, and white oak also present. Mountain laurel, huckleberry, blueberry, and swamp azalea are the most common shrub species. Sedges, (especially *Carex hystericina*), sensitive fern, and cinnamon fern dominate the groundcover. The sandy soil is gleyed, indicating a widely fluctuating water level. Some areas likely dry out completely in late summer, but there also wetter areas of standing water dominated by Sphagnum, *Carex folliculata*, and highbush blueberry. The overstory is young and open, and may have been logged in the past, but is recovering. There is potential habitat for the rare plant species located upstream at Smoke Hole Run in Powell Creek Swamp as well. The site is currently used for hunting and fishing. Part of the site is within State Game Lands #211.

Crevices and overhangs in talus slopes and bolder fields provide habitat for the Allegheny Woodrat, a mammal species of concern. Woodrat colonies are found along the ridges of the county. Photo: PA Science Office of The Nature Conservancy.

Above:The fly-poison borer moth *(Papaipema sp.1)* is currently only known from Pennsylvania. (Photo: Tom Smith)

Below: The larval stage of this species feeds on the roots of the fly-poison plant (*Amianthium muscaetoxicum*), a plant commonly found in dry oak forests and pitch pine barrens.

LONDONDERRY TOWNSHIP, ROYALTON BOROUGH

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Conewago Creek at T300 Covered Bridge (5)	Animal Species of Concern	G3G4	S3S4	N	08-08-1995	D
Conewago Falls (3)	Animal: Black-crowned Night Heron *Nycticorax nycticorax*	G5	S2S3B	N	05-30-1996	D
	Animal: Bronze Copper Butterfly *Lycaena hyllus*	G5	SU	N	09-03-1995	E
	Plant: Aster-like Boltonia *Boltonia asteroides*	G5	S1	PE	08-21-2001	D
	Plant: Sedge *Carex shortiana*	G5	S3	N	06-18-2001	CD
	Plant: Ellisia *Ellisia nyctelea*	G5	S2	PT	05-06-1996	B
	Plant: Flat-stemmed Spike-rush *Eleocharis compressa*	G4	S1	PE	09-09-1991	C
Iron Run Dam Site (5)	Plant: Rough-leaved Aster *Eurybia radula*	G5	S2	N	09-12-1997	C
	Plant: Eastern Coneflower *Rudbeckia fulgida*	G5	S3	TU	08-05-2004	C
	Plant: Tooth-cup *Rotala ramosior*	G5	S3	PR	10-14-1997	CD
	Animal Species of Concern	G5	S1	N	08-16-2004	E

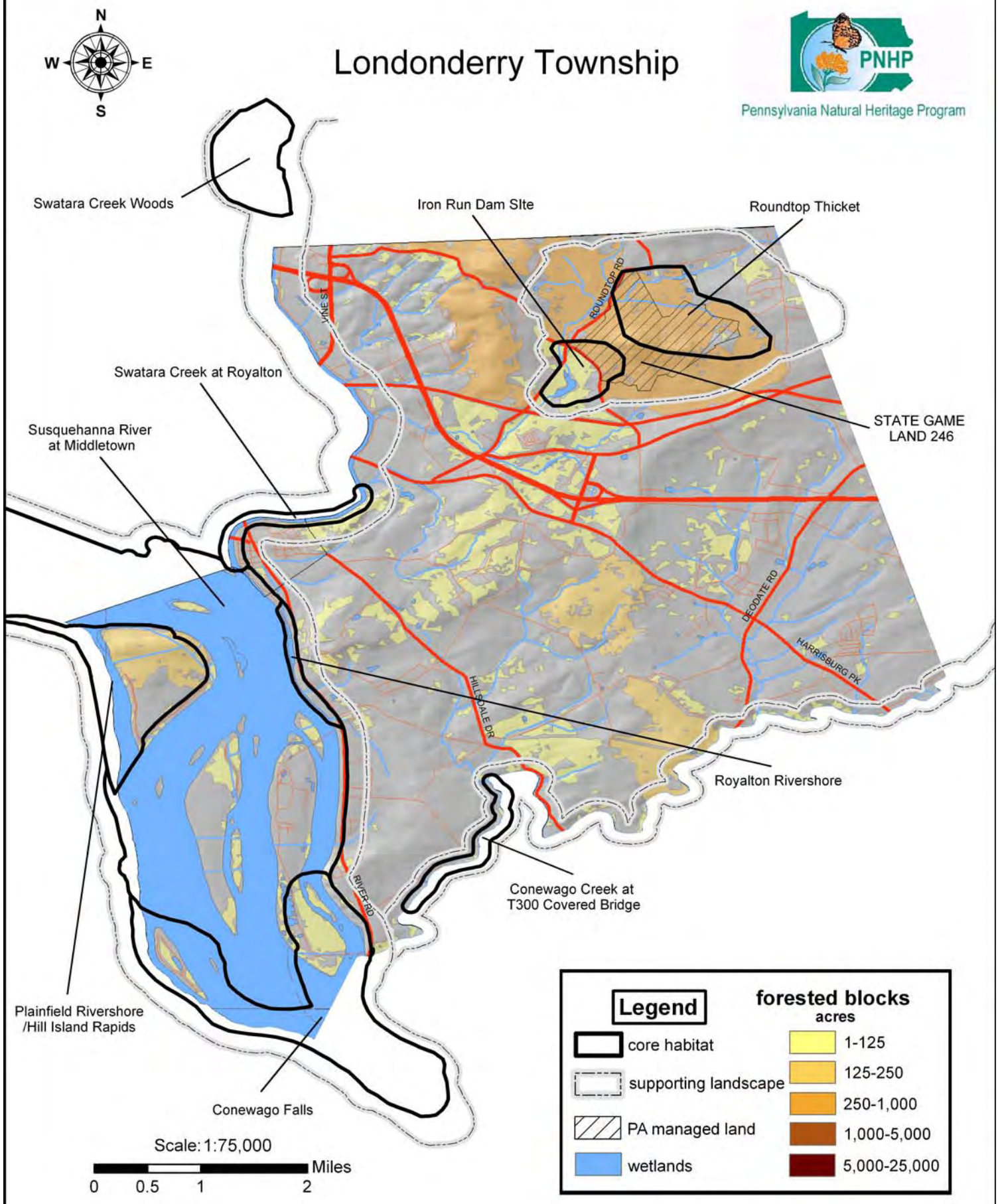
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Plainfield Rivershore/ Hill Island Rapids (3)	Plant: Flat-stemmed Spike Rush *Eleocharis compressa*	G4	S1	PE	10-18-1997	BC
	Plant: White Trout-lily *Erythronium albidum*	G5	S3	N	05-01-2001	B
	Plant: Virginia mallow *Sida hermaphrodita*	G2	S2	PE	08-08-2001	BC
Roundtop Thicket (5)	Plant: Sand Blackberry *Rubus cuneifolius*	G5	S1	TU	09-01-1998	CD
	Plant: Eastern Coneflower *Rudbeckia fulgida*	G5	S3	TU	09-22-2000	B
Susquehanna River at Middletown (3)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2B	PE	2001	E
Swatara Creek at Royalton (5)	Animal Species of Concern	G3G4	S3S4	N	08-08-1995	E

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

Locally Significant: Royalton Rivershore

Managed Lands: State Game Lands #246

LONDONDERRY TOWNSHIP MAP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Londonderry Township
PNHP
Pennsylvania Natural Heritage Program
Swatara Creek Woods
Iron Run Dam SIte
Roundtop Thicket
VINE ST
ROUNDTOP RD
Swatara Creek at Royalton
Susquehanna River at Middletown
STATE GAME LAND 246
DEODATE RD
HARRISBURG PK
HILLSDALE DR
Royalton Rivershore
RIVER RD
Conewago Creek at T300 Covered Bridge
Plainfield Rivershore /Hill Island Rapids
Conewago Falls
Scale: 1:75,000
Miles
0
0.5
1
2
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

Londonderry Township contains the confluences of both the Conewago Creek and Swatara Creek with the Susquehanna River. The majority of the township is in agriculture. Significant large forest blocks are found throughout the township, in particular along the headwaters of Iron Run. Forested riparian corridors should be restored and maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. The forested blocks of the township appear to be clustered in a few areas, lending themselves to protection and connectivity. The Susquehanna River in this area is peppered with large and small islands that provide diversity in the river's topography and are important habitats for wildlife.

CONEWAGO CREEK AT T300 COVERED BRIDGE—NEW—(Londonderry Township, Lancaster and York Counties)

Surveys in 1995 yielded a G3G4 aquatic animal species of concern in the creek.

Threats and Disturbances:

Threats to this species include siltation of the creek from erosional runoff and degradation of the water quality from a nearby chicken farm.

Conservation Recommendations:

Maintaining the best quality water possible will help this species persist and even flourish at this site into the future.

CONOWAGO FALLS—NEW—(Londonderry Township, Lancaster & York Counties)

The exposed bedrock and isolated pools of the lower portion of the Susquehanna River in Dauphin County are characteristic of a Riverside Outcrop Natural Community. This community type is subject to several natural disturbances including extreme fluctuations in water level between winter and summer; ice and water scour; and very little soil in the exposed bedrock of the riverbed. Four plant species of concern are adapted to these disturbances and thrive in this location. This site has small populations of the **G5, S1 aster-like boltonia (*Boltonia asteroids*)** and the **G5, S3 sedge *(Carex shortiana)***. Two other plant species of concern, the **G5, S2 Ellisia (*Ellisia nyctelea)*** and the **G4, S1 Flat-stemmed Spike-rush (*Eleocharis compressa)*** also occur in the river bedrock and along the disturbed shore of the river. Two animal species of concern including a nesting occurrence of **Black-crowned Night Heron (*Nycticorax nycticorax*)** and **Bronze Copper Butterfly *(Lycaena hyllus),*** have also been documented at this location.

Threats and Disturbances:

There are numerous examples of disturbances along this stretch of the river including a railroad, a gravel road and boat launch ramp, powerline crossings, garbage dumping, and weedy exotic species of plants.

Conservation Recommendations:

Despite these disturbances, the species of plants appear to be doing quite well in the habitat of the rivershore at this location. The native forest cover along the banks should be preserved and expanded where possible.

IRON RUN DAM SITE—UPDATED—(Londonderry Township)

A fair to poor quality population of **G5, S2 rough-leaved aster (*Eurybia radula*)** occurs at this site. The species of concern, which requires disturbed habitats, grows in an open area of damp silt and mud on the shoreline of an artificial lake in the Susan Cole Natural Area. Associated species include St. John's wort, bulrushes, and arrowhead. The lake is used as a water source for Middletown Borough.

A fair to poor population of **G5, S3 tooth-cup (*Rotala ramosior*)** was found in a wet-mesic area along the lake shore in open light. Associated species include dwarf St. Johns-wort, sedges (*Cyperus* spp.), and tearthumb. Also located along the lakeshore is a small occurrence of **G5, S3 eastern coneflower (*Rudbeckia fulgida*)** in disturbed openings created by fishing trails. Associated species include southern agrimony, switchgrass, late goldenrod, and poison ivy.

In 2004 an individual rare invertebrate animal was collected at the site, but not in breeding habitat. Follow-up searches should be conducted along small, forested streams such as Iron Run in order to determine the status of this species at the site.

Threats & Disturbances:

Threats to the plant species of concern are plant succession shading the openings and competition by exotic species.

PLAINFIELD RIVERSHORE/HILL ISLAND RAPIDS –UPDATE- (Londonderry Township and York County)

The Hill Island Rapids site has been combined with the Plainfield Rivershore site from the York County NAI. This site includes a floodplain forest along the Susquehanna River with a mixed hardwood canopy dominated by silver maple, green ash, box elder, honey locust, and hackberry. The site also includes the western shore of Hill Island, which consists of a rock outcrop rivershore. These outcrops are usually scoured by ice flows in late winter and/or floodwaters in early spring, but by late summer the plants growing here may be subjected to extreme drought. The species growing here are usually found in protected crevices and hollows where soil accumulates, and may have adaptations that allow them to survive extremely harsh conditions. Vegetation is restricted to cracks between rocks and species found include switch grass, poison ivy, and boneset. Aquatic species such as water-willow and water smartweed grow in and around the low water line of the river. A fair to good quality population of **G4, S1 PA-Endangered flat-stemmed spike rush (*Eleocharis compressa*)** was found growing in cracks between rocks at this site.

During a survey in 2001, two new plant species of concern were identified at this site, and the site boundary was enlarged to accommodate these populations. A good-quality population of a **G5, S3 plant species of special concern White Trout-lily (*Erythronium albidum)*** was found spread throughout the woodlot in association with Solomon's seal, spring beauty, false-mermaid, common blue violet & pawpaw. A small but globally significant population of a **G2, S2 PA-Endangered plant species Virginia mallow (*Sida hermaphrodita)*** was also found at this site. This species was found growing in association with Indian hemp, virgin's-bower, frost grape, Indian strawberry and hog-peanut. To preserve the species found here, the forest canopy should remain intact.

Threats and Disturbances:

Purple loosestrife and garden loosestrife, two exotic species common along the lower Susquehanna River, are abundant at this site, but do not appear to be adversely affecting the species of concern.

This population is vulnerable to impoundment of the river on this otherwise free flowing stretch of water. Impoundment of the river would detrimentally impact the habitat of this species.

ROUNDTOP THICKET—UPDATED—(Londonderry Townships)

This site is an "old field" habitat situated on a powerline right-of-way in State Game Lands # 242 in the Iron Run drainage. The vegetation is dominated by a variety of native and exotic herbaceous and low woody species. The soil is derived from diabase rock and varies from well-drained to poorly drained. The open aspect of the site is maintained by periodic mowing by the Pennsylvania Game Commission. Although the mowing, the presence of the powerline, and the numerous exotic species make the site low quality, it does support populations of two plant species of special concern: **G5, S1 sand blackberry (*Rubus cuneifolius*) and G5, S3 eastern coneflower (*Rudbeckia fulgida*).**

Management Recommendations:

The management regime has undoubtedly been beneficial for these species, which require early successional conditions, and their long-term survival here probably depends on a continuation of these activities. Privately owned lands adjacent to the State Game Lands may have additional habitat for the species.

SWATARA CREEK AT ROYALTON (Londonderry Township, Royalton and Middletown Boroughs)

This site is located in the lower reaches of Swatara Creek at Royalton just before the creek's confluence with the Susquehanna River. It supports an aquatic animal species of special concern.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the creek include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the best quality water possible will help this species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT MIDDLETOWN—NEW—(Londonderry, Lower Swatara, Swatara Townships, Middletown Borough and York County)

A nesting pair of Bald Eagles was documented along this stretch of the Susquehanna River in 2001.

Threats and Disturbances:

The river shore in this area has many disturbances including roads, railroads, lack of forested buffers, point and non-point sources of pollution, exotic species of plants and commercial, industrial and residential development.

Conservation Recommendations:

Conservation and repair of a 100 meter-wide forested buffer along the shores of the Susquehanna River will help protect the river from sources of pollution and habitat fragmentation. Areas frequently flooded by seasonal and yearly fluctuations in the river level should be restricted from future development. Conservation of the floodplain habitat will help mitigate the effects of floodwaters on adjacent developed areas.

Locally Significant Site:

Royalton Rivershore (Londonderry Township)

This is a disturbed site just below small rapids on the east shore of the Susquehanna River. A small quality population of G5, S4 lance fog-fruit (*Phyla lanceolata*), delisted since the 1997 report, occurs in a scoured rivershore area and adjacent disturbed areas upslope associated with various grasses and weed species. With this species delisting, the site has been moved from the sites of state-wide significance to the locally significant sites. A boat access is present at the site, and part of the population of the plant of concern is occasionally mowed. The species of concern requires disturbance and the present artificial and natural disturbances appear to favor its persistence at this site.

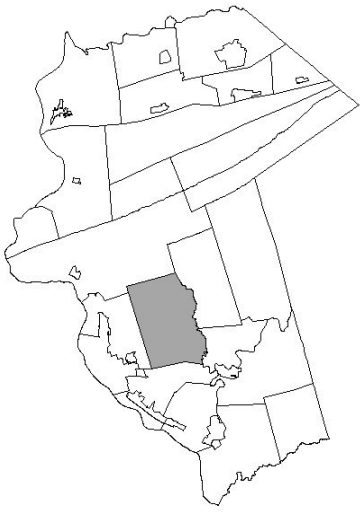
Virginia mallow (*Sida hermaphrodita*) is a globally uncommon plant that is adapted to the frequently disturbed banks along the Susquehanna River. Flooding events, ice scour and seasonally low water levels provide favorable conditions for this plant species
Photo: PA Science Office of The Nature Conservancy,

The white trout-lily (*Erythronium albidum*) is much less common than yellow trout lily (*Erythronium americanum*), but can bee found along floodplains and rich wooded slopes in the county. Photo: PA Science Office of The Nature Conservancy.

LOWER PAXTON TOWNSHIP

Site Name	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
None						

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



Locally Significant: None

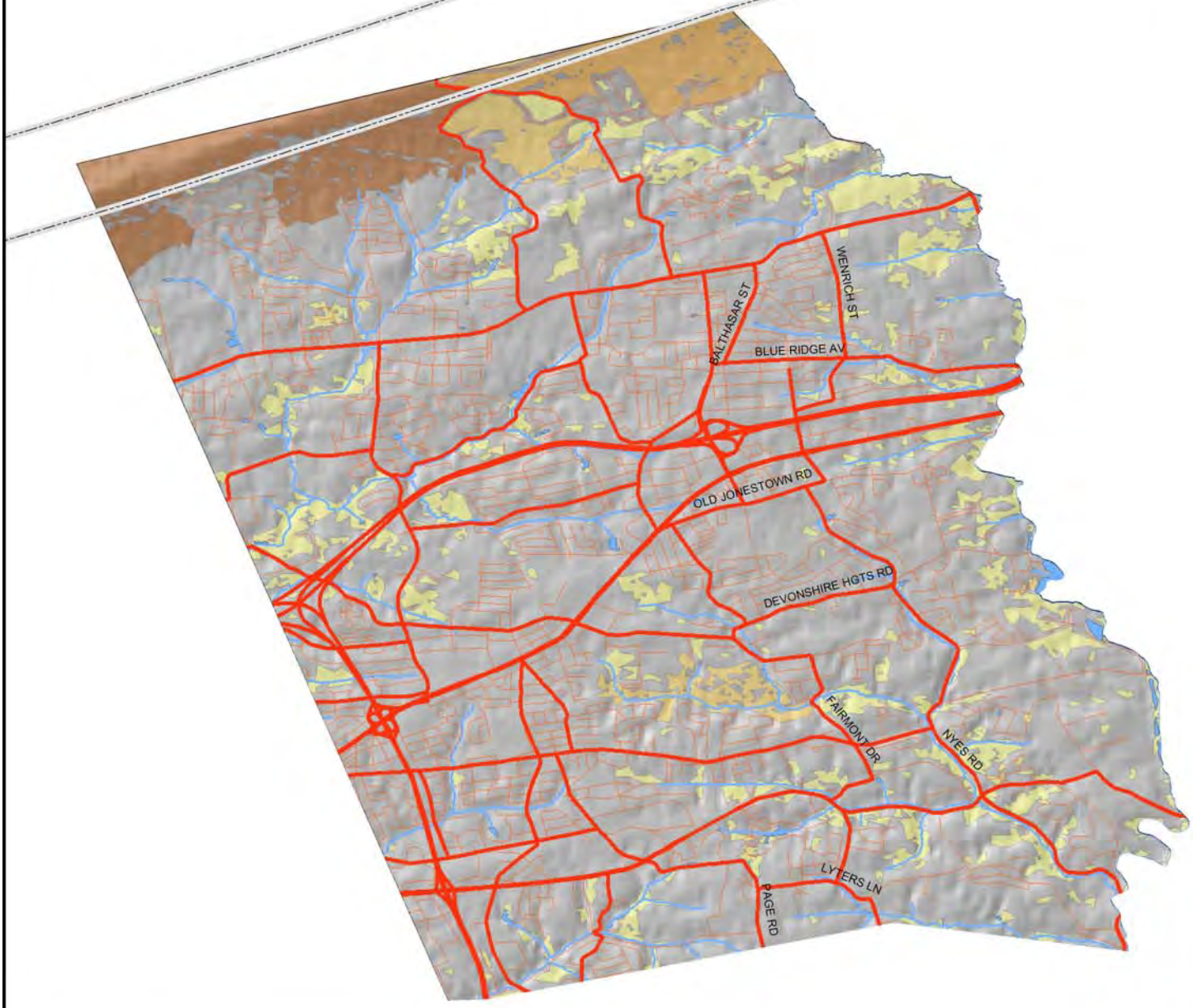
Managed Lands: None

Lower Paxton Township has minimal natural landscapes, being covered primarily by development associated with the greater Harrisburg area. Nevertheless, examination of the forested blocks shows extensive riparian buffers remaining along many of the township's aquatic resources. Forested riparian corridors should be maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. Protection of the continuous forested ridge along Blue Mountain is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. A small portion of the Blue Mountain is included in the north of the Township and may need particular attention to preserve the continuity of the forest in the face of development pressures.

