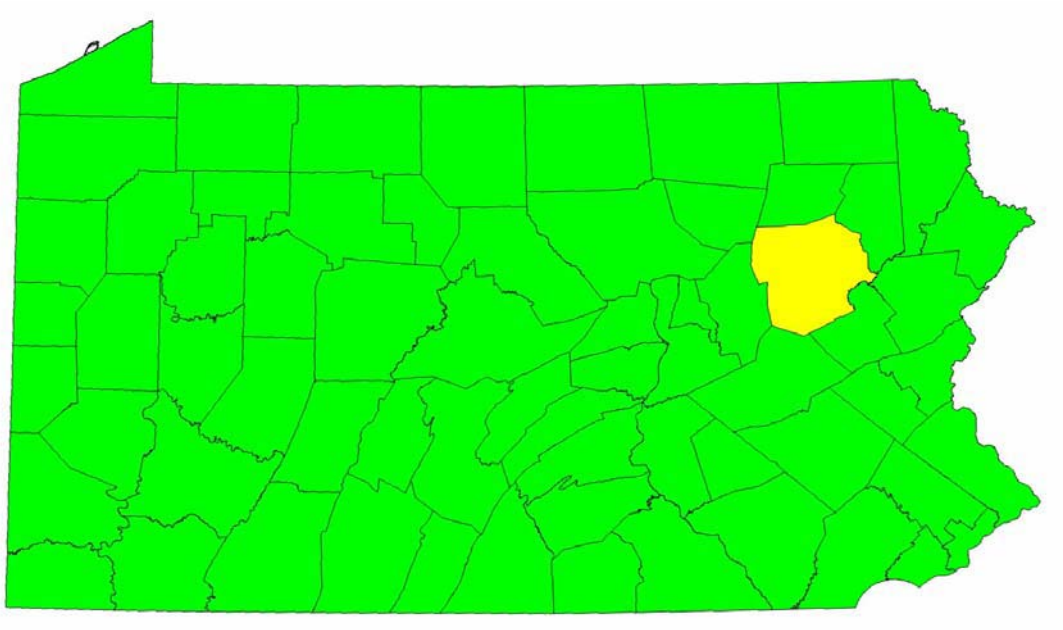
A NATURAL AREAS INVENTORY
LUZERNE COUNTY, PENNSYLVANIA

Update – 2006



Prepared By:

Pennsylvania Natural Heritage Program
Western Pennsylvania Conservancy
208 Airport Drive
Middletown, Pennsylvania 17057

Prepared for:

Luzerne County Board of Commissioners
Gregory A. Skrepenak
Stephen A Urban
Todd A. Vonderheid

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2006 UPDATE SUMMARY

The original Luzerne County Natural Areas Inventory (NAI), which was completed in 2001, included descriptions, maps, and rankings of sites of ecological significance in the county. The emphasis of the report was upon locations of species listed as rare, threatened, or endangered Federally, or in Pennsylvania, and exemplary natural communities. The NAI update is simply a supplement to the original report. It includes new information based on fieldwork that was completed since the original NAI was written. The sites that were not visited since completion of the original NAI were not reevaluated. 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.

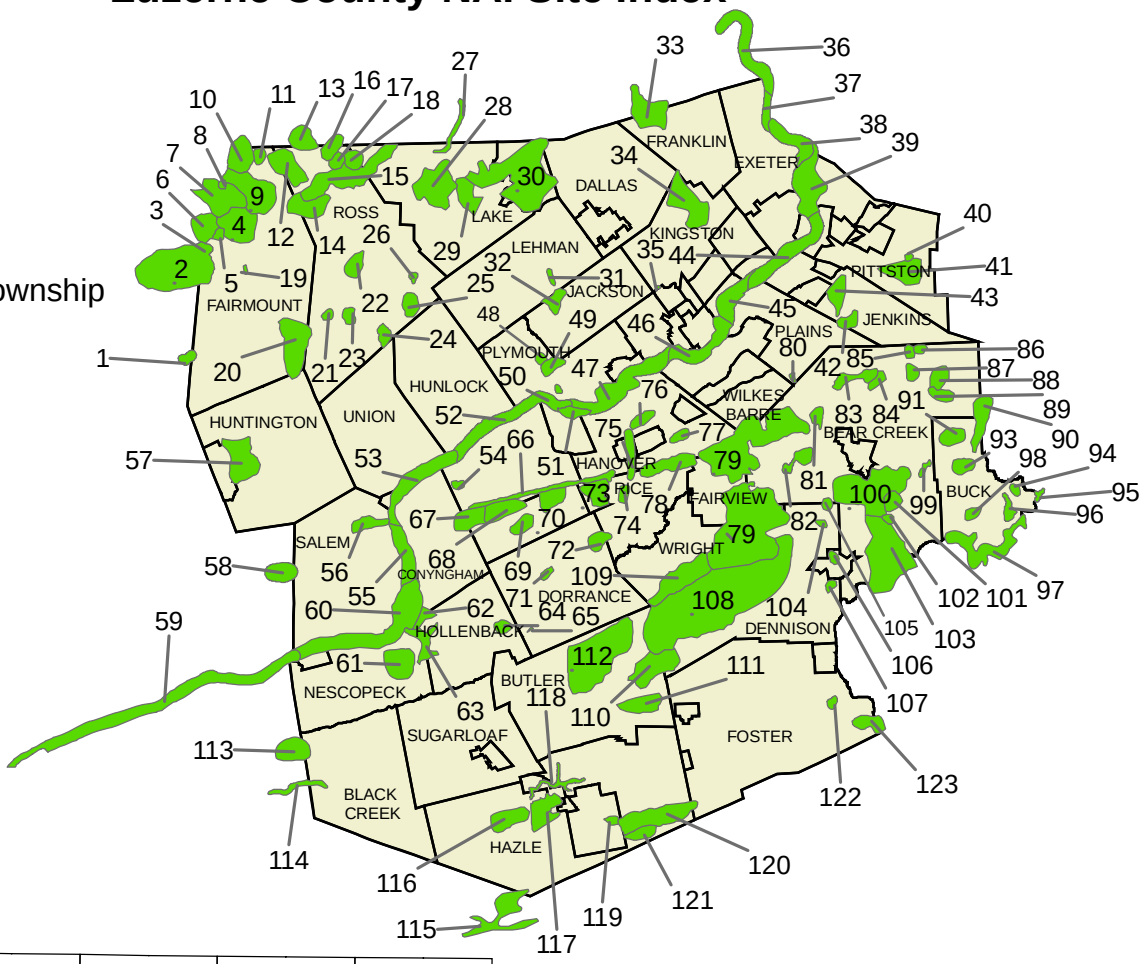
The format presented in the update differs from that of the original Luzerne County NAI. Where the original report was based on USGS quadrangle maps, this update is based on Township maps. There are tables for each Township listing all new or updated elements by the species name where appropriate. The corresponding page number from the original NAI is given for each USGS quadrangle table. Each table provides the original report code, global and state rarity ranks, state legal status, site quality, date last observed for each element, and the status of each element occurrence (i.e. delisted, new, rank change). Following the table is a brief narrative for each site, noting whether it is a NEW occurrence or an UPDATE. **Most text in bold print is new text for this version of the report.**

All original natural communities and species of concern are coded described in the tables and text. The codes are PNDI map codes that are unique to each element on a given USGS topographic map. Where the original report did not name any species of concern, the update names all plants, animals and natural communities except those considered at threat due to the potential of unauthorized collection. Sensitive species are not identified to prevent unauthorized collection and possible extirpation of the species at the site. The natural communities are identified by NC, plants by SP, and animals by SA. All species of concern from the original NAI report are followed by a three-digit code.

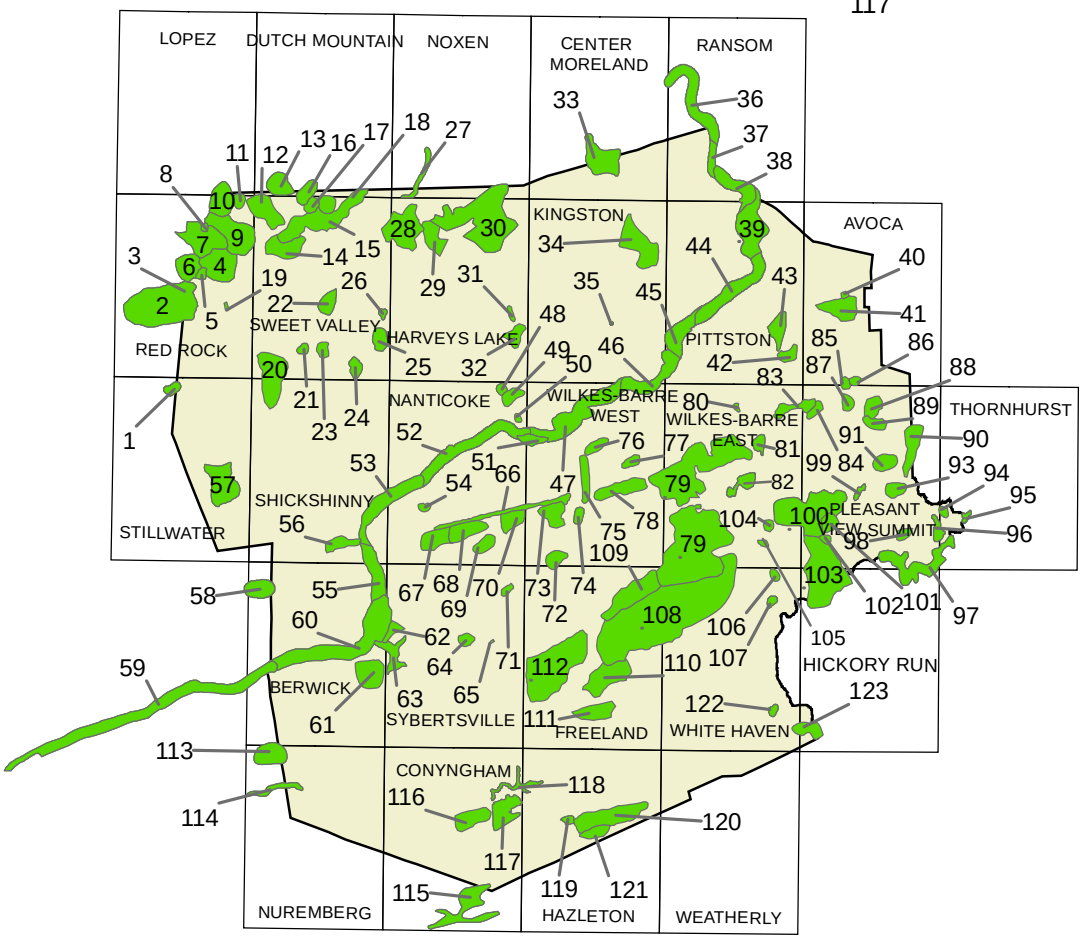
Township maps accompany the text. The areas outlined on the maps represent the general location of a species as well as the watershed or subwatershed area where the elements are located. Proposed development activities within the encircled areas should be carefully assessed to determine the impact of the project on the species or communities before approval is granted. This report is intended to be used as a reference for general planning purposes. It is not a replacement for consultation of the PNDI database for environmental review. Consultation with the biologists of the Pennsylvania Natural Heritage Program may be necessary to assess potential impacts. Questions about this supplement or the original NAI can be directed to Denise Johnson, Assistant County Inventory Ecologist, at the address on the title page.

Luzerne County NAI Site Index

Site Index by Township



Site Index by USGS Quadrangle Map



Index to Luzerne County Sites – Listed by Site Number

- Sites are numbered roughly from North to South
- Note that natural areas with species of special concern are in CAPITAL LETTERS, while locally significant sites are in Tital Case Letters.
- Sites are ranked on their biodiversity value with 1 = highest priority, 5 = lowest priority, LS = Locally Significant.

Site #	Site Name	Rank	Municipality	USGS Quadrangle Map	Page(s)
1	Five Points Swamp	LS	Fairmount	Stillwater	102
2	CENTRAL MOUNTAIN	4	Fairmount	Red Rock	102
3	Grand View	LS	Fairmount	Red Rock	102
4	KITCHEN CREEK RAVINES	2	Fairmount	Red Rock	102
5	OLD BEAVER DAM SWAMP	5	Fairmount	Red Rock	102
6	RICKETTS GLEN SWAMP	4	Fairmount	Red Rock	102
7	LAKE JEAN	4	Fairmount	Red Rock	102
8	BENTON STATION FIELDS	3	Fairmount	Red Rock	102
9	LAKE LEIGH	3	Fairmount	Red Rock, Sweet Valley	102
10	COUNTY LINE ISLANDS	4	Fairmount	Red Rock, Lopez	102
11	OPPERMAN PASS	4	Fairmount	Red Rock, Lopez	102
12	THE MEADOWS/ BEECH LAKE	4	Fairmount, Ross	Red Rock, Sweet Valley, Dutch Mountain	102, 169
13	OPOSSUM SWAMP	4	Ross	Dutch Mountain, Sweet Valley	169
14	MOUNTAIN SPRINGS LAKES	4	Fairmount, Ross	Sweet Valley	102, 169
15	STATE GAME LANDS #57	3	Lake, Ross,	Sweet Valley, Dutch Mountain	144, 169
16	INDEFATIGABLE SWAMP	1	Ross	Sweet Valley, Dutch Mountain	169
17	WOLF RUN HEADWATER SWAMP	4	Ross	Sweet Valley, Dutch Mountain	169
18	BOULDER RUN SWAMP	3	Ross, Lake	Sweet Valley, Dutch Mountain	169, 144
19	KITCHEN CREEK FALLS	5	Fairmount	Red Rock	102
20	HUNTINGTON CREEK	5	Fairmount, Huntington, Ross	Sweet Valley, Shickshinny	102,136, 169
21	Bear Swamp	LS	Ross	Sweet Valley	169
22	SHINGLE RUN	4	Ross	Sweet Valley	169
23	NEVEL SWAMP	5	Ross	Sweet Valley	169
24	SYLVAN LAKE	5	Ross, Union	Sweet Valley	169, 189
25	Roaring Brook Swamp	LS	Ross	Sweet Valley	169
26	HARRIS POND	5	Ross	Sweet Valley	169
27	Sorber Run	LS	Lake	Noxen, Harvey's Lake	144
28	LEE SWAMP	2	Lake	Sweet Valley, Harvey's Lake	144
29	BEAR HOLLOW	3	Lake	Harvey's Lake	144
30	HARVEYS LAKE	4	Dallas, Lake	Harvey's Lake, Noxen	85, 144
31	EAST FORK HARVEYS CREEK (NORTH)	5	Lehman	Harvey's Lake	148
32	EAST FORK HARVEYS CREEK (SOUTH)	5	Jackson, Lehman	Harvey's Lake	137, 148
33	PERRINS MARSH	5	Franklin	Center Moreland	119

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34	ABRAHAMS CREEK WETLANDS	4	Franklin, Kingston	Kingston	119, 141
35	ICE CAVES	4	Kingston	Kingston	141
36	COUNTY LINE SWAMP	3	Exeter	Ransom	98
37	SUSQUEHANNA RIVER AT EXETER	4	Exter	Ransom	98
38	SUSQUEHANNA RIVER AT DURYEA	4	Exeter	Ransom, Pittston	98, 158
39	CAMPBELL'S LEDGE	2	Exter	Ransom, Pittston	98, 158
40	SUSCON RAILROAD GRADE SITE	5	Pittston	Avoca	158
41	MILL CREEK AT SUSCON	5	Pittston	Avoca	158
42	GARDNER CREEK RESERVOIR	3	Jenkins, Plains	Pittston	139, 159
43	OLD BOSTON MINES	3	Jenkins	Pittston	139
44	PITTSTON ROOKERY	4	Plains	Pittston	159
45	PLAINS FLATS	4	Plains	Pittston	159
46	KIRBY PARK	4	Plains, Wilkes-Barre	Pittston, Kingston, Wilkes-Barre West	159, 191
47	SUSQUEHANNA RIVER AT HANOVER GREEN	4	Hanover, Plymouth, Wilkes-Barre	Wilkes-Barre West	121, 162, 191
48	Shickshinny Mountain Slopes	LS	Plymouth	Nanticoke	162
49	SHICKSHINNY MOUNTAIN RIDGETOP	4	Jackson, Plymouth	Nanticoke	137, 162
50	TILLBURY KNOB	5	Plymouth	Nanticoke	162
51	NANTICOKE MARSH	3	Hanover	Nanticoke, Wilkes-Barre West	121
52	SUSQUEHANNA RIVER AT NANTICOKE	4	Newport, Plymouth	Nanticoke	152, 162
53	ROUTE 11 BOAT LAUNCH	3	Conyngham, Hunlock, Newport, Union	Nanticoke, Shickshinny	80, 134, 152, 189
54	GLEN LYON ANTHRACITE MINE	2	Newport	Nanticoke	152
55	SUSQUEHANNA RIVER AT MOCANAQUA	4	Conyngham, Salem	Shickshinny, Berwick	80, 177
56	DOGTOWN MINES	2	Salem	Shickshinny	177
57	PINE CREEK	4	Huntington	Stillwater	136
58	Summer Hill Bog	LS	Salem	Berwick	177
59	SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)	4	Nescopeck, Salem	Berwick	149, 177
60	SUSQUEHANNA RIVERLANDS	3	Conyngham, Salem	Berwick, Sybetsville	80, 177
61	BRIGGSVILLE VERNAL POOLS	2	Nescopeck	Berwick	149
62	COUNCIL CUP CLIFFS	5	Conyngham, Hollenback	Berwick, Sybetsville	80, 132
63	Wapwallopen Gorge	LS	Hollenback, Nescopeck	Berwick, Sybetsville	132, 149
64	HOBBIE MEADOW	4	Hollenback	Sybertsville	132
65	MYLET'S CORNERS	5	Dorrance	Sybertsville	96

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66	PENOBSCOT MOUNTAIN RIDGETOP	4	Hanover, Newport, Slocum,	Nanticoke, Wilkes-Barre West	121, 152, 183
67	LILLY LAKE	2	Conyngham, Newport, Rice, Slocum	Nanticoke	80, 152, 165, 183
68	CRANBERRY POND	2	Newport, Slocum	Nanticoke	152, 183
69	SLOCUM MARSH	5	Slocum	Nanticoke	183
70	Folstown Mud Pond	LS	Newport, Slocum	Nanticoke	152, 183
71	DORRANCE BOG	2	Dorrance	Sybertsville	96
72	ANDY POND	5	Dorrance, Rice	Wilkes-Barre West, Freeland	96, 165
73	NUANGOLA LAKE	5	Rice	Wilkes-Barre West	165
74	Nuangola Station Swamp	LS	Rice	Wilkes-Barre West	165
75	NUANGOLA RAILROAD TUNNEL	5	Hanover, Rice	Wilkes-Barre West	121, 165
76	HANOVER CROSSING WETLAND	5	Hanover	Wilkes-Barre West	121
77	WILKES-BARRE MOUNTAIN	5	Hanover	Wilkes-Barre West	121
78	HAYSTACK MOUNTAIN	2	Fairview, Hanover, Rice	Wilkes-Barre West	113, 121, 165
79	ARBUTUS PEAK	1	Bear Creek, Dennison, Fairview, Hanover, Wilkes-Barre, Wright	Wilkes-Barre West, Wilkes-Barre East, White Haven, Freeland	55, 87, 113, 121, 191, 196
80	THE TUBS	5	Bear Creek, Plains	Wilkes-Barre East	55, 159
81	ORLOSKI'S BOG	3	Bear Creek	Wilkes-Barre East	55
82	BEHREN POND	3	Bear Creek	Wilkes-Barre East	55
83	WYOMING MOUNTAIN BARRENS	3	Bear Creek	Wilkes-Barre East, Pleasant View Summit	55
84	CANADA BOG	4	Bear Creek	Pleasant View Summit	55
85	PIPELINE SWAMP NORTH	5	Bear Creek, Jenkins	Avoca, Pleasant View Summit	55, 139
86	BALD MOUNTAIN ROAD SWAMP	4	Bear Creek, Jenkins	Avoca, Pleasant View Summit	55, 139
87	PIPELINE SWAMP	4	Bear Creek	Pleasant View Summit	55
88	MUD POND WOODS	3	Bear Creek	Pleasant View Summit	55
89	MUD POND	4	Bear Creek	Pleasant View Summit	55
90	TANNERY ROAD SITE/BEHLER SWAMP	3	Bear Creek, Buck	Pleasant View Summit	55, 69
91	INDIAN LAKE SWAMP	5	Buck	Pleasant View Summit	69
93	SHADES GLEN HEADWATERS	4	Buck	Pleasant View Summit	69
94	CHOKE CREEK SHRUB SWAMP	5	Buck	Pleasant View Summit, Thornhurst	69
95	LEHIGH RIVER AT CHOKE CREEK	3	Buck	Thornhurst	69
96	KENDALL CREEK WETLAND	5	Buck	Pleasant View Summit, Thornhurst	69
97	LEHIGH RIVER - RT. 115 BRIDGE SITE	3	Buck	Pleasant View Summit, Thornhurst, Hickory Run	69
98	DRY LAND HILL POOLS	3	Buck	Pleasant View Summit	69
99	HAAS ROUTE 115	5	Bear Creek	Pleasant View Summit	55

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100	BEAR CREEK RAILROAD SITE	4	Bear Creek, Dennison	Pleasant View Summit, Wilkes-Barre East	55, 87
101	Bear Creek At Shades Creek	LS	Bear Creek	Pleasant View Summit	55
102	RED BEAR SWAMP	5	Bear Creek	Pleasant View Summit	55
103	FRANCES E. WALTER RESERVOIR	2	Bear Creek	Pleasant View Summit, Hickory Run	55
104	WRIGHT CREEK WATERSHED (C)	5	Bear Creek, Dennison	Wilkes-Barre East	55, 87
105	WRIGHT CREEK WATERSHED (B)	5	Dennison	Wilkes-Barre East	87
106	WRIGHT CREEK WATERSHED (A)	3	Dennison	White Haven	87
107	POPPLES QUARRY POND	4	Dennison	White Haven	87
108	NESCOPECK CREEK VALLEY	1	Butler, Dennison, Wright	Wilkes-Barre East, Freeland, White Haven	74, 87, 196
109	NESCOPECK MOUNTAIN BARRENS	3	Dennison, Dorrance, Wright	Freeland	87, 96, 196
110	Hell's Kitchen	LS	Butler, Dennison	Freeland	74, 87
111	HELL'S KITCHEN ANTHRACITE MINE	4	Butler	Freeland	74
112	EDGEWOOD VERNAL POOLS	1	Butler, Dorrance	Freeland	74, 96
113	SCOTCH RUN	5	Black Creek	Berwick, Nuremberg	66
114	Beaver Run Wetlands	LS	Black Creek	Nuremburg	66
115	BLUE NOB RIDGETOP DWARF-TREE FOREST	5	Hazel	Conyngham	127
116	HUMBOLDT BARREN	3	Hazel	Conyngham	127
117	VALMONT INDUSTRIAL PARK	3	Hazel	Conyngham	127
118	BLACK CREEK FLATS	4	Hazel	Conyngham, Hazleton	127
119	HELL'S KITCHEN AMLF# 3 SITE	4	Hazel	Hazleton	127
120	STOCKTON MT. BARRENS	3	Foster, Hazel	Hazleton	117, 127
121	DRECK CREEK WATERSHED	3	Hazel	Hazleton	127
122	STATE GAME LANDS #149	5	Foster	White Haven	117
123	LEHIGH GORGE	3	Foster	White Haven, Hickory Run	117

Site Index: Sites Listed Alphabetically by Site Name

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86	BALD MOUNTAIN ROAD SWAMP	4	Bear Creek, Jenkins	Avoca, Pleasant View Summit	55, 139
101	Bear Creek At Shades Creek	LS	Bear Creek	Pleasant View Summit	55
100	BEAR CREEK RAILROAD SITE	4	Bear Creek, Dennison	Pleasant View Summit, Wilkes-Barre East	55, 87
29	BEAR HOLLOW	3	Lake	Harvey's Lake	144
21	Bear Swamp	LS	Ross	Sweet Valley	169
114	Beaver Run Wetlands	LS	Black Creek	Nuremburg	66
82	BEHREN POND	3	Bear Creek	Wilkes-Barre East	55
8	BENTON STATION FIELDS	3	Fairmount	Red Rock	102
118	BLACK CREEK FLATS	4	Hazel	Conyngham, Hazleton	127
115	BLUE NOB RIDGETOP DWARF-TREE FOREST	5	Hazel	Conyngham	127
18	BOULDER RUN SWAMP	3	Ross, Lake	Sweet Valley, Dutch Mountain	169, 144
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94	CHOKE CREEK SHRUB SWAMP	5	Buck	Pleasant View Summit, Thornhurst	69
62	COUNCIL CUP CLIFFS	5	Conyngham, Hollenback	Berwick, Sybetsville	80, 132
10	COUNTY LINE ISLANDS	4	Fairmount	Red Rock, Lopez	102
36	COUNTY LINE SWAMP	3	Exeter	Ransom	98
68	CRANBERRY POND	2	Newport, Slocum	Nanticoke	152, 183
56	DOGTOWN MINES	2	Salem	Shickshinny	177
71	DORRANCE BOG	2	Dorrance	Sybertsville	96
121	DRECK CREEK WATERSHED	3	Hazel	Hazleton	127
98	DRY LAND HILL POOLS	3	Buck	Pleasant View Summit	69
31	EAST FORK HARVEYS CREEK (NORTH)	5	Lehman	Harvey's Lake	148
32	EAST FORK HARVEYS CREEK (SOUTH)	5	Jackson, Lehman	Harvey's Lake	137, 148
112	EDGEWOOD VERNAL POOLS	1	Butler, Dorrance	Freeland	74, 96

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42	GARDNER CREEK RESERVOIR	3	Jenkins, Plains	Pittston	139, 159
54	GLEN LYON ANTHRACITE MINE	2	Newport	Nanticoke	152
3	Grand View	LS	Fairmount	Red Rock	102
99	HAAS ROUTE 115	5	Bear Creek	Pleasant View Summit	55
76	HANOVER CROSSING WETLAND	5	Hanover	Wilkes-Barre West	121
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88	MUD POND WOODS	3	Bear Creek	Pleasant View Summit	55

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105	WRIGHT CREEK WATERSHED (B)	5	Dennison	Wilkes-Barre East	87
104	WRIGHT CREEK WATERSHED (C)	5	Bear Creek, Dennison	Wilkes-Barre East	55, 87
83	WYOMING MOUNTAIN BARRENS	3	Bear Creek	Wilkes-Barre East, Pleasant View Summit	55

ARBUTUS PEAK, which is one of the richest barrens for moths and butterflies in the northeast, is one of the top sites for conservation in Luzerne County.

Photo: Pennsylvania Natural Heritage Program

(Title Page of First Edition)

A NATURAL AREAS INVENTORY
LUZERNE COUNTY, PENNSYLVANIA
2001

Prepared By:

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

Anthony F. Davis, Director
Aura L. Stauffer, County Inventory Coordinator (Present)
Rich Ring, County Inventory Coordinator (until March 2001)
Chris Urban, Herpetologist
Jim Hart, Mammalogist
John Kunsman, Botanist
Jenni Mumper, Information Manager
Susan Klugman, GIS Scientist
Betsy Ray, Conservation Information Assistant
Sarah Hamsher Conservation Information Assistant

Prepared for:

Luzerne County Board of Commissioners
Thomas A. Makowski, Chairman
Thomas P. Pizano
Stephen A Urban

PREFACE

The Luzerne Natural Areas Inventory is a document compiled and written by the Pennsylvania Natural Heritage Program (PNHP). It contains information on the locations of rare, threatened, and endangered species and of the highest quality natural areas in Luzerne County; it is not an inventory of all open space or even all natural areas. 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 Pennsylvania Natural Heritage Program and do not necessarily reflect the policies of the state or the policies of Luzerne County or Townships for which the report was prepared.

Managed areas such as federal, state, county and township lands, private preserves and conservation easements are also provided on the maps 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 Natural Heritage Program, Eastern Office at (717) 948-3962 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 Luzerne County, it is possible that something was missed. Anyone with information on sites that may have been overlooked should contact the Luzerne County Office of Community Development.

Particular species names, common and scientific, are provided in coordination with the appropriate jurisdictional agency. Plants and terrestrial invertebrates 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). Aquatic animals, reptiles and amphibians are under the jurisdiction of the PA Fish and Boat Commission (PFBC). **Certain species are often subject to unauthorized collection. They are therefore not identified in the text of this report, at the request of the agency, in order to provide some measure of protection for the species.**

Questions regarding potential conflicts between proposed projects 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.

The Pennsylvania Natural Heritage Program (PNHP) has recently undergone restructuring. In the past, the Pennsylvania Science Office of The Nature Conservancy (TNC) conducted the County Inventories in the eastern half of the state, while the Western Pennsylvania Conservancy (WPC) conducted the County Inventories for the western half of the state. Both the eastern and western science offices have recently been unified under the direction of the Western Pennsylvania Conservancy.

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, Luzerne County Office of Community Development. Additional Funding came from the Delaware and Lehigh National Heritage Corridor, and the Sordoni Foundation.

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, organizations, and agencies such as the North Branch Land Trust, Academy of Natural Sciences in Philadelphia, Wilkes University, the Morris Arboretum of the University of Pennsylvania, the Department of Conservation and Natural Resources, 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 Douglas Gross conducted surveys for rare bird species under contract for this report.

This report benefited from an unusually high degree of involvement from local naturalists and conservationists who gave generously of their time. Rick Koval in particular spent many days in the field with PNHP ecologists and provided valuable data on sites for rare birds, herptiles, lepidoptera, and plants. Alan Gregory, Jim Hoyson, Autumn Pfieffer, and Linda Thoma also assisted in field surveys and provided information on rare species. Jane Frey and Claudia Steckel provided information on rare plant species in the county. Many other private citizens contacted our office with information on natural areas. Gene Wiener provided access to remote portions of State Game Lands. Dan Brauning of the PA Game Commission provided information on sites for rare bird species. Many thanks go to those who reviewed the draft of this report. Finally, we especially wish to thank the many landowners that granted us permission to conduct inventories on their lands. The task of inventorying the natural heritage of Luzerne County would have been far more difficult without this tremendous pool of information gathered by many people over many years.

Copies of this document may be obtained from:

Luzerne County
Office of Community Development
54 West Union Street
Wilkes-Barre, PA 18711
(570) 824-7214

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Forested corridors are essential for the movement of animals from one habitat to the next.

Photo: PNHP

INTRODUCTION

Luzerne County is located in northeastern Pennsylvania, centered about the North Branch of the Susquehanna River and the historic Wyoming Valley. Luzerne County encompasses 901 square miles (Luzerne County Office of Community Development), making it the fifth largest county, (by area) in the state. Past development patterns have been greatly influenced by the dominant features of the landscape itself. The Wyoming Valley, the heart of the richest anthracite coal deposits in North America, has a densely settled and highly disturbed landscape as a result of the County's history as a mining center. Few natural areas remain here and the early successional habitats of the old tailing areas will remain for some time. In contrast, the rugged plateaus of North Mountain and the Pocono Plateau are only sparsely populated today, though these areas were also severely disturbed, by logging and burning, from 80 to 100 years ago. Despite this disturbance, the large publicly owned tracts of second-growth forest and relatively intact watersheds contain a wide diversity of habitats as well as scenic and recreational values. Outside of these extremes, Luzerne County contains a patchwork of natural and human-dominated habitats, including cropland, pasture, young and old forests, ponds, streams, and rivers. The bluffs and water gaps along the North Branch of the Susquehanna River, the Lehigh River Gorge, and the deep ravines cut at Ricketts Glen and elsewhere on the Allegheny Front are among the most striking landscapes in the county and the commonwealth. The natural areas of Luzerne County are used for hunting, fishing, hiking, biking, birdwatching, and other activities that make the region an attractive place to live. Outdoor recreation and tourism is an increasingly important part of Northeast Pennsylvania's economy (PA State Data Center). 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 rare, threatened and endangered species. This Natural Areas Inventory documented many examples of intact natural communities and sites for species rarely found in the state or the world.

Luzerne County's population fell from 343,079 to 328,149 (-4.3%) during the 1980's, and census projections predict a continuing gradually slowing population loss in the coming decades (PA State Data Center). However, the majority of the population loss has come from the urban areas centered in the Wyoming Valley and Hazleton (-5.5% from 1980 to 1990), and the rural population has decreased only slightly over the same period (-.9%). Despite the overall decline in population there is development pressure in scenic and rural areas for commuters to the Wilkes-Barre/Scranton area, and for commuters to the NYC/NJ area from the Pocono Plateau area at the eastern edge of the county. The natural areas that comprise Luzerne County's natural heritage can be easily lost without careful planning of growth and development; ironically the scenic and remote nature of these areas may make them prime targets for residential developments. Protecting the integrity of these natural systems provides benefits to humans as well as providing for the survival of wildlife, rare and otherwise. 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 Natural Heritage Program, under contract to the Luzerne County Office of Community Development, 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 the known outstanding natural features—floral, faunal and geologic in Luzerne County. 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 Luzerne County. The maps do not pinpoint the site of concern but rather represent a zone of potential impacts within the site's watershed. A written description and a summary table of the sites, including quality, degree of rarity, and last-observed date, accompany each map. Potential threats and some suggestions for protection of the rare plants or animals at the site are included in many of the individual site descriptions. Selected geologic features of statewide significance are also noted. In addition, the inventory describes locations of areas that are significant on a county - wide scale, but cannot be deemed exemplary natural communities because of past disturbances. These "locally significant" sites represent good examples of habitats that are relatively rare in the county, support an uncommon diversity of plant species, and/or provide valuable wildlife habitat on a local level.

The information and maps presented in this report provide a useful guide for planning development 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 the 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 Luzerne County Office of Community Development. The inventory is one tool that will aid in the creation of municipal and county and comprehensive plans, and the emphasis on biological diversity should inform county and regional open space plans already underway. Luzerne County, its municipalities, land trusts, and other organizations can also use the Natural Areas Inventory to identify potential protection projects that may be eligible for funding through state or community grant programs such as Growing Greener. 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. For example, the Forest Stewardship program, coordinated by DCNR Bureau of Forestry, assists landowners in creating management plans. This plan is developed based on landowner objectives (e.g., wildlife or timber management). Land managers may wish to consult this report and the Pennsylvania Natural Diversity Inventory (PNDI) 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 Natural Heritage Program for additional information.

NATURAL HISTORY OVERVIEW OF LUZERNE COUNTY

The climate, geology, topography, and soils have played an important role in the development of the ecosystems (forests, wetlands, etc) as well as other natural features (e.g., streams and geologic features) in Luzerne County. Natural and human disturbances have also been influential in the development and alteration of these ecosystems, causing 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 in the county. The following sections provide a brief overview of the physiography, geology, soils, surface water, and vegetation of Luzerne County.

Physiography and Geology

The characteristic landscapes and distinctive geologic formations classify Physiographic Provinces. Physiography relates in part to a region's topography and climate. These two factors, along with bedrock type, significantly influence soil development, hydrology, and land use patterns of an area. Additionally, both physiography and geology are important to the patterns of plant community distribution, which in turn influences animal distribution. Because of the differences in climate, soils, and moisture regime, certain plant communities would be expected to occur within some provinces and not in others. Physiographic and geologic information was obtained from many sources including *Ground Water in Northeastern Pennsylvania* (Lohman 1957), *The Geologic Map of Pennsylvania* (DCNR, Bureau of Topographic & Geologic Survey 1982), and *Physiographic Provinces of Pennsylvania* (Sevan 2000).

Luzerne County is situated within two Physiographic Provinces: the Ridge and Valley Province and Appalachian Plateaus Province. The county contains three sections of the Appalachian Plateaus Province: the Glaciated High Plateau Section in its northwest corner, the Glaciated Low Plateau in the northeast corner, and the Glaciated Pocono Plateau Section in the southeast corner. Most of Luzerne County lies within the Susquehanna Lowland Section, the Anthracite Upland Section, and the Anthracite Valley Section of the Ridge and Valley Province. The most striking physiographic feature in this section is the Wyoming Valley, bisected by the North Branch of the Susquehanna River from Pittston to Nanticoke and bordered by steep ridges on both sides. This part of the county is comprised of a long synclinal trough, with the outer rim made up of hard sandstone and conglomerate of the Pocono Formation, and the inner rim made up of bedrock of the Pottsville Formation. Outcrops of conglomerate rock from the Pottsville formation are exposed along Wilkes-Barre Mountain above Ashley. The abrupt Allegheny Front, which is visible from Route 29 in the northwestern portion of Luzerne County, is the demarcation between the Ridge and Valley and Mountainous Plateau provinces. The Appalachian Plateau Province is underlain predominantly by red to brownish shale and sandstone of the Catskill Formation.

Continental glaciers greatly modified the landscape of Luzerne County, covering most of the county during their last advance that ended approximately 12,000 years ago. Deposits of rock, sand, clay, and silt left directly by the glacier are called unstratified or till deposits. Some of these deposits are 300 feet thick. Many of Luzerne County's soils that developed on till have a dense clay layer, or hardpan, and are too stony or wet for cultivation. Wetlands have formed in the depressions that were the result of glacial scouring and the deposition of ice blocks (kettleholes), as well as glacial deposits that blocked drainage channels and altered stream flow. Large aggregations of these small kettle holes are found in several areas along the base of Nescopeck Mountain, which is located near the southern limit of the last

glacial advance. Between Penobscot and Nescopeck Mountain numerous larger ice–blocks formed a series of glacial bogs and lakes that have been altered to various degrees. Nuangola Lake, Lily Lake, Cranberry Pond, and Dorrance Bog sites are examples of these sites. Stratified sands and gravels form very deep deposits, now utilized as gravel pits, along the terraces of the North Branch of the Susquehanna River.

Soils

The distribution of soils in Luzerne County reflects both local topography and bedrock geology. The previously described physiographic regions tend to have similar soils, which in turn influence land use patterns. For example, coal deposits that have been exploited extensively in the Wyoming Valley and the Hazleton area are underlain by the Anthracite Valley Section and the Anthracite Upland Section of the Ridge and Valley Province. The Susquehanna Lowland Section is a comprised of a mixture of agriculture and young forest. Mountains in the section (e.g., Penobscot and Nescopeck) remain largely undeveloped and contain extensive forested or barrens areas. Similarly, the Glaciated High Plateau, the Glaciated Low Plateau, and the Glaciated Pocono Plateau Sections are mostly forested and contain many of the recreational areas of the county (e.g., Ricketts Glen Sate Park and State Game Lands).

The following brief descriptions of soil associations, which are grouped by physiographic section, are taken from the USDA *Soil Survey of Luzerne County, Pennsylvania* (Bush 1981). The reader should refer to the *Soil Survey* for more detailed soil information. An association is a group of soils with a distinctive, proportional pattern of occurrence in the landscape (Bush 1981). Seven soil associations have been described for Luzerne County. Each soil association contains one or more major soils and minor soils.

Susquehanna Lowland, Anthracite Valley, & Anthracite Upland Sections – The majority of Luzerne County is situated within these Sections. These sections contains all seven soil associations described in the *Soil Survey* for the County. The **Oquaga-Wellsboro-Lackawanna** association is the largest in Luzerne County comprising approximately 46 percent of the county. The association is found on broad, dissected plateaus and in broad basins between mountains. The soils have formed from reddish loamy glacial till derived from red sandstone and shale. The land is mainly used for dairy farming and development. The majority of the land in this association remains forested because of the stoniness and impeded drainage of the soils. Many of the State Game Lands in the county are located in this soil association.

The **Oquaga-Lordstown-Arnot** association makes up about 13 percent of the county. It consists of moderately steep to very steep soils on the sides and tops of ridges of the major northeast-southwest trending mountain ranges. The soils formed in red to brown loamy glacial till derived from red or gray sandstone, shale, or conglomerate. Because of the extremely stony surface and the steep and very steep slopes, about 90 percent of this association is in woodland. A few State Game Lands are found in this association.

The **Strip Mine-Mine Dump** association, which makes up approximately 10 percent of the county, is found on broad mountaintops, mountainsides, and valleys. It consists of exposed bedrock, soil, and rock material that were removed during coal mining activities. Most areas of this association are either developed or are presently idle with dwarf forests of gray birch (*Betula populifolia*). If restored these areas would be ideal for future industrial development.

The **Chenango-Pope-Wyoming** association consists of nearly level to steeply sloping, deep soils on glacial outwash areas and floodplains. This soil association comprises approximately 9 percent of the county. The soils formed in loamy to coarse textured glacial outwash deposits derived from reddish and brown upland glacial till. Agriculture is the main land use of the association—the orchards located beneath Council Cup Cliffs are one example.

The **Pocono-Dekalb** association makes up about 9 percent of the county. It consists of gently sloping to very steep soils on mountaintops formed in glacial till or residuum, and derived from sandstone, conglomerate, and some shale. The main land uses of this association are woodlands with some land developed for residential and strip mining activities.

The **Lordstown-Mardin-Volusia** association is found on broad, dissected plateaus, and it comprises approximately 8 percent of the county. The soils formed in glacial till derived from red and gray sandstone, shale, and conglomerate. Dairy farms are the main land use of this association. Because of the stoniness and the impeded drainage of the soils, the majority of the association remains forested.

Finally, the **Meckesville-Kendron-Leck Kill** association consists of gently sloping to moderately steep, deep soils in upland valleys. The soils formed in reddish glacial till derived from sandstone and shale. This association makes up about 5 percent of the county. Agriculture is the main land use of the association.

Glaciated Pocono Plateau Section – A small piece of this section is found in eastern Luzerne County. The soils are formed in glacial till derived from sandstone, shale, or conglomerate. There are four soil associations in this section including the **Oquaga-Wellsboro-Lackawanna** association, **Chenango-Pope-Wyoming**, **Lordstown-Mardin-Volusia,** and the **Oquaga-Lordstown-Arnot** association. The descriptions for all of the associations are given above. Most of the land remains forested with State Game Lands, hunting clubs, and residential developments as the primary land uses.

Glaciated High & Glaciated Low Plateau Sections – The soils in these two sections are formed in glacial till derived from sandstone, shale, or conglomerate. There are three soil associations in the sections including the **Oquaga-Wellsboro-Lackawanna** association, **Lordstown-Mardin-Volusia,** and the **Oquaga-Lordstown-Arnot** association. The descriptions for all of the associations are given above. The main land use for this section of the county, which is largely forested, is recreational. Like much of Luzerne County this area was mostly stripped of its forests a century ago; the second growth that exists today is a mixture of northern hardwoods with much black cherry (*Prunus serotina*) and conifer-dominated wetlands. Recreational areas include Ricketts Glen State Park, State Game Lands, and private hunting clubs.

Vegetation

Upland Forest Communities

The vegetation of Luzerne County reflects the environmental conditions (geology, topography, soils, climate) and disturbance history, both natural and anthropogenic. On a regional scale, Luzerne County is located within two major forest types —Appalachian Oak Forest and Northern Hardwood Forest (Bailey 1980). Appalachian Oak Forest is more common east of the Susquehanna River and in drier or

less fertile locations in the Appalachian Mountain Section west of the Susquehanna. This mixed oak forest is analogous to Braun's (1950) Oak-Chestnut Forest and includes black oak (*Quercus velutina*), red oak (*Q. rubra*), white oak (*Q. alba*), and chestnut oak (*Q. montana*) as potential dominants or codominants depending on soil moisture and fertility. Other common tree species of this forest type are red maple (*Acer rubrum*), black cherry (*Prunus serotina*), gray and black birches (*Betula populifolia & B. lenta*), white pine (*Pinus strobus*), pitch pine (*Pinus rigida*), and aspens (*Populus sp.*). Shrubs include species of blueberries (*Vaccinium sp.*), huckleberries (*Gaylussacia sp.*), teaberry *(Gaultheria procumbens)* and other dry forest species. Variants of the Mixed Oak Forest occur as a result of differing environmental conditions. One common forest type in Luzerne County is the Chestnut Oak community which is characteristic of dry ridgetops and rocky slopes. Associates include red oak, black oak, scarlet oak (*Q. coccinea*), black birch, and red maple. **PENOBSCOT MOUNTAIN RIDGETOP,** in its unburned portions, typifies this community type. The understory may be sparse or dominated by ericaceous species such as blueberries, huckleberry and mountain laurel (*Kalmia latifolia*).

Less frequent is the Pitch Pine-Scrub Oak community found on isolated dry, exposed ridgetops. **ARBUTUS PEAK** and **STOCKTON MOUNTAIN BARRENS** are examples of this community. Characteristic species are pitch pine that may be frequent to dominant, scrub oak (Q*uercus ilicifolia*) that typically forms a nearly impenetrable shrub layer and may be the dominant species in the community, and black and chestnut oaks. Other species common to this community include huckleberry, black chokeberry (*Aronia melanocarpa*), lowbush blueberry, teaberry (*Gaultheria procumbens*), and bracken fern (*Pteridium aquilinum*). Also found on exposed ridge tops is the Acidic Rocky Summit community. This community has many of the same species as the Pitch Pine-Scrub Oak community. It is characterized by a high percentage of exposed rock (often Pottsville Conglomerate), extremely shallow soils, and a little tree cover. Openings are dominated by a mix of low shrubs, grasses, and mosses such as lowbush blueberry, poverty grass (*Deschampsia flexuosa*), Pennsylvania sedge (*Carex pensylvanica*), and haircap moss (*Polytrichum sp.*). An example of this community type occurs at **WILKES-BARRE MOUNTAIN** above Ashley. Fires are necessary disturbances to perpetuate both of these community types.

Northern Hardwood Forest is more common west of the Susquehanna in slightly richer or mesic areas, and on the Glaciated High Plateau area that includes Ricketts Glen State Park. **SHICKSHINNY MOUNTAIN SLOPES** is a young example of this forest type. Sugar maple (*Acer saccharum*), red maple, American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), Eastern hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) are potential dominants in this forest type. This area is second growth forest. The regeneration of trees after logging has been slow in some areas because of poor soils, particularly in the Glaciated High Plateau Section in the northwest.

Wetland Communities

Wetlands are found throughout the glaciated portion of the county but tend to have been less altered by humans in the Pocono and Glaciated High Plateau Sections. Many of these are shallow ice-block basins. In acidic soils Boreal Conifer Swamps such as **BALD MOUNTAIN ROAD SWAMP** (Avoca quad.) tend to dominate. There are many examples of these in the Pocono Plateau section, although most are highly disturbed. They are often dominated by a relatively open canopy of red spruce (*Picea rubens*), eastern hemlock, and larch (*Larix laricina*), with a dense shrub layer of highbush blueberry (*Vaccinium corymbosum*), rhododendron (*Rhododendron maximum*), and/or mountain holly (*Nemopanthus mucronata*).

At slightly more enriched sites, Broadleaf-Conifer Swamp appears to be the natural climax community for these wetlands. **BEAR SWAMP** and **NEVEL SWAMP** are examples. They are dominated by a more closed canopy of yellow birch, red maple, and eastern hemlock. Many of the wetlands within the county are not forested but instead support open shrub swamps dominated by some mix of rhododendron, highbush blueberry, mountain holly, speckled alder (*Alnus incana*), leatherleaf (*Chamaedaphne calyculata*), cinnamon fern (*Osmunda cinnamomea*), sphagnum mosses (*Sphagnum sp.*) and sedges (*Carex sp.*). The maintenance of open canopy wetlands is the result of fire, logging, or higher water levels due to beaver and other causes. Some of the forested swamps have not received recent disturbance and have recovered sufficiently to be considered as high quality natural communities.

Both forest and shrub dominated wetland community types are important in Luzerne County as habitat for rare species. One of the rarest wetland communities in the county is the glacial kettlehole bog, exemplified by **DORRANCE BOG**. This community is characterized by concentric bands of vegetation encircling a pond: spruce and/or larch on the outside band, then shrubs, sedges, and a floating sphagnum-dominated bog mat towards the center. Historically, other sites in the county appear to have supported bogs as well. However most of these were flooded out by beaver and/or human-made dams, and in some cases impacted by logging and/or fires. For example, remnants of the bog mat can still be found at **NUANGOLA LAKE**. Recently impounded or otherwise disturbed wetlands may sometimes support marshes of graminoid or other emergent vegetation. **LEE SWAMP** and **NANTICOKE MARSH**, which are examples of these community types, are often important breeding habitat for bird species of concern. Most lakes (deepwater habitats) in the county have been greatly enlarged by damming or are the result of flooding stream valleys. **HARVEY'S LAKE** is an exception, although it has been significantly impacted by development. However, the remaining lakes that are relatively natural are habitat for many aquatic plants and animals, several of which are species of concern.

Ephemeral/fluctuating or vernal pools are wetlands that fill annually from precipitation, surface water runoff, and rising groundwater (Kenney and Burne, 2000). The pools typically become completely dry through evaporation by late spring or summer. During the brief time the pools contain water, they become important breeding areas for a multitude of amphibian species (e.g., spotted salamanders), many of which breed solely in vernal pools. In Luzerne County, several vernal pool communities are found in topographic depressions created by small ice blocks left behind by the retreating glaciers. The EDGEWOOD VERNAL POOLS (Butler Township) and the BRIGGSVILLE VERNAL POOLS exemplify these types of vernal pools. Vernal pools, such as the pools on **PENOBSCOT MOUNTAIN RIDGETOP,** can also occur on the tops of mountains**.** The rock strata on Penobscot Mountain are tilted sharply upward creating several parallel rock outcrops (some of conglomerate) with the pools occurring in the "grooves" between the more resistant outcrops.

Disturbance

The nature, scale, and frequency of disturbance are influential factors in the evolution and appearance of natural communities. Disturbance has played a major role in forming the current vegetation of Luzerne County. Disturbance can be beneficial or destructive to the development and persistence of natural communities. Fires may have helped to establish and maintain some of the important plant communities that we see on the landscape today, particularly on ridgetops and in the Pocono Plateau section (State Game Lands #91). Many Ridgetop Dwarf -Tree Forest communities show evidence of past fire and these barrens communities are important habitat for a variety of rare species, especially moths. Other

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

In contrast, deer have been blamed for a number of negative impacts on Pennsylvania flora and fauna (Rhoads et al. 1992): a reduction in the amount of understory, poor regeneration of some species, decreased songbird diversity, and direct loss of rare plants. For example, some areas that were once dominated by oak trees are now converting to red maples trees because of deer pressure (The Pennsylvania State University Cooperative Extension Service). Private landowners can help to control the deer population by allowing hunting to occur on their properties.

Beavers are natural disturbance agents in Luzerne County and their alterations to the landscape are important for maintaining a variety of open upland and wetland habitats. Species that require high light regimes depend on open habitats created by beaver and may drop out of an area without beaver altering the natural vegetation. However, where beaver become too abundant they may alter wetland systems to the degree that some wetland types, such as bogs, and the rare species that inhabit them have become threatened.

In many cases, human disturbance has been destructive to natural habitats and species associated with them. In Luzerne County logging and mining have played a major role in changing the landscape. For example, old-growth forests are virtually non-existent, although occasional old trees may be encountered (e.g., The Glens Natural Area). Mining, which has altered topography and vegetation, is not as active in the County as it once was. Old mined lands can still provide valuable habitat, especially for birds, by reclaiming the land with grasses and shrubs. For instance, reclaimed mined lands that were surveyed near Pittsburgh were found to provide nesting and wintering habitat for grassland bird species including ring-necked pheasant (*Phasianus colchicus*), short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), eastern meadowlark (*Sturnella magna*), and Henlow's sparrow (*Ammodramus henslowii*).

Lake Jean and the entire upper Fishing Creek watershed have been severely affected by acid deposition (i.e., acid rain). Active (e.g., limestone) and passive (e.g., cattail wetlands) water treatment may eventually bring the fisheries in these areas back to life.

Additionally, 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. Human disturbances are a permanent part of Luzerne County's landscape, but decisions about the type, timing, and extent of future disturbances are important to the natural ecological diversity that remains.

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

the native plants. In wetlands and along streams, purple loosestrife (*Lythrum salicaria*), wild hops (*Humulus japonicus*), and Japanese knotweed (*Polygonum cuspidatum*) are aggressive, weedy species that follow in the wake of disturbance and crowd out native species. They pose a particular problem today along the Susquehanna River.

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

The preservation of grasslands (e.g., reclaimed mined lands) is important for ground-nesting species like these PA-Endangered short-eared owls.

Photo: Taken by Aura Stauffer at a reclaimed strip mine near Pittsburgh.

Landscape Analysis

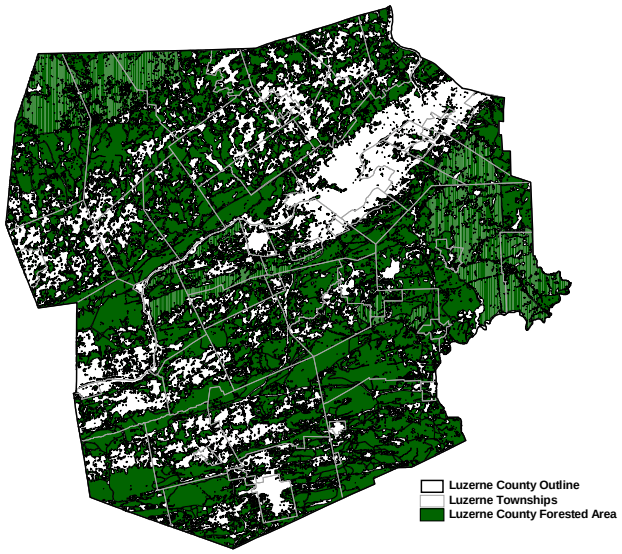
Background: Fragmentation of the landscape by roads, utility lines, and other human disturbances can impact the surrounding landscape significantly. A road or utility line cut through a forested block cleaves the large block into two smaller blocks and significantly increases the amount of edge habitat 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. Historically, edge habitat was created to provide habitat for organisms, namely game species, which often thrive in disturbed areas. Today, we realize that by fragmenting forests we are eliminating habitats for the forest interior species. Those species that utilize edge habitats are typically considered generalists, capable of utilizing many different habitats and are usually not of immediate conservation concern.

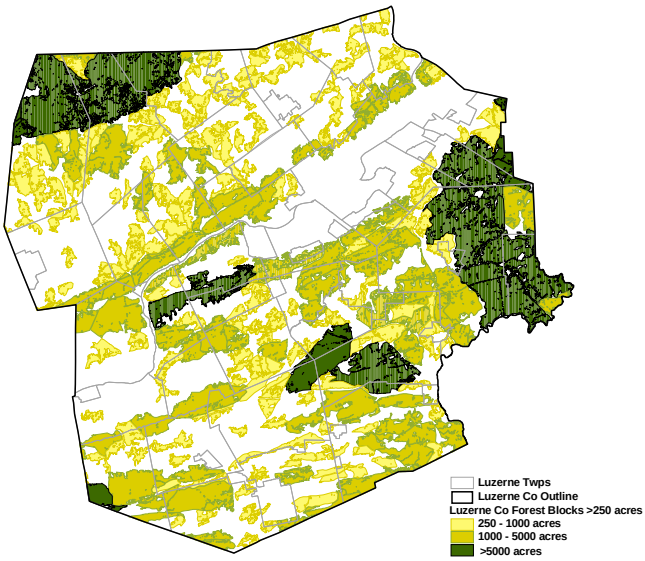
The larger forested blocks in the County (those of at least one mile in area ~ 640 acres) have been highlighted in an effort to draw attention to the significance of large forested blocks within the County. Besides being habitat suitable for many native species, large unfragmented forest blocks in close 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

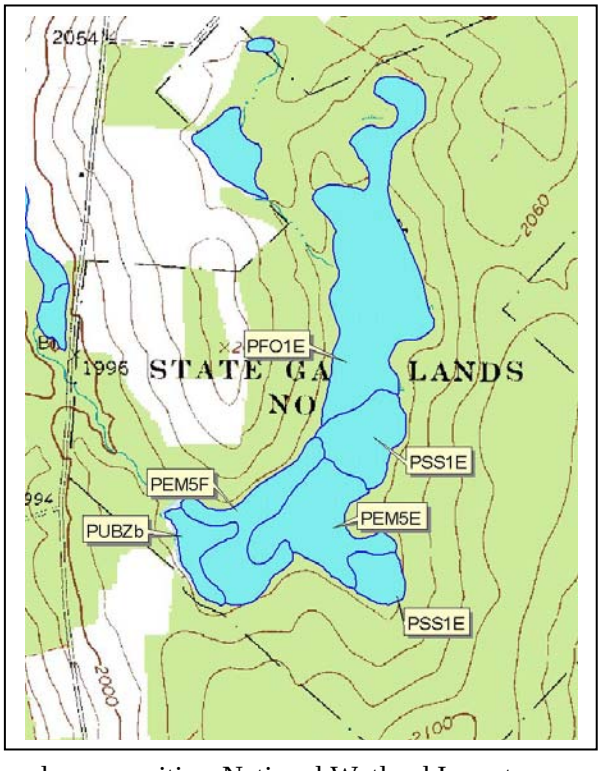
The Pennsylvania portion of the National Land Cover Dataset (NLCD) was created as part of land cover mapping activities for Federal Region III that includes the states of Maryland, Delaware, Pennsylvania, Virginia, West Virginia, and the District of Columbia. The NLCD classification contains 21 different 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, and local roads have a 100-foot ROW. Forest blocks with an area of greater than one square mile were selected from the forest land cover type. This process highlights interior forest blocks greater than one square mile in area as presented on the following page.





At first glance, most of Luzerne County appears forested (left). Unfortunately much of the county's forested areas are in small fragmented blocks with a high edge to interior ratio. When forest blocks of at least 250 acres are selected from the county's forested areas, the most important forest blocks become more apparent (right). These large forested blocks are critical habitat for plants and animals that are dependent of forest interior conditions such as many migrating bird species, fishers, bobcats, Northern Goshawks and Barred Owls. These forest blocks and their adjacent streams should be considered the backbone of wildlife habitat in the county. Conservation efforts in the county should concentrate on maintaining these large forest blocks by avoiding further fragmentation with additional roads, development and utility rights-of-way.



Wetlands are frequently a combination of several types of natural communities. National Wetland Inventory (NWI) maps provide distinctions among these types. The lines that occur within wetlands on the township maps in this report represent these distinctions. This wetland is represented in the aerial photo and the topographic map above. Distinct zones of open water and types of vegetation are clearly visible in the aerial photo and roughly correspond to the lines on the topographic map. This helps illustrate the complex diversity of habitats found in many wetlands. For a definition of wetland codes visit the National Wetland Inventory web site at: http://wetlandsfws.er.usgs.gov/tips.html

Riparian Buffer Recommendations:

Riparian areas are lands directly adjacent to streams, creeks and rivers. Land adjacent to waterways and wetlands has an immediate influence on the quality of the water and the habitat it supports. An undisturbed (no-cut) riparian buffer of 100 meters is recommended adjacent to all streams. The riparian buffers recommended in this report also include wetlands over one acre in size, while artificially created farm ponds have been excluded from this riparian buffer.

The literature varies with regard to buffer distances. From a strictly water quality standpoint, wetland buffers of 35-100 feet are thought to be sufficient for water quality maintenance. However, many of these buffer recommendations do not take wildlife habitat into account. Unfortunately, many states still refer to older literature with regard to wetland buffers and many of these studies are now considered to be rather obsolete. Newer scientific techniques have allowed researchers to conduct better studies with regard to habitat buffers. For example, wetland buffers of 15-30 meters were once thought to be sufficient to protect vernal pool amphibians. A series of papers from Conservation Biology (Semlitsch and Brodie 2003 - Buffer Zones for Wetlands and Riparian Habitats) conclude that buffers of this size are inadequate to protect terrestrial habitats for amphibians and reptiles. Some bird species require forested buffers to be closer to 500 meters!

PNHP recommends minimum buffers of 100 meters to maintain the water quality of the wetland as well as to support many of the species of wildlife found in these sites. These buffers were not created for any one particular species but are thought to overlap the habitats used by both common and rare species found at these sites. Certainly, expanding these buffers will still provide water quality protection while increasing habitat for species that require larger blocks of contiguous forest, such as the fisher and Northern Goshawk. It is our scientific judgment that a minimum buffer of 100 meters should be implemented around the wetland and riparian areas identified in the report to continue to support the species, both common and rare found at these locations.

The Township maps graphically symbolize these recommended riparian buffers in a green shade. Where these buffers coincide with large forested blocks (yellow, orange or brown) the riparian buffer is a priority for conservation. Where the buffers are outside of large forested blocks (gray areas) these are riparian buffers that should be considered priorities for restoratio

Riparian buffers through large forest blocks should be considered a priority for conservation (left)

Riparian buffer through non-forested areas should be considered a priority for restoration (below).

Invasive Plant Species

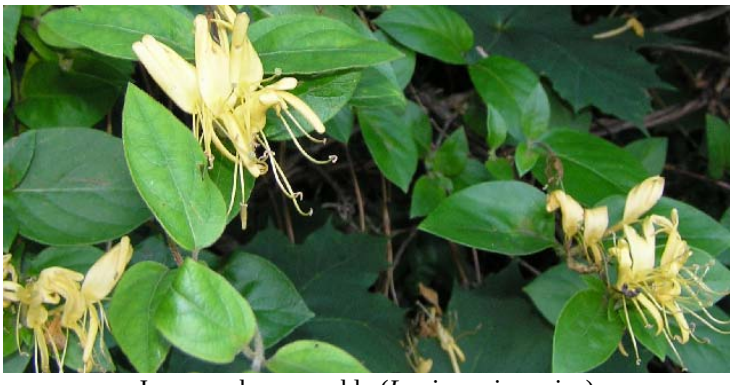
Among the most aggressive introduced plant species in Pennsylvania include the following top offenders of natural areas. These species are not kept in check by natural predators, and out-compete native species. Once established, they can be very difficult and time consuming to remove. Natural Areas should 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 & PNHP

Garlic mustard
(*Alliaria petiolata*)

Japanese Knotweed (*Polygonum cuspidatum*)

Purple loosestrife (*Lythrum salicaria*)

Below: Edge habitat that has been invaded by aggressive species of plants including tree-of-heaven, Japanese honeysuckle, multiflora rose and Asiatic bittersweet becomes a snarled, poor quality forest.



Japanese honeysuckle (*Lonicera japonica*)

PENNSYLVANIA NATURAL DIVERSITY INVENTORY DATA SYSTEM

In order to plan for the protection and stewardship of Luzerne County's natural features, the Pennsylvania Natural Heritage Program was contracted by the Luzerne County Office of Community Development to provide an inventory of significant flora, fauna and natural communities in the county. Critical to this effort is the Pennsylvania Natural Diversity Inventory (PNDI) database. PNDI 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 (WPC). In its 14 years of operation, the PNDI database has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (called natural communities in PNDI terminology), sensitive plant and animal species (species of special concern), and heron rookeries. Several other noteworthy natural features are also mapped, including 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 and digital 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 using a GIS (geographic information system).

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 Luzerne County. These areas, comprised of natural communities with their characteristic species, represent an estimated 85-90 percent of the biological diversity of an area (The Nature Conservancy, 1988); the other 10-15 percent consists of sensitive plant and animal species which occur both within and outside these natural communities. The full range of biological diversity in Luzerne County can be conserved by protecting both sites with the best occurrences of Luzerne County's natural communities as well as 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.

NATURAL AREAS INVENTORY METHODS

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

Information Gathering

A list of natural features found in each county was prepared from the PNDI data base and supplemented with information volunteered by local individuals and organizations familiar with Luzerne County. In May of 2000 a public meeting was held and recommended Natural Area Survey Forms (Appendix I) were distributed to facilitate public input. Pennsylvania Natural Heritage Program (PNHP) 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 by audience members and scheduled for field surveys.

Map and Air Photo Interpretation

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

After an initial round of photo interpretation, field surveys were conducted to evaluate the potential natural areas that were 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 with poor quality sites led to the elimination of further field work on other sites with similar signatures.

Field Work

Experienced PSO biologists and contractors conducted numerous field surveys throughout Luzerne County from Summer 1999 through Fall 2000. 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 of each potential natural area visited. An evaluation of quality was made for each potential natural community element, care being taken to give reasons for the quality rank. Boundaries of the community types were redrawn, if needed, based on new field information. 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 & Animal Survey Form, Appendix III), the quality of each population or community was assessed, and locations were marked on USGS topographic quadrangle maps.

In May of 2000 two low altitude reconnaissance flights were flown over the county to provide a more accurate overview of the current condition and extent of known natural areas and to assess the potential of any additional areas.

Data Analysis

To organize the natural features data and set conservation priorities, each natural community or species (element) is ranked using factors of rarity and threat on a state-wide (state element ranking) and range-wide (global element ranking) basis (see Appendix IV). Each location of a species (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 V. 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 bog copper in Luzerne County, as well as the state-wide or world-wide importance of these natural features. Obviously, sites with a greater number of highly-ranked elements merit more immediate attention than sites with a smaller number of lower ranked elements.

Field data for natural communities of C-rank or better, and for all plant and animal species of concern found were combined with existing data and summarized on PNDI Element Occurrence Records for mapping and computerization. Mapped locations of natural features, including approximate watershed or subwatershed boundaries, were then created and added electronically to PNDI's Geographical Information System (GIS) layer.

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 rare moth and butterfly species in Pennsylvania. A list of Plant and Animal of Special Concern in Luzerne County is provided in Appendix VI.

Luzerne County has a number of groups pursuing the protection of natural areas within the county. The following are general recommendations for protecting the biological diversity of Luzerne 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 Wild Resource Conservation Program funded The Mid-Atlantic Exotic Pest Plant Council (MA-EPPC) to develop an Invasive Plant Tutorial. This tutorial is designed to help with identification, prioritizing, preventing, and managing invasive plant species through resources already available through the internet.
http://intraforestry/invasivetutorial/index.htm

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/

Species Ranking

Each year biologists representing various taxonomic groups of the Pennsylvania Biological Survey meet to discuss and rank the most important species for the protection of biodiversity in Pennsylvania. The various Biological Technical Committees include the Vascular Plant Technical Committee, the Herpetological Technical Committee and the Ornithological Technical Committee. These meetings consist of a review and ranking of species of concern 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 species 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 presented in the Results section prioritizes sites with natural communities and species of concern documented in Luzerne County. These sites are displayed in **UPPER CASE LETTERS** throughout the report. This table ranks sites from the most important and threatened to the least, with 1 representing the highest priority sites and 5 representing the lowest priority sites for the conservation of biodiversity in the county. Ranks are based on rarity, quality, and threats or management needs of the elements at the site. Sites in this category that are ranked 1 or 2 may contain some of the best natural areas in the state. Table 2 lists the site name, local jurisdiction, and pertinent information about the site. A more detailed description for 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. These secondary sites are arranged in Table 2 in the Results section. They have been given qualitative ranks (high, medium, or low) according to size, level of disturbance, proximity to other open-space lands, and potential for sustaining a diversity of plant and animal life. These secondary-site ranks must be viewed as very approximate.

Site Ranking

The Pennsylvania Natural Heritage Program considers several criteria when ranking NAI sites to ensure that all sites, regardless of ecological differences, are evaluated systematically. Each criterion is considered independently and then all are examined collectively to ensure that no one criterion receives more emphasis than another. First, the commonness/rareness of the species at a site, defined by the global and state ranks (G & S ranks Appendix IV), is considered in the site ranking process. Those sites which include rarer species with lower ranks (i.e. G3 or S1) are given

precedence over sites with more common, higher ranked species (i.e. G5 or S3). Next, the number of different species occurring at a site is also considered in the ranking process. Sites with multiple tracked species are considered to be higher conservation priorities than sites with fewer tracked species. The ecological characteristics of the species at each site are also considered in the ranking process. For example, species that have highly specialized habitat requirements and are not known to readily disperse during periods of disturbance are under greater ecological pressure than species that have more general habitat requirements and have a greater capacity for dispersion. Finally, the site ranking process examines the landscape context of each site. For example, a site that is entirely isolated due to fragmentation, with little chance of restoration of connectedness, is a lower conservation priority than a site which remains connected to other suitable patches of habitat. Site connectedness is critical because the potential for connected populations to remain viable is far greater than small isolated populations. By considering these criteria, the conservation priorities within Luzerne County are highlighted to promote appropriate use of conservation dollars and efforts.

The **Northern flying squirrel (*Glaucomys sabrinus*)** is currently only found in a few sites in northern Pennsylvania including Luzerne County. Its status is undertermined in the state and more research is being conducted to determine the abundance of this species in PA. This species often inhabits mature spruce-fir forests and mixed conifer-northern hardwood forests.
Photo: Gregory Turner

Currently identified Important Bird Areas of Pennsylvania
From Audubon PA's website (http://pa.audubon.org/).

Pennsylvania Important Bird Areas

Luzerne County has much undeveloped land, forest interior, and a myriad of wetland communities that provide some of the finest bird habitats in Pennsylvania. The forests of the county provide outstanding habitat for bird species that rely on large unfragmented forested tracts, including the Northern Goshawk, Barred Owl and Scarlet Tanager. Pennsylvania's bird diversity is a critical component to the integrity and character of Penn's Woods and Luzerne County accounts for a significant proportion of the state's forests. Birds provide numerous benefits to human including insect and pest control, plant seed dispersal, tremendous aesthetic value, and in some cases hunting opportunities. Pennsylvania birders spend hundreds of millions of dollars in bird watching activities and equipment purchases every year!

Since European colonization, our diversity of bird life has been dramatically altered. Gone from the state are the Carolina Parakeet, the Heath Hen, and the Passenger Pigeon, a species which once stood as North America's most common bird. With the intense forestry practices of the 1800's, birds that relied on large forested tracts declined precipitously. During the past century, much of Pennsylvania's cleared forests have regenerated, restoring much of the lost habitat for forest birds that had been eliminated in years prior. Marsh birds have also been in decline across the U.S. from the draining and modification of natural marshlands.

In an effort to conserve the Commonwealth's avifauna, the Pennsylvania chapter of the National Audubon Society, along with the Pennsylvania Ornithological Technical Committee of the Pennsylvania Biological Survey, has identified 81 areas within the state, which they consider to be a part of a global network of places recognized for their outstanding value to bird conservation. More information about the Important Bird Area Program can be found at Audubon PA's website (http://pa.audubon.org/)

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. The list of sites for Luzerne County was then evaluated and ranked in order of importance for conservation of biodiversity at a statewide level. The rankings do not reflect the relative protection status or urgency of conservation action of the sites.

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. Sites of statewide importance support species of special concern, or have exemplary natural communities. These sites are listed in Table 1. Sites in this category that are ranked 1 or 2 may contain some of the best natural areas in the state. Locally significant sites are presented in Table 2. These areas provide locally significant habitat and may be suitable for environmental education, parks or preserves; no species of special concern or exemplary communities have been identified at the sites listed in Table 2.

Exceptional Natural Feature: The North Branch of the Susquehanna and Lehigh Rivers

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 North Branch of the Susquehanna River, the Lehigh River, and their tributaries. The North Branch of the Susquehanna River and its adjacent forested watersheds comprise one of the major corridors for the movement of biota in Pennsylvania. These forested corridors provide the habitat for resident species, the habitat required for migrating birds on a biannual basis, the habitat for resident and migratory aquatic animals, the habitat needed for the long term survival of plant species, and more. For example, an animal species of concern, the eastern fox squirrel (*Sciurus niger vulpinus*), has been reported to occur in forested areas and forested river islands of the North Branch of the Susquehanna in Luzerne County (Derge and Steele 1999). Additional surveys for this species are needed to determine the quality of the populations; however, the preservation of floodplain forests would greatly benefit the fox squirrel populations in the County.

The Lehigh River is listed as a High Quality Coldwater Fishery in the PA Code, Chapter 93 (1999) from its source to Tobyhanna Creek. The river has become a major recreational attraction for fishing and rafting. The Lehigh and its tributaries are also part of the historical range of the river otter (*Lutra canadensis*), and local residents have reported frequent otter sightings in this watershed.

In reviewing the report it is evident that many natural sites within the County are along the North Branch of the Susquehanna and Lehigh Rivers and their major tributaries. Along with these sites are areas that were beyond the scope of this project to fully investigate. Any intact natural areas in or adjacent to these waterways should be considered potential important habitat. The development of a comprehensive conservation plan for areas adjacent to the rivers and their tributaries, conducted in conjunction with other counties, may be the best tool for conserving these important natural resources.

Top Priority Natural Areas in Luzerne County:

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

ARBUTUS PEAK

(Bear Creek, Dennison, Fairview, Hanover, & Wright Twps. & Laurel Run Boro.) Arbutus Peak oak barrens is a relatively large oak-barrens complex of 5,000 to 6,000 acres southeast of Wilkes Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one located northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one located southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man - made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the heath shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and the exposure to sun. Pitch Pine (*Pinus rigida*), where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetlands adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appears to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species are found associated with the barrens and adjacent wetlands and more wait to be found. Four plant species of special concern are also found within the barrens. There are only minimal threats to these species posed by trail and mountain bikes and development such as radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

EDGEWOOD VERNAL POOLS

(Butler Twp.). This site is one of the top priority sites in Luzerne County. It contains a good example of an Ephemeral/Fluctuating Pool Natural Community (NC513). The site is located on and adjacent to Nescopeck Mountain, near the southern boundary of the last glacial advance. The dozens of pools occupy topographic depressions created by small ice blocks left behind by the retreating glaciers. This site provides valuable breeding habitat for many amphibians.

A large ice-block depression swamp of mixed hardwoods and hemlock is found near the southern edge of the vernal pool area. A good-to excellent-quality population of a PA-Rare plant species exists in the stream that drains this swamp (a tributary to Long Run). Two populations of another PA-Rare plant species were found at the site in 1990, growing along an ATV trail and in openings in the young oak forest surrounding the vernal pools. Neither of these were rediscovered during visits in 1999 and 2000, and one of the locations has been developed. A globally rare invertebrate species was also discovered at this site in 1990; although portions of the habitat for this species has been developed, additional surveys in the surrounding oak forest are recommended.

Commercial development has destroyed some areas of the woods and pools south of I-80 near Edgewood. Other disturbances include foot traffic from nearby trails. The nearby roadways pose a threat to amphibians when they migrate to the pools in spring. Vernal pools are extremely important, fragile habitats that are facing statewide pressure from development and other human disturbances (e.g., ATV traffic). Consequently, sites containing vernal pools should be a top priority for conservation in the county.

INDEFATIGABLE SWAMP

(Ross Twp. in Luzerne County and Forkston Twp. in Wyoming County). Indefatigable Swamp is a large and diverse forested seepage swamp with a variety of different habitats, three rare plant species and one animal species of concern on State Game Lands #57. The swamp was designated as a marginal- to good-quality Boreal Conifer Swamp Natural Community. There is no sign of current human activity in the swamp, and portions of the second growth spruce forest are beginning to mature. Heavy logging, road-building or other direct disturbances would be a threat to the continued recovery of this site as would disturbances to the surrounding hydrology**.**

NESCOPECK CREEK VALLEY

(Butler, Dennison & Wright Twps). This large natural area is centered about the upper watershed of Nescopeck Creek, encompassing portions of Nescopeck State Park and State Game Lands #187, and bordered by the Arbutus Peak site to the north. At least five rare animal and seven rare plant species have been documented from the site, occupying a variety of wetland and upland habitats. Disturbances to the site include Lake Francis and other impoundments along the Creek, a variety of ATV and jeep trails, logging, management activities in the State Game Lands, and recent construction of facilities for the State Park. Despite these disturbances, the valley is largely forested and undisturbed by past anthracite mining. Efforts should be made to manage the park to protect the wild nature of much of the valley (especially by protecting the forests along the Creek tributaries) and the associated species of concern**.**

TABLE 1. Summary of the sites of statewide significance for the protection of biological diversity in Luzerne 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. Ranks take into account potential threats, management needs, and existing protection. Sites of similar rank are listed alphabetically by site name. More in-depth information on each site including detailed site descriptions and management recommendations where appropriate can be found in the text following each township map and table. [1]

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
1	1	ARBUTUS PEAK	Bear Creek, Dennison, Fairview, Hanover, & Wright Twps. & Laurel Run Boro.	This Ridgetop Dwarf Tree Forest Natural Community has four plant species and fifteen invertebrate species of concern. Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania. There are only minimal threats to these species posed by trail and mountain bikes and development such as radio and cell towers. Some of the disturbance seems to actually benefit the species.
2	1	CRANBERRY POND	Newport & Slocum Twps.	Cranberry Pond is a fair- to good-quality example of an Oligotrophic Glacial Kettlehole Bog Natural Community (NC503). A good quality population of a PA-Rare plant species (SP525A) is one of the dominant species of over much of the floating mat. A fair-quality population of another plant species of concern (SP525B) occurs in mucky depressions near the edge of the open water, with many of the same associated species. The site also has an extraordinary diversity of amphibians, including at least nine different species of salamanders. This is one of the top priority sites for conservation in Luzerne County. There is a good diversity of bog flora and potential for additional plant as well as animal species of concern to be found. Cranberry Pond is hydrologically linked to adjacent glacial wetlands (Folstown Mud Pond, Lily Lake). The health of the natural community and its associated species will depend on maintaining water quality throughout the watershed – upstream, upslope on Penobscot Mountain, and downstream at Lily Lake. The pond, the surrounding forest, and adjacent lands are owned by the farm south of the site. Efforts should be made to assist the landowner in continuing to protect this unique site for the future. **Six new odonate species of concern and one new plant species of concern were located at this site during surveys in 2001 and 2005.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
1	1	EDGEWOOD VERNAL POOLS	Butler Twp.	This site is one of the top priority sites in Luzerne County. It contains a good example of an Ephemeral/Fluctuating Pool Natural Community (NC513). The dozens of pools occupy topographic depressions created by small ice blocks left behind by the retreating glaciers. This site provides valuable breeding habitat for amphibians. Many additional pools remain to be surveyed. A good- to excellent-quality population of a PA-Rare plant species (SP511) exists in the stream that drains this swamp. Two populations of another PA-Rare plant species (SP512 & SP513) were found at the site in 1990. A globally rare invertebrate species (SA514) was also discovered at this site in 1990; although portions of the habitat for this species have been developed, additional surveys in the surrounding oak forest are recommended. Commercial development has destroyed some areas of the woods and pools south of I-80 near Edgewood. Other disturbances include foot traffic from nearby trails. The nearby roadways pose a threat to amphibians when they migrate to the pools in spring. Vernal pools are extremely important, fragile habitats that are facing statewide pressure from development and other human disturbances (e.g., ATV traffic). Consequently, sites containing vernal pools should be a top priority for conservation in the county. **The plant species SP511, *Orontium aquaticum* (Golden Club), and SP512, *Lygodium palmatum* (Hartford Fern), have been removed from the species of concern list.**
1	1	INDEFATIGABLE SWAMP	Ross Twp. in Luzerne County and Forkston Twp. in Wyoming County	Indefatigable Swamp is a large and diverse forested seepage swamp with a variety of different habitats, three rare plant species (SP532, SP533, and SP534) and one animal species of concern (SA533) on SGL #57. The swamp was designated as a marginal-to good-quality Boreal Conifer Swamp Natural Community (NC534). There is no sign of current human activity in the swamp, and portions of the second growth spruce forest are beginning to mature. Heavy logging, road-building or other direct disturbances would be a threat to the continued recovery of this site as would disturbances to the surrounding hydrology. Additional surveys are recommended to monitor the plant and animal species of concern.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
1	1	NESCOPECK CREEK VALLEY	Butler, Dennison & Wright Twps.	This large natural area is centered about the upper watershed of Nescopeck Creek, encompassing portions of Nescopeck State Park and SGL #187, and bordered by the Arbutus Peak site to the north. At least five rare animal and seven rare plant species have been documented from the site, occupying a variety of wetland and upland habitats. Disturbances to the site include Lake Francis and other impoundments along the Creek, a variety of ATV and jeep trails, logging, management activities in the SGL and recent construction of facilities for the State Park. Despite these disturbances, the valley is largely forested and undisturbed by past anthracite mining. Efforts should be made to manage the park to protect the wild nature of much of the valley (especially by protecting the forests along the Creek tributaries) and the associated species of concern. **Seven new odonate species of concern, one new Lepidopteran species of concern, and two new plant species of concern were located at this site between 1987 and 2005.**
2	2	BRIGGSVILLE VERNAL POOLS	Nescopeck Twp.	This site contain a series of vernal pools making up an Ephemeral/Fluctuating Pool Natural Community (NC515) north of the Nescopeck mountain. Vernal pools are extremely important, fragile habitats that are facing statewide pressure from development and other human disturbances (e.g., ATV traffic). Consequently, sites containing vernal pools should be a top priority for conservation in the county. One of the current landowners would like to preserve his property and has expressed an interest in having a conservancy purchase the property. **A reptile species reported from previous survey visits has since been added to the species of concern list.**
2	2	CAMPBELL'S LEDGE	Exeter Twp. & Wilkes Barre Boro	Campbell's Ledge is situated on the summit of a ridge overlooking the Susquehanna River and provides a spectacular view of the river valley. This unique site was identified as a Northern Appalachian Calcareous Cliff Natural Community (NC501) and a Northern Appalachian Calcareous Rocky Summit Natural Community (NC502). The vegetation in these areas, consisting of scrubby woodland, shrub thickets, and small herb-dominated openings, provide the habitat for seven state-listed plant species of special concern, as well as a number of other plant species that are infrequent in the state. The disturbances on the ridge include previous logging, previous mining, numerous jeep and ATV trails, exotic plant species, and litter. The habitat in the vicinity of the outlook has been degraded by excessive foot and vehicular traffic. Potential threats include development and additional logging. **Two new animal species of concern were located at this site in 2000 and 2005. One species is a State Endangered animal that was seen nesting along the cliff at this site.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
2	2	DOGTOWN MINES	Salem Twp.	This site on SGL #260 contains a series of underground mine portals. Two animal species of concern were captured near one of the mine entrances. SA506 is a G4 species, while SA507 is Federally and PA-Endangered. Threats to the species include mine collapse, logging of the woods near the mines, and coal extraction. Placing gates across the mine openings would also help to protect the species of concern. **An additional PA-Threatened mammal species of concern was documented at this site in 2000.**
2	2	DORRANCE BOG	Dorrance Twp.	This site is one of the top sites for preservation in Luzerne County. It is a classic kettlehole bog with a floating mat at its center, and it is the best example of an Oligotrophic Glacial Kettlehole Bog Natural Community (NC503) in Luzerne County. A good- to fair-quality population of a plant species of concern (SP503B) occurs along the edge of the bog. A fair- to poor-quality population of a PA-Rare plant species (SP503A) occurs in shaded habitat. Draining, peat mining, or excessive visitation are the only likely future threats to the natural community. The current landowners have owned the site for many years. They should be commended for their stewardship and assisted with the protection of the site for the future. **The plant species SP503A, *Orontium aquaticum* (Golden Club), has been removed from the species of concern list.** **Surveys conducted in 2001 documented the occurrence of a reptile species of concern, and the Bog Copper butterfly (*Lycaena epixanthe)* at this location. The Bog Copper butterfly feeds exclusively on cranberry plants while it is in its larval stage**.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
3	2	FRANCIS E. WALTER RESERVOIR SITE	Bear Creek Twp. & Carbon County	Three occurrences of a PA-Threatened animal species (sa511, sa533, & SA533) have been monitored at the reservoir area for many years. The species feeds at the reservoir and therefore is dependent on the water quality of Bear Creek and the Lehigh River. The population of the animal species has grown in recent years. The protection of large trees and snags along the waterways is important for the species. Two additional animal species of concern (SA503A & SA503B) occupy the Lehigh River gorge below the dam, using the rock outcrops and cliffs on both sides of the river. This portion of the river is used for recreational boating; care should be taken not to disturb the rock outcrops and overhangs that provide habitat for this species. Additional surveys are needed to evaluate the quality of the animal populations. A PA-Rare plant species (SP531) occurs on a privately-owned pond near the reservoir **The plant species SP531, purple bladderwort (*Utricularia purpurea)* has been removed from the species of concern list.** **Eight new odonate species of concern were identified at the Francis E. Walter Reservoir Site in 2004 and 2005. An excellent quality population of a Pennsylvania Threatened bat species, Eastern Small-footed Myotis (*Myotis leibii*) was located at this site in 2004.**
2	2	GLEN LYON ANTHRACITE MINE	Newport Twp.	One Federally Threatened animal species (SA512A) and another PA animal species of concern (SA512B) occupy the same man-made habitat at this site. To persist, the species require not only the mine as a hibernacula, but also adequate nearby feeding areas. There is some evidence of human disturbance within the mine entrance, and of litter and use of the site as a party spot. The site needs to have continued monitoring of the populations and protection of the mine entrance by gating or other means to prevent disturbance of the rare species.
2	2	HAYSTACK MOUNTAIN	Rice, Fairview, and Hanover Twps.	This site is a good to excellent quality high elevation (1,600-1,870 feet) Northern Appalachian Acidic Rock Summit Natural Community (NC501) characterized by open, rocky areas with sparse vegetation. Since 1996, five plant species of concern were identified at the site. The wildfires that periodically burn the area are actually good for the plant species that grow in this natural community. Fire suppression and trash dumping are potential threats to the plants. **A small population of a State Endangered plant species of concern, Bicknell's Sedge (*Carex bicknellii*) was located at this site in 2001.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
2	2	KITCHEN CREEK RAVINES	Fairmount Twp.	The gorge and waterfalls host a unique assortment of plant life including four plant species of concern. Two of the plant species found at this site are PA-Endangered (SP514 & SA537B). Additional searches in nearby drainages and the continued monitoring of this site are recommended. A wooded buffer should be maintained along the waterfalls and ravines. The ravines are protected within Ricketts Glen State Park and The Glens Natural Area. **A population of an animal species of concern was observed here in 2000.** **A good population of a State Rare plant species of concern, Creeping Snowberry (*Gaultheria hispidula*) was documented at this site in 2003.** **A bird species of concern, Swainson's Thrush (*Catharus ustulatus*) was found at this site in 2004.**
2	2	LEE SWAMP	Lake Twp.	This site located on private property is the 40 -50 acre former bed of Lee Pond that was drained in the 1950's. The substrate over much of the area is deep, quaking peat. Five different bird species of special concern have been observed breeding at Lee Swamp in recent years and there is potential habitat for several other listed bird species. Despite past disturbances the site today is one of the largest marshes in the county and clearly provides good nesting habitat for the species of concern. There is no evidence of recent disturbance. Potential threats include runoff from surrounding agricultural fields, or changes in the water level that could hasten succession from the current marshy habitat favorable to the species of concern.
3	2	LILY LAKE	Conyngham, Newport & Slocum Twps.	This site is a natural glacial lake downstream of the Cranberry Pond site. Three plant species of concern occur at the site (SP510A, SP510B, and SP513). Care should be taken to preserve the windward (southeastern) sandy shoreline areas from disturbance and to maintain a "no-wake" zone here to prevent excessive shoreline erosion by waves. **Five new odonate species of concern and three new plant species of concern were documented at this site between 2001 and 2005. Two plant species identified at this site in the original inventory have been removed from the species of concern list.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
3	2	VALMONT INDUSTRIAL PARK	Hazle Twp.	This site is a sloping area of shallow peat and acidic seeps dominated by sphagnum moss (*Sphagnum sp*.) and sedge (*Carex sp*.) species. The combination of the high-elevation acidic seep and the open areas created by disturbances, provides habitat for seven rare plant species (SP506A, SP506B, SP506C, SP506D, SP506E, SP509A, & SP509B) and an animal species (SA506). Increased use of the trail to the site by ATVs, spraying of the powerline R-O-W with herbicide, increasing surrounding development, and changes in hydrology are among the chief threats to this vulnerable and unique habitat. Steps should be taken to assist the surrounding landowners and municipalities in preserving this unique site and the rare elements it contains. **The plant species 506B, *Lygodium palmatum* (Hartford Fern), SP506E, *Xyris montana* (Northern Yellow-eyed Grass), SP509A, *Gentiana linearis* (Narrow-leaved Gentian), and SP509B, *Utricularia geminiscapa* (Bladderwort), have been removed from the species of concern list.** **Eight new odonate species of concern and two new mammal species of concern were located at this site in 2004 and 2005.**
3	3	BEAR HOLLOW	Lake Twp.	This site contains a nesting area for an S3S4B,S4N animal species of concern (SA515) in a small, open wetland along the small stream draining Bear Hollow. Bear Hollow itself is an isolated eastern hemlock (Tsuga canadensis) hollow with a remarkable diversity of breeding amphibian species occupying the stream and several small vernal pools. A small dirt road parallels the stream, and some trash has been left in the vernal pools. Leaving the road unimproved and protecting the stream and pools should benefit both the species of concern and the great diversity of other plant and animal species occupying the site. **Four new odonate species of concern were located at this site in 2004.**
NEW	3	BEHREN POND	Bear Creek Twp.	**Seven odonate species of concern, Elfin Skimmer, Slaty Skimmer, Crimson-ringed Whiteface, Petite Emerald, Lilypad Clubtail, Mottled Darner, and New England Bluet, and one new plant species of concern, Water Bulrush, were documented at this site. Threats to the plant species of concern include the potential use of herbicides for vegetation control or dredging in this very shallow lake. The major disturbance to this habitat was the flooding of the former bog to create the present lake.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
4	3	BENTON STATION FIELDS	Fairmount Twp.	An S3,G4 invertebrate animal species (SA557) was identified at this site in Ricketts Glen State Park. The threats to the animal species include mowing of the field in the spring and summer when the larvae are feeding on vegetation. A rotating schedule of mowing that includes mowing one third of the field every year in late October is optimal for maintaining habitat for the species of concern. A field with mowed and unmowed areas provides a variety of vegetation height and structure. Additionally, at least six inches of stubble must be left as a vegetative buffer for overwintering eggs and larvae. In 2001, two plant species of concern were discovered (SP562A & SP562B). This site may be partially impacted by the current logging activities in the park. The field should be restored upon the conclusion of the logging. **The plant Narrow-leaved Gentian (SP562B) was removed from the species of concern list.** **Two Lepidopteran species of concern were located here in 2001, Baltimore Checkerspot (*Euphydryas phaeton*) and Eyed Brown (*Satyrodes eurydice*). A good population of a new plant species of concern, Slender Wheatgrass (*Elymus trachycaulus*) was also documented at this site in 2005.**
3	3	BOULDER RUN SWAMP	Ross & Lake Twps.	This site is an Acidic Shrub Swamp Natural Community (NC521) near the edge of the Allegheny Front. A PA-Rare shrub (SP521) is a dominant plant in the low-shrub swamp. Two breeding occurrences of a PA-Threatened animal species (SA522 & SA523) were documented. There is no sign of recent habitat disturbance at the site, although the early successional stage suggests beaver activity in the past. The preservation of the existing hydrology is important for the plant species found in the swamp. Additional surveys are needed to access the quality of the animal species. Logging in or near the swamp are possible threats to the site. The site is located on SGL #57.
4	3	COUNTY LINE SWAMP	Fairmount Twp. in Luzerne County, Forkston Twp in Wyoming County, & Colley Twp. in Sullivan County	County Line Swamp is found on SGL #57. Two PA-Rare plant species (SP567A & SP567B) were identified at the site in 1993. The populations of both rare plant species are healthy and there does not appear to be any threats. New locations of an S3B, S3 animal species (SA581) were discovered in SGL #57 in April of 1995. Additional surveys are needed to determine the numbers of this species present in the SGLs. The preservation of snags and older trees would benefit this animal. The majority of this site lies in Wyoming County. **Two new good quality population of plant species of concern were found at this site in 2003, Screw-stem (*Bartonia paniculata*) and Fall Dropseed Muhly (*Muhlenbergia uniflora*).**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
3	3	DRECK CREEK WATERSHED	Hazle Twp.	This site, which is owned by the City Water Authority of Hazleton, consists of a narrow, wooded stream valley with a small perennial stream that flows into a series of wetlands and eventually a reservoir that is used for public drinking water. A good-quality population of a PA-Endangered plant species (SP510B) and a fair-quality population of another plant species of concern (SP510A) occur here. Runoff or other disturbance from logging in the adjacent forest, and flooding of the wetland by the reservoir are potential threats to the plant species of concern. An animal species of concern (SA511) was discovered using rocky habitat along a powerline ROW south of Dreck Creek. Additional surveys are needed to determine the status of this population. In addition, two rare Lepidopteran species (SA512A & SA512B) were identified. Logging of the site and gypsy moth spraying would be detrimental to these species.
3	3	DRY LAND HILL POOLS	Bucks Twp.	This site consists of two large vernal pools in a matrix of typical dry, acid, oak-heath forest. A plant species of concern (SP532) is the dominant plant in the larger pool and is also present in the second pool. A deer trail runs through the site, but no browse was seen on the plant species of concern. An S2 animal species of concern (SA532) was identified in 1999. This inconspicuous invertebrate animal species uses cranberry as its host plant. The spraying of pesticides or herbicides is a potential threat for SA532. The woods to the south have been heavily logged recently. The long -term threats to the site would be succession from shrub-thicket margins of pools, and human disturbance by draining or dumping of logging slash in pools. Buffering the pools from logging would protect both species of concern from harmful disturbance. The North Branch Land Trust is working on protection for this site.
3	3	GARDNER CREEK RESERVOIR	Jenkins & Plains Twps.	This site consists of an extensive rock outcrop area north of the Gardner Creek reservoir. An animal species of concern exists at the site (SA537). There are no apparent disturbances to the site at this time. An extensive clearcut or development of the site are potential threats. Additional surveys are needed to determine the status of the animal population.
3	3	HUMBOLDT BARREN	Hazle Twp.	This site is a Ridgetop Dwarf Tree Forest Natural Community (NC508) on a broad, high-elevation (1500-1700 ft) ridgetop. The site is unusual among Luzerne County ridgetop barrens in having pitch pine (*Pinus rigida*) that is at least as abundant as scrub oak over much of the site. Disturbances include a large utility line, a network of gravel roads that may act as firebreaks, and mine tailings at the border of the Natural Community. Fire suppression, chemical maintenance of the powerline R-O-W. (observed in 2000), logging for pulpwood, and ATV use are potential threats to the site.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
3	3	LAKE LEIGH	Fairmount Twp. in Luzerne Co. & Colley Twp. in Sullivan Co.	Three plant species of concern (SP542A, SP542B, & SP543C) occupy boggy habitat on the bottom of this drained lake. A dam at its south end is no longer functional, but the site has been impacted by repeated flooding and draining. A small population of a PA-Rare plant species (SP553) was found growing in a young red maple/hemlock swamp just east of Lake Leigh. The site has a history of disturbance including changes in hydrology and wind thrown trees from a storm that passed through this area a couple of years ago. No current threats are evident. The site should be monitored in the future. A small portion of this site is within Sullivan County. **The plant species SP542A, Narrow-leaved gentian (*Gentiana linearis*), has been removed from the species of concern list. A new odonate species of concern, Brush-tipped Emerald (*Somatochlora walshii*) was located at this site in 2002.**
3	3	LEHIGH GORGE	Foster Twp. in Luzerne Co. & Kidder Twp. in Carbon Co.	Two animal species of concern (SA534A & SA534B) have been observed using this area. Additional surveys are needed to determine the quality of the populations. No management of the two species is needed at this time. **Many individuals of a newly documented S1 animal species of concern were located at this site in 2003.**
NEW	3	LEHIGH RIVER AT CHOKE CREEK	Buck Twp.	**Six odonate species of special concern were documented at this site in 2004. Further surveys need to be done to determine the extent of the populations and habitat quality.**
3	3	LEHIGH RIVER-ROUTE 115 BRIDGE	Buck Twp. in Luzerne Co. & Monroe & Carbon Counties	Two aquatic plant species of concern (SP505 & SP526) were identified at the site in 1991 and 1992. The river was revisited in 1999 and a fair-quality population of SP505 was once again found at the site. A great deal of siltation in the river was noted. The continued siltation and degradation of water quality of the Lehigh River are potential threats. **The plant species SP526 Golden Club *(Orontium aquaticum)*, has been removed from the species of concern list.** **A Federally and State Threatened animal species of concern was seen nesting at this site in 2001 at the confluence of White House Run and the Lehigh River.**
3	3	MUD POND WOODS	Bear Creek Twp.	This site consists of a moist second growth oak-heath forest. A globally rare invertebrate species (SA541) was found here at several locations in 2000. The species is dependent upon the fly-poison (*Amianthium muscaetoxicum*) that is abundant in the groundcover, particularly in the slightly more mesic areas. The threats to the species include logging, the use of herbicides, or spraying for gypsy moth.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
3	3	NANTICOKE MARSH	Nanticoke Boro, Hanover Twp.	This site is one of the largest cattail (*Typha latifolia*) marshes in Luzerne County. It is located on the Susquehanna River floodplain adjacent to the City of Nanticoke. Three animal species of concern have been found using this habitat in recent years (SA535A, SA535B, & SA535C). Draining of the marsh or pesticide use are potential threats. The Earth Conservancy owns portions of this site. Additional surveys are recommended to monitor the extent and success of the rare species populations at the site.
3	3	NESCOPECK MOUNTAIN BARRENS	Dennison and Wright Twps.	This site is an example of a Ridgetop Dwarf-Tree Forest Natural Community (NC507). It mainly consists of a scrub oak (*Quercus ilicifolia*) forest stretching across several summit areas along a sandstone ridgetop. Some of the pitch pines show evidence of past fires that are a natural process necessary to maintain the plant community. This habitat is also appropriate for rare Lepidopteran species; although none have been found at this site, several are found in similar habitat at the adjacent Arbutus Peak site. This site is part of SGL #187.
NEW	3	OLD BOSTON MINES	Jenkins Twp.	**Two mammal species of concern, Northern Myotis and Eastern Small-footed Myotis, were located at this site in 2005, including a state threatened species.**
NEW	3	ROUTE 11 BOAT LAUNCH	Conyngham, Hunlock, Newport, Salem & Union Twps.	**One odonate species of concern, Cobra Clubtail, and two animal species of special concern were documented at this site in 2000 and 2005, including a Federally Threatened species. Threats include disturbance by humans and the creation of new roads or trails.**
3	3	STATE GAME LANDS #57	Ross & Lake Twps.	This area has extensive south-southeast facing rocks and rock outcrops. Four separate occurrences of an animal species of concern have been documented. Further extensive surveys are needed to adequately survey this area. The overgrown portions of the site may actually benefit from a very limited selective cut during the winter to remove larger trees shading the site.
3	3	STOCKTON MOUNTAIN BARRENS	Hazle & Foster Twps.	This area includes a fair-quality example of a Ridgetop Dwarf-Tree Forest Natural Community (NC509). A globally rare Lepidopteran species (SA512A) and a second rare Lepidopteran species (SA512B) were discovered to the south of the Barrens in limited surveys over the course of this study making additional searches warranted. The surrounding area is highly disturbed. The city of Hazleton owns the western edge of the site, and extensive coal mining and other industrial activity has taken place to the north and to the south. The site is also bisected by several powerline R-O-Ws, one paved road, and various ATV trails. Portions of the site burned in the 1990's and the natural community is fire-dependent. Minimizing loss of habitat from ATV activity and maintaining the scrub oak and pitch pine will benefit the rare moth species present.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
Locally Signi-ficant	3	SUSQUEHANNA RIVERLANDS	Salem & Conyngham Twps.	**Five Lepidopteran, one mammal species of concern, and two animal species of concern, were identified at this site between 1997 and 2000. Threats and disturbances include BT spraying for gypsy moths, herbicides along roadside, draining of marsh, sand and gravel mining, sprawl, drought, and absence of many woodland species.**
5	3	TANNERY ROAD SITE/ BEHLER SWAMP	Bear Creek and Buck Twps. in Luzerne County and Lehigh Twp. in Lackawanna County	This site is part of State Game Land #91 and the Lackawanna State Forest. Populations of two separate plant species of concern exist here. A good-quality population of a PA-Rare plant (SP517) was first identified at the site in 1991. The population was monitored in 1996 and again in 1999. A second plant population of concern (SP531) was discovered in 1999. Both populations could potentially be affected from trampling by hikers using the trail. Also, browsing by deer could pose a threat. Lastly, SP531 would be impacted if beavers change the hydrology of Choke Creek. An animal species of concern (SA540) was observed nesting at the site in 2000. The preservation of larger trees and snags would greatly benefit this species. Additional surveys are needed to determine the quality of the population. **The plant species SP531, Narrow-leaved Gentian *(Gentiana linears)*, has been removed from the species of concern list.** **A new population of Common Labrador-tea (*Ledum groenlandicum*), was located at this site in 2003.** **Four newly documented odonate species of concern, were found at this site in 2004 and 2005.**
4	3	THE MEADOWS/ BEECH LAKE	Fairmount and Ross Twps.	This site on SGL #57 is made up of a pond and an adjacent wetland known as the Meadows, and a small man-made area named Beech Lake. Two plant species of concern (SP514A & B) were identified in the Meadows area and two plant species of concern (SA514C & D) were found in Beech Lake. Maintaining the present hydrology is important. Additionally, three animal species of concern (SA524, SA525, & SA551) were discovered. The threats to SA524 & SA525 include mowing of the field in the spring and summer when the larvae are feeding on vegetation. A rotating schedule of mowing that includes mowing one third of the field every year in late October is optimal for maintaining habitat for the species of concernSA551 would benefit from the preservation of larger trees and snags. **The plant species SP514A, Narrow-leaved Gentian *(Gentiana linearis*), SP514B, Small-floating Manna-grass, (*Glyceria borealis*) and 514D, Purple Bladderwort *(Utricularia purpurea*) have been removed from the species of concern list.** **Nine new odonate species of concern and one new Lepidopteran species of concern were located at this site between 2002 and 2005.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
4	3	WRIGHT CREEK WATERSHED A	Dennison Twp.	This area along Wright Creek was last visited in 1996. A globally rare, PA-Endangered plant species (SA517) occurs in a dry-mesic to moist woods on the site. Garbage dumping, foot traffic, and utility line & railroad construction are the past and present disturbances. Threats to the species of concern include logging, development, and the establishment of exotic plant species.
3	3	WYOMING MOUNTAIN BARRENS	Bear Creek Twp.	This site is part of a mosaic of a Ridgetop Dwarf Tree Forest Natural Community (NC501 & NC504) stretching along the ridgetop from Bald Mountain southwest to Penobscot Mountain. A PA-Rare plant species (SP524) was identified at the site. Fire is beneficial to this plant and plant community. Development and fire suppression and the use of herbicides are potential threats. Part of this site is within SGL #91. **Two new moth species of concern, a noctuid moth (*Platyperigea menalis*) and (*Diarsia rubifera)*, and an odonate species of concern Ski-tailed Emerald (*Somatochlora elongata*) were located at this site in 2000.**
4	4	ABRAHAMS CREEK WETLANDS	Dallas, Franlin & Kingston Twps.	The site consists of creek-side wetlands impacted by flooding from the damming of the creek downstream in Frances Slocum State Park. Two animal species of concern (SA505A & SA505B) occupy a herbaceous wetland where the creek enters the reservoir, and another species of concern (SA504) breeds in a flooded forested wetland to the north. More habitat data is needed on this site, but the species of concern have been recorded using the site for several years. The preservation of large trees is important to SA504. Maintaining the water quality of the Abraham's Creek and stable water levels during growing season will benefit the species of concern. **A good population of a plant species of concern, Soft-leaved Sedge (*Carex disperma*) was located at this site in 2003.**
3	4	BALD MOUNTAIN ROAD SWAMP	Bear Creek Twp.	This site, which is designated as a marginal to good - quality example of a Boreal Conifer Swamp Natural Community (NC532), is located near the headwaters of the Bear Creek drainage. The site appears to be ideal habitat for several plant species of concern, though no rare plant species were seen during this visit. A bird species of concern has been observed in the area, although no nests have been found. The site is on SGL #91. Allowing the site to mature further will enhance the quality of the natural community.
NEW	4	BEAR CREEK RAILROAD SITE	Bear Creek Twp.	**Two animal species of concern, one Lepidopteran species of concern, Flypoison Borer Moth, and one odonate species of concern, Mottled Darner, were seen at this site in 2002. A potential threat to the animal species of concern is mortality due to vehicles.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
5	4	BLACK CREEK FLATS	Hazle Twp.	This site is a flat, open area along Black Creek in Hazleton. It appears to have been severely disturbed by mining or other invasive activities in the past. A good-quality population of a PA-Rare plant species (SP508) is scattered throughout the site. This species requires open conditions and benefits from the disturbed soil and slow succession at the site. In 2001, an invertebrate species of concern (SA508) was discovered. The site is being disturbed by litter and fill. Also, the area is being degraded by fast-growing, weedy plant species. Management of the aggressive plant species may be required. **The plant species SP508, Hartford Fern *(Lygodium palmatum*), has been removed from the species of concern list. Six invertebrate species of concern (four lepidopterans and two odonotes) were documented at this site from 1997 to 2004.**
4	4	CANADA BOG	Bear Creek Twp.	The site is a fairly intact floating Oligotrophic Kettlehole Bog Natural Community (NC539) surrounded by a beaver-impacted spruce and tall shrub swamp. The substrate is a deep sphagnous peat. A plant species of special concern (SP539) occurs in the center of the bog in low mucky pools and was associated with sundews (*Drosera intermedia*) and yellow-eyed grass (*Xyris sp*.). A beaver dam and impoundment exists north of the Natural Community. The Canada Bog may have been affected by fluctuating water levels in the past, but remains one of the few intact floating bogs in the county. Additional flooding by beaver or draining by humans are the only identifiable threats. A portion of this site lies on SGL #91.
NEW	4	CENTRAL MOUNTAIN	Fairmont Twp., & Sullivan and Columbia Counties	**This mostly forested area contains an Ephemeral/Fluctuating Pool Natural Community, a Hemlock Palustrine Forest Natural Community and a G3, S3 Federally–Endangered plant species of concern.**
5	4	COUNTY LINE ISLANDS	Exeter Twp. & Lackawanna & Wyoming Counties	This island/river gravel community was first visited in 1996. A marginal population of a PA-Rare plant species (SP524) occurs in an open, scour area of the island. When the site was revisited in 1999, SP524 was found once again along with a new marginal population of a G3G4 animal species (SA525). Threats to the plant species include competition with invasive plant species, deer browse, and changes in hydrology (e.g., construction of new dams). Any changes in hydrology and water pollution would affect the animal species.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
5	4	HARVEY'S LAKE	Dallas & Lake Twps. in Luzerne County & Monroe Twp. in Wyoming County	Harvey's Lake is one of the largest natural lakes in Pennsylvania and there are numerous historical records from the lake of plant species now considered rare or endangered. Populations of one PA-Rare (SP510) and one PA-Endangered plant (SP509) species have been collected from the site by PNHP biologists. These plants were not rediscovered in a survey of the lake in 1999, but much additional habitat remains and it is possible that the species of concern are persisting. Additional surveys are needed to assess these populations. **Three new plant species of concern were located at this site in 2002 and 2003. The plant species SP510 has been delisted.**
NEW	4	HELL'S KITCHEN AMLF #3 SITE	Hazle Twp.	**A G4 animal species was discovered at this mine site in 1998, but additional surveys are needed to determine the quality of this population.**
4	4	HELL'S KITCHEN ANTHRACITE MINE	Butler Twp.	A G4 animal species (SA517) was discovered at this mine site in 1998, but additional surveys are needed to determine the quality of this population. Disturbance of the site from continued mining is a potential threat.
4	4	HOBBIE MEADOW	Hollenback Twp.	This private property contains a young forest (20-30 years) that was formerly farmed or used as pasture. A fair to good-quality population of a PA–Rare plant species (SP504) was found at this site along a mowed path. The plants could be out -competed by other species like Virginia creeper or poison ivy. Also the trees may be shading-out SP504 as the forest stand becomes older. Lastly, deer browse may be affecting the plants. Maintaining the mowed path and periodic mowing of the small clearings will help the rare plant population found at this site. The control of the deer population by allowing hunting on the property would also be helpful.
4	4	ICE CAVES	Kingston & Wilkes Barre Twps.	This Talus Cave Natural Community (NC502) on private property has ice caves and a waterfall that drops 50 feet into a high gradient hemlock (Tsuga canadensis) and yellow birch (*Betula alleghaniensis*) ravine. The massive ice formations are present into mid-March. This area was last visited in 1982 and should be revisited to obtain updated information and to assess conservation needs.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
4	4	KIRBY PARK	Kingston, Plains & Wilkes Barre Twps.	This site is a municipal park that includes a large silver maple (50 + feet) floodplain forest along the Susquehanna River. A population of a PA animal species of concern (SA532) exists at this site and on nearby river islands (Richard & Monocanock Islands). Both the floodplain and the river islands are seasonally flooded. One current threat to the animal population is a proposed inflatable dam that could cause inundation of this floodplain or the river islands. Changes in the hydrology could kill the large trees used by the animal species of concern at the site. The present hydrology (seasonal flooding) should be maintained. The same animal species of concern occurs at various floodplain forest sites along the Susquehanna River throughout much of the county. These sites are not mapped, as more descriptive information on the status of these populations is needed. **In 2000 an animal species of concern was found along the Susquehanna River. The floodplain and the river islands are seasonally flooded. The current threat to the species of concern is the proposed inflatable dam that could cause inundation of this floodplain or river islands. Changes in the hydrology could kill the large trees at the site that this species seem to prefer.**
3	4	LAKE JEAN	Fairmount Twp. in Luzerne Co. & Colley Twp. in Sullivan Co.	This site within Ricketts Glen State Park is a shallow man-made lake that was formerly the site of two smaller lakes, one natural and one man-made. A fair- to good-quality population of SP505 was last seen in 1996. SP506 is a good-quality population of a PA-Threatened aquatic plant species. SP545 is a small, easily overlooked, aquatic species found in shallow water near one edge of the lake. At least 30 individuals of an invertebrate animal species of concern (SA543) were seen at the lake margin. This species appears to be doing well at this site and appears to tolerate recreational lake activities if the natural vegetation persists at the lake edge. In 2000, two additional invertebrate species of concern (SA555 & SA558) were discovered. If the park uses herbicides to control aquatic weeds in the lake, the practice should be closely evaluated and monitored to avoid either direct impacts on the rare plant species (SP505, SP506, & SP545) or indirect impacts on the animals of special concern (SA543, SA555, & SA558). Use of pesticides (including Bt) in and around the lake could also impact the animals of concern. . A small portion of this site is within Sullivan County. **The plant species SP505, *Utricularia purpurea* (Purple Bladderwort), and SP545, *Elatine minima* (Small Waterwort), have been removed from the species of concern list.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
4	4	MOUNTAIN SPRINGS LAKES	Fairmount & Ross Twps.	This site is the drained bed of a man-made lake known as Lake #1 or Splash Dam located in a mountainous area along Bowmans Creek. The land is public and is maintained by the PA Game Commission and The PA Fish & Boat Commission. A functional lake (Lake #2), which is used for public fishing, is found to the west and is included as part of this site. Four plant species of concern (SP512A, B, C, & D) were identified in Lake #1 and four were identified in Lake #2 (SP513A, B, C, & D). The species of concern at both Lake #1 and Lake #2 should continue to thrive if the current land use is maintained. **The plant species SP512B and 513A, *Gentiana linearis* (Narrow-leaved Gentian), SP512C and 513C, *Glyceria borealis* (Small-floating Manna-grass), and SP513D, *Utricularia purpuea* (Purple Bladderwort) have been removed from the species of concern list.** **A good population of a Lepidopteran species of concern, Silver Bordered Fritillary (*Boloria selene myrina*), was found at this site in 2005.**
5	4	MUD POND	Bear Creek Twp.	In 1992 and 1999, a marginal population of a PA-Rare plant species (SP512) was located along a creek that outlets Mud Pond and eventually crosses beneath SR 2035. The population of SP512 is threatened by changes in hydrology, deer browse, roadside litter, and road de-icing agents. In order to protect these plant species, the current site hydrology should be maintained. Beaver trapping may become necessary if they once again become too numerous at this site. **The plant species SP512, Golden Club (*Orontium aquaticum*), has been removed from the species of concern list.** **An excellent population of Water Bulrush (*Schoenoplectus subterminalis*) was located at this site in 2004.** **Three odonate species of concern were identified at Mud Pond in 2004, Petite Emerald (*Dorocordulia lepida*), Azure Bluet (*Enallagma aspersum*), and Mottled Darner (*Aeshna clepsydra*).**
4	4	NUANGOLA RAILROAD TUNNEL	Hannover & Rice Twps.	A small population of an animal species of concern has been documented in this tunnel on SGL #207. Additional habitat information is needed. The animal species is periodically monitored by the PA Game Commission.
4	4	OPOSSUM SWAMP	Ross Twp. in Luzerne County & Forkston Twp. in Wyoming County	Opossum Swamp is a large wetland mostly composed of low shrubs less than 2 meters tall within SGL #57. Two PA-Rare plant species of concern (SP524A & SP524B) were identified in 1995. There is good potential for other rare species including birds, mammals and more rare plants within this wetland and in the others found on the plateau.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
5	4	OPPERMAN PASS	Fairmount Township	This site is a boreal conifer swamp within Ricketts Glen State Park. Two animal species of concern, one of which is PA-Threatened (SA559), are breeding at the site. Continued site monitoring is needed to determine the extent of the animal populations. Logging is a potential threat to these two species. A wooded buffer around the site is recommended. In addition, the preservation of snags would benefit SA584. **An excellent population of a moth species of concern, Sundew Cutworm Moth (*Hemipachnobia monochromatea*) was found at this site in 2003.** **Two plant species of concern were also located at this site in 2002, the State Threatened species Horned Bladderwort (*Utricularia cornuta*) and the State Rare species Common Labrador-tea (*Ledum groenlandicum*)**
4	4	PENOBSCOT MOUNTAIN RIDGETOP	Hanover, Newport, Rice, & Slocum Twps.	The area consists of an Ephemeral/Fluctuating Pool Natural Community (NC526) in a matrix of dry oak-heath forest. Rock outcrops and openings provide habitat for two plant species of concern (SP502 & SP522) along the same ridgetop farther east. The pools have good potential for use by a variety of herptiles. Additional landowner information, early spring surveys, and mapping the extent of the natural community are needed.
NEW	4	PINE CREEK	Huntington Twp.	**A mammal species of concern, Northern Myotis, was located at this site in 1999. Further surveys need to be done to determine the extent of the population.**
3	4	PIPELINE SWAMP	Bear Creek Twp.	This site is a good-quality example of an Acidic Shrub Swamp Natural Community (NC530). A good-quality population of a PA-Rare plant species (SP530) was found growing in the open portion of this wetland. The land use is recreational (mostly hunting) and is part of SGL # 91. A gas pipeline is adjacent to the west-side of the bog. The bog probably extended further west at one time, but this area was destroyed when the pipeline was created. The threats include maintenance activities associated with nearby pipeline, some deer browse, and beaver activity. Management implications include no spraying of herbicides in the vicinity of the bog and no additional widening of the pipeline R-O-W. No current beaver activity was noted during the field visit, but control of the beaver population may be needed if they once again move into this area. The current site hydrology should be maintained.
5	4	PITTSTON ROOKERY	Pittston & Exeter Boros & Jenkins & Plains Twps.	This site is an island in the Susquehanna River that was an active nesting area for an animal species of concern (SA511) for ten years. The island was not visited during the field surveys for the Natural Areas Inventory, but the nesting area has been reported to be no longer active. A field visit during breeding is needed to confirm this report. **A new animal species of concern was documented at this site in 2000.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
NEW	4	PLAINS FLATS	Plains Twp.	**An animal species of concern and an odonate species of concern, Halloween Pennant were observed at this site in 2000 and 2004. Further surveys need to be done to determine the extent of the populations.**
NEW	4	POPPLES QUARRY POND	Dennison Twp.	**Four odonate species of concern, Lilypad Forktail, Mottled Darner, Azure Bluet, and Sweetflag Spreadwing, were identified at this site in 2004 and 2005.**
5	4	RICKETTS GLEN SWAMP	Fairmount Township in Luzerne Co. & Davidson Twp. in Sullivan Co.	In 1993 & 1997, hundreds of plants of a good-quality PA-Rare plant population (SP532) were found in this hemlock-dominated swamp. There are no known threats to the plants or the habitat. An S2S3B,S3N animal species (SA561) was observed in 1997. This animal requires large tracts of mature forest. Some degree of selective timbering is acceptable and may potentially increase prey abundance for the animal. Additional visits to the site are needed to assess the quality of the animal population. This site is protected within Ricketts Glen State Park. **An animal species of concern was documented at this site in 1997.**
5	4	SHADES GLEN HEADWATERS	Buck Twp.	This area is a heath-dominated shrubland with patches of scrub oak and occasional pitch pine. In 2000, this site was mapped as a fair occurrence of a Mesic Scrub Oak-Heath-Pitch-Pine Barrens (NC533). The barrens should be revisited for more thorough vegetation and soil sampling, and to determine its relation to the till barrens of Long Pond. Additionally, Lepidopteran surveys are needed. A PA-Threatened plant species (SP534) and a PA-Rare plant species (SP535) were identified in a swamp at this site. To protect the site and species of concern, the hydrology of the site should be preserved.
5	4	SHICKSHINNY MOUNTAIN RIDGETOP	Jackson & Plymouth Twps.	This site includes populations of a fair-to poor-quality population of a PA-Rare plant species (SP519), and a population of an animal species of concern (SA519). The site appears to have burned. Competition from blackberry or other species, succession to a closed canopy, and deer browse are all threats to this small population. However, there is likely additional habitat along the ridgetop to the southwest. No special management of the site is recommended. The animal species of concern was collected from open grassy habitat along a large powerline right-of-way just north of the ridgetop. Additional surveys are needed to determine the extent of this population. This site occurs within Lackawanna State Forest. **In 2003 an animal species of concern and a plant species of concern, slender wheatgrass (*Elymus trachycaulus),* were documented at this site.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
NEW	4	SHINGLE RUN	Ross Twp.	**Three butterfly species of concern, Aphrodite Fritillary, Atlantis Fritillary, and Northern Pearly-eye, were documented at this site in 1999. Threats and disturbances to these species include urban sprawl, insecticide use, pesticide use, and increased use of ATVs.**
NEW	4	SUSQUEHANNA RIVER at MOCANAQUA	Salem & Conyngham Twps.	**One animal species of concern was documented at this site in 2000. More surveys need to be done to determine the full extent of the population.**
5	4	SUSQUEHANNA RIVER AT DURYEA	Exeter Twp in Luzerne County & Ransom Twp. in Lackawanna County	A marginal quality population of an animal species of concern (SA520) was found in the Susquehanna River in an unshaded riffle area in sand with cobble and boulder substrate. Siltation and degradation of water quality from surrounding land use (residential and industrial) threaten the site. Conservation of the water quality is important for the survival of this species. **An additional animal species of concern was located along the Susquehanna River corridor in 2000.**
5	4	SUSQUEHANNA RIVER AT EXETER	Exeter Twp. in Luzerne Co. & Ransom & Newton Twps. in Lackawanna Co.	This section of the Susquehanna River was first surveyed in 1995. A small population of an aquatic animal species of concern (SP519A) was identified during the 1995 survey. In 1999, the site was revisited and a fair-quality population of a second animal species of concern (SA519B), was documented. The potential threats include changes in water quality or temperature, and sedimentation. **The animal species of concern SA519B, *Pyganodon cataracta* (Eastern Floater), has been removed from the species of concern list.**
NEW	4	SUSQUEHANNA RIVER at HANOVER GREEN	Hanover, Plymouth & Wilkes Barre Twps.	**A new occurrence of an animal species of concern was located at this site in 2000.**
4	4	SUSQUEHANNA RIVER AT NANTICOKE	City of Nanticoke & Hunlock, Newport & Plymouth Twps.	Two mussel species of concern (SA518A & B) were collected here in 1995. Very few specimens were collected, and surveys in 2000 failed to discover any live mussel fauna. This portion of the Susquehanna has suffered from acid mine drainage, and water quality continues to be compromised by the inflow of the Lackawanna River at Wilkes-Barre. It is possible that as the river recovers, the rare species will be able to re-establish from populations living above the Lackawanna River or downstream of the mine-impacted area. No special management is recommended. **A new animal species of concern was documented at this site in 2000.**
NEW	4	SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)	Salem & Nescopeck Twps. & Columbia County.	**Two mussel species of concern, Yellow Lampmussel, and Green Floater and an additional animal species of concern were documented at this site in 2003 and 2006. Threats to these species include loss of water quality, pollution from nearby roadways, agriculture, and residential areas, and invasive species.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
4	4	WOLF RUN HEADWATERS SWAMP	Ross Twp.	A good population of an S3 plant species (SP516) is located in three wetlands at the headwaters of Wolf Run on SGL #57. Each wetland is hydrologically connected. No serious disturbances were noted. The site should continue to be monitored. Two animal species of concern (SA517A & SA517B) were identified at the site. Additional surveys are needed to assess both of these animal species. Changes in hydrology and logging are potential threats. **The plant species SP516, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.**
5	5	ANDY POND	Dorrance & Rice Twps.	This site on private property has an estimated 35 acres of mixed shrub swamp and additional wetland habitats. An animal species of concern (SA537) was observed in the shrub wetland, but this animal will mainly use sedge and cattail areas. The potential threats include development and changes in the hydrology of the marsh.
Locally Signif-icant	5	BEAR SWAMP	Ross Twp.	**A reptile species reported from previous survey visits has since been added to the species of concern list. With this new information, this area is moved from the Locally Significant category to that of State-wide Significance.**
NEW	5	BLUE NOB RIDGETOP DWARF-TREE FOREST	Hazel Twp. & Schuylkill County	**This site represents one of five expansive Ridgetop Dwarf-Tree Forest Natural Communities that occupy the high elevation plateaus of Broad Mountain and the adjoining ridges. Though occurring frequently in northeastern Pennsylvania, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community.**
5	5	CHOKE CREEK SHRUB SWAMP	Tobyhanna Twp.	This site on private property is a fairly small Acidic Shrub Swamp Natural Community (NC518) with a fair population of a PA-Rare plant species (SP518). No disturbances were noted at the time of the field visit. Potential threats include development, logging, or changing the hydrology of the site.
5	5	COUNCIL CUP CLIFFS	Conyngham & Hollenback Twps.	This site includes an extensive cliff erosional remnant (GE502) and an extensive Northern Appalachian Acidic Cliff Community (NC502). An animal species of concern (SA502) also exists at the site. Trampling and the installation of a chain-link fence have disturbed the top of the cliff. No additional disturbances were noted.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
5	5	EAST FORK HARVEY'S CREEK – SOUTH	Jackson & Lehman Twps.	This site consists of an impounded area near the state penitentiary on the east fork of Harveys Creek. The habitat is a partially flooded forest of eastern hemlock (Tsuga canadensis) with some red maple (Acer rubrum) and other deciduous trees. The animal species of concern (SA513) was observed using the site from a remote distance and the status of the population is unknown. This site has also been used repeatedly for several years and current land uses do not appear to have disturbed the species of concern.
5	5	EAST FORK HARVEY'S CREEK - NORTH	Lehman Twp.	This site contains a thin band of riparian forest (mostly red maple) on the east fork of Harveys Creek. An animal species of concern (SA514) uses these woods as a breeding area. The site occurs in a largely agricultural area. The species is sensitive to disturbance, but has used the site for many years and current land uses appear compatible with the species at the site.
NEW	5	HAAS ROUTE 15	Bear Creek Twp.	**One odonate species of concern, Slaty Skimmer, was observed at this site in 2005. Further surveys need to be done to determine the extent of the population.**
5	5	HANOVER CROSSING WETLAND	Hanover Twp.	An animal species of concern (SA538) was observed in the wetland during the breeding season. The surrounding area is highly disturbed by past coal mining; slag piles and gray-birch scrub forests are common. Additional habitat and threat information is needed for this site.
NEW	5	HARRIS POND	Ross Twp.	**A large population of a State Endangered plant species of concern, Broad-leaved Water-milfoil, was documented at this site in 2003. Threats to this species include chemical and mechanical removal.**
5	5	HUNTINGTON CREEK	Fairmount, Huntington & Ross Twps.	An S3, PA-Candidate animal species of concern (SA510) was identified during a 1998 survey of Huntington Creek. Additional surveys are needed to assess the population quality. Maintaining the hydrology, water quality, and water temperature of the creek are important for the survival of the species.
5	5	INDIAN LAKE SWAMP	Buck Twp.	The site is a red-spruce mixed hardwood palustrine forested swamp near Indian Lake on private property and State Game Lands 91. A small population of a PA –Rare plant species (SP536) was found growing on hummocks. No disturbance, with the exception of deer browse, was noted at the site. Threats include development and logging. The site should be monitored and additional searches for the plant species are needed.
NEW	5	KENDALL CREEK WETLAND	Buck Twp.	**One odonate species of special concern, Ski-tailed Emerald, was seen at this site in 2003. Further surveys need to be done to determine the extent of the population.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
5	5	KITCHEN CREEK FALLS	Fairmount Twp.	A scenic gorge that crosses the Allegheny Front, this geologic feature (GE534) is a series of waterfalls and rapids in Ricketts Glen State Park. The gorge descends 1,000 feet over three miles and includes over 25 falls.
5	5	MILL CREEK AT SUSCON	Pittston Twp.	This site provides habitat for an aquatic animal species of concern (SA534) occupying the upper portions of Mill Creek. Additional surveys are needed to determine the extent and health of this population that is dependent upon maintaining good water quality and habitat in the Mill Creek watershed.
5	5	MYLET'S CORNER	Dorrance Twp.	A good-quality population of a PA-Rare plant (SP505) was found at this site in 2000. A portion of the site is mowed periodically during road maintenance. The current mowing practices may actually benefit this species by keeping weedy aggressive species from taking over. Threats include the potential for herbicide spraying and the effects of de-icing agents. No management is currently needed. The site should continue to be monitored.
5	5	NEVEL SWAMP	Ross Twp.	Nevel Swamp is a good example of an Acidic Broadleaf Swamp Natural Community (NC503) on private property. A manmade impoundment exists at the southwest corner of the swamp. The threats include changes in the hydrology of the swamp and logging.
3	5	NUANGOLA LAKE	Rice Twp. & Nuangola Boro.	This is a large glacial lake, likely once an extensive bog lake before the outlet at its south end was dammed. Five different plants and one animal species of concern are found here, both in the lake itself and in the remnant bog mats around its edges. All of the plant species appear to be doing well. The aquatic species are dependent on maintaining the water quality of the lake. **The plant species SP502, Bushy Naiad (*Najas gracillima*), SP511A, Small Waterwort (*Elatine minima*), SP511B Flat-leaved Pondweed (*Potamogeton robbinsii*), and SP512, Northern Yellow-eyed Grass (*Xyris montana*), have been removed from the species of concern list.** **A good population of a plant species of concern, Small Beggar-ticks (*Bidens discoidea*) was found at this site in 2003. Threats are turbulence and shoreline erosion due to high speed boating, and nutrient enrichment and water quality degradation due to the high density housing around approximately two-thirds of the shoreline.**
5	5	OLD BEAVER DAM SWAMP	Fairmount Township	In 2000, an S2 invertebrate species of concern (SA556) was identified in this open sphagnum swamp. Further surveys are needed to determine the extent and size of the population. Permanent flooding or draining of the swamp would eliminate this species of concern.
NEW	5	ORLOSKI'S BOG	Bear Creek Township	**An odonate species of concern, Ski-tailed Emerald (*Somatochlora elongata*) was documented at this site in 2005.**

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
2	5	PERRIN'S MARSH	Northumberland Twp. in Wyoming County and Franklin Twp. in Luzerne County	A good-quality population of a PA-Rare plant (SP503A) species was first identified at this site in 1993. The site was revisited in 1999 and SP503A is still present. A new good-quality PA-Endangered, S1 plant (SP503B) population was identified at the site during the 1999 visit The site should continue to be monitored and surrounding locations (e.g., Cummings Pond) should be visited to search for additional populations of these plants of concern and wading bird species of concern. The use of an aquatic herbicide or dramatically changing the water level are the greatest potential threats to the marsh.
5	5	PIPELINE SWAMP NORTH	Bear Creek Twp.	The site on State Game Lands 91 is an extensive (approximately 10-15 acres) spruce and shrub swamp clearly impacted by flooding, presumably from construction of the pipeline and possibly from beaver activity. An S2 animal species of concern (SA535) was found at the swamp in 2000. Additional surveys are needed to determine the quality of the occurrence of this animal species. The survival of the animal species can be aided by restricting the use of herbicides for weed control on the pipeline right-of-way. Additional threats to the site include changes in hydrology caused by beaver.
4	5	RED BEAR SWAMP	Bear Creek Twp.	This site is a small high-elevation wetland dominated by sedges (*Carex stricta*), large cranberry (*Vaccinium macrocarpon*), and sphagnum moss (*Sphagnum sp*.). An invertebrate species of concern (SA538) was collected here in 2000. Additional surveys are needed to determine the quality of this population.
NEW	5	SCOTCH RUN	Black Creek Twp.	**A natural community of special concern, Ephemeral/Fluctuating Pool, was documented at this site in 2003 during the Columbia County NAI. New development in the area may threaten the natural community. An undisturbed forested buffer should be maintained around the ponds.**
4	5	SLOCUM MARSH	Slocum Twp.	Slocum Marsh is a large 15 to 20-acre cattail wetland. An animal species of concern (SA527) has been using the marsh for breeding since 1998. Draining and pesticide use are potential threats. Additional visits are needed to determine the population size and to obtain a more detailed habitat description.
NEW	5	STATE GAME LANDS 149	Foster Twp.	**One odonate species of concern, Elfin Skimmer, was documented at this site in 2003.**
5	5	SUSCON RAILROAD GRADE SITE	Pittston Twp.	This site contains a population of a PA-Rare plant species (SP530) growing in disturbed habitat (the old WB-Eastern RR grade) that was last visited in 1997. This is a species found in open areas that benefits from regular disturbance. No current threats are evident, although the species will eventually be eliminated by natural succession in the absence of disturbance. Future surveys could assess the condition of the habitat as well as search for the rare animal species associated with this plant.