LOWER PAXTON TOWNSHIP MAP

Lower Paxton Township

Pennsylvania Natural Heritage Program



Legend

- core habitat
- supporting landscape
- PA managed land
- wetlands

forested blocks
acres

- 1-125
- 125-250
- 250-1,000
- 1,000-5,000
- 5,000-25,000

Scale: 1:70,000

0 0.5 1 2 Miles

Forested floodplains provide habitat for numerous species of breeding and migratory birds, invertebrates, mammals, reptiles and amphibians. These linear habitats provide natural travel corridors for animal species up and down stream. This is particularly important in areas where the only remaining intact closed canopy forest is on the active floodplain, due to farming or development of the adjacent uplands (Podniesinski & Wagner 2002).
(Photo by the PA Science Office of The Nature Conservancy)

LOWER SWATARA TOWNSHIP, Highspire Borough, Middletown Borough

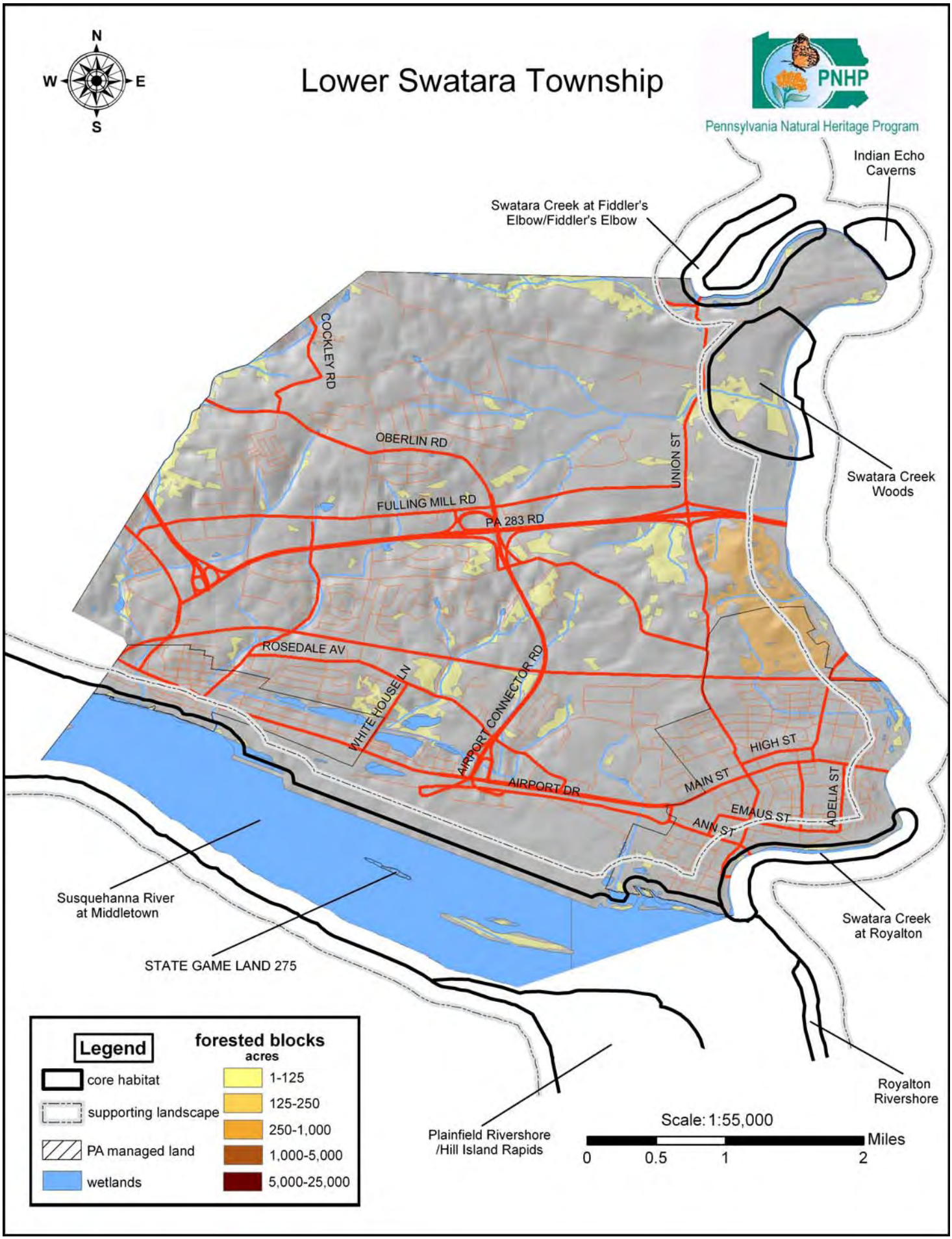
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Susquehanna River at Middletown (3)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2B	PE	2001	E
Swatara Creek at Fiddler's Elbow/Fiddler's Elbow Bluffs (3)	Animal Species of Concern	G3G4	S3S4	N	05-13-97	C
	Animal Species of Concern	G4	S4	N	05-13-97	E
	Animal Species of Concern	G4	S3S4	N	05-13-97	E
Swatara Creek at Royalton (5)	Animal Species of Concern	G3G4	S3S4	CU	08-08-95	E
Swatara Creek Woods (4)	Plant: Ellisia *Ellisia nyctelea*	G5	S2	PT	05-20-93	B
	Plant: Limestone Petunia *Ruellia strepens*	G4G5	S2	PT	05-20-93	D

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

Locally Significant: None

Managed Lands: State Game Lands #275

LOWER SWATARA TOWNSHIP MAP


N
W
E
S
Lower Swatara Township
PNHP
Pennsylvania Natural Heritage Program
Indian Echo Caverns
Swatara Creek at Fiddler's Elbow/Fiddler's Elbow
COCKLEY RD
OBERLIN RD
UNION ST
FULLING MILL RD
PA 283 RD
Swatara Creek Woods
ROSEDALE AV
WHITEHOUSE LN
AIRPORT CONNECTOR RD
HIGH ST
MAIN ST
AIRPORT DR
EMAUS ST
ANN ST
ADELIA ST
Susquehanna River at Middletown
STATE GAME LAND 275
Swatara Creek at Royalton
Royalton Rivershore
Plainfield Rivershore /Hill Island Rapids
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:55,000
Miles
0
0.5
1
2

LOWER SWATARA TOWNSHIP

Lower Swatara Township drains to the Swatara Creek and the Susquehanna River. The majority of the township is developed, with some remaining agriculture. Forested riparian corridors should be restored and maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. The forested blocks of the township appear to be clustered in a few areas, lending themselves to protection and connectivity. The Susquehanna River in this area is peppered with large and small islands that provide diversity in the river's topography and are important habitats for wildlife.

SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS—UPDATED—((Derry, Lower Swatara, and Swatara Townships)

This site is an approximately one-mile section of Swatara Creek below Hummelstown. The portion of the river surveyed included several quickwater riffles with gravelly to stony substrates. A fair to good-quality population of **a G3G4, S2S3 aquatic animal species** was found here in 1997, along with two other rare aquatic animals. This section of Swatara Creek is often bounded by limestone cliffs and ledges with a diverse native flora. Round-leaved hare's bells, bloodroot, hepatica, ragwort, and columbine and cliff-brake are among the native species present; wineberry, Norway Maple and tree-of-heaven are among the invasives. Swallows nest on muddy portions of the steep riverbanks. Despite disturbances, there is potential for rare plants or animals to colonize this site.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy Swatara Creek include thermal and chemical pollution, impoundment, and excessive sedimentation. Disturbances to the site include invasive plants as well as old trash and mulch that have been thrown over the bank from above.

Conservation Recommendations:

Maintaining the best quality water possible will help these species persist at this site in the future.

SWATARA CREEK AT ROYALTON (Londonderry Township, Royalton and Middletown Boroughs)

This site is located in the lower reaches of Swatara Creek at Royalton just before the creek's confluence with the Susquehanna River. It supports **an aquatic animal species of special concern**.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the creek include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the best quality water possible will help these species persist and even flourish at this site into the future.

SWATARA CREEK WOODS (Derry and Lower Swatara Townships)

This forested site along the Swatara Creek occurs on limestone-derived soils and creates habitat that supports a rich diversity of herbaceous species including two plant species of special concern. On the

upper slopes hackberry is a dominant tree species with pawpaw in the understory. On the floodplain of the creek sycamore is dominant with a few scattered copses of multiflora rose in the understory. Native herbs such as waterleaf, cutleaf toothwort, bluebells, jewelweed, false mermaid weed, and Dutchman's breeches are common. A large good quality population of **G5, S2 PA-Threatened *Elissia nyctelea*** occurs on and adjacent to the floodplain of the creek. Additionally, a smaller poor quality population of **G4G5, S2 PA-Threatened limestone petunia (*Ruellia strepens*)** occurs higher up on the slopes.

Threats and Disturbances:

This site has not seen any recent disturbance, but it may have been used for grazing at one time. Exotic species such as garlic mustard, multiflora rose, and Japanese honeysuckle degrade the site.

SUSQUEHANNA RIVER AT MIDDLETOWN—NEW—(Londonderry, Lower Swatara, Swatara Townships, Middletown Borough and York County)

A nesting pair of Bald Eagles was documented along this stretch of the Susquehanna River in 2001.

Threats and Disturbances:

The river shore in this area has many disturbances including roads, railroads, lack of forested buffers, point and non-point sources of pollution, exotic species of plants and commercial, industrial and residential development.

Conservation Recommendations:

Conservation and repair of a 100 meter-wide forested buffer along the shores of the Susquehanna River will help protect the river from sources of pollution and habitat fragmentation. Areas frequently flooded by seasonal and yearly fluctuations in the river level should be restricted from future development. Conservation of the floodplain habitat will help mitigate the effects of floodwaters on adjacent developed areas.

Invasive Plant Species

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

Japanese Knotweed (*Polygonum cuspidatum*)

Tree of Heaven (*Ailanthus altissima*)

Purple loosestrife (*Lythrum salicaria*)

Multiflora rose (*Rosa multiflora*)

LYKENS TOWNSHIP, Gratz Borough

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Bear Mountain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	06-2001	B
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	05-29-02	E

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

Locally Significant: None

Managed Lands: State Game Land #264

Lykens Township is bordered by two large forested ridges; Mahantango Mountain in the north and Bear Mountain in the south. Expanded protection of the continuous forested Kittatinny Ridge and the nearby ridgelines is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural central portions of the Township, forested riparian corridors should be maintained where they remain along Pine Creek. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor and providing connectivity between the two ridgelines.

BEAR MOUNTAIN—NEW—(Lykens, Wiconisco and Williams Townships & Schuylkill County)

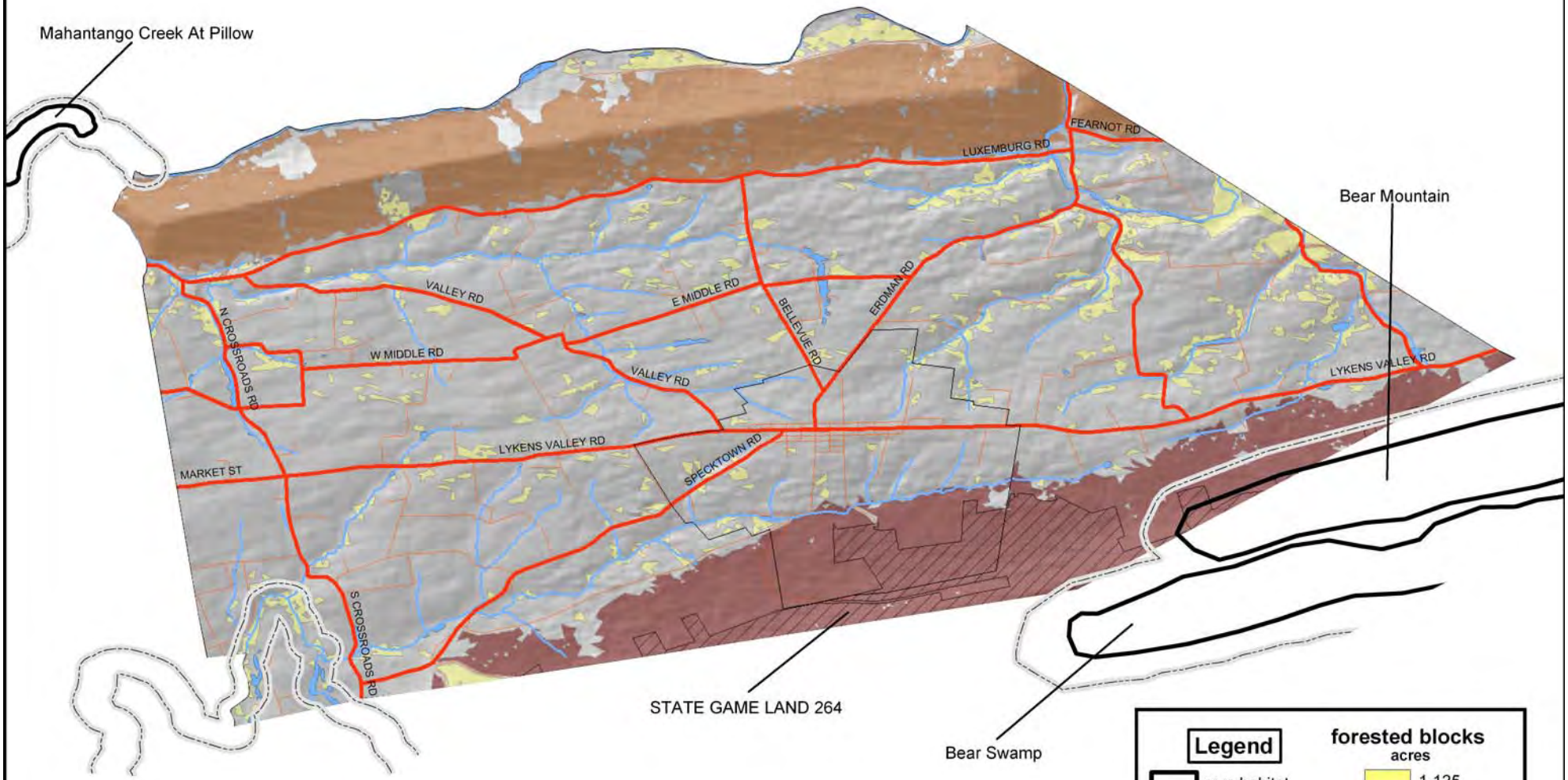
In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain. This shrub, related to blueberries, has a very limited distribution in Pennsylvania. It occupies the slopes of northern Dauphin and western Schuylkill Counties, as well as the southern mountains of Bedford and Somerset Counties. This species occurs scattered sparingly from Georgia, where it is considered critically imperiled, through the Smoky Mountains of Tennessee, to the northernmost limit of its range in Pennsylvania. Associated shrub species include mountain laurel, black huckleberry, dangleberry, beaked hazelnut, striped maple, and American chestnut tree sprouts. The dry oak-heath woods of these slopes have seen recent logging activity, which seems to have benefited this plant's growth. No threats are evident and no special management appears to be needed.

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

LYKENS TOWNSHIP MAP

Lykens Township

Pennsylvania Natural Heritage Program



MIDDLE PAXTON TOWNSHIP, Dauphin Borough

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Clark Creek Wetlands (4)	Plant: Grass-leaved Rush *Juncus biflorus*	G5	S2	N	09-11-98	D
	Plant: Yellow-fringed Orchid *Platanthera ciliaris*	G5	S2	TU	09-11-98	C
	Plant: Vasey's Eupatorium *Eupatorium godfreyanum*	G4	S2	N	09-28-01	BC
Clark Creek Woods (4)	Plant: Cattail Sedge *Carex typhina*	G5	S2	PE	08-11-97	BC
Devils Race Course (5)	Geologic Feature: Boulder Belts	G?	S?	N	N/A	E
Ellendale Forge Site/Sharp Mountain (3)	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	11-21-02	B
Second Mountain Cliffs (3)	Natural Community: Northern Appalachian Acidic Cliff Community	G5	S5	N	05-06-98	BC
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	11-20-92	E
Stony Creek Valley (2)	Plant: American Holly *Ilex opaca*	G5	S2	PT	06-19-02	BC
	Animal Species of Concern	G5	S2S3	N	06-16-02	E
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	08-29-97	C

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Stony Mountain Ponds (2)	Natural Community: Ephemeral/Fluctuating Natural Pool	G?	S3	N	07-24-97	B
	Plant: Northeastern Bulrush *Scirpus ancistrochaetus*	G3	S3	PE	07-24-97	B
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	07-28-93	E
Susquehanna River at Fort Hunter/Rockville (3)	Animal Species of Concern	G3G4	S3S4	N	08-09-95	E
	Animal Species of Concern	G4	S3S4	N	08-09-95	E
	Animal Species of Concern	G5	S1	N	08-09-95	E
	Animal Species of Concern	G3G4	S1S2	N	05-19-01	E
Susquehanna River at Speeceville (3)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2	E	2004	E

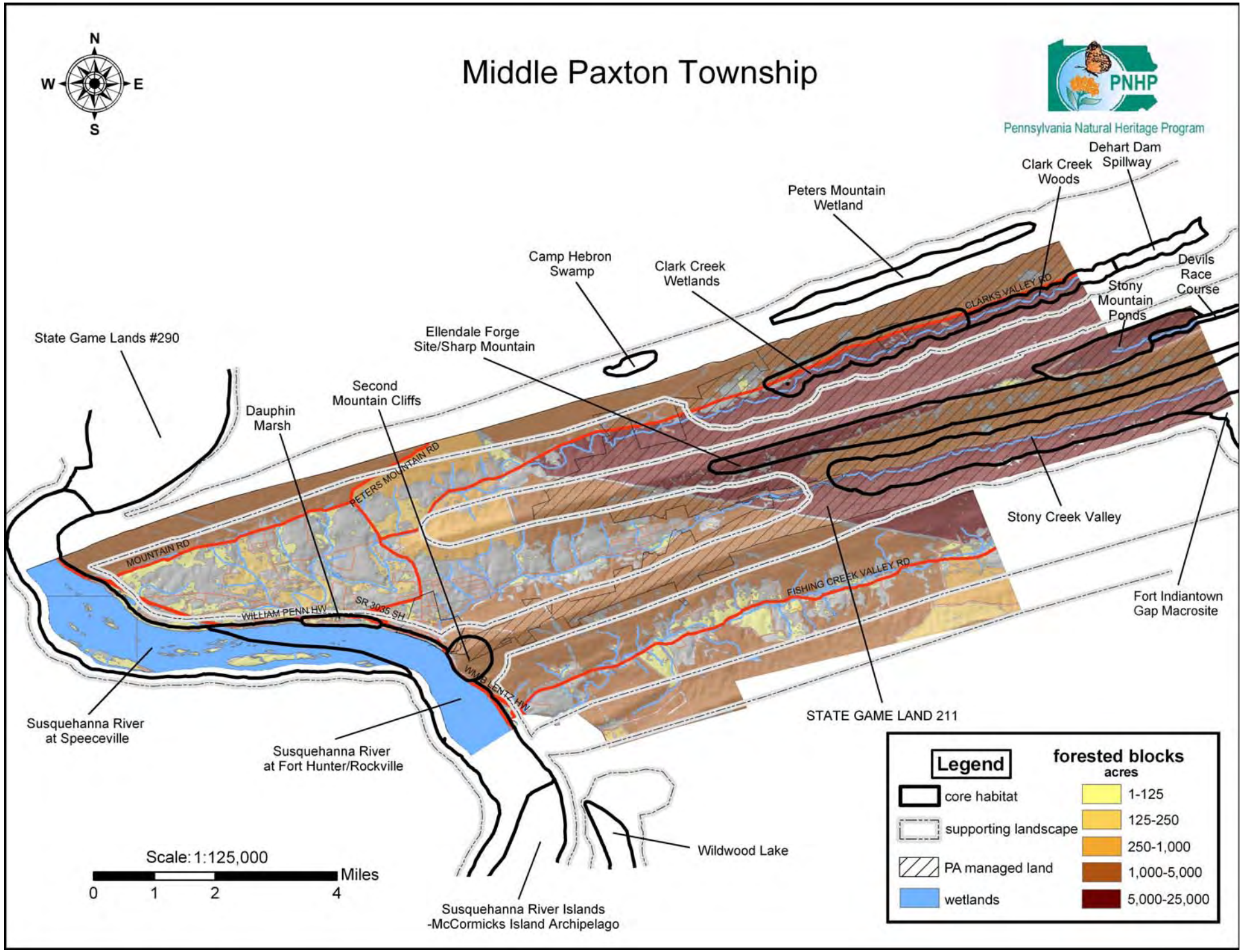
*Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: Dauphin Marsh

Managed Lands: State Game Land #211

Other: High Quality Cold Water Fisheries—
Clark Creek, Stony Creek to Ellendale Dam

MIDDLE PAXTON TOWNSHIP MAP


Middle Paxton Township
N
W
E
S
PNHP
Pennsylvania Natural Heritage Program
Dehart Dam Spillway
Clark Creek Woods
Peters Mountain Wetland
Camp Hebron Swamp
Clark Creek Wetlands
Devils Race Course
Stony Mountain Ponds
CLARKS VALLEY RD
State Game Lands #290
Ellendale Forge Site/Sharp Mountain
Second Mountain Cliffs
Dauphin Marsh
PETERS MOUNTAIN RD
MOUNTAIN RD
WILLIAM PENN HW
SR 3035 SH
WM B ENTZ HW
FISHING CREEK VALLEY RD
Stony Creek Valley
Fort Indiantown Gap Macrosite
STATE GAME LAND 211
Susquehanna River at Speeceville
Susquehanna River at Fort Hunter/Rockville
Wildwood Lake
Susquehanna River Islands -McCormicks Island Archipelago
Scale: 1:125,000
Miles
0
1
2
4
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

MIDDLE PAXTON TOWNSHIP

Middle Paxton Township is almost entirely forested, containing the heart of the Kittatinny Ridge in Dauphin County. Expanded protection of the private portions of the continuous forested Kittatinny Ridge is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural western portions of the Township, forested riparian corridors should be maintained where they remain along Clark Creek in particular. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. The Susquehanna River in this area is peppered with large and small islands that provide diversity in the river's topography and are important habitats for wildlife.

CLARK CREEK WETLANDS—UPDATED— (Middle Paxton Township)

Clark Creek Wetland is a small, damp-to-seepy, sandy opening on the roadbank/woods border interface along PA Route 325 in State Game Lands # 211. It lies at the southern base of Peters Mountain and is within the Clark Creek drainage. Periodic roadside clearing activities have resulted in an interesting plant habitat that includes marginal and poor populations of two plant species of special concern: **yellow-fringed orchid (*Platanthera ciliaris*) and grass-leaved rush (*Juncus biflorus*)**. The habitat also includes a good population of **G4, S2 Vasey's eupatorium (*Eupatorium godfreyanum*)** along the roadside. In addition, attractive and regionally unusual species as meadow-beauty and marsh-gentian are part of the flora.

Threats and Disturbances:

The viability of this habitat is largely dependent on maintaining roadside clearing operations to benefit the species of concern. In addition, the eupatorium is extremely showy, and given its roadside location, is very vulnerable to removal by gardeners and wildflower enthusiasts.

CLARK CREEK WOODS (Middle Paxton and Rush Townships)

This site consists of two small pools along a blocked streamlet at the base of Third Mountain. The pools are vegetated with a mixture of sedges (*Carex gynandra, C. lupulina, C. crinita, C. intumescens, C. lurida*), bulrushes (*Scirpus cyperinus, S. polyphyllus*), grasses (*Leersia oryzoides, L. virginicus, Glyceria melicaria, Panicum clandestinum, P. agrostoides, P. microcarpon*), Iris, cardinal flower and other herbs, and scattered winterberry, highbush blueberry, and buttonbush. A fair to good population of **G5, S2 PA-endangered cattail sedge (*Carex typhina*)** was discovered in these pools in 1997. The pools may have been formed by a small rock dam, which blocks flow of the streamlet just downslope.

Threats and Disturbances:

No immediate threats to the species of concern are apparent.

Conservation Recommendations:

Protecting the stream and a surrounding buffer of woods will allow the rare species to persist at this site.