Original County Rank	New County Rank	Site Name	Township Map(s)	Site Summary
NEW	5	SYLVAN LAKE	Ross & Union Twps.	**A plant species of concern, Small Beggar-ticks, was located at this site in 2003. Compaction and little vegetation near the boat dock are disturbances close to the population.**
5	5	THE TUBS	Plains Twp.	The Tubs is a Whirlpool Canyon with a series of falls over sandstone and conglomerate rock of the Pocono Formation. Today, this area is a county park that is used for passive recreation. Littering by visitors is a disturbance. The development of the surrounding land is a potential threat to the quality of this site.
5	5	TILBURY KNOB	Plymouth Twp.	A poor-quality population of a PA-Rare plant species (SP515) occurs at this site on the crest of a red shale cliff in xeric, thin soils. No special management is recommended for this site.
5	5	WILKES-BARRE MOUNTAIN	Hanover Twp.	This site on Wilkes-Barre Mountain is a marginal to good example of a North Appalachian Acidic Rocky Summit Community (NC524). A small population of a PA-Rare plant species (SP523) was located here in 2000. The plant is growing in a powerline right-of-way and is in danger of being sprayed with herbicides during maintenance activities. Therefore the right-of-way should be maintained by mechanical means if possible. Natural wildfires would be beneficial to the plants and the natural community at the site.
5	5	WRIGHT CREEK WATERSHED B	Dennison Twp.	This site on SGL #119 includes an upland area drained by Wright Creek. A fair to small population of a PA-Endangered plant species (SP521) was found in a low heath area in 1996. No obvious threats to the plants were noted during the field visit. Additional surveys are needed to adequately assess the size of the population.
4	Locally Signi-ficant	Bear Creek At Shades Creek	Bear Creek Twp.	**Since the last inventory, the plant species located at this site, Golden Club, has been delisted. This site is now classified as Locally Significant.**
5	Locally Signi-ficant	Folstown Mud Pond	Newport & Slocum Twps.	**Both plant species located at this site in the previous inventory, Flat-leaved Pondweed and Purple Bladderwort, have been delisted. This site is now listed as Locally Significant.**
4	Locally Signi-ficant	Hell's Kitchen	Butler & Dennison Twps.	**Since the last inventory, the plant species located at this site, Hartford Fern (SP503), has been removed from the species of concern list. This site is now listed as Locally Significant.**
5	Locally Signi-ficant	Wright Creek Watershed C	Bear Creek & Dennison Twps.	**This site is now classified as Locally Significant. See Table 3 for a description.**

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

Original County Rank[1]	New County Rank	Site Name (municipality)	Township	Natural Feature and Importance
NEW	Low	Beaver Run Wetlands	Black Creek Twp. & Columbia County	**This locally significant site ia a diverse wetland complex that was identified as part of the Columbia County NAI. The headwaters of this wetland occur in Luzerne County.**
NEW	Med	Five Points Swamp	Fairmont Twp. & Columbia County	**This locally significant site was identified from aerial photography. This area appears to have a conifer-dominated palustrine forest and an adjacent shrub wetland. Ground surveys are recommended to determine the quality of these habitats.**
High	3	Susquehanna Riverlands	Conyngham & Salem Twps.	**This site was identified as Locally Significant in the original NAI report. Information on species of concern occurrences at this location promt the promotion of this site to Table 1.**
High	5	Bear Swamp	Ross Twp.	**A reptile species reported from previous survey visits has since been added to the species of concern list. With this new information, this area is moved from the Locally Significant category to that of State-wide Significance.**
High	High	Nuangola Station Swamp	Rice Twp.	This Locally Significant area is a mixed broadleaf-conifer swamp bisected by a small meandering stream. The swamp has numerous small pools and seeps and a well-developed micro-topography of pits and tip-up mounds. There are a few large trees in the matrix of second/third growth forest and no recent signs of logging. Black ash (*Fraxinus nigra*) is notable for its abundance here. There are ATV trails along the margin of the swamp and through its north end. No current threats are evident and allowing the forest to mature will improve the quality of the plant community.
High	High	Roaring Brook Swamp	Ross Twp.	This Locally Significant area consists of a disturbed third-growth mixed broadleaf and conifer swamp on the east side of Roaring Brook. A bird species of concern was observed using the habitat, although reproduction at the site was not confirmed. Marshy openings and old beaver impoundments along the creek break the canopy of the swamp. Avoiding logging in the wetland and the buffering uplands will help this Locally Significant area to recover from past disturbances.

Original County Rank[1]	New County Rank	Site Name (municipality)	Township	Natural Feature and Importance
High	High	Shickshinny Mountain Slopes	Plymouth Twp.	This Locally Significant site occurs on a saddle or cove on the north slope of Shickshinny Mountain, near the headwaters of Hunlock Creek. The forest community is second-growth northern hardwood of intermediate age. Several rock outcrops with small seeps occur just upslope of the site, perhaps the source of the rich soil conditions. The site has potential for several rare plant species of concern and should be revisited in late spring. Establishing a small no disturbance zone around the site would prevent disturbance to the soil and the diversity of the wildflowers present.
High	High	Wapwallopen Gorge	Conyngham, Hollenback & Nescopeck Twps.	The Lance Corporation, who allows public access for recreation, owns this Locally Significant property. The gorge is very steeply-sided and forested with hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*) at the upper end. The gorge has some historical significance as many remnants of a turn of the century powder plant are found along the edge of the gorge. Excessive trash, graffiti, and the practice of stripping the trees of their bark for campfires detract from the beauty of the gorge.
5	Low	Wright Creek Watershed C	Bear Creek & Dennison Twps.	A small population of a plant species of concern was found along the edge of the woods near a trail at Wright Creek in SGL #119. The current nearby disturbances include ATV and foot traffic. The potential threats include trampling and deer browse. **Since the last inventory, the plant species located at this site, Narrow-leaved Gentian (*Gentiana linearis*), was delisted. This site is now classified as Locally Significant.**
4	Med	Bear Creek At Shades Creek	Bear Creek Twp.	The rocky and coarse sandy substrate of the creek provides habitat for a good-quality population of a PA-Rare plant species (SP537). No deer browsing of the plants was seen. The water quality and the present hydrology of the streams should be maintained, as well as a forested buffer along the stream banks. **Since the last inventory, the plant species located at this site, Golden Club, has been delisted. This site is now classified as Locally Significant.**
Med	Med	Grand View	Fairmount Twp.	This Locally Significant site within Ricketts Glen State Park is the highest point on Red Rock Mountain (2,449 feet), providing a spectacular overlook on the rim of the Allegheny Front (Geyer and Bolles, 1987).

Original County Rank[1]	New County Rank	Site Name (municipality)	Township	Natural Feature and Importance
4	Med	Hell's Kitchen	Butler Twp.	This site contains an excellent-quality population of a G4, PA-Rare plant species of concern (SP503). The site has a history of disturbance for a residential development and past and present mining activities. The plant species at the site should continue to be monitored. **Since the last inventory, the plant species located at this site, Hartford Fern, has been delisted. This site is now listed as Locally Significant.**
Med	Med	Prospect Rock	Laurel Run Boro.	This Locally Significant site is a large rock ledge about 2,000 feet in length that provides a grand view of the Wyoming Valley and Wilkes-Barre (Geyer and Bolles, 1987).
NEW	Med	Summer Hill Bog	Salem Twp. & Columbia County	**This Locally Significant site is a wetland habitat identified from aerial photographs and as part of a low-level reconnaissance flight over the county. Besides an apparent ditch running down the center of the wetland, the site appears to have had little recent disturbance. There appears to be a ring of thick shrubs surrounding the edge of the wetland, with the expansive inner portions composed primarily of short shrubs and herbaceous vegetation, and may have floating vegetation mats.**
NEW	Low	Sorber Run	Lake Twp.	**DEP-designated Exceptional value stream mostly within SGL #57.**

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

During the Natural Areas Inventory survey new populations of **Jacob's Ladder**, a PA-Endangered plant, were found in Luzerne County.

Photo: PNHP

BEAR CREEK TOWNSHIP AND BEAR CREEK VILLAGE BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia Barrens Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3		PR	8/24/00	CD	
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, SA507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed Cinquefoil SP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. susquehanae Sand Cherry SP522	G5	S3		PT	7/08/97	CD	
Psectraglaea carnosa Pink Sallow SA506J, SA507D	G3	S1			10/08/97	BC	
Ridgetop Dwarf-Tree Forest NC505	G4	S3			1984	B	
Sideridis maryx SA506K	G4	S1S3			5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3			6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1			9/15/98	BC	

BALD MOUNTAIN ROAD SWAMP						
Boreal Conifer Swamp NC532	GNR	S3		6/12/20	BC	**UPDATED**
BEAR CREEK AT SHADES CREEK		**(Locally Significant Area)**				**CHANGED**
Orontium aquaticum Golden Club SP537	G5	S4	DL	8/10/99	B	**DELISTED**
BEAR CREEK RAILROAD SITE						
Aeshna clepsydra Mottled Darner	G4	S2S3		9/14/02	E	**NEW**
Animal Species of Concern	G4	S3S4	CA	8/20/02	E	**NEW**
Animal Species of Concern	G5	S3S4		8/20/02	E	**NEW**
Papaipema sp. 1 Flypoison Borer Moth	G2G3	S2		9/14/02	E	**NEW**
BEHREN POND						
Aeshna clepsydra Mottled Darner	G4	S2S3		9/02/04	E	**NEW**
Arigomphus furcifer Lilypad Clubtail	G5	S2		7/02/05	E	**NEW**
Dorocordulia lepida Petite Emerald	G5	S2		7/02/05	E	**NEW**
Enallagma laterale New England Bluet	G3	S1		6/26/05	E	**NEW**
Leucorrhinia glacialis Crimson-ringed Whiteface	G5	S3S4		7/02/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4		7/02/05	E	**NEW**
Nannothemis bella Elfin Skimmer	G4	S1		7/02/05	E	**NEW**
Schoenoplectus subterminalis Water Bulrush	G4G5	S3	PT	7/08/03	AB	**NEW**
CANADA BOG						
Oligotrophic Glacial Kettlehole Bog NC539	GNR	S3		8/03/99	BC	**UPDATED**
Utricularia cornuta Horned Bladderwort SP539	G5	S2		8/03/99	BC	
FRANCIS E. WALTER RESERVOIR SITE						
Aeshna clepsydra Mottled Darner	G4	S2S3		9/04/04	E	**NEW**
Anax longipes Comet Darner	G5	S1S2		6/26/05	E	**NEW**
Cordulia shurtleffi American Emerald	G5	S3			E	**NEW**
Animal Species of Concern SA503A	G4	S3S4	PC	2000	E	
Enallagma divagans Turquoise Bluet	G5	S3			E	**NEW**
Enallagma laterale New England Bluet	G3	S1		6/06/05	E	**NEW**
Animal Species of Concern SA503B	G5	S3S4		2000	E	
Leucorrhinia glacialis	G5	S3S4		6/06/05	E	**NEW**

Crimson-ringed Whiteface						
Libellula auripennis Golden-winged Skimmer	G5	S1		6/26/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4		6/26/05	E	**NEW**
Myotis leibii Eastern Small-footed Myotis	G3	S1B,S1N	PT	7/22/04	A	**NEW**
Pandion haliaetus Osprey SA511, SA533	G5	S2B	PT	7/12/00	E	
Utricularia purpurea Purple Bladderwort SP531	G5	S4	DL	8/31/99	E	**DELISTED**
HAAS ROUTE 115						
Libellula incesta Slaty Skimmer	G5	S3S4		7/04/05	E	**NEW**
MUD POND						
Aeshna clepsydra Mottled Darner	G4	S2S3		7/10/04	E	**NEW**
Dorocordulia lepida Petite Emerald	G5	S2		6/20/04	E	**NEW**
Enallagma aspersum Azure Bluet	G5	S3S4		6/20/04	E	**NEW**
Oronium aquaticum Golden Club SP512	G5	S4	DL	6/23/99	C	**DELISTED**
Schoenoplectus subterminalis Water Bulrush	G4G5	S3	PT	8/10/04	AB	**NEW**
MUD POND WOODS						
Papaipema sp 1 Flypoison Borer Moth SA541	G2G3	S2		10/04/00	BC	
ORLOSKI'S BOG						
Somatochlora elongate Ski-tailed Emerald	G5	S2		7/01/05	E	**NEW**
PIPELINE SWAMP						
Ledum groenlandicum Common Labrador-tea SP530	G5	S3	PR	6/24/99	B	
Oligotrophic Glacial Kettlehole Bog NC530	GNR	S3		6/24/99	B	**UPDATED**
PIPELINE SWAMP NORTH						
Lycaena epixanthe Bog Copper SA535	G4G5	S2		7/2000	E	
RED BEAR SWAMP						
Lycaena epixanthe Bog Copper SA538	G4G5	S2		8/10/99	E	
TANNERY ROAD SITE/BEHLER SWAMP						
Aegolius acadicus Northern Saw-whet Owl SA540	G5	S3B,S3N		2000	E	
Gentiana linearis Narrow-leaved Gentian SP531	G4G5	S4	DL	8/31/99	E	**DELISTED**
Juncus filimormis Thread Rush SP517	G5	S3	PR	8/31/99	B	**UPDATED**
Ledum groenlandicum	G5	S3	PR	9/14/03	C	**NEW**

Common Labrador-tea						
Nannothemis bella Elfin Skimmer	G4	S1		8/06/04	E	**NEW**
Somatochlora elongata Ski-tailed Emerald	G5	S2		6/25/04	E	**NEW**
Somatochlora incurvata Incurvate Emerald	G4	S1		7/24/04	E	**NEW**
Somatochlora walshii Brush-tipped Emerald	G5	S2		6/25/04	E	**NEW**
Wright Creek Watershed C			**(Locally Significant)**			**CHANGED**
Gentiana linearis Narrow-leaved Gentian SP523	G4G5	S4	DL	8/17/00	D	**DELISTED**
WYOMING MOUNTAIN BARRENS						
Diarsia rubifera	G5	SU		8/29/00	BD	**NEW**
Platyperigea meralis A Noctuid Moth	G4	S1		8/29/00	B	**NEW**
Prunus pumila Sand Cherry SP524	G5	S3		8/31/00	CD	**DELISTED**
Ridgetop Dwarf-Tree Forest NC501, NC504	G4	S3		9/18/86	B	
Somatochlora incurvata Incurvate Emerald	G4	S1			E	**NEW**

LOCALLY SIGNIFICANT AREAS:

Bear Creek At Shades Creek

Wright Creek Watershed C

PUBLICLY MANAGED LANDS:

State Game Lands #91

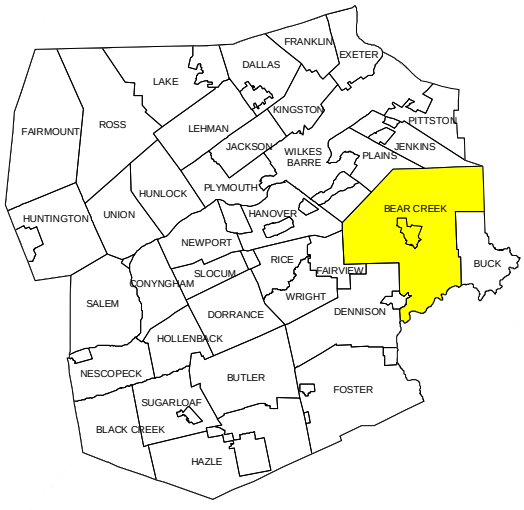
State Game Lands #119

State Game Lands #292

Lehigh Gorge State Park

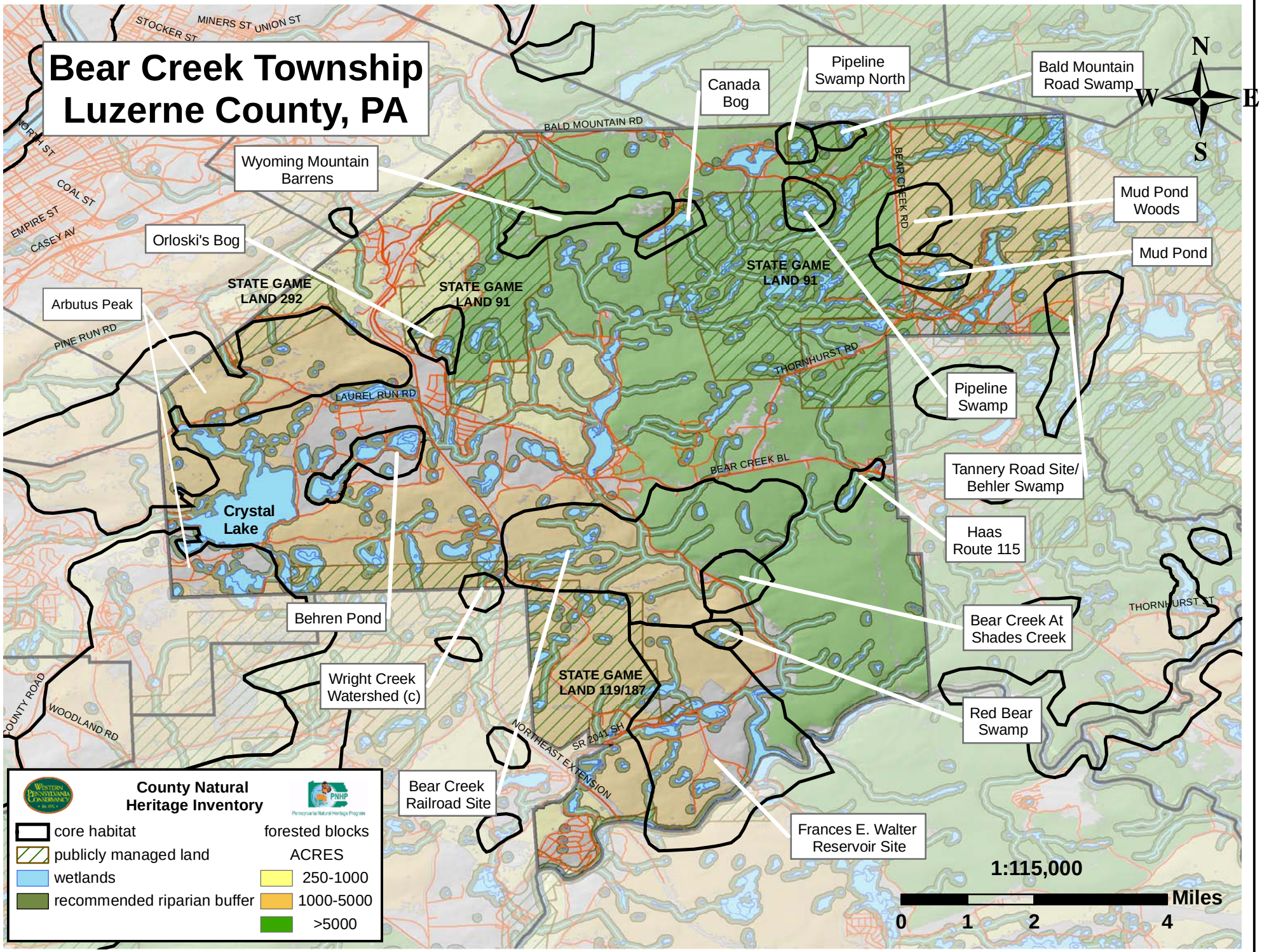
OTHER CONSERVATION AREAS:

Lehigh Valley / Lehigh Gorge State Park Important Mammal Area



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

** Please refer to Appendix II for Quality ranks.


Bear Creek Township
Luzerne County, PA
Wyoming Mountain Barrens
Canada Bog
Pipeline Swamp North
Bald Mountain Road Swamp
Mud Pond Woods
Mud Pond
Orloski's Bog
Arbutus Peak
STATE GAME LAND 292
STATE GAME LAND 91
STATE GAME LAND 91
Pipeline Swamp
Tannery Road Site/ Behler Swamp
Haas Route 115
Crystal Lake
Behren Pond
Bear Creek At Shades Creek
Wright Creek Watershed (c)
STATE GAME LAND 119/187
Red Bear Swamp
Bear Creek Railroad Site
Frances E. Walter Reservoir Site
BALD MOUNTAIN RD
BEAR CREEK RD
THORNHURST RD
LAUREL RUN RD
BEAR CREEK BL
PINE RUN RD
NORTHEAST EXTENSION
SR 2041 SH
WOODLAND RD
STOCKER ST
MINERS ST
UNION ST
COAL ST
EMPIRE ST
CASEY AV
N
S
W
E
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:115,000
Miles
0
1
2
4

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp.*).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species have been found at areas (three species were found at two location at the site) associated with the barrens and adjacent wetlands and more are expected to be found. Five of the species are Globally Rare (G3) or the subspecies is Globally Rare (G5T2T3). Several are new to the present-day fauna of PA - one species is known to utilize arctic/boreal habitats making Arbutus Peak an extreme southern location for it. Another is considered to be a southern species usually found on the New Jersey Pine Barrens. These species are typically dependent upon particular plant species for a portion of their lives; some use scrub oak to feed upon; while other use blueberries found in wetlands or in the barrens. Some species use the pitch pine while others appear to use cranberries and other plants found in the wetlands. One species that has not been found anywhere else but Pennsylvania, feeds exclusively on the flypoison plant (*Amianthium muscaetoxicum*). Another feeds on wild indigo (*Baptisia tinctoria*). Some of the species have very little life-history information and require more research. Most of them depend on plants that require plenty of sunlight found in shrubland or open woodland.

Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a

pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

BALD MOUNTAIN ROAD SWAMP (Bear Creek Twp.) NC532 - This site, which is designated as a marginal- to good-quality example of a Boreal Conifer Swamp Natural Community (NC532), is located near the headwaters of the Bear Creek drainage. It contains a preponderance of older, large spruces, and less disturbance from beavers and other sources than most of the other spruce swamps sampled in the county. Red spruce (*Picea rubens*) is the dominant overstory species, with red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*) also present. The open understory is dominated by regenerating spruce, with some rhododendron (*Rhododendron maximum*), mountain holly (*Nemopanthus mucronata),* mountain laurel (*Kalmia angustifolia*), highbush blueberry (V*accinium corymbosum),* and alder (*Alnus sp*.) present. The groundcover is dominated by sphagnum moss (*Sphagnum sp*.), cinnamon fern (*Osmunda cinnamomea),* goldthread (*Coptis trifolium*), three-seeded sedge (*Carex trisperma*), starflower (*Trientalis borealis*), Canada mayflower (*Maianthemum canadense*), slender manna-grass (*Glyceria melicaria*), and aster (*Aster sp*.). There is a marked pit-and-mound microtopography in the swamp, with saturated peat soils and small open pools. The center of the swamp has a narrow strip of mixed shrub swamp with young spruce, tall shrubs, and herbaceous vegetation; this appears to be good habitat for a rare animal species of concern, though none were seen in this survey. A small stream coalesces out of the southern end of the swamp and flows south towards Bear Creek.

Bird species heard during this brief visit include northern waterthrush, (*Seiurus noveboracensis*), ovenbird (*Seiurus aurocapillus*), black-and-white warbler (*Mniotilta varia*), purple finch (*Carpodacus purpureus*), cedar waxwing (*Bombycilla cedrorum*), Canada warbler (*Wilsonia canadensis*), and common yellowthroat (*Geothlypis trichas*). The site appears to be ideal habitat for several plant species of concern, though no rare plant species were seen during this visit. A bird species of concern has been observed in the area, although no nests have been found. The site is on State Game Lands #91. Allowing the site to mature further will enhance the quality of the natural community.

BEAR CREEK RAILROAD SITE – NEW – In 2002, two reptile species of concern were located along Bear Creek. One individual was seen crossing the railroad tracks running along Bear Creek. Associated species include grey fox, boreal red-backed vole, smoky shrew, snowshoe hare, meadow vole, eastern coyote, black-throated green warbler, red-eyed vireo, Louisiana waterthrush, osprey, red-shouldered hawk, pickerel frog, mountain dusky salamander, northern spring salamander, red-spotted purple, eastern garter snake, smooth green snake, fawn darner, four-toed salamander, spotted salamander, redbacked salamander, silver-bordered fritillary, spicebush swallowtail, common wood nymph, bracken borer, bidens borer, white underwing, variable darner, citrine Forktail, brush-tipped emerald, pitch pine, chestnut oak, sassafras, sweet fern, scrub oak, low sweet blueberry, hayscented fern, whorled wood aster, wild indigo, red oak, eastern hemlock, black birch, teaberry, witch hazel, rhododendron, star flower, painted trillium, and purple-stemmed aster. Threats include mortality due to vehicles.

A population of Mottled Darner (*Aeshna clepsydra*) was observed at this site in 2002. Further surveys need to be done to determine the extent of the population.

BEHREN POND- NEW- One plant species of concern, Water Bulrush (*Schoenoplectus subterminalis*), was found at this site in 2003. This species is found growing throughout the pond and is in excellent condition. Associated plant species include *Nymphaea odorata, Brasenia schreberi, Nuphar variegata, Potamogeton epihydrus, Isoetes* hybrid*, Carex utriculata, Carex stricta, Dulichium arundinaceum, Utricularia purpurea, Vallisneria americana, Decodon verticillata, Calamagrostis canadensis, Lysimachia terrestris,* and *Utricularia geminiscapa*. Threats to the Water Bulrush include the potential for vegetation control or dredging in this very shallow lake. The major disturbance was the flooding of a former bog which created the lake.

Seven odonate species of concern were identified at Behren Pond in 2004 and 2005, Elfin Skimmer, Slaty Skimmer, Crimson-ringed Whiteface, Petite Emerald, Lilypad Clubtail, Mottled Darner, and New England Bluet. Associated species include Vesper Bluet (*Enallagma vesperum*), Eastern Forktail (*Ischnura verticalis*), Orange Bluet (*Enallagma signatum*), Elegant Spreadwing (*Lestes inaequalis*), Powdered Dancer (*Argia moesta*), Marsh Bluet (*Enallagma ebrium*), Eastern Pondhawk (*Erythemis simplicicollis*), Painted Skimmer (*Libellula semifasciata*), and Sedge Sprite (*Nehalennia irene*).

CANADA BOG (Bear Creek Twp.) SP539 & NC539 **–** The site is a fairly intact floating Oligotrophic Kettlehole Bog Natural Community (NC539) surrounded by a beaver-impacted spruce and tall shrub swamp. The substrate is a deep sphagnous peat. The area of interest is a circular (approximately 50-meter-diameter) quaking sphagnum bog. There are patches of leatherleaf (*Chamaedaphne calyculata*), scattered tamarack (*Larix laricina*), and sheep laurel (*Kalmia angustifolia*), but most of the bog is dominated by low vegetation, including large cranberry (*Vaccinium macrocarpon*), beak rush (*Rhynchospora alba*), sedges (*Carex trisperma* & *Carex utriculata*), cottongrass (*Eriphorum virginicum*), sundews (*Drosera intermedia* & *Drosera rotundifolia*), pitcher plant (*Sarracenia purpurea*), horned bladderwort (*Utricularia cornuta*), and yellow-eyed grass (*Xyris sp*.) A plant species of special concern (SP539) occurs in the center of the bog in low mucky pools and is associated with sundews (*Drosera intermedia*) and yellow-eyed grass (*Xyris sp*.).

Much of the natural community consists of very early successional bog habitat dominated by horned bladderwort (*Utricularia cornuta*), yellow-eyed grass (*Xyris sp*.), and beaked rush (*Rhynchospora alba*). The surrounding swamp is a thick shrub swamp of young red maple (*Acer rubrum*), tamarack (*Larix laricina*), highbush blueberry (*Vaccinium corymbosum*), mountain holly (*Nemopanthus mucronata*), and woolgrass (*Scirpus cyperinus*) in the openings. A beaver dam and impoundment exists north of the natural community. The Canada Bog may have been affected by fluctuating water levels in the past, but remains as one of the few intact floating bogs in the county. Additional flooding by beaver or draining by humans are the only identifiable threats. A portion of this site lies in State Game Lands #91.

FRANCIS E. WALTER RESERVOIR SITE (Bear Creek Twp.) –UPDATE- SP531, SA503A, SA503B, SA511, SA533, & SA533 **–** Three occurrences of a PA-Threatened animal species (sa511, sa533, & SA533) have been monitored at the reservoir area for many years. The species feeds at the reservoir and therefore is dependent on the water quality of Bear Creek and the Lehigh River. The population of the animal species has grown in recent years. The protection of large trees and snags along the waterways is important for the species. Two additional animal species of concern (SA503A & SA503B) occupy the Lehigh River gorge below the dam, using the rock outcrops and cliffs on both sides of the river. This portion of the river is used for recreational boating; care should be taken not to disturb

the rock outcrops and overhangs that provide habitat for this species. Additional surveys are needed to evaluate the quality of the animal populations.

A PA-Rare plant species (SP531) occurs on a privately-owned pond near the reservoir. This plant species thrives in areas with good water quality. Sedimentation in the pond or the use of herbicides are potential threats to the plant population of concern. The Francis E. Walter Reservoir Site extends into the Pleasant View Summit quadrangle. **The plant species SP531, *Utricularia purpurea* (Purple Bladderwort) has been removed from the species of concern list.**

Eight new odonate species of concern were identified at the Francis E. Walter Reservoir Site in 2004 and 2005, Turquoise Bluet (*Enallagma divagans*), American Emerald (*Cordulia shurtleffi*), Mottled Darner (*Aeshna clepsydra*), Slaty Skimmer (*Libellula incesta*), New England Bluet (*Enallagma laterale*), Crimson-ringed Whiteface (*Leucorrhinia glacialis*), Comet Darner (*Anax longipes*), and Golden-winged Skimmer (*Libellula auripennis*). Further surveys need to be conducted to determine the extent of the populations.

An excellent quality population of a Pennsylvania Threatened bat species, Eastern Small-footed Myotis (*Myotis leibii*) was located at this site in 2004.

HAAS ROUTE 115- NEW- In 2005 a Slaty Skimmer, a newly documented animal species of concern, was located along Shades Creek. Associated odonate species include the Eastern Red Damsel, Variable Dancer, Ebony Jewelwing, Delta-spotted Spiketail, Hagen's Bluet, Common Baskettail, Prince Baskettail, Dragonhunter, Fragile Forktail, Eastern Forktail, Southern Pygmy Clubtail, Chalk-fronted Corporal, Common Whitetail, Widow Skimmer, Twelve-spotted Skimmer, and Sedge Sprite.

MUD POND (Bear Creek Twp.) –UPDATE- SP512 - In 1992 and 1999, a marginal population of a PA-Rare plant species (SP512) was located along a creek that outlets Mud Pond and eventually crosses beneath SR 2035. The associated plant species include leatherleaf (*Chamaedaphne calyculata*), meadowsweet (*Spiraea latifolia*), reedgrass (*Calamagrostis cinnoides*), cranberry (*Vaccinium macrocarpon*), highbush blueberry (*Vaccinium corymbosum*), red maple (*Acer rubrum*), sphagnum moss (*Sphagnum sp*.), rice-cut grass (*Leersia oryzoides*), and rattlesnake mannagrass (*Glyceria canadensis*). The population of SP512 is threatened by changes in hydrology, deer browse, roadside litter, and road de-icing agents. In order to protect these plant species, the current site hydrology should be maintained. Beaver trapping may become necessary if they become too numerous at this site. **The plant species SP512, *Orontium aquaticum* (Golden Club), has been removed from the species of concern list.**

An excellent population of Water Bulrush (Schoenoplectus subterminalis) was located at this site in 2004. Associated plant species include *Utricularia macrorhiza, Nuphar variegata, Nymphaea odorata,* and *Potamogeton pusillus*. Beavers are the main source of disturbance by causing fluctuating water levels.

Three odonate species of concern were identified at Mud Pond in 2004, Petite Emerald (*Dorocordulia lepida*), Azure Bluet (*Enallagma aspersum*), and Mottled Darner (*Aeshna clepsydra*). Further surveys need to be conducted to determine the extent of the populations.

MUD POND WOODS (Bear Creek Twp.) SA541 - This site consists of a moist second-growth oak-heath forest. A globally rare invertebrate species (SA541) was found here at several locations in 2000. The species

is dependent upon the fly-poison (*Amianthium muscaetoxicum*) that is abundant in the groundcover, particularly in the slightly more mesic areas. The threats to the species include logging, the use of herbicides, or spraying for gypsy moth.

ORLOSKI"S BOG (Bear Creek Twp.) – NEW - A new odonate species of concern, Ski-tailed Emerald (*Somatochlora elongate*) was documented at this site in 2005. Associated odonate species include Sphagnum Sprite (*Nehalennia gracilis*) and Shadow Darner (*Aeshna umbrosa*). Further surveys need to be done to determine the extent of the population.

PIPELINE SWAMP (Bear Creek Twp.) SP530 & NC530 - This site provides a good-quality example of an Acidic Shrub Swamp Natural Community (NC530). A good-quality population of a PA -Rare plant species (SP530) was found growing in the open portion of this wetland. The associated plant species include leatherleaf (*Chamaedaphne calyculata*), rhodora (*Rhododendron canadense*), chokeberry (*Aronia sp.*), sheep laurel (*Kalmia angustifolia*), sphagnum moss (*Sphagnum sp.*), and cotton grass (*Eriophorum vaginatum*). The northern part of the bog contained more tree and larger shrub species including red spruce (*Picea rubens*), American larch (*Larix laricina*), and highbush blueberry (*Vaccinium corymbosum*). The land surrounding the bog is mostly forested. The land use is recreational (mostly hunting) and is part of SGL # 91. A gas pipeline is adjacent to the west-side of the bog. The bog probably extended farther west at one time, but this area was destroyed when the pipeline was created. A large shrub swamp dominated by blueberry (*Vaccinium sp.*) lies west of the pipeline, but this area was degraded in the past by beaver activity. The threats to the area include maintenance activities associated with the nearby pipeline, some deer browse, and beaver activity. Management implications include no spraying of herbicides in the vicinity of the bog and no additional widening of the pipeline R-O-W. No current beaver activity was noted during the field visit, but control of the beaver population may be needed if they once again move into this area. The current site hydrology should be maintained.

PIPELINE SWAMP NORTH (Bear Creek Twp.) SA535 – The site is located on State Game Lands #91. It is an extensive (approximately 10-15 acre) spruce and shrub swamp clearly impacted by flooding, presumably from construction of the pipeline and possibly from beaver activity. Many of the trees at the site, including some spruce, were dead. The swamp has a concentric pattern with 1/2 meter deep water near the center, and a floating (sinking) peat surrounded by leatherleaf (*Chamaedaphne calyculata*). In turn, the center of the swamp is surrounded by shallower peat with highbush blueberry (*Vaccinium corymbosum*). The dominant vegetation in the swamp includes red spruce (*Picea rubens*), tamarack (*Larix laricina*), *spirea (Spiraea sp.*), sheep laurel (*Kalmia angustifolia*), highbush blueberry (*Vaccinium corymbosum*), small cranberry (*Vaccinum oxycoccos*), pitcher plant (*Sarracenia purpurea*), sphagnum moss (*Sphagnum sp.*), yellow-eyed grass (*Xyris sp.*), buckbean (*Menyanthes trifoliata*), sundew (*Drosera intermedia*), and sedges (*Carex canescens*, *Carex utriculata*, and *Carex trisperma*). Animal species that were observed during the field visit include the northern green frog (*Rana clamitans melanota*), red-spotted newt (*Notophthalmus viridescens viridescens*), cedar waxwing (*Bombycilla cedrorum*), common yellowthroat (*Geothlypis trichas*), and yellow warbler (*Dendroica petechia*).

An S2 animal species of concern (SA535) was found at the swamp in 2000. Additional surveys are needed to determine the quality of the occurrence of this animal species. The survival of the animal species can be aided by restricting the use of herbicides for weed control on the pipeline right-of-way. Additional threats to the site include changes in hydrology caused by beaver. A small portion of this site extends to the Pleasant View Summit quadrangle.

RED BEAR SWAMP (Bear Creek Twp.) SA538 **–** This site is a small high-elevation wetland dominated by sedges (*Carex stricta*), large cranberry (*Vaccinium macrocarpon*), and sphagnum moss (*Sphagnum sp.*). An invertebrate species of concern (SA538) was collected here in 2000. Cedar waxwings (*Bombycilla cedrorum*)

and a broad-winged hawk (*Buteo platypterus*) were also observed during a brief 1999 field visit. Additional surveys are needed to determine the quality of this population.

TANNERY ROAD SITE/BEHLER SWAMP (Bear Creek and Buck Twps. in Luzerne County & Lehigh Twp. in Lackawanna County) –UPDATE- SP517, SP531, & SA540 **–** This site is part of State Game Land #91 and the Lackawanna State Forest. Populations of two separate plant species of concern exist here. A good-quality population of a PA-Rare plant (SP517) was first identified at the site in 1991. The population was monitored in 1996 and again in 1999. SP517 was found on both sides of a hiking trail in both Luzerne and Lackawanna Counties. The associated species include sphagnum moss (*Sphagnum sp.*), common hairgrass (*Deschampsia flexuosa*), Brachyelytrum (*Brachyelytrum erectum*), mountain laurel (*Kalmia latifolia*), sheep laurel (*Kalmia angustifolia*), swamp dewberry (*Rubus hispidus*), and highbush blueberry (*Vaccinium corymbosum*). A second plant population of concern (SP531) was discovered in 1999. SP531 was found along the banks of Choke Creek that is bordered by a young deciduous forest (20-30 years old). More surveys of the creek are needed before the quality of this population can be assessed. The vegetation surrounding the creek included red maple (*Acer rubrum*), white pine (*Pinus strobus*), red spruce (*Picea rubens*), highbush blueberry (*Vaccinium corymbosum*), sheep laurel (*Kalmia angustifolia*), New York fern (*Thelypteris noveboracensis*), and a sedge (*Carex gynandra*). Species associated with SP531 included sphagnum moss (*Sphagnum sp*.), cinnamon fern (*Osmunda cinnamomea*), fly-poison (*Amianthium muscaetoxicum*), poverty grass (*Aristida dichotoma*), and mountain laurel (*Kalmia latifolia*). The site and land surrounding the site, within the State Game Land and State Forest, is primarily used for recreation including hunting and hiking. Much of the land beyond the State Game Land and State Forest boundaries remains undeveloped with the exception of a couple of residential developments (e.g., Meadow Run and Indian Lake). Both populations could potentially be affected from trampling by hikers using the trail. Also, browsing by deer could pose a threat. Lastly, SP531 would be impacted if beavers change the hydrology of Choke Creek. **The plant species SP531, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.**

An animal species of concern (SA540) was observed nesting at the site in 2000. The preservation of larger trees and snags would greatly benefit this species. Additional surveys are needed to determine the quality of the population.

A new population of Common Labrador-tea (*Ledum groenlandicum*), was located at this site in 2003.

Four newly documented odonate species of concern, the Ski-tipped Emerald (*Somatochlora elongate*) Incurvate Emerald (*Somatochlora incurvata*), Elfin Skimmer (*Nannothemis bella*) and Brush-tipped Emerald (*Somatochlora walshii*), were found at this site in 2004 and 2005. Associated odonate species include the Twelve-spotted Skimmer, Four-spotted Skimmer, Painted Skimmer, Clamp-tipped Emerald, Slender Spreadwing, and Sedge Sprite.

WYOMING MOUNTAIN BARRENS (Bear Creek Twp.) SP524, NC501, & NC504 –This site is part of a mosaic of a Ridgetop Dwarf Tree Forest Natural Community (NC501 & NC504) stretching along the ridgetop from Bald Mountain southwest to Penobscot Mountain. Very little pitch pine (*Pinus rigida*) is present. The site includes occasional conglomerate outcrops and little bluestem (*Schizachyrium scoparium*) -dominated areas mixed with oak/blackgum forests and shrub-oak/gray birch barrens. A large area just to the southwest of the site burned in 1999.

A PA-Rare plant species (SP524) was identified at the site. The associated plant species include wintergreen *(Gaultheria procumbens)*, scrub oak (*Quercus ilicifolia*), red chokeberry (*Aronia arbutifolia*), gray birch (*Betula populifolia*), sweet fern (*Comptonia peregrina*), black huckleberry (*Gaylussacia baccata*), wintergreen *(Gaultheria procumbens)*, sedge (*Carex sp.*), cowwheat (*Melampyrum lineare*), poverty grass (*Danthonia spicata*), hairgrass

(*Deschampsia sp*.), and grass (*Panicum sp*.). Fire is beneficial to this plant species and natural community. Development and fire suppression and the use of herbicides are potential threats. Part of this site is within State Game Lands #91. A portion of the site extends to the Pleasant View Summit quadrangle. **The plant species SP524 *Prunus pumila* (Sand Cherry), has been removed from the species of concern list.**

Two new moth species of concern, a noctuid moth (*Platyperigea menalis*) and (*Diarsia rubifera)*, and an odonate specis of concern Ski-tailed Emerald (*Somatochlora elongata*) were located at this site in 2000.

Locally Significant Sites:

Bear Creek at Shades Creek (Bear Creek Twp.) –UPDATE- SP537 - Bear Creek and Shades Creek are rocky, quick-moving streams predominantly shaded by hemlocks (*Tsuga canadensis*). The dominant herbaceous plant species at this **Locally Significant** site include turtlehead (*Chelone glabra*), sedges (*Carex sp*.), bulrush (*Scirpus sp*.), and bent grass (*Agrostis sp*.). The adjacent riverbanks have hemlock (*Tsuga canadensis*), beech (*Fagus grandifolia*), swamp azalea (*Rhododendron viscosum*), mountain laurel (*Kalmia latifolia*), aster (*Aster sp*.), panic grass (*Panicum sp*.), a sedge (*Carex stricta*), New York fern (*Thelypteris noveboracensis*), water horehound (*Lycopus uniflorus*), marsh St. Johns wort (*Triadenum sp*.), and a small amount of Japanese knotweed (*Polygonum cuspidatum*). The knotweed is not currently impacting the plant species of concern but can be aggressive and should be monitored. No deer browsing of the plants was seen. The water quality and the present hydrology of the streams should be maintained, as well as a forested buffer along the stream banks.

The plant species, SP537, *Orontium aquaticum* (Golden Club), has been found at this site, but has been removed from the species of concern list

Horned bladderwort (*Utricularia cornuta*)

Wright Creek Watershed C (Bear Creek & Dennison Twps.) –UPDATE- SP523 **–** At this **Locally Significant** site, a small population of a former plant species of concern was found along the edge of the woods near a trail at Wright Creek in State Game Lands #119. The vegetation included groundberry (*Rubus hipidus*), mosses, sedges (*Carex folliculata* and *Carex* sp.), mountain laurel (*Kalmia latifolia*), highbush blueberry (*Vaccinium corymbosum*), bunchberry (*Cornus canadensis*), large cranberry (*Vaccinium macrocarpon*), winterberry (*Ilex verticillata*), grass (Poaceae), bugleweed (*Lycopus uniflorus*), and grass (*Brachyelytrum erectum*). The current nearby disturbances include ATV and foot traffic. The potential threats include trampling and deer browse. **The plant species SP523, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.**

Lilypad Clubtail dragonfly (*Arigomphus furcifer*)

BLACK CREEK TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
SCOTCH RUN							
Ephemeral/Fluctuating Pool Natural Community	G?	S3			5/08/03	E	**NEW**

LOCALLY SIGNIFICANT SITES:

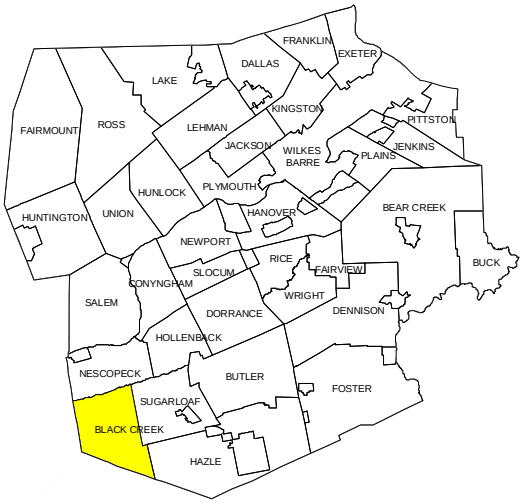
Beaver Run Wetlands

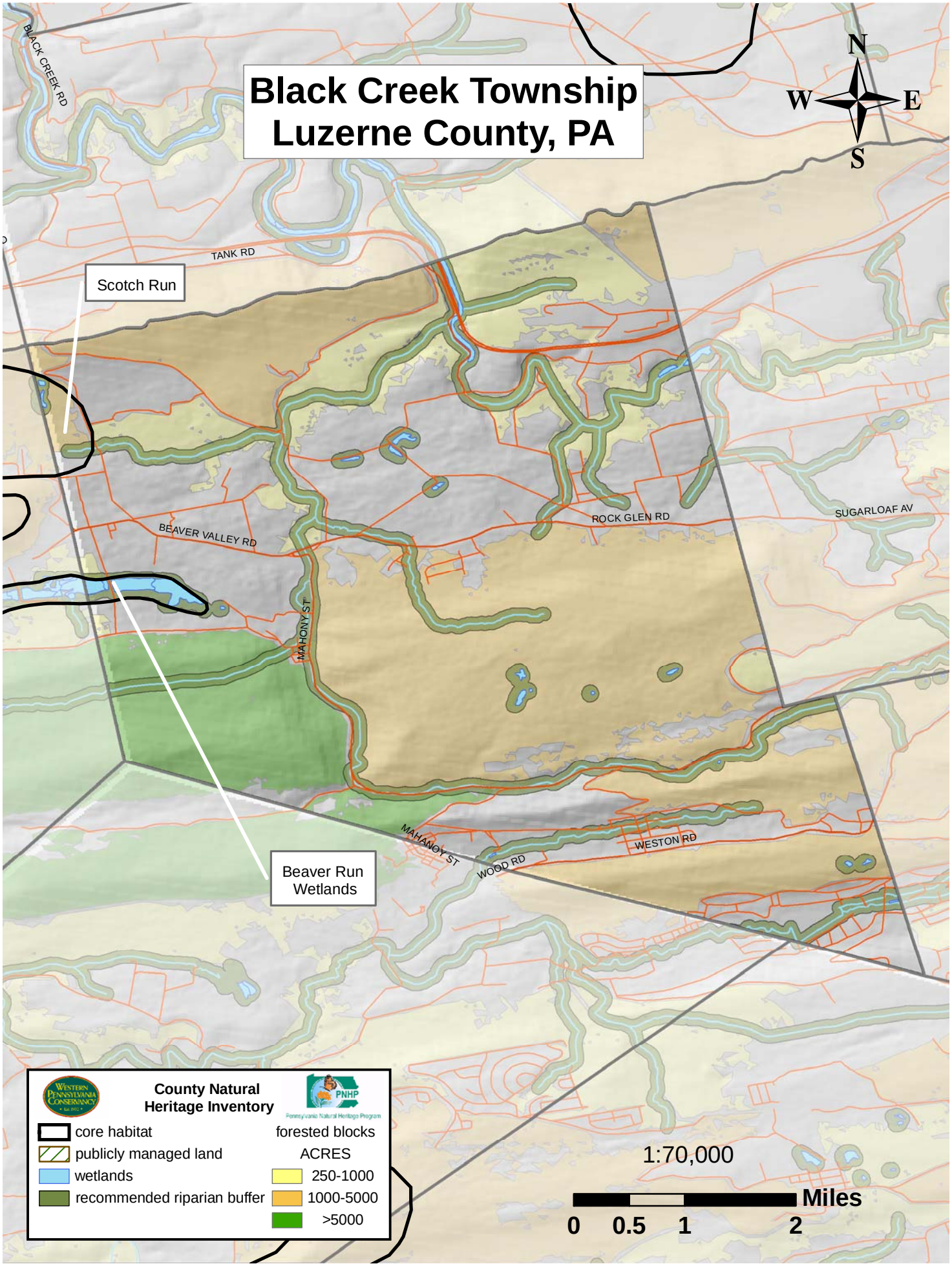
PUBLICLY MANAGED LANDS:

None

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

** Please refer to Appendix II for Quality ranks.




Black Creek Township
Luzerne County, PA
N
W
E
S
BLACK CREEK RD
TANK RD
Scotch Run
BEAVER VALLEY RD
ROCK GLEN RD
SUGARLOAF AV
MAHONY ST
MAHANOY ST
WOOD RD
WESTON RD
Beaver Run
Wetlands
County Natural
Heritage Inventory
PNHP
Pennsylvania Natural Heritage Program
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:70,000
Miles
0
0.5
1
2

SCOTCH RUN – NEW -An **Ephemeral/Fluctuating Pool Natural Community** was documented at this site during surveys in 2003. Scotch Run was dammed and a reservoir established in the past. A small residential community with a fairly extensive road system is now located along Scotch Run and around this reservoir. The "hemlock-mixed hardwood palustrine forest" east of the reservoir contains numerous forested wetlands and vernal pools. These pools provide important breeding habitat for amphibians such as wood frogs (*Rana sylvatica*) and spotted salamanders (*Ambystoma maculatum*). A variety of plant species are also in this forest including eastern hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), white oak (*Quercus alba*), American beech (*Fagus grandifolia*), red oak (*Quercus rubra*), rhododendron (*Rhododendron maximum*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), false hellebore (*Veratrum viride*), goldthread (*Coptis trifolia*), wood anemone (*Anemone quinquefolia*), teaberry (*Gaultheria procumbens*) and sphagnum moss (*Sphagnum* spp.).

This biggest threat to this community is destruction of vernal ponds during construction of new houses. These small wetlands are often filled and developed, destroying the natural community and important breeding habitat for amphibians. Disturbances include numerous dirt roads bisecting the habitat and separating vernal pools. The proximity of these ponds to residential development may lead to abuses such as dumping of household waste, lawn clippings and other debris. The ponds may also be perceived as mosquito breeding areas, with accompanying demands for pesticide application to reduce insect populations. Introduced invasive species of plants can threaten the natural character and diversity of this site. The increased use of All Terrain Vehicles (ATVs) in forested property poses a potential threat to the site.

An undisturbed forested buffer between nearby residences and the ponds should be established. Local planning should discourage further development near this sensitive wetland community. Residents of Scotch Valley will benefit from preservation of natural resources in this area. Not only will the natural beauty of the area be preserved, but ecological services such as flood control will also be beneficial for residents. The site should be monitored for ATV traffic, and trails blocked as they appear. Aquatic pesticide applications for mosquito control should be avoided in these ponds, as this would disrupt the food cycle necessary to maintain amphibian populations. Additional surveys for species of concern in this area are encouraged.

Locally Significant Site:

Beaver Run Wetlands - This **Locally Significant** site contains an extensive and diverse wetland. The largest component of this wetland complex mosaic is an extensive "highbush blueberry – meadow-sweet shrub swamp". Other characteristic wetland plant species found at this site include the shrubs northern arrow-wood (*Viburnum recognitum*), speckled alder (*Alnus incana*), poison sumac (*Toxicodendron vernix*), black ash (*Fraxinus nigra*), mountain holly (*Nemopanthus mucronatus*), red elderberry (*Sambucus racemosa*), buttonbush (*Cephalanthus occidentalis*), and steeple-bush (*Spiraea tomentosa*). Associated herbaceous species include skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), cattail (*Typha latifolia*), yellow pond lily (*Nuphar lutea*), soft rush (*Juncus effusus)*, marsh St.-John's-wort (*Triadenum virginicum*), smooth goldenrod (*Solidago gigantea*), fowl mannagrass (*Glyceria striata*), rattlesnake grass (*Glyceria canadensis*), sedge (*Carex lacustris*), sedge (*Carex lurida*), swamp candles (*Lysimachia terrestris*), Canada bluejoint (*Calamagrostis canadensis*), woolgrass (*Scirpus cyperinus*), iris (*Iris versicolor*) and prickly sedge (*Carex echinata*).

The shrub swamp is alongside slow-moving Beaver Run, which is fairly wide in some places dominated by yellow pond lily. Another component of this extensive swamp is a "red maple-yellow birch-eastern

hemlock palustrine forest". Additional plant species not found in the above shrub swamp include false hellebore (*Veratrum viride*), orange jewelweed (*Impatiens capensis*), Jack-in-the-pulpit (*Arisaema triphyllum*), black tupelo (*Nyssa sylvatica*), Canada mayflower (*Maianthemum canadense*), Solomon's seal (*Polygonatum pubescens*), halberd-leaved tearthumb (*Polygonum arifolium*), cinnamon fern (*Osmunda cinnamomea*), partridgeberry (*Mitchella repens*), and white pine (*Pinus strobus*). Yet another similar component of this shrub swamp is a cattail marsh (*Typha latifolia*) and "buttonbush - highbush blueberry shrub swamp". A few of the species found in this swamp that are absent from the site above include swamp rose (*Rosa palustris*), winterberry holly (*Ilex verticillata*), and hawthorn (*Crataegus* sp.).

Some species of birds found within this wetland complex include Yellow Warbler (*Dendroica petechia*), Common Yellowthroat (*Geothlypis trichata*), Ovenbird (*Seiurus aurocapillus*), House Wren (*Troglodytes aedon*), Gray Catbird (*Dumetella carolinensis*), and Swamp Sparrow (*Melospiza georgiana*). Also documented here is Spangled Skimmer (*Libellula cyanea*), a species of dragonfly.

Any land use changes in the surrounding area could affect the hydrology of the wetland. Runoff from the nearby roadway is a disturbance that could change the natural state of the wetland. The surrounding agricultural and residential land use may not provide an adequate protective buffer to this important habitat. Runoff from residences, streets and agricultural fields could impair the water quality of the wetland. The spread of invasive plant species into the wetland could displace much of the native diversity within this habitat.

Some areas adjacent to the wetland require additional forested buffers to minimize the impact of non-point sources of pollution. Forested buffers provide critical protection to streams by reducing nutrient, sediment and toxic runoff from roads, residences and agricultural fields. Monitoring for invasive species of plants is also recommended. Populations of invasive species removed as they first appear are far more easily and effectively eliminated than established populations. A program could be initiated to monitor the wetland, hydrology and surrounding land use. This would ensure the integrity of one of the best examples of a shrub swamp in the county.

BUCK TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
CHOKE CREEK SHRUB SWAMP							
Acidic Shrub Swamp NC518	G5	S3			7/28/99	CD	
Ledum groenlandicum Common Labrador-tea SP518	G5	S3		PR	7/28/99	CD	
DRY LAND HILL POOLS							
Carex oligosperma Few-seeded Sedge SP532	G5?	S2		PT	8/11/99	B	**UPDATED**
Lycaena epixanthe Bog Copper SA532	G4G5	S2			7/17/99	E	
INDIAN LAKE SWAMP							
Gaultheria hispidula Creeping Snowberry SP536	G5	S3		PR	7/18/00	CD	
KENDALL CREEK WETLAND							
Somatochlora elongate Ski-tailed Emerald	G5	S2			6/29/03	E	**NEW**
LEHIGH RIVER AT CHOKE CREEK							
Calopteryx aequabilis River Jewelwing	G5	S2			6/25/04	E	**NEW**
Calopteryx amata Superb Jewelwing	G4	S2S3			6/25/04	E	**NEW**
Gomphus adelphus Mustached Clubtail	G4	S3S4			6/25/04	E	**NEW**
Gomphus descriptus Harpoon Clubtail	G4	S1S2			6/25/04	E	**NEW**
Ophiogomphus carolus Riffle Snaketail	G5	S2S3			6/25/04	E	**NEW**
Ophiogomphus mainensis Maine Snaketail	G4	S3			6/25/04	E	**NEW**
LEHIGH RIVER- ROUTE 115 BRIDGE							
Animal Species of Concern	G5	S2B	LT	PT	2001	E	**NEW**
Northern Appalachian acidic cliff community	G5	S5			5/22/91	CD	**NEW**
Orontium aquaticum Golden Club SP526	G5	S4		DL	9/13/92	B	**DELISTED**
Ranunculus aquatilis var *diffusus* White Water-crowfoot SP505	G5T5	S3		PR	7/28/99	C	**UPDATED**
SHADES GLEN HEADWATERS							
Carex oligosperma Few-seeded sedge SP534	G5?	S2		PT	7/18/00	C	**UPDATED**
Ledum groenlandicum Common Labrador-tea SP535	G5	S3		PR	7/18/00	CD	
Mesic Scrub-Oak Heath Pitch Pine Barrens NC533	GNR	S1			7/18/00	C	**UPDATED**

TANNERY ROAD SITE/ BEHLER SWAMP						
Aegolius acadicus Northern Saw-whet Owl SA540	G5	S3B,S3N		2000	E	
Gentiana linearis Narrow-leaved Gentian SP531	G4G5	S4	DL	8/31/99	E	**DELISTED**
Juncus filimormis Thread Rush SP517	G5	S3	PR	8/31/99	B	**UPDATED**
Ledum groenlandicum Common Labrador-tea	G5	S3	PR	9/14/03	C	**NEW**
Nannothemis bella Elfin Skimmer	G4	S1		6/25/04	E	**NEW**
Somatochlora elongata Ski-tipped Emerald	G5	S2		6/25/04	E	**NEW**
Somatochlora incurvata Incurvate Emerald	G4	S1		7/24/04	E	**NEW**
Somatochlora walshii Brush-tipped Emerald	G5	S2		6/25/04	E	**NEW**

LOCALLY SIGNIFICANT SITES:

None

PUBLICLY MANAGED LANDS:

State Game Lands #91

Lackawanna State Forest

OTHER CONSERVATION AREAS:

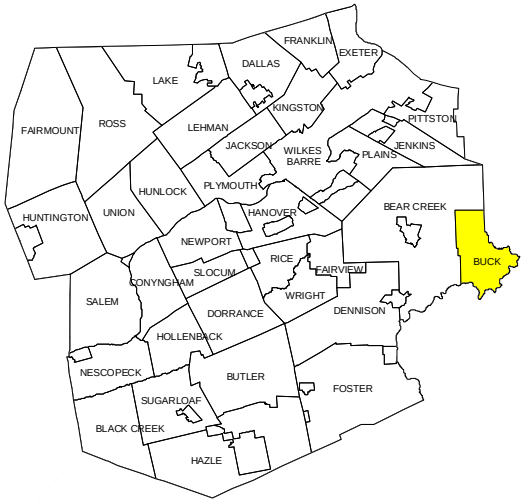
Lehigh River: High Quality Cold Water Fishery

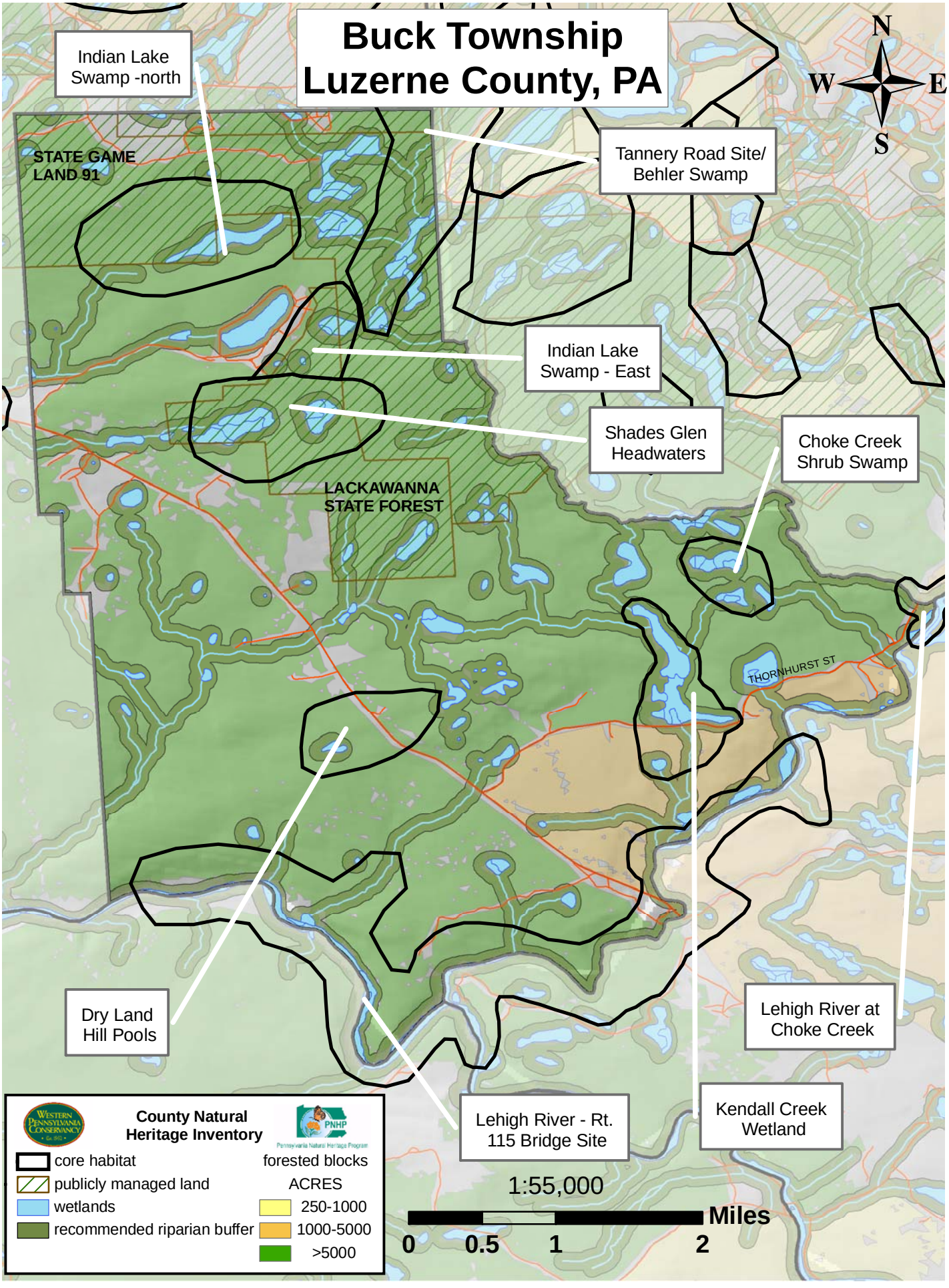
Lehigh Valley / Lehigh Gorge State Park Important Mammal Area

Pocono Lake / Adams Swamp / Two Mile Run Important Mammal Area

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

** Please refer to Appendix II for Quality ranks.




Buck Township
Luzerne County, PA
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Indian Lake Swamp -north
STATE GAME LAND 91
Tannery Road Site/ Behler Swamp
Indian Lake Swamp - East
Shades Glen Headwaters
Choke Creek Shrub Swamp
LACKAWANNA STATE FOREST
THORNHURST ST
Dry Land Hill Pools
Lehigh River at Choke Creek
Lehigh River - Rt. 115 Bridge Site
Kendall Creek Wetland
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:55,000
Miles
0
0.5
1
2

CHOKE CREEK SHRUB SWAMP (Buck Twp.) SP518 & NC518 – This site on private property is a fairly small Acidic Shrub Swamp Natural Community (NC518) with a fair- to poor-quality population of a PA-Rare plant species (SP518). No disturbances were noted at the time of the field visit. Potential threats include development, logging, or changing the hydrology of the site.

DRY LAND HILL POOLS (Buck Twp.) SP532 & SA532 - This site consists of two large vernal pools in a matrix of typical dry, acid, oak-heath forest. The substrate is hemic/sappric sedge peat. A plant species of concern (SP532) is the dominant plant in the larger pool and is also present in the second pool. No open water was present in this severe drought year. It is likely that the centers of the pools are inundated during the growing season. The site has probably burned in the past. The associated plant species in decreasing order of abundance include three-way sedge (*Dulichium arundinaceum)*, marsh St. John's wort (*Triadenum sp*.), loosestrife (*Lysimachia terrestris*), iris (*Iris versicolor*), large cranberry *(Vaccinium macrocarpon*), and Canada rush (*Juncus canadensis*). Additional species in wetland habitat between and along the margin of the pools include a sedge (*Carex stricta*), fowl mannagrass (*Glyceria canadensis*), royal fern (*Osmunda regalis*), woolgrass (*Scirpus cyperinus*), chain fern (*Woodwardia virginica*), winterberry (*Ilex verticillata*), highbush blueberry (*Vacccinium corymbosum*), and red maple (*Acer rubrum*). A deer trail runs through the site, but no browse was seen on the plant species of concern. An S2 animal species of concern (SA532) was identified in 1999. This inconspicuous invertebrate animal species uses cranberry as its host plant. The spraying of pesticides or herbicides is a potential threat for SA532.

Recently, the woods to the south were heavily logged. The long -term threats to the pools include succession of the shrub-thicket margins, and human disturbance by draining or dumping of logging slash in pools. Buffering the pools from logging would protect both species of concern from harmful disturbance. The North Branch Land Trust is working to protect this site.

INDIAN LAKE SWAMP (Buck Twp.) SP536 – The site is characterized by red-spruce mixed hardwood palustrine forested swamp near Indian Lake on private property and State Game Lands 91. A small population of a PA–Rare plant species (SP536) was found growing on hummocks. The substrate is shallow sphagnous peat. The canopy is relatively open with much young spruce regeneration and well-developed pit-and-mount microtopography. The estimated tree canopy height was 50-60 ft and the estimated average tree size was 6-8"diameter at breast height (DBH). The overstory tree species include eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*). The understory species were red spruce (*Picea rubens*), rhododendron (*Rhododendron maximum*), and highbush blueberry (*Vaccinium corymbosum*). The dominant groundcover species include sphagnum moss, (*Sphagnum sp*.), sedges (*Carex trisperma*, & *Carex folliculata*), goldthread (*Coptis trifolium*), star flower (*Trientalis borealis*), and Canada mayflower (*Maianthemum candense*). The swamp becomes dominated with highbush blueberry as you travel west. No disturbance, with the exception of deer browse, was noted at the site. Threats include development and logging. The site should be monitored and additional searches for the plant species are needed**.**

KENDALL CREEK WETLANDS – NEW- Six odonate species of concern were documented here during field surveys in 2003. Additional surveys need to be conducted to determine the extent of the populations and habitat conditions.

LEHIGH RIVER AT CHOKE CREEK – NEW- Six odonate species of concern were documented at this site in 2004 including four G4 species. Further surveys need to be done to determine the full extent of the populations.

LEHIGH RIVER-ROUTE 115 BRIDGE (Buck Twp. in Luzerne Co. & Kidder Twp. In Carbon Co. & Tobyhanna Twp. in Monroe Co.) –UPDATE- SP505 & SP526 - Two aquatic plant species of concern (SP505 & sp526) were identified at the site in 1991 and 1992. The river was revisited in 1999 and a fair-quality population of SP505 was once again found at the site. The quality of the population in 1993 was ranked as good (B). No search for sp526 was conducted during the brief 1999 visit. The associated plant and animal species include river weed (*Podostemum ceratophyllum*), pondweed (*Potamogeton sp.*), eastern elliptio (*Elliptio complanata*), common shiner (*Luxilus cornutus*), bluegill (*Lepomis macrochirus*), spottail shiner (*Notropis hudsonius*), tesselated darter (*Etheostoma olmstedi*), shield darter (*Percina peltata*), white sucker (*Catostomus commersoni*), margined madtom (*Noturus insignis*), blacknose dace (*Rhinichthys atratulus*), longnose dace (*Rhinichthys cataractae*), fallfish (*Semotilus corporalis*), caddisflies (Trichoptera), and crayfish (Decapoda). The reduction in numbers of the plant species of concern could have been due to lower than normal water levels during the drought year when the site was visited. A great deal of siltation in the river was also noted. Scour may have reduced the number of plants since the last visit. The continued siltation and degradation of water quality of the Lehigh River are potential threats. The site extends to the Hickory Run and Thornhurst quadrangles.

Also included at this site is the major waterfall of the Lehigh River, the Stoddartsville Falls. The river has formed these jagged 25-foot high falls by cutting through flat-lying beds of sandstone (Geyer and Bolles, 1987).

The plant species SP526 *Orontium aquaticum* (Golden Club), has been removed from the species of concern list.

A fair Natural Community of Concern, Northern Appalachian Acidic Cliff Community was located at this site in 1991.

A Federally and State Threatened animal species of concern was seen nesting at this site in 2001 at the confluence of White House Run and the Lehigh River. Further surveys need to be done to determine the quality of this population.

SHADES GLEN HEADWATERS (Buck Twp.) NC533, SP534, SP535 - This area is a heath-dominated shrubland with patches of scrub oak (*Quercus ilicifolia*) and occasional pitch pine (*Pinus rigida*). In 2000, this site was mapped as a fair occurrence of a Mesic Scrub Oak-Heath-Pitch Pine Barrens (NC533). Sheep laurel (*Kalmia angustifolia*) and rhodora (*Rhodora canadense*) are co-dominant plant species along with serviceberry (*Amelanchier sp.*), pitch pine (*Pinus rigida*), wintergreen (*Gaultheria procumbens*), sweet fern (*Comptonia peregrina*) and raspberries and blackberries (*Rubus sp.)*. The sparse (estimated 10-15%) herbaceous plant layer includes fly poison (*Amianthium muscaetoxicum*), ricegrass (*Oryzopsis asperifolia*), poverty grass (*Danthonia spicata*), hairgrass (*Deschampsia flexuosa*), and bracken fern (*Pteridium aquilinum*). The soil is a stony silt loam (Morris series) formed in acidic glacial till and poorly drained with a fragipan. Therefore, the "barrens" vegetation appears to be due to factors (e.g., fire history, site function as a frost pocket) other than xeric soil conditions. The barrens should be revisited for more thorough vegetation and soil sampling, and to determine its relation to the till barrens of Long Pond. Additionally, Lepidopteran surveys are needed.

A PA-Threatened plant species (SP534) and a PA-Rare plant species (SP535) were identified in a swamp at this site. The habitat containing the species of concern has a few, stunted trees (*Acer rubrum*, *Picea rubens*, *Pinus strobus*, and *Betula populifolia*) and occasional tall shrubs (*Alnus sp.*, *Spiraea latifolia*, and

Chamaedaphne calyculata) but is largely unshaded and dominated by herbaceous plants and low shrubs. The groundcover is dominated by sphagnum moss (*Sphagnum sp*.), a sedge (*Carex trisperma*), and cinnamon fern (*Osmunda cinnamomea*). The substrate is shallow sphagnous peat. To protect the site and species of concern, the hydrology of the site should be preserved.

TANNERY ROAD SITE/BEHLER SWAMP (Bear Creek and Buck Twps. in Luzerne County & Lehigh Twp. in Lackawanna County) –UPDATE- SP517, SP531, & SA540 **–** This site is part of State Game Land #91 and the Lackawanna State Forest. Populations of two separate plant species of concern exist here. A good-quality population of a PA-Rare plant (SP517) was first identified at the site in 1991. The population was monitored in 1996 and again in 1999. SP517 was found on both sides of a hiking trail in both Luzerne and Lackawanna Counties. The associated species include sphagnum moss (*Sphagnum sp.*), common hairgrass (*Deschampsia flexuosa*), Brachyelytrum (*Brachyelytrum erectum*), mountain laurel (*Kalmia latifolia*), sheep laurel (*Kalmia angustifolia*), swamp dewberry (*Rubus hispidus*), and highbush blueberry (*Vaccinium corymbosum*). A second plant population of concern (SP531) was discovered in 1999. SP531 was found along the banks of Choke Creek that is bordered by a young deciduous forest (20-30 years old). More surveys of the creek are needed before the quality of this population can be assessed. The vegetation surrounding the creek included red maple (*Acer rubrum*), white pine (*Pinus strobus*), red spruce (*Picea rubens*), highbush blueberry (*Vaccinium corymbosum*), sheep laurel (*Kalmia angustifolia*), New York fern (*Thelypteris noveboracensis*), and a sedge (*Carex gynandra*). Species associated with SP531 included sphagnum moss (*Sphagnum sp*.), cinnamon fern (*Osmunda cinnamomea*), fly-poison (*Amianthium muscaetoxicum*), poverty grass (*Aristida dichotoma*), and mountain laurel (*Kalmia latifolia*). The site and land surrounding the site, within the State Game Land and State Forest, is primarily used for recreation including hunting and hiking. Much of the land beyond the State Game Land and State Forest boundaries remains undeveloped with the exception of a couple of residential developments (e.g., Meadow Run and Indian Lake). Both populations could potentially be affected from trampling by hikers using the trail. Also, browsing by deer could pose a threat. Lastly, SP531 would be impacted if beavers change the hydrology of Choke Creek.

An animal species of concern (SA540) was observed nesting at the site in 2000. The preservation of larger trees and snags would greatly benefit this species. Additional surveys are needed to determine the quality of the population.

The plant species SP531, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.

A new population of Common Labrador-tea (*Ledum groenlandicum*), was located at this site in 2003.

Four newly documented odonate species of concern, the Ski-tipped Emerald (*Somatochlora elongate*) Incurvate Emerald (*Somatochlora incurvata*), Elfin Skimmer (*Nannothemis bella*) and Brush-tipped Emerald (*Somatochlora walshii*), were found at this site in 2004 and 2005. Associated odonate species include the Twelve-spotted Skimmer, Four-spotted Skimmer, Painted Skimmer, Clamp-tipped Emerald, Slender Spreadwing, and Sedge Sprite.

BUTLER TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
EDGEWOOD VERNAL POOLS							
Ephemeral/Fluctuating Natural Pool NC513	GNR	S3			3/15/00	B	**UPDATED**
Lygodium palmatum Hartford Fern SP512, SP513	G4	S4		DL	8/29/90	BC	**DELISTED**
Orontium aquaticum Golden Club SP511	G5	S4		DL	9/24/99	BC	**DELISTED**
Papaipema sp 1 Flypoison Borer Moth SA514	G2G3	S2			10/03/90	E	
Hell's Kitchen	**(Locally Significant Site)**						**CHANGED**
Lygodium palmatum Hartford Fern SP503	G4	S4		DL	10/28/87	A	**DELISTED**
HELL'S KITCHEN ANTHRACITE MINE							
Myotis septentrionalis Northern Myotis SA517	G4	S3B,S3N		CR	4/21/98	E	**UPDATED**
NESCOPECK CREEK VALLEY							
Animal Species of Concern SA518	G5	S2S3B, S3N		CR	6/2000	AB	**UPDATED**
Aeshna tuberculifera Black-tipped Darner	G4	S2S3			6/26/05	E	**NEW**
Aeshna verticalis Green-striped Darner	G5	S3S4			8/20/05	E	**NEW**
Boyeria grafiana Ocellated Darner	G5	S3			8/04/01	E	**NEW**
Calopteryx amata Superb Jewelwing	G4	S2S3			7/06/01	E	**NEW**
Carex polymorpha Variable Sedge SP505	G3	S2		PT	7/21/00	A	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4			6/07/05	E	**NEW**
Eurybia radula Rough-leaved Aster SP520	G5	S2		PT	8/30/00	B	**UPDATED**
Helocordulia uhleri Uhler's Sundragon	G5	S3			7/30/03	E	**NEW**
Hemileuca maia Barrens Buckmoth	G5	S1S2			6/01/01	E	**NEW**
Hesperia leonardus Leonard's Skipper SA519B	G4	S3S4			8/22/00	BC	**UPDATED**

Animal Species of Concern SA519A	G5	S3S4		8/20/00	E	
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4		8/20/05	E	**NEW**
Lonicera hirsuta Hairy Honeysuckle SP516	G4G5	S1	PE	7/12/00	B	**UPDATED**
Plant Species of Concern SP515	G5	S3	PR	8/30/00	D	
Lygodium palmatum Hartford Fern SP506	G4	S4	DL	8/23/00	A	**DELISTED**
Metaxaglaea semitaria Footpath Sallow Moth SA523	G5	S2		10/03/00	E	
Najas gracillima Bushy Naiad SP522	G5?	S4	DL	7/18/00	E	**DELISTED**
Rosa virginiana Virginia Rose	G5	S1	TU	7/01/94	BC	**NEW**
Schoenoplectus subterminalis Water Bulrush	G4G5	S3	PR	9/12/01	C	**NEW**
Utricularia geminiscapa Bladderwort SP521	G4G5	S4	DL	8/22/00	B	**DELISTED**

LOCALLY SIGNIFICANT AREAS:

Hell's Kitchen

PUBLICLY MANAGED LANDS:

State Game Lands #187

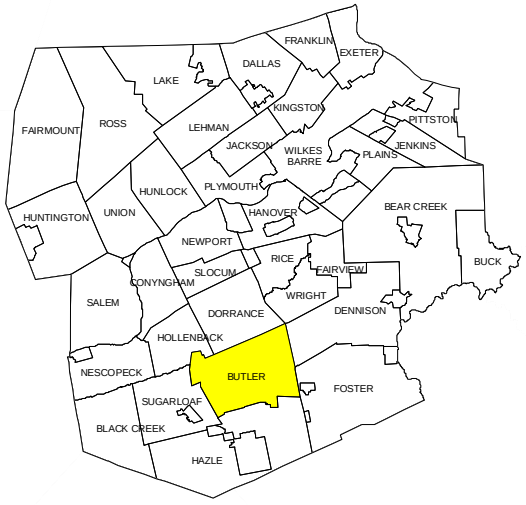
Nescopeck State Park

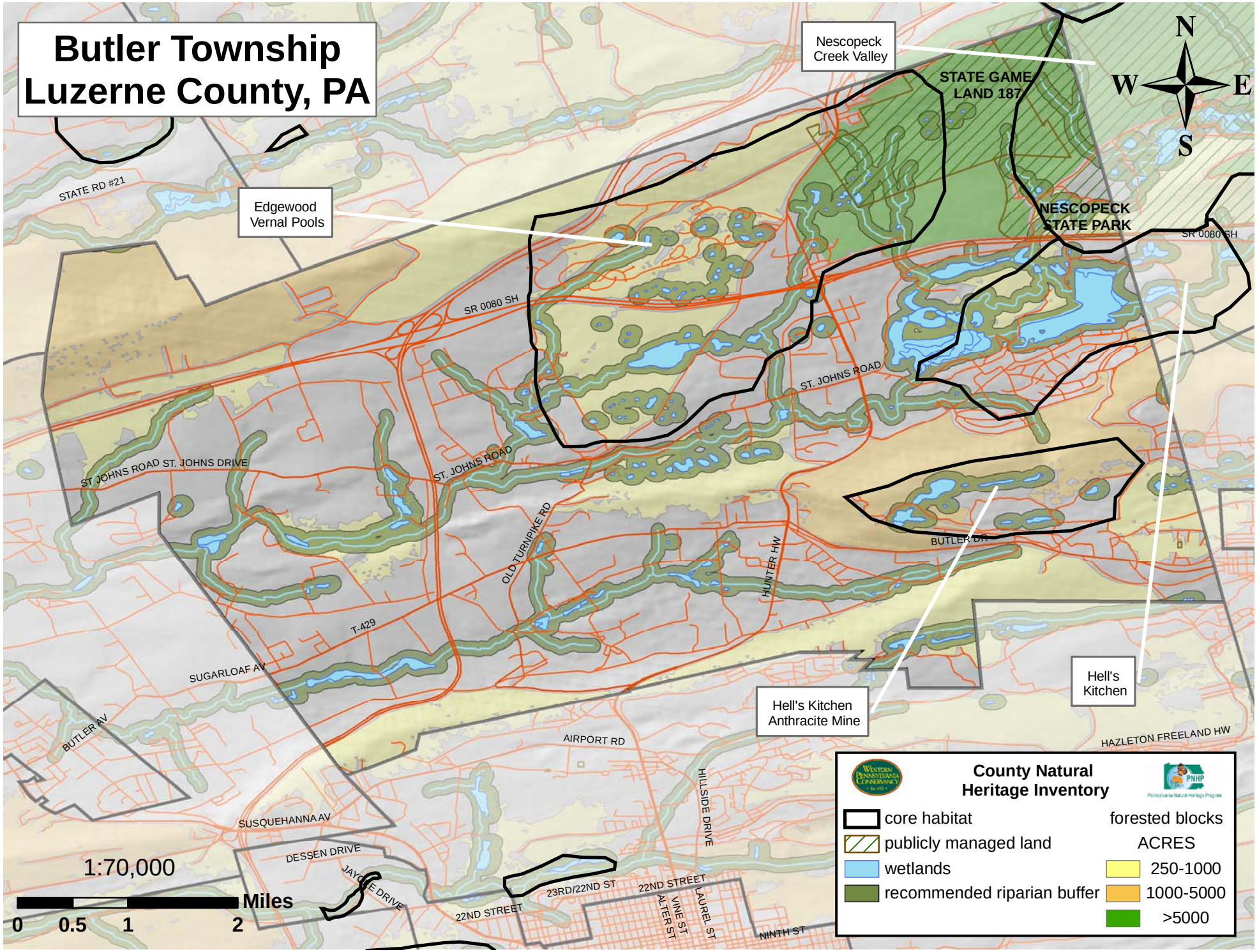
OTHER CONSERVATION AREAS:

Nescopeck Creek: High Quality Cold Water Fishery

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

** Please refer to Appendix II for Quality ranks.




Butler Township
Luzerne County, PA
Nescopeck Creek Valley
STATE GAME LAND 187
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STATE RD #21
Edgewood Vernal Pools
NESCOPECK STATE PARK
SR 0080 SH
SR 0080 SH
ST. JOHNS ROAD
ST JOHNS ROAD ST. JOHNS DRIVE
ST. JOHNS ROAD
OLD TURNPIKE RD
HUNTER HW
BUTLER DR
T-429
SUGARLOAF AV
BUTLER AV
Hell's Kitchen Anthracite Mine
Hell's Kitchen
AIRPORT RD
HAZLETON FREELAND HW
HILLSIDE DRIVE
SUSQUEHANNA AV
DESSEN DRIVE
JAYCEE DRIVE
22ND STREET
23RD/22ND ST
22ND STREET
ALTER ST
VINE ST
LAUREL ST
NINTH ST
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County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

EDGEWOOD VERNAL POOLS (Butler Twp.) –UPDATE- SP511, SP512, SP513, SA514, NC513 - This site is one of the top priority sites in Luzerne County. It contains a good example of an Ephemeral/Fluctuating Pool Natural Community (NC513). The site is located on and adjacent to Nescopeck Mountain, near the southern boundary of the last glacial advance. Dozens of pools occupy topographic depressions created by small ice blocks left behind by the retreating glaciers. The majority of pools are situated in a dry-mesic, oak-heath woods with a rolling kettle-kame topography typical of ice-contact terrain. Shrubs dominate some of these pools, while others have shrubby margins and open centers with a leaf-litter and/or sphagnous substrate. Highbush blueberry (*Vaccinium corymbosum*) was the dominant shrub along with spicebush (*Lindera benzoin*). Other dominant vegetation included red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), white oak (*Quercus alba*), winterberry (*Ilex verticillata*), musclewood (*Carpinus caroliniana*), greenbrier (*Smilax sp*.), chestnut oak (*Quercus prinus*), white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*), sphagnum moss (*Sphagnum sp.*), and cinnamon fern (*Osmunda cinnamomea*). This site provides valuable breeding habitat for amphibians. Wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystomata maculatum*), and an animal species of concern were observed using the pools to breed in 2000, and many additional pools remain to be surveyed.

A large ice-block depression swamp of mixed hardwoods and hemlock is found near the southern edge of the vernal pool area. A good- to excellent-quality population of a PA-Rare plant species (SP511) exists in the stream that drains this swamp (a tributary to Long Run). Two populations of another PA-Rare plant species (SP512 & SP513) were found at the site in 1990, growing along an ATV trail and in openings in the young oak forest surrounding the vernal pools. Neither of these were rediscovered during visits in 1999 and 2000, and one of the locations has been developed. A globally rare invertebrate species (SA514) was also discovered at this site in 1990; although portions of the habitat for this species have been developed, additional surveys in the surrounding oak forest are recommended. Some of the species of concern found here are also found a few miles to the east at the Nescopeck Creek Valley Site. The current disturbances and possible threats include development (mainly business/industrial). The properties surrounding the pools are being developed at a rapid rate. The pools are spread over several hundred acres, bisected by Interstate 80.

Commercial development has destroyed some areas of the woods and pools south of I-80 near Edgewood. Other disturbances include foot traffic from nearby trails. The nearby roadways pose a threat to amphibians when they migrate to the pools in spring. Vernal pools are extremely important, fragile habitats that are facing statewide pressure from development and other human disturbances (e.g., ATV traffic). Consequently, sites containing vernal pools should be a top priority for conservation in the county. **The plant species SP511, *Orontium aquaticum* (Golden Club), and SP512, *Lygodium palmatum* (Hartford Fern), have been removed from the species of concern list.**

HELL'S KITCHEN ANTHRACITE MINE (Butler Twp.) SA517 - A G4 animal species (SA517) was discovered at this mine site in 1998, but additional surveys are needed to determine the quality of this population. Disturbance of the site from continued mining is a potential threat.

NESCOPECK CREEK VALLEY (Butler, Dennison & Wright Twps.) –UPDATE- SP505, SP506, SP515, SP516, SP520, SP521, SP522, SA518, SA519A, SA519B, & SA523 – This large natural area is centered about the upper watershed of Nescopeck Creek, encompassing portions of Nescopeck State Park and State Game Lands 187, and bordered by the Arbutus Peak site to the north. At least five rare animal and seven rare plant species have been documented at the site, occupying a variety of wetland and upland habitats. One of the most significant of these is an excellent quality population of a globally rare, PA-

Endangered plant species (SP505) that occurs in scattered subpopulations throughout the upper Nescopeck Valley, in moist oak woods along the Nescopeck Creek and its south-flowing tributaries. The habitat usually consists of mixed oak-heath woods, often along the boundary between streamside wetlands and adjacent uplands. Tree species present include white oak (*Quercus alba),* black oak, (*Quercus velutina*), red maple *(Acer rubrum),* and white pine (*Pinus strobus)*. The shrubs include witch hazel (*Hamamelis virginiana*), arrow-wood (*Viburnum sp.*), and various heaths *(Gaylussacia baccata, Kalmia latifolia, Vaccinium sp.)*. The species of concern occurs in the groundcover and is associated with various sedge species (*Carex vestita, Carex stricta*), fly-poison (*Amianthium muscaetoxicum*), hay-scented fern (*Dennstaedtia punctiloba*), and wild sarsaparilla (*Aralia nudicaulis*).

The additional rare species at the site occur in separate, disparate habitats within Nescopeck State Park and Sate Game Lands 187. SA518**,** which is an animal species that is a candidate for PA-Rare status, utilizes one of the pine plantations adjacent to the Nescopeck Creek for nesting. This animal is extremely sensitive to disturbance while nesting. Three invertebrate species of concern (SA519B, SA523, & SA541) were found in various habitats including dry woods and old fields. One of these species, SA541, is a G2G3 species that is only known to occur in Pennsylvania. SA519A is a vertebrate species of concern that has been found in several disturbed roadside habitats with sandy soils and open basking areas. One population of this animal was seriously affected by construction of the beach for the State Park. Finally, several plant species of concern (SP506, SP515, SP516, SP520, SP521, & SP522) have been found in some of the streamside wetlands and seeps within the State Park. These habitats are dominated by sphagnum mosses (*Sphagnum sp.*), sedges (*Carex trisperma, Carex folliculata*), and rushes (*Juncus effusus).* Recent fieldwork completed by Dr. Ann Rhoads of Morris Arboretum has uncovered several new plant species of concern in these habitats and small impoundments along Nescopeck Creek, as well as new subpopulations of the globally rare species discussed above. Maintaining buffers around the wetlands and the water quality of Nescopeck Creek (a High Quality–Cold Water Fishery) will help these species of concern to persist at the site.

Disturbances to the site include the creation of Lake Francis and other impoundments along the Creek, a variety of ATV and jeep trails, logging, management activities in the State Game Lands, and recent construction of facilities for the State Park. Despite these disturbances, the valley is largely forested and undisturbed by past anthracite mining. Efforts should be made to manage the park to protect the wild nature of much of the valley (especially by protecting the forests along the Creek tributaries) and the associated species of concern. This site extends to the White Haven quadrangle. **The plant species SP506, Hartford fern *(Lygodium palmatum)*, SP521 Bladderwort (*Utricularia geminiscapa*), and SP522, Bushy Naiad (*Najas gracillimaas*) have been removed from the species of concern list.**

Field surveys in 2001, 2003, and 2005 located seven new odonate species of concern, Uhler's Sundragon, Superb Jewelwing, Ocellated Darner, Black-tipped Darner, Sweetflag Spreadwing, Green-striped Darner, and American Emerald. Associated odonate species include Shadow Darner, Fawn Darner, Swamp Darner, Ashy Clubtail, and Dragonhunter.

Two plant species of concern were also identified from this site in 1994 and 2001, Water Bulrush (*Schoenoplectus subterminalis)* and Virginia Rose (*Rosa virginiana*). Associated species are *Hamamelis virginiana, Lonicera hirsuta, Quercus ilicifolia, Rubus sp., Corylus cornuta, C. americana, Solidago rugosa,* and *Lysimachia quadrifolia.* Threats include deer browse; it appears that deer stripped this forest recently - perhaps large numbers of deer wintered here along the creek.

A moth species of concern, Barrens Buckmoth (*Hemileuca maia*) was identified from this site in 2001 along a powerline right-of-way. Associated plant species include Scrub Oak, Sweet Fern, Highbush

Blueberry, Lowbush Blueberry, Chestnut Oak, Red Maple, Black Racer, Grey Treefrog, Chestnut-sided Warbler, Whip-poor-will, Ovenbird, Common Yellowthroat, Ruffed Grouse, Eastern Chipmunk, Grey Fox, Raccoon, Whitetail Deer.

Locally Significant Area:

Hell's Kitchen (Butler & Dennison Twps.) –UPDATE- SP503 – This **Locally Significant** site contains an excellent-quality population of a former G4 plant species of concern (SP503). The site has a history of disturbance for a residential development and past and present mining activities. Plant species associated with SP503 include spiraea (*Spiraea sp*.), whorled loostrife (*Lysimachia quadrifolia*), hay-scented fern (*Dennstaedtia punctiloba*), black huckleberry (*Gaylussacia baccata*), grass (*Panicum sp*.), tall goldenrod (*Solidago altissima*), and groundberry (*Rubus hispidus*). The plant species at the site should continue to be monitored. **The plant species SP503, *Lygodium palmatum* (Hartford Fern), has been removed from the species of concern list.**

Ephemeral/fluctuating pools, many of which have been filled to make way for development, provide important breeding habitat for several species of amphibians. The **EDGEWOOD VERNAL POOLS** site is one of the top sites for conservation in Luzerne County.

Photo: PA Science Office of The Nature Conservancy

Ephemeral/Fluctuating Natural Pool Communities or **vernal pools** are wetlands that fill from precipitation, surface water runoff, and rising groundwater in the fall or spring. These pools typically become completely dry through evaporation in the summer months. Since these ponds usually dry up during a portion of the year, they cannot support fish populations. During the brief time the pools contain water, and in the absence of fish, they become important breeding areas for a variety of amphibian species such as wood frogs and spotted salamanders (adult and eggs pictured above), many of which breed solely in vernal pools.
Photos: PNHP

CONYNGHAM TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
COUNCIL CUP CLIFFS							
Erosional Remnant GE502	GNR	SNR			1979	E	**UPDATED**
Animal Species of Concern SA502	G5	S3S4			9/98	E	
Northern Appalachian Acidic Cliff Community NC502	G5	S5			7/29/99	C	
LILY LAKE							
Aeshna clepsydra Mottled Darner	G4	S2S3			9/10/05	E	**NEW**
Bidens discoidea Small Beggar-ticks	G5	S3		PR	9/16/03	E	**NEW**
Celithemis eponina Halloween Pennant	G5	S2S3			8/24/05	E	**NEW**
Elatine minima Small Waterwort SP501A	G5	S4		DL	7/27/01	B	**DELISTED**
Ischnura kellicotti Lilypad Forktail	G5	S1			6/25/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4			8/24/05	E	**NEW**
Myriophyllum heterophyllum Broad-leaved Water-milfoil	G5	S1		PE	7/27/01	E	**NEW**
Potamogeton robbinsii Flat-leaved Pondweed SP513	G5	S4		DL	8/27/99	B	**DELISTED**
Schoenoplectus torreyi Torrey's Bulrush SP501B	G5?	S1		PE	8/13/92	C	
Sympetrum semicinctum Band-winged Meadowhawk	G5	S3S4			9/10/05	E	**NEW**
Utricularia intermedia Flat-leaved Bladderwort	G5	S2		PT	7/27/01	E	**NEW**
ROUTE 11 BOAT LAUNCH							
Gomphus vastus Cobra Clubtail	G5	S3S4			7/26/05	E	**NEW**
Animal Species of Concern	G5	S2	LT	PT	7/03/05	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SUSQUEHANNA RIVER AT MOCANAQUA							
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

SUSQUEHANNA RIVERLANDS						
Animal Species of Concern	G5	S3			E	**NEW**
Enodia anthedon Northern Pearly Eye	G5	S3S4		6/26/99	E	**NEW**
Euphydryas phaeton Baltimore Checkerspot	G4	S2S4		6/26/99	E	**NEW**
Lontra canadensis Northern River Otter	G5	S3	CA		E	**NEW**
Poanes massasoit Mulberry Wing	G4	S3		7/25/97	E	**NEW**
Polites mystic Long Dash	G5	S3		7/25/97	E	**NEW**
Animal Species of Concern	G5T4T5	SU	CR	2000	E	**NEW**
Speyeria Aphrodite Aphrodite Fritillary	G5	S3S4		6/26/99	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

Wapwallopen Gorge

PUBLICLY MANAGED LANDS:

None

OTHER CONSERVATION AREAS:

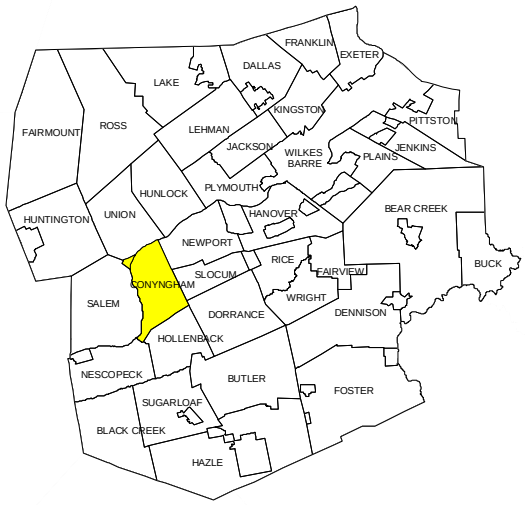
Wyoming Valley Important Mammal Area

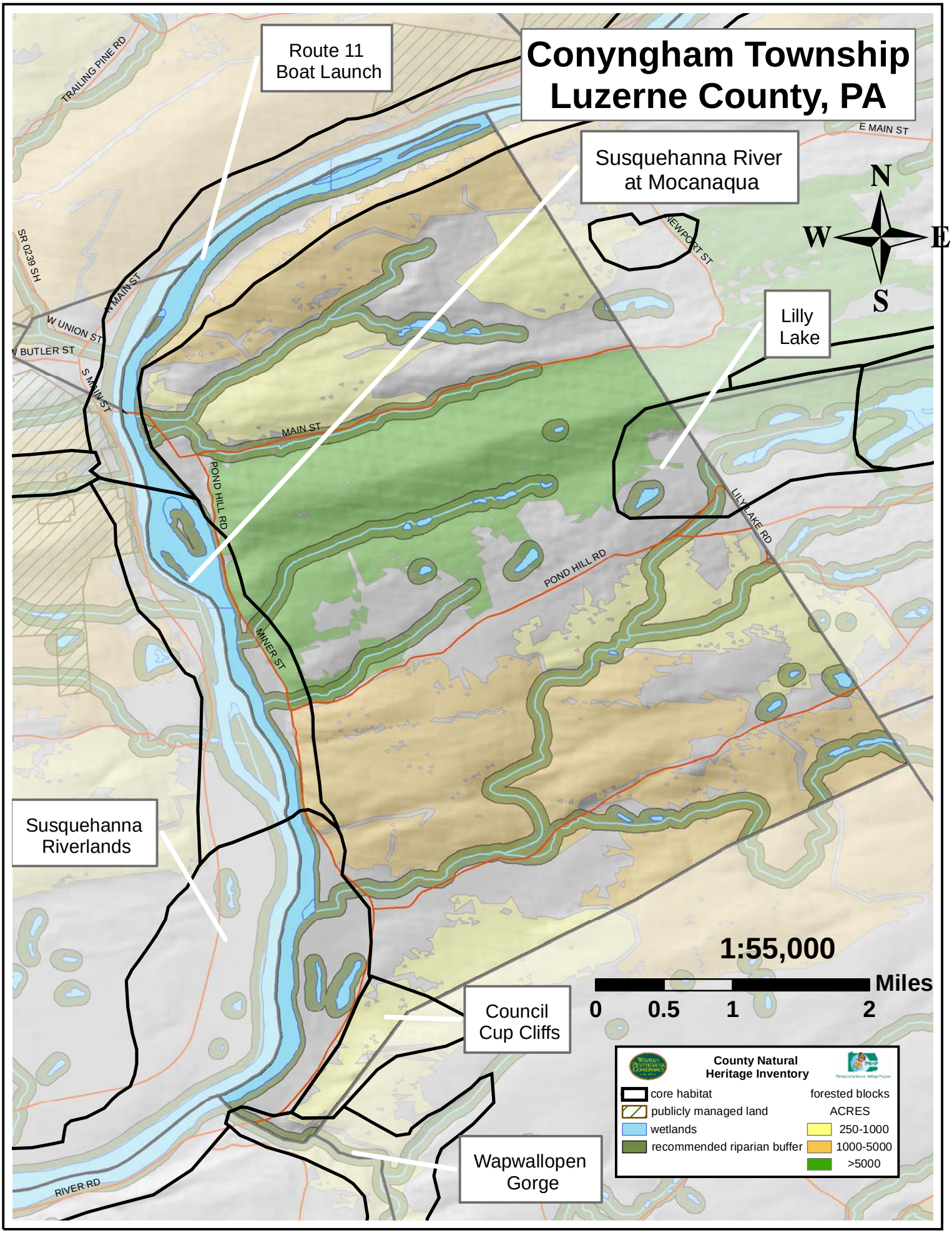
Susquehanna Riverlands Important Bird Area

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

** Please refer to Appendix II for Quality ranks.

Halloween Pennant Dragonfly (*Celithemis eponina*)




Conyngham Township
Luzerne County, PA
Route 11
Boat Launch
Susquehanna River
at Mocanaqua
Lilly
Lake
Susquehanna
Riverlands
Council
Cup Cliffs
Wapwallopen
Gorge
N
W
E
S
TRAILING PINE RD
E MAIN ST
NEWPORT ST
SR 0239 SH
W MAIN ST
W UNION ST
W BUTLER ST
S MAIN ST
MAIN ST
POND HILL RD
LILY LAKE RD
MINER ST
RIVER RD
1:55,000
Miles
0
0.5
1
2
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

COUNCIL CUP CLIFFS (Conyngham & Hollenback Twps.) SA502, NC502, & GE502 – The site consists of an extensive cliff erosional remnant (GE502) cut into the Trimmers Rock Formation of mudstone and siltstones overlooking the North Branch of the Susquehanna River (Geyer and Bolles 1987). There are portions of the cliffs that are nearly vertical and mostly unvegetated, while other areas have stunted trees, shrubs, and herbaceous vegetation. The adjacent steep south-facing slope has burned recently and is dominated by a nearly pure stand of Virginia pine (*Pinus virginiana*). The vegetation on the cliff includes Virginia pine (*Pinus virginiana*), sweet birch (*Betula lenta*), red cedar (*Juniperus virginiana*), oak (Quercus sp.), ash (*Fraxinus sp.*), bush honeysuckle (*Diervilla lonicera*), blueberry (*Vaccinium sp.*), smooth sumac (*Rhus glabra*), fire cherry (*Prunus pennsylvanica*), goldenrod (*Solidago sp.*), hairgrass *(Deschampsia sp.*), sedges (*Carex sp.*), cowwheat (*Melampyrum lineare*), panic grass (*Panicum sp.*), red fescue (*Festuca rubra*), and sandwort (*Minuartia groenlancium*). Peregrine falcons (*Falco peregrinus*) formerly nested on Council Cup cliffs as well as many other cliffs along the Susquehanna River previous to the 1960's (Hickey 1969).

An animal species of concern (SA502) also exists at the site. Trampling and the installation of a chain-link fence have disturbed the top of the cliff. No additional disturbances were noted. This site extends to the Berwick quadrangle.

LILY LAKE (Conyngham, Newport & Slocum Twps.) –UPDATE- SP501A, SP501B, & SP513– This site is a natural glacial lake downstream of the Cranberry Pond site. Three plant species of concern occur at the site (SP510A, SP510B, and SP513). Two of these grow rooted in shallow water along the sandy shoreline at the west end of the lake near the outlet. The associated plant species include St. John's wort (*Hypericum virginicum),* pipewort (*Eriocaulon septangulare),* and grass-leaved arrowhead (*Sagittaria graminea).* The third plant species is a floating aquatic species growing at the same site and floating throughout the lake. The plant is associated with pondweed (*Potamogeton epihydrus),* spike-rush (*Eleocharis palustris),* quillwort (*Isoetes sp.*), water-shield (*Brasenia schreberi*), and bladderworts *(Utricularia sp.*). There is a PA Fish and Boat Commission boat launch at this corner of the lake, and some habitat destruction has occurred. Nonetheless adequate habitat remains for the species of concern. Care should be taken to preserve the windward (southeastern) sandy shoreline areas from disturbance and to maintain a "no-wake" zone here to prevent excessive shoreline erosion by waves. **The plant species SP501A, *Elatine minima* (Small Waterwort), and SP513, Flat-leaved Pondweed (*Potamogeton robbinsii*) have been removed from the species of concern list.**

Three new plant species of concern have been identified at Lily Lake in 2001 and 2003, Flat-leaved Bladderwort (*Utricularia intermedia*), Broad-leaved Water-milfoil (*Myriophyllum heterophyllum*), and Small Beggar-ticks (*Bidens discoidea*). Threats to these species of concern are herbicides and invasive species. Disturbances include boat traffic and other recreational activities.

Five new odonate species have been located at Lily Lake in 2005, Band-winged Meadowhawk (*Sympetrum semicinctum*), Mottled Darner (*Aeshna clepsydra*), Slaty Skimmer (*Libellula incesta*), Halloween Pennant (*Celithemis eponina*), and Lilypad Forktail (*Ischnura kellicotti*). Further surveys need to be conducted to determine the extent of the populations.

ROUTE 11 BOAT LAUNCH – NEW – A Cobra Clubtail (*Gomphus vastus*) was documented at this site in 2005. Associated odonate species include Powdered Dancer (*Argia moesta*), Calico Pennant (*Caelithemis elisa*), Ashy Clubtail (*Gomphus lividus*), Eastern Forktail (*Ischnura verticalis*) Common Spreadwing (*Lestes disjunctus*), Swamp Spreadwing (*Lestes vigilax*), Illinois River Cruiser (*Macromia illinoiensis*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*Pantala*

***hymenaea*), Ruby Meadowhawk (*Sympetrum rubicundulum*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).**

A Federally and State Threatened species of concern was observed nesting along the Susquehanna River at this site in 2005. Human disturbance, including the creation of new trails threaten this species.

An animal species of concern was observed along the Susquehanna River in 2000. Additional surveys need to be conducted to determine the extent of this species.

SUSQUEHANNA RIVERLANDS (Conyngham & Salem Twps.) –UPDATE- This area consists of approximately 2,500 acres. Pennsylvania Audubon Society has designated it as a Pennsylvania Important Bird Area because it contains fairly extensive riparian and hillside forest (Crossley 1999). Both sides of the North Branch Susquehanna are protected for approximately one mile. The west-side of the park includes public picnic areas, riparian forest, hillside forest, and some marsh and swamp. The site is owned and managed for recreation and environmental education by PPL.

The riparian forest supports populations of yellow-throated vireo (*Vireo flavifrons*), warbling vireo (*Vireo gilvus*), American redstart (*Setaphaga ruticilla*), and northern parula (*Parula americana*). Both northern oriole (*Icterus galbula*) and orchard oriole (*I. spurius*) nest in forest and park land. Wetlands support good populations of swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), willow flycatcher (*Empidonax traillii*), and eastern bluebirds (*Sialis sialis*) nesting in natural cavities. The east side of the park (Sybertsville Quadrant) encompasses many habitats, including hundreds of acres of oak – hickory – pine forest, cliffs, and abandoned fields. Oak-dominated forests support good populations of scarlet tanager *(Piranga olivacea*), ovenbird (*Seiurus aurocapillus*), wood thrush (*Hylocichla mustlina*), worm-eating warbler (*Helmitheros vermivorus*), pine warbler (*Dendroica pinus*), red-eyed vireo (*Vireo olivaceus*), and rose-breasted grosbeak (*Pheucticus ludovicianus*).

Gould Island, owned by PPL, has a fairly mature forest, especially on its downstream end. Here there are large specimens of silver maple (*Acer saccharinum),* sycamore (*Platanus occidentalis*), and black maple (*Acer niger*). At least one state-listed bird species has nested here in the past, although none were observed in recent years.

The area contains a good diversity of reptile and amphibian species. A reptile species of concern was seen at this site. Further surveys need to be done to determine the extent of the population. Northern River Otters, a mammal species of concern, have also been seen at this site.

In 2000 an animal species of concern was seen at this site along the Susquehanna River. Further surveys are needed to determine the full extent of the population.

Five Lepidopteran species of concern were seen at this site in 1997 and 1999, Mulberry Wing (*Poanes massasoit*), Northern Pearly-eye (*Enodia anthedon*), Aphrodite Fritillary (*Spyeria aphrodite*), Long Dash (*Polites mystic*), and Baltimore Checkerspot (*Euphydryas phaeton*). Threats and disturbances for these species include BT spraying for gypsy moths, herbicides along roadside, draining of marsh, sand and gravel mining, sprawl, drought, and absence of many woodland species.

SUSQUEHANNA RIVER AT MOCANAQUA – NEW – A new animal species of concern was located at this site in 2000. More surveys need to be done to assess the full extent of the population.

Locally Significant Area:

Wapwallopen Gorge (Conyngham, Hollenback & Nescopeck Twps.) The Lance Corporation, who allows public access for recreation, owns this **Locally Significant** property. There are several hiking trails and camping/picnic areas throughout. The gorge is very steeply-sided and forested with hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*) at the upper end. River birch (*Betula nigra*) and sycamore (*Platanus occidentalis*) dominate the lower end of the gorge. The gorge, which is known locally as the Powderhole, has some historical significance - many remnants of a turn of the century gunpowder plant are found along the edge of the gorge. Excessive trash, graffiti, and the practice of stripping of tree bark for campfires detract from the beauty of the gorge.

The Powderhole is located in the **Wapwallopen Gorge**, a Locally Significant site in Luzerne County.

Photo: Aura Stauffer, PA Science Office of The Nature Conservancy.

DALLAS TOWNSHIP AND DALLAS BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS::							
ABRAHAMS CREEK WETLANDS							
Animal Species of Concern	G5	S3S4B,S4N			2002	E	
Carex disperma Soft-leaved Sedge	G5	S3		PR	6/10/03	BC	**NEW**
Porzana carolina Sora SA505A	G5	S3B		CR	6/2000	E	**UPDATED**
Rallus limicola Virginia Rail SA505B	G5	S3B			6/2000	E	
HARVEY'S LAKE							
Megalodonta beckii Beck's Water-marigold	G4G5	S1		PE	7/08/02	E	**NEW**
Myriophyllum heterophyllum Broad-leaved Water-milfoil SP509	G5	S1		PE	9/17/82	E	
Potamogeton gramineus Grassy Pondweed	G5	S1		PE	7/10/03	A	**NEW**
Potamogeton robbinsii Flat-leaved Pondweed SP510	G5	S4		DL	8/23/91	E	**DELISTED**
Potamogeton vaseyi Vasey's Pondweed	G4	S1		PE	7/10/03	AB	**NEW**

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

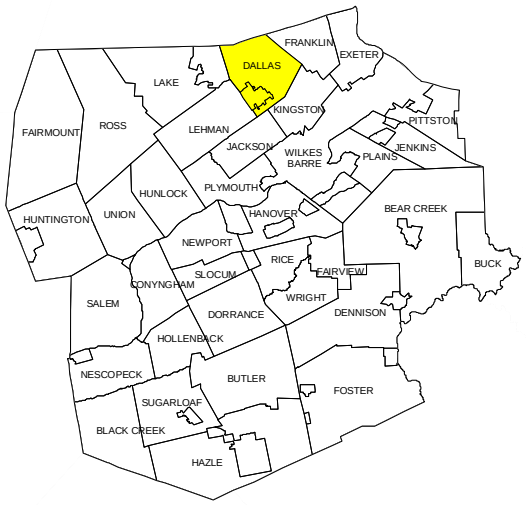
None

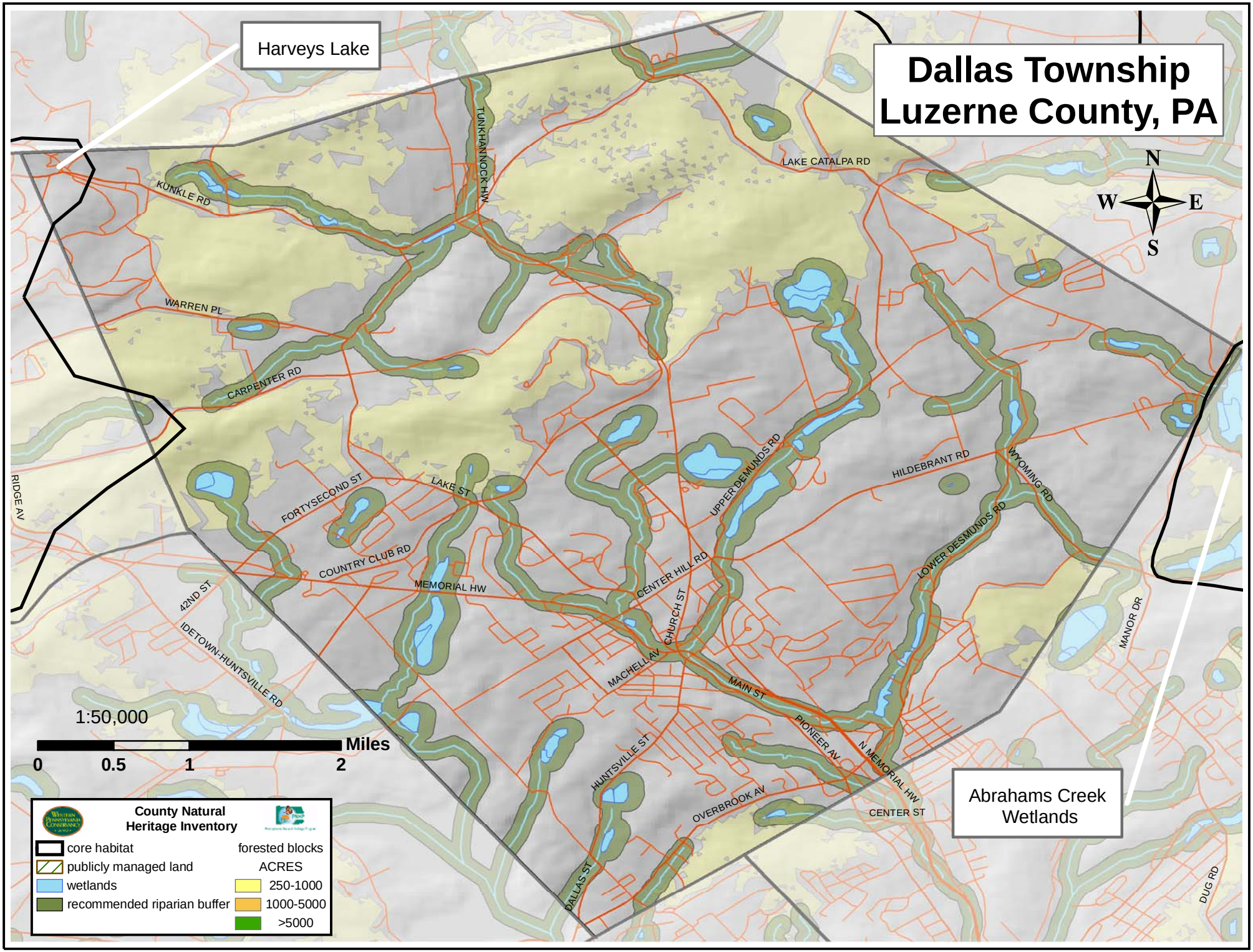
OTHER CONSERVATION AREAS

None

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

** Please refer to Appendix II for Quality ranks.




Harveys Lake
Dallas Township
Luzerne County, PA
N
W
E
S
KUNKLE RD
TUNKHANNOCK HW
LAKE CATALPA RD
WARREN PL
CARPENTER RD
RIDGE AV
FORTYSECOND ST
LAKE ST
UPPER DEMUNDS RD
HILDEBRANT RD
WYOMING RD
LOWER DESMUNDS RD
COUNTRY CLUB RD
MEMORIAL HW
CENTER HILL RD
42ND ST
IDETOWN-HUNTSVILLE RD
CHURCH ST
MACHELL AV
MAIN ST
MANOR DR
PIONEER AV
N MEMORIAL HW
HUNTSVILLE ST
OVERBROOK AV
CENTER ST
DALLAS ST
DUG RD
1:50,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
Abrahams Creek Wetlands

ABRAHAM'S CREEK WETLANDS (Dallas, Kingston Twp.) SA504, SA505A, & SA505B - The site consists of creek-side wetlands impacted by flooding from the damming of the creek downstream in Francis Slocum State Park. Two animal species of concern (SA505A & SA505B) occupy a herbaceous wetland where the creek enters the reservoir, and another species of concern (SA504) breeds in a flooded forested wetland to the north. More habitat data is needed on this site, but the species of concern have been recorded using the site for several years. The preservation of large trees is important to SA504. Maintaining the water quality of Abraham's Creek and stable water levels during the growing season will benefit the species of concern.

A good population of a plant species of concern, Soft-leaved Sedge (*Carex disperma*) was located at this site in 2003. Associated species include *Carex pensylvanica, Maianthemum canadense, Mitchella repens, Carex digitalis, Uvularia perfoliata, Lycopodium obscurum,* and *Viburnum acerifolium*.

HARVEY'S LAKE –UPDATE- (Dallas & Lake Twps. in Luzerne County & Monroe Twp. in Wyoming County) - SP509 & SP510 **–** Harvey's Lake is one of the largest natural lakes in Pennsylvania and there are numerous historical records from the lake of plant species now considered rare or endangered. The majority of the shoreline is now developed and impacts from this, as well as from exotic plant species [e.g., fanwort, (*Cabomba caroliniana*)] have changed the habitat dramatically. Populations of one PA-Rare (SP510) and one PA-Endangered plant (SP509) species have been collected from the site by PNHP biologists. These plants were not rediscovered in a survey of the lake in 1999, but much additional habitat remains and it is possible that the species of concern are persisting. Additional surveys are needed to assess these populations. A small portion of the boundary of this site extends into Wyoming County (Noxen quadrangle). **The plant species SP510, *Potamogeton robbinsii* (Flat-leaved Pondweed), has been removed form the species of concern list.**

Three State Endangered plant species of concern, Beck's Water Marigold (*Megalodonta beckii*), Vasey's Pondweed (*Potamogeton vaseyi*), and Grassy Pondweed (*Potamogeton gramineus*) were located at Harvey's Lake in 2002 and 2003. Associated species include *Ceratophyllum muricatum, Decodon verticillatus, Elodea nuttallii, Nitella sp., Nymphaea sp, Potamogeton crispus, P. diversifolius,* and *P. pusillus*. There appears to be scattered litter from parts of damaged boats on the bank and invasion of purple loosestrife on the shoreline near the parking area. Invasive aquatic coontail seems to be very dominant and crowding out other species.