DEVILS RACE COURSE (East Hanover and Middle Paxton Townships)

This site represents an **outstanding geologic feature** of Pennsylvania. It consists of a boulder field about 40 meters wide and over 1000 meters long. It is formed by angular boulders from the two adjacent ridges, broken off by successive freezing and thawing when the glacial front was nearby to the north. The boulder field is of Pottsville conglomerate (Pennsylvanian Age) and sandstone derived from ridges of sharp and stony mountains (Geyer and Bolles 1979).

ELLENDALE FORGE SITE/SHARP MOUNTAIN—UPDATED—(Middle Paxton and East Hanover Townships, Lebanon County)

This site consists of the forested crest and steep upper slopes of a south-facing section of Third Mountain. It is dominated by chestnut oak, red oak, black birch, eastern hemlock, red maple, and sassafras with an understory of scattered witch hazel, striped maple, mountain laurel, and blueberry. It supports a good quality population of **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**. This site received extensive surveys by the PA Game Commission between 1992 and 1994. Their surveys showed this species to be active and fairly abundant at the site. This site is located in State Game Lands #211.

SECOND MOUNTAIN CLIFFS (Middle Paxton Township and Perry County)

This site consists of the extremely steep slopes with a series of rock outcrops and cliffs separated by loose scree slopes. The slopes are located on Second Mountain where it is bisected by the Susquehanna River, with similar cliffs occurring on both sides of the River. The site supports an **Acidic Cliff Natural Community** with an open forest of chestnut oak, red oak, Virginia pine, black birch, and sassafras, with witch-hazel, blackberry, and greenbriar in the understory. The site also supports a population of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**. Only a small portion of this site has been surveyed due to the hazardous conditions associated with such a steep slope, and potential exists for rare plant species. This site is located partly in State Game Lands #211.

Threats and Disturbances:

In a few places the site has been disturbed by and graffiti or trash, and a small amount of the weedy exotic species tree-of-heaven, most of the Natural Community remains undisturbed and inaccessible.

STONY CREEK VALLEY—UPDATED—(East Hanover and Middle Paxton Townships and Lebanon County)

This site consists of a narrow band of forest along Stony Creek. A good stand of **American holly (*Ilex opaca*, G5, S2 PA-threatened)** occurs intermittently on the Stony Creek floodplain and the adjacent lower slopes of Sharp Mountain. Associated species include hemlock, yellow birch, sweet birch, white pine, black-gum, red maple, chestnut and other oaks, witch-hazel, mountain laurel, and rhododendron. The holly appears to be doing well, and no special management is recommended. Also occurring within this site is the golden club (*Orontium aquaticum*), which has been delisted since the 1997 report.

Also, specimens identified as a **G4 S2S3 Pennsylvania animal species of concern** were taken from a spring leading to Stony Creek. Part of the overall habitat of this area is described as a rocky substrate "Hemlock-Red Oak-Mixed Hardwood Terrestrial Forest" (Fike, 1999).

The terrestrial "Hemlock-Red Oak-Mixed Hardwood Terrestrial Forest" gradually opens into a "Hemlock-Mixed Hardwoods palustrine forest" where the water table is higher. This area opens into a large and extensive "Alder-Sphagnum Wetland" along Stony Creek. The species associated with this wetland include meadowsweet, highbush blueberry, maleberry, smooth alder, red maple, buttonbush, poison sumac, jewelweed, mannagrass, swamp candles, cinnamon fern, royal fern, sensitive fern, winterberry holly, arrow-wood, sedges, grasses and water horsetail.

The creek valley includes a site formerly named County Line Swamp. This swamp on the Dauphin/Lebanon County border is bisected by a slow-moving portion of Stony Creek. It contains

areas of shrub-swamp dominated by alder as well as graminoid areas, and appears to have been dammed and flooded in the past, possibly by beavers. Sedges, Sphagnum moss, bulrushes, bur-reed, and rushes are present in the groundcover, with aquatic vegetation in the Creek channel and in isolated small pools. The area is potential habitat for plant species of concern as well as for odonate species--further surveys for rare odonates are recommended.

The Stony Creek valley provides important habitat for nesting neo–tropical songbirds. The survey was conducted in mid to late June, which is optimal time for detecting breeding birds. The species recorded on this site included Gray Catbird, American Redstart, Common Yellowthroat, Blue-gray Gnatcatcher, Red-eyed Vireo, Blue-headed Vireo, Scarlet Tanager, Worm-eating Warbler, Black-and-white Warbler, Black-throated Green Warbler, Acadian Flycatcher, Wood Thrush, and Ovenbird. This area extends vastly into Lebanon County as well and should be considered an important wetland area for both Dauphin and Lebanon Counties.

Threats and Disturbances:
Disturbances in this area include trails and paths used for outdoor recreation and some exotic plant species but there are not any imminent threats to the population of the S2S3 plant species. The site is used for hunting, fishing, and recreation, and is within State Game Lands #211. There are concerns about the hemlock woolly adelgid that is continuing to attack eastern hemlock forests and is a real threat to these trees. This aphid has the potential to destroy most hemlock forests in the area and wipe out critical habitat for wildlife, especially hemlock-dependent bird species.

Conservation Recommendations:
Buffers should be placed adjacent to Stony Creek and around the wetland. It is recommended that biological control measures be used to reduce the impact of the growing threat of the hemlock woolly adelgid.

STONY MOUNTAIN PONDS—UPDATED—(Middle Paxton Township)

This site is a good quality occurrence of an **Ephemeral/Fluctuating Natural Pool** community. It includes 12 ponds, which occur in a high valley between Stony Mountain and Sharp Mountain. The ponds range from 20 to 70 feet in diameter, and at the time of observation had varying depths of water ranging from over a foot to a few inches. The two largest ponds are open and graminoid-dominated. Surrounding the pools are red maple, pin oak, black-gum, mountain laurel, and blueberry. Tree species providing cover at the ponds included chestnut, white, and red oaks, red maple, and black-gum. The smaller pools are mostly shallower and partially forested with black-gum and red maple in the canopy and sphagnum moss and mud beneath. Openings in the smaller pools also have patches of graminoid-dominated vegetation. The **G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*)** occurs in open habitat in several of the ponds. Associated plant species include three-way sedge, wool-grass, floating mannagrass, marsh St. John's-wort, and various sedges. The site also supports a population of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)**.

Threats and Disturbances:
A few of the smaller pools appear to have been excavated and may not be natural, and the west end of the site has been disturbed by jeep trails and excavations. The woods surrounding the ponds have been logged.

Conservation Recommendations:

The wooded buffer between the pools and the mowed area to the south should be maintained. This site occurs on State Game Lands #211.

SUSQUEHANNA RIVER AT FORT HUNTER/ROCKVILLE—UPDATED—(Middle Paxton and Susquehanna Townships; and Cumberland and Perry Counties)

Two adjacent sites from the original NAI were combined because of the contiguous habitat that occurs for these species of concern. This site is located in the Susquehanna River and is characterized by a bedrock bottom covered with gravel and cobbles with boulders. It supports four species of rare aquatic animals. During a survey in 2001 a population of a rare invertebrate animal was found in the Susquehanna River near Lions Park.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT SPEECEVILLE—NEW—(Middle Paxton Township)

An animal species of concern was found among the river islands at this site in 2004.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

Locally Significant:

Dauphin Marsh–UPDATE-(Middle Paxton Township)

This site has been changed from an area of statewide significance to a locally significant site because the species of concern previously documented at this site was not found at this location. This site is an approximately two-acre marsh located in the floodplain of the Susquehanna River. It consists of shallow open water with scattered patches of bur-reed, spike-rush, cattail, and rice cut-grass surrounded by woods and thickets. It historically supported a small but good quality population of **PA-Endangered false loosestrife seedbox (*Ludwigia polycarpa*).** Surveys in 1995 and 1997 failed to find this rare plant, but it likely still exists in the seed bank, and favorable conditions may encourage growth in future years.

Threats and Disturbances:

This site has few exotics and receives little use from humans. The disappearance of the false loosestrife seedbox could be attributed to changes in the hydrology of the site through drought years or competition by bur-reed.

Conservation Recommendations:

Maintaining the wooded buffer around this site may help the species of concern continue to persist here.

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

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

MIFFLIN TOWNSHIP, Berrysburg Borough, Pillow Borough

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Mahantango Creek at Pillow (4)	Plant: Jeweled Shooting Star *Dodecatheon radicatum*	G?	S2	PT	05-15-01	BC
Malta Cliffs (4)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	5/18/01	A

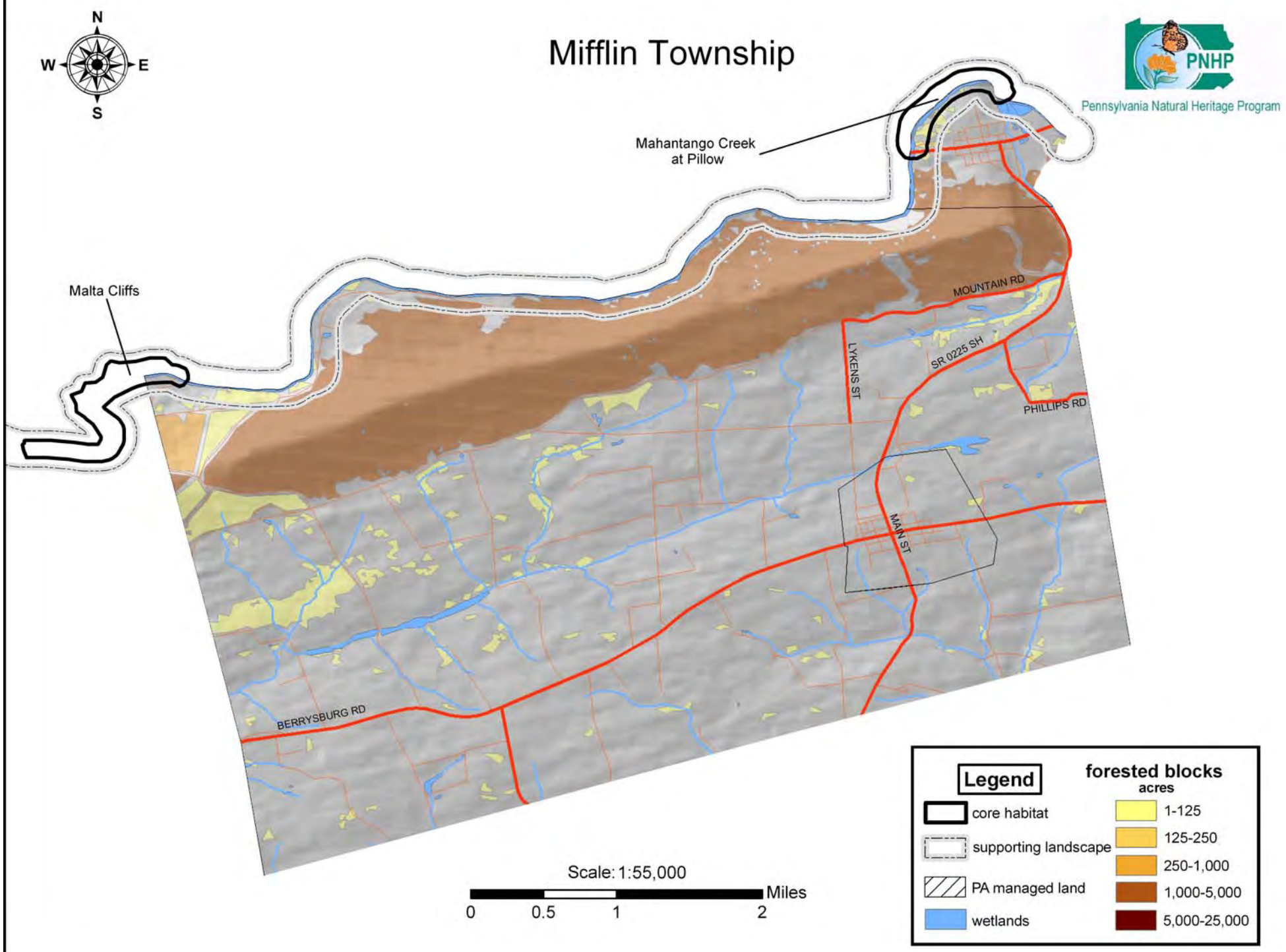
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: None

Managed Lands: None

Mahantango Township is bordered by a large forested ridge, Mahantango Mountain in the north. Protection of the continuous forested ridges in Pennsylvania is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural central portions of the Township, forested riparian corridors should be restored and maintained, particularly in proximity to the wetland portions of Little Wiconisco Creek. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor.

MIFFLIN TOWNSHIP MAP


N
W
E
S
Mifflin Township
PNHP
Pennsylvania Natural Heritage Program
Mahantango Creek
at Pillow
Malta Cliffs
MOUNTAIN RD
LYKENS ST
SR 0225 SH
PHILLIPS RD
MAIN ST
BERRYSBURG RD
Scale: 1:55,000
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2
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

MAHANTANGO CREEK AT PILLOW—NEW—(Pillow Borough and Northumberland County)

The site is a very steep east-southeast facing shale (Weikert soil series) cliff area along the Mahantango Creek. During a survey of the creek by boat, a marginal to good-quality population of PA-Threatened jeweled shooting star (*Dodecatheon* radicatum) was identified on the cliffs. The surrounding landuse includes the Flying Eagle Wildlife refuge to the west and north; transportation (SR225) to the south; and a wooded riparian corridor to the east (across the creek). The associated plant species include Virginia creeper, grass, white wood aster, ninebark, alum root, maidenhair spleenwort, marginal shield fern, columbine, and jewelweed.

Threats and Disturbances:

No disturbances were noted during the field visit. The plant population may eventually be threatened by aggressive plant species such as multiflora rose, but the threat is not immediate. The site should continue to be monitored. If the invasive plant species become a problem, then management of the exotic plants (e.g., cutting & limited spraying) may become necessary.

MALTA CLIFFS—NEW—(Upper Paxton and Mifflin Townships & Northumberland County)

Portions of the Mahantango Creek were surveyed by boat in the spring of 2001. A new excellent-quality population of a Pennsylvania-Threatened plant species, the jeweled shoot star (*Dodecatheon* radicatum), was identified in a steep shale cliff area along the creek. Several plant species that were growing in association with the species of concern included liverwort, columbine, lyre-leaved rockcress, maidenhair spleenwort, marginal shield fern, white wood aster, fragile fern, and early saxifrage. A small amount of muliflora rose was growing at this site. If the rose starts to spread, then cutting or limited spraying to control it may be needed. This area should be periodically monitored.

Jeweled shooting star (*Dodecatheon radicatum*) occurs in several locations along shaded rock outcrops in Dauphin County. Photo: PA Science Office of The Nature Conservancy

REED TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Aqueduct Bluffs/ Juniata River Scour (3)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	05-01-93	B
	Plant: Lance Fog-fruit *Phyla lanceolata*	G5	S4	DL	07-15-98	C
	Plant: Flat-stemmed Spike-rush *Eleocharis compressa*	G4	S1	PE	07-15-98	CD
State Game Lands #290 (5)	Plant: False Loosestrife Seedbox *Ludwigia polycarpa*	G4	S1	PE	09-12-01	C
	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2B	PE	2002	B
	Animal Species of Concern	G3G4	S3S4	N	09-13-95	E
Susquehanna River at Speeceville (3)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2	E	2004	E

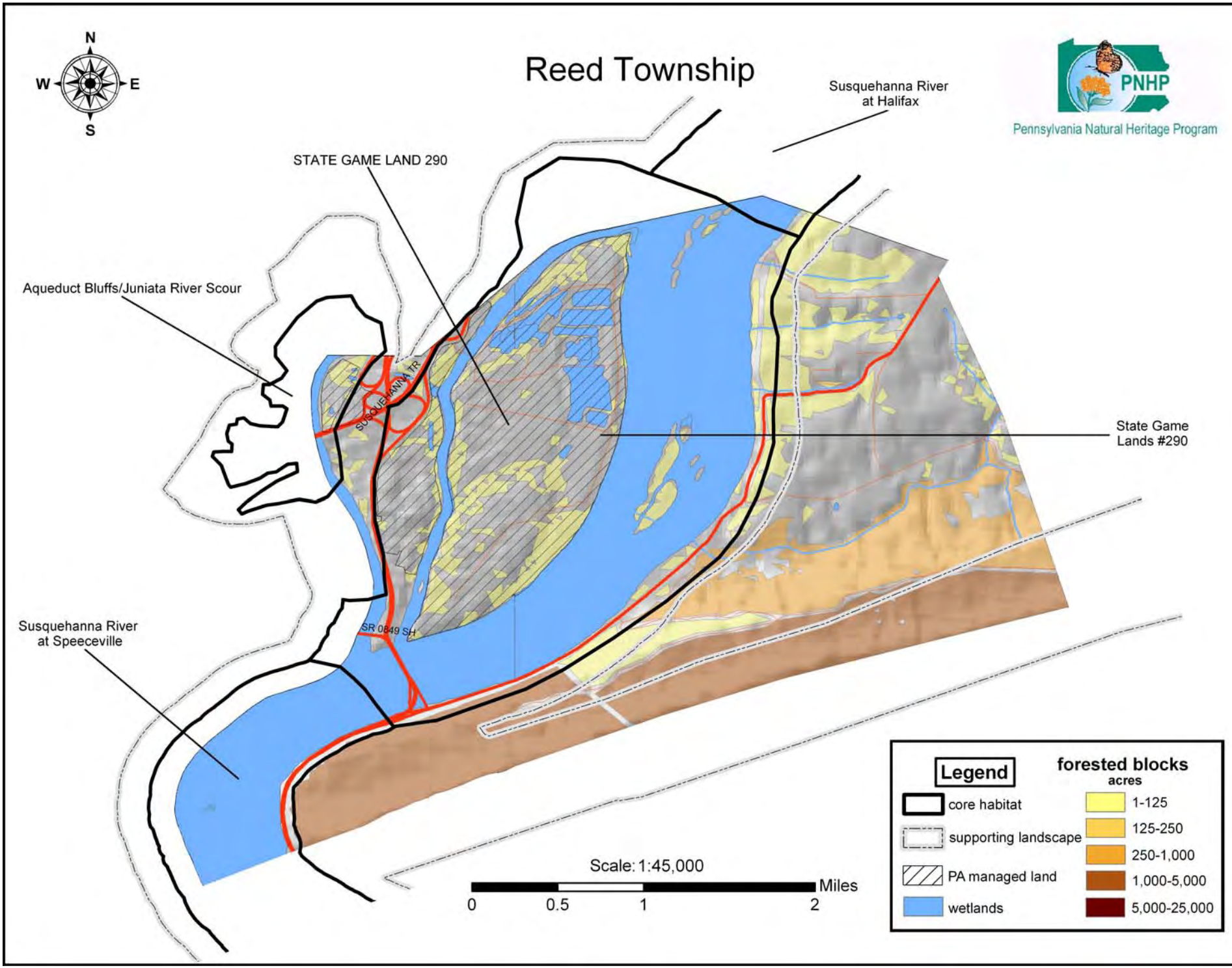
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: None

Managed Lands: State Game Land #290

Reed Township is a small township that hosts several important aquatic resources in the confluence of the Juniata and Susquehanna Rivers. Forested buffershelp filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. Increasing riparian buffers along the Susquehanna and its tributaries will help reduce agricultural runoff and erosion and protect the watershed from degradation. The Susquehanna River in this area is peppered with small islands and the large Haldeman Island that provide diversity in the river's topography and are important habitats for wildlife. Forested ridges make up the southern portion of the township, including the Appalachian Scenic Trail. Protection of these continuous forested ridges of the Appalachian Mountain Section is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the downstream watersheds.

REED TOWNSHIP MAP


Reed Township
N
W
E
S
PNHP
Pennsylvania Natural Heritage Program
Susquehanna River at Halifax
STATE GAME LAND 290
Aqueduct Bluffs/Juniata River Scour
SUSQUEHANNA TR
SR 0849 SH
State Game Lands #290
Susquehanna River at Speeceville
Scale: 1:45,000
0
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Miles
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

AQUEDUCT BLUFFS/JUNIATA RIVER SCOUR—NEW—(Reed Township and Perry County)

This site along the Juniata River has two listed species occupying distinct habitats. **The S2, PA-threatened jeweled shooting star (*Dodecatheon radicatum*)** occupies moist limestone cliffs on the west side of the Juniata, associated with maidenhair spleenwort fern, wild columbine, and poison ivy. The **G4, S1 PA-endangered flat-stemmed spike rush (*Eleocharis compressa*)** occurs along a scoured area of riverbank, growing on sparsely populated bedrock ridges at the water's edge. Also occurring with the spike rush is the **G5, S4 lance fog fruit (*Phyla lanceolata*)**, which has been delisted since the 1997 report.

Threats and Disturbances:

The habitat occupied by the shooting star is fairly inaccessible and there are no current threats to the population. The exotic species purple loosestrife is a potential threat to the river scour species, although annual scouring by ice and floods prevents succession from progressing at this site.

STATE GAME LANDS #290 (Reed Township and Perry County)

This site is at the confluence of the Juniata and Susquehanna Rivers. A fair population of **G4, S1 PA-endangered false loosestrife seedbox (*Ludwigia polycarpa*)** was discovered in 2001 occupying the more open parts of an extremely densely vegetated herb thicket on an island dominated by purple loosestrife and weedy natives. An unknown quality population of an aquatic animal species of concern was found in the west channel of the Susquehanna around Haldeman Island. The animal was found in still water 18 to 36 inches deep, with a substrate of large cobbles and bedrock, some silt-covered. Another aquatic animal species of concern was observed at the site in 1995. Sedimentation and degradation of water quality are potential threats to all three of these species of concern as well as other aquatic animals at the site. This site is an island in the Susquehanna River. A pair of nesting Bald Eagles has been breeding at this site since 1991. The island, part of State Game Lands #290, is a mixture of floodplain forest and agricultural fields, with a number of artificial ponds in the vicinity of the nest.

Threats and Disturbances:

The primary threat to the false loosestrife seedbox is competition from purple loosestrife and other exotic plant species. The habitat itself is artificial and has been used in the past for waterfowl propagation. Threats to the animal populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help the animal species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT SPEECEVILLE—NEW—(Middle Paxton Township)

An animal species of concern was found among the river islands at this site in 2004.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

RUSH TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Clark Creek Woods (4)	Plant: Cattail Sedge *Carex typhina*	G5	S2	PE	08-11-97	BC
DeHart Dam Spillway (5)	Plant: Netted Chainfern *Woodwardia areolata*	G5	S2	N	2003-11-15	CD
	Plant: American Holly *Ilex opaca*	G5	S2	PT	2003-11-15	CD
Peters Mountain (4)	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	06-01-95	E

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

Locally Significant: None

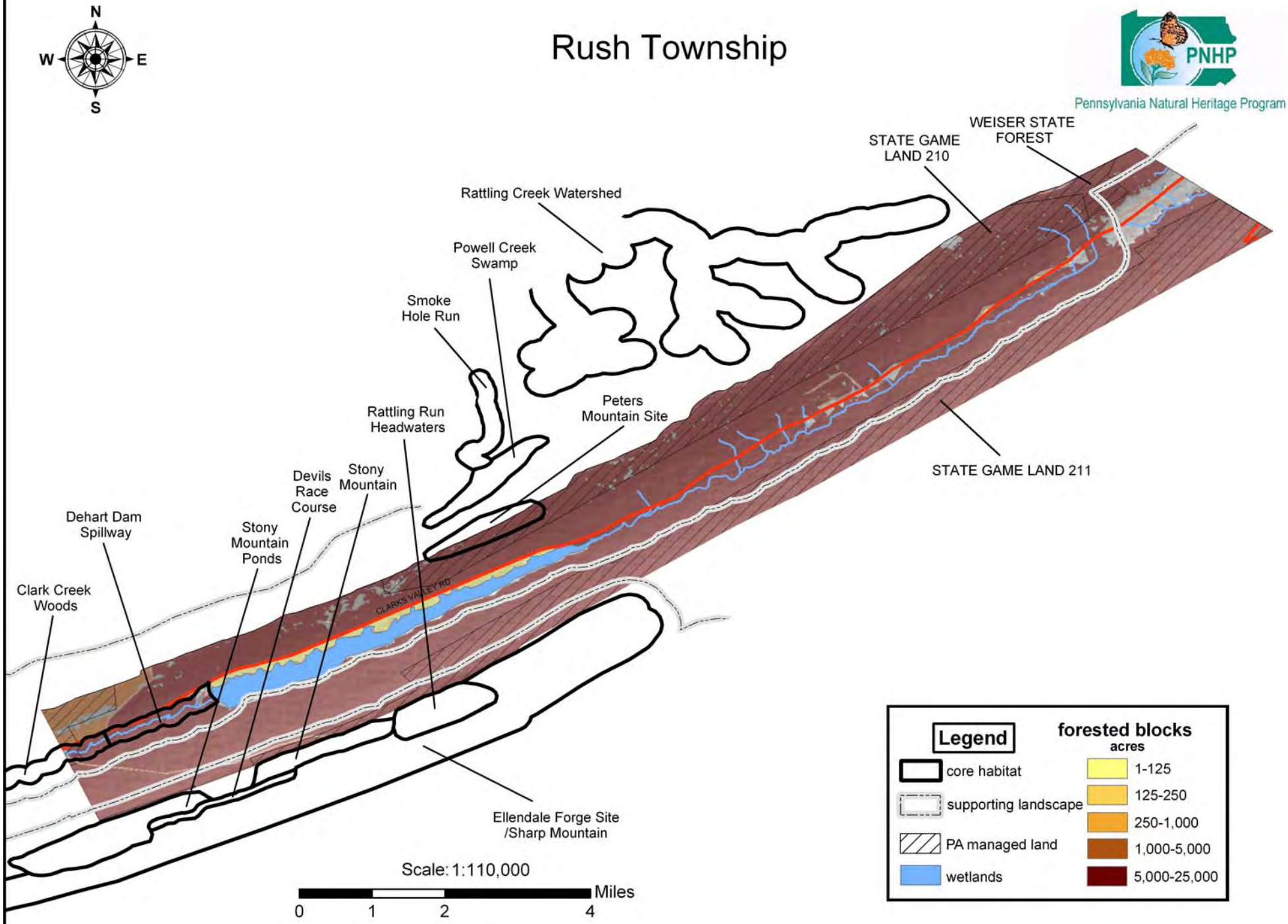
Managed Lands: State Game Land #211

Other: High Quality Cold Water Fishery—Clark Creek

Rush Township is almost entirely forested, containing most of the Clark Creek valley between portions of the Kittatinny Ridge. Expanded protection of the continuous forested Kittatinny Ridge is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. State managed lands border the township both north and south, but the quality of Clark Creek and its water supply will rely on maintenance of the forested buffer that lies outside these managed lands.

RUSH TOWNSHIP MAP

Rush Township



CLARK CREEK WOODS (Middle Paxton and Rush Townships)

This site consists of two small pools along a blocked streamlet at the base of Third Mountain. The pools are vegetated with a mixture of sedges (*Carex gynandra, C. lupulina, C. crinita, C. intumescens, C. lurida*), bulrushes (*Scirpus cyperinus, S. polyphyllus*), grasses (*Leersia oryzoides, L. virginicus, Glyceria melicaria, Panicum clandestinum, P. agrostoides, P. microcarpon*), Iris, cardinal flower and other herbs, and scattered winterberry, highbush blueberry, and buttonbush. A fair to good population of **G5, S2 PA-endangered cattail sedge (*Carex typhina*)** was discovered in these pools in 1997. The pools may have been formed by a small rock dam, which blocks flow of the streamlet just downslope.

Threats and Disturbances:

No immediate threats to the species of concern are apparent.

Conservation Recommendations:

Protecting the stream and a surrounding buffer of woods will allow the rare species to persist at this site.

DEHART DAM SPILLWAY—NEW—(Rush Township)

Two small populations of plant species of concern were documented south of the spillway for the DeHart Dam Reservoir. The **G5, S2 netted chain fern (*Woodwardia areolata*)** was observed near the spillway, and the **G5, S2 American Holly (*Ilex opaca*)** was seen further downstream where Clarks Creek passes through seepy wet woods. Only a few populations of American holly are considered native to Pennsylvania, the others are considered to be the result of introductions from its popular use as an ornamental landscape tree. The native populations found in Stony Valley and a few other locations in the state may represent a local ecotype of distinct genetic composition. It is considered ecologically important to maintain local genotypes of widespread species to preserve the genetic variability of the species.

Threats and Disturbances:

None observed.

Conservation Recommendations:

Maintain a 100 meter undisturbed forested buffer along the creek and adjacent wetlands.

PETERS MOUNTAIN—NEW—(Jefferson and Rush Townships)

Evidence of **G3G4, S3 PA-threatened Allegheny woodrat (*Neotoma magister*)** was found in this area during surveys in 1995. Evidence of extant populations was found at a location at the crest of Peters Mountain. This species utilizes rocky outcrops along the ridgetop and requires a mosaic of forested and open areas. The habitat is within State Game Lands #210.

SOUTH HANOVER TOWNSHIP

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Hummelstown Limestone Bluffs (4)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G4	S2	PT	05-01-97	C

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

Locally Significant: None

Managed Lands: None

South Hanover Township supports important aquatic resources in the Swatara Creek, under the influence of ever-expanding developed areas and shrinking agricultural lands. Several small forest blocks remain along the creek and its tributaries, and should be maintained here. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. Several wetlands along the floodplains of Swatara and Beaver Creeks will also benefit from enhanced riparian protection.

HUMMELSTOWN LIMESTONE BLUFF (Derry & South Hanover Townships and Hummelstown Borough)

This site consists of a series of small north-facing limestone bluffs. It supports a fair quality population of **G4, S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*).** This species, last observed here in 1997, has been known from this site for at least 60 years. It is found growing with wild columbine, rock polpody, and maidenhair spleenwort. The adjacent slopes support a very diverse spring flora under a canopy of sugar maple and hackberry.

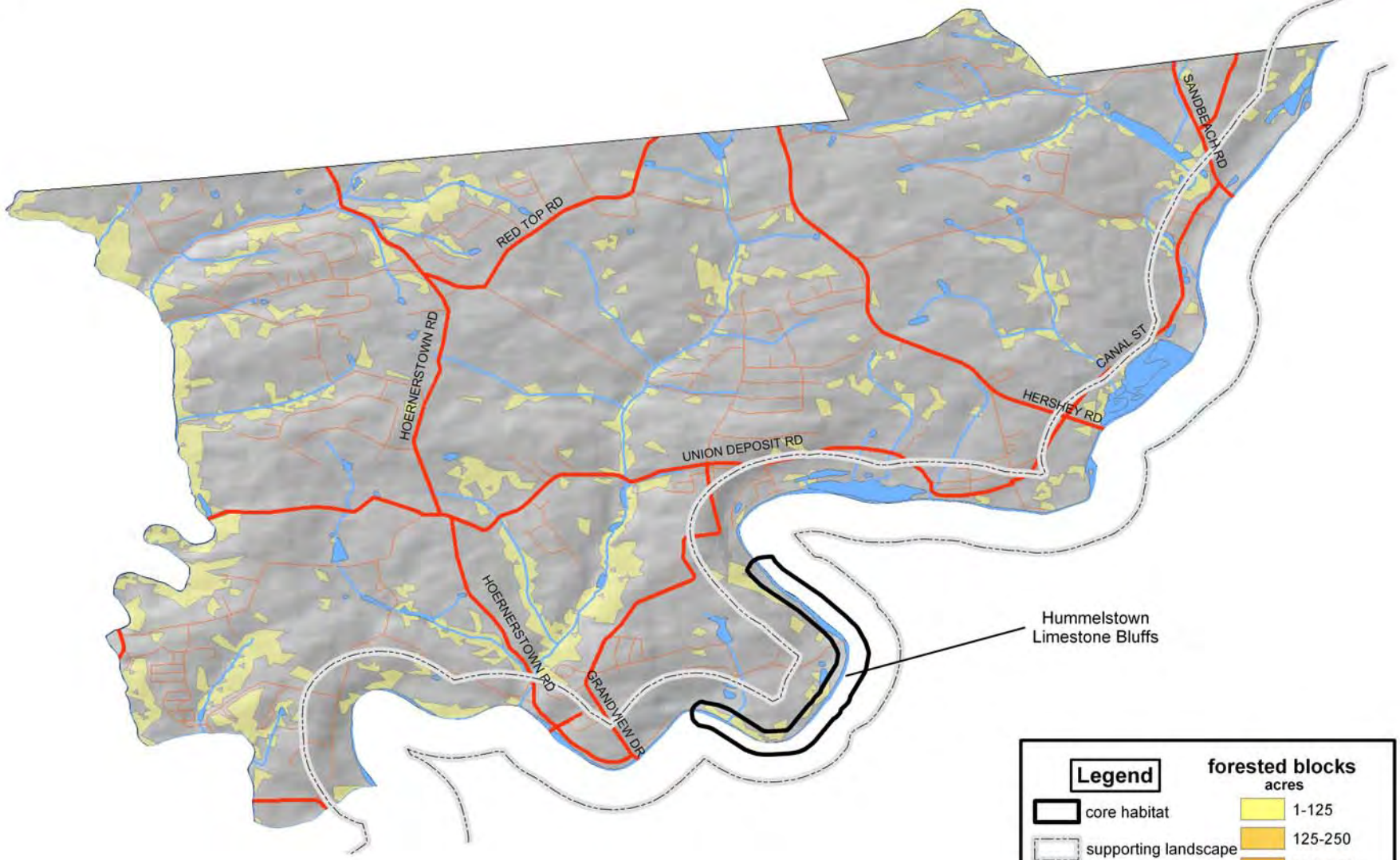
Threats and Disturbances:
Threats to this site include trash dumping and clearing of trees. Clearing of the trees along these slopes may expose this unique outcrop habitat to too much sun possibly causing the outcrops to become too hot and dry for the continued persistence of this species.

Conservation Recommendations:
Maintenance of forested buffer along the creek will help minimize erosion and will help provide habitat for the rich flora and animal species that occur there.

SOUTH HANOVER TOWNSHIP MAP

South Hanover Township

Pennsylvania Natural Heritage Program



Scale: 1:50,000

0 0.5 1 2 Miles

Legend

- core habitat
- supporting landscape
- PA managed land
- wetlands

forested blocks
acres

- 1-125
- 125-250
- 250-1,000
- 1,000-5,000
- 5,000-25,000

Hemlock Wooly Adelgid

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

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

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

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

SUSQUEHANNA TOWNSHIP, Penbrook Borough, City Of Harrisburg

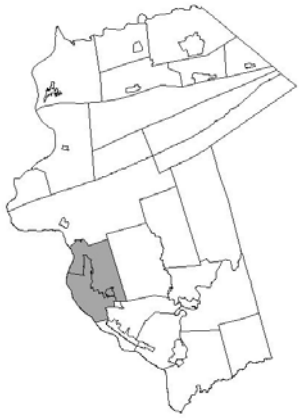
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Harrisburg Site (5)	Animal: Peregrine falcon *Falco peregrinus*	G4	S1BS1N	PE	1999	E
Susquehanna River at Fort Hunter/Rockville (3)	Animal Species of Concern	G3G4	S3S4	N	08-09-95	E
	Animal Species of Concern	G4	S3S4	N	08-09-95	E
	Animal Species of Concern	G5	S1	N	08-09-95	E
	Animal Species of Concern	G3G4	S1S2	N	05-19-01	E
Susquehanna River at Harrisburg (4)	Animal: Yellow-crowned Night-heron *Nyctanassa violacea*	G5	S1B	PE	05-02-89	B
	Animal Species of Concern	G3G4	S3S4	N	08-20-98	D
	Animal Species of Concern	G4	S3S4	N	08-20-98	E
	Animal Species of Concern	G4	S4	N	08-20-98	E
Susquehanna River Islands—McCormicks Island Archipelago (2)	Natural Community: Floodplain Forest	G?	S2	N	06-09-97	CD
	Plant: Umbrella Magnolia *Magnolia tripetala*	G5	S2	PT	06-09-97	CD
	Animal: Great Egret *Casmerodius albus*	G5	S1B	PE	06-09-97	AB
	Animal: Black-crowned Night-heron *Nycticorax nycticorax*	G5	S2S3B	CA	04-18-00	A
	Animal: Yellow-crowned Night-heron *Nyctanassa violacea*	G5	S1B	PE	06-09-97	B

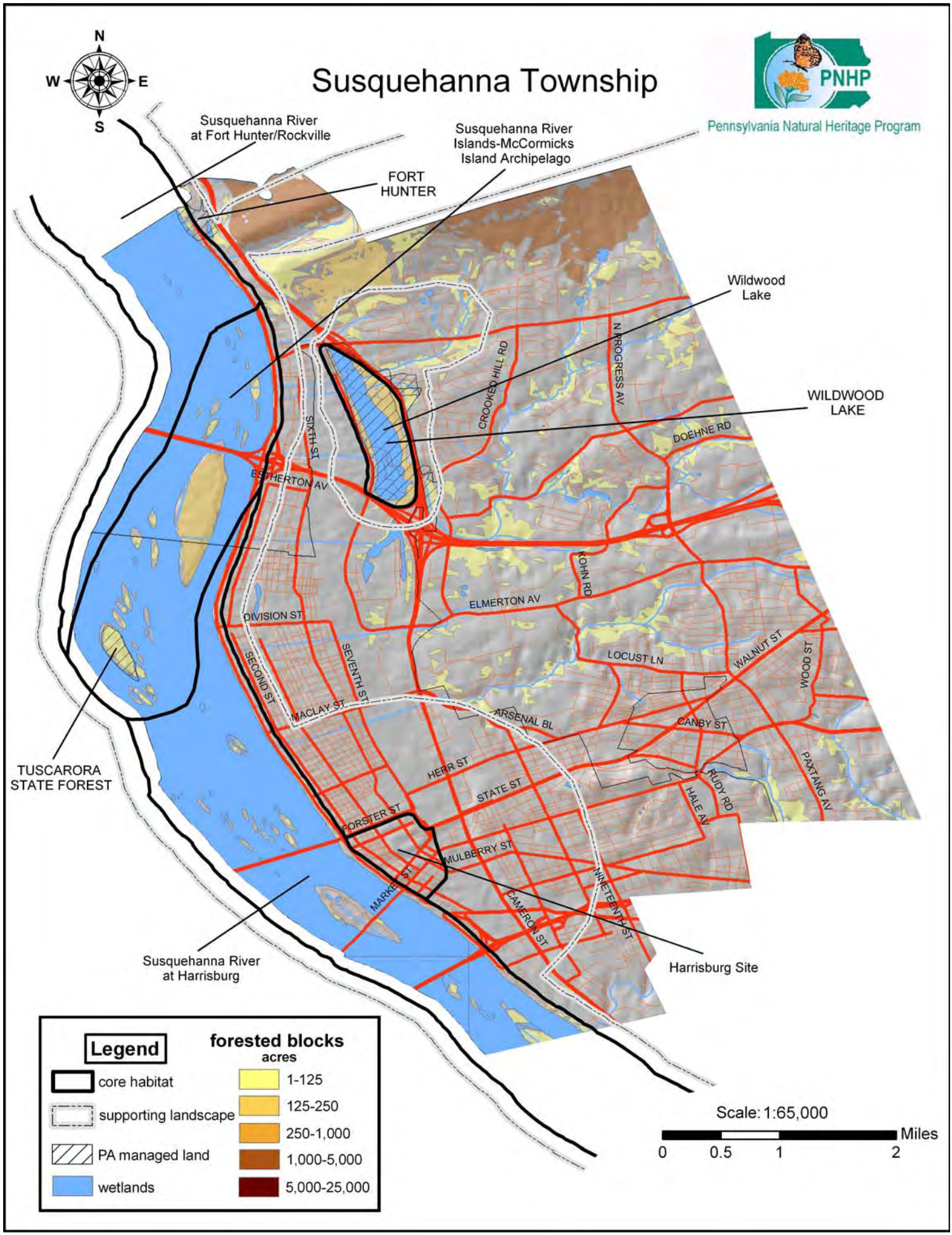
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: Wildwood Lake

Managed Lands: Tuscarora State Forest
Wildwood Lake
Fort Hunter

SUSQUEHANNA TOWNSHIP MAP




Susquehanna Township
Pennsylvania Natural Heritage Program
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Susquehanna River at Fort Hunter/Rockville
Susquehanna River Islands-McCormicks Island Archipelago
FORT HUNTER
Wildwood Lake
WILDWOOD LAKE
TUSCARORA STATE FOREST
Susquehanna River at Harrisburg
Harrisburg Site
CROOKED HILL RD
N PROGRESS AV
DOEHNE RD
SIXTH ST
ESTHERTON AV
KOHN RD
ELMERTON AV
DIVISION ST
SECOND ST
SEVENTH ST
MACLAY ST
LOCUST LN
WALNUT ST
WOOD ST
ARSENAL BL
CANBY ST
HERR ST
STATE ST
FORSTER ST
MULBERRY ST
MARKET ST
CAMERON ST
NINETEENTH ST
HALE AV
RUDY RD
PAXTANG AV
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:65,000
Miles
0
0.5
1
2

Susquehanna Township and the City of Harrisburg drain directly to the Susquehanna River. The majority of the township is developed, with some remaining agriculture. Forested riparian corridors should be restored and maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. The forested blocks of the township appear to be clustered in a few areas, lending themselves to protection and connectivity. The Susquehanna River in this area is peppered with large and small islands that provide diversity in the river's topography and are important habitats for wildlife. A small portion of the Blue Mountain is included in the north of the Township and may need particular attention to preserve the continuity of the forest in the face of development pressures. The Paxton Creek Watershed Association has been very active in developing a plan for the revitalization of this watershed. Their Rivers Conservation Plan provides very specific recommendations for protection and improvements of the watershed that can be applied to any watershed in the region. The Paxton Creek Rivers Conservation Plan can be viewed at the Paxton Creek Watershed Association web site: www.hacc.edu/paxtoncreek/

HARRISBURG SITE—NEW—(City of Harrisburg)

The **PA-Endangered Peregrine Falcon (*Falco peregrinus*)** has been found at this site in downtown Harrisburg. Each year a nesting pair uses the Rachel Carson Building located on Market Street and in the past have successfully reproduced. Though tall city buildings are not the traditional habitat for this species, pairs are nesting successfully in these situations around the country.

Threats and Disturbances:

Possible threats for this species may be the loss of foraging habitat in surrounding areas.

Management Recommendations:

It is important that there are areas nearby for foraging and that these areas are protected from further development.

SUSQUEHANNA RIVER AT FORT HUNTER/ROCKVILLE—UPDATED—(Middle Paxton and Susquehanna Townships and Cumberland County)

Two adjacent sites from the original NAI (Susquehanna River at Fort Hunter, Susquehanna River at Rockville) were combined because of the contiguous habitat that occurs for these species of concern. This site is located in the Susquehanna River and is characterized by a bedrock bottom covered with gravel and cobbles with boulders. It supports four species of rare aquatic animals.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT HARRISBURG—UPDATED—(City of Harrisburg, Susquehanna & Swatara Townships)

This site combines two sites from the original NAI due to the contiguous suitable habitat between the two. This site is a portion of the Susquehanna River adjacent to the city of Harrisburg, Steelton and Cumberland County. Three species of rare aquatic animals are found here in shallow quickwater and riffles. The substrate consists of pebbles with some bedrock ledges, sand and larger cobbles.

Independence Island and other forested islands in the vicinity are also potential habitat for wading bird colonies; in 1989 nests of the **G5, S1B PA-endangered Yellow-crowned Night Heron (*Nyctanassa violacea*)** were documented at this site, but a survey of the site in 1997 failed to find any active nests of this species.

Threats and Disturbances:

This site is near the upstream limit of the impounded area from the Dock Street Dam. Brief surveys in the impounded areas downstream of the site found increased sedimentation, and no live native mussels. Increasing the height of the dam, as has been proposed, would expand the impounded area and probably eliminate the species of concern at this site. Pollution or other changes in water quality are also threats to the species of concern.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER ISLANDS—MCCORMICKS ISLAND ARCHIPELAGO (Susquehanna Township, City of Harrisburg and Cumberland County)

This site encompasses a series of islands in the Susquehanna River on the north side of Harrisburg. McCormick's Island, the largest of the series, is characterized by a rare **floodplain forest natural community**. This silver maple and tulip poplar-dominated forest is relatively mature and contains many canopy gaps with scattered subcanopy trees and shrubs. The largest gaps are dominated by a dense mix of native and exotic herbs including the native jewel-weed, ostrich fern, and poison ivy, and the non-native garlic mustard and mile-a-minute weed, and Japanese knotweed. Spicebush is the most common shrub. The site supports a fair-to-poor population of the PA-threatened **umbrella magnolia (Magnolia tripetala, G5, S2).** This site has been disturbed by logging and campfires in the past but has recovered well. Its quality as a natural community should continue to improve over time.