Soft-leaved sedge (*Carex disperma*)
Photo:PNHP

DENNISON TOWNSHIP AND PENN LAKE PARK BOROUGH

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia Barrens Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3		PR	8/24/00	CD	**UPDATED**
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, SA507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed Cinquefoil SP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. *susquehanae* Sand Cherry SP522	G5	S3		PT	7/08/97	CD	**UPDATED**
Psectraglaea carnosa Pink Sallow SA506J, SA507D	G3	S1			10/08/97	BC	
Ridgetop Dwarf-Tree Forest NC505	G4	S3			1984	B	
Sideridis maryx SA506K	G4	S1S3			5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3			6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1			9/15/98	BC	

Hell's Kitchen		**(Locally Significant Area)**				**CHANGED**
Lygodium palmatum Hartford Fern SP503	G4	S4	DL	10/28/87	A	**DELISTED**
NESCOPECK CREEK VALLEY						
Animal Species of Concern SA518	G5	S2S3B, S3N	CR	6/2000	AB	**UPDATED**
Aeshna tuberculifera Black-tipped Darner	G4	S2S3		6/26/05	E	**NEW**
Aeshna verticalis Green-striped Darner	G5	S3S4		8/20/05	E	**NEW**
Boyeria grafiana Ocellated Darner	G5	S3		8/04/01	E	**NEW**
Calopteryx amata Superb Jewelwing	G4	S2S3		7/06/01	E	**NEW**
Carex polymorpha Variable Sedge SP505	G3	S2	PT	7/21/00	A	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4		6/07/05	E	**NEW**
Eurybia radula Rough-leaved Aster SP520	G5	S2	PT	8/30/00	B	**UPDATED**
Helocordulia uhleri Uhler's Sundragon	G5	S3		7/30/03	E	**NEW**
Hesperia leonardus Leonard's Skipper SA519B	G4	S3S4		8/22/00	BC	**UPDATED**
Animal Species of Concern SA519A	G5	S3S4		8/20/00	E	
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4		8/20/05	E	**NEW**
Lonicera hirsuta Hairy Honeysuckle SP516	G4G5	S1	PE	5/14/05	B	**UPDATED**
Plant Species of Concern SP515	G5	S3	PR	8/30/00	D	
Lygodium palmatum Hartford Fern SP506	G4	S4	DL	8/23/00	A	**DELISTED**
Metaxaglaea semitaria Footpath Sallow Moth SA523	G5	S2		10/03/00	E	
Najas gracillima Bushy Naiad SP522	G5?	S4	DL	7/18/00	E	**DELISTED**
Papaipema sp. 1 Flypoison Borer Moth	G2G3	S2		9/29/87	H	**NEW**
Rosa virginiana Virginia Rose	G5	S1	TU	7/01/94	BC	**NEW**
Schoenoplectus subterminalis Water Bulrush	G4G5	S3	PT	9/12/01	C	**NEW**
Utricularia geminiscapa Bladderwort SP521	G4G5	S4	DL	8/22/00	B	**DELISTED**

NESCOPECK MOUNTAIN BARRENS						
Ridgetop Dwarf-Tree Forest NC507	G4	S3		10/01/86	AB	
POPPLES QUARRY POND						
Aeshna clepsydra Mottled Darner	G4	S2S3		8/20/05		**NEW**
Enallagma aspersum Azure Bluet	G5	S3S4		7/09/05		**NEW**
Ischnura kellicotti Lilypad Forktail	G5	S1		8/20/05		**NEW**
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4		9/10/04		**NEW**
WRIGHT CREEK WATERSHED A						
Carex Polymorpha Variable Sedge SP517	G3	S2	PT	8/29/96	BC	**UPDATED**
WRIGHT CREEK WATERSHED B						
Oryzopsis pungens Slender Mountain-ricegrass SP521	G5	S2	PE	7/02/96	CD	
Wright Creek Watershed C		**(Locally Significant Area)**				**CHANGED**
Gentiana linearis Narrow-leaved Gentian SP523	G4G5	S4	DL	8/17/00	D	**DELISTED**

LOCALLY SIGNIFICANT AREAS:

Hell"s Kitchen

Wright Creek Watershed C

PUBLICLY MANAGED LANDS:

State Game Lands #119/ 187

Nescopeck State Park

Lehigh Gorge State Park

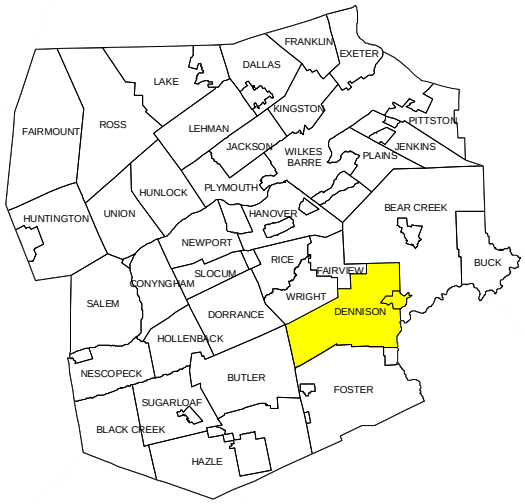
OTHER CONSERVATION AREAS:

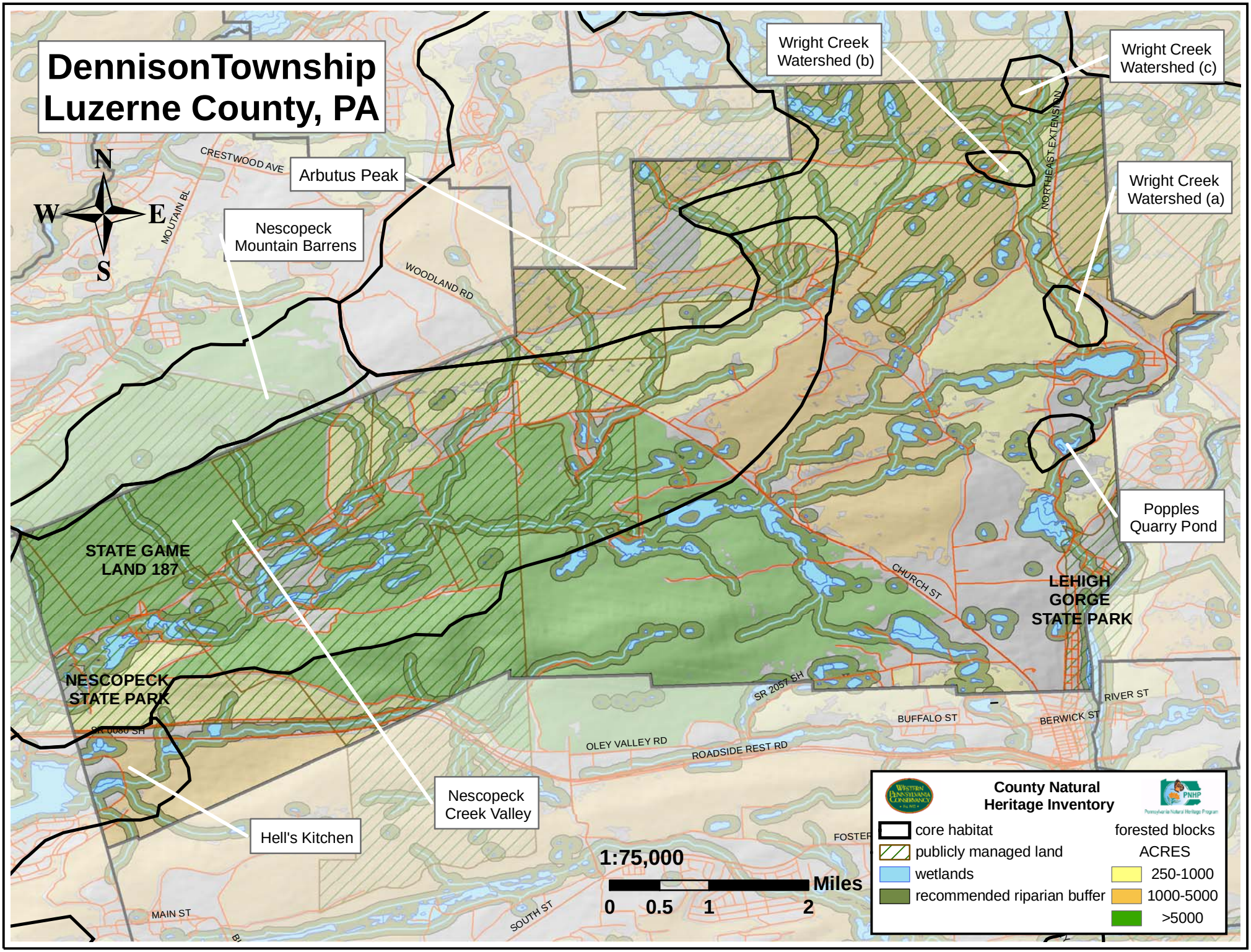
Lehigh Valley / Lehigh Gorge State Park Important Bird Area

Oley Creek High Quality Cold Water Fishery

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

** Please refer to Appendix II for Quality ranks.




DennisonTownship
Luzerne County, PA
N
W
E
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Wright Creek Watershed (b)
Wright Creek Watershed (c)
Wright Creek Watershed (a)
Arbutus Peak
Nescopeck Mountain Barrens
Popples Quarry Pond
Nescopeck Creek Valley
Hell's Kitchen
CRESTWOOD AVE
MOUTAIN BL
WOODLAND RD
NORTHEAST EXTENSION
STATE GAME LAND 187
NESCOPECK STATE PARK
LEHIGH GORGE STATE PARK
CHURCH ST
SR 2057 SH
BUFFALO ST
BERWICK ST
RIVER ST
OLEY VALLEY RD
ROADSIDE REST RD
FOSTER
MAIN ST
SOUTH ST
1:75,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp.*).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species have been found at areas (three species were found at two location at the site) associated with the barrens and adjacent wetlands and more are expected to be found. Five of the species are Globally Rare (G3) or the subspecies is Globally Rare (G5T2T3). Several are new to the present-day fauna of PA - one species is known to utilize arctic/boreal habitats making Arbutus Peak an extreme southern location for it. Another is considered to be a southern species usually found on the New Jersey Pine Barrens. These species are typically dependent upon particular plant species for a portion of their lives; some use scrub oak to feed upon; while other use blueberries found in wetlands or in the barrens. Some species use the pitch pine while others appear to use cranberries and other plants found in the wetlands. One species that has not been found anywhere else but Pennsylvania, feeds exclusively on the flypoison plant (*Amianthium muscaetoxicum*). Another feeds on wild indigo (*Baptisia tinctoria*). Some of the species have very little life-history information and require more research. Most of them depend on plants that require plenty of sunlight found in shrubland or open woodland.

Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as

rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

NESCOPECK CREEK VALLEY (Butler and Dennison Twps.) –UPDATE- SP505, SP506, SP515, SP516, SP520, SP521, SP522, SA518, SA519A, SA519B, & SA523 – This large natural area is centered about the upper watershed of Nescopeck Creek, encompassing portions of Nescopeck State Park and State Game Lands 187, and bordered by the Arbutus Peak site to the north. At least five rare animal and seven rare plant species have been documented at the site, occupying a variety of wetland and upland habitats. One of the most significant of these is an excellent quality population of a globally rare, PA-Endangered plant species (SP505) that occurs in scattered subpopulations throughout the upper Nescopeck Valley, in moist oak woods along the Nescopeck Creek and its south-flowing tributaries. The habitat usually consists of mixed oak-heath woods, often along the boundary between streamside wetlands and adjacent uplands. Tree species present include white oak (*Quercus alba)*, black oak, (*Quercus velutina*), red maple *(Acer rubrum)*, and white pine (*Pinus strobus)*. The shrubs include witch hazel (*Hamamelis virginiana*), arrow-wood (*Viburnum sp.*), and various heaths *(Gaylussacia baccata, Kalmia latifolia, Vaccinium sp.)*. The species of concern occurs in the groundcover and is associated with various sedge species (*Carex vestita, Carex stricta*), fly-poison (*Amianthium muscaetoxicum*), hay-scented fern (*Dennstaedtia punctiloba*), and wild sarsaparilla (*Aralia nudicaulis*).

The additional rare species at the site occur in separate, disparate habitats within Nescopeck State Park and Sate Game Lands 187. SA518**,** which is an animal species that is a candidate for PA-Rare status, utilizes one of the pine plantations adjacent to the Nescopeck Creek for nesting. This animal is extremely sensitive to disturbance while nesting. Three invertebrate species of concern (SA519B, SA523, & SA541) were found in various habitats including dry woods and old fields. One of these species, SA541, is a G2G3 species that is only known to occur in Pennsylvania. SA519A is a vertebrate species of concern that has been found in several disturbed roadside habitats with sandy soils and open basking areas. One population of this animal was seriously affected by construction of the beach for the State Park. Finally, several plant species of concern (SP506, SP515, SP516, SP520, SP521, & SP522) have been found in some of the streamside wetlands and seeps within the State Park. These habitats are dominated by sphagnum mosses (*Sphagnum sp*.), sedges (*Carex trisperma, Carex folliculata*), and rushes (*Juncus effusus)*. Recent fieldwork completed by Dr. Ann Rhoads of Morris Arboretum has uncovered several new plant species of concern in these habitats and small impoundments along Nescopeck Creek, as well as new subpopulations of the globally rare species discussed above. Maintaining buffers around the wetlands and the water quality of Nescopeck Creek (a High Quality–Cold Water Fishery) will help these species of concern to persist at the site.

Disturbances to the site include the creation of Lake Francis and other impoundments along the Creek, a variety of ATV and jeep trails, logging, management activities in the State Game Lands, and recent construction of facilities for the State Park. Despite these disturbances, the valley is largely forested and undisturbed by past anthracite mining. Efforts should be made to manage the park to protect the

wild nature of much of the valley (especially by protecting the forests along the Creek tributaries) and the associated species of concern. This site extends to the White Haven quadrangle. **The plant species SP506, Hartford fern *(Lygodium palmatum)*, SP521 Bladderwort (*Utricularia geminiscapa*), and SP522, Bushy Naiad (*Najas gracillimaas*) have been removed from the species of concern list.**

Field surveys in 2001, 2003, and 2005 located seven new odonate species of concern, Uhler's Sundragon, Superb Jewelwing, Ocellated Darner, Black-tipped Darner, Sweetflag Spreadwing, Green-striped Darner, and American Emerald. Associated odonate species include Shadow Darner, Fawn Darner, Swamp Darner, Ashy Clubtail, and Dragonhunter.

Two plant species of concern were also identified from this site in 1994 and 2001, Water Bulrush (*Schoenoplectus subterminalis)* and Virginia Rose (*Rosa virginiana*). Associated species are *Hamamelis virginiana, Lonicera hirsuta, Quercus ilicifolia, Rubus sp., Corylus cornuta, C. americana, Solidago rugosa,* and *Lysimachia quadrifolia.* Threats include deer browse; it appears that deer stripped this forest recently - perhaps large numbers of deer wintered here along the creek.

A new moth species of concern, Barrens Buckmoth (*Hemileuca maia*) was identified from this site in 2001 along a powerline right-of-way. Associated plant species include Scrub Oak, Sweet Fern, Highbush Blueberry, Lowbush Blueberry, Chestnut Oak, Red Maple, Black Racer, Grey Treefrog, Chestnut-sided Warbler, Whip-poor-will, Ovenbird, Common Yellowthroat, Ruffed Grouse, Eastern Chipmunk, Grey Fox, Raccoon, Whitetail Deer.

NESCOPECK MOUNTAIN BARRENS (Dennison and Wright Twps.) NC507 - This site is an example of a Ridgetop Dwarf-Tree Forest Natural Community (NC507). It consists mainly of a scrub oak (*Quercus ilicifolia)* forest stretching across several summit areas along a sandstone ridgetop. The natural community occurs on the most exposed portions, with taller oak forests occupying the ravines between the balds. The vegetation ranges from open areas of sandstone bedrock, hairgrass (*Deschampsia flexuosa*), little bluestem (*Schizachyrium scoparius*), and blueberry (*Vaccinium sp*.) to dense scrub oak (*Quercus ilicifolia*) and emergent pitch pines (*Pinus rigida*). Some of the pitch pines show evidence of past fires; fires are a natural process that are necessary to maintain the plant community. This habitat is also appropriate for rare Lepidopteran species; although none have been found at this site, several were found in similar habitat at the adjacent Arbutus Peak site. This site is part of State Game Lands 187.

POPPLES QUARRY POND – NEW – Four new odonate species of concern were identified at this site in 2004 and 2005, Lilypad Forktail (*Ischnura kellicotti*), Mottled Darner (*Aeshna clepsydra*), Azure Bluet (*Enallagma aspersum*), and Sweetflag Spreadwing (*Lestes forcipatus*). Associated species include Fragile Forktail (*Ischnura posita*), Eastern Forktail (*Ischnura verticalis*), Swamp Spreadwing (*Lestes vigilax*), Jane's Meadowhawk (*Sympetrum janeae*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).

WRIGHT CREEK WATERSHED A (Dennison Twp.) SA517 – This area along Wright Creek was last visited in 1996. The habitat primarily consists of a hardwood forest with scattered hemlocks (*Tsuga canadensis*) and pines (*Pinus sp*.). A globally rare, PA-Endangered plant species (SA517) occurs in a dry-mesic to moist woods on the site. The associated plant species include white oak

(*Quercus alba*), red maple (*Acer rubrum*), various heaths (e.g., *Vaccinium sp*. & *Gaylussacia sp*.), witch hazel (*Hamamelis virginiana*), fly poison (*Amianthium muscaetoxicum*), grass (*Brachyelytrum erectum*), and hay-scented fern (*Dennstaedtia punctilobula*). Garbage dumping, foot traffic, and utility line and railroad construction are the past and present disturbances. Threats to the species of concern include logging, development, and the establishment of exotic plant species.

WRIGHT CREEK WATERSHED B (Dennison Twp.) SP521 **–** This site on State Game Lands #119 includes an upland area drained by Wright Creek. A fair- to small-quality population of a PA-Endangered plant species (SP521) was found in a low heath area in 1996. No obvious threats to the plants were noted during the field visit. Additional surveys are needed to adequately assess the size of the population.

The **variable sedge (*Carex polymorpha*)** is a PA-threatened and globally vulnerable plant species that can be found in woodlands near streams in Luzerne County. The leaves are often the most visible portion of the plant and resemble large blades of grass (right). Without the fruiting stem (left) the variable sedge can be very difficult to identify. Luzerne County is one of the strongholds for this species in the state.
Photos: PNHP

Locally Significant Areas:

Hell's Kitchen (Butler & Dennison Twps.) –UPDATE- SP503 – This **Locally Significant** site contains an excellent-quality population of a G4 plant species (SP503). The site has a history of disturbance for a residential development and past and present mining activities. Plant species associated with the plant species of concern include spiraea (*Spiraea sp*.), whorled loostrife (*Lysimachia quadrifolia*), hay-scented fern (*Dennstaedtia punctiloba*), black huckleberry (*Gaylussacia baccata*), grass (*Panicum sp*.), tall goldenrod (*Solidago altissima*), and groundberry (*Rubus hispidus*). The plant species at the site should continue to be monitored. **The plant species SP503, *Lygodium palmatum* (Hartford Fern), has been removed from the species of concern list.**

Wright Creek Watershed C (Bear Creek & Dennison Twps.) –UPDATE- SP523 **–** At this **Locally Significant** site, a small population of a plant species SP523 was found along the edge of the woods near a trail at Wright Creek in State Game Lands #119. The vegetation included groundberry (*Rubus hipidus*), mosses, sedges (*Carex folliculata* and *Carex sp*.), mountain laurel (*Kalmia latifolia*), highbush blueberry (*Vaccinium corymbosum*), bunchberry (*Cornus canadensis*), large cranberry (*Vaccinium macrocarpon*), winterberry (*Ilex verticillata*), grass (Poaceae), bugleweed (*Lycopus uniflorus*), and grass (*Brachyelytrum erectum*). The current nearby disturbances include ATV and foot traffic. The potential threats include trampling and deer browse. **The plant species SP523 *Gentiana linearis* (Narrow-leaved Gentian) has been removed from the species of concern list.**

Pitch pine (*Pinus rigida*) is a fire dependent species that has the unusual tendency to produce growth from lateral branch buds in response to a fire event, giving the trees a "bearded" appearance. Pitch pine is a common component of the many Ridgetop Barrens Communities in Luzerne County.
Left photo: PNHP Right photo: Roger Latham

DORRANCE TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ANDY POND							
Rallus limicola Virginia Rail SA537	G5	S3B			6/08/99	E	
DORRANCE BOG							
Animal Species of Concern	G5	S3S4			7/09/01	E	**NEW**
Lycaena epixanthe Bog Copper	G4G5	S2			7/09/01	E	**NEW**
Oligotrophic Glacial Kettlehole Bog NC503	G?	S3			7/13/00	B	
Orontium aquaticum Golden Club SP503A	G5	S4		DL	7/27/01	CD	**DELISTED**
Plant Species of Concern SP503B	G4G5	S2S3		TU	7/27/01	BC	**UPDATED**
MYLET'S CORNER							
Plant Species of Concern SP505	G5	S3		PR	7/12/00	BC	

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

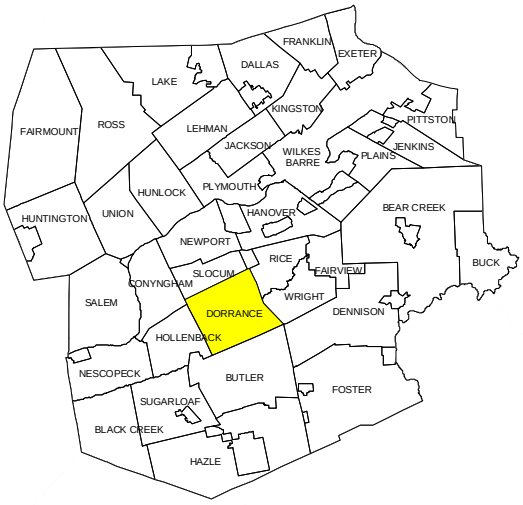
Nescopeck State Park

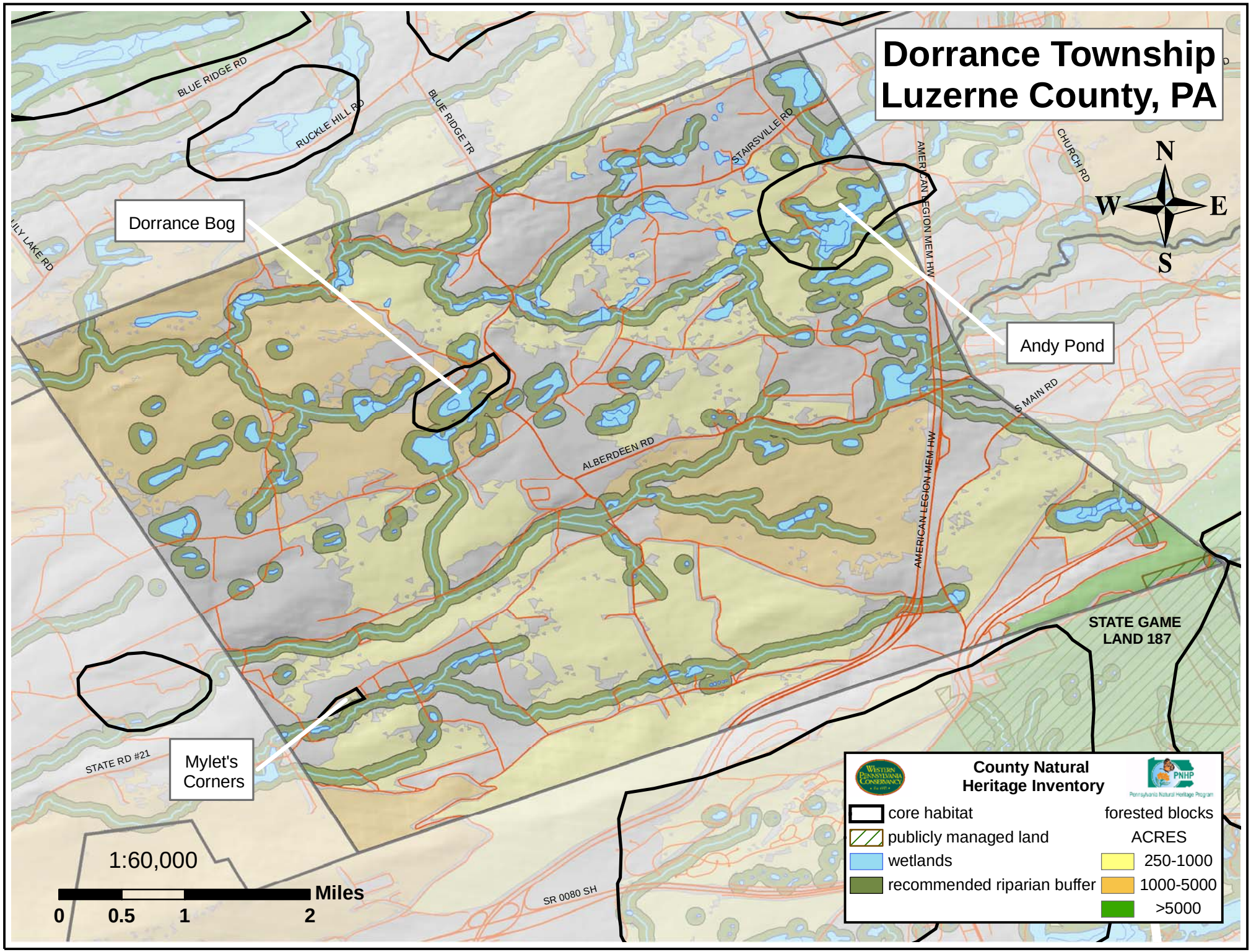
OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area

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

** Please refer to Appendix II for Quality ranks.




Dorrance Township
Luzerne County, PA
Dorrance Bog
Andy Pond
Mylet's Corners
BLUE RIDGE RD
RUCKLE HILL RD
BLUE RIDGE TR
STAIRSVILLE RD
AMERICAN LEGION MEM HWY
CHURCH RD
ALBERDEEN RD
S MAIN RD
STATE GAME LAND 187
STATE RD #21
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1:60,000
0 0.5 1 2 Miles
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

ANDY POND (Dorrance & Rice Twps.) SA537 – This site on private property has an estimated 35 acres of mixed shrub swamp and additional wetland habitats. An animal species of concern (SA537) was observed in the shrub wetland, but this animal will mainly use sedge and cattail areas. River otters (*Lutra canadensis*) were also observed at the site, but evidence of breeding and regular site-use is needed. The potential threats include development and changes in the hydrology of the marsh.

DORRANCE BOG (Dorrance Twp.) –UPDATE- NC503, SP503A, SP503B **–** This site is one of the top sites for preservation in Luzerne County. It is a classic kettlehole bog with a floating mat at its center, and is the best example of an Oligotrophic Glacial Kettlehole Bog Natural Community (NC503) in Luzerne County. No open water persists in the bog. The center of the bog mat has sparsely vegetated depressions with sundews (*Sarracenia sp.*), yellow-eyed grass (*Xyris sp.*), white beak-rush (*Rhynchospora sp.*), and cranberries (*Vaccinium macrocarpon and V. oxycoccos*). It is possible to "break through" the mat in these areas. Moving away from the center of the bog, sphagnum moss (*Sphagnum sp.*) and tawny cotton-grass (*Eriophorum sp.*) are the dominant vegetation, with areas of leatherleaf (*Chaemadaphne calyculata*), sheep laurel (*Kalmia angustifolia*), and a few black spruce (*Picea mariana*).

A good- to fair-quality population of a plant species of concern (SP503B) occurs along the edge of the bog. The edge transitions to a dense shrub swamp dominated by highbush blueberry (*Vaccinium corymbosum*), mountain holly (*Nemopanthus mucronatus*), and winterberry (*Ilex sp.*). A fair- to poor-quality population of a PA-Rare plant species (SP503A) occurs in shaded habitat.

There are no trails into the bog itself and it shows no signs of recent disturbance. A faint deer trail runs along the northern edge of the bog. The shrub swamp was presumably cut over and is recovering slowly. At high water, the shrub swamp drains across the logging road into an open beaver meadow/shrub swamp to the south. No immediate threats are present. Draining, peat mining, or excessive visitation are the only likely future threats to the natural community. The current landowners have owned the site for many years. They should be commended for their stewardship and assisted with protecting the site for the future. **The plant species SP503A, *Orontium aquaticum* (Golden Club), has been removed from the species of concern list.**

Surveys conducted in 2001 documented the occurrence of a reptile species of concern, and the Bog Copper butterfly (*Lycaena epixanthe)* at this location. The Bog Copper butterfly feeds exclusively on cranberry plants while it is in its larval stage.

MYLET'S CORNER (Dorrance Twp.) SP505 - A good-quality population of a PA-Rare plant (SP505) was found at this site in 2000. The site, which is located along a along the road, is fairly open with low shrubs and mixed young deciduous trees. The dominant vegetation includes cowwheat *(Melampyrum lineare*), highbush blueberry (*Vaccinium corymbosum*), bigtooth aspen (*Populus grandidentata*) in the shrub layer, white pine (*Pinus strobus*) in the shrub layer, black oak (*Quercus velutina*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), groundberry (*Rubus hispidus*), goldenrod (*Solidago sp.*), grape (*Vitis sp.*), grasses (*Poaceae*), sassafras (*Sassafras albidum*), white birch (*Betula papyrifera*), scotch pine (*Pinus sylvestris*), red maple (*Acer rubrum*), indian pipe (*Monotropa uniflora*), meadowsweet (*Spirea sp.*), and pink lady slipper (*Cypripedium acaule*). This area is mostly residential and agricultural. A portion of the site is mowed periodically during road maintenance. The current mowing practices may actually benefit this species by keeping weedy aggressive species from taking over. Threats include the potential for herbicide spraying and the effects of de-icing agents. No management is currently needed. The site should continue to be monitored.

EXETER TOWNSHIP AND EXETER, WEST PITTSTON, PITTSTON, HUGHESTOWN, DURYEA, AVOCA, AND DUPONT BOROUGHS

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
CAMPBELL'S LEDGE							
Amelanchier humilis Serviceberry SP529A, SP530	G5	S1		PE	5/22/95	E	
Amelanchier sanguinea Roundleaf Serviceberry SP529B	G5	S1		PE	8/20/97	D	
Erosional remnant GE501	GNR	SNR			1979	E	
Falco peregrinus Peregrine Falcon	G4	S1B,S1N		PE	7/31/05	E	**NEW**
Helianthemum bicknellii Bicknell's Hoary Rockrose SP505	G5	S2		PE	8/14/96	B	
Northern appalachian calcareous cliff community NC501	GNR	S2			6/22/83	E	
Northern appalachian calcareous rocky summit community NC502	G2?	S1			9/18/86	E	
Oryzopsis pungens Slender Mountain-ricegrass SP504A	G5	S2		PE	8/14/96	D	
Panicum xanthophysum Slender Panic-grass SP504B	G5	S1		PE	7/06/88	E	
Prunus pumila var. susquehanae Sand Cherry SP506	G5T4	S2		PT	8/14/96	D	
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
COUNTY LINE ISLANDS							
Lampsilis cariosa Yellow Lampmussel SA525	G3G4	S3S4		CU	9/01/99	C	**UPDATED**
Prunus pumila var. depressa Sand Cherry SP524	G5T5	S1		PE	9/01/99	C	**UPDATED**
PITTSTON ROOKERY							
Animal Species of Concern SA511	G5	S2S3B		PE	5/08/87	E	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

SUSQUEHANNA RIVER AT DURYEA						
Lampsilis cariosa Yellow Lampmussel SA520	G3G4	S3S4	CU	9/02/99	C	**UPDATED**
Animal Species of Concern	G5T4T5	SU	CR	2000	E	**NEW**
SUSQUEHANNA RIVER AT EXETER						
Anodonta implicata Alewife Floater SA519A	G5	SNR	CU	9/29/95	D	**UPDATED**
Pyganodon cataracta Eastern Floater SA519B	G5	S3S4	DL	9/02/99	C	**DELISTED**

LOCALLY SIGNIFICANT AREAS:

None

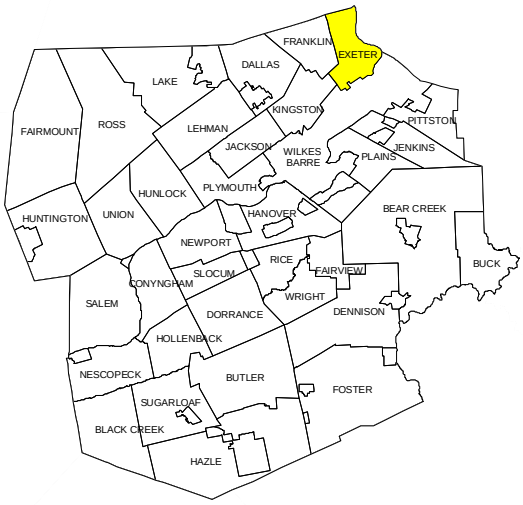
PUBLICLY MANAGED LANDS:

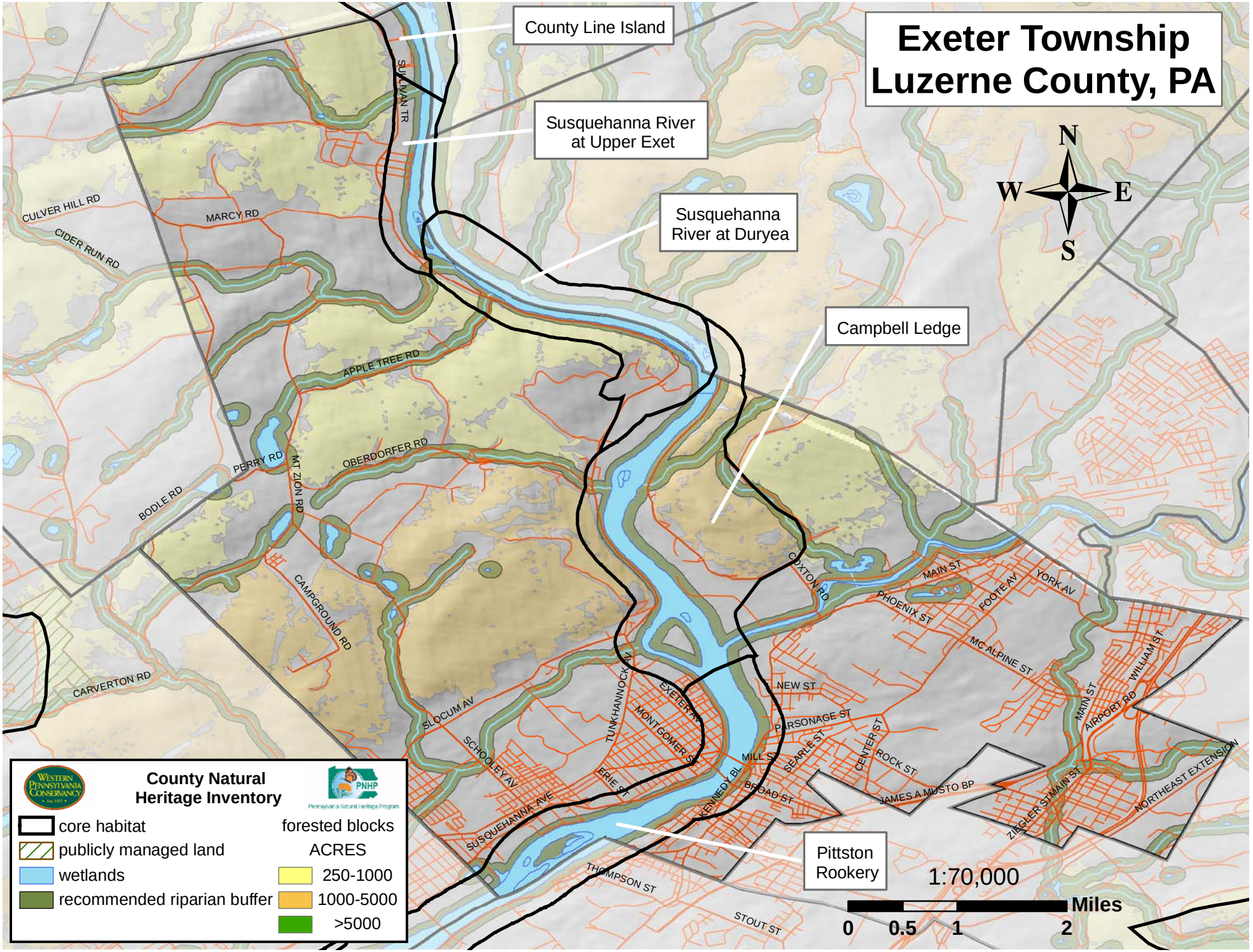
None

OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Exeter Township
Luzerne County, PA
County Line Island
Susquehanna River at Upper Exet
Susquehanna River at Duryea
Campbell Ledge
Pittston Rookery
N
W
E
S
SULLIVAN TR
CULVER HILL RD
MARCY RD
CIDER RUN RD
APPLE TREE RD
OBERDORFER RD
PERRY RD
MT ZION RD
BODLE RD
CAMPGROUND RD
CARVERTON RD
SLOCUM AV
SCHOOLEY AV
SUSQUEHANNA AVE
THOMPSON ST
STOUT ST
TUNKHANNOCK AV
EXETER AV
MONTGOMERY ST
ERIE ST
KENNEDY BL
MILL ST
BROAD ST
SEARLE ST
CENTER ST
ROCK ST
PARSONAGE ST
NEW ST
COXTON RD
MAIN ST
PHOENIX ST
FOOTE AV
YORK AV
MC ALPINE ST
WILLIAM ST
MAIN ST
AIRPORT RD
JAMES A MUSTO BP
ZIEGLER ST
MAIN ST
NORTHEAST EXTENSION
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:70,000
Miles
0
0.5
1
2

COUNTY LINE ISLANDS (Exeter Twp. & Lackawanna & Wyoming Counties) SP525 & SA525 - This island/river gravel community was first visited in 1996. A marginal population of a PA-Rare plant species (SP524) occurs in an open, scour area of the island. The associated plant species include turkeyfoot (*Andropogon gerardii*), switch grass (*Panicum virgatum*), grape (*Vitis riparia*), Indian grass (*Sorghastrum nutans*), and cocklebur *(Xanthium echinatum*). When the site was revisited in 1999, SP524 was found again along with a new marginal population of a G3G4 animal species (SA525). The animal species was found in a riffle area in a cobble/gravel substrate along with ridged-wedge mussel (*Alasmidonta marginata*). Many exotic plant species such as crown vetch (*Coronilla varia*) are growing on the island. Threats to the plant species include competition with invasive plant species, deer browse, and changes in hydrology (e.g., construction of new dams). Any changes in hydrology and water pollution would affect the animal species.

CAMPBELL'S LEDGE (Exeter Twp. & Wilkes Barre Boro) NC501, NC502, SP504A, SP504B, SP505, SP506, SP529A, SP529B, SP530, & GE501 - Campbell's Ledge is situated on the summit of a ridge overlooking the Susquehanna River and provides a spectacular view of the river valley. This unique site was identified as a Northern Appalachian Calcareous Cliff Natural Community (NC501) and a Northern Appalachian Calcareous Rocky Summit Natural Community (NC502). Also, the state classified this area as a unique geologic feature (Erosional Remanant-GE501) in 1979. Portions of the middle and upper slopes, particularly below the outlook, have prominent exposed cliffs with sheer drop-offs. The cliffs, bluffs, and other slopes near the summit have severe growing conditions due to the thin, rocky soil, steep terrain, exposure to wind, and the frequency of fire. The vegetation in these areas, consisting of scrubby woodland, shrub thickets, and small herb-dominated openings, provide the habitat for seven state-listed plant species of special concern, as well as a number of other plant species that are infrequent in the state. An additional twelve state-listed plant species of special concern are known historically from Campbell's Ledge, but have not been confirmed in recent years; several of these species are of limestone affinity. There is also an historic record of an animal species of concern at the Ledge, but additional surveys are needed to confirm the presence of the species.

In contrast to the vegetation of the cliffs and dry slopes, the stream that exits Falling Springs Reservoir and descends the northwestern portion of the ridge drains a cool, moist ravine that features a waterfall and supports a mesic flora, including the Canada yew (*Taxus canadensis*). The disturbances on the ridge include previous logging, previous mining, numerous jeep and ATV trails, exotic plant species, and litter. The habitat in the vicinity of the outlook has been degraded by excessive foot and vehicular traffic. Potential threats include development and additional logging. The site, which extends on to the Ransom quadrangle, should continue to be monitored.

Two new animal species of concern were located at this site in 2000 and 2005. One species is a State Endangered animal that was seen nesting along the cliff at this site. Disturbances include ATVs, four-wheel drive vehicles, and rock climbers in the area. Natural predation by Great Horned Owls is a possibility.

PITTSTON ROOKERY (Pittston & Exeter Boros. & Jenkins Twp.) SA511 –This site is an island in the North Branch of the Susquehanna River that was an active nesting area for an animal species of concern (SA511) for ten years. The island was not visited during the field surveys for the Natural Areas Inventory, but the nesting area has been reported to be no longer active. A field visit during breeding is needed to confirm this report.

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

SUSQUEHANNA RIVER AT DURYEA (**Exeter Twp in Luzerne County and Ransom Twp. in Lackawanna County)** SA520 **–** A marginal quality population of an animal species of concern (SA520) was found in the North Branch of the Susquehanna River in an unshaded riffle area in sand with cobble and boulder substrate. The associated animal species include elktoe (*Alasmidonta marginata*) and one shell each of triangle floater (*Alasmidonta undulata*) and eastern floater (*Pyganodon cataracta*). Some algae and water stargrass (*Heteranthera dubia*) grew in this riffle area. The river is bordered to the east by railroad tracks and to the west by a sand/cobble/boulder shelf area directly adjacent to the river. An industry (possible mining) is located southwest of the animal population. Siltation and degradation of water quality from surrounding land use (residential and industrial) threaten the site. Conservation of the water quality is important for the survival of this species.

An additional animal species of concern was located along the Susquehanna River corridor in 2000. Further surveys are needed to assess the extent of the population.

SUSQUEHANNA RIVER AT EXETER (Exeter Twp. in Luzerne County & Ransom & Newton Twps. in Lackawanna County) –UPDATE- SA519A & SA519B **–** This section of the North Branch of the Susquehanna River was first surveyed in 1995. It contains riffle areas with cobble/gravel/sand substrate. A small population of an aquatic animal species of concern (SP519A) was identified during the 1995 survey. In 1999, the site was revisited and a fair-quality population of a second animal species of concern (SA519B), which was believed to no longer occur at the site, was rediscovered. The associated plant and animal species include water stargrass (*Heteranthera dubia*), elktoe (*Alasmidonta marginata*), and Asian clam (*Corbicula fluminea*). The potential threats include changes in water quality or temperature and sedimentation. **The animal species of concern SA519B, *Pyganodon cataracta* (Eastern Floater), has been removed from the species of concern list.**

Roundleaf serviceberry (*Amelanchier sanguinea*)
Photo: PNHP

FAIRMOUNT TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
BENTON STATION FIELDS							
Animal Species of Concern SA557	G4	S3			6/04/00	BC	
Elymus trachycaulus Slender Wheatgrass	G5	S3		TU	9/01/05	B	**NEW**
Euphydryas phaeton Baltimore Checkerspot	G4	S2S4			7/21/01	AB	**NEW**
Gentiana linearis Narrow-leaved Gentian SP562B	G4G5	S4		DL	6/25/01	BC	**DELISTED**
Plant Species of Concern SP562A	G3	S1		PE	6/25/01	BC	
Satyrodes Eurydice Eyed Brown	G4	S1S3			7/21/01	AC	**NEW**
CENTRAL MOUNTAIN							
Plant Species of Concern	G3	S3	LE	PE	07/22/03	BC	**NEW**
Ephemeral/Fluctuating Natural Pool Community	G?	S3		N	07/22/03	E	**NEW**
Hemlock Palustrine Forest Natural Community	G?	S3		N	07/22/03	E	**NEW**
COUNTY LINE SWAMP							
Aegolius acadicus Northern Saw-whet Owl SA581	G5	S3B,S3N			5/04/00	E	
Bartonia paniculata Screw-stem	G5	S3		TU	9/04/03	B	**NEW**
Gaultheria hispidula Creeping Snowberry SP567A	G5	S3		PR	8/27/02	B	**UPDATED**
Ledum groenlandicum Common Labrador-tea SP567B	G5	S3		PR	7/14/93	B	
Muhlenbergia uniflora Fall Dropseed Muhly	G5	S2		PT	9/04/03	B	**NEW**
HUNTINGTON CREEK							
Umbra pygmaea Eastern Mudminnow SA510	G5	S3		PC	8/11/98	E	

KITCHEN CREEK FALLS						
Waterfalls and Rapids GE534	GNR	SNR		1979	E	
KITCHEN CREEK RAVINES						
Catharus ustulatus Swainson's Thrush	G5	S2S3B,S5N	CR	7/29/04	E	**NEW**
Animal Species of Concern	G4	S3S4	PC	9/20/00		**NEW**
Gaultheria hispidula Creeping Snowberry	G5	S3	PR	9/04/03	B	**NEW**
Polystichum braunii Braun's Holly Fern SP514	G5	S1	PE	6/11/88	D	
Ribes lacustre Swamp Currant SP537A	G5	S1	PE	5/21/98	BC	**UPDATED**
Streptopus amplexifolius White Twisted-stalk SP537B	G5	S1	PE	5/21/98	B	
Viola selkirkii Great-spurred Violet SP550	G5?	S1	TU	5/04/97	CD	**UPDATED**
LAKE JEAN						
Aeshna clepsydra Mottled Darner SA543	G4	S2S3		8/25/93	B	
Carterocephalus palaemon mandan Arctic Skipper SA558	G5T5	S2		6/03/00	C	
Elatine minima Small Waterwort SP545	G5	S4	DL	8/05/96	C	**DELISTED**
Sphinx gordius SA555	G4	S1S3		5/04/00	E	
Utricularia purpurea Purple Bladderwort SP505	G5	S4	DL	8/05/96	BC	**DELISTED**
LAKE LEIGH						
Gaultheria hispidula Creeping Snowberry SP553	G5	S3	PR	9/21/05	B	**UPDATED**
Gentiana linearis Narrow-leaved Gentian SP542A	G4G5	S4	DL	8/20/93	E	**DELISTED**
Muhlenbergia uniflora Fall Dropseed Muhly SP542B	G5	S2	PT	9/01/05	A	**UPDATED**
Somatochlora walshii Brush-tipped Emerald	G5	S2		9/7/02	E	**NEW**
Utricularia cornuta Horned Bladderwort SP542C	G5	S2	PT	9/6/02	B	**UPDATED**

THE MEADOWS/BEECH LAKE						
Aegolius acadicus Northern Saw-whet Owl SA551	G5	S3B,S3N		5/04/00	E	
Anax longipes Comet Darner	G5	S1S2		6/26/04	E	**NEW**
Boyeria grafiana Ocellated Darner	G5	S3		9/07/02	E	**NEW**
Carterocephalus palaemon mandan Arctic Skipper SA525	G5T5	S2		6/01/02	B	**NEW**
Animal Species of Concern SA524	G4	S3		6/06/98	BC	
Cordulia shurtleffi American Emerald	G5	S3S4		6/26/04	E	**NEW**
Enallagma annexum Northern Bluet	G5	S3			E	**NEW**
Enallagma boreale Boreal Bluet	G5	S2		6/12/05	E	**NEW**
Gentiana linearis Narrow-leaved Gentian SP514A	G4G5	S4	DL	8/20/99	C	**DELISTED**
Glyceria borealis Small-floating Manna-grass SP514B	G5	S4	DL	8/20/99	CD	**DELISTED**
Gomphaeschna furcillata Harlequin Darner	G5	S2		6/25/05	E	**NEW**
Leucorrhinia glacialis Crimson-ringed Whiteface	G5	S3S4		6/12/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4		6/26/04	E	**NEW**
Muhlenbergia uniflora Fall Dropseed Muhly SP514C	G5	S2	PT	9/10/99	D	**UPDATED**
Somatochlora walshii Brush-tipped Emerald	G5	S2		9/07/02	E	**NEW**
Utricularia purpurea Purple Bladderwort SP514D	G5	S4	DL	9/10/99	D	**DELISTED**
MOUNTAIN SPRINGS LAKES						
Bartonia paniculata Screw-stem SP512A	G5	S3	TU	9/01/99	C	**UPDATED**
Boloria selene myrina Silver Bordered Fritillary	G5T5	S1S3		8/02/05	B	**NEW**
Gentiana linearis Narrow-leaved Gentian SP512B, SP513A	G4G5	S4	DL	9/01/99	B	**DELISTED**
Glyceria borealis Small-floating Manna-grass SP512C, SP513C	G5	S4	DL	9/01/99	C	**DELISTED**

Muhlenbergia uniflora Fall Dropseed Muhly SP512D, SP513B	G5	S2	PT	9/01/99	BC	**UPDATED**
Utricularia purpurea Purple Bladderwort SP513D	G5	S4	DL	8/20/99	D	**DELISTED**
OLD BEAVER DAM SWAMP						
Dorocordulia lepida Petite Emerald SA556	G5	S2		6/04/00	C	
OPPERMAN PASS						
Aegolius acadicus Northern Saw-whet Owl SA584	G5	S3B,S3N		5/04/00	E	
Animal Species of Concern SA559	G5	S1S2B	PE	8/15/98	B	**UPDATED**
Hemipachnobia monochromatea Sundew Cutworm Moth	G4	S2S3		6/15/03	AB	**NEW**
Ledum groenlandicum Common Labrador-tea	G5	S3	PR	9/17/02	D	**NEW**
Utricularia cornuta Horned Bladderwort	G5	S2	PT	9/17/02	BC	**NEW**
RICKETTS GLEN SWAMP						
Animal Species of Concern	G5	S2S3B,S3N		7/16/97	E	**NEW**
Gaultheria hispidula Creeping snowberry SP532	G5	S3	PR	10/02/97	B	

LOCALLY SIGNIFICANT AREAS:

Grand View

Five Points Swamp

PUBLICLY MANAGED LANDS:

Rickets Glen State Park

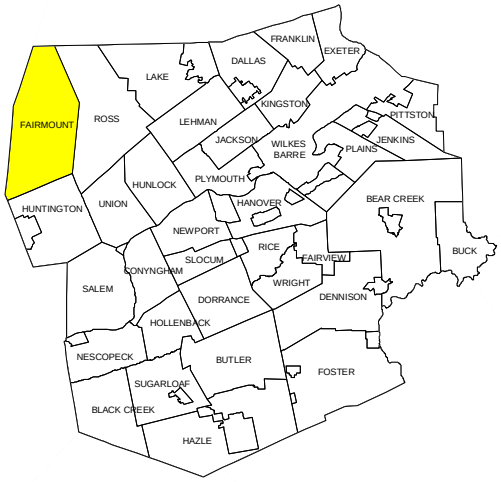
Glens Natural Area

OTHER CONSERVATION AREAS:

North Mountain - Ricketts Glen State Park Important Bird Area

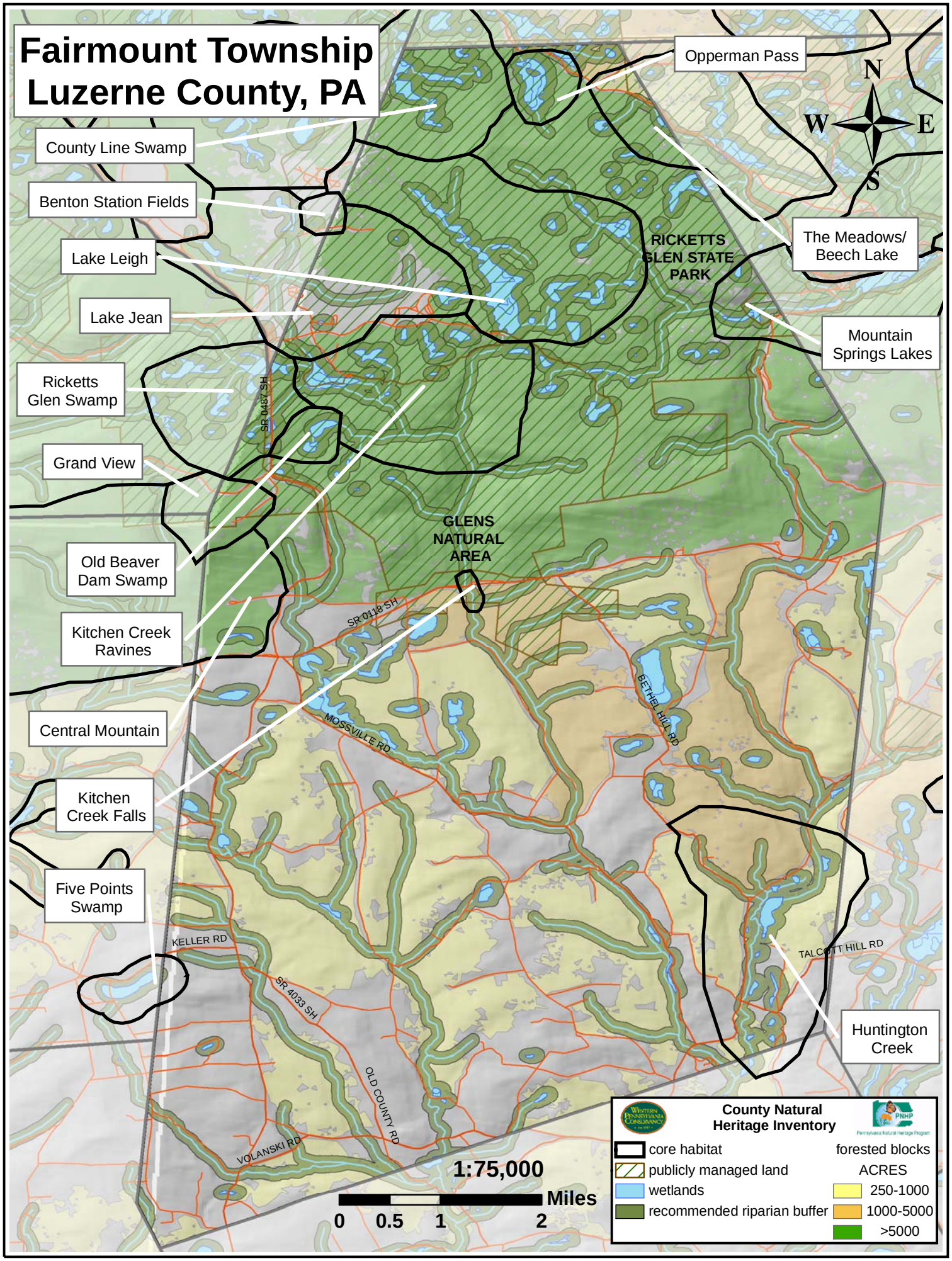
Ricketts Glen State Park / SGLs 57/13/16 Important Mammal Area

Kitchen Creek - High Quality Cold Water Fishery



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

** Please refer to Appendix II for Quality ranks.


Fairmount Township
Luzerne County, PA
Opperman Pass
N
W
E
S
County Line Swamp
Benton Station Fields
Lake Leigh
Lake Jean
Ricketts Glen Swamp
Grand View
Old Beaver Dam Swamp
Kitchen Creek Ravines
Central Mountain
Kitchen Creek Falls
Five Points Swamp
RICKETTS GLEN STATE PARK
The Meadows/ Beech Lake
Mountain Springs Lakes
GLENS NATURAL AREA
SR 0487 SH
SR 0118 SH
MOSSVILLE RD
BETHEL HILL RD
KELLER RD
SR 4033 SH
OLD COUNTY RD
VOLANSKI RD
TALCOTT HILL RD
Huntington Creek
1:75,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

BENTON STATION FIELDS (Fairmount Twp.) UPDATE - SA557, SP562A, & SP562B **–** This site, which is also known as "the Hayfields," is found in Ricketts Glen State Park. It contains a small wet swale surrounded by a dry open meadows with flat-topped white aster (*Aster umbellatus*), milkweed (*Asclepias syriaca*), and grasses (Poaceae). An S3, G4 invertebrate animal species (SA557) was identified here in 2000. This species uses flat-topped white aster as its host plant. The threats to the animal species include mowing of the field in the spring and summer when the larvae are feeding on vegetation. A rotating schedule of mowing that includes mowing one-third of the field every year in late October is optimal for maintaining habitat for the species of concern. A field with mowed and unmowed areas provides a variety of vegetation height and structure. Additionally, at least six inches of stubble must be left as a vegetative buffer for overwintering eggs and larvae.

Extensive stands of flat-topped white aster exist on the west-side of the highway and along game land roads west of Splashdam Pond (Sullivan Co.). Some stands of *Aster umbellatus* also occur around ponds, along unimproved dirt roads, and "food plots" of game lands on North Mountain. Searches of these areas are needed to determine the extent of the animal species of concern.

In 2001, a new population of PA-Endangered, G3 plant species of concern (SP562A) and a new population of an S3 plant species of concern (SP562B) were mapped in a wet meadow. Populations of these plant species occur at other nearby locations. **The plant species Narrow-leaved Gentian (*Gentiana linearis*), SP562B, has been removed from the species of concern list.**

This site may be partially impacted by the current logging activities in the park. The field should be restored upon the conclusion of the logging. Deer browse and potential spraying of herbicides are also threats to the species of concern. The site should continue to be monitored.

Two Lepidopteran species of concern were located here in 2001, Baltimore Checkerspot (*Euphydryas phaeton*) and Eyed Brown (*Satyrodes eurydice*).

A good population of a new plant species of concern, Slender Wheatgrass (*Elymus trachycaulus*) was also found at this site in 2005. Associated species are *Euthamia graminifolia, Aster umbellatus, Danthonia compressa, Phleum pretense, Rubus flagellaris, Potentilla canadensis, Vaccinium corymbosum, Dactylis glomerata, Solidago rugosa, Asclepias syriaca, Spiraea latifolia, Achillea millefolium, Berberis vulgaris,* and *Elytrigia repens*. Threats and disturbances include eventual succession and invasive species.

CENTRAL MOUNTAIN (Fairmont Twp, and Columbia and Sullivan Counties) -NEW– This extensive forested area at the edge of the Allegheny Plateau physiographic province rises dramatically from the adjacent southern lowlands. This area contains an Ephemeral/Fluctuating Pool Natural Community, a Hemlock Palustrine Forest Natural Community and G3, S3 Federally–Endangered plant species of concern. The Federally endangered status of this plant indicates that the species may be in danger of extinction throughout all or a significant portion of its range. This species is primarily found in temporary ponds and other pools with fluctuating water levels. These ponds also typically provide important breeding habitat for forest dwelling amphibians such as the wood frog (*Rana sylvatica*), and the spotted salamander (*Ambystoma maculatum*). The Hemlock Palustrine Forest Natural Community contains forested wetlands dominated by a hemlock canopy. The forested wetlands give way to open sedge meadows in several locations. The water-saturated deep-muck soils are covered in layers of sphagnum moss and mounds of sedges and other herbaceous species. This large forested area provides habitat for a variety of species and is an

important natural habitat in Columbia County. Much of this forest has a visible browse-line, indicating a higher than desirable deer population. Regeneration of trees, shrubs and herbaceous species appears sparse in many areas of this forest.

Logging and other changes in the habitat adjacent to the ponds could endanger the quality of the habitat for the population of a plant species of concern at this location. Herbivory by a large deer population decreases the potential for forest regeneration throughout the area. The increased use of All Terrain Vehicles (ATVs) on forested property poses a potential threat to the site.

Logging should be avoided adjacent to the ponds and other wetland habitats including forested wetlands, creeks, seeps and sedge openings. Undisturbed forested buffers surrounding all wetland habitats will best protect these habitats from detrimental influences. Increased deer hunting pressure should be encouraged to reduce the herd population to ecologically sustainable levels. The site should be monitored for ATV traffic, and trails near the ponds and wetlands blocked as they appear.

COUNTY LINE SWAMP (Fairmount Twp. & Wyoming & Sullivan Counties) SP567A, SP567B, & SA581 - County Line Swamp is found on State Game Lands #57. The swamp was apparently logged in the late 1800s or early 1900s and has remained a shrub swamp with little encroachment by trees since that time. Two PA-Rare plant species (SP567A & SP567B) were identified at the site in 1993. The populations of both rare plant species are healthy and there does not appear to be any threats. New locations of an S3B,S3 animal species (SA581) were discovered in State Game Lands 57 in April of 1995. Additional surveys are needed to determine the numbers of this species present in the SGLs. The preservation of snags and older trees would benefit this animal. The majority of this site lies in Wyoming County.

Two new good quality population of plant species of concern were found at this site in 2003, Screw-stem (*Bartonia paniculata*) and Fall Dropseed Muhly (*Muhlenbergia uniflora*). Associated species include *Sphagnum, Rhynchospora alba, Carex* sp., *Eriophorum virginicum, Gentiana linearis, Triadenum fraseri, Rubus hispidus, Thelypteris palustris, Chamaedaphne, Juncus brevicaudatus, Carex folliculata,* and *Hypericum canadense*.

HUNTINGTON CREEK (Fairmount, Huntington & Ross Twps.) SA510 – An S3, PA-Candidate animal species of concern (SA510) was identified during a 1998 survey of Huntington Creek. Additional surveys are needed to assess the population quality. Maintaining the hydrology, water quality, and water temperature of the creek are important for the survival of the species.

KITCHEN CREEK FALLS (Fairmount Twp.) GE534 – A scenic gorge that crosses the Allegheny Front, this geologic feature consists of a series of waterfalls and rapids in the Glens Natural Area. The gorge descends 1,000 feet over three miles and includes over 25 falls.

KITCHEN CREEK RAVINES (Fairmount Twp.) SP514, SP537A, SP537B, & SP550 – The gorge and waterfalls host a unique assortment of plant life including four plant species of concern. Two of the plant species found at this site are PA-Endangered (SP514 & SA537B). Additional searches in nearby drainages and the continued monitoring of this site are recommended. Also included in this site is an area listed by Geyer and Bolles (1987) as Midway Crevasse. The Crevasse is described as a narrow passage between large blocks of white sandstone and conglomerate rocks (rock city) that have been separated along fractures by frost wedging and gravity creep.

The ravines are protected within Ricketts Glen State Park and the Glens Natural Area. The Glens Natural Area is a Registered National Natural Landmark since October 12, 1969. Here, two branches of Kitchen Creek cut through deep gorges of Gang Glen and Glen Leigh to unite at "Waters Meet" and then flow through Ricketts Glen (for which the park is named) among very large specimens of eastern hemlock (*Tsuga canadensis*), eastern white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*), tulip poplar (*Lireodendron tulipifera*) and oaks (*Quercus sp*). Many of the trees in this area are over 500 years old and ring counts of fallen trees have revealed ages as high as 900 years. (DCNR 1996).

The Glens Natural Area (Kitchen Creek ravines) and adjacent mature hemlock – pine –northern hardwood forest support good populations of birds typical of old growth forests (Pennsylvania Society for Ornithology Special Areas Project, Haney 1999). Swainson's' thrush (*Catharus ustulatus*), which is a species of concern, was once common in the old growth forest of the Ricketts Glen State Park (Cope 1936). There have been occasional reports of Swainson's thrushes in the hemlock groves of the park (Brauning 1992). Habitat for this species also exists in headwater hemlock swamps and groves located throughout the park and the Glens Natural Area.

There is good evidence that old growth hemlock – white pine – hardwood forests support significantly higher densities of breeding birds than younger forests in the same region (Haney and Schaadt 1996). For this reason, Ricketts Glen State Park was selected as a Pennsylvania Important Bird Area because of its relatively large scale interior forest and its old growth stand support large populations of forest interior birds (Crossley 1999). The old growth forest in these gorges support high densities of canopy-dwelling conifer forest birds such as blue-headed Vireo (*Vireo solitarius*), Blackburnian warbler (*Dendroica fusca*), black-throated green warbler (*Dendroica virens*), magnolia warbler (*Dendroica magnolia*), and purple finch (*Carpodacus purpureus*). Tree trunk specialists such as hairy woodpecker (*Picoides villosus*), red-breasted nuthatch (Sitter canadensis), and brown creeper (*Certhia familiaris*) also are common in this forest. Acadian flycatcher (*Empidonax virescens*), winter wren (*Troglodytes troglotytes*), hermit thrush (*Catharus guttatus*), Louisiana waterthrush (*Seiurus motacilla*), and dark-eyed junco (*Junco hyemalis*) are common breeders in and around the glens. All of these species have positive old-growth affinity in old-growth hemlock –white pine – hardwood forests of the northern Appalachian plateau (Haney 1999). The large cone crops produced by these massive conifers attract flocks of red crossbill (*Loxia curvirostra*), a bird species of special concern, and white-winged crossbill (*Loxia leucoptera*) in the winter (Pennsylvania Society for Ornithology Special Areas Project). Also, a mammal species of concern in Pennsylvania is dependent upon mature forest habitat (Mahan et. al. 1999). It should be a high priority for DCNR to preserve this old growth forest with a substantial buffer zone that would protect it from logging, and tree diseases that would substantially harm the health of the remaining mature forest.

An early winter storm toppled many old hemlocks and white ashes (*Fraxinus americana*) in 1989. This kind of natural disturbance creates more of a mosaic of tree ages in a mature forest and reminds us of the need to preserve mature forests in large acreage. The hemlock wooly aldelgid is a substantial threat to the health of the trees in this gorge. The wooly adelgid is an aphid-like insect that has killed many hemlocks in the Commonwealth. While spraying the large old growth hemlocks may not be feasible, using biological controls (e.g., natural predators, fungi, bacteria, and viruses) may be the best defense against the adelgid. An infestation of the adelgid would have a substantial negative effect on the biodiversity and scenic attributes of the Glens Natural Area, one of the most important natural tourist attractions of Luzerne County.

A bird species of concern, Swainson's Thrush (*Catharus ustulatus*) was found at this site in 2004. Further surveys need to be conducted to determine the extent of the population. Associated bird

species include Sharp-shinned Hawk, Red-shouldered Hawk, Broad-winged Hawk, Northern Saw-whet Owl, Yellow-bellied Sapsucker, Downy Woodpecker, Hairy Woodpecker, Ruby-throated Hummingbird, Blue-headed Vireo, Red-eyed Vireo, American Crow, Common Raven, Blue Jay, Black-capped Chickadee, Tufted Titmouse, White-breasted Nuthatch, Brown Creeper, Winter Wren, Hermit Thrush, American Robin, Gray Catbird, Cedar Waxwing, Magnolia Warbler, Black-throated Green Warbler, Black-throated Blue Warbler, Yellow-rumped Warbler, Blackburnian Warbler, American Redstart, Ovenbird, Common Yellowthroat, Scarlet Tanager, Dark-eyed Junco, and Purple Finch. The major threat to the species of concern is the spread of Hemlock Wooly Adelgid.

A population of an animal species of concern was observed here in 2000. Further surveys need to be done to determine the extent of the population.

A good population of a State Rare plant species of concern, Creeping Snowberry (*Gaultheria hispidula*) was seen at this site in 2003. Associated species include S*phagnum, Coptis trifolia, Carex trisperma, Trientalis borealis, Mitchella repens, Tsuga canadensis,* and *Betula alleghaniensis*.

LAKE JEAN (Fairmont Twp. in Luzerne County & Colley Twp. in Sullivan County) –UPDATE- SP505, SP506, SP545, SA543, SA555, & SA558 **–** This site within Ricketts Glen State Park is a shallow man-made lake that was formerly the site of two smaller lakes, one natural and one man-made. The lake is spring-fed with marginal beds of bur-reed (*Sparganium sp.*), rushes and sedges (*Carex sp., Juncus sp., Dulichium arundinaceum*, etc.), blueberry (*Vaccinium sp.*), and sphagnum moss (*Sphagnum sp.*) along the lake margin. Relatively little emergent vegetation occurs in the open water. The lake is used for fishing, boating, and swimming.