This island is one of a series of islands occurring along this stretch of the river, which together make up a greater system of habitats including riparian forest, sloughs and shrub swamps, a littoral zone, and several types of aquatic habitats such as riffles, sand bars, and pools. Several listed bird species are found here, including the **G5, S1B PA-endangered Yellow-crowned Night Heron (*Nyctanassa violacea*), the G5, S1B PA-endangered Great Egret (*Casmerodius albus*), and the G5, S2S3B Black-crowned Night Heron (*Nyctanassa nyctanassa*).** The birds are colonial nesters and their rookeries may contain hundreds of nests in small areas of floodplain forest. Rookeries are known from McCormick's Island as well as from several smaller nearby islands with mature floodplain forests. These rookeries are critical to the continued well-being of these species in PA. Both the nesting trees and the surrounding mosaic of feeding habitats are required to protect the bird colonies. This site has been identified by the PA Audubon Society as one of the most important areas in the state for supporting bird diversity.

Threats and Disturbances:

This rookery and all of the habitat associated with the McCormicks Island Archipelago would be threatened by an increase of the water level along this stretch of the river through the construction of the Dock Street Dam. Increased water levels would kill trees on the islands, destroying their utility for nesting, and likely drown entirely many of the smaller islands and sand bars used for feeding. In addition, increased recreational use of the river in this area may disturb the birds' breeding and roosting activities. The abundant diversity that helps retain the wild character of the river in this urban area exists primarily due to these islands.

Locally Significant Site:

Wildwood Lake—UPDATED—(Susquehanna Township)

There is an excellent quality population of **recently delisted American lotus (*Nelumbo lutea*),** an aquatic emergent plant, which is found growing densely over much of the site. With the removal of this species from the species of concern list, this site has been changed from state-wide significance to locally significant. The wetlands at this eighty-plus acre site are likely remnant oxbows from the Susquehanna River. Along with the species of special concern these wetlands are dominated by reed canary-grass, cattail, arrow-arum, and lizard's-tail. The site is also good habitat for herons and turtles.

Threats and Disturbances:

The hydrology at this site was probably altered to accommodate the construction of Route 322 and Interstate 81. These two highways along with a secondary road completely encircle the site leaving a minimal buffer for the wetlands.

Conservation Recommendations:

Maintaining the current hydrology and preventing any further disturbances to the relatively thin forest buffer will help the species to persist at this site. This site is entirely within Wildwood Lake County Park.

SWATARA TOWNSHIP, Paxtang Borough, Steelton Borough

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Swatara Creek at Fiddler's Elbow/Fiddler's Elbow Bluffs (3)	Animal Species of Concern	G3G4	S3S4	N	05-13-97	C
	Animal Species of Concern	G4	S4	N	05-13-97	E
	Animal Species of Concern	G4	S3S4	N	05-13-97	E
Susquehanna River at Harrisburg (4)	Animal: Yellow-crowned Night-heron *Nyctanassa violacea*	G5	S1B	PE	05-02-89	B
	Animal Species of Concern	G3G4	S3S4	N	08-20-98	D
	Animal Species of Concern	G4	S3S4	N	08-20-98	E
	Animal Species of Concern	G4	S4	N	08-20-98	E
Susquehanna River at Middletown (3)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2B	PE	2001	E

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

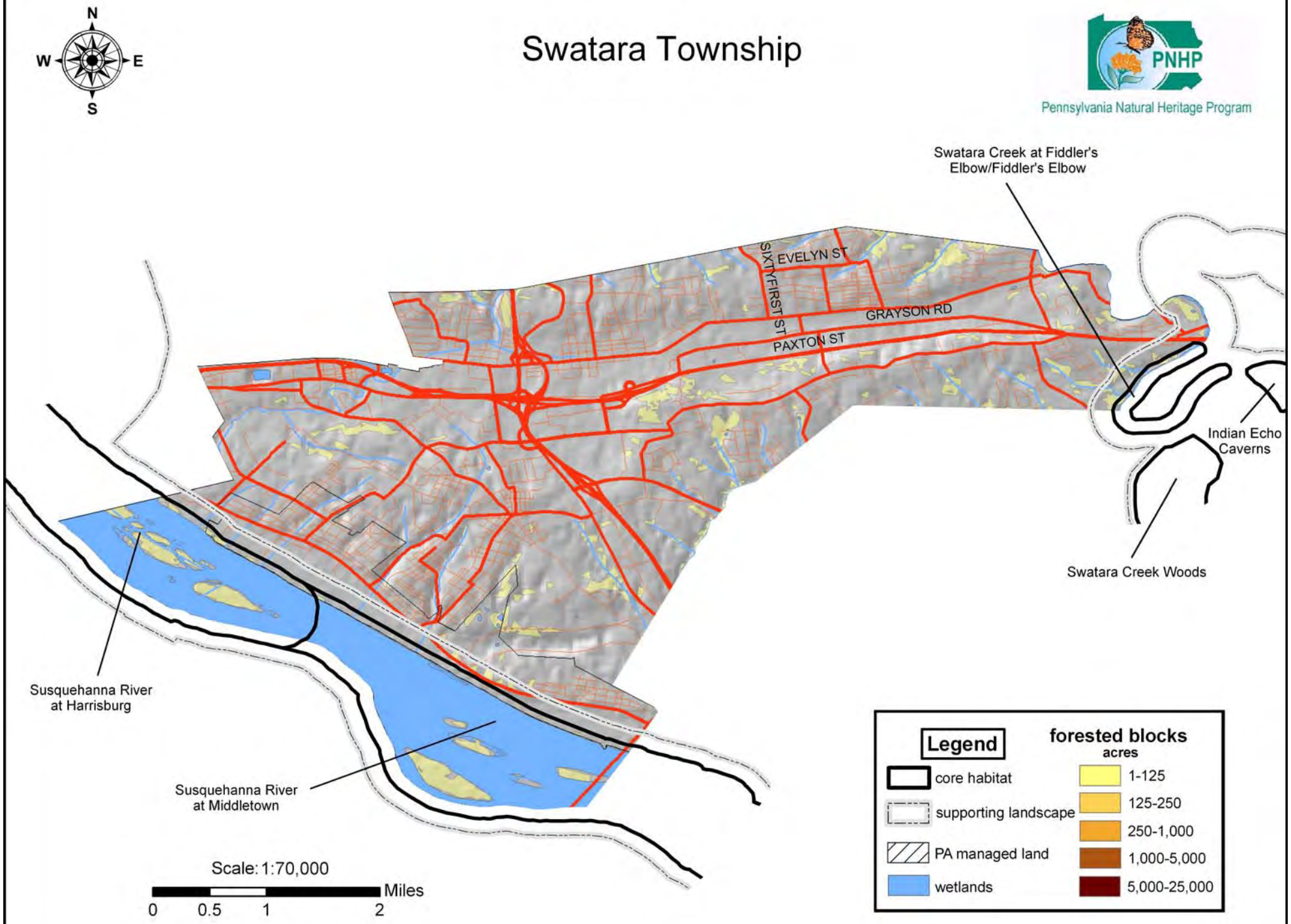
Locally Significant: None

Managed Lands: None

Swatara Township drains to the Swatara Creek and the Susquehanna River. The majority of the township is developed, with some remaining agriculture. Forested riparian corridors should be restored and maintained where they remain. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. The small forested blocks of the township appear to be clustered in a few areas, lending themselves to protection and connectivity. The Susquehanna River in this area is peppered with large and small islands that provide diversity in the river's topography and are important habitats for wildlife.

SWATARA TOWNSHIP MAP

Swatara Township



SWATARA CREEK AT FIDDLER'S ELBOW/FIDDLER'S ELBOW BLUFFS—UPDATED—(Derry, Lower Swatara, and Swatara Townships)

This site is an approximately one-mile section of Swatara Creek below Hummelstown. The portion of the river surveyed included several quickwater riffles with gravelly to stony substrates. A fair to good-quality population of a G3G4, S2S3 aquatic animal species was found here in 1997, along with two other rare aquatic animals. This section of Swatara Creek is often bounded by limestone cliffs and ledges with a diverse native flora. Round-leaved hare's bells, bloodroot, hepatica, ragwort, and columbine and cliff-brake are among the native species present; wineberry, Norway Maple and tree-of-heaven are among the invasives. Swallows nest on muddy portions of the steep riverbanks. Despite disturbances, there is potential for rare plants or animals to colonize this site.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy Swatara Creek include thermal and chemical pollution, impoundment, and excessive sedimentation. Disturbances to the site include invasive plants as well as old trash and mulch that have been thrown over the bank from above.

Conservation Recommendations:

Maintaining the best quality water possible will help these species persist at this site in the future.

SUSQUEHANNA RIVER AT HARRISBURG—UPDATED—(City of Harrisburg, Susquehanna & Swatara Townships)

This site combines two sites from the original NAI due to the contiguous suitable habitat between the two. This site is a portion of the Susquehanna River adjacent to the city of Harrisburg, Steelton and Cumberland County. Three species of rare aquatic animals are found here in shallow quickwater and riffles. The substrate consists of pebbles with some bedrock ledges, sand and larger cobbles.

Independence Island and other forested islands in the vicinity are also potential habitat for wading bird colonies; in 1989 nests of the **G5, S1B PA-endangered Yellow-crowned Night Heron (*Nyctanassa violacea*)** were documented at this site, but a survey of the site in 1997 failed to find any active nests of this species.

Threats and Disturbances:

This site is near the upstream limit of the impounded area from the Dock Street Dam. Brief surveys in the impounded areas downstream of the site found increased sedimentation, and no live native mussels. Increasing the height of the dam, as has been proposed, would expand the impounded area and probably eliminate the species of concern at this site. Pollution or other changes in water quality are also threats to the species of concern.

Conservation Recommendations:

Maintaining the free-flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT MIDDLETOWN—NEW—(Londonderry, Lower Swatara, Swatara Townships, Middletown Borough, and York County)

A nesting pair of Bald Eagles was documented along this stretch of the Susquehanna River in 2001.

Threats and Disturbances:

SWATARA TOWNSHIP

The river shore in this area has many disturbances including roads, railroads, lack of forested buffers, point and non-point sources of pollution, exotic species of plants and commercial, industrial and residential development.

Conservation Recommendations:

Conservation and repair of a 100 meter-wide forested buffer along the shores of the Susquehanna River will help protect the river from sources of pollution and habitat fragmentation. Areas frequently flooded by seasonal and yearly fluctuations in the river level should be restricted from future development. Conservation of the floodplain habitat will help mitigate the effects of floodwaters on adjacent developed areas.

The Susquehanna River is habitat for the **YELLOW LAMPMUSSEL** (*Lampsilis cariosa*), center, a globally rare species, as well as other mussel species.
Photo: PA Science Office of The Nature Conservancy.

UPPER PAXTON TOWNSHIP, MILLERSBURG BOROUGH

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Berry Mountain Woods (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	05-30-92	B
Cummings Swamp (4)	Plant: Purple Fringeless Orchid *Platanthera peramoena*	G5	S2	TU	07-15-93	B
Mahantango Creek Outcrops (4)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	06-23-98	B
	Animal Species of Concern	G4	S4	N	08-17-95	E
	Animal Species of Concern	G3G4	S3S4	N	08-17-95	E
Mahantango Mountain Slopes (2)	Natural Community: Mesic Central Forest	GNR	S2	N	04-16-97	BC
	Natural Community: Northern Appalachian Acidic Cliff	G5	S5	N	04-16-97	BC
Malta Cliffs (4)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	5/18/01	A
Susquehanna River at Millersburg (4)	Animal Species of Concern	G3G4	S3S4	N	10-24-97	AB
	Animal Species of Concern	G4	S4	N	10-24-97	E
	Animal Species of Concern	G4	S3S4	N	10-24-97	E

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	State	State Status	Last Seen (m-d-y)	Quality**
Susquehanna River at State Game Lands #258 (4)	Animal: Bald Eagle *Haliaeetus leucocephalus*	G4	S2B	PE	2000	B
	Animal Species of Concern	G3	S2	N	07-28-98	B
	Animal Species of Concern	G4	S4	N	07-28-98	E
	Animal Species of Concern	G3G4	S3S4	N	07-28-98	E
Wiconisco Creek Outcrops (3)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	06-23-98	E

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

Locally Significant: Berry Mountain Slopes

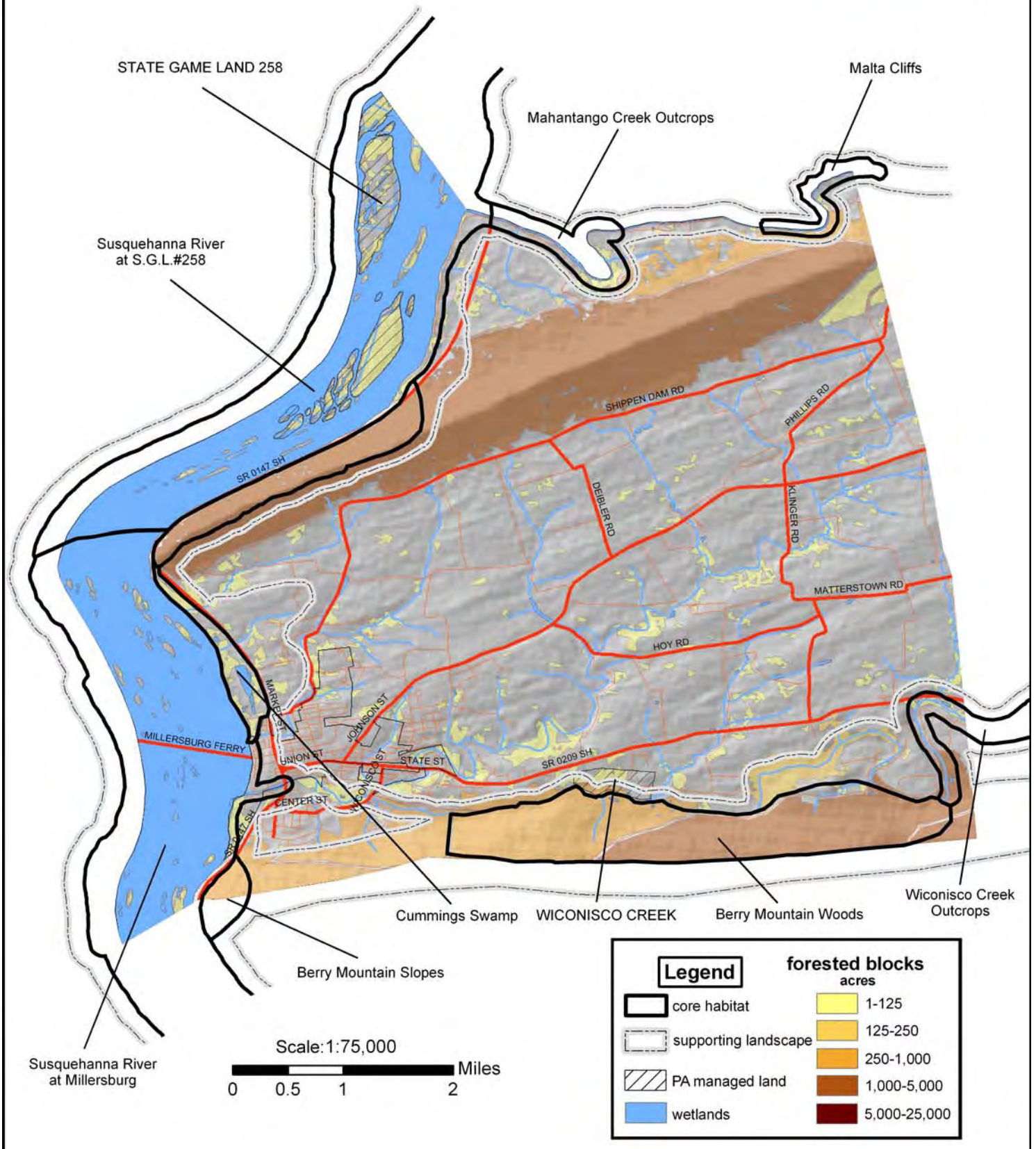
Managed Lands: Wiconisco Creek
State Game Land #258

Upper Paxton Township is bordered by two large forested ridges; Mahantango Mountain in the north and Berry Mountain in the south. Expanded protection of the continuous forested Kittatinny Ridge and the nearby ridgelines is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural central portions of the Township, forested riparian corridors should be maintained where they remain along Little Wiconisco Creek. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor and providing connectivity between the two ridgelines.

UPPER PAXTON TOWNSHIP MAP

Upper Paxton Township

Pennsylvania Natural Heritage Program



BERRY MOUNTAIN WOODS (Upper Paxton Township)

This site consists of a portion of the lower slopes of Berry Mountain along Wiconisco Creek. The habitat is an oak-heath woods occupying bouldery slopes and ravines. An abandoned railroad grade bisects the site. A good-quality population of **G4G5, S3 PA-Rare minniebush (*Menziesia pilosa*)** occurs at several locations within the site. Associated species include lowbush blueberry, deerberry, huckleberry, pinxter-flower, mountain laurel, maple-leaved viburnum, hazelnut, witch-hazel, sweet birch, red, chestnut and other oak species, tulip-tree, white pine, and hemlock. The population is apparently healthy and may benefit from the disturbances of small-scale logging and the abandoned railroad. Additional surveys, particularly of the steeper slopes and ravines, are needed to determine the full extent of the population.

CUMMINGS SWAMP (Upper Paxton Township)

This site consists of a swampy forest on the floodplain of the Susquehanna River. It supports a good quality population of the **G5, S2 purple fringeless orchid (*Platanthera peramoena*).** This species occurs in filtered light with blueflag iris and cardinal flower.

Threats and Disturbances:

Possible threats to the orchid population are overbrowsing by deer and trampling or collecting by people walking through the site.

Conservation Recommendations:

Preserve the wetland hydrology of the river floodplain.

MAHANTANGO CREEK OUTCROPS (Upper Paxton Township)

This site has a good quality population of **G4, S2 PA-threatened Jeweled shooting-star (*Dodecatheon radicatum*).** The plant occurs on two 20-meter high shale cliffs, about .5 mile apart, along Mahantango Creek. The cliffs are east-facing and consist of large areas of bare rock, with plants clinging to cracks, crevices, and seeps. The species of concern occurs 2-5 meters above the creek, especially in overhung crevices and ledges. Associated vegetation includes mosses, jewelweed, common bladder-fern, maidenhair spleenwort, marginal wood-fern, Virginia creeper, and the invasive species mossy stonecrop, and stilt grass.

This site also includes a stretch of Mahantango Creek near its confluence with the Susquehanna. It is characterized by a sandy bottom that changes to gravel and cobbles further downstream. It supports two animal species of special concern.

Threats and Disturbances:

Currently the exotics are chiefly in lower or better-lit portions of the cliff and do not appear to be threatening the plant species of concern. The cliffs themselves are unlikely to be disturbed because of their inaccessibility. However, care should be taken to preserve the woods above and across the creek from the cliffs, as increased light may adversely affect the species of concern. The aquatic animal species are sensitive to water pollution and excessive siltation.

Conservation Recommendations:

Maintaining the best quality water possible will help the animal species persist and even flourish at this site into the future.

MAHANTANGO MOUNTAIN SLOPES (Upper Paxton Township)

This site is located on the northwest slope of Mahantango Mountain extending from the ridge's terminus at the Susquehanna River for about two miles to the east. The site supports a fair-to-good quality **Mesic Central Forest Natural Community** and a fair to good quality **Northern Appalachian Acidic Cliff Natural Community**. The Mesic Central Forest Natural Community is located on the lower third to half of the slope. This steeply sloping area is dominated by a canopy of mature trees including sugar maple, basswood, and red oak with lesser amounts of black birch, hop-hornbeam, and hemlock. The shrub layer is sparse with maple-leaved viburnum being most common and other species including bladdernut, elderberry, and hydrangea occurring as scattered individuals. The herb layer is moderately diverse including Dutchman's breeches, marginal shield fern, jewelweed, trillium and a variety of other species.

The Northern Appalachian Acidic Cliff Natural Community is located in a band occurring primarily along the top of the slope, but also extending nearly down to the river at the ridge's terminus. This natural community is characterized by large escarpments of exposed rock and talus, which support a sparse canopy of table-mountain pine, pitch pine, Virginia pine, and chestnut oak with scattered individuals of serviceberry. The shrub layer occurs in patches where there is suitable substrate and includes lowbush blueberry and mountain laurel. Herb diversity is minimal with poverty grass and sedge being most common. This natural community is potential nesting habitat for black vultures, turkey vultures, ravens and other bird species. Although no nests were observed, turkey vultures, ravens, and red-tailed hawks were all observed at the site during our 1997 field survey. They are likely to remain that way because the steepness and geology of the site probably precludes any opportunity for timber harvest or other activities.

Threats and Disturbances:

One threat is the gradual invasion by exotic species. The road and rail line at the toe of the slope and the recent disturbance due to logging on the south face of the slope have both exposed this area to a variety of exotic species. Although current occupation of the site by exotics is minimal, several species, including tree-of-heaven and garlic mustard, have gotten a foothold. If the site remains undisturbed colonization of these species should progress slowly.

MALTA CLIFFS—NEW—(Upper Paxton and Mifflin Townships & Northumberland County)

Portions of the Mahantango Creek were surveyed by boat in the spring of 2001. A new excellent-quality population of a **Pennsylvania-Threatened plant species, the jeweled shoot star (*Dodecatheon* radicatum),** was identified in a steep shale cliff area along the creek. Several plant species that were growing in association with the species of concern included liverwort, columbine, lyre-leaved rockcress, maidenhair spleenwort, marginal shield fern, white wood aster, fragile fern, and early saxifrage. A small amount of muliflora rose was growing at this site. If the rose starts to spread, then cutting or limited spraying to control it may be needed. This area should be periodically monitored.

SUSQUEHANNA RIVER AT MILLERSBURG (Halifax & Upper Paxton Townships, Millersburg Borough and Perry County)

This site is a portion of the Susquehanna River just upstream of the confluence of the Susquehanna adjacent to Millersburg Borough. A forested island is present in the western half of the river. The river is shallow with low intensity riffles flowing over large cobbles and gravel. Algae and water-stargrass grow scattered on the river bottom. Three animal species of concern were found here during field surveys in 1997.

Threats and Disturbances:

Threats to these populations as well as to other common species that occupy this stretch of the river include thermal and chemical pollution, impoundment, and excessive sedimentation.

Conservation Recommendations:

Maintaining the free flowing character of the river and the best quality water possible will help these species persist and even flourish at this site into the future.

SUSQUEHANNA RIVER AT STATE GAME LANDS #258 (Upper Paxton Township and Perry County)

This site consists of an archipelago of islands in the Susquehanna River near the Dauphin/Northumberland Co. line. The channels between the islands tend to have shallow, quick-flowing water over a substrate of gravel (cobbles and pebbles) and sand, with a few bedrock ridges. Three animal species of concern were found in this habitat. Crafts Island, the most southern of the large islands, is dominated by silver maple and spicebush. An animal species of concern was found on the southern half Craft's Island. This species is apparently breeding on the island.

Threats and Disturbances:

Camping or other recreational visits to this island during the breeding season could disturb this species of concern.

Conservation Recommendations:

All the animal species of concern at State Game Lands 258 are dependent on the maintaining the fish populations and water quality of the Susquehanna River.

WICONISCO CREEK OUTCROPS—UPDATED—(Upper Paxton and Washington Townships)

This site consists of a series of calcareous shale and limestone outcrops along Wiconisco Creek below Elizabethville. The **S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*)** occurs on seven separate outcrops. Six new subpopulations for this species were found in 1998 surveys. This species was found in moist, usually north-facing or overhung ledges and rocky crevices. Associated plant species include maidenhair spleenwort, columbine, sevenbark, asters, grasses, and lichens.

Threats and Disturbances:

While the outcrops themselves are fairly inaccessible and undisturbed, logging upslope or across the Creek from these outcrops is a potential threat to this shade-loving species. Competition from an exotic species of stonecrop and dumping of brush or trash over the cliffs from above are also potential threats.

Locally Significant Site:

Berry Mountain Slopes (Halifax and Upper Paxton Townships)

This site consists of a very steep, undercut shaly slope at the west end of Berry Mountain south of Millersburg. The steepness of the slope, the southwestern aspect, and the shaly soil have created hot, dry condition and an unusual forest composition. The lower slope is eroding and has been disturbed by road-building, but the upper slope has a largely intact (and unusual) forest of table-mountain pine, Virginia pine, and chestnut and black oaks, with blueberry the dominant understory. Exposed boulders and ledges are also present. Access to the site is limited due to the steepness of the slope. The unusual forest type may serve as habitat for rare plant or animal species.

WASHINGTON TOWNSHIP, ELIZABETHVILLE BOROUGH

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Oakdale Station Woods (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	09-23-97	BC
Wiconisco Creek Outcrops (3)	Plant: Jeweled Shooting-star *Dodecatheon radicatum*	G?	S2	PT	06-23-98	E

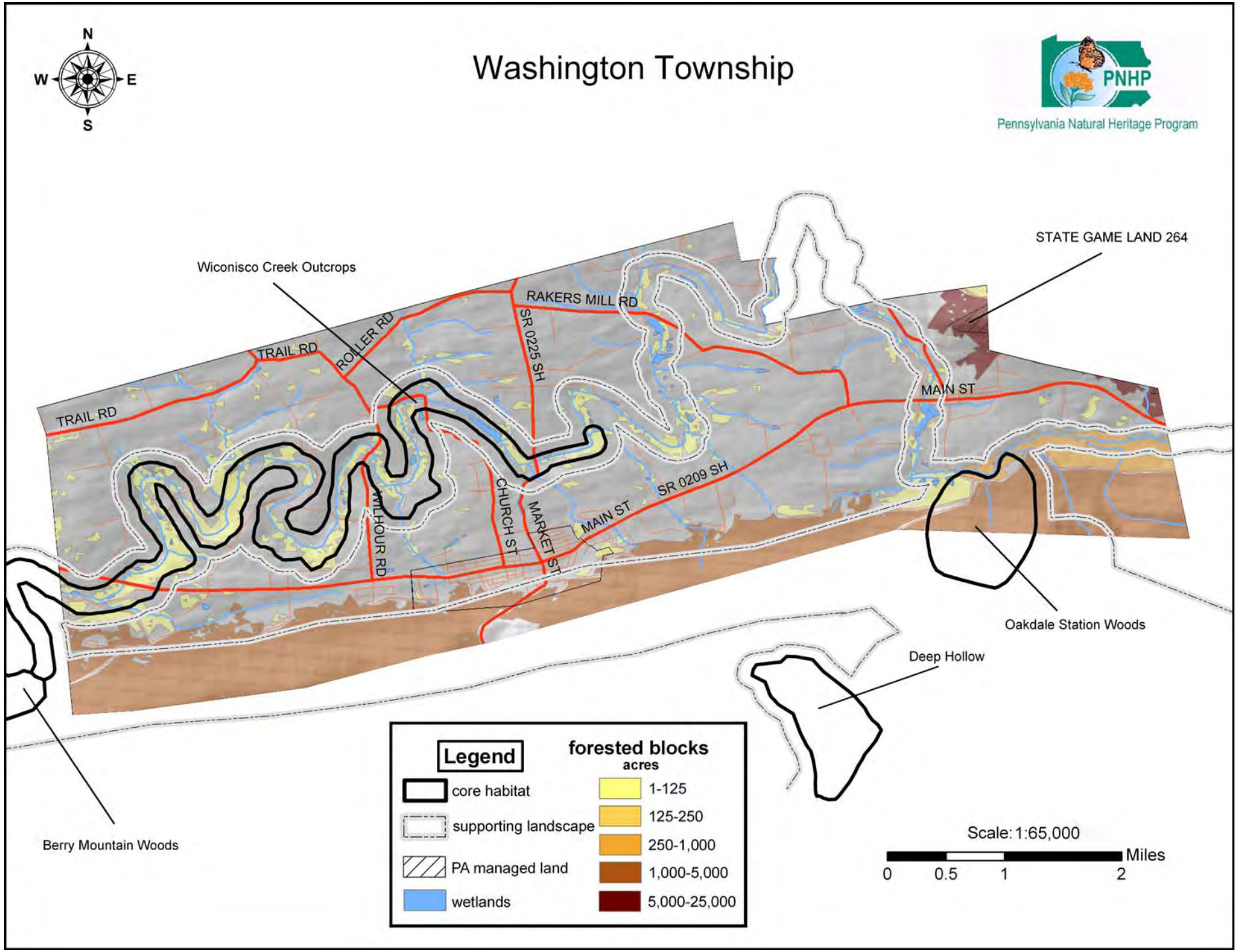
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: None

Managed Lands: State Game Land #264

Washington Township is bordered by the large forested ridge Berry Mountain in the south. Expanded protection of the continuous forested Kittatinny Ridge and the nearby ridgelines is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the more agricultural central portions of the Township, several small forest blocks provide a riparian corridor that should be maintained along Wiconisco Creek and its tributaries. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor and providing connectivity between the ridgelines.

WASHINGTON TOWNSHIP MAP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Washington Township
PNHP
Pennsylvania Natural Heritage Program
Wiconisco Creek Outcrops
STATE GAME LAND 264
RAKERS MILL RD
SR 0225 SH
ROLLER RD
TRAIL RD
TRAIL RD
MAIN ST
SR 0209 SH
MAIN ST
CHURCH ST
MARKET ST
WILHOUR RD
Oakdale Station Woods
Deep Hollow
Berry Mountain Woods
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:65,000
Miles
0
0.5
1
2

OAKDALE STATION WOODS (Jackson and Washington Townships)

This site is a north-facing ravine with a dry-mesic, acidic soil. The overstory is open and dominated by various oaks, red maple, black-gum, hemlock, and sweet birch. The **G4G5, S3 minniebush (*Menziesia pilosa*)** is found in the understory at this site, associated with rhododendron, huckleberry, highbush blueberry, mountain laurel, spicebush, and witch hazel. This is a fair-to-good quality population with many mature and reproducing individuals.

Threats and Disturbances:

The site has been disturbed by logging, a railroad grade, and small dams in the past, but the population appears healthy. Severe logging and browsing by deer are potential threats.

WICONISCO CREEK OUTCROPS—UPDATED—(Upper Paxton and Washington Townships)

This site consists of a series of calcareous shale and limestone outcrops along Wiconisco Creek below Elizabethville. The **S2 PA-Threatened jeweled shooting star (*Dodecatheon radicatum*)** occurs on seven separate outcrops. Six new subpopulations for this species were found in 1998 surveys. This species was found in moist, usually north-facing or overhung ledges and rocky crevices. Associated plant species include maidenhair spleenwort, columbine, sevenbark, asters, grasses, and lichens.

Threats and Disturbances:

While the outcrops themselves are fairly inaccessible and undisturbed, logging upslope or across the Creek from these outcrops is a potential threat to this shade-loving species. Competition from an exotic species of stonecrop and dumping of brush or trash over the cliffs from above are also potential threats.

WICONISCO CREEK OUTCROPS consists of a series of steep, eroded cliffs along Wiconisco Creek, which provide habitat for a PA-threatened plant species.
Photo: PA Science Office of The Nature Conservancy.

WAYNE TOWNSHIP

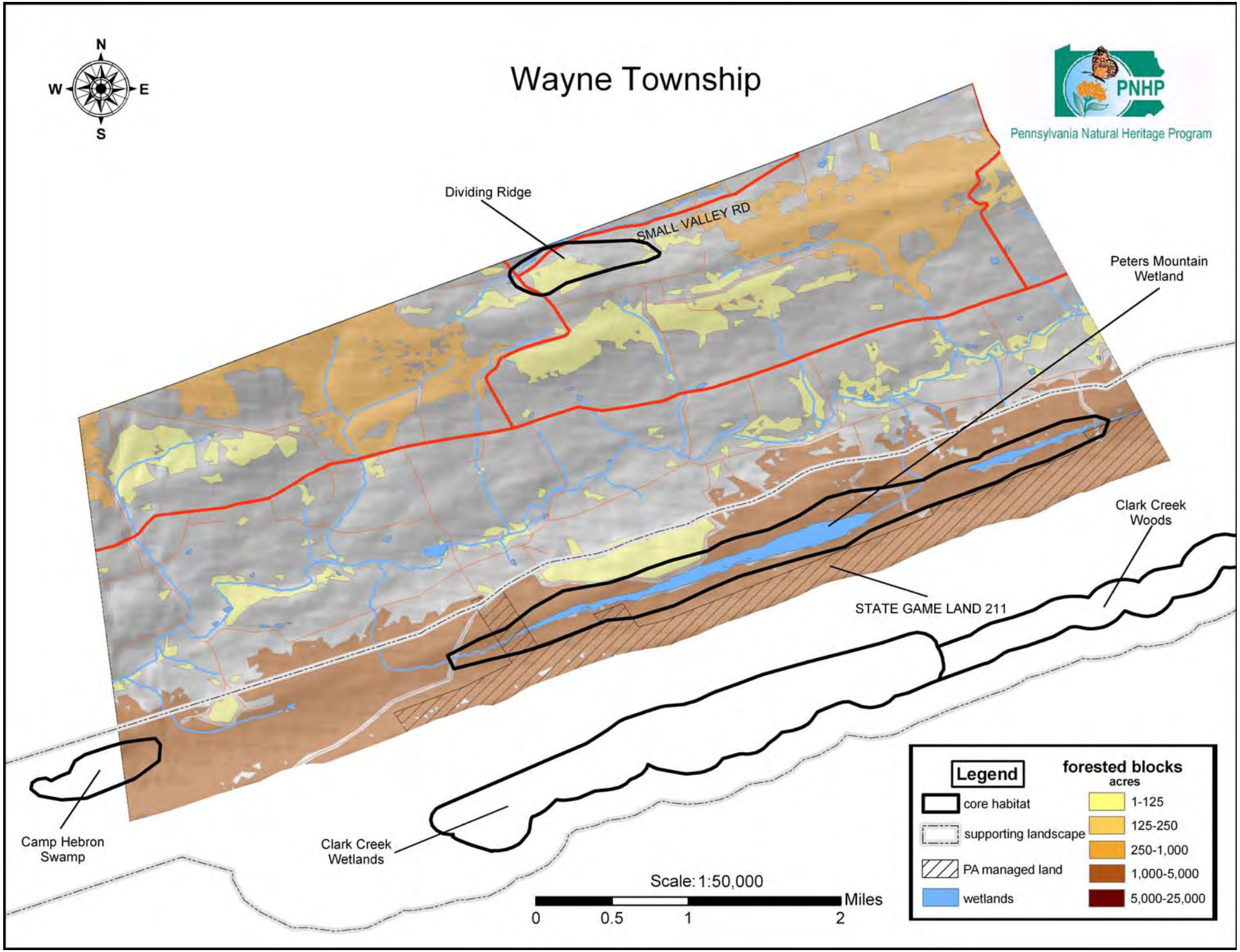
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Camp Hebron Swamp (4)	Plant: Swamp Dog-hobble *Leucothoe racemosa*	G5	S2S3	N	05-26-92	B
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	05-26-92	BC
Dividing Ridge (5)	Plant: Wild Blue Lupine (*Lupinus perennis*)	G5	S3	PR	7-10-01	E
Peters Mountain Wetland (1)	Plant: Swamp Dog-hobble *Leucothoe racemosa*	G5	S2S3	N	07-27-94	B
	Plant: Pod-grass *Scheuchzeria palustris*	G5	S1	PE	07-27-94	BC
	Plant: Mud Sedge *Carex limosa*	G5	S2	TU	06-26-92	B
	Plant: Northeastern Bulrush *Scirpus ancistrochaetus*	G3	S3	PE	07-27-94	B
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	07-27-94	B

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

Locally Significant: None

Managed Lands: State Game Land #211

WAYNE TOWNSHIP MAP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Wayne Township
PNHP
Pennsylvania Natural Heritage Program
Dividing Ridge
SMALL VALLEY RD
Peters Mountain
Wetland
Clark Creek
Woods
STATE GAME LAND 211
Camp Hebron
Swamp
Clark Creek
Wetlands
Scale: 1:50,000
0
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Miles
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

WAYNE TOWNSHIP

Wayne Township is bordered on the south by part of the Kittatinny Ridge, containing the Appalachian Scenic Trail. Expanded protection of the continuous forested Kittatinny Ridge is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below. In the agricultural portions of the Township, forested riparian corridors should be maintained where they remain along the Powell Creek and its tributaries. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. Connectivity of the larger forested blocks in the northern portion of the township will maintain their utility as a natural wildlife corridor.

CAMP HEBRON SWAMP (Halifax and Wayne Townships)

This site is an approximately five-acre swamp located at the headwaters of a tributary to Powell Creek. Tree species present include pin oak, red maple, black-gum, swamp-white oak, and black and yellow birch. Shrubs include winterberry, highbush blueberry, spicebush, dangleberry, and arrow-wood. A good quality population of the **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*)** shrub species is found in growing in dense thickets with the other shrub species listed above. A fair-to-good-quality population of the golden club (*Orontium aquaticum*), delisted since the 1997 report, occurs in the slow-moving streamlets and wet depressions. Associated species include halberd-leaved tearthumb, jack-in-the-pulpit, cinnamon fern, sensitive fern, violets, Sphagnum mosses, and various grasses and sedges. Both species of concern appear healthy and are reproducing.

Threats and Disturbances:

The site has been selectively logged in the past, which may have benefited the shrub species of concern.

Conservation Recommendations:

No special management is recommended.

DIVIDING RIDGE (Wayne Township)

A roadside population of **wild blue lupine (*Lupinus perennis*), a G5, S3 PA-rare plant species of concern** was documented at this site. The plant population occupies a wooded hillside along the roadway, and may actually benefit from the periodic mowing provided by roadside maintenance. The hillside is a diverse mix of hardwoods.

Threats and Disturbances:

The current roadside maintenance activity appears to favor the lupines at this location. A road-widening project could destroy the plant population.

Conservation Recommendations:

Continue the current roadside maintenance schedule, as this seems to help the species at this location. Extreme care should be exercised with any road-widening activity in this location. Additional surveys for this species should be conducted in the area.

PETERS MOUNTAIN WETLAND (Wayne Township)

Peters Mountain Wetland is situated between the northern base of the main ridge of Peters Mountain and a smaller foothill ridge to the north. The site is a headwaters swamp, drained by tributaries of Powell Creek, which flow out both East and West. A variety of plant habitats are present, including swamp forest, wet thickets of shrubs and small trees, graminoid-dominated

marshes, vigorous stands of the Virginia chain-fern, small ponded areas, and sphagnous wetlands. It supports four plant species of special concern, including good populations of **G5, S2S3 swamp dog-hobble (*Leucothoe racemosa*), G5, S2 mud sedge (*Carex limosa*), and G3, S3 PA-endangered northeastern bulrush (*Scirpus ancistrochaetus*).** The site also supports **G5, S1, PA-endangered pod-grass (*Scheuchzeria palustris*)**, believed to occur here at its southernmost extant population in eastern North America. In addition to the species of special concern, the site is noteworthy in having a mixture of plant species unusual for this region of the state, including such species as yellow-eyed-grass and spatulate-leaved sundew. Also occurring at this site is the plant species golden club (*Orontium aquaticum*), which has been removed from the species of concern list since the 1997 report.

Threats and Disturbances:

The site is primarily used for hunting and does not appear to have any unnatural threats. Recent surveys revealed heavy use of the site by bear and deer. The site should be monitored for habitat changes from browse or changing water levels.

Wild blue lupine (*Lupinus perennis*) in Dauphin County
Photo: PA Science Office of The Nature Conservancy

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

WEST HANOVER TOWNSHIP

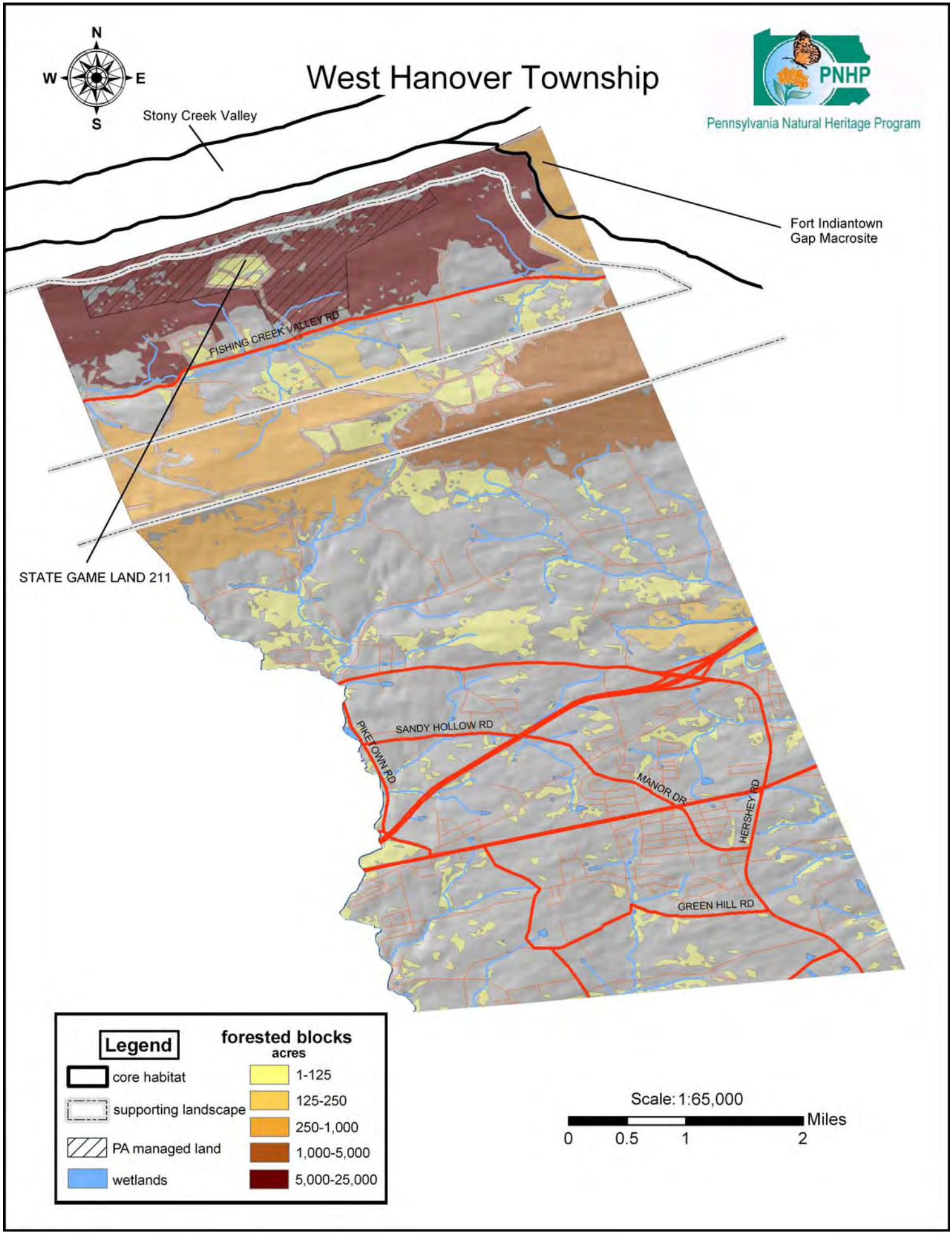
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Fort Indiantown Gap Macrosite (1)	Plant: American Holly *Ilex opaca*	G5	S2	PT	09-20-99	D
	Plant: Forked Chickweed *Paronychia fastigiata var. nuttalli*)	G5T3T5	S1S2	TU	09-08-99	C
	Animal: Earwig Scorpionfly *Merope tuber*	G3G5	SU	N	07-15-99	E
	Animal: Regal Fritillary *Speyeria idalia*	G3	S1	N	2005	AB
	Animal: Leonard's Skipper *Hesperia leonardus*	G4	S3S4	N	09-09-99	B
	Animal: Frosted Elfin Butterfly *Incisalia irus*	G3	S2	N	05-10-99	E
	Animal: A Hand-Maid Moth *Datana ranacaeps*	G3G4	S1	N	05-17-99	E
	Animal: Pine Barrens Zale Moth *Zale sp.1*	G3Q	S1	N	05-17-99	E
	Animal: Northern Myotis *Myotis septentrionalis*	G4	S3BS3N	CR	07-15-99	E
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	10-15-02	E
	Animal Species of Concern	G5	S3S4	N	06-22-98	E

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

Locally Significant: None

Managed Lands: State Game Land #211

WEST HANOVER TOWNSHIP MAP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E
S
West Hanover Township
PNHP
Pennsylvania Natural Heritage Program
Stony Creek Valley
Fort Indiantown Gap Macrosite
FISHING CREEK VALLEY RD
STATE GAME LAND 211
SANDY HOLLOW RD
PIKETOWN RD
MANOR DR
HERSHEY RD
GREEN HILL RD
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:65,000
Miles
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WEST HANOVER TOWNSHIP

West Hanover Township transitions from the Kittatinny Ridge in the north to a mixture of agriculture and developed areas in the valley portion, bisected by interstate highway. Forested riparian corridors should be maintained where they remain, in particular along Beaver Creek at the western border of the Township. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. In addition, reforestation of creek and stream banks can help link larger forested blocks together, contributing to their utility as a natural wildlife corridor. Protection of the continuous forested ridge along Blue Mountain is critical to maintaining this area as a wildlife corridor and to protecting the water quality of the headwater streams flowing into the valley below.