A fair- to good-quality population of SP505 was last seen in 1996. SP506 is a good-quality population of a PA-Threatened aquatic plant species. SP545 is a small, easily overlooked, aquatic species found in shallow water near one edge of the lake. Although only a small population has been located, the possibility exists for it to occur anywhere the water is shallow and the bottom is sandy.

At least 30 individuals of an invertebrate animal species of concern (SA543) were seen at the lake margin. This species appears to be doing well at this site and appears to tolerate recreational lake activities if the natural vegetation persists at the lake edge. In 2000, two additional invertebrate species of concern (SA555 & SA558) were discovered. Also, a bird species of concern has been seen using the Lake Jean area since 1999. Field surveys are needed to locate the nest for this species.

If the park uses herbicides to control aquatic weeds in the lake, the practice should be closely evaluated and monitored to avoid either direct impacts on the rare plant species (SP505, SP506, & SP545) or indirect impacts on the animals of special concern (SA543, SA555, & SA558). Use of pesticides (including Bt) in and around the lake could also impact the animals of concern. A small portion of this site lies within Sullivan County. **The plant species SP505, *Utricularia purpurea* (Purple Bladderwort), and SP545, *Elatine minima* (Small Waterwort), have been removed from the species of concern list.**

LAKE LEIGH (Fairmount Twp. in Luzerne County & Colley Twp. in Sullivan County) –UPDATE- SP542A, SP542B, SP542C, & SP553 – Three plant species of concern (SP542A, SP542B, & SP543C) occupy boggy habitat on the bottom of this drained lake. A dam at its south end is no longer functional, but the site has been impacted by repeated flooding and draining. The species of concern occupy an open sphagnum-dominated area with peaty soils that may represent a remnant of a floating bog mat. The associated

plant species include sphagnum (*Sphagnum sp*.) and white beak-rush (*Rhynchospora alba*). A small population of a PA-Rare plant species (SP553) was found growing in a young red maple/hemlock swamp just east of Lake Leigh. The dominant vegetation included eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), highbush blueberry (*Vaccinium corymbosum*), beech (*Fagus grandifolia*), sedges (*Carex trisperma* and *Carex folliculata*), Christmas fern (*Polystichum acrostichoides*), mountain laurel (*Kalmia latifolia*), goldthread (*Coptis trifolium*), mountain ash (*Pyrus americana*), partridge berry (*Mitchella repens*), sphagnum moss (*Sphagnum sp*.), and Allegheny blackberry (*Rubus allegheniensis*). The site has a history of disturbance including changes in hydrology and wind- thrown trees from a storm that passed through this area a couple of years ago. No current threats are evident. The site should be monitored in the future. A small portion of this site lies within Sullivan County. **The plant species SP542A, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.**

A new odonate species of concern, Brush-tipped Emerald (*Somatochlora walshii*) was located at this site in 2002. More surveys need to be done to determine the extent of the population. Associated species include *Aeshna canadensis* and *Sympetrum* sp.

THE MEADOWS/BEECH LAKE (Fairmount & Ross Twps.) –UPDATE- SP514A, SP514B, SP514C, SP514D, SA524, SA525, & SA551 – This site located on State Game Lands #57 is made up of a pond and an adjacent wetland known as the Meadows, and a small man-made area named Beech Lake. A young hardwood forest dominated by red maple (*Acer rubrum*) surrounds Beech Lake. Two plant species of concern (SP514A & B) were identified in the Meadows area and two plant species of concern (SA514C&D) were found in Beech Lake. The plant species in both areas are small- to fair-quality populations that do not appear to have any imminent threats. Maintaining the present hydrology is important.

Additionally, three animal species of concern (SA524, SA525, & SA551) were discovered. The threats to SA524 & SA525 include mowing of the field in the spring and summer when the larvae are feeding on vegetation. A rotating schedule of mowing that includes mowing one-third of the field every year in late October is optimal for maintaining habitat for the species of concern. A field with mowed and unmowed areas provides a variety of vegetation height and structure. Additionally, at least six inches of stubble must be left as a vegetative buffer for overwintering eggs and larvae. The animal species SA551 would benefit from the preservation of larger trees and snags. Occasional sightings of an additional animal species of concern have been seen at the Meadows and artificial ponds along the west branch of Bean Run (State Game Lands #57). The sightings suggest that there is a small colony of this wetland bird in the general area, probably in a forested section of the State Game Lands near Beech Lake. Additional field surveys are needed to find the nesting areas of this species. A small portion of this site extends to the Dutch Mountain and Red Rock quadrangles. **The plant species SP514A, *Gentiana linearis* (Narrow-leaved Gentian), SP514B, *Glyceria borealis* (Small-floating Manna-grass), and 514D, *Utricularia purpurea* (Purple Bladderwort) have been removed from the species of concern list.**

Nine new odonate species of concern were identified from this site in 2002, 2004, and 2005, Comet Darner (*Anax longipes*), American Emerald (*Cordulia shurtleffi*), Crimson-ringed Whiteface (*Leucorrhinia glacialis*), Boreal Bluet (*Enallagma boreale*), Harlequin Darner (*Gomphaeschna furcillata*), Slaty Skimmer (*Libellula incesta*), Brush-tipped Emerald (*Somatochlora walshii*), and Ocellated Darner (*Boyeria grafiana*). Associated odonate species include Common Green Darner (*Anax junius*), Calico Pennant (*Celithemis elisa*), Common Baskettail (*Epitheca cynosure*), Eastern Pondhawk (*Erythemis simplicicollis*), Eastern Forktail (*Ischnura verticalis*), Frosted Whiteface (*Leucorrhinia frigida*), Hudsonian Whiteface (*Leucorrhinia hudsonica*), Four-spotted Skimmer (*Libellula quadrimaculata*), Ashy Clubtail (*Gomphus lividus*), Blue Dasher (*Pachydiplax longipennis*),

Hagen's Bluet (*Enallagma hageni*), Marsh Bluet (*Enallagma ebrium*, Spangled Skimmer (Libellula cyanea), and Sphagnum Sprite (Nehalennia gracilis).

A good quality population of a new butterfly species, Arctic Skipper (*Carterocephalus palaemon mandan*), was located at this site in 2002.

MOUNTAIN SPRINGS LAKES (Fairmount & Ross Twps.) –UPDATE- SP512A, SP512B, SP512C, SP512D, SP513A, SP513B, SP513C, & SP513D – This site is the drained bed of a man-made lake known as Lake #1 or Splash Dam located in a mountainous area along Bowmans Creek. The land is public and is maintained by the PA Game Commission and The PA Fish & Boat Commission. A functional lake (Lake #2), which is used for public fishing, is found to the west and is included as part of this site. A block of woodland through which Bowman Creek flows separates the two lakes. Four plant species of concern (SP512A, B, C, & D) were identified in Lake #1 and four were identified in Lake #2 (SP513A, B, C, & D). Lake #1 has had two major disturbances: the destruction of the original vegetation caused by the construction of the dam, and the removal of the dam. There does not seem to be any obvious recent disturbances to this area (Lake #1). The dam at Lake # 2 is in poor condition. If the dam is no longer maintained, then the aquatic plants in the lake would be destroyed. It is likely that the land would revert back to a wetland and a different plant community would develop. The species of concern at both Lake #1 and Lake #2 should continue to thrive if the current land use is maintained. **The plant species SP512B and 513A, *Gentiana linearis* (Narrow-leaved Gentian), SP512C and 513C, *Glyceria borealis* (Small-floating Manna-grass), and SP513D, *Utricularia purpuea* (Purple Bladderwort) have been removed from the species of concern list.**

A good population of a Lepidopteran species of concern, Silver Bordered Fritillary (*Boloria selene myrina*), was found at this site in 2005. Individuals observed nectaring on *Aster umbellatus* and other late season asters.

OLD BEAVER DAM SWAMP (**Fairmount Township)** SA556 – In 2000**,** an S2 invertebrate species of concern (SA556) was identified in this open sphagnum swamp. Additional surveys are needed to determine the extent and size of the population. Permanent flooding or draining of the swamp would eliminate this species of concern.

OPPERMAN PASS (Fairmount Township) SA559 & SA584 – This site is a boreal conifer swamp within Ricketts Glen State Park. Two animal species of concern, one of which is PA-Threatened (SA559), are breeding at the site. Continued site monitoring is needed to determine the extent of the animal populations. Logging is a potential threat to these two species. A wooded buffer around the site is recommended. In addition, the preservation of snags would benefit SA584.

An excellent population of a moth species of concern, Sundew Cutworm Moth (*Hemipachnobia monochromatea*) was found at this site in 2003.

Two plant species of concern were also located at this site in 2002, the State Threatened species Horned Bladderwort (*Utricularia cornuta*) and the State Rare species Common Labrador-tea (*Ledum groenlandicum*)

RICKETTS GLEN SWAMP (Fairmount Township in Luzerne County & Davidson Twp. in Sullivan County) – In 1993, hundreds of plants of a good-quality PA-Rare plant population (SP532) were found in this hemlock-dominated swamp with yellow birch (*Betula alleghaniensis*), black gum (*Nyssa sylvatica*), cinnamon fern (*Osmunda cinnamomea*), sedges (*Carex sp*.), and sphagnum moss (*Sphagnum sp*.). In Pennsylvania, the species usually occurs in cool, shaded swamps that are dominated by conifers, but it may persist in more open sites if they remain cool and moist. Ricketts Glen Swamp was revisited in 1997. The good-quality population of (SP532)

was found once again and appears to be healthy. There are no known threats to the plants or the habitat. An S2S3B,S3N animal species (SA561) was also observed during the site visit. This animal requires large tracts of mature forest. Some degree of selective timbering is acceptable and may potentially increase prey abundance for the animal. Additional visits to the site are needed to access the quality of the animal population. This site is protected within Ricketts Glen State Park.

An animal species of concern was observed at this site in 1997. Further surveys need to be done to determine the extent of the population.

Locally Significant Areas:

Five Points Swamp – (Fairmont Township & Columbia Co.) – NEW - This locally significant site was identified from aerial photography. This area appears to have a conifer-dominated palustrine forest and an adjacent shrub wetland. Ground surveys are recommended to determine the quality of these habitats.

Grand View (Fairmount Twp.). This **Locally Significant** site within Ricketts Glen State Park is the highest point on Red Rock Mountain (2,449 feet) providing a spectacular overlook on the rim of the Allegheny Front (Geyer and Bolles, 1987). The approximately 1,200 feet of relief at Grand View is due to the vast difference in the erosional character of the red sandstone, siltstone, and shale that underlie the rolling hills to the south, and the hard, conglomerate that forms the rim of the Front and the plateau to the north (Geyer and Bolles, 1987).

Baltimore Checkerspot (*Euphydryas phaeton*)
Photo: PNHP

creeping snowberry (*Gaultheria hispidula*)
Photo:PNHP

FAIRVIEW TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow Moth SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia The Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame Moth (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3	N/A	PR	8/24/00	CD	
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, SA507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed Cinquefoil SP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2		PT	7/08/97	CD	**UPDATED**
Psectraglaea carnosa Pink Sallow SA507D	G3	S1			10/08/97	BC	
Ridgetop Dwarf-Tree Forest NC505	G4	S3			1984	B	

Sideridis maryx SA506K	G4	S1S3		5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3		6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1		9/15/98	BC	
HAYSTACK MOUNTAIN						
Amelanchier humilis Serviceberry SP507A	G5	S1	PE	6/27/96	BC	**UPDATED**
Carex bicknellii Bicknell's Sedge	G5	S1	PE	7/10/01	C	**NEW**
Plant Species of Concern SP530A	G5	S3	PR	6/18/97	D	
Northern Appalachian Acidic Rocky Summit Community NC501	GNR	S2		8/22/91	AB	
Oryzopsis pungens Slender Mountain-ricegrass SP530B	G5	S2	PE	6/18/97	D	
Potentilla tridentate Three-toothed Cinquefoil SP507B	G5	S1	PE	10/02/01	B	**UPDATED**
Prunus pumila var. susquehanae Sand Cherry SP507C	G5T4	S2	PT	6/27/96	B	**UPDATED**

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

State Game Lands 119/187

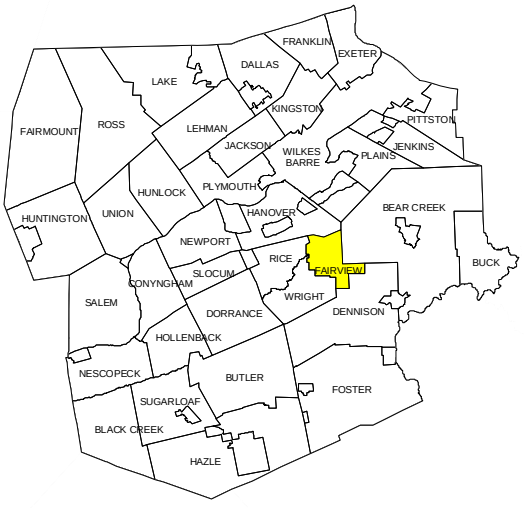
State Game Lands 207

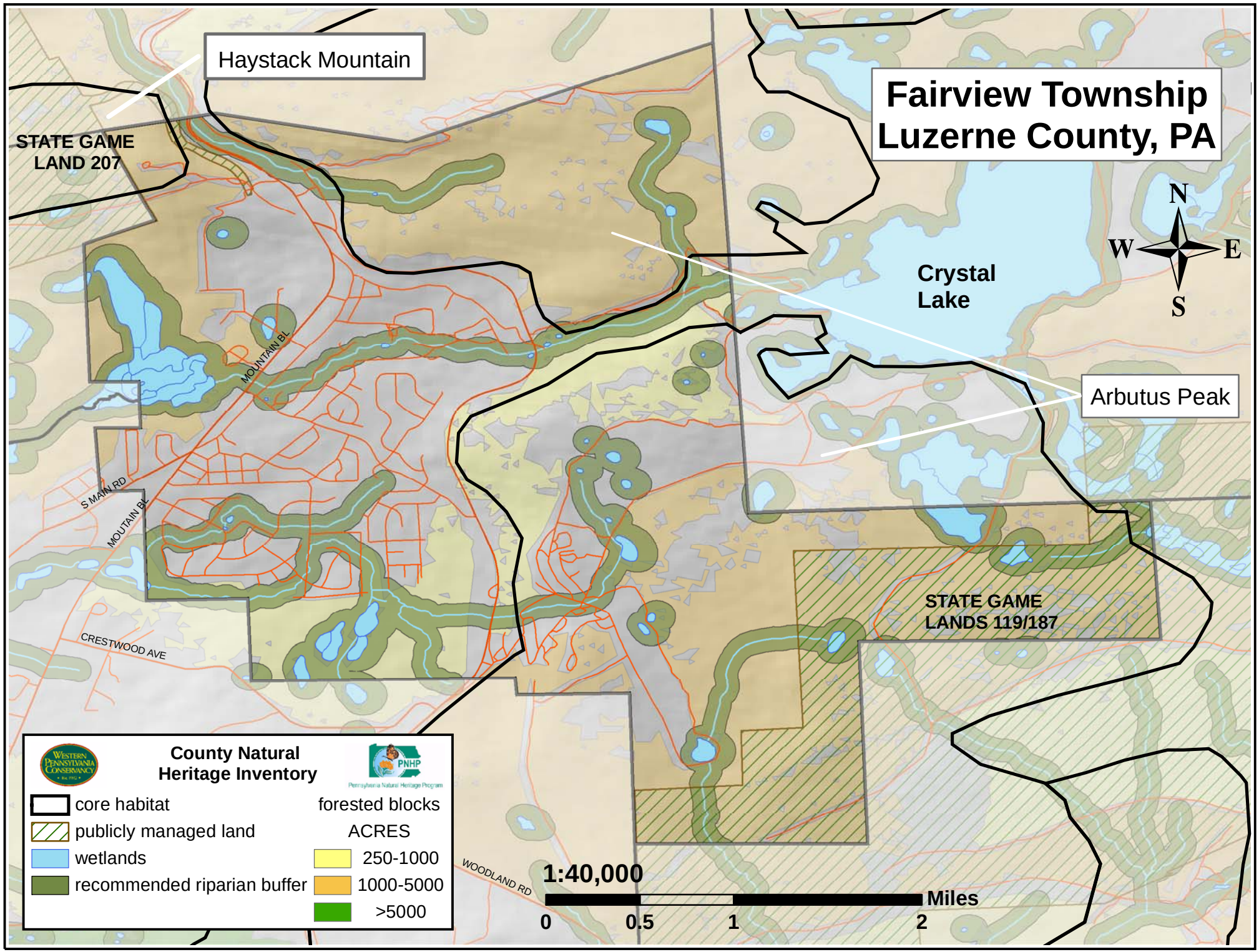
OTHER CONSERVATION AREAS:

None

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

** Please refer to Appendix II for Quality ranks.




Haystack Mountain
STATE GAME LAND 207
Fairview Township
Luzerne County, PA
N
W
E
S
Crystal Lake
Arbutus Peak
MOUNTAIN BL
S MAIN RD
MOUTAIN BL
CRESTWOOD AVE
STATE GAME LANDS 119/187
WOODLAND RD
County Natural Heritage Inventory
Western Pennsylvania Conservancy
PNHP
Pennsylvania Natural Heritage Program
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:40,000
0
0.5
1
2
Miles

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp*.).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species have been found at areas (three species were found at two location at the site) associated with the barrens and adjacent wetlands and more are expected to be found. Five of the species are Globally Rare (G3) or the subspecies is Globally Rare (G5T2T3). Several are new to the present-day fauna of PA - one species is known to utilize arctic/boreal habitats making Arbutus Peak an extreme southern location for it. Another is considered to be a southern species usually found on the New Jersey Pine Barrens. These species are typically dependent upon particular plant species for a portion of their lives; some use scrub oak to feed upon; while other use blueberries found in wetlands or in the barrens. Some species use the pitch pine while others appear to use cranberries and other plants found in the wetlands. One species that has not been found anywhere else but Pennsylvania, feeds exclusively on the flypoison plant (*Amianthium muscaetoxicum*). Another feeds on wild indigo (*Baptisia tinctoria*). Some of the species have very little life-history information and require more research. Most of them depend on plants that require plenty of sunlight found in shrubland or open woodland.

Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and

mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

HAYSTACK MOUNTAIN (Rice, Fairview, and Hanover Twps.) SP507A, SP507B, SP507C, SP530A, SP530B, & NC501 – This site is a good- to excellent-quality high elevation (1,600-1,870 feet) Northern Appalachian Acidic Rock Summit Natural Community (NC501) characterized by open, rocky areas with sparse vegetation. A xeric oak forest (*Quercus montana*) and thickets of scrub oak (*Quercus ilicifolia*) surround these scattered open areas. Powerlines and jeep trails cut through the site located mostly on State Game Lands #207. Since 1996, five plant species of concern were identified at the site. The wildfires that periodically burn the area are actually good for the plant species that grow in this natural community. Fire suppression and trash dumping are potential threats to the plants.

A small population of a State Endangered plant species of concern, Bicknell's Sedge (*Carex bicknellii*) was located at this site in 2001. Associated species include *Deschampsia flexuosa, Andropogon gerardii, Polytrichum sp, Carex pensylvanica, Apocynum androsaemifolium*, and *Carex argyrantha*. The surrounding land use is hunting and outdoor recreation. A threat to the species of concern is fire, which appears to be a minimal component of the system.

The **fly-poison borer moth (*Papaipema* sp. 1)** (left) is currently only known to occur in Pennsylvania. It is typically found in Ridgetop Barrens habitat with abundant fly-poison (*Amianthium muscitoxicum*) (right). This plant serves as food for the larvae of this species and is critical to its survival. The fly-poison borer moth is considered globally imperiled and state imperiled.
Photos: PNHP

FOSTER TOWNSHIP AND FREELAND, WHITE HAVEN, AND JEDDO BOROUGHS

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
LEHIGH GORGE							
Animal Species of Concern SA534A	G4	S3S4		CA	2000	E	
Animal Species of Concern	G5	SU			2000's	E	**NEW**
Animal Species of Concern SA534B	G5	S3S4			2000	E	
STATE GAME LANDS 149							
Nannothemis bella Elfin Skimmer	G4	S1			6/28/03	E	**NEW**
STOCKTON MOUNTAIN BARRENS							
Ridgetop Dwarf-Tree Forest NC509	G4	S3			6/22/00	C	

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

State Game Lands 119/187

State Game Lands 149

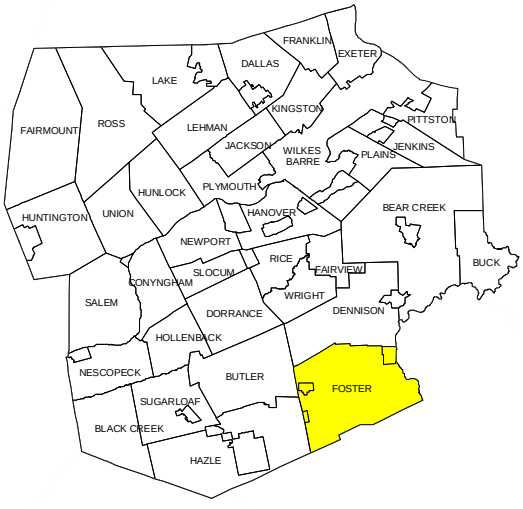
Lehigh Gorge State Park

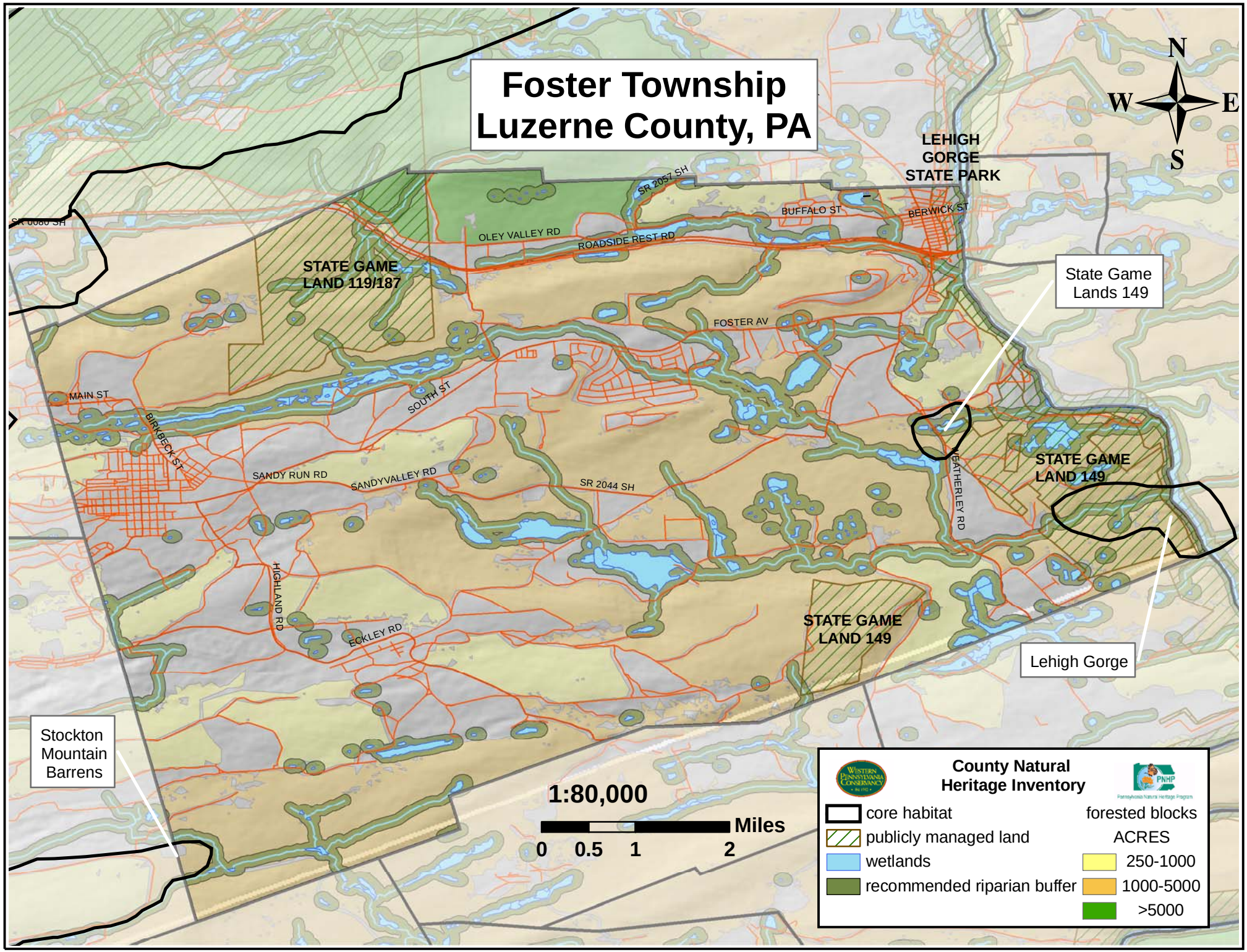
OTHER CONSERVATION AREAS:

Lehigh Valley / Lehigh Gorge State Park Important Mammal Area

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

** Please refer to Appendix II for Quality ranks.




Foster Township
Luzerne County, PA
N
W
E
S
LEHIGH GORGE STATE PARK
SR 2057 SH
BUFFALO ST
BERWICK ST
OLEY VALLEY RD
ROADSIDE REST RD
STATE GAME LAND 119/187
State Game Lands 149
FOSTER AV
MAIN ST
SOUTH ST
BIRKBECK ST
SANDY RUN RD
SANDYVALLEY RD
SR 2044 SH
HEATHERLEY RD
STATE GAME LAND 149
HIGHLAND RD
ECKLEY RD
STATE GAME LAND 149
Lehigh Gorge
Stockton Mountain Barrens
1:80,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

LEHIGH GORGE (Foster Twp. in Luzerne Co. & Kidder Twp. in Carbon Co.) SA534A & SA534B – Two animal species of concern (SA534A & SA534B) have been observed using this area. Additional surveys are needed to determine the quality of the populations. No management of the two species is needed at this time.

Many individuals of a new S1 animal species of concern were located at this site in 2003. More surveys need to be done to more accurately assess the quality of the population.

STOCKTON MOUNTAIN BARRENS (Hazle & Foster Twp.) NC509, SA512A, & SA512B - This area includes a fair-quality example of a Ridgetop Dwarf-Tree Forest Natural Community (NC509). The site is a mosaic containing low heath areas of sheep laurel (*Kalmia angustifolia*), sweet fern (*Comptonia peregrina*), and bracken fern (*Pteridium aquilinum*), as well as pitch pine/scrub oak forests and woodlands. Other plant species present include fly poison (*Amianthium muscaetoxicum*), huckleberry (*Gaylussacia sp.*), gray birch (*Betula populifolia*), blueberry (*Vaccinium sp.*), serviceberry (*Amelanchier sp.*), wintergreen (*Gaultheria procumbens*), and chokeberry (*Aronia sp.*). There are several large outcrops of Pottsville Conglomerate rock in the northern portion of the site. These natural communities often have diverse Lepidopteran species. A globally rare Lepidopteran species (SA512A) and a second rare Lepidopteran species (SA512B) were discovered to the south of the Barrens in limited surveys over the course of this study making additional searches warranted. The surrounding area is highly disturbed. The City of Hazleton owns the western edge of the site, and extensive coal mining and other industrial activity has taken place to the north and to the south. The site is also bisected by several powerline R-O-W's, one paved road, and various ATV trails. Portions of the site burned in the 1990's and the natural community is fire-dependent. Minimizing loss of habitat from ATV activity and maintaining the scrub oak and pitch pine will benefit the rare moth species present.

STATE GAME LANDS 149 – NEW – Elfin Skimmer dragonfly (*Nannothemis bella*), an S1 species of concern, was identified at this site in 2003. More surveys should be conducted to determine the full extent of this population.

FRANKLIN TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ABRAHAMS CREEK WETLANDS							
Animal Species of Concern	G5	S3S4B,S4N			2002	E	
Carex disperma Soft-leaved Sedge	G5	S3		PR	6/10/03	BC	**NEW**
Porzana carolina Sora SA505A	G5	S3B		CR	6/2000	E	**UPDATED**
Rallus limicola Virginia Rail SA505B	G5	S3B			6/2000	E	
PERRIN'S MARSH							
Megalodonta beckii Beck's Water-marigold SP503A	G4G5	S1		PE	7/08/03	B	**UPDATED**
Potamogeton robbinsii Flat-leaved Pondweed SP503B	G5	S4		DL	8/20/99	B	**DELISTED**

LOCALLY SIGNIFICANT AREAS:

None

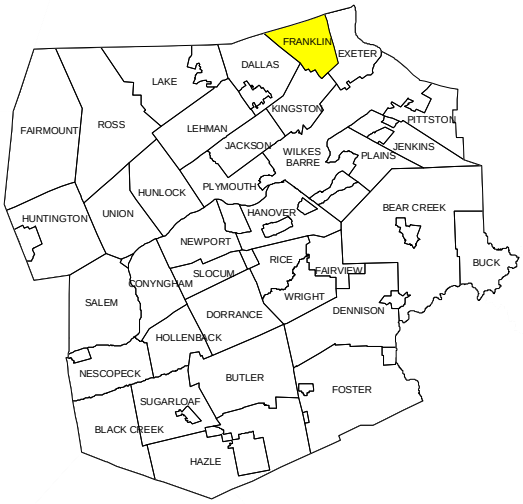
PUBLICLY MANAGED LANDS:

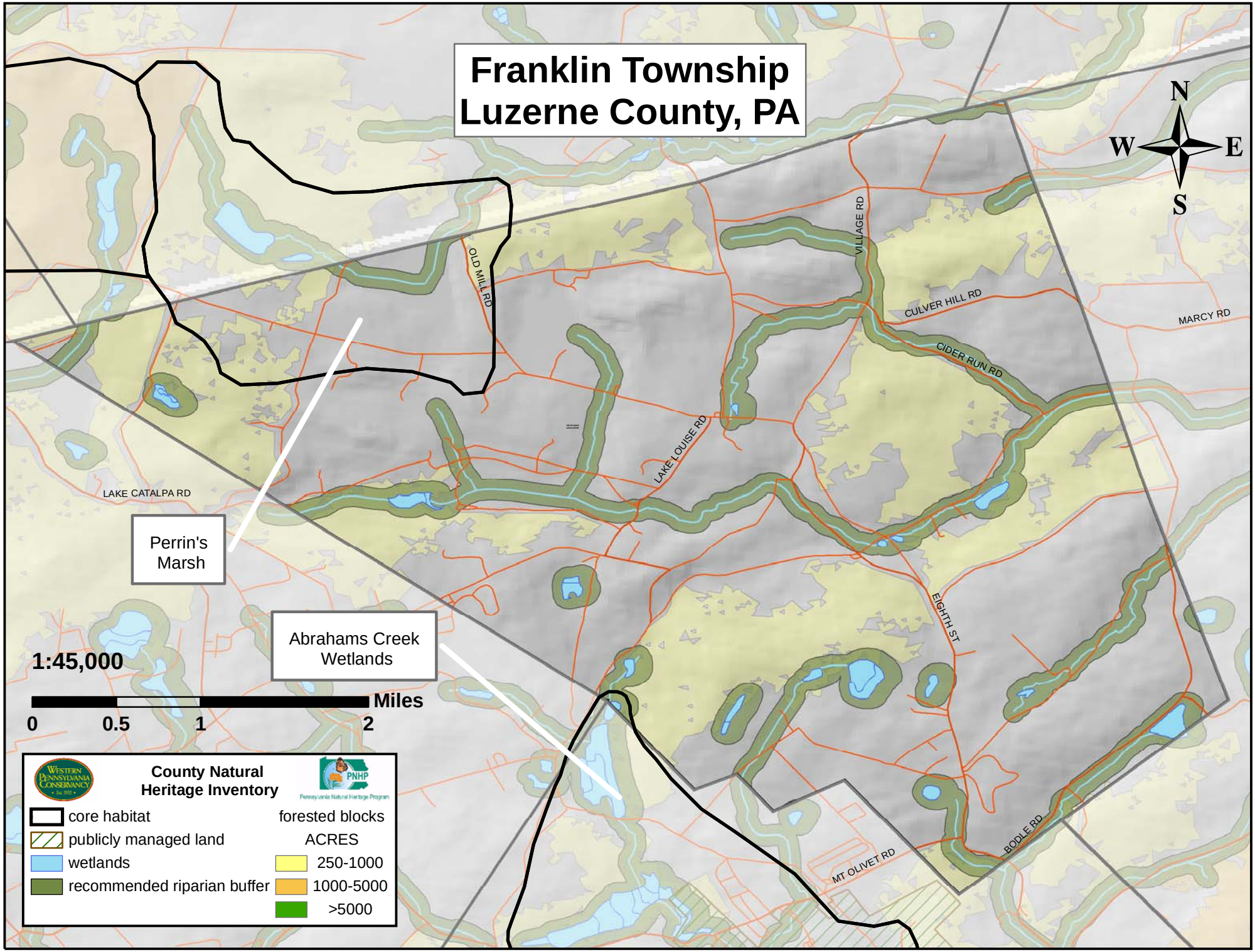
None

OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Franklin Township
Luzerne County, PA
N
W
E
S
OLD MILL RD
VILLAGE RD
CULVER HILL RD
MARCY RD
CIDER RUN RD
LAKE LOUISE RD
LAKE CATALPA RD
Perrin's Marsh
Abrahams Creek Wetlands
EIGHTH ST
BODLE RD
MT OLIVET RD
1:45,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

ABRAHAM'S CREEK WETLANDS (Dallas, Franklin & Kingston Twps.) -UPDATE- SA504, SA505A, & SA505B - The site consists of creek-side wetlands impacted by flooding from the damming of the creek downstream in Francis Slocum State Park. Two animal species of concern (SA505A & SA505B) occupy a herbaceous wetland where the creek enters the reservoir, and another species of concern (SA504) breeds in a flooded forested wetland to the north. More habitat data is needed on this site, but the species of concern have been recorded using the site for several years. The preservation of large trees is important to SA504. Maintaining the water quality of Abraham's Creek and stable water levels during the growing season will benefit the species of concern.

A good population of a plant species of concern, Soft-leaved Sedge (Carex disperma) was located at this site in 2003. Associated species include *Carex pensylvanica, Maianthemum canadense, Mitchella repens, Carex digitalis, Uvularia perfoliata, Lycopodium obscurum,* and *Viburnum acerifolium*.

PERRIN'S MARSH (Northumberland Twp. in Wyoming County and Franklin Twp. in Luzerne County) –UPDATE- SP503A & SA503B - Perrins Marsh is a shallow (1-2 meters deep) man-made pond located on private property on the Wyoming/Luzerne County border. The pond has been dammed for over 50 years. A good-quality population of a PA-Rare plant (SP503A) species was first identified at the site in 1993. The site was revisited in 1999 and SP503A is still present. A new good-quality PA-Endangered, S1 plant (SP503B) population was identified at the site during the 1999 visit. This thriving population is the first known occurrence of the plant species in Eastern Pennsylvania. The dominant plant species at this site include spatterdock (*Nuphar variegatum*), hornwort (*Ceratophylum carolinianum*), watershield (*Brasenia schreberi*), water lily (*Nyphaea odorata*), and pondweed (*Potamogeton sp*.). Perrins Marsh also provides habitat for a diverse population of dragonflies and damselflies. A 1994 survey of the site identified twelve species of dragonflies and two species of damselflies. Eleven of the species were observed for the first time in Luzerne county. Disturbances include a high Canada goose population, but the geese do not appear to be impacting the plant species of concern. The site should continue to be monitored and surrounding locations (e.g., Cummings Pond) should be visited to search for additional populations of these plants of concern and wading bird species of concern. The use of an aquatic herbicide or dramatically changing the water level are the greatest potential threats to the marsh. **The plant species SP503B, *Potamogeton robbinsii* (Flat-leaved Pondweed), has been removed from the species of concern list.**

HANOVER TOWNSHIP, NANTICOKE, SUGAR NOTCH, WARRIOR RUN AND ASHLEY BOROUGHS, AND THE CITY OF NANTICOKE

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia Barrens Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3		PR	8/24/00	CD	
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, SA507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed Cinquefoil SP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2		PT	7/08/97	CD	
Psectraglaea carnosa Pink Sallow SA506J, SA507D	G3	S1			10/08/97	BC	
Ridgetop Dwarf-Tree Forest NC505	G4	S3			1984	B	

Sideridis maryx SA506K	G4	S1S3		5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3		6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1		9/15/98	BC	
HANOVER CROSSING WETLAND						
Rallus limicola Virginia Rail SA538	G5	S3B		7/2000	E	**UPDATED**
HAYSTACK MOUNTAIN						
Amelanchier humilis Serviceberry SP507A	G5	S1	PE	6/27/96	BC	**UPDATED**
Carex bicknellii Bicknell's Sedge	G5	S1	PE	7/10/01	C	**NEW**
Plant Species of Concern SP530A	G5	S3	PR	6/18/97	D	
Northern Appalachian Acidic Rocky Summit NC501	G?	S2		8/22/91	AB	
Oryzopsis pungens Slender Mountain-ricegrassSP530B	G5	S2	PE	6/18/97	D	
Potentilla tridentate Three-toothed Cinquefoil SP507B	G5	S1	PE	10/02/01	B	**UPDATED**
Prunus pumila var. susquehanae Sand Cherry SP507C	G5T4	S2	PT	6/27/96	B	**UPDATED**
NANTICOKE MARSH						
Cistothorus palustris Marsh Wren SA535A	G5	S2S3B	CR	2000	E	**UPDATED**
Porzana carolina Sora SA535B	G5	S3B	CR	2000	E	**UPDATED**
Rallus limicola Virginia Rail SA535C	G5	S3B		2000	E	
NUANGOLA RAILROAD TUNNEL						
Myotis septentrionalis Northern Myotis SA531	G4	S3B,S3N	CR	4/27/02	E	**UPDATED**
PENOBSCOT MOUNTAIN RIDGETOP						
Ephemeral/Fluctuating Natural Pool NC526	GNR	S3		6/21/00	E	
Helianthemum bicknellii Bicknell's Hoary Rockrose SP509	G5	S2	PE	8/09/90	D	
Prunus pumila var. *susquehanae* Sand Cherry SP522	G5T4	S2	PT	8/09/90	D	**UPDATED**

SUSQUEHANNA RIVER at HANOVER GREEN						
Animal Species of Concern	G5T4T5	CR		2000	E	**NEW**
SUSQUEHANNA RIVER AT NANTICOKE						
Anodonta implicata Alewife Floater SA518A	G5	SNR	CU	9/29/95	D	**UPDATED**
Lampsilis Cariosa Yellow Lampmussel SA518B	G3G4	S3S4	CU	9/29/95	D	**UPDATED**
WILKES-BARRE MOUNTAIN						
Plant Species of Concern SP523	G5	S3	PR	5/25/00	D	
Northern Appalachian acidic rocky summit NC524	GNR	S2		5/16/91	BC	

LOCALLY SIGNIFICANT AREAS:

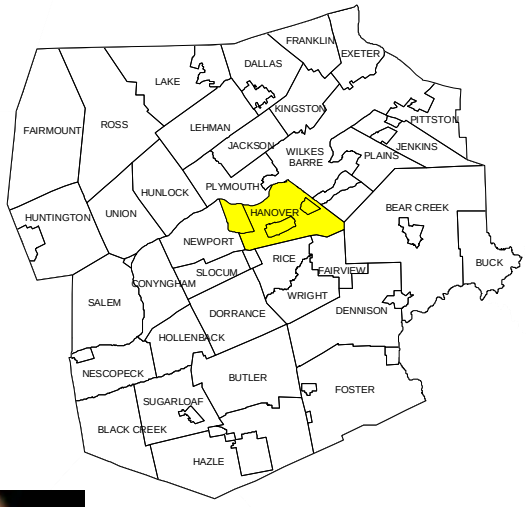
None

PUBLICLY MANAGED LANDS:

State Game Lands 207

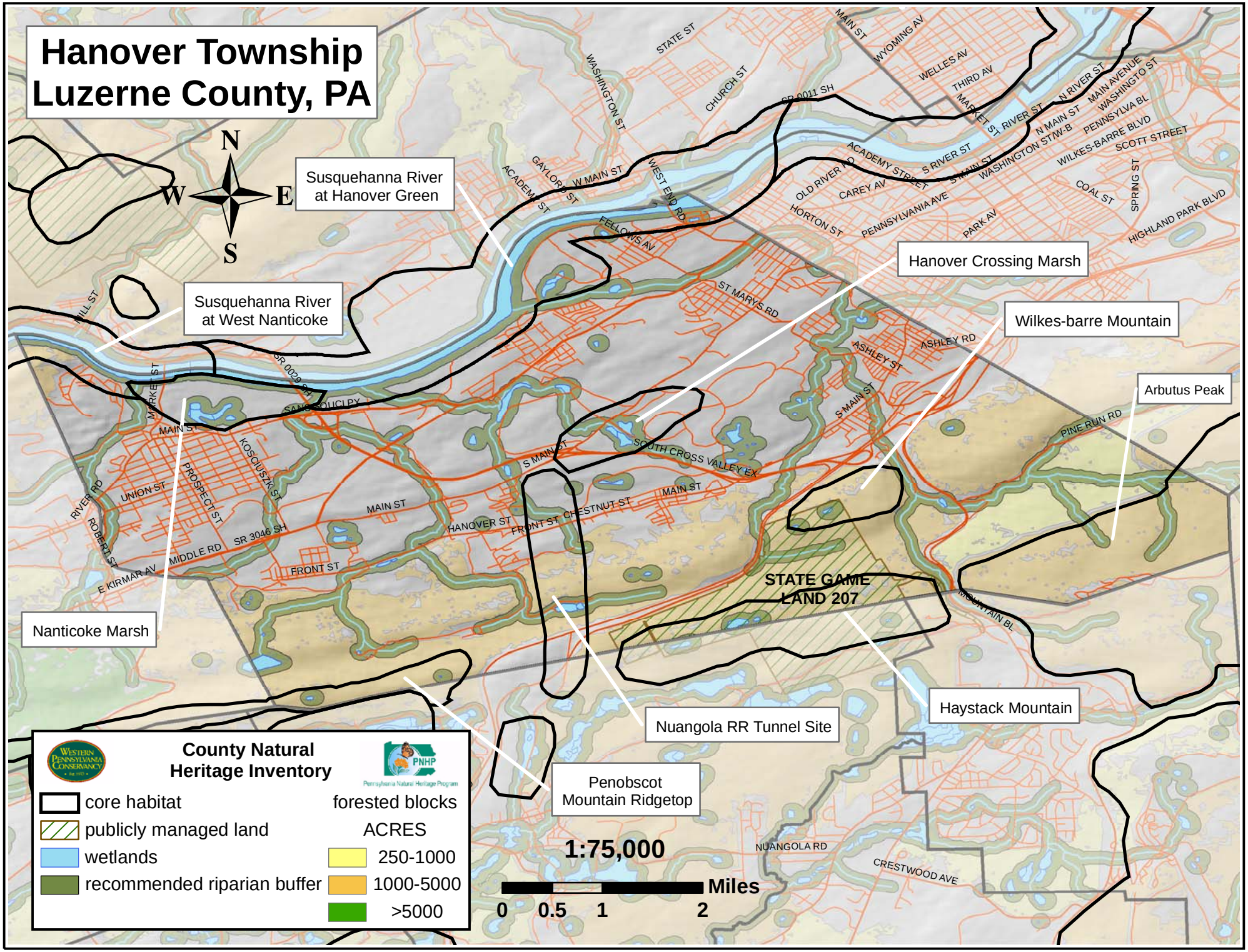
OTHER CONSERVATION AREAS:

None



* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.

Northern Myotis (*Myotis septentrionalis*)
Photo: PNHP


Hanover Township
Luzerne County, PA
N
W
E
S
Susquehanna River at Hanover Green
Susquehanna River at West Nanticoke
Hanover Crossing Marsh
Wilkes-barre Mountain
Arbutus Peak
Nanticoke Marsh
Nuangola RR Tunnel Site
Penobscot Mountain Ridgetop
Haystack Mountain
STATE GAME LAND 207
MAIN ST
WYOMING AV
STATE ST
WASHINGTON ST
CHURCH ST
WELLES AV
THIRD AV
MARKET ST
N RIVER ST
MAIN AVENUE
WASHINGTO ST
PENNSYLVA BL
WILKES-BARRE BLVD
SCOTT STREET
SPRING ST
HIGHLAND PARK BLVD
SR 0011 SH
S RIVER ST
N MAIN ST
WASHINGTON ST/W-B
ACADEMY STREET
OLD RIVER RD
CAREY AV
HORTON ST
PENNSYLVANIA AVE
PARK AV
COAL ST
GAYLORD ST
W MAIN ST
WEST END RD
FELLOWS AV
ST MARYS RD
ASHLEY ST
ASHLEY RD
S MAIN ST
SOUTH CROSS VALLEY EX
PINE RUN RD
MOUNTAIN BL
NUANGOLA RD
CRESTWOOD AVE
MILL ST
SR 0029 SH
SANG SOUCI PY
MARKET ST
MAIN ST
KOSCIUSZKI ST
PROSPECT ST
UNION ST
RIVER RD
ROBERT ST
E KIRMAR AV
MIDDLE RD
SR 3046 SH
FRONT ST
HANOVER ST
CHESTNUT ST
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:75,000
0 0.5 1 2
Miles

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp*.).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species have been found at areas (three species were found at two location at the site) associated with the barrens and adjacent wetlands and more are expected to be found. Five of the species are Globally Rare (G3) or the subspecies is Globally Rare (G5T2T3). Several are new to the present-day fauna of PA - one species is known to utilize arctic/boreal habitats making Arbutus Peak an extreme southern location for it. Another is considered to be a southern species usually found on the New Jersey Pine Barrens. These species are typically dependent upon particular plant species for a portion of their lives; some use scrub oak to feed upon; while other use blueberries found in wetlands or in the barrens. Some species use the pitch pine while others appear to use cranberries and other plants found in the wetlands. One species that has not been found anywhere else but Pennsylvania, feeds exclusively on the flypoison plant (*Amianthium muscaetoxicum*). Another feeds on wild indigo (*Baptisia tinctoria*). Some of the species have very little life-history information and require more research. Most of them depend on plants that require plenty of sunlight found in shrubland or open woodland.

Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and

mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

HANOVER CROSSING WETLAND (Hanover Twp.) SA538 - The wetland at Hanover Crossing is approximately 15 acres, and is dominated by broad-leaved cattail (*Typha latifolia*) with some rushes (Juncus sp.). An animal species of concern (SA538) was observed in the wetland during the breeding season. The surrounding area is highly disturbed by past coal mining; slag piles and gray-birch scrub forests are common. Additional habitat and threat information is needed for this site.

HAYSTACK MOUNTAIN (Rice, Fairview, and Hanover Twps.) SP507A, SP507B, SP507C, SP530A, SP530B, & NC501 **–** This site is a good- to excellent-quality high elevation (1,600-1,870 feet) Northern Appalachian Acidic Rock Summit Natural Community (NC501) characterized by open, rocky areas with sparse vegetation. A xeric oak forest (*Quercus montana*) and thickets of scrub oak (*Quercus ilicifolia*) surround these scattered open areas. Powerlines and jeep trails cut through the site located mostly on State Game Lands #207. Since 1996, five plant species of concern were identified at the site. The wildfires that periodically burn the area are actually good for the plant species that grow in this natural community. Fire suppression and trash dumping are potential threats to the plants.

A small population of a State Endangered plant species of concern, Bicknell's Sedge (*Carex bicknellii*) was located at this site in 2001. Associated species include *Deschampsia flexuosa, Andropogon gerardii, Polytrichum sp, Carex pensylvanica, Apocynum androsaemifolium,* and *Carex argyrantha*. The surrounding land use is hunting and outdoor recreation. A threat to the species of concern is fire, which appears to be a minimal component of the system.

NANTICOKE MARSH (City of Nanticoke & Hanover Twp.) SA535A, SA535B, & SA535C - This site is one of the largest cattail *(Typha latifolia*) marshes in Luzerne County. It is located on the North Branch of the Susquehanna River floodplain adjacent to City of Nanticoke. The habitat includes an extensive cattail marsh with some sedge (*Carex sp*.) tussocks and willow (*Salix sp.*) trees in the eastern portion. Three animal species of concern have been found using this habitat in recent years (SA535A, SA535B, & SA535C). The current habitat is the result of past disturbances that have created favorable conditions for the species of concern. The site is surrounded by agriculture. Previous disturbances have likely created the cattail marsh habitat appropriate for this species. Draining of the marsh or pesticide use are potential threats. The Earth Conservancy owns portions of this site. Additional surveys are recommended to monitor the extent and success of the rare species populations at the site.

NUANGOLA RAILROAD TUNNEL (Hanover & Rice Twps.) SA531 **–** A small population of an animal species of concern has been documented in this tunnel on State Game Lands #207. Additional habitat information is needed. The animal species is periodically monitored by the PA Game Commission.

PENOBSCOT MOUNTAIN RIDGETOP (Hanover, Newport, Rice, & Slocum Twps.) SP509, SP522, & NC526 - The area consists of an Ephemeral/Fluctuating Pool Natural Community in a matrix of dry oak-heath forest. The rock strata here are tilted sharply upward, creating several parallel outcrops (some of conglomerate) running along the ridgetop, with the pools occurring in the "grooves" between the more

resistant outcrops. The matrix forest canopy is open, with areas of lichen-covered rocks and graminoids (*Carex sp*. and *Deschampsia sp*.). The common overstory species include sweet birch (*Betula lenta*), red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), and red maple (*Acer rubrum*). Striped maple (*Acer pensylvanicum*), serviceberry (*Amelanchier sp*.), and American chestnut (*Castanea dentata*) are all present in the understory. The shrub layer has the aforementioned species as well as upland low blueberry (*Vaccinium pallidum*), early low blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), wintergreen *(Gaultheria procumbens*), mountain laurel *(Kalmia latifolia),* and maple-leaved viburnum (*Viburnum acerifolium*). The groundcover is sparse and includes may-apple (*Podophyllum peltatum*), hairgrass (*Deschampsia flexuosa*), cowwheat (*Melampyrum lineare*), common Solomon's seal (*Polygonatum biflorum*), several sedge species (*Carex sp*.), marginal shield fern (*Dryopteris marginalis*), lichens, and mosses. The outcrops and openings provide habitat for two plant species of concern (SP502 & SP522) along the same ridgetop further east.

The individual pools themselves vary in depth and dominant vegetation. Four pools were visited; two were largely forested, and two consist of a mixture of tall shrub and herbaceous habitat. Additional pools are present that were not visited during this survey. Some of the pools exist as narrow, steep-sided depressions at the base of the rock outcrops. All of the pools had standing water up to 24 inches deep at the time of visit, and a substrate of sphagnum and/or dead oak leaves.

These pools have good potential for use by a variety of herptiles. Additional landowner information, early spring surveys, and mapping the extent of the natural community are needed.

SUSQUEHANNA RIVER at HANOVER GREEN (Hanover, Plymouth & Wilkes Barre Twps.) NEW – A new occurrence of an animal species of concern was located at this site in 2000. More surveys need to be conducted to assess the full extent of the population.

SUSQUEHANNA RIVER AT NANTICOKE (Nanticoke Boro. & Plymouth Twp.) SA518A & SA518B – Very few specimens of the two mussel species of concern were collected here in 1995. Surveys in 2000 failed to discover any live mussel fauna. This portion of the North Branch of the Susquehanna River has suffered from acid mine drainage, and water quality continues to be compromised by the inflow of Lackawanna River at Wilkes-Barre. It is possible that as the river recovers, the rare species will be able to re-establish itself from populations living above the Lackawanna or downstream of the mine-impact area. No special management is recommended**.**

WILKES-BARRE MOUNTAIN (Hanover Twp.) SP523 & NC524 – This site on Wilkes-Barre Mountain is a marginal to good example of a North Appalachian Acidic Rocky Summit Community (NC524). The natural community is an approximately 45-acre area of bare conglomerate rock with low shrubs, grasses, and scattered dwarfed trees. The surrounding land is forested and it has been logged in the past. The dominant species are black huckleberry (*Gaylussacia baccata*), upland low blueberry (*Vaccinium pallidum*), and crinkled hairgrass (*Deschampsia flexuosa*). A small population of a PA-Rare plant species (SP523) was located here in 2000. The plant is growing in a powerline right-of-way and is in danger of being sprayed with herbicides during maintenance activities. Therefore the right-of-way should be maintained by mechanical means if possible. Natural wildfires would be beneficial to the plants and the natural community at the site.

HAZLE TOWNSHIP, WEST HAZLETON BOROUGH, AND THE CITY OF HAZLETON

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS::							
BLACK CREEK FLATS							
Amblyscirtes vialis Common Roadside-skipper	G5	S2S4			6/28/97	E	**NEW**
Argia bipunctulata Seepage Dancer	G4	S3			8/08/04	E	**NEW**
Lycaena epixanthe Bog Copper SA508	G4G5	S2			7/02	E	
Lygodium palmatum Hartford Fern SP508	G4	S4		DL	7/31/96	C	**DELISTED**
Nannothemis bella Elfin Skimmer	G4	S1			8/08/04	E	**NEW**
Polites mystic Long Dash	G5	S3			6/23/99	E	**NEW**
Satyrodes eurydice Eyed Brown	G5	S1S3			6/23/99	E	**NEW**
Speyeria aphrodite Aphrodite Fritillary	G5	S3S4			6/23/99	E	**NEW**
BLUE NOB RIDGETOP DWARF-TREE FOREST							
Ridgetop dwarf-tree forest Natural Community	G4	S3			6/10/02	E	**NEW**
DRECK CREEK WATERSHED							
Animal Species of Concern SA511	G5	S3S4			2000	E	
Muhlenbergia uniflora Fall Dropseed Muhly SP510B	G5	S2		PT	8/17/99	B	**UPDATED**
Plant Species of Concern SP510A	G5	S2		PT	7/05/00	C	**UPDATED**
Psectraglaea carnosa Pink Sallow Moth SA512A	G3	S1			9/05/99	BC	
Syngrapha epigaea SA512B	G5	S1			9/05/99	C	
HELL'S KITCHEN AMLF #3 SITE							
Myotis septentrionalis Northern Myotis SA517	G4	S3B,S3N		CR	4/21/98	E	**NEW**
HUMBOLDT BARRENS							
Ridgetop Dwarf-Tree Forest NC508	G4	S3			6/22/00	B	
STOCKTON MOUNTAIN BARRENS							
Ridgetop Dwarf-Tree Forest NC509	G4	S3			6/22/00	C	
VALMONT INDUSTRIAL PARK							
Aeshna constricta Lance-tipped Darner	G5	S3S4			8/03/04	E	**NEW**
Aeshna verticalis Green-striped Darner	G5	S3S4			9/10/05	E	**NEW**

Argia bipunctulata Seepage Dancer	G5	S3		9/10/05	E	**NEW**
Bartonia paniculata Screw-stem SP506A	G5	S3	TU	8/29/00	BC	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4		7/05/04	E	**NEW**
Gentiana linearis Narrow-leaved Gentian SP509A	G4G5	S4	DL	8/29/00	BC	**DELISTED**
Leucorrhinia glacialis Crimson-ringed Whiteface	G5	S3S4		7/05/04	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4		6/26/05	E	**NEW**
Lycaena epixanthe Bog Copper SA506	G4G5	S2		7/02	B	**UPDATED**
Lygodium palmatum Hartford Fern SP506B	G4	S4	DL	8/29/00	D	**DELISTED**
Muhlenbergia uniflora Fall Dropseed Muhly SP506C	G5	S2	PT	8/29/00	B	**UPDATED**
Myotis leibii Eastern Small-footed Myotis	G3	S1B, S1N	PT	9/22/05	E	**NEW**
Myotis septentrionalis Northern Myotis	G4	S3B,S3N	CR	9/22/05	E	**NEW**
Nannothemis bella Elfin Skimmer	G4	S1		6/26/05	E	**NEW**
Plant Species of Concern SP506D	G5	S2	PT	8/29/00	BC	**UPDATED**
Somatochlora walshii Brush-tipped Emerald	G5	S2		8/01/04	E	**NEW**
Utricularia geminiscapa Bladderwort SP509B	G4G5	S4	DL	8/29/00	BC	**DELISTED**
Xyris Montana Northern Yellow-eyed Grass SP506E	G4	S4	DL	8/29/00	C	**DELISTED**

LOCALLY SIGNIFICANT AREAS:

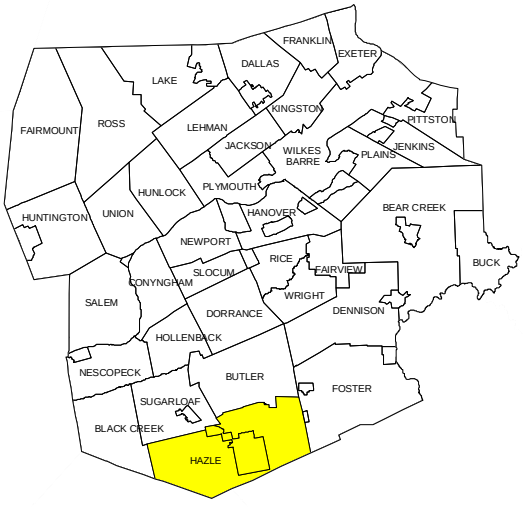
None

PUBLICLY MANAGED LANDS:

None

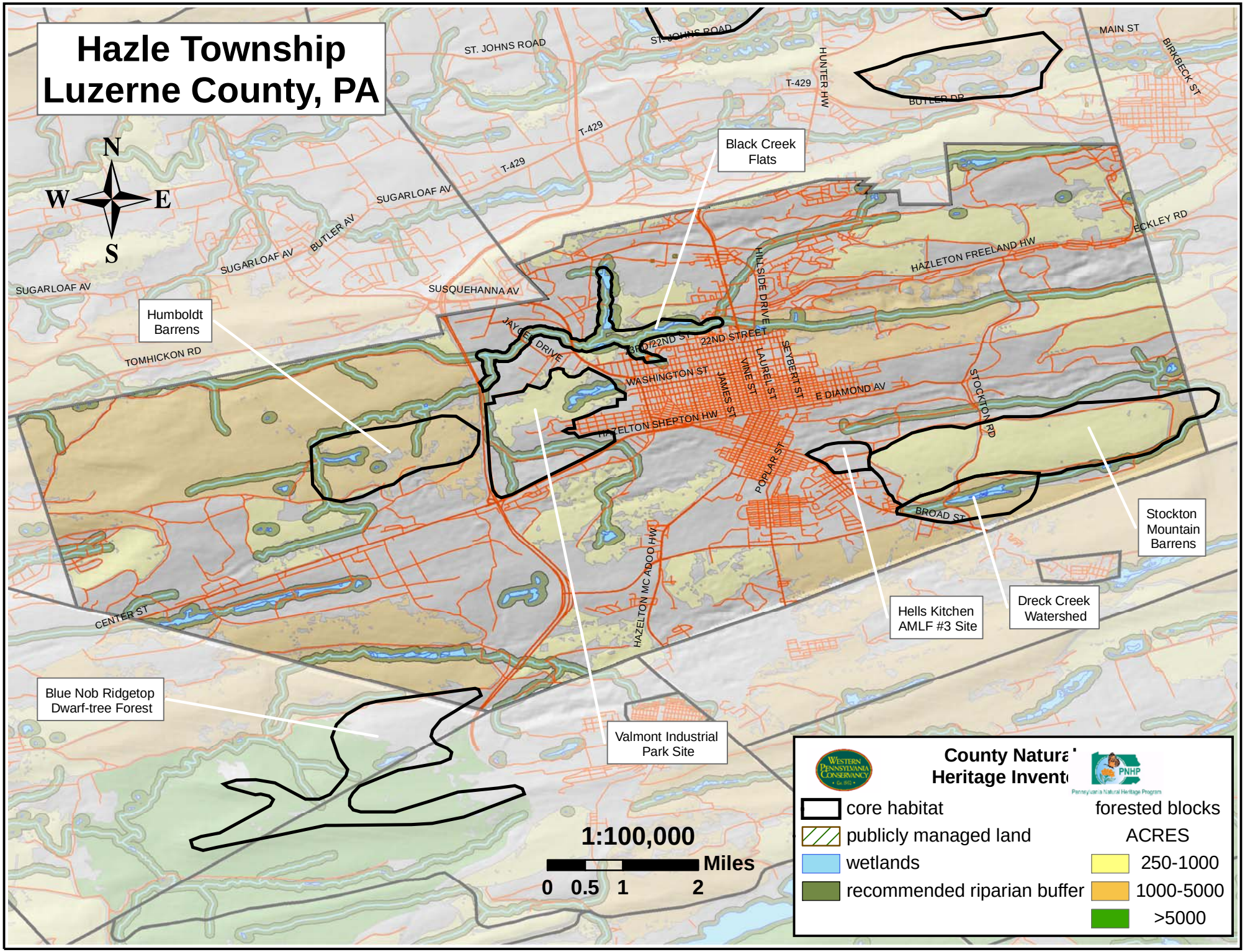
OTHER CONSERVATION AREAS:

None



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

** Please refer to Appendix II for Quality ranks.


Hazle Township
Luzerne County, PA
N
W
E
S
Black Creek Flats
Humboldt Barrens
Blue Nob Ridgetop Dwarf-tree Forest
Valmont Industrial Park Site
Hells Kitchen AMLF #3 Site
Dreck Creek Watershed
Stockton Mountain Barrens
ST. JOHNS ROAD
T-429
HUNTER HW
MAIN ST
BIRKBECK ST
BUTLER DR
SUGARLOAF AV
BUTLER AV
SUSQUEHANNA AV
TOMHICKON RD
JAYCEE DRIVE
HILLSIDE DRIVE
ECKLEY RD
HAZLETON FREELAND HW
22ND STREET
WASHINGTON ST
JAMES ST
VINE ST
LAUREL ST
SEYBERT ST
E DIAMOND AV
HAZELTON SHEPTON HW
POPLAR ST
STOCKTON RD
BROAD ST
HAZELTON MC ADOO HW
CENTER ST
1:100,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

BLACK CREEK FLATS (Hazle Twp.) –UPDATE- SP508 & SA508 - This site is situated in a flat, open area along Black Creek in Hazleton. It appears to have been severely disturbed by mining or other invasive activities in the past. At present it is a mix of open sphagnum (*Sphagnum sp*.) "lawns" and shrub swamps of leatherleaf (*Chamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*), spiraea (*Spiraea tomentosa*), and highbush blueberry (*Vaccinium corymbosum*). A good-quality population of a PA-Rare plant species (SP508) is scattered throughout the site. This species requires open conditions and benefits from the disturbed soil and slow succession at the site. After seven years of field visits, an invertebrate animal species of concern (SA508) was observed at the site for the first time. Additional surveys of the site are needed to determine the quality of the animal population. The site is being disturbed by litter and fill. Also, the area is being degraded by fast-growing, weedy plant species. Management of the aggressive plant species may be required. **The plant species SP508, *Lygodium palmatum* (Hartford Fern), has been removed from the species of concern list. Six invertebrate species of concern (four lepidopterans and two odonotes) were documented at this site from 1997 to 2004. This additional information resulted in an increased priority rank for this site.**

BLUE NOB RIDGETOP DWARF-TREE FOREST - NEW – (Hazle Twp. & Schuylkill County) This site represents one of four expansive **Ridgetop Dwarf-Tree Forest Natural Communities** that occupy the high elevation plateaus of Broad Mountain. While occurring frequently in northeastern Pennsylvania, this community type is considered rare on a global scale. The prevalence of pitch pine, scrub oak, and other stunted-growth trees characterize this dry, fire-dependent community. Rare species of moths and butterflies are frequent inhabitants of this specialized environment. The development and implementation of a prescribed burn management program would help maintain the quality of this naturally occurring community. The extent of this Natural Community was delineated from aerial photography.

DRECK CREEK WATERSHED (Hazle Twp.) SP510A, SP510B, SA511, SA512A, & SA512B – This site, which is owned by the City Water Authority of Hazleton, consists of a narrow, wooded stream valley with a small perennial stream that flows into a series of wetlands and eventually to a reservoir that is used for public drinking water. The uplands are largely second-growth oak-heath forest that appears to support a healthy black bear (*Ursus americana*) population. The area of primary interest is an open wetland with a substrate of shallow peat over sand and exposed conglomerate rock. A good-quality population of a PA-Endangered plant species (SP510B) and a fair-quality population of another plant species of concern (SP510A) occur here. Tawny cotton grass (*Eriophorum virginicum*) and sphagnum moss (*Sphagnum sp*.) dominate this shallow peatland. Other species in the same habitat include sedges (*Carex folliculata* and *Carex canescens*), Virginia chain fern (*Woodwardia virginica*), swamp dewberry (*Rubus hispidus*), reedgrass (*Calamagrostis cinnoides*), Canada rush (*Juncus canadensis*), highbush blueberry (*Vaccinium corymbosum*), sheep laurel (*Kalmia angustifolia*), scattered pitch pine (*Pinus rigida*), red maple (*Acer rubrum*), and black gum (*Nyssa sylvatica*). The peatland grades into a rhododendron (*Rhododendron maximum)* swamp and then into hemlock-dominated forest. The presence of pitch pine, the open aspect, and proximity of the Stockton Barrens suggest a history of fire. The peatland may also have been affected in the past by beaver or human impoundments on adjacent Dreck Creek.

Runoff or other disturbance from logging in the adjacent forest, and flooding of the wetland by the reservoir are potential threats to the plant species of concern. An animal species of concern (SA511) was discovered using rocky habitat along a powerline R-O-W south of Dreck Creek. Additional surveys are needed to determine the status of this population. In addition, two rare Lepidopteran species (SA512A & SA512B) were identified. Logging of the site and gypsy moth spraying would be detrimental to these species.

HELL'S KITCHEN AMLF #3 SITE – NEW – (Hazle Twp.) - A G4 animal species was documented at this mine site in 1998, but additional surveys are needed to determine the quality of this population. Disturbance of the site from continued mining is a potential threat.

HUMBOLDT BARREN (Hazle Twp.) NC508 - A Ridgetop Dwarf Tree Forest Natural Community (NC508) on a broad, high-elevation (1500-1700 ft) ridgetop occurs at this site The site is unusual among Luzerne County ridgetop barrens in having pitch pine (*Pinus rigida)* that is at least as abundant as scrub oak (*Quercus ilicifolia*) over much of the site. Portions of the site are pitch-pine oak woodland with openings dominated by large conglomerate rock slabs. Chestnut oak (*Quercus prinus*) and pitch pine (*Pinus rigida*) are the dominant overstory trees, along with black gum (*Nyssa sylvatica*) and red maple *(Acer rubrum).* The shrub layer is dominated by black huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium angustifolium*), and scrub oak (*Quercus ilicifolia*). Additional woody species that were identified include wintergreen (*Gaultheria procumbens),* gray birch (*Betula populifolia*), mountain laurel (*Kalmia latifolia*), dewberry (*Rubus flagellaris*), and serviceberry (*Amelanchier sp*.). Bracken fern (*Pteridium aquilinum*) is by far the dominant herbaceous species, with traces of fly poison (*Amianthium muscaetoxicum*), cow-wheat *(Melampyrum lineare),* and poverty grass (*Danthonia spicata*). Abundant snake habitat exists among the conglomerate slabs and boulders.

There are also scrub oak- and pitch pine-dominated barrens east of the large utility line bisecting the site. Scrub oak covers more than 50% of this area, with pitch pine the only overstory tree and bracken fern and teaberry dominating the groundcover. Although scrub-oak barrens occur at several other locations in the county, this site has the greatest area of pitch pine seen in the county. The site was trapped for Lepidopterans in late summer 2000. Although no rare Lepidopteran species were found, additional surveys for rare Lepidopterans at this site are warranted. Disturbances include a large utility line, a network of gravel roads that may act as firebreaks, and mine tailings at the border of the natural community. Fire suppression, chemical maintenance of the powerline R-O-W. observed in 2000, logging for pulpwood, and ATV use are potential threats to the site.

STOCKTON MOUNTAIN BARRENS (Hazle & Foster Twps.) – NEW - NC509, SA512A, & SA512B - This area includes a fair-quality example of a Ridgetop Dwarf-Tree Forest Natural Community (NC509). The site is a mosaic containing low heath areas of sheep laurel (*Kalmia angustifolia*), sweet fern (*Comptonia peregrina*), and bracken fern (*Pteridium aquilinum*), as well as pitch pine/scrub oak forests and woodlands. Other plant species present include fly poison (*Amianthium muscaetoxicum*), huckleberry (*Gaylussacia sp.*), gray birch (*Betula populifolia*), blueberry (*Vaccinium sp.*), serviceberry (*Amelanchier sp.*), wintergreen (*Gaultheria procumbens*), and chokeberry (*Aronia sp.*). There are several large outcrops of Pottsville Conglomerate rock in the northern portion of the site. These natural communities often have diverse Lepidopteran species. A globally rare Lepidopteran species (SA512A) and a second rare Lepidopteran species (SA512B) were discovered to the south of the Barrens in limited surveys over the course of this study making additional searches warranted. The surrounding area is highly disturbed. The City of Hazleton owns the western edge of the site, and extensive coal mining and other industrial activity has taken place to the north and to the south. The site is also bisected by several powerline R-O-W's, one paved road, and various ATV trails. Portions of the site burned in the 1990's and the natural community is fire-dependent. Minimizing loss of habitat from ATV activity and maintaining the scrub oak and pitch pine will benefit the rare moth species present.

VALMONT INDUSTRIAL PARK (Hazle Twp.) –UPDATE- SP506A, SP506B, SP506C, SP506D, SP506E, SP509A, SP509B, & SA506 - This site consists of a sloping area of shallow peat and acidic seeps dominated by sphagnum moss (*Sphagnum sp.)* and sedge (*Carex sp.*) species. It has been created, at least

in part, by the powerline R-O-W that cut through the site. The shallow soils and presence of pitch pine (*Pinus rigida)* in the surrounding forest suggest fire may have affected the site in the past. The combination of the high-elevation acidic seep and the open areas created by the disturbances, provides habitat for seven rare plant species (SP506A, SP506B, SP506C, SP506D, SP506E, SP509A, & SP509B). Many of these species are more commonly associated with bog habitats. The rare plant species are all found in the open wetland habitat and are associated with sedges (*Carex folliculata* and *Carex trisperma*), beak-rushes (*Rhyncospora capitellata*), round-leaved sundew (*Drosera rotundifolia*), pitcher-plant (*Sarracenia purpurea*), cinnamon fern (*Osmunda cinnamomea*), low heaths (*Kalmia angustifolia* and *Vaccinium angustifolium*), cranberry (*Vaccinium macrocarpon*), and other peatland species. The site is also frequented by SA506, an invertebrate species that uses one of the common plant species as its host plant.

This site is precariously located in West Hazleton in an area of industrial and commercial development, with little buffering forest remaining and significant ongoing development upstream in the watershed. Increased use of the trail to the site by ATVs, spraying of the powerline R-O-W with herbicide, increasing surrounding development, and changes in hydrology are among the chief threats to this vulnerable and unique habitat. Nonetheless, the listed plant species have persisted here for many years and the site is monitored regularly by local naturalists. Steps should be taken to assist the surrounding landowners and municipalities in preserving this unique site and the rare elements it contains. **The plant species 506B, *Lygodium palmatum* (Hartford Fern), SP506E, *Xyris montana* (Northern Yellow-eyed Grass), SP509A, *Gentiana linearis* (Narrow-leaved Gentian), and SP509B, *Utricularia geminiscapa* (Bladderwort), have been removed from the species of concern list.**

Eight new odonate species of concern were identified at Valmont Industrial Park in 2004 and 2005, Seepage Dancer (*Argia bipunctulata*), Green-striped Darner (*Aeshna verticalis*), Elfin Skimmer (*Nannothemis bella*), Slaty Skimmer (*Libellula incesta*), Lance-tipped Darner (*Aeshna constricta*), Brush-tipped Emerald (*Somatochlora walshii*), Crimson-ringed Whiteface (*Leucorrhinia glacialis*), and American Emerald (*Cordulia shurtleffi*).

Two bat species of concern, the G4 Northern Myotis (*Myotis septentrionalis*) and the G3 Eastern Small-footed Myotis (*Myotis leibii*) were documented at this site in 2005. Further surveys need to be done to determine the extent of the populations.

The **small-footed myotis (*Myotis leibii*)** is the smallest species of bat in PA. This species is considered threatened in the state and very little is known about the status of populations here. Researchers suspect that small-footed bats roost in rock crevices, but little is known about their habitat requirements.
Photo: PNHP

HOLLENBACK TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
COUNCIL CUP CLIFFS							
Erosional Remnant GE502	GNR	SNR			1979	E	
Animal Species of Concern SA502	G5	S3S4			9/98	E	
Northern Appalachian Acidic Cliff Community NC502	G5	S5			7/29/99	C	
HOBBIE MEADOW							
Plant Species of Concern SP504	G5	S3		PR	7/12/00	BC	

LOCALLY SIGNIFICANT AREAS:

Wapwallopen Gorge

PUBLICLY MANAGED LANDS:

None

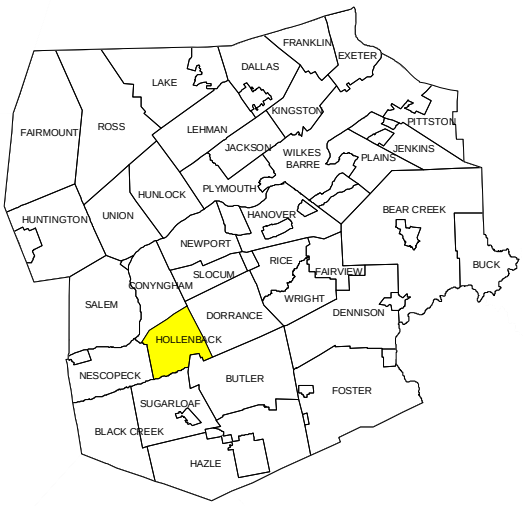
OTHER CONSERVATION AREAS:

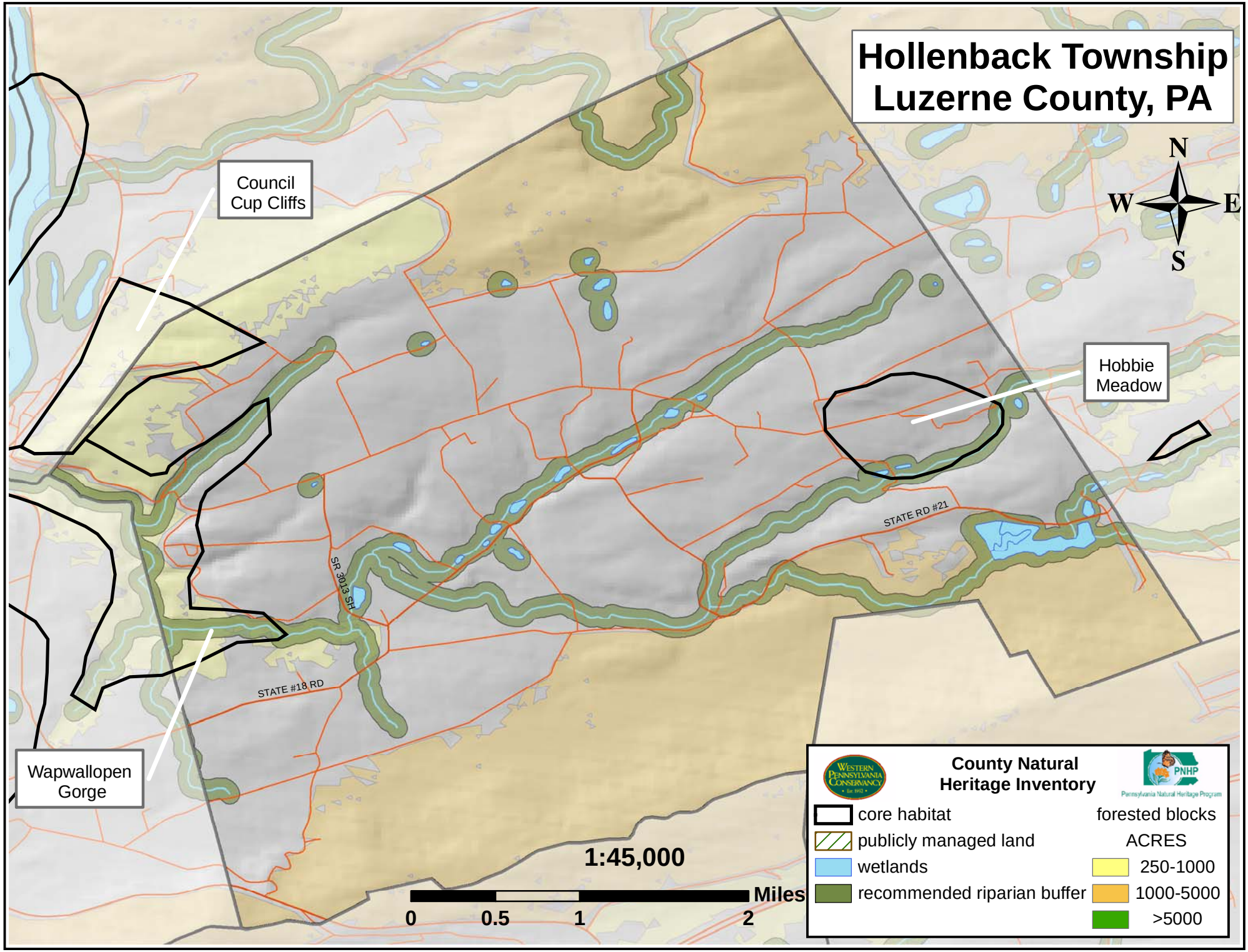
Susquehanna Riverlands Important Bird Area

Wyoming Valley Important Mammal Area

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

** Please refer to Appendix II for Quality ranks.




Hollenback Township
Luzerne County, PA
N
W
E
S
Council Cup Cliffs
Hobbie Meadow
Wapwallopen Gorge
STATE RD #21
SR 3013 SH
STATE #18 RD
1:45,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

COUNCIL CUP CLIFFS (Conyngham & Hollenback Twps.) SA502, NC502, & GE502 – The site consists of an extensive cliff erosional remnant (GE502) cut into the Trimmers Rock Formation of mudstone and siltstones overlooking the North Branch of the Susquehanna River (Geyer and Bolles 1987). There are portions of the cliffs that are nearly vertical and mostly unvegetated, while other areas have stunted trees, shrubs, and herbaceous vegetation. The adjacent steep south-facing slope has burned recently and is dominated by a nearly pure stand of Virginia pine (*Pinus virginiana*). The vegetation on the cliff includes Virginia pine (*Pinus virginiana*), sweet birch (*Betula lenta*), red cedar (*Juniperus virginiana*), oak (Quercus sp.), ash (*Fraxinus sp.*), bush honeysuckle (*Diervilla lonicera*), blueberry (*Vaccinium sp.*), smooth sumac (*Rhus glabra*), fire cherry (*Prunus pennsylvanica*), goldenrod (*Solidago sp.*), hairgrass *(Deschampsia sp.*), sedges (*Carex sp.*), cowwheat (*Melampyrum lineare*), panic grass (*Panicum sp.*), red fescue (*Festuca rubra*), and sandwort (*Minuartia groenlancium*). Peregrine falcons (*Falco peregrinus*) formerly nested on Council Cup cliffs as well as many other cliffs along the Susquehanna River previous to the 1960's (Hickey 1969).

An animal species of concern (SA502) also exists at the site. Trampling and the installation of a chain-link fence have disturbed the top of the cliff. No additional disturbances were noted. This site extends to the Berwick quadrangle.

HOBBIE MEADOW (Hollenback Twp.) SP504 - This private property contains a young forest (20-30 years) that was formerly farmed or used as pasture. A fair- to good-quality population of a PA–Rare plant species (SP504) was found at this site along a mowed path. The associated plant species included Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), black oak (*Quercus velutina*), green ash (*Fraxinus pennsylvanica*) seedlings, groundberry (*Rubus hispidus*), hickory (*Carya sp.*), flowering dogwood (*Cornus florida*), red maple (*Acer rubrum*), and sassafras (*Sassafras albidum*). The surrounding landuse is agricultural and residential with large lots. A scrub-shrub wetland lies south of the plant population, and a branch of the Wapwallopen Creek is south. Competition with other species like Virginia creeper or poison ivy is a distinct threat to SP504. Also the trees may be shading-out SP504 as the forest stand becomes older. Lastly, deer browse may be affecting the plants. Maintaining the mowed path and periodic mowing of the small clearings will help the rare plant population found at this site. The control of the deer population by allowing hunting on the property would also be helpful.

Wapwallopen Gorge (Conyngham, Hollenback & Nescopeck Twps.) The Lance Corporation, who allows public access for recreation, owns this **Locally Significant** property. There are several hiking trails and camping/picnic areas throughout. The gorge is very steeply-sided and forested with hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*) at the upper end. River birch (*Betula nigra*) and sycamore (*Platanus occidentalis*) dominate the lower end of the gorge. The gorge, which is known locally as the Powderhole, has some historical significance - many remnants of a turn of the century gunpowder plant are found along the edge of the gorge. Excessive trash, graffiti, and the practice of stripping of tree bark for campfires detract from the beauty of the gorge.

HUNLOCK TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS::							
ROUTE 11 BOAT LAUNCH							
Gomphus vastus Cobra Clubtail	G5	S3S4			7/26/05	E	**NEW**
Animal Species of Concern	G5	S2B	LT	PT	7/03/05	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SUSQUEHANNA RIVER at NANTICOKE							
Anodonta implicata Alewife Floater SA518A	G5	SNR		CU	9/29/95	D	**UPDATED**
Lampsilis cariosa Yellow Lampmussel SA518B	G3G4	S3S4		CU	9/29/95	D	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

LOCALLY SIGNIFICANT AREAS;

None

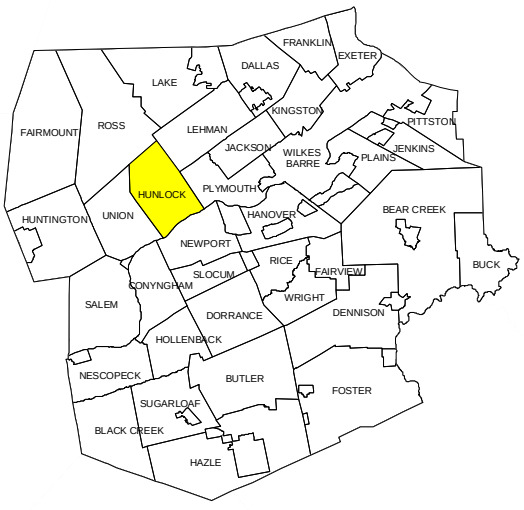
PUBLICLY MANAGED LANDS:

State Game Lands 224

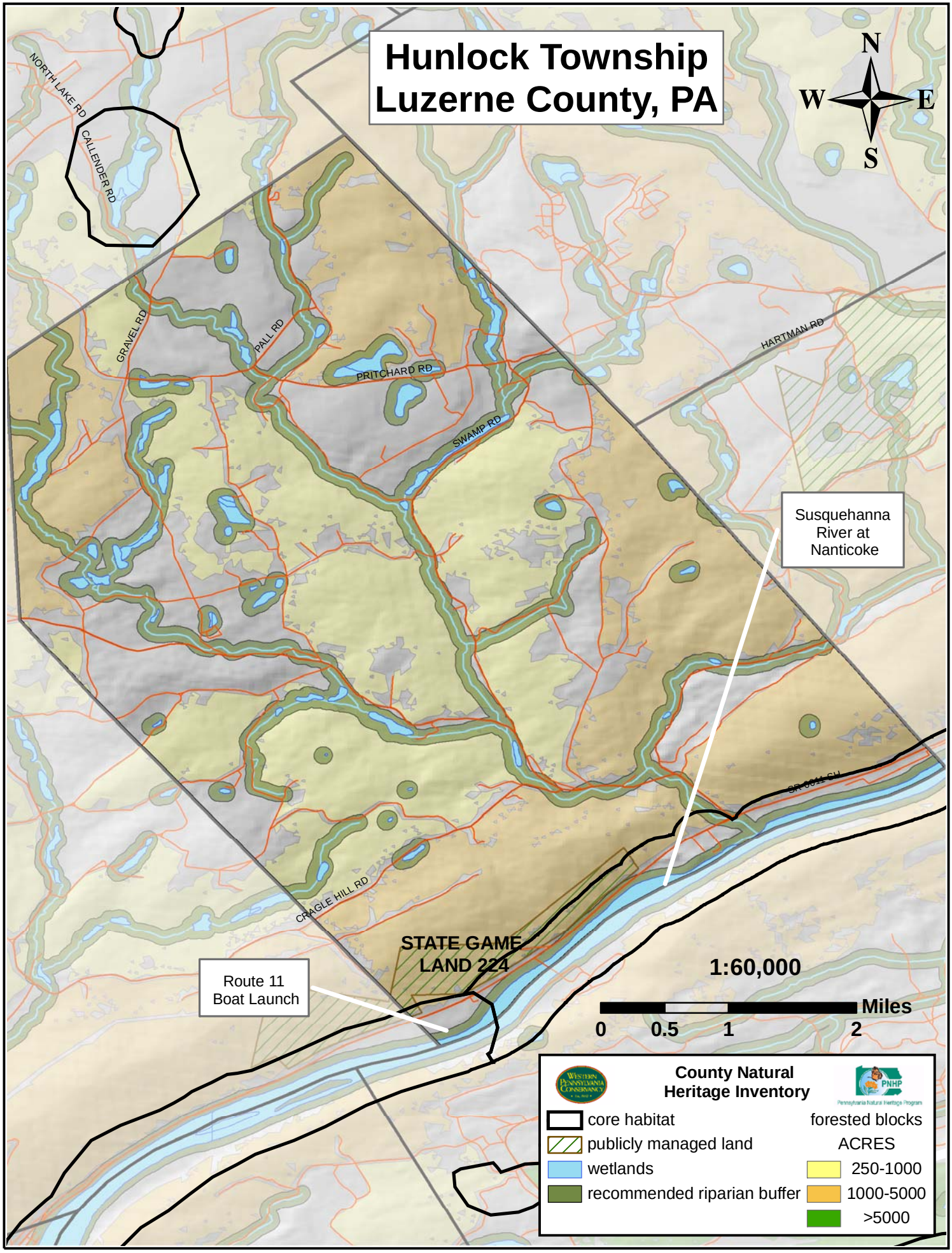
OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.



ROUTE 11 BOAT LAUNCH – NEW – A Cobra Clubtail dragonfly (*Gomphus vastus*) was documented at this site in 2005. Associated odonate species include Powdered Dancer (*Argia moesta*), Calico Pennant (*Caelithemis elisa*), Ashy Clubtail (*Gomphus lividus*), Eastern Forktail (*Ischnura verticalis*) Common Spreadwing (*Lestes disjunctus*), Swamp Spreadwing (*Lestes vigilax*), Illinois River Cruiser (*Macromia illinoiensis*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*Pantala hymenaea*), Ruby Meadowhawk (*Sympetrum rubicundulum*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).


Hunlock Township
Luzerne County, PA
N
W
E
S
NORTH LAKE RD
CALLENDER RD
GRAVEL RD
PALL RD
PRITCHARD RD
SWAMP RD
HARTMAN RD
Susquehanna River at Nanticoke
CRAGLE HILL RD
STATE GAME LAND 224
Route 11 Boat Launch
1:60,000
0
0.5
1
2
Miles
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

A Federally and State Threatened animal species of concern was observed nesting along the Susquehanna River at this site in 2005. Human disturbance, including the creation of new trails threaten this species.

An animal species of concern was located at this site in 2000. Additional surveys need to be conducted to assess the extent of the population.

SUSQUEHANNA RIVER AT NANTICOKE (City of Nanticoke & Hunlock, Newport & Plymouth Twps.) SA518A & SA518B – Very few specimens of the two mussel species of concern were collected here in 1995. Surveys in 2000 failed to discover any live mussel fauna. This portion of the North Branch of the Susquehanna River has suffered from acid mine drainage, and water quality continues to be compromised by the inflow of Lackawanna River at Wilkes-Barre. It is possible that as the river recovers, the rare species will be able to re-establish itself from populations living above the Lackawanna or downstream of the mine-impact area. No special management is recommended**.**

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

Great Blue Heron Rookeries

Great Blue Herons were in severe decline throughout Pennsylvania for the first half of the 20th century, but have made a remarkable comeback in recent decades. Acid mine drainage (AMD), which kills fish and other aquatic life, may have deprived these birds of their food source in the past. Efforts to mitigate the effects of AMD over the past few decades have likely helped restore life to some of these previously disturbed aquatic habitats. Herons typically form roosting colonies in the tops of trees. Disturbance or destruction of woodland rookeries by logging operations pose the greatest current threat to these nesting sites. Photo: Jeannine Tardiff

HUNTINGTON TOWNSHIP AND NEW COLUMBUS BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
HUNTINGTON CREEK							
Umbra pygmaea Eastern Mudminnow	G5	S3		PC	8/11/98	E	
PINE CREEK							
Myotis septentrionalis Northern Myotis	G4	S3B,S3N		CR	8/07/99	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

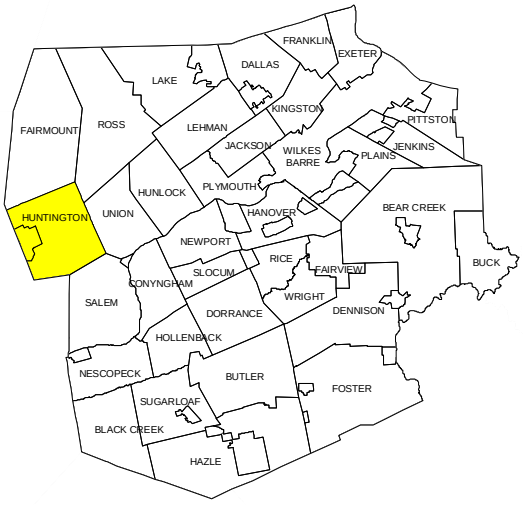
None

OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area

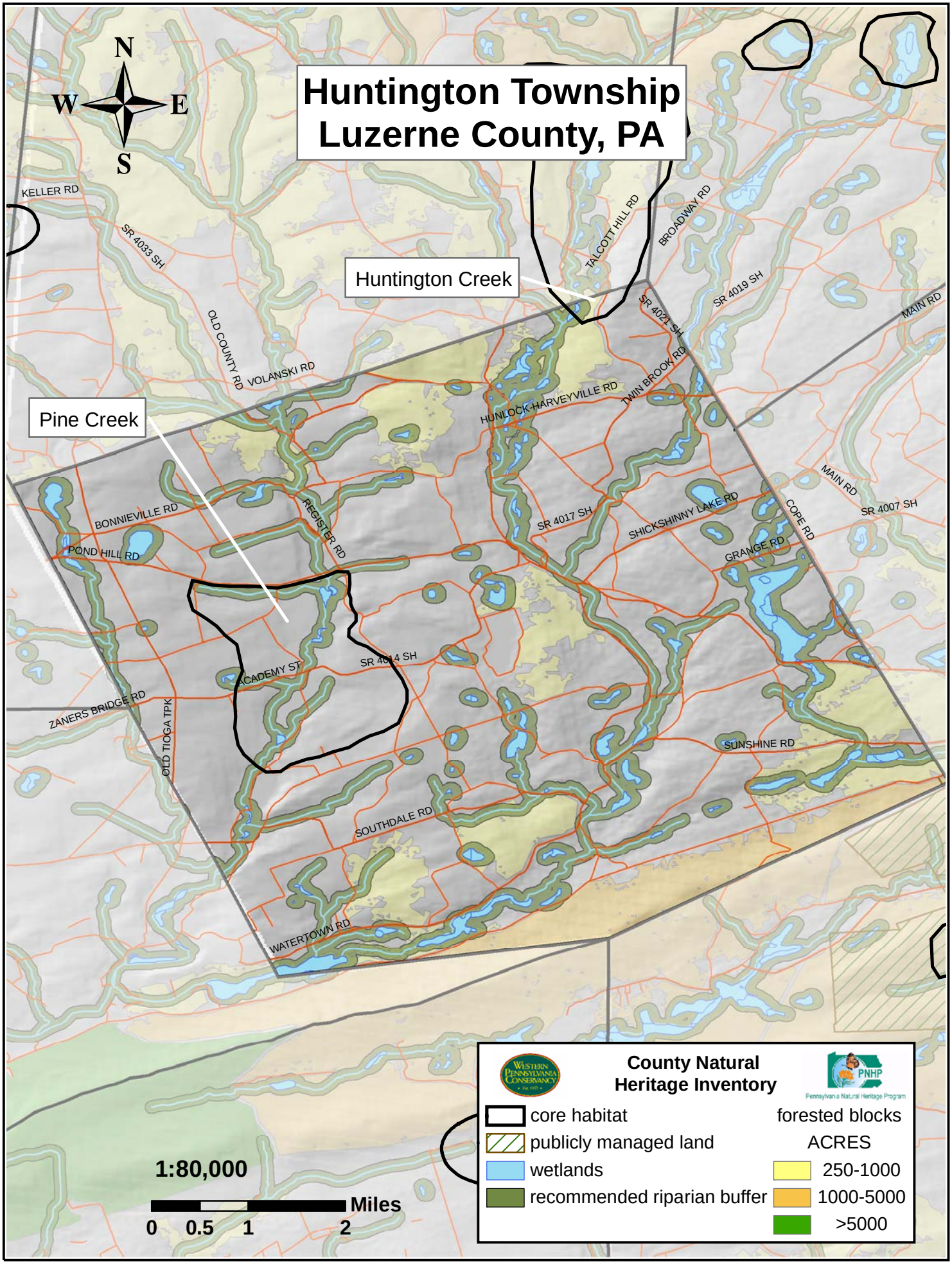
Huntingdon Creek - High Quality Cold Water Fishery

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.



HUNTINGTON CREEK (Fairmount, Huntington & Ross Twps.) SA510 – An S3, PA-Candidate animal species of concern (SA510) was identified during a 1998 survey of Huntington Creek. Additional surveys are needed to assess the population quality. Maintaining the hydrology, water quality, and water temperature of the creek are important for the survival of the species.

PINE CREEK – NEW – In 1999 an animal species of concern, Northern Myotis (*Myotis septentrionalis*), were located at this site. Mist nests were used to sample for bat species along Pine Creek. Further surveys need to be done to determine the extent of the population.


Huntington Township
Luzerne County, PA
N
W
E
S
Huntington Creek
Pine Creek
KELLER RD
SR 4033 SH
OLD COUNTY RD
VOLANSKI RD
TALCOTT HILL RD
BROADWAY RD
SR 4021 SH
SR 4019 SH
MAIN RD
HUNLOCK-HARVEYVILLE RD
TWIN BROOK RD
BONNIEVILLE RD
POND HILL RD
REGISTER RD
SR 4017 SH
SHICKSHINNY LAKE RD
COPE RD
GRANGE RD
SR 4007 SH
ACADEMY ST
SR 4014 SH
ZANERS BRIDGE RD
OLD TIOGA TPK
SUNSHINE RD
SOUTHDALE RD
WATERTOWN RD
1:80,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

JACKSON TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
EAST FORK HARVEY'S CREEK -SOUTH							
Animal Species of Concern SA513	G5	S3S4B, S4N		N/A	4/22/02	E	**UPDATED**
SHICKSHINNY MOUNTAIN RIDGETOP							
Animal Species of Concern	G4	S3S4		PC	7/01/03	E	**NEW**
Elymus trachycaulus Slender Wheatgrass	G5	S3		TU	7/01/03	B	**NEW**
Hesperia Leonardus Leonard's Skipper SP519	G4	S3S4			8/24/00	CD	**UPDATED**
Prunus pumila var. susquehanae Sand Cherry SA519	G5T4	S2		PT	8/24/00	CD	**UPDATED**

LOCALLY SIGNIFICANT AREAS:

None

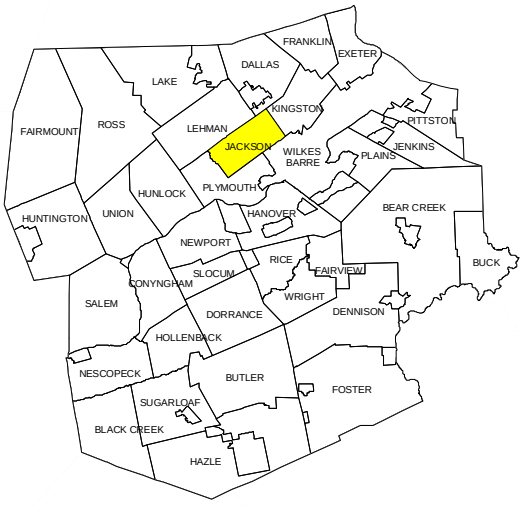
PUBLICLY MANAGED LANDS:

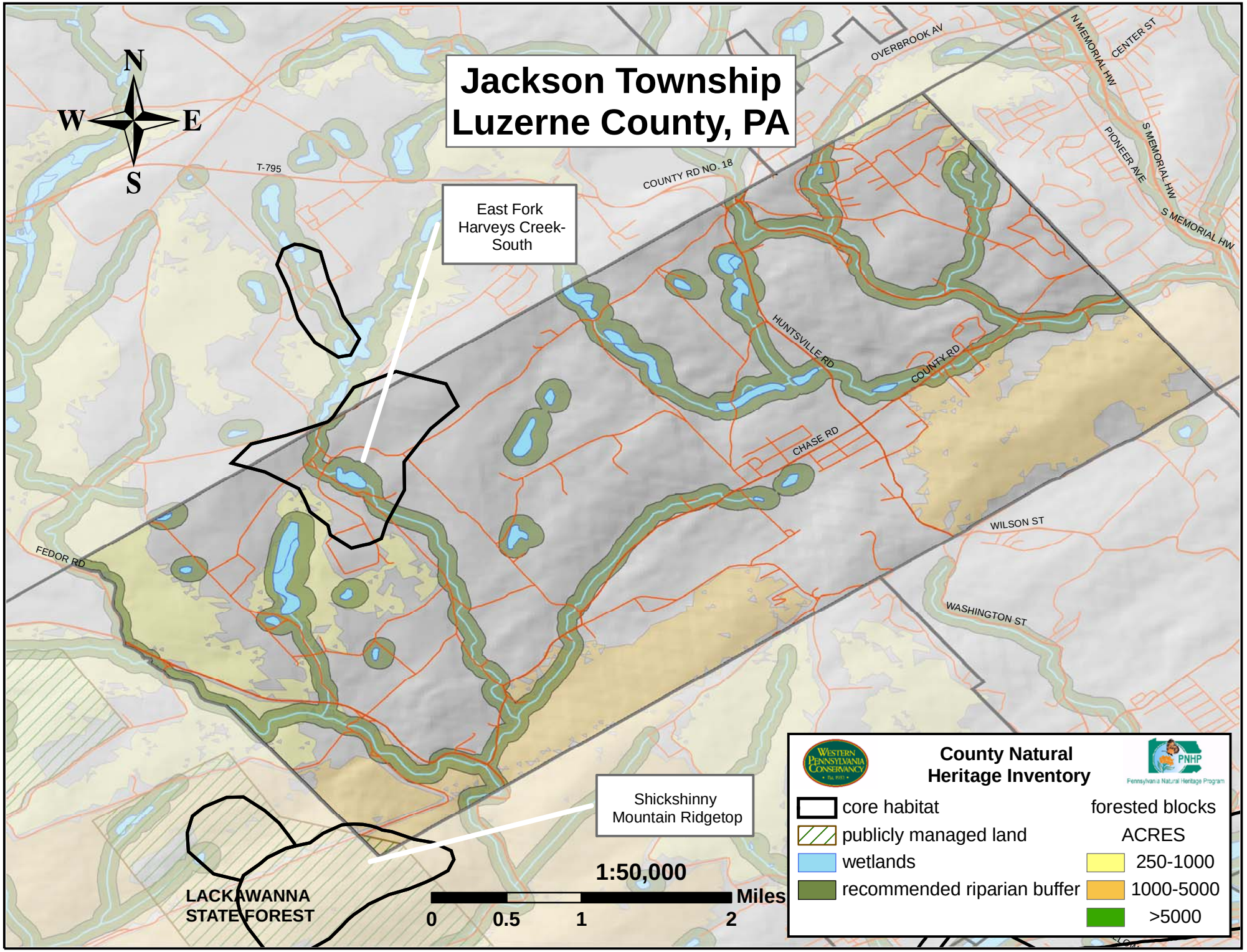
Lackawanna State Forest

OTHER CONSERVATION AREAS:

None

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.




Jackson Township
Luzerne County, PA
N
W
E
S
East Fork Harveys Creek-South
Shickshinny Mountain Ridgetop
T-795
COUNTY RD NO. 18
OVERBROOK AV
N MEMORIAL HW
CENTER ST
PIONEER AVE
S MEMORIAL HW
S MEMORIAL HW
HUNTSVILLE RD
COUNTY RD
CHASE RD
WILSON ST
WASHINGTON ST
FEDOR RD
LACKAWANNA STATE FOREST
1:50,000
0 0.5 1 2 Miles
County Natural Heritage Inventory
Western Pennsylvania Conservancy
PNHP
Pennsylvania Natural Heritage Program
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

EAST FORK HARVEY'S CREEK – SOUTH (Jackson & Lehman Twps.) - SA513 **-** This site consists of an impounded area near the state penitentiary on the east fork of Harvey's Creek. The habitat is a partially flooded forest of eastern hemlock (*Tsuga canadensis*) with some red maple (*Acer rubrum*) and other deciduous trees. From a remote distance, the animal species of concern (SA513) was observed using the site The status of the population is unknown. This site has also been used repeatedly for several years and current land uses do not appear to have disturbed the species of concern.

SHICKSHINNY MOUNTAIN RIDGETOP (Jackson & Plymouth Twps.) SA519 & SP519 **-** This site includes populations of a fair to poor-quality population of a PA-Rare plant species (SP519), and a population of an animal species of concern (SA519). The plant species of concern was growing out of thin soil on a narrow ridgetop spine. The plant species occurs in open habitat with areas of exposed conglomerate bedrock. The associated plant species include black huckleberry (*Gaylussacia baccata*), blueberry (*Vaccinium sp.*,) blackberry (*Rubus alleghaniensis*), hairgrass (*Deschampsia flexuosa*), sorrel (*Rumex acetosella*), dogbane (*Apocynum androsaefolium*), bracken fern (*Pteridium aquilinium*), cowwheat *(Melampyrum lineare)*, rock-harlequin (*Corydalis sempervirens*), turkey-foot grass (*Andropogon gerardii*), and marginal wood fern (*Dryopteris marginalis*). The sparse overstory included pitch pine, (Pinus rigida), chestnut oak *(Quercus prinus*), and fire cherry (*Prunus pennsylvanica*). The site appears to have burned. Competition from blackberry or other species, succession to a closed canopy, and deer browse are all threats to this small population. However, there is likely to be additional habitat along the ridgetop to the southwest. No special management of the site is recommended.

The animal species of concern was collected from open grassy habitat along a large powerline right-of-way just north of the ridgetop. Additional surveys are needed to determine the extent of this population. The right-of-way contained a mixture of grasses and shrubby vegetation, including turkey-foot grass (*Andropogon gerardii*), goldenrod (*Solidago sp.*), and dogwood (*Cornus racemosa* and *Cornus florida*). The powerline runs the length of Shickshinny Mountain, presumably providing extensive additional potential habitat. Spraying of the powerline or the adjacent forest with pesticide could affect the population. This site occurs within Lackawanna State Forest.

In 2003 a good population of a plant species of concern, slender wheatgrass (*Elymus trachycaulus),* was collected from an open powerline right-of-way at this site. Associated species include *Solidago rugosa, Panicum clandestinum, Apocynum cannabinum,* and *Deschampsia flexuosa*. A threat to this species is eventual succession. Exotics and rare ATV traffic are disturbances to this species of concern.

An animal species of concern was seen at this site in 2003. The habitat is mostly dry rocky upland hardwood forest in Lackawanna State Forest. Associated species include *Quercus montana, Quercus rubra, Betula lenta, Vaccinium* sp, and *Gaylussacia baccata*. Logging is a potential threat to the species of concern.

JENKINS TOWNSHIP AND YATESVILLE AND LAFLIN BOROUGHS

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
GARDNER CREEK RESERVOIR							
Animal Species of Concern SA537	G4	S3S4		PC	5/11/00	E	
OLD BOSTON MINES							
Myotis leibii Eastern Small-footed Myotis	G3	S1B,S1N		PT	10/03/05	E	**NEW**
Myotis septentrionalis Northern Myotis	G4	S3B,S3N		CR	10/03/05	E	**NEW**
PITTSTON ROOKERY							
Animal Species of Concern SA511	G5	S2S3B		PE	5/08/87	E	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

None

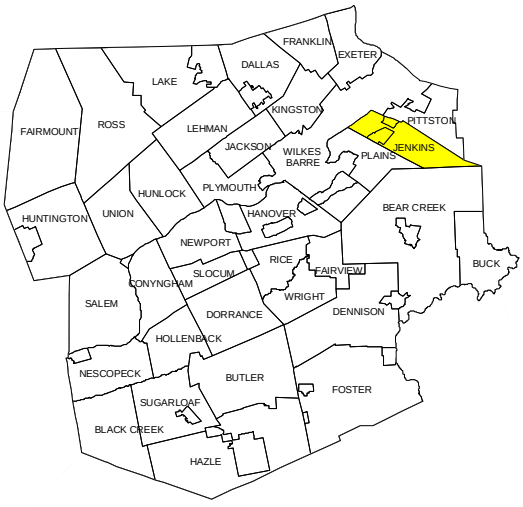
PUBLICLY MANAGED LANDS:

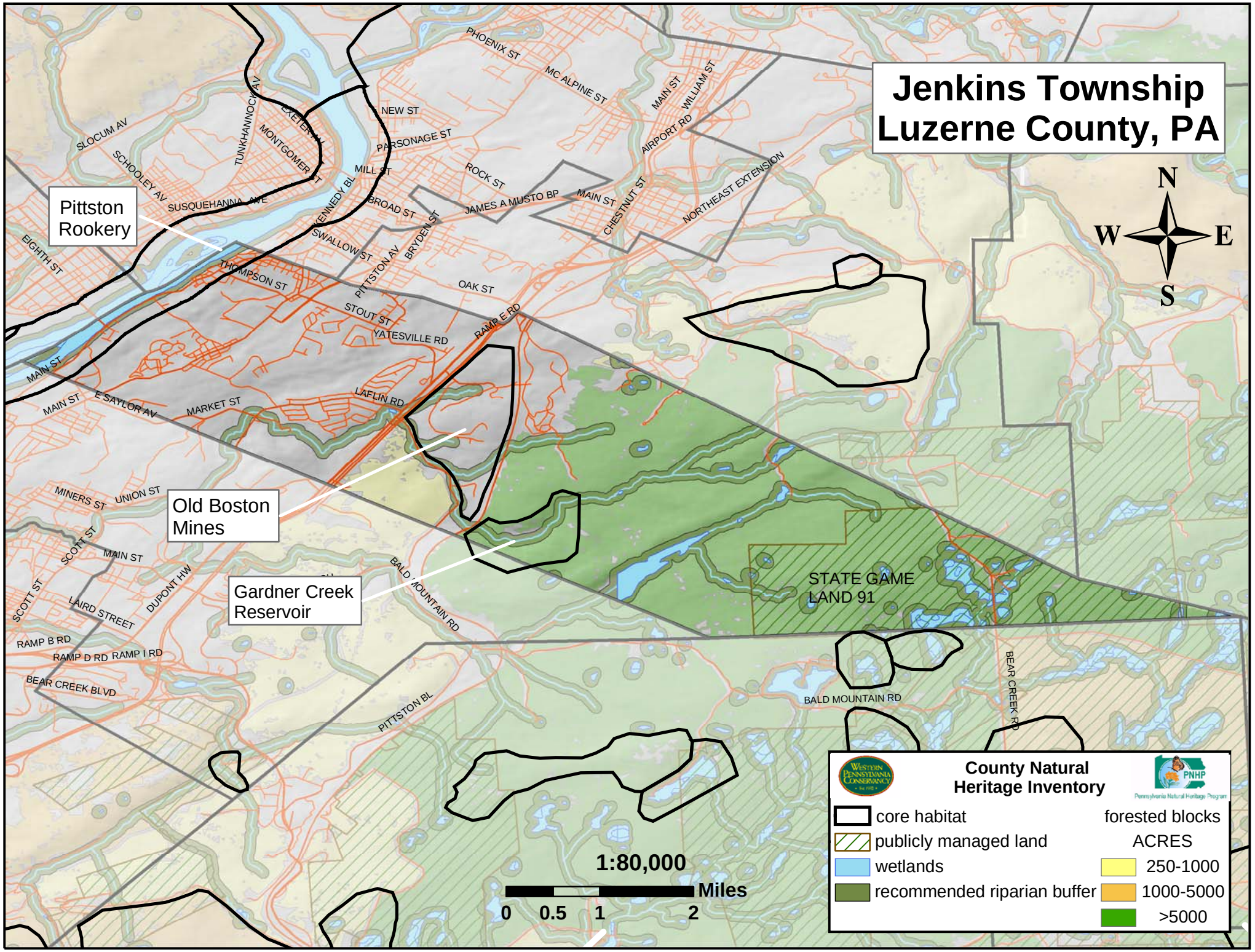
State Game Lands #91

OTHER CONSERVATION AREAS:

None

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.




Jenkins Township
Luzerne County, PA
N
W
E
S
Pittston Rookery
Old Boston Mines
Gardner Creek Reservoir
STATE GAME LAND 91
PHOENIX ST
MC ALPINE ST
MAIN ST
WILLIAM ST
AIRPORT RD
NEW ST
PARSONAGE ST
ROCK ST
MILL ST
JAMES A MUSTO BP
CHESTNUT ST
NORTHEAST EXTENSION
SLOCUM AV
SCHOOLEY AV
SUSQUEHANNA AVE
TUNKHANNOCK AV
EXETER AV
MONTGOMERY ST
KENNEDY BL
BROAD ST
BRYDEN ST
SWALLOW ST
PITTSTON AV
EIGHTH ST
THOMPSON ST
OAK ST
STOUT ST
YATESVILLE RD
RAMP E RD
MAIN ST
E SAYLOR AV
MARKET ST
LAFLIN RD
MINERS ST
UNION ST
SCOTT ST
DUPONT HWY
LAIRD STREET
BALD MOUNTAIN RD
RAMP B RD
RAMP D RD
RAMP I RD
BEAR CREEK BLVD
PITTSTON BL
BEAR CREEK RD
1:80,000
Miles
0 0.5 1 2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

GARDNER CREEK RESERVOIR (Jenkins & Plains Twps.) SA537 **–** This site consists of an extensive rock outcrop area north of the Gardner Creek reservoir. An animal species of concern exists at the site (SA537). The forest is relatively young (40+ years). The dominant trees includes chestnut oak (*Quercus prinus*) and other oaks, while the understory is dominated by huckleberry (*Gaylussacia sp*.), and blueberry (*Vaccinium sp*.). The hillside with the rock outcrops recently burned (spring of 2000). There are no apparent disturbances to the site at this time. An extensive clearcut or development of the site are potential threats. Additional surveys are needed to determine the status of the animal population.

OLD BOSTON MINES – NEW – This site contains two bat species of concern, Northern Myotis (*Myotis septentrionalis*), a G4 bat species of concern and Eastern Small-footed Myotis (*Myotis leibii*), a State Threatened species. More surveys need to be done to determine the extent of the populations.

PITTSTON ROOKERY (Pittston & Exeter Boros. & Jenkins & Plains Twps.) SA511 –This site is an island in the North Branch of the Susquehanna River that was an active nesting area for an animal species of concern (SA511) for ten years. The island was not visited during the field surveys for the Natural Areas Inventory, but the nesting area has been reported to be no longer active. A field visit during breeding is needed to confirm this report.

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

Ospreys, bald eagles, herons, and egrets use the tall trees for nesting along rivers and on islands.

Photo: Jill Bellefonti, PA Game Commission

KINGSTON TOWNSHIP AND WYOMING, WEST WYOMING, SWOYERSVILLE, FORTY FORT, KINGSTON, LUZERNE, COURTDALE, AND PRINGLE BOROUGHS

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ABRAHAMS CREEK WETLANDS							
Animal Species of Concern SA504	G5	S3S4B,S4N			2002	E	**UPDATED**
Carex disperma Soft-leaved Sedge	G5	S3		PR	6/10/03	BC	**NEW**
Porzana carolina Sora SA505A	G5	S3B		CR	6/2000	E	**UPDATED**
Rallus limicola Virginia Rail SA505B	G5	S3B			6/2000	E	
ICE CAVES							
Talus Cave Community NC502	GNR	S2S4			6/19/82	E	
KIRBY PARK/ROUTE 309 BRIDGE SITE							
Animal Species of Concern SA532	G4	S1B,S1N		PE	7/17/05	E	**UPDATED**
Animal Species of Concern SA532	G5T4T5	SU		CR	6/07/00	E	**NEW**
PITTSTON ROOKERY							
Animal Species of Concern SA511	G5	S2S3B		PE	5/08/87	E	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
PLAINS FLATS							
Celithemis eponina Halloween Pennant	G5	S2S3			7/5/04	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

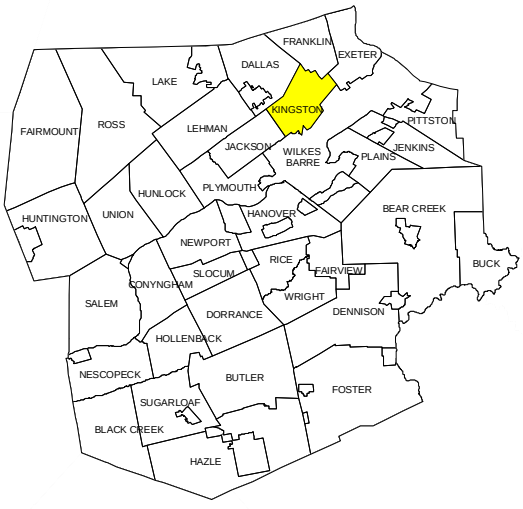
None

PUBLICLY MANAGED LANDS:

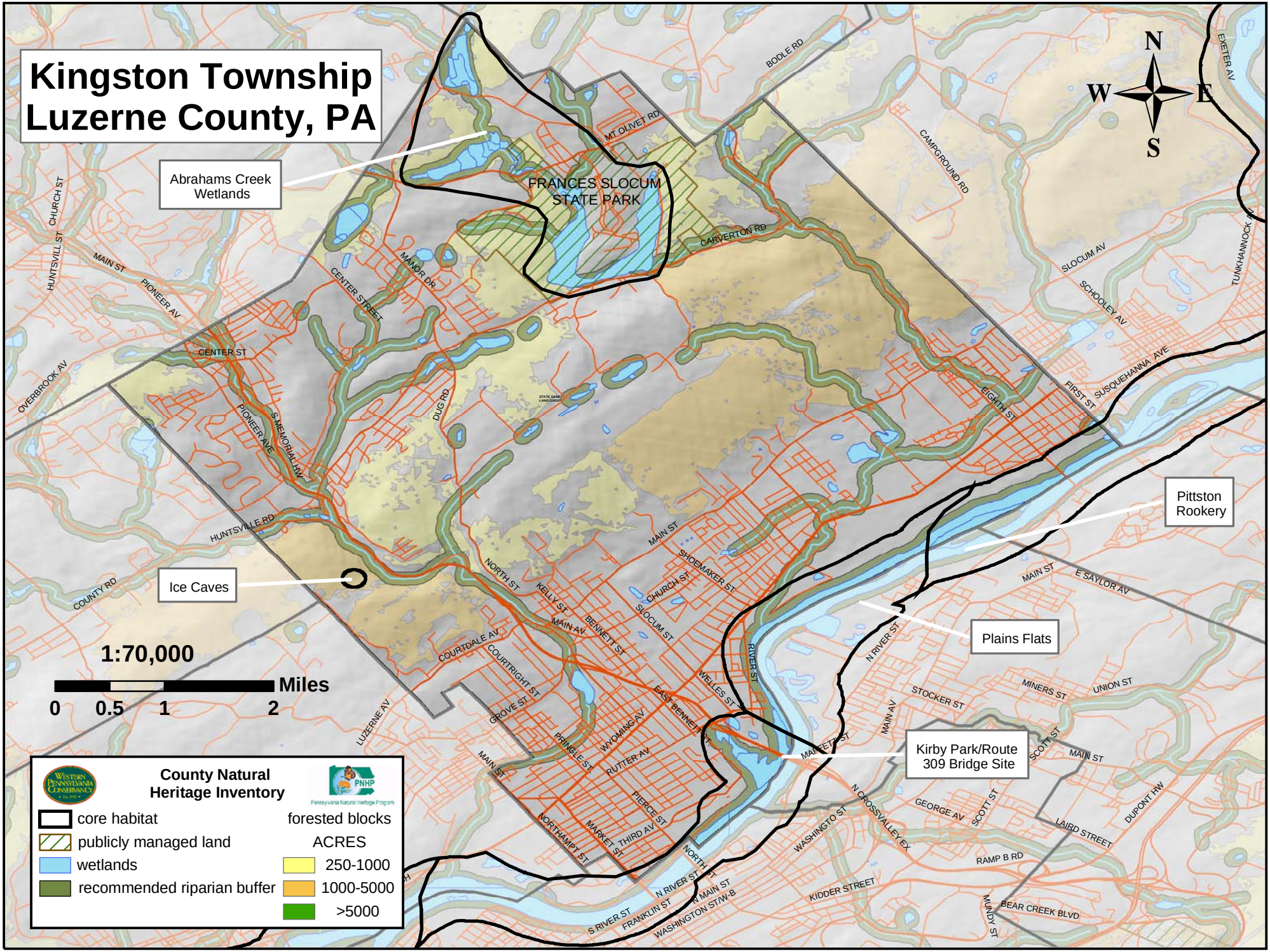
Francis Slocum State Park

OTHER CONSERVATION AREAS:

None



*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.


Kingston Township
Luzerne County, PA
Abrahams Creek Wetlands
FRANCES SLOCUM STATE PARK
Pittston Rookery
Ice Caves
Plains Flats
Kirby Park/Route 309 Bridge Site
N
W
E
S
1:70,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
BODLE RD
MT OLIVET RD
CAMPGROUND RD
CARVERTON RD
EXETER AV
TUNKHANNOCK AV
CHURCH ST
HUNTSVILL ST
MAIN ST
PIONEER AV
CENTER STREET
MANOR DR
SLOCUM AV
SCHOOLEY AV
CENTER ST
OVERBROOK AV
PIONEER AVE
S MEMORIAL HW
DUG RD
EIGHTH ST
FIRST ST
SUSQUEHANNA AVE
HUNTSVILLE RD
COUNTY RD
MAIN ST
SHOEMAKER ST
NORTH ST
KELLY ST
CHURCH ST
SLOCUM ST
MAIN AV
BENNETT ST
COURTDALE AV
COURTRIGHT ST
GROVE ST
LUZERNE AV
WELLES ST
EAST BENNETT ST
RIVER ST
N RIVER ST
E SAYLOR AV
MINERS ST
UNION ST
STOCKER ST
MAIN AV
SCOTT ST
MAIN ST
MARKET ST
PRINGLE ST
WYOMING AV
RUTTER AV
PIERCE ST
NORTHAMPT ST
THIRD AV
NORTH ST
N RIVER ST
N MAIN ST
WASHINGTON ST/W-B
S RIVER ST
FRANKLIN ST
N CROSSVALLEY EX
WASHINGTO ST
GEORGE AV
SCOTT ST
LAIRD STREET
DUPONT HW
RAMP B RD
KIDDER STREET
MUNDY ST
BEAR CREEK BLVD

ABRAHAM'S CREEK WETLANDS (Dallas, Franklin & Kingston Twps.) SA504, SA505A, & SA505B - The site consists of creek-side wetlands impacted by flooding from the damming of the creek downstream in Francis Slocum State Park. Two animal species of concern (SA505A & SA505B) occupy a herbaceous wetland where the creek enters the reservoir, and another species of concern (SA504) breeds in a flooded forested wetland to the north. More habitat data is needed on this site, but the species of concern have been recorded using the site for several years. The preservation of large trees is important to SA504. Maintaining the water quality of Abraham's Creek and stable water levels during the growing season will benefit the species of concern.

A good population of a plant species of concern, Soft-leaved Sedge (*Carex disperma*) was located at this site in 2003. Associated species include *Carex pensylvanica, Maianthemum canadense, Mitchella repens, Carex digitalis, Uvularia perfoliata, Lycopodium obscurum,* and *Viburnum acerifolium*.

ICE CAVES (Kingston & Wilkes Barre Twps.) NC502 – This Talus Cave Natural Community (NC502) on private property has ice caves and a waterfall that drops 50 feet into a high gradient hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*) ravine. Other plant species found in the ravine included American yew (*Taxus canadensis*) and paper birch (*Betula papyrifera*). The massive ice formations are present into mid-March. Native brook trout have been reported in the stream. This area was last visited in 1982 and should be revisited to obtain updated information and to assess conservation needs.

KIRBY PARK/ROUTE 309 BRIDGE SITE (Kingston & Wilkes Barre Twps.) SA532 – This site is a municipal park that includes a large silver maple (50 + feet) floodplain forest along the Susquehanna River. A population of a PA animal species of concern (SA532) exists at this site and on nearby river islands (Richard & Monocanock Islands). The floodplain forest associated plant species include large silver maples (*Acer saccharinum*), elm (*Ulmus americana*.), red oak (*Quercus rubra*), white mulberry (*Morus alba*), American basswood (*Tilia americana*), catalpa (*Catalpa bignonioides*), black locust (*Robinia pseudoacacia*), green ash (*Fraxinus pennsylvanica*), jewelweed (*Impatiens sp*.), Japanese knotweed (*Polygonum cuspidatum*), reed canary grass (*Phalaris arundinacea*), garlic mustard (*Allaria officinalis*), and nettles (*Urticaceae*). A series of nature and biking trails run through the floodplain. The surrounding land use (Kirby Park) includes navigable water to the south, with recreational facilities, residences, and businesses located to the west, east, and north. Both the floodplain and the river islands are seasonally flooded. One current threat to the animal population is a proposed inflatable dam that could cause inundation of this floodplain or the river islands. Changes in the hydrology could kill the large trees used by the animal species of concern at the site. The present hydrology (seasonal flooding) should be maintained. The same animal species of concern occurs at various floodplain forest sites along the Susquehanna throughout much of the county. These sites are not mapped, as more descriptive information on the status of these populations is needed.

In 2000 an animal species of concern was found along the Susquehanna River. Associated plant species include Silver Maple (*Acer saccharinum*), Elm (*Ulmus* sp.), Red Oak (*Quercus rubra*), Mulberry (*Morus* sp), American Basswood (*Tilia americana*), Catalpa (*Catalpa bignonioides*), Black Locust (*Robinia pseudoacacia*), Green Ash (*Fraxinus pennsylvaninica*), Jewelweed (*Impatiens* sp), Japanese Knotweed (*Polygonum cuspidatum*), Reed Canary Grass (*Phalaris arundinacea*), Garlic Mustard (*Allaria officinalis*), and Nettles (*Urticaceae*). Surrounding land use includes navigable water to the south, with recreational facilities, residences, and businesses located to the west, east, and north. The floodplain and the river islands are seasonally flooded. The current threat to the species of concern is the proposed inflatable dam that could cause inundation of this floodplain or river islands. Changes in the hydrology could kill the large trees at the site that this species seem to prefer.

PITTSTON ROOKERY (Pittston & Exeter Boros. & Jenkins & Plains Twps.) SA511 –This site is an island in the North Branch of the Susquehanna River that was an active nesting area for an animal species of concern (SA511) for ten years. The island was not visited during the field surveys for the Natural Areas Inventory, but the nesting area has been reported to be no longer active. A field visit during breeding is needed to confirm this report.

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

PLAINS FLATS – NEW – An odonate species of concern, Halloween Pennant (*Celithemis eponina*), was seen at this site in 2004. Associated odonate species include Skimming Bluet (*Enallagma geminatum*), Common Whitetail (*Libellula (Plahemis) lydia*), Blue Dasher (*Pachydilplax longipennis*), Jane's Meadowhawk (*Sympetrum janeae*), Fragile Forktail (*Ischnura posita*), Twelve-spotted Skimmer (*Libellula pulchella*), Wandering Glider (*Pantala flavescens*), Yellow-legged Meadowhawk (*Sympetrum vicinum*), Common Green Darner (*Anax junius*), Unicorn Clubtail (*Arigomphus villosipes*), Familiar Bluet (*Enallagma civile*), Orange Bluet (*Enallagma signatum*), Common Baskettail (*Epitheca cyanosura*), Eastern Forktail (*Ischnura verticalis*), Widow Skimmer (*Libellula luctuosa*), Blue-fronted Dancer (*Argia apicalis*), Powdered Dancer (*Argia moesta*), Calico Pennant (*Celithemis elisa*), Prince Baskettail (*Epitheca princeps*), Eastern Amberwing (*Perithemis tenera*), and Spot-winged Glider (*Pantala hymenaea*).