FORT INDIANTOWN GAP MACROSITE—UPDATED—(East Hanover and West Hanover Townships and Lebanon County)

This site is a valley located between Blue Mountain and Second Mountain on both sides of the Dauphin/Lebanon county line. Historically, parts of the valley were kept open by wildfires and other disturbance. In recent times, the valley has been used as a military reservation. Bombing and other exercises by the military have maintained an unusual, prairie-like habitat in parts of the valley. Currently the Fort is a mosaic of second-growth mixed oak and conifer forests, woodlands, open areas dominated by little bluestem and other grasses, goldenrods, milkweeds, asters, and blueberries. Surveys in 1999 revealed one poor population of **G5, S2 PA-Threatened American holly (*Ilex opaca*)** located in St. Pauls Cemetery Woods. This species is found in mixed-hardwood habitat and appears healthy despite evidence of repeated deer browse. Also located in 1999 in the Lebanon County portion of the site was a small population of **G5, S1S2 forked chickweed (*Paronychia fastigiata var. nuttalli*)** surviving in an area of frequent disturbance from military operations.

This site includes the Manada Creek Woods, an upland forest growing on a well-drained, shaly soil on the east side of Manada Creek. Another poor-quality population of **G5, S2 PA-Threatened American holly (*Ilex opaca*)** occurs at the site. Associated tree and shrub species are red oak, white oak, red maple, black-gum, hemlock, witch-hazel, serviceberry, highbush blueberry, and mountain laurel.

Evidence of the **G3G4, S3 PA-Threatened Allegheny woodrat (*Neotoma magister*)** was found in this area during surveys in 1999 and was confirmed again more recently in 2002. Evidence of extant populations was found at 10 locations along Second Mountain, including areas within the Fort Indiantown Gap site and extending into Lebanon County. This species utilizes rocky outcrops along the ridgetop.

Populations of three rare animal species occur together in the open habitats within the Fort. One of these is the **G3, S1 regal fritillary (*Speyeria idalia*)**, and the Fort Indiantown Gap population is one of only two populations known to remain east of the Mississippi. This species has very specific habitat requirements, and has been found at several separate locations in the Gap where pockets of appropriate early-successional habitat exists. Larval forms of this species depend exclusively upon arrow-leaved violet for food, and butterfly-weed is the preferred nectar plant for the adults, although other flowers may also be used. Associated with the regal fritillary in the old field habitats are the **G4, S3S4 Leonard's skipper (*Hesperia leonardus*)** and the **G3, S2 frosted elfin butterfly (*Incisalia irus*).**

An individual **G4, S3BS3N northern myotis (*Myotis septentrionalis*)** was captured within the training center, but the relationship of this location to a maternity site or roost is unknown. A

survey of nocturnal insects with blacklight traps yielded several rare species. A **G3G4, S1 hand-maid moth (*Datana ranacaeps*)** was the first documented occurrence in Pennsylvania in many decades. The host plant for this moth appears to be Lyonia ligustrina; it was found in woods adjacent to a large disturbed opening. Another moth species, the **G3, S1 Pine barrens Zale moth (*Zale* sp. 1)** was located in a wooded area abundant with scrub oak, the host plant for the larval form. The first Pennsylvania record of the **G3G5, SU earwig scorpionfly (*Merope tuber*)** was also captured in the black lights at Fort Indiantown Gap.

Threats and Disturbances:

Some recent human disturbances at FIG have benefited the species of concern, while others have eliminated sites for the species. Exotic species, particularly spotted knapweed, and natural succession to forest are also threats to the habitat and therefore to the listed species.

Conservation Recommendations:

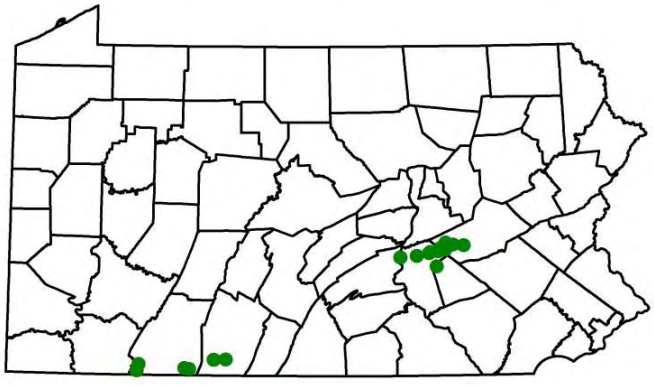
The persistence of the regal fritillary and associated species in the human-managed habitats of Fort Indiantown Gap depends upon maintaining the food plants used by both the larval and adult forms. To do this requires controlling the amount and type of disturbance to the early-successional habitat to favor the survival of the species of concern and its food plants. The Nature Conservancy is working with the Fort Indiantown Gap National Guard Training Center facility managers to actively manage the habitats of the regal fritillary and assess how future military operations might coexist with and facilitate the survival of the rare species at this site.

A Northern long-eared bat (*Myotis septentrionalis*) a G4, S3 animal species of concern captured in a mist net along a stream at Fort Indiantown Gap. Photo: PA Science Office of The Nature Conservancy

Minniebush (*Menziesia pilosa*)

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

Photo: Aura Stauffer



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

WICONISCO TOWNSHIP, LYKENS BOROUGH

Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Bear Mountain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	06-2001	B
	Animal: Allegheny Woodrat *Neotoma magister*	G3G4	S3	PT	05-29-02	E
Bear Swamp (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	09-17-98	D
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	06-12-97	B

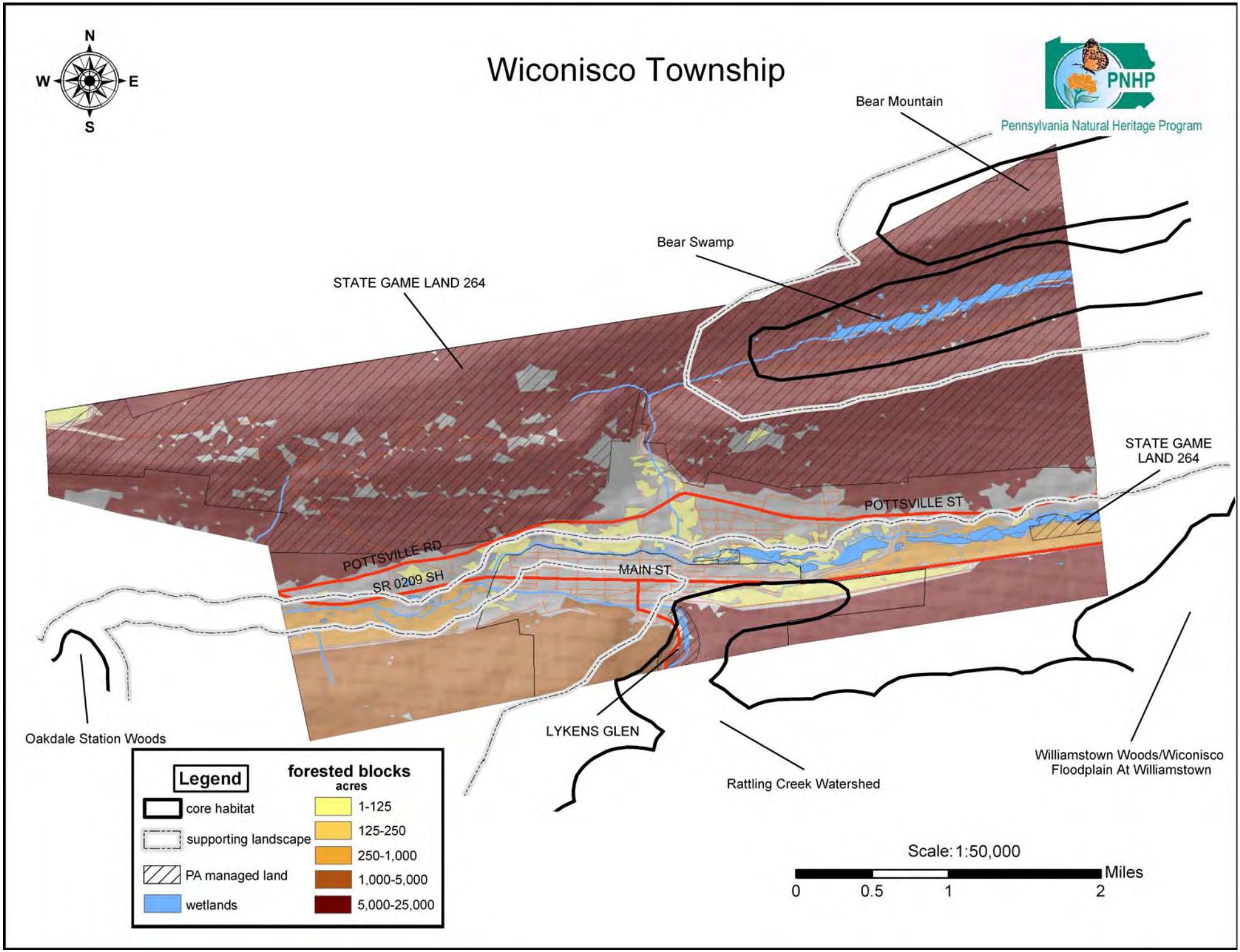
* Please refer to Appendix IV for an explanation of PNHP Ranks and State Status.
**Please refer to Appendix V for an explanation of Quality Ranks.

Locally Significant: None

Managed Lands: State Game Land #264
Lykens Glen

Wiconisco Township supports large forested ridges tucked around the Wiconisco Creek floodplain. The northern forested ridge is almost entirely withiin State Game Lands #264, whereas the southern forest remains private land. Protection of these forested ridgelines are critical to the water quality of the creek and its tributaries. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. Floodplain wetlands along the Wiconisco contribute to the maintenance of water quality and flow. Additionally, protection of the continuous forested ridge along Blue Mountain is critical to maintaining this area as a wildlife corridor.

WICONISCO TOWNSHIP MAP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Wiconisco Township
PNHP
Pennsylvania Natural Heritage Program
Bear Mountain
Bear Swamp
STATE GAME LAND 264
STATE GAME LAND 264
POTTSVILLE ST
POTTSVILLE RD
SR 0209 SH
MAIN ST
Oakdale Station Woods
LYKENS GLEN
Rattling Creek Watershed
Williamstown Woods/Wiconisco Floodplain At Williamstown
Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000
Scale: 1:50,000
Miles
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0.5
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2

BEAR MOUNTAIN—NEW—(Lykens, Wiconisco and Williams Townships & Schuylkill County)

In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain. This shrub, related to blueberries, has a very limited distribution in Pennsylvania. It occupies the slopes of northern Dauphin and western Schuylkill Counties, as well as the southern mountains of Bedford and Somerset Counties. This species occurs scattered sparingly from Georgia, where it is considered critically imperiled, through the Smoky Mountains of Tennessee, to the northernmost limit of its range in Pennsylvania. The canopy tree species at this site included chestnut oak, black oak, black birch, black gum, red maple, eastern hemlock, and sassafras. Associated shrub species include mountain laurel, black huckleberry, dangleberry, beaked hazelnut, striped maple, and American chestnut tree sprouts. The dry oak-heath woods of these slopes have seen recent logging activity, which seems to have benefited this plant's growth. No threats are evident and no special management appears to be needed.

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

BEAR SWAMP (Wiconisco and Williams Townships)

This site includes wetlands and riparian areas along a two-mile stretch of Bear Creek in the valley between Bear Mountain and Big Lick Mountain. A mosaic of wetlands including shrub swamp, forested swamp, emergent marsh, and seepage areas occur in two places where Bear Creek meanders and divides into secondary channels. Beaver may have been responsible for the open herbaceous character of some of these wetlands. Shrub swamp areas are dominated by highbush blueberry, alder, viburnums, and red maple with lush mats of sedges and wetland grasses. The forested swamps are dominated by red maple with black gum and highbush blueberry. Emergent marsh, mostly found at the extreme east end of the site, is dominated by cattail, rushes, and the notoriously invasive common reed. This site supports a poor quality population of **minniebush (*Menziesia pilosa*).** Also occurring here are over 400 individuals of formerly-listed golden club (*Orontium aquaticum*), widely scattered over the site in 1997.

Management Recommendations:

Although this isolated valley is still recovering from the legacy of mining, these wetlands are in relatively good shape. Additionally, this site and the adjacent woods are excellent habitat for a wide variety of other more common plants and animals. This site will benefit from being left to recover without further manipulation. Bear Swamp is entirely within State Game Lands #264.

WILLIAMS TOWNSHIP, WILLIAMSTOWN BOROUGH

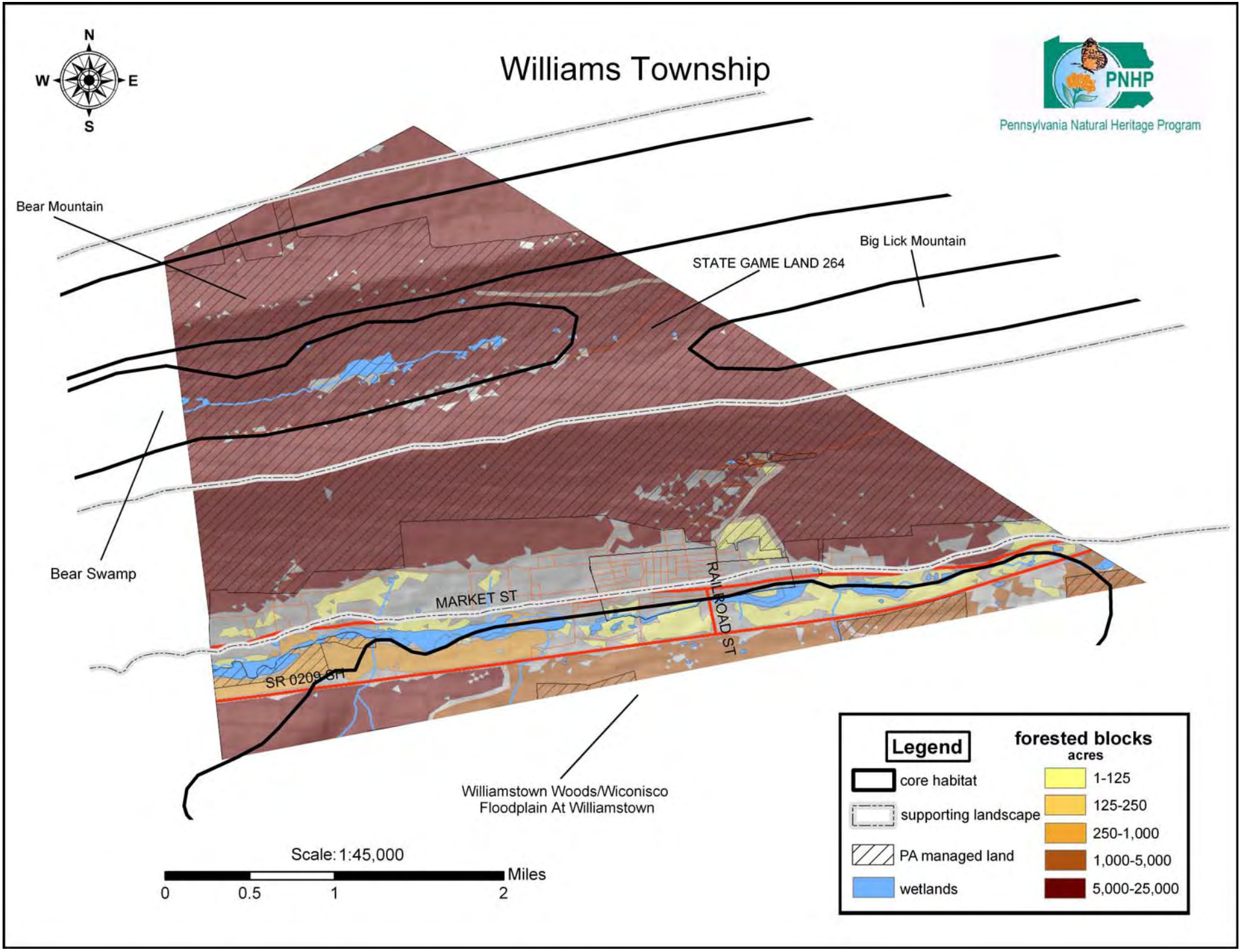
Site Name (County Rank)	Special Species / Community Type	PNHP Ranks* Global	PNHP Ranks* State	State Status	Last Seen (m-d-y)	Quality**
Bear Mountain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	06-2001	B
	Animal: Allegheny Woodrat Neotoma magister	G3G4	S3	PT	05-29-02	E
Bear Swamp (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	09-17-98	D
	Plant: Golden Club *Orontium aquaticum*	G5	S4	DL	06-12-97	B
Big Lick Mountain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	06-2001	B
Williamstown Woods/ Wiconisco Creek Floodplain (4)	Plant: Minniebush *Menziesia pilosa*	G4G5	S3	PR	10-15-98	BC
	Plant: Showy goldenrod *Solidago speciosa var. speciosa*	G5T5?	S?	N	10-04-97	CD
	Plant: Yellow-fringed orchid *Platanthera ciliaris*	G5	S2	TU	08-05-98	BC

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

Locally Significant: None

Managed Lands: State Game Land #264
Weiser State Forest

WILLIAMS TOWNSHIP MAP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Williams Township
PNHP
Pennsylvania Natural Heritage Program
Bear Mountain
Big Lick Mountain
STATE GAME LAND 264
Bear Swamp
MARKET ST
RAILROAD ST
SR 0209 BH
Williamstown Woods/Wiconisco
Floodplain At Williamstown
Scale: 1:45,000
Miles
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0.5
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Legend
core habitat
supporting landscape
PA managed land
wetlands
forested blocks
acres
1-125
125-250
250-1,000
1,000-5,000
5,000-25,000

WILLIAMS TOWNSHIP

Williams Township supports large forested ridges tucked around the Wiconisco Creek floodplain. The northern forested ridge is almost entirely withiin State Game Lands #264, whereas the southern forest remains private land. Protection of these forested ridgelines are critical to the water quality of the creek and its tributaries. Forested buffers help filter surface water runoff, preventing many non-point sources of pollution from entering waterways, protecting water quality in the township and the Susquehanna River basin. Floodplain wetlands along the Wiconisco contribute to the maintenance of water quality and flow. Additionally, protection of the continuous forested ridge along Blue Mountain is critical to maintaining this area as a wildlife corridor.

BEAR MOUNTAIN—NEW—(Wiconisco and Williams Townships & Schuylkill County)

In 2001 a fair-quality population of a G4G5, S3 PA-Rare plant species, **minniebush (*Menziesia pilosa*)** was found on several acres along the roads and slopes of Bear Mountain. This shrub, related to blueberries, has a very limited distribution in Pennsylvania. It occupies the slopes of northern Dauphin and western Schuylkill Counties, as well as the southern mountains of Bedford and Somerset Counties. This species occurs scattered sparingly from Georgia, where it is considered critically imperiled, through the Smoky Mountains of Tennessee, to the northernmost limit of its range in Pennsylvania. The canopy tree species at this site included chestnut oak, black oak, black birch, black gum, red maple, hemlock, and sassafras. Associated shrub species include mountain laurel, black huckleberry, dangleberry, beaked hazelnut, striped maple, and American chestnut tree sprouts. The dry oak-heath woods of these slopes have seen recent logging activity, which seems to have benefited this plant's growth. No threats are evident and no special management appears to be needed.

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

BEAR SWAMP (Wiconisco and Williams Townships)

This site includes wetlands and riparian areas along a two-mile stretch of Bear Creek in the valley between Bear Mountain and Big Lick Mountain. A mosaic of wetlands including shrub swamp, forested swamp, emergent marsh, and seepage areas occur in two places where Bear Creek meanders and divides into secondary channels. Beaver may have been responsible for the open herbaceous character of some of these wetlands. Shrub swamp areas are dominated by highbush blueberry, alder, viburnums, and red maple with lush mats of sedges and wetland grasses. The forested swamps are dominated by red maple with black gum and highbush blueberry. Emergent marsh, mostly found at the extreme east end of the site, is dominated by cattail, rushes, and the notoriously invasive common reed. This site supports a poor quality population of **minniebush (*Menziesia pilosa*).** Also occurring here are over 400 individuals of formerly-listed golden club (*Orontium aquaticum*), widely scattered over the site in 1997. Although this isolated valley is still recovering from the legacy of mining, these wetlands are in relatively good shape. Additionally, this site and the adjacent woods are excellent habitat for a wide variety of other more common plants and animals. This site will benefit from being left to recover without further manipulation. Bear Swamp is entirely within State Game Lands #264.

BIG LICK MOUNTAIN—NEW—(Williams Township & Schuylkill County)

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

WILLIAMSTOWN WOODS/WICONISCO FLOODPLAIN AT WILLIAMSTOWN (Jackson, Jefferson, and Williams Townships)

Williamstown Woods consists of a 3.5-mile rectangular block situated on the lower north slope of Berry Mountain between Wiconisco and Tower City. Except for a small private tract, the area is contained within the Weiser State Forest. The terrain is rugged, consisting of steep rocky slopes broken here and there by small gaps that are drained by intermittent or small permanent streamlets that flow into Wiconisco Creek. The predominant vegetation is upland mixed hardwood-heath forest. A fair to good population of **G4G5, S3 minniebush (*Menziesia pilosa*)** inhabits the margins of the streamlets and rocky places, especially talus slopes, in the gaps. This species is well established and should do well over the long term, although it is currently suffering from excessive deer browse. A fair population of **yellow-fringed orchid (*Platanthera ciliaris*)** occupies a portion of the site where a powerline/pipeline ROW was established in the recent past. The habitat here is the result of disturbance, but provides the proper environmental conditions- full sun, damp or seepy, acidic soil, and an early successional state-that the plant requires. Also found at this site is a fair population of the **showy goldenrod (*Solidago speciosa var. speciosa*)**, occurring in the floodplain in a mix of open, overgrown former sand quarries.

Threats and Disturbances:

The succession of woody plants in the formerly more open habitat is shading these plants and inhibiting their reproduction.

GLOSSARY

anthropogenic - human caused.

ATV - all-terrain-vehicle.

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

canopy - the layer formed by the tallest vegetation.

circumneutral - pH between 5.5 and 7.

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

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

DCNR - Pennsylvania Department of Conservation and Natural Resources.

DEP - Pennsylvania Department of Environmental Protection.

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

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.

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

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

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

extant - currently in existence.

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

forb - non-grass herbaceous plant such as goldenrod.

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

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

hibernacula – a location where animals hibernate.

High-Quality Coldwater Fisheries (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 Special Protection Waters Implementation Handbook (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, the shoreline.

mesic - moist, not saturated.

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

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

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

POSCIP - Plant of Special Concern in Pennsylvania

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

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

riparian - streamside

rookery – the breeding ground of certain birds or animals, such as herons, penguins, and seals.

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.

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

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

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

TNC – The Nature Conservancy

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

upland – sites with well-drained dry to mesic soils.

wetland – are intermediate between aquatic and terrestrial habitats; characterized by a predominance of hydrophytes, where conditions are at least periodically wet enough, during the growing season, to produce anaerobic soil conditions and thereby influence plant growth.

vernal – occurring in the spring.

xeric - extremely dry or droughty.

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Appendix I: Natural Area Survey Form

Surveyor: Address & Phone:

Date of Observation_____Site Name:

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

Owner:
Owners Attitude Toward Conservation:

Site Elevation:_____ Size of Site (acres):

Source of Lead:

Current Land Use:

Type of Area: __Old Growth Forest; __Marsh; __Shrub Swamp;
__Forested Swamp; __Bog; __Natural Pond.

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

Evidence of Disturbance:

Site Condition Compared to Your Last Visit:

Please attach any additional information, species list, etc.
Please send completed report forms to Pennsylvania Science Office
of The Nature Conservancy, 208 Airport Drive, Middletown, PA 17057
(717) 948-3962. Additional forms may be obtained from this
office. Thank you for your contribution.

Appendix II: Community Classification

CLASSIFICATION OF NATURAL COMMUNITIES IN PENNSYLVANIA (Fike 1999)

Community Name	State Rank
Terrestrial Forests	
CONIFEROUS TERRESTRIAL FORESTS:	
Hemlock (white pine) forest	S4
CONIFER – BROADLEAF TERRESTRIAL FORESTS	
Serpentine pitch pine - oak forest	S1
Serpentine Virginia pine - oak forest	S1
Pitch pine - mixed oak forest	S4
Virginia pine - mixed hardwood forest	S5
Dry white pine (hemlock) - oak forest	S4
Hemlock (white pine) - northern hardwood forest	S5
Hemlock (white pine) - red oak - mixed hardwood forest	S4
Hemlock - tuliptree - birch forest	S4
Rich hemlock - mesic hardwood forest	S2S3
BROADLEAF TERRESTRIAL FORESTS	
Dry oak - heath forest	S4S5
Dry oak - mixed hardwood forest	S3
Red oak - mixed hardwood forest	S5
Northern hardwood forest	S4
Black cherry - northern hardwood forest	S4
Tuliptree - beech -maple forest	S4
Sugar maple - basswood	S4
Mixed mesophytic forest	S1S2
Sweet gum - oak coastal plain forest	S1
Red maple (terrestrial) forest	S5
Black-gum Ridgetop forest	S3
Aspen/gray (paper) birch forest	S3 NOT TRACKED
Palustrine Forests	
CONIFEROUS PALUSTRINE FORESTS	
Black spruce - tamarack peatland forest	S3
Red spruce palustrine forest	S3
Hemlock palustrine forest	S3
CONIFER – BROADLEAF PALUSTRINE FORESTS	
Hemlock - mixed hardwood palustrine forest	S3S4
Red spruce - mixed hardwood palustrine forest	S3
BROADLEAF PALUSTRINE FORESTS	
Bottomland oak - hardwood palustrine forest	S2
Red maple - black-gum palustrine forest	S3S4
Red maple - black ash palustrine forest	S2S3
Red maple - magnolia Coastal Plain palustrine forest	S1
Great Lakes Region lakeplain palustrine forest	S1
Sycamore - (river birch) - box-elder floodplain forest	S3
Silver maple floodplain forest	S3
Red maple - elm - willow floodplain swamp	S2
Terrestrial Woodlands	

CONIFEROUS WOODLANDS	
Pitch pine - heath woodland	S2
Pitch pine - scrub oak woodland	S2S3
Red spruce rocky summit	S1
Pitch pine - rhodora - scrub oak woodland	S1
CONIFER – BROADLEAF TERRESTRIAL WOODLANDS	
Pitch pine - mixed hardwood woodland	S2S3
Virginia pine - mixed hardwood shale woodland	S2
Red-cedar - mixed hardwood rich shale woodland	S1S2
BROADLEAF – TERRESTRIAL WOODLANDS	
Dry oak - heath woodland	S3
Birch (black-gum) rocky slope woodland	S2
Yellow oak - redbud woodland	S2
Great Lakes Region scarp woodland	S1S2
Great Lakes Region bayberry - cottonwood community	S1
Palustrine Woodlands	
CONIFEROUS PALUSTRINE WOODLANDS	
Pitch pine - leatherleaf palustrine woodland	S1
Black spruce - tamarack palustrine woodland	S2
Red spruce palustrine woodland	S2S3
BROADLEAF PALUSTRINE WOODLANDS	
Red maple - highbush blueberry palustrine woodland	S4
Red maple - sedge palustrine woodland	S4
Red maple - mixed shrub palustrine woodland	S4
Terrestrial Shrublands	
CONIFEROUS TERRESTRIAL SHRUBLANDS	
Red-cedar - prickly pear shale shrubland	S2
Red-cedar - pine serpentine shrubland	S1
CONIFER – BROADLEAF TERRESTRIAL SHRUBLANDS	
Red-cedar - redbud shrubland	S2
BROADLEAF TERRESTRIAL SHRUBLANDS	
Low heath shrubland	S1
Low heath - mountain ash shrubland	S2
Scrub oak shrubland	S3
Rhodora - mixed heath - scrub oak shrubland	S1
Palustrine Shrublands	
BROADLEAF PALUSTRINE SHRUBLANDS	
Buttonbush wetland	S4
Alder - ninebark wetland	S3
Alder - sphagnum wetland	S4
Highbush blueberry - meadow-sweet wetland	S5
Highbush blueberry - sphagnum wetland	S5
Leatherleaf - sedge wetland	S3
Leatherleaf - bog rosemary peatland	S2
Leatherleaf - cranberry peatland	S2S3
Water-willow (Decodon verticillatus) shrub wetland	S3
River birch - sycamore floodplain scrub	S4
Black willow scrub/shrub wetland	S4
Poison sumac - red-cedar - bayberry fen	S1
Buckthorn - sedge (Carex interior) - golden ragwort fen	S1
Great Lakes Region scarp seep	S1

Great Lakes Region bayberry - mixed shrub palustrine shrubland	S1
Terrestrial Herbaceous Openings	
Little bluestem - Pennsylvania sedge opening	S2
Side-oats gramma calcareous grassland	S1
Calcareous opening/cliff	S2
Serpentine grassland	S1
Serpentine gravel forb community	S1
Great Lakes Region dry sandplain	S1
Great Lakes Region sparsely vegetated beach	S1
Herbaceous Wetlands	
PERSISTENT EMERGENT WETLANDS	
Bluejoint - reed canary grass marsh	S5
Cattail marsh	S5
Tussock sedge marsh	S3
Mixed forb marsh	S3
Herbaceous vernal pond	S3S4
Wet meadow	S5 NOT TRACKED
Bulrush marsh	S3
Great Lakes Region palustrine sandplain	S1
Prairie sedge - spotted joe-pye-weed marsh	S1S2
Open sedge (Carex stricta, C. prairea, C. lacustris) fen	S1
Golden saxifrage - sedge rich seep	S2
Skunk cabbage - golden saxifrage forest seep	S4S5
Serpentine seepage wetland	S1
Golden saxifrage - Pennsylvania bitter-cress spring run	S3S4
Sphagnum - beaked rush peatland	S3
Many fruited sedge - bladderwort peatland	S2
Water-willow (Justicia americana) - smartweed riverbed community	S4
Riverside ice scour community	S1S2
Big bluestem - Indian grass river grassland	S3
NON-PERSISTENT EMERGENT WETLANDS	
Pickerel-weed - arrow-arum - arrowhead wetland	S4
Spatterdock - water lily wetland	S4
Community Complexes	
ACIDIC GLACIAL PEATLAND COMPLEX	
GREAT LAKES REGION SCARP COMPLEX	
ERIE LAKESHORE BEACH - DUNE - SANDPLAIN COMPLEX	
MESIC TILL BARRENS COMPLEX	
SERPENTINE BARRENS COMPLEX	
RIDGETOP ACIDIC BARRENS COMPLEX	
RIVER BED - BANK - FLOODPLAIN COMPLEX	

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

Appendix III: Field Survey Form

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

SNAME: **EOCODE:**

SURVEYDATE:

SITENAME:

SOURCECODE

SURVEYSITE: **SURVEYOR:**

SPECIMEN REPOSITORY:

Locational Information QUADCODE DOTNUM
TEN,TEN COUNTYCODE TOWNSHIP

LAT:

LONG:

DIRECTIONS:

Global **PA EORANK:**
EORANK
COMMENTS:

DATA:

HABITAT
DESCRIPTION:

MISCELLANEOUS:

DATA SENSITIVITY: **OWNERCODE**

REASON FOR DATA **OWNER**
SENSITIVITY:

HABITAT SKETCH:

Appendix IV: PNHP Ranks, Federal and State Status

FEDERAL AND STATE STATUS AND THE PENNSYLVANIA NATURAL HERITAGE PROGRAM RANKS

FEDERAL STATUS

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

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

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

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

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

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

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

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

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

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

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

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

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

STATE STATUS - NATIVE PLANT SPECIES

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

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

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

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

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

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

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

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

STATE STATUS - ANIMALS

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

PE - Pennsylvania Endangered

Game Commission - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are:

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

Fish and Boat Commission - Endangered Species are all species and subspecies:

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

PT - Pennsylvania Threatened

Game Commission - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the causal factors affecting the organism are abated. These are:

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

Fish and Boat Commission - Threatened Species are all species and subspecies:

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

APPENDIX IV (continued)

PNHP 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.

PNHP STATE ELEMENT RANKS

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

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

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

S4 = Apparently secure in state, with many occurrences.

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

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

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

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

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

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

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

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

SX = Apparently extirpated from the state.

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

Appendix V: **Pennsylvania Element Occurrence Quality Ranks**

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

*Intermediate ranks may also be assigned.

Appendix VII: Plants And Animals Of Special Concern In Dauphin County

PLANTS

SCIENTIFIC NAME	COMMON NAME
Bartonia paniculata	screw-stem
Carex limosa	mud sedge
Carex typhina	cattail sedge
Cuscuta polygonorum	smartweed dodder
Dodecatheon radicatum	jeweled shooting-star
Eleocharis compressa	flat-stemmed spike rush
Ellisia nyctelea	ellisia
Eupatorium godfreyanum	Vasey's eupatorium
Eurybia radula	rough aster
Ilex opaca	American holly
Juncus biflorus	grass-leaved rush
Leucothoe racemosa	swamp dog-hobble
Ludwigia polycarpa	false loosestrife seedbox
Magnolia tripetala	umbrella magnolia
Menziesia pilosa	minniebush
Nelumbo lutea	American lotus
Orontium aquaticum	golden club
Paronychia fastigiata var. nuttallii	forked chickweed
Phyla lanceolata	lance fog-fruit
Platanthera ciliaris	yellow-fringed orchid
Platanthera peramoena	purple fringeless orchid
Rotala ramosior	tooth-cup
Rubus cuneifolius	sand blackberry
Rudbeckia fulgida	eastern coneflower
Ruellia strepens	limestone petunia
Scheuchzeria palustris	pod-grass
Scirpus ancistrochaetus	northeastern bulrush
Solidago speciosa var. speciosa	showy goldenrod

ANIMALS

SCIENTIFIC NAME	COMMON NAME
Alasmidonta marginata	elktoe mussel
Alasmidonta undulata	triangle floater mussel
Boyeria grafiana	ocellated darner dragonfly
Caecidotea pricei	Price’s cave isopod
Casmerodius albus	Great Egret
Crotalus horridus	timber rattlesnake
Datana ranacaeps	a hand-maid moth
Falco peregrinus	Peregrine Falcon

Gomphus quadricolor	rapids clubtail dragonfly
Haliaeetus leucocephalus	Bald Eagle
Hesperia leonardus	Leonard's skipper
Heterodon platirhinos	eastern hognose snake
Incisalia irus	frosted elfin butterfly
Lampsilis cariosa	yellow lampmussel
Lasmigona subviridis	green floater mussel
Merope tuber	earwig scorpionfly
Myotis septentrionalis	northern myotis
Neotoma magister	Allegheny woodrat
Nyctanassa violacea	Yellow-crowned Night-heron
Nycticorax nicticorax	Black-crowned Night-heron
Speyeria idalia	regal fritillary
Papaipema sp. 1	flypoison borer moth
Somatochlora linearis	mocha emerald dragonfly
Stygobromus allegheniensis	Allegheny cave amphipod
Zale sp.1	Pine Barrens zale moth

NATURAL COMMUNITIES

Ephemeral/fluctuating natural pool
Floodplain forest
Mesic central forest
Northern Appalachian acidic cliff

Appendix VIII: Associated Species of Plants and Animals Referenced in Site Descriptions for Dauphin County

Common Name	Scientific Name
Acadian Flycatcher	*Empidomax virescens*
Alder	*Alnus serrulata*
Alum Root	*Heuchera americana*
American Chestnut	*Castanea dentata*
American Redstart	*Setophaga ruticilla*
Arrow-Arum	*Peltandra virginica*
Arrowhead	*Saggitaria latifolia*
Arrow-Leaved Violet	*Viola sagittata*
Arrow-Wood	*Viburnum recognitum*
Asters	*Aster spp.*
Autumn-Bent	*Agrostis perennans*
Azalea	*Rhododendron viscosum*
Basswood	*Tilia americana*
Bayberry	*Myrica pennsylvanica*
Beaked Hazelnut	*Corylus cornuta*
Black Birch	*Betula lenta*
Black Huckleberry	*Gaylussacia baccata*
Black Oak	*Quercus velutina*
Black Vulture	*Coragyps atratus*
Black-And-White Warbler	*Mniotilta varia*
Blackberry	*Rubus alleghaniensis*
Black-Gum	*Nyssa sylvatica*
Black-Throated Green Warbler	*Dendroica virens*
Bladdernut	*Staphylea trifolia*
Bloodroot	*Sanguinaria canadense),*
Bluebells	*Mertensia virginiana*
Blueberries	*Vaccinium spp.*
Blue-Gray Gnatcatcher	*Polioptila caerulea*
Blue-Headed Vireo	*Vireo solitarius*
Boneset	*Eupatorium perfoliatum*
Bulrush	*Scirpus polyphyllus*
Bulrushes	*Cyperus spp.*
Bur-reed	*Sparganium eurycarpum*
Bush-Honeysuckle	*Diervilla lonicera*
Butterfly-Weed	*Asclepias tuberosa*
Buttonbush	*Cephalanthus occidentalis*
Cardinal Flower	*Lobelia cardinalis*
Cattail	*Typha latifolia*
Chestnut Oak	*Quercus montana*
Cinnamon Fern	*Osmunda cinnamomea*
Cliff-Brake	*Pellaea atropurpurea*
Columbine	*Aquilegia canadensis*
Common Bladder-Fern	*Cystopteris fragilis*
Common Reed	*Phragmites australis*

Common Name	Scientific Name
Common Yellowthroat	*Geothylpis trichas*
Coville's Rush	*Juncus gymnocarpus*
Cutgrass	*Leersia virginica*
Cutleaf Toothwort	*Dentaria laciniata*
Dangleberry	*Gaylussacia frondosa*
Deerberry	*Vaccinium stamineum*
Deer-tongue Grass	*Panicum clandestinum*
Deer-Tongue Grass	*Panicum clandestinum*
Dutchman's Breeches	*Dicentra cucullaria*
Dwarf St. John's-wort	*Hypericum mutilum*
Early Saxifrage	*Saxifrga virginiensis*
Eastern Elliptio	*Elliptio complanata*
Eastern Hemlock	*Tsuga canadensis*
Elderberry	*Sambucus canadensis*
False Mermaid Weed	*Floerkea proserpinacoides*
Floating Mannagrass	*Glyceria septentrionalis*
Fly-Poison	*Amianthium muscaetoxicum*
Fragile Fern	*Cystopteris tenuis*
Garden Loosestrife	*Lysimachia vulgaris*
Garlic Mustard	*Alliaria officinalis*
Goldenrods	*Solidago spp.*
Gooseberry	*Ribes cynosbati*
Gray Catbird	*Dumetella carolinensis*
Greenbriar	*Smilax rotundifolia*
Halberd-Leaved Tearthumb	*Polygonum arifolium*
Hay-Scented Fern	*Dennstaedtia punctilobula*
Hazelnut	*Corylus americana*
Hemlock Woolly Adelgid	*Adelges tsugae*
Hepatica	*Hepatica americana*
Highbush Blueberry	*Vaccinium corymbosum*
Hop-Hornbeam	*Ostrya virginiana*
Huckleberry	*Gaylussacia spp.*
Hydrangea	*Hydrangea spp.*
Interrupted Fern	*Osmunda claytoniana*
Iris	*Iris versicolor*
Jack-In-The-Pulpit	*Arisaema triphyllum*
Japanese Honeysuckle	*Lonicera japonica*
Japanese Knotweed	*Polygonum cuspidatum*
Jewelweed	*Impatiens spp.*
Late Goldenrod	*Solidago altissima*
Little Bluestem	*Shizachyrium scoparium*
Liverwort	*Conecephalum conicum*
Lizard's-Tail	*Saururus cernuus*
Low-Sweet Blueberry	*Vaccinium angustifolium*
Lyre-Leaved Rockcress	*Arabis lyrata*
Maidenhair Spleenwort	*Asplenium trichomanes*
Maleberry	*Lyonia ligustrina*

Common Name	Scientific Name
Mannagrass	*Glyceria spp.*
Maple-Leaved Viburnum	*Viburnum acerifolium*
Marginal Shield Fern	*Dryopteris marginalis*
Marsh-Gentian	*Sabatia angularis*
Meadow-Beauty	*Rhexia virginica*
Meadowsweet	*Spirea latifolia*
Mile-A-Minute Weed	*Polygonum perfoliatum*
Milkweeds	*Asclepias spp.*
Mossy Stonecrop	*Sedum acre*
Mountain Laurel	*Kalmia latifolia*
Multiflora Rose	*Rosa multiflora*
Ninebark	*Physocarpus opulifolius*
Norway Maple	*Acer platanoides*
Ostrich Fern	*Matteuccia struthiopteris*
Ovenbird	*Seiurus aurocapillus*
Panic Grass	*Panicum microcarpon*
Pawpaw	*Asimina triloba*
Pin Oak	*Quercus palustris*
Pinxter-Flower	*Rhododendron periclymenoides*
Poison Ivy	*Toxicodendron radicans*
Poison Sumac	*Toxicodendron vernix*
Poverty Grass	*Danthonia spicata*
Purple Loosestrife	*Lythrum salicaria*
Ragwort	*Senecio obovatus*
Raven	*Corvus corax*
Red Maple	*Acer rubrum*
Red Oak	*Quercus rubra*
Red-Eyed Vireo	*Vireo olivaceus*
Red-Tailed Hawk	*Buteo jamaicensis*
Red-top Panic Grass	*Panicum agrostoides*
Reed Canary-Grass	*Phalaris arundinacea*
Reedgrass	*Calamagrostis cinnoides*
Rhododendron	*Rhododendron spp.*
Rice cutgrass	*Leersia oryzoides*
Rock Polpody	*Polypodium virginianum*
Rosebay	*Rhododendron maximum*
Round-Leaved Hare's Bells	*Campanula rotundifolia*
Round-Leaved Sundew	*Drosera rotundifolia*
Royal Fern	*Osmunda regalis*
Sassafras	*Sassafras albidum*
Scarlet Tanager	*Piranga olivacea*
Scattered Winterberry	*Ilex verticillata*
Sedges	*Carex spp.*
Sedges	*Cyperus spp.*
A Sedge	*Carex folliculata*
A Sedge	*Carex gynandra*
A Sedge	*Carex hystericina*

Common Name	Scientific Name
A Sedge	*Carex intumescens*
A Sedge	*Carex lupulina*
A Sedge	*Carex lurida*
Sensitive Fern	*Onoclea sensibilis*
Serviceberry	*Amelanchier spp.*
Short Hair Sedge	*Carex crinita*
Silver Maple	*Acer saccharinum*
Slender Mannagrass	*Glyceria melicaria*
Smooth Alder	*Alnus serrulata*
Southern Agrimony	*Agrimonia parviflora*
Southern Arrow-wood	*Viburnum dentatum*
Spatulate-Leaved Sundew	*Drosera intermedia*
Sphagnum	*Sphagnum spp.*
Spicebush	*Lindera benzoin*
Spike-Rush	*Eleocharis acicularis*
Spotted Knapweed	*Centaurea maculata*
Squawfoot	*Strophitus undulatus*
St. John's Wort	*Hypericum mutilum*
Stilt Grass	*Microstegium vimineum*
Striped Maple	*Acer pensylvanicum*
Swamp Candles	*Lysimachia terrestris*
Swamp Dewberry	*Rubus hispidus*
Swamp-White Oak	*Quercus bicolor*
Switch Grass	*Panicum virgatum*
Table-Mountain Pine	*Pinus pungens*
Tearthumb	*Polygonum sagittatum*
Three-Way Sedge	*Dulichium arundinaceum*
Tree-Of-Heaven	*Ailanthus altissima*
Tulip Poplar	*Liriodendron tulipifera*
Turkey Vulture	*Cathartes aura*
Turtlehead	*Chelone glabra*
Virginia Chain-Fern	*Woodwardia virginica*
Virginia Creeper	*Parthenocissus quinquefolia*
Virginia Pine	*Pinus virginiana*
Water Horsetail	*Equisetum fluviatile*
Water Smartweed	*Polygonum spp.*
Waterleaf	*Hydrophyllum spp.*
Water-Willow	*Decodon verticillatus*
White Oak	*Quercus alba*
White Pine	*Pinus strobus*
White Wood Aster	*Aster divaricatus*
Whorled Loosestrife	*Lysimachia quadrifolia*
Wild Grape	*Vitis spp.*
Wild Sarsparilla	*Aralia nudicaulis*
Wineberry	*Rubus phoenicolasius*
Winterberry Holly	*Ilex verticillata*
Witch-Hazel	*Hamamelis virginiana*

Common Name	Scientific Name
Wood Thrush	*Hylocichla mustelina*
Woolly Bulrush	*Scirpus cyperinus*
Worm-Eating Warbler	*Helmitheros vermivorous*
Yellow Birch	*Betula alleghaniensis*
Yellow-Eyed-Grass	*Xyris difformis*

Fact Sheets
for Selected Species of Dauphin County