In 2000 a new animal species of concern was located at this site along the Susquehanna River. More surveys need to be done to determine the full extent of the population.

LAKE TOWNSHIP AND HARVEYS LAKE BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
BEAR HOLLOW							
Aeshna constricta Lance-tipped Darner	G5	S3S4			7/28/04	E	**NEW**
Anax longipes Comet Darner	G5	S1S2			7/20/04	E	**NEW**
Animal Species of Concern SA515	G5	S3S4B,S4N			4/22/02	E	**UPDATED**
Lestes eurinus Amber-winged Spreadwing	G4	S3			7/15/04	E	**NEW**
Libellula vibrans Great Blue Skimmer	G5	S2N			7/15/04	E	**NEW**
BOULDER RUN SWAMP							
Acidic Shrub Swamp NC521	G5	S3			5/29/00	C	
Animal Species of Concern SA522, SA523	G5	S1S2B		PE	7/13/00	C	**UPDATED**
Ledum groenlandicum Common Labrador-tea SP521	G5	S3		PR	5/29/00	C	
HARVEY'S LAKE							
Megalodonta beckii Beck's Water-marigold	G4G5	S1		PE	7/8/02	E	**NEW**
Potamogeton gramineus Grassy Pondweed	G5	S1		PE	7/10/03	A	**NEW**
Potamogeton robbinsii Flat-leaved Pondweed SP510	G5	S4		DL	8/23/91	E	**DELISTED**
Potamogeton vaseyi Vasey's Pondweed	G4	S1		PE	7/10/03	AB	**NEW**
LEE SWAMP							
Botaurus lentiginosus American Bittern SA512D	G4	S1B		PE	2000	BC	
Circus cyaneus Northern Harrier SA512A	G5	S3B,S4N		CA	5/08/99	E	**UPDATED**
Gallinago delicata Wilson's Snipe SA512B	G5	S3B,S3N		CA	5/08/99	E	**UPDATED**
Porzana carolina Sora SA512E	G5	S3B		CR	2000	BC	**UPDATED**
Rallus limicola Virginia Rail SA512C	G5	S3B			2000	BC	

STATE GAME LANDS #57					
Animal Species of Concern SA502, SA518, SA519, SA520	G4	S3S4	PC	9/19/00	E

LOCALLY SIGNIFICANT AREAS:

Sorber run – Exceptional value Waters

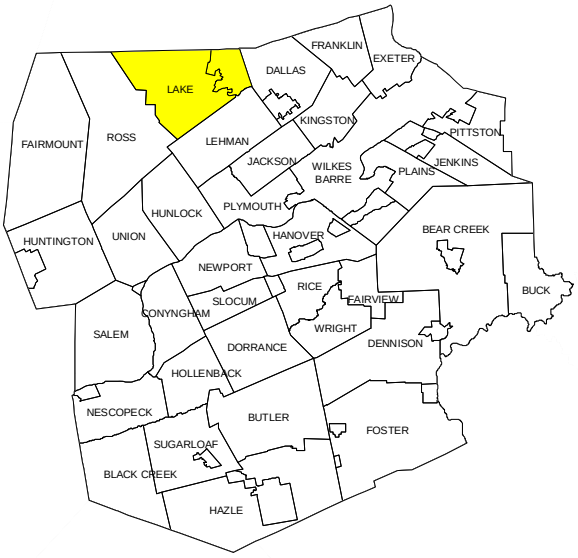
PUBLICLY MANAGED LANDS:

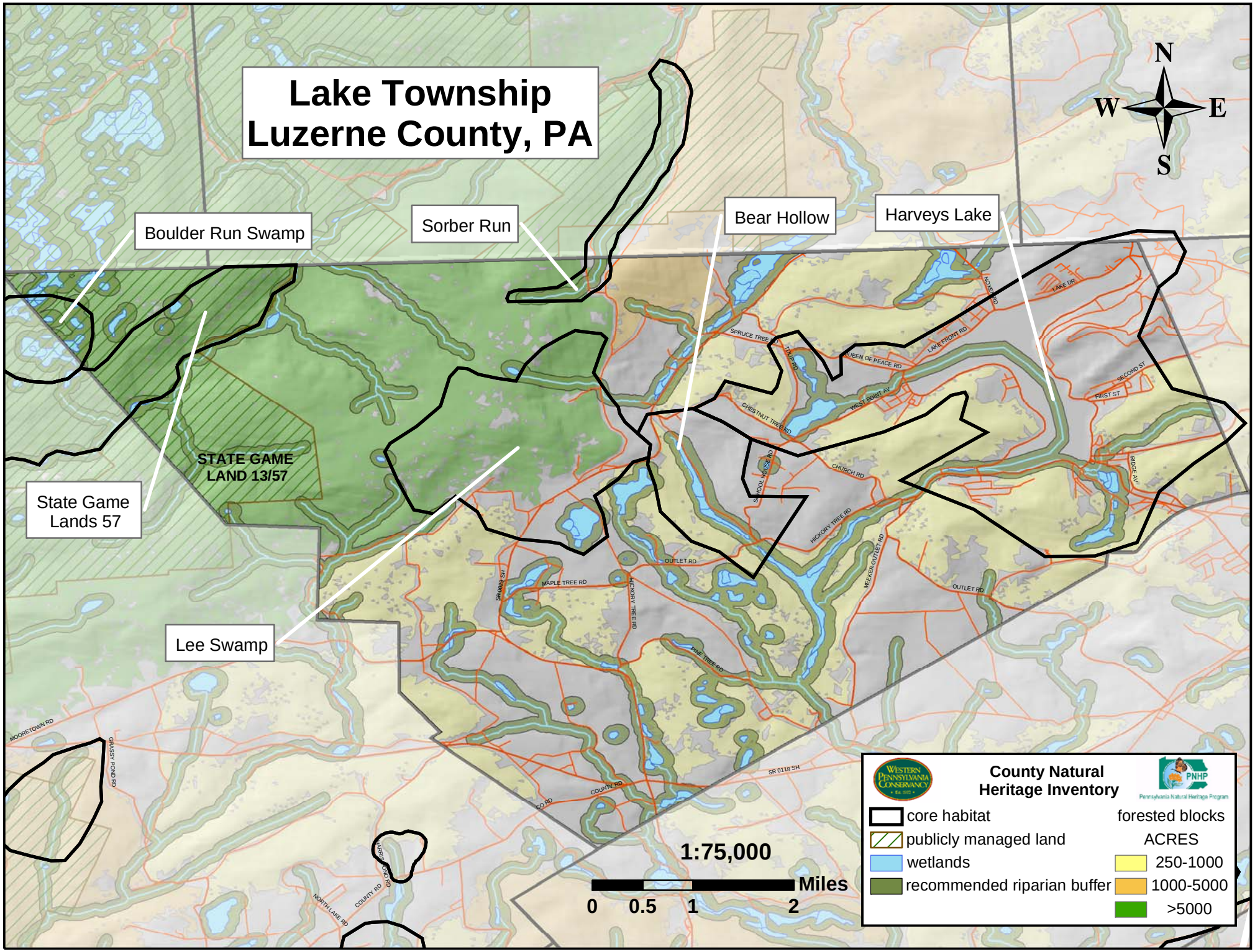
State Game Lands 13/57

OTHER CONSERVATION AREAS:

North Mountain - Ricketts Glen State Park Important Bird Area
Ricketts Glen State Park / SGLs 57/13/16 Important Mammal Area
Sorber Run - Exceptional Value Waters
Beth Run – High Quality Cold Water Fishery
Butternut Run – High Quality Cold Water Fishery
Sugar Run – High Quality Cold Water Fishery

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Lake Township
Luzerne County, PA
N
W
E
S
Boulder Run Swamp
Sorber Run
Bear Hollow
Harveys Lake
STATE GAME
LAND 13/57
State Game
Lands 57
Lee Swamp
SPRUCE TREE RD
TOLL RD
QUEEN OF PEACE RD
LAKEFRONT RD
MOXEY RD
LAKE DR
SECOND ST
FIRST ST
WEST POINT AV
CHESTNUT TREE RD
SCHOOL HOUSE RD
CHURCH RD
RIDGE AV
HICKORY TREE RD
MEEKER OUTLET RD
OUTLET RD
SR 0309 SH
MAPLE TREE RD
HICKORY TREE RD
PINE TREE RD
SR 0118 SH
COUNTY RD
CO RD
MOORETOWN RD
GRASSY POND RD
HARRIS POND RD
NORTH LAKE RD
COUNTY RD
1:75,000
Miles
0
0.5
1
2
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

BEAR HOLLOW (Lake Twp.) - SA515 - This site contains a nesting area for an S3S4B,S4N animal species of concern (SA515) in a small, open wetland along the small stream draining Bear Hollow. The vegetation is a mixture of shrub swamp and wet meadow (*Solidago sp.* and *Eupatorium sp.* are present). The species of concern utilize dead red maple and conifer trees along the east edge of the wetland.

Bear Hollow itself is an isolated eastern hemlock (*Tsuga canadensis*) hollow with a remarkable diversity of breeding amphibian species occupying the stream and several small vernal pools. Among these are spotted salamander (*Ambystomata maculatum*), northern red salamander (*Pseudotriton ruber ruber*), mountain dusky salamander (*Desmognathus ochrophaeus*), northern dusky salamander (*Desmognathus fuscus fuscus*), redback salamander (*Plethodon cinereus*), red-spotted newt (*Notophthalmus viridescens viridescens*), spring peepers (*Hyla crucifer crucifer*), and an animal species of concern. The surrounding forest has hemlock along the stream course and a diverse second-growth forest of sugar maple (*Acer saccharum),* bitternut hickory (*Carya cordiformis*), beech (*Fagus grandifolia),* white ash (*Fraxinus americana*), basswood (*Tilia americana),* and red oak (*Quercus rubra)* away from the stream. The understory plant species include spicebush (*Lindera benzoin)* and witch hazel (*Hamamelis virginiana*), as well as invasive species such as Japanese barberry (*Berberis thunbergii*) and old apple trees *(Malus sp.*). A small dirt road parallels the stream, and some trash has been left in the vernal pools. Leaving the road unimproved and protecting the stream and pools should benefit both the species of concern and the great diversity of other plant and animal species occupying the site.

Four new odonate species of concern were identified at this site in 2004, Lance-tipped Darner (*Aeshna constricta*), Comet Darner (*Anax longipes*), Great Blue Skimmer (*Libellula vibrans*), and Amber-winged Spreadwing (*Lestes eurinus*). Further surveys need to be done to determine the extent of the populations. Associated odonate species include Delta-spotted Spiketail (*Cordulegaster diastatops*), Common Green Darner (*Anax junius*), Ebony Jewelwing (*Calopteryx maculate*), Hagen's Bluet (*Enallagma hageni*), Eastern Forktail (*Ischnura verticalis*), Chalk-fronted Corporal (*Libellula* (*Ladona*) *julia*), Common Whitetail (*Libellula* (*Plathemis*) *lydia*), Widow Skimmer (*Libellula luctosa*), Twelve-spotted Skimmer (*Libellula pulchella*), Blue Dasher (*Pachydiplax longipennis*), Ruby Meadowhawk (*Sympetrum rubicundulum*), and Black Saddlebags (*Tramea lacerate*).

BOULDER RUN SWAMP (Ross & Lake Twps.) SP521, SA522, SA523, & NC521 – This site is an Acidic Shrub Swamp Natural Community (NC521) near the edge of the Allegheny Front. The natural community grades into an upland red spruce forest to the northeast, a palustrine red spruce swamp to the northwest, and a highbush blueberry-sphagnum wetland to the south. A PA-Rare shrub (SP521) is one of the dominant plants found in the low-shrub swamp along with leatherleaf (*Chamaedaphne calyculata*). Additional dominant plants include black spruce (*Picea mariana*), red spruce (*Picea rubens*), highbush blueberry (*Vaccinium corymbosum*), large cranberry (*Vaccinium macrocarpon*), small *cranberry (Vaccinium oxycoccos*), sheep laurel (*Kalmia angustifolia*), pitcher plant (*Sarracenia purpurea*), sundew (*Drosera sp*.), sedges (*Carex trisperma* & *Carex canescens*), and sphagnum moss (*Sphagnum sp*.). The shrub swamp has deep peat soils and a small floating mat area adjacent to a pool.

Two breeding occurrences of a PA-Threatened animal species (SA522 & SA523) were documented. Bird species noted here included northern waterthrush (*Seiurus noveboracensis*), Canada warbler (*Wilsonia canadensis*), hairy *woodpecker (Picoides villosus*), Nashville warbler (*Vermivora ruficapilla*), blackburnian warbler (*Dendroica fusca*), and black and white warbler (*Mniotilta varia*). There is no sign of recent habitat disturbance at the site, although the early successional stage suggests beaver activity in the past. The preservation of the existing hydrology is important for the plant species found in the swamp. Additional

surveys are needed to assess the quality of the animal species. Logging in or near the swamp are possible threats to the site. The site is located on State Game Lands #57.

HARVEY'S LAKE (Dallas & Lake Twps. in Luzerne County & Monroe Twp. in Wyoming County) –UPDATE- SP509 & SP510 **–** Harveys Lake is one of the largest natural lakes in Pennsylvania and there are numerous historical records from the lake of plant species now considered rare or endangered. The majority of the shoreline is now developed and impacts from this, as well as from exotic plant species [e.g., fanwort, (*Cabomba caroliniana*)] have changed the habitat dramatically. Populations of one PA-Rare (SP510) and one PA-Endangered plant (SP509) species have been collected from the site by PNHP biologists. These plants were not rediscovered in a survey of the lake in 1999, but much additional habitat remains and it is possible that the species of concern are persisting. Additional surveys are needed to assess these populations. A small portion of the boundary of this site extends into Wyoming County (Noxen quadrangle). **The plant species SP510, *Potamogeton robbinsii* (Flat-leaved pondweed), has been removed from the species of concern list.**

Three State Endangered plant species of concern, Beck's Water Marigold (Megalodonta beckii), Vasey's Pondweed (*Potamogeton vaseyi*), and Grassy Pondweed (*Potamogeton gramineus*) were located at Harvey's Lake in 2002 and 2003. Associated species include *Ceratophyllum muricatum, Decodon verticillatus, Elodea nuttallii, Nitella sp., Nymphaea sp, Potamogeton crispus, P. diversifolius,* and *P. pusillus*. There appears to be scattered litter from parts of damaged boats on the bank and invasion of purple loosestrife on the shoreline near the parking area. Invasive aquatic coontail seems to be very dominant and crowding out other species.

LEE SWAMP (Lake Twp.) – SA512A, SA512B, SA512C, SA512D, & SA512E - This site located on private property is the 40 to 50-acre former bed of Lee Pond that was drained in the 1950's. The substrate over much of the area is deep, quaking peat. The largest area is dominated by a sedge (*Carex utriculata*) and marsh cinquefoil (*Potentilla palustris*), with some cattail (*Typha latifolia*) marsh and alder (*Alnus sp.)* thickets.

Five different bird species of special concern have been observed breeding at Lee Swamp in recent years and there is potential habitat for several other listed bird species. Despite past disturbances the site today is one of the largest marshes in the county and clearly provides good nesting habitat for the species of concern. There is no evidence of recent disturbance. Potential threats include runoff from surrounding agricultural fields or changes in the water level that could hasten succession from the current marshy habitat favorable to the species of concern.

STATE GAME LANDS #57 (Ross & Lake Twps.) SA502, SA518, SA519, & SA520 – This area has extensive south-southeast facing rocks and rock outcrops. Four separate occurrences of an animal species of concern have been documented. A deciduous forest dominated by black cherry (*Prunus serotina*), red maple (*Acer rubrum*), birch (*Betula sp*.), and striped maple *(Acer pensylvanicum*) shade the majority of the areas with suitable habitat. Additional visits are needed to adequately survey this area. The overgrown portions of the site may actually benefit from a very limited selective cut during the winter to remove larger trees shading the site.

Locally Significant Area:

Sorber run – NEW – (Lake Twp.) DEP-designated Exceptional Value stream mostly within SGL #57.

LEHMAN TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
EAST FORK HARVEY'S CREEK -NORTH							
Animal Species of Concern SA514	G5	S3S4B,S4N			8/05/99	E	
EAST FORK HARVEY'S CREEK -SOUTH							
Animal Species of Concern SA513	G5	S3S4B,S4N			4/22/02	E	**UPDATED**

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

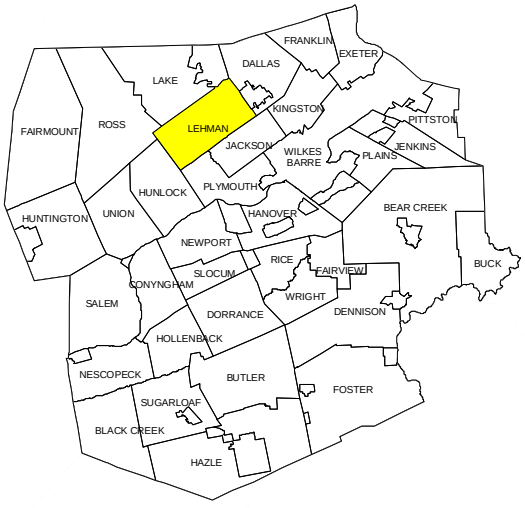
Moon Lake Park

OTHER CONSERVATION AREAS:

Harveys Creek - High Quality Cold Water Fishery

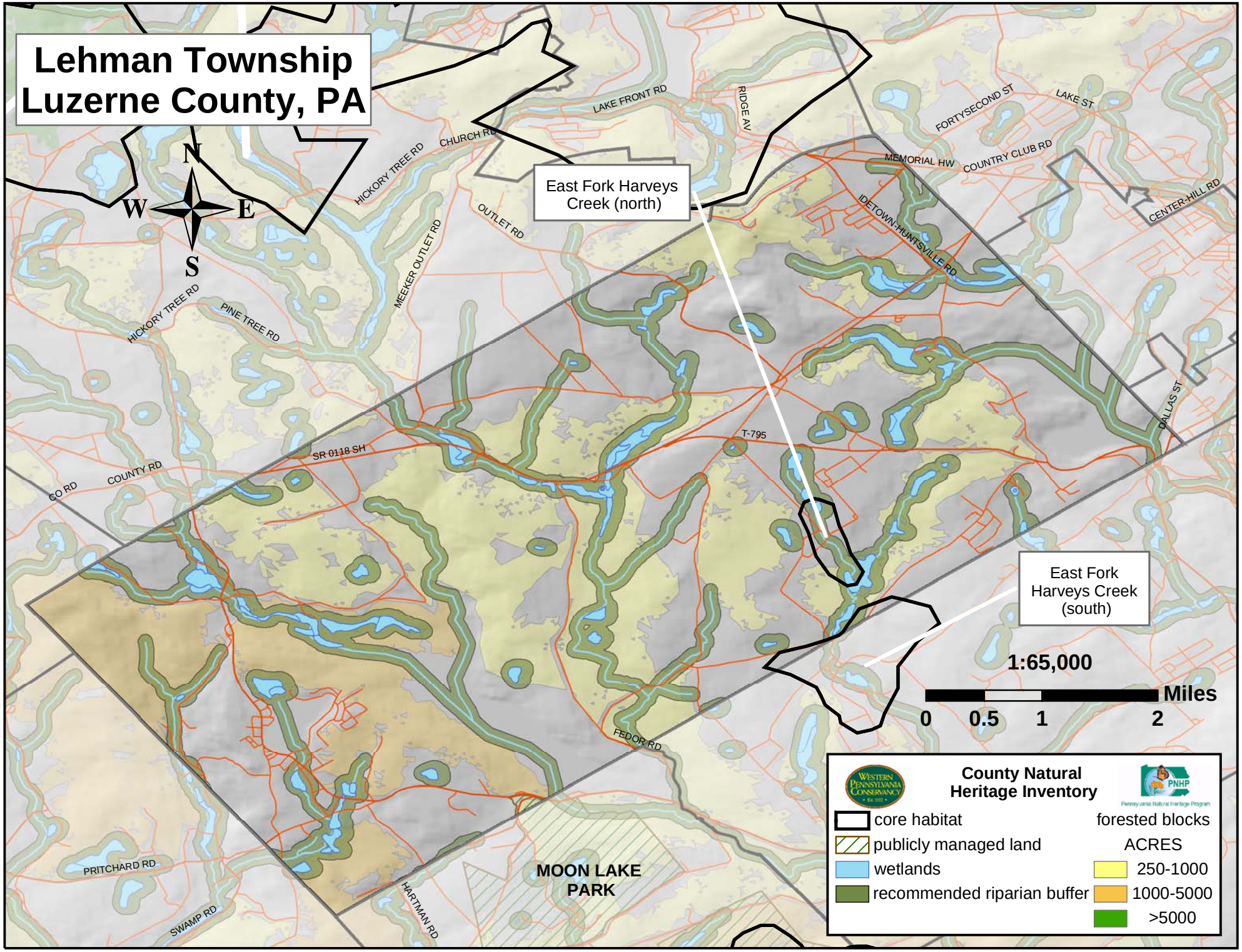
Pikes Creek - High Quality Cold Water Fishery

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.



EAST FORK HARVEY'S CREEK - NORTH (Lehman Twp.) - SA514 - This site contains a thin band of riparian forest, which is comprised mostly red maple, on the east fork of Harvey's Creek. An animal species of concern (SA514) uses these woods as a breeding area. The site occurs in a largely agricultural area. Although the species is sensitive to disturbance, the current land uses have not deterred the species as it has used the site for many years.

EAST FORK HARVEY'S CREEK – SOUTH (Jackson & Lehman Twps.) - SA513 - This site consists of an impounded area near the state penitentiary on the east fork of Harvey's Creek. The habitat is a partially flooded forest of eastern hemlock (*Tsuga canadensis*) with some red maple (*Acer rubrum*) and other deciduous trees. From a remote distance, the animal species of concern (SA513) was observed using the site. The status of the population is unknown. This site has also been used repeatedly for several years and current land uses do not appear to have disturbed the species of concern.


Lehman Township
Luzerne County, PA
N
W
E
S
East Fork Harveys Creek (north)
East Fork Harveys Creek (south)
LAKE FRONT RD
RIDGE AV
FORTYSECOND ST
LAKE ST
MEMORIAL HW
COUNTRY CLUB RD
CENTER-HILL RD
IDETOWN-HUNTSVILLE RD
HICKORY TREE RD
CHURCH RD
OUTLET RD
MEEKER OUTLET RD
PINE TREE RD
DALLAS ST
T-795
SR 0118 SH
COUNTY RD
CO RD
FEDOR RD
PRITCHARD RD
SWAMP RD
HARTMAN RD
MOON LAKE PARK
1:65,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

NESCOPECK TOWNSHIP AND NESCOPECK BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
BRIGGSVILLE VERNAL POOLS							
Ephemeral/Fluctuating Natural Pool NC515	G?	S3			8/15/00	B	
Animal Species of Concern	G5	S3				E	**NEW**
SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)							
Animal Species of Concern	G5	S2B	LT	PT	2/22/06	E	**NEW**
Lampsilis cariosa Yellow Lampmussel	G3G4	S3S4		CU	2003	D	**NEW**
Animal Species of Concern	G3	S2		CU	2003	C	**NEW**
SUSQUEHANNA RIVERLANDS							
Animal Species of Concern	G5	S3				E	**NEW**
Enodia anthedon Northern Pearly Eye	G5	S3S4			6/26/99	E	**NEW**
Euphydryas phaeton Baltimore Checkerspot	G4	S2S4			6/26/99	E	**NEW**
Lontra canadensis Northern River Otter	G5	S3		CA		E	**NEW**
Poanes massasoit Mulberry Wing	G4	S3			7/25/97	E	**NEW**
Polites mystic Long Dash	G5	S3			7/25/97	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
Speyeria Aphrodite Aphrodite Fritillary	G5	S3S4			6/26/99	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

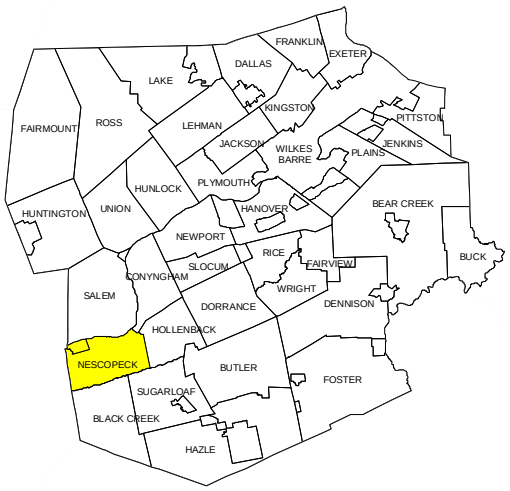
Wapwallopen Gorge

PUBLICLY MANAGED LANDS:

Moon Lake Park

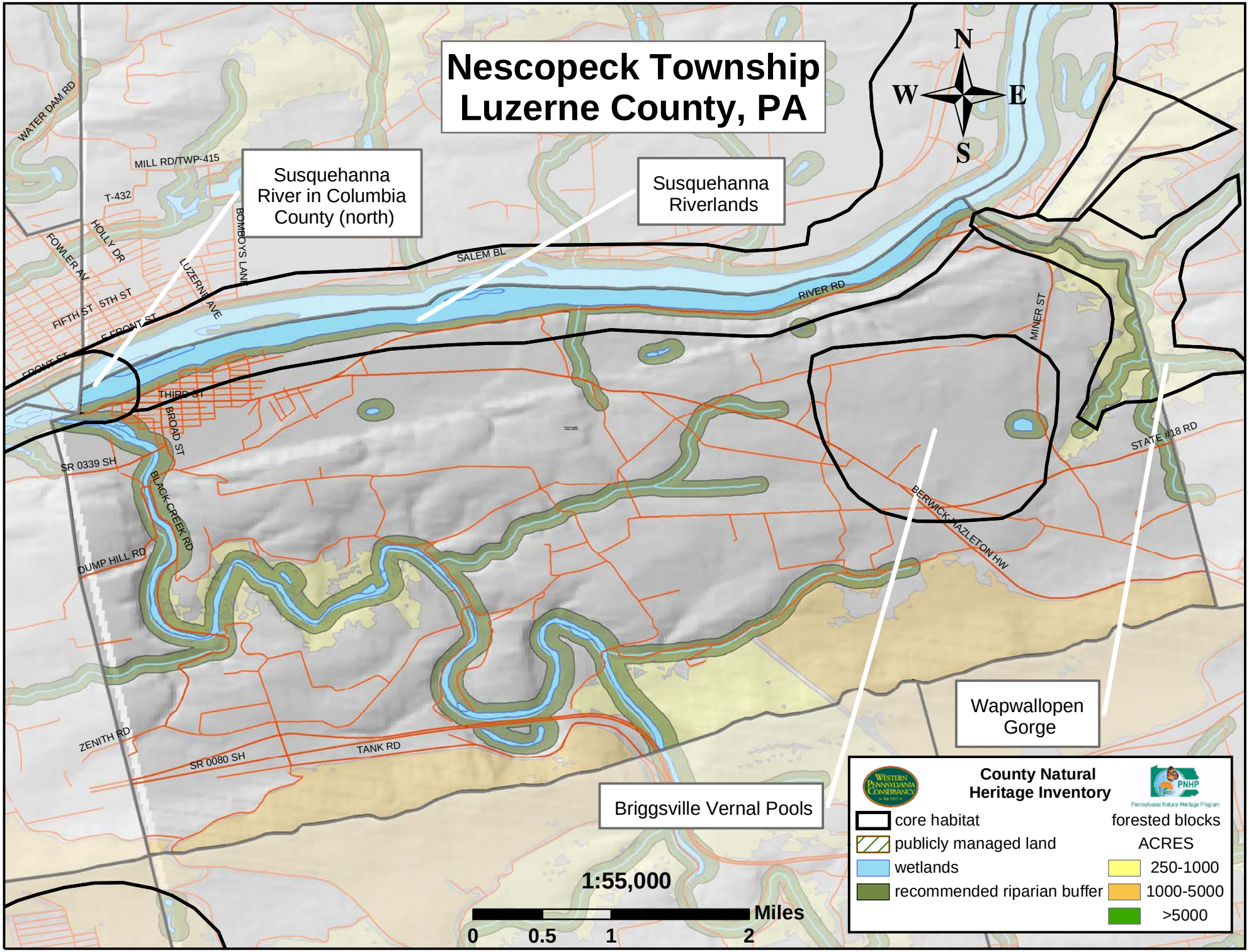
OTHER CONSERVATION AREAS:

None



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

** Please refer to Appendix II for Quality ranks.


Nescopeck Township
Luzerne County, PA
N
W
E
S
Susquehanna River in Columbia County (north)
Susquehanna Riverlands
Wapwallopen Gorge
Briggsville Vernal Pools
WATER DAM RD
MILL RD/TWP-415
T-432
HOLLY DR
FOWLER AV
FIFTH ST
5TH ST
E FRONT ST
FRONT ST
LUZERNE AVE
BOMBOYS LANE
SALEM BL
RIVER RD
MINER ST
THIRD ST
BROAD ST
SR 0339 SH
BLACK CREEK RD
DUMP HILL RD
STATE #18 RD
BERWICK-HAZLETON HW
ZENITH RD
SR 0080 SH
TANK RD
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:55,000
Miles
0
0.5
1
2

BRIGGSVILLE VERNAL POOLS (Nescopeck Twp.) NC515 – This site contains a series of vernal pools that make up an Ephemeral/Fluctuating Pool Natural Community (NC515) north of Nescopeck Mountain. The pools are located near the southern boundary of the last glacial advance that formed depressions created by small ice blocks left behind by the retreating glaciers. Today some of the pools are situated in an agricultural setting, while many of the vernal pools are found in young, deciduous woods. The pools in the agricultural areas are more disturbed and subject to siltation and warming because the pools are not shaded by trees and are surrounded by fields. Typical vegetation in these agricultural pools included softrush (*Juncus effusus*), sedges (*Carex sp.*), rice-cut grass (*Leersia oryzoides*), and spikerush (*Eleocharis sp.*). The pools in the woods are less disturbed and are in a more natural state. Shrubs, especially buttonbush (*Cephalanthus occidentalis*), dominate some of these pools, while others have shrubby margins and open centers with a leaf-litter and/or sphagnum substrate. Typical vegetation included highbush blueberry (*Vaccinium corymbosum*), red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), royal fern (*Osmunda regalis*), red chokeberry (*Pyrus arbutifolia*), water plantain (*Alisma sp.*), beggar tick (*Bidens sp.*), cinnamon fern (*Osmunda cinnamomea*), sphagnum moss (*Sphagnum sp.*), sheep laurel (*Kalmia angustifolia*), and buttonbush (*Cephalanthus occidentalis*). Many wooded vernal pools are shown on aerial photos in this area; only a few could be visited during the field visit. Wood frogs (*Rana sylvatica*) have been observed using the pools, which are also appropriate habitat for Ambystomid salamander species (spotted or Jefferson salamanders). Vernal pools are extremely important, fragile habitats that are facing statewide pressure from development and other human disturbances (e.g., ATV traffic). Consequently, sites containing vernal pools should be a top priority for conservation in the county. One of the current landowners would like to preserve his property and has expressed an interest in having a conservancy purchase the property.

A reptile species reported from previous survey visits has since been added to the species of concern list.

SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)- (Nescopeck & Salem Twps. & Columbia County) **-** Two different **animal species of concern** were identified at this site in 1995. Biologists revisited the site in the fall of 2003 and again located these animals of concern. Individuals were found at several sites along the Susquehanna River between Berwick and Bloomsburg. Additional surveys are recommended to better estimate populations of these animal species of concern in the river. Associated species include the freshwater mussels eastern floater (*Pyganodon cataracta*) and creeper (*Strophitus undulatus*). Additional information on the life history of freshwater mussels can be viewed online at the US Fish and Wildlife Service web site:
http://midwest.fws.gov/mussel/life_history.html.
The river also provides a valuable migration corridor for many bird species, especially aquatic dependent species, but also many Neo-tropical passerine migratory species.

A State and Federally Threatened animal of concern was seen here in 1995. Further surveys need to be done to determine the full extent of the population. Care should be taken to avoid disturbing the nests of this species.

The Susquehanna River is subject to frequent flooding and seasonal low water levels. Scouring of the banks and islands by flood events and ice have created specialized habitats along the river floodplain. Several islands have distinctive "Big bluestem (*Andropogon gerardii*)-Indian grass (*Sorghastrum nutans*) river grasslands" natural tall grassland communities created as the result of these natural disturbances. These areas are dominated by the two species the community type is named for and also include switch grass (*Panicum virgatum*) and Indian hemp (*Apocynum cannabinum*). The habitat grades into a "water willow (*Justicia americana*) – smartweed riverbed community" on the lowest island elevations, and into a

"black willow scrub/shrub wetland", and "River birch – sycamore floodplain scrub" as the elevation increases, providing drier habitat. These natural communities are part of the "Riverbed – Bank – Floodplain Community Complex", a broadly defined mosaic of community types that typify the natural vegetation along the Susquehanna River in Luzerne County.

There are numerous examples of disturbance along the Susquehanna River. These animal species of concern are affected by numerous non-point sources of pollution including sedimentation from cultivated and developed land along the river, runoff from roadways, pesticide runoff from agricultural fields, discharge of chemical pollutants and thermal pollution. The main threat to these animals is reduction of water quality. The banks, floodplains and islands of the river are in areas infested with the invasive introduced plant species Japanese knotweed (*Polygonum cuspidatum*) and purple loosestrife (*Lythrum salicaria*). Control of established populations of these species is very difficult, so eradication of pioneer populations is the best way to control the spread of these species of plants.

Any of the above types of disturbances should be minimized where possible. Also, monitoring of these populations should continue into the future. Loss of individuals and reductions in population sizes should lead to an investigation into possible causes. Water quality should be monitored and pollution sources should be identified where possible. Forested buffers should be maintained and created where absent along the length of the river with logging operations refraining from cutting within 100 feet of the river edge. River bank forests help buffer the watershed from the effects of non-point sources of pollution including runoff from agricultural, residential and roadway settings. In addition, the river floodplain and corridor is usually an area of significantly higher biodiversity than the adjoining uplands. Much of the area's important biodiversity can be preserved by maintaining an intact, forested floodplain along the river. The effectiveness of the forested riverbanks as a habitat corridor would be diminished by fragmentation of the forest continuity by the construction of houses, businesses and additional roadways along the river. Local planning should discourage construction of new structures and roadways along the river, adjacent slopes and floodplain.

Locally Significant Area:

Wapwallopen Gorge (Conyngham, Hollenback & Nescopeck Twps.) The Lance Corporation, who allows public access for recreation, owns this **Locally Significant** property. There are several hiking trails and camping/picnic areas throughout. The gorge is very steeply-sided and forested with hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*) at the upper end. River birch (*Betula nigra*) and sycamore (*Platanus occidentalis*) dominate the lower end of the gorge. The gorge, which is known locally as the Powderhole, has some historical significance - many remnants of a turn of the century gunpowder plant are found along the edge of the gorge. Excessive trash, graffiti, and the practice of stripping of tree bark for campfires detract from the beauty of the gorge.

NEWPORT TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
CRANBERRY POND							
Aeshna clepsydra Mottled Darner	G4	S2S3			9/10/05	E	**NEW**
Carex lasiocarpa Slender Sedge SP525A	G5	S3		PR	6/21/00	B	
Carex limosa Mud Sedge SP525B	G5	S2		PT	6/21/00	C	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4			6/25/05	E	**NEW**
Elatine americana Long-stemmed Water-wort	G4	SU		PE	7/27/01	C	**NEW**
Ischnura kellicotti Lilypad Forktail	G5	S1			6/25/05	E	**NEW**
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4			9/10/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4			6/25/05	E	**NEW**
Nannothemis bella Elfin Skimmer	G4	S1			6/25/05	E	**NEW**
Oligotrophic Glacial Kettlehole Bog NC503	G?	S3			6/21/00	BC	
FOLSTOWN MUD POND	***(Locally Significant Area)***						**CHANGED**
Potamogeton robbinsii Flat-leaved Pondweed SP517A	G5	S4		DL	8/27/99	B	**DELISTED**
Utricularia purpurea Purple Bladderwort SP517B	G5	S4		DL	8/27/99	B	**DELISTED**
GLEN LYON ANTHRACITE MINE							
Myotis septentrionalis Northern Myotis SA512B	G4	S3B,S3N		CR	10/09/96	E	**UPDATED**
Animal Species of Concern SA512A	G2	SUB,S1N	LE	PE	10/09/96	B	
LILY LAKE							
Aeshna clepsydra Mottled Darner	G4	S2S3			9/10/05	E	**NEW**
Bidens discoidea Small Beggar-ticks	G5	S3		PR	9/16/03	E	**NEW**
Celithemis eponina Halloween Pennant	G5	S2S3			8/24/05	E	**NEW**
Elatine minima Small Waterwort SP501A	G5	S4		DL	8/21/91 7/27/01	B	**DELISTED**
Ischnura kellicotti Lilypad forktail	G5	S1			6/25/05	E	**NEW**

Libellula incesta Slaty Skimmer	G5	S3S4			8/24/05	E	**NEW**
Myriophyllum heterophyllum Broad-leaved Water-milfoil	G5	S1		PE	7/27/01	E	**NEW**
Potamogeton robbinsii Flat-leaved PondweedSP513	G5	S4		DL	8/27/99	B	**DELISTED**
Schoenoplectus torreyi Torrey's Bulrush SP501B	G5?	S1		PE	8/13/92	C	
Sympetrum semicinctum Band-winged Meadowhawk	G5	S3S4			9/10/05	E	**NEW**
Utricularia intermedia Flat-leaved Bladderwort	G5	S2		PT	7/27/01	E	**NEW**
PENOBSCOT MOUNTAIN RIDGETOP							
Ephemeral/Fluctuating Natural Pool NC526	G?	S3			6/21/00	E	
Helianthemum bicknellii Bicknell's Hoary Rockrose SP509	G5	S2		PE	8/09/90	D	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2		PT	8/09/90	D	**UPDATED**
ROUTE 11 BOAT LAUNCH							
Gomphus vastus Cobra Clubtail	G5	S3S4			7/26/05	E	**NEW**
Animal Species of Concern	G5	S2B	LT	PT	7/03/05	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SUSQUEHANNA RIVER at NANTICOKE							
Anodonta implicata Alewife Floater SA518A	G5	SNR		CU	9/29/95	D	**UPDATED**
Lampsilis cariosa Yellow Lampmussel SA518B	G3G4	S3S4		CU	9/29/95	D	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

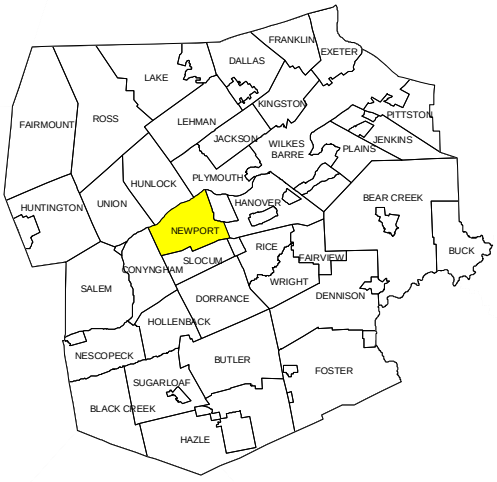
Folstown Mud Pond

PUBLICLY MANAGED LANDS:

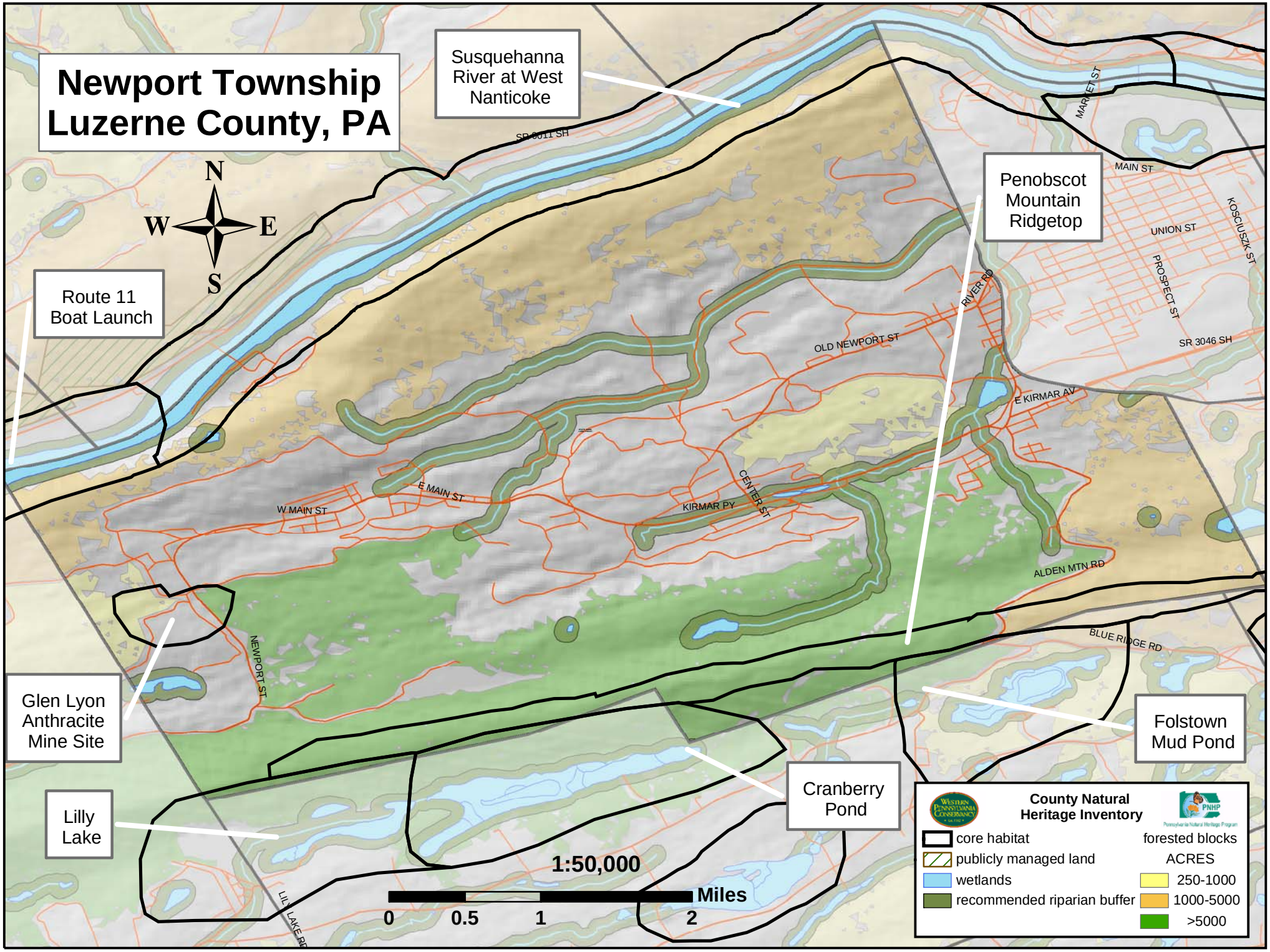
None

OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area



* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.


Newport Township
Luzerne County, PA
Susquehanna River at West Nanticoke
Penobscot Mountain Ridgetop
Route 11 Boat Launch
Glen Lyon Anthracite Mine Site
Lilly Lake
Cranberry Pond
Folstown Mud Pond
N
W
E
S
SR 0011 SH
MARKET ST
MAIN ST
UNION ST
KOSCIUSZK ST
PROSPECT ST
SR 3046 SH
RIVER RD
OLD NEWPORT ST
E KIRMAR AV
E MAIN ST
W MAIN ST
KIRMAR PY
CENTER ST
ALDEN MTN RD
BLUE RIDGE RD
NEWPORT ST
LILLY LAKE RD
1:50,000
0
0.5
1
2
Miles
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

CRANBERRY POND (Newport & Slocum Twps.) NC503, SP525A, SP525B - Cranberry Pond is a large glacial "kettlehole" pond with concentric rings of vegetation surrounding open water in the center. It is a fair- to good-quality example of an Oligotrophic Glacial Kettlehole Bog Natural Community (NC503) that is located on private property. The gravel road around the west end of the pond forms an earth and rock dam that may have altered the hydrology somewhat. However, the low shrub and sedge areas appear intact and are largely free of exotic plant species. A good-quality population of a PA-Rare plant species (SP525A) is one of the dominant species over much of the floating mat. It is associated with leatherleaf (C*hamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*) cranberry (*Vaccinium sp.*), cotton-grass (*Eriophorum virginicum*), sedges (C*arex canescens* and *Carex. utriculata*), beak-rush (*Rhynchospora alba*), bog buckbean (*Menyanthes trifoliata*), Canada rush (*Juncus canadensis*), arrowhead (S*agittaria* sp.), pitcher-plant (*Sarracenia purpurea*), sundew (*Drosera intermedia),* and sphagnum moss (*Sphagnum sp.*). The abundance of this species may indicate a raised pH due to groundwater input or some influence of flooding. A fair-quality population of another plant species of concern (SP525B) occurs in mucky depressions near the edge of the open water with many of the same associated species. Both of these populations are reproducing and no immediate threats or management needs are apparent. The site also has an extraordinary diversity of amphibians, including the only Luzerne County occurrence of the northern cricket frog (*Acris crepitans crepitans*), and at least nine different species of salamanders.

This is one of the top priority sites for conservation in Luzerne County. There is a good diversity of bog flora and potential for additional plant, as well as animal species of concern to be found. Cranberry Pond is hydrologically linked to adjacent glacial wetlands (Folstown Mud Pond, Lily Lake). The health of the natural community and its associated species will depend on maintaining water quality throughout the watershed – upstream, upslope on Penobscot Mountain, and downstream at Lily Lake. The pond, the surrounding forest, and adjacent lands are owned by the farm south of the site. Efforts should be made to assist the landowner in continuing to protect this unique site for the future.

Six new odonate species of concern were located at this site in 2005, Sweetflag Spreadwing (*Lestes forcipatus*), Mottled Darner (*Aeshna clepsydra*), Elfin Skimmer (*Nannothemis bella*), Slaty Skimmer (*Libellula incesta*), Lilypad Forktail (*Ischnura kellicotti*), and American Emerald (*Cordulia shurtleffi*). Associated odonate species are Common Green Darner (*Anax junius*), Calico Pennant (*Celithemis elisa*), Racket-tailed Emerald (*Dorocordulia libera*), Marsh Bluet (*Enallagma Ebrium*), Hagen's Bluet (*Enallagma hageni*), Eastern Pondhawk (*Erythemis simplicicollis*), Fragile Forktail (*Ischnura posita*), Swamp Spreadwing (*Lestes vigilax*), Frosted Whiteface (*Leucorrhinia frigida*), Dot-tailed Whiteface (*Leucorrhinia intacta*), Chalk-fronted Corporal (*Libellula (Ladona) julia*), Spangled Skimmer (*Libellula cyanea*), Widow Skimmer (*Libellula luctuosa*), Four-spotted Skimmer (*Libellula quadrimaculata*), Sphagnum Sprite (*Nehalennia gracilis*), and Blue Dasher (*Pachydiplax longipennis*).

A fair populations of a State Endangered plant species of concern, Long-stemmed Water-wort (*Elatine americana*), was located at this sit in 2001. Associated plant species are *Sagittaria graminea* (submersed form) and *Eriocaulon aquaticum*. Threats and disturbances are heavy boat use and invasive species.

GLEN LYON ANTHRACITE MINE (Newport Twp.) SA512A & SA512B – One Federally Threatened animal species (SA512A) and another PA animal species of concern (SA512B) occupy the same man-made habitat at this site. The full extent of these populations are unknown. To persist, the species require not only the mine as a hibernacula, but also adequate nearby feeding areas. The mine

occurs in a highly disturbed area with many abandoned mine shafts and tailings areas amid a matrix of a young successional forest. The tree species present include black and grey birch (*Betula lenta* and *Betula populifolia*), aspen (*Populus sp.),* and sassafras (*Sassafras albidum).* There is some evidence of human disturbance within the mine entrance, and of litter and use of the site as a party spot. The site needs to have continued monitoring of the populations and protection of the mine entrance by gating or other means to prevent disturbance of the rare species.

LILY LAKE (Conyngham, Newport & Slocum Twps.) –UPDATE- SP501A, SP501B, & SP513– This site is a natural glacial lake downstream of the Cranberry Pond site. Three plant species of concern occur at the site (SP510A, SP510B, and SP513). Two of these grow rooted in shallow water along the sandy shoreline at the west end of the lake near the outlet. The associated plant species include St. John's wort (*Hypericum virginicum),* pipewort (*Eriocaulon septangulare),* and grass-leaved arrowhead (*Sagittaria graminea).* The third plant species is a floating aquatic species growing at the same site and floating throughout the lake. The plant is associated with pondweed (*Potamogeton epihydrus),* spike-rush (*Eleocharis palustris),* quillwort (*Isoetes sp.*), water-shield (*Brasenia schreberi*), and bladderworts *(Utricularia sp.*). There is a PA Fish and Boat Commission boat launch at this corner of the lake, and some habitat destruction has occurred. Nonetheless adequate habitat remains for the species of concern. Care should be taken to preserve the windward (southeastern) sandy shoreline areas from disturbance and to maintain a "no-wake" zone here to prevent excessive shoreline erosion by waves. **The plant species SP501A, *Elatine minima* (Small Waterwort), and SP513, Flat-leaved Pondweed (*Potamogeton robbinsii*) have been removed from the species of concern list.**

Three new plant species of concern have been identified at Lily Lake in 2001 and 2003, Flat-leaved Bladderwort (*Utricularia intermedia*), Broad-leaved Water-milfoil (*Myriophyllum heterophyllum*), and Small Beggar-ticks (*Bidens discoidea*). Threats to these species of concern are herbicides and invasive species. Disturbances include boat traffic and other recreational activities.

Five new odonate species have been located at Lily Lake in 2005, Band-winged Meadowhawk (*Sympetrum semicinctum*), Mottled Darner (*Aeshna clepsydra*), Slaty Skimmer (*Libellula incesta*), Halloween Pennant (*Celithemis eponina*), and Lilypad Forktail (*Ischnura kellicotti*). Further surveys need to be conducted to determine the extent of the populations.

PENOBSCOT MOUNTAIN RIDGETOP (Hanover, Newport, Rice, & Slocum Twps.) SP509, SP522, & NC526 - The area consists of an Ephemeral/Fluctuating Pool Natural Community in a matrix of dry oak-heath forest. The rock strata here are tilted sharply upward, creating several parallel outcrops (some of conglomerate) running along the ridgetop, with the pools occurring in the "grooves" between the more resistant outcrops. The matrix forest canopy is open, with areas of lichen-covered rocks and graminoids (*Carex sp*. and *Deschampsia sp*.). The common overstory species include sweet birch (*Betula lenta*), red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), and red maple (*Acer rubrum*). Striped maple (*Acer pensylvanicum*), serviceberry (*Amelanchier sp*.), and American chestnut (*Castanea dentata*) are all present in the understory. The shrub layer has the aforementioned species as well as upland low blueberry (*Vaccinium pallidum*), early low blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), wintergreen *(Gaultheria procumbens*), mountain laurel *(Kalmia latifolia),* and maple-leaved viburnum (*Viburnum acerifolium*). The groundcover is sparse and includes may-apple (*Podophyllum peltatum*), hairgrass (*Deschampsia flexuosa*), cowwheat (*Melampyrum lineare*), common Solomon's seal (*Polygonatum biflorum*), several sedge species (*Carex sp*.), marginal shield fern (*Dryopteris marginalis*),

lichens, and mosses. The outcrops and openings provide habitat for two plant species of concern (SP502 & SP522) along the same ridgetop further east.

The individual pools themselves vary in depth and dominant vegetation. Four pools were visited; two were largely forested, and two consist of a mixture of tall shrub and herbaceous habitat. Additional pools are present that were not visited during this survey. Some of the pools exist as narrow, steep-sided depressions at the base of the rock outcrops. All of the pools had standing water up to 24 inches deep at the time of visit, and a substrate of sphagnum and/or dead oak leaves. These pools have good potential for use by a variety of herptiles. Additional landowner information, early spring surveys, and mapping the extent of the natural community are needed.

ROUTE 11 BOAT LAUNCH – NEW – A Cobra Clubtail dragonfly (*Gomphus vastus*) was documented at this site in 2005. Associated odonate species include Powdered Dancer (*Argia moesta*), Calico Pennant (*Caelithemis elisa*), Ashy Clubtail (*Gomphus lividus*), Eastern Forktail (*Ischnura verticalis*) Common Spreadwing (*Lestes disjunctus*), Swamp Spreadwing (*Lestes vigilax*), Illinois River Cruiser (*Macromia illinoiensis*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*Pantala* hymenaea, Ruby Meadowhawk (*Sympetrum rubicundulum*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).

A Federally and State Threatened species of concern was observed nesting along the Susquehanna River at this site in 2005. Human disturbance, including the creation of new trails threaten this species.

An animal species of concern was observed along the Susquehanna River in 2000. Additional surveys need to be conducted to determine the extent of this species.

SUSQUEHANNA RIVER AT NANTICOKE (City of Nanticoke & Hunlock, Newport & Plymouth Twps.) SA518A & SA518B – Very few specimens of the two mussel species of concern were collected here in 1995. Surveys in 2000 failed to discover any live mussel fauna. This portion of the North Branch of the Susquehanna River has suffered from acid mine drainage, and water quality continues to be compromised by the inflow of Lackawanna River at Wilkes-Barre. It is possible that as the river recovers, the rare species will be able to re-establish itself from populations living above the Lackawanna or downstream of the mine-impact area. No special management is recommended**.**

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

SUSQUEHANNA RIVERLANDS (Salem Twp.) This area consists of approximately 2,500 acres. Pennsylvania Audubon Society has designated it as a Pennsylvania Important Bird Area because it contains fairly extensive riparian and hillside forest (Crossley 1999). Both sides of the North Branch Susquehanna are protected for approximately one mile. The west-side of the park includes public picnic areas, riparian forest, hillside forest, and some marsh and swamp. The site is owned and managed for recreation and environmental education by PPL.

The riparian forest supports populations of yellow-throated vireo (*Vireo flavifrons*), warbling vireo (*Vireo gilvus*), American redstart (*Setaphaga ruticilla*), and northern parula (*Parula americana*). Both northern oriole (*Icterus galbula*) and orchard oriole (*I. spurius*) nest in forest and park land. Wetlands support good populations of swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), willow flycatcher (*Empidonax traillii*), and eastern bluebirds (*Sialis sialis*) nesting in natural cavities. The east side of the park (Sybertsville Quadrant) encompasses many habitats, including hundreds of acres of oak – hickory – pine forest, cliffs, and abandoned fields. Oak-dominated forests support good populations of scarlet tanager *(Piranga*

olivacea), ovenbird (*Seiurus aurocapillus*), wood thrush (*Hylocichla mustlina*), worm-eating warbler (*Helmitheros vermivorus*), pine warbler (*Dendroica pinus*), red-eyed vireo (*Vireo olivaceus*), and rose-breasted grosbeak (*Pheucticus ludovicianus*).

Gould Island, owned by PPL, has a fairly mature forest, especially on its downstream end. Here there are large specimens of silver maple (*Acer saccharinum)*, sycamore (*Platanus occidentalis*), and black maple (*Acer niger*). At least one state-listed bird species has nested here in the past, although none were observed in recent years.

The area contains a good diversity of reptile and amphibian species, including two reptile species of concern. Also, an animal species of concern and river otter have been frequently observed at this site.

The area contains a good diversity of reptile and amphibian species. A reptile species of concern was seen at this site. Further surveys need to be done to determine the extent of the population. Northern River Otters, a mammal species of concern, have also been seen at this site.

In 2000 an animal species of concern was seen at this site along the Susquehanna River. Further surveys are needed to determine the full extent of the population.

Five Lepidopteran species of concern were documented at this site in 1997 and 1999, Mulberry Wing (*Poanes massasoit*), Northern Pearly Eye (*Enodia anthedon*), Aphrodite Fritillary (*Speyeria aphrodite*), Long Dash (*Polites mystic*), and Baltimore Checkerspot (*Euphydryas phaeton*). Threats and disturbances for these species include BT spraying for gypsy moths, herbicides along roadside, draining of marsh, sand and gravel mining, sprawl, drought, and absence of many woodland species.

Locally Significant Area:

Folstown Mud Pond (Newport & Slocum Twps.) –UPDATE- SP517A & SP517B **–** Folstown Mud Pond is a **Locally Significant** glacial wetland apparently impacted by damming and road - building at its western end. The pond may have once been a bog that was inundated when the pond was created. The pond, which is currently used for recreational for boating and fishing, has two parts connected by a narrow channel. The area of the pond closest to the road contains more sediment and floating aquatic plants. This part of the pond is dominated by water shield (*Brasenia schreberi*), water lily (*Nymphaea odorata*), and spatterdock *(Nuphar lutea*). Two good-quality populations of two different former PA-Rare plant species (SP517A & SA517B) were identified at the site**.** The threats to the site include nutrient and sediment load from nearby farms, homes, and the roadway. Management recommendations include protecting the water quality of the site and continued monitoring of the species of concern. **The plant species SP517A, *Potamogeton robbinsii* (Flat-leaved Pondweed), and SP517B, *Utricularia purpurea* (Purple Bladderwort), have been removed from the species of concern list. The rank for this site has been changed to Locally Significant.**

Slender sedge (*Carex lasiocarpa*)
Photo: PNHP

PITTSTON TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
MILL CREEK AT SUSCON							
Umbra pygmaea Eastern Mudminnow SA534	G5	S3		PC	9/26/00	E	
SUSCON RAILROAD GRADE SITE							
Plant Species of Concern SP530	G5	S3		PR	6/06/97	E	

LOCALLY SIGNIFICANT AREAS:

None:

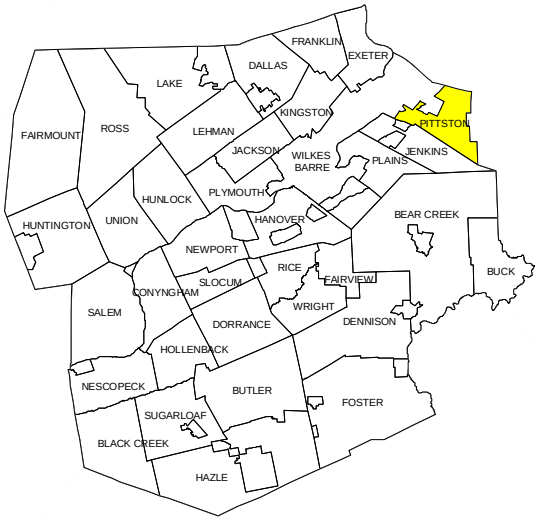
PUBLICLY MANAGED LANDS:

State Game Lands #91

OTHER CONSERVATION AREAS:

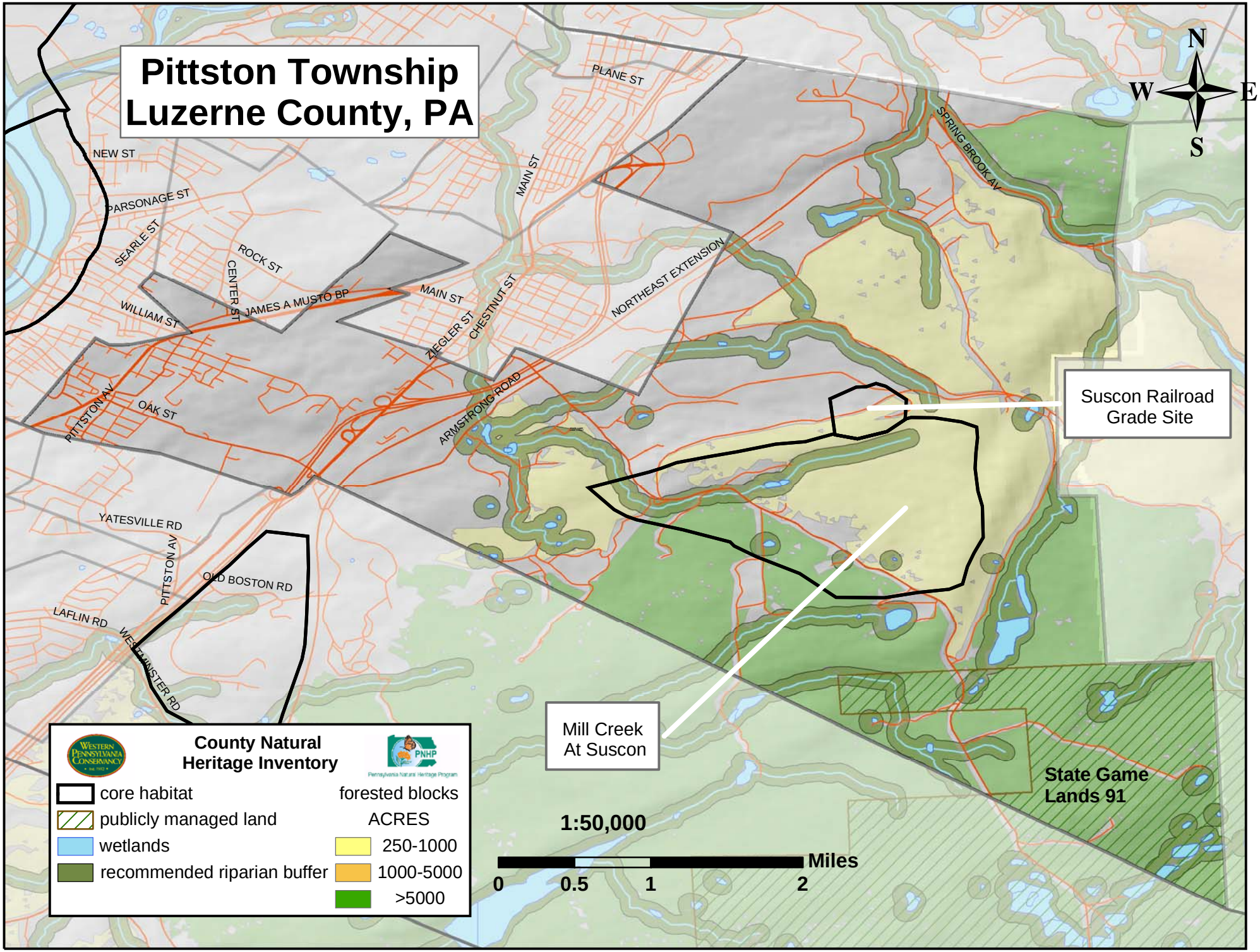
None

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.



MILL CREEK AT SUSCON (Pittston Twp.) SA534 **–** An aquatic animal species of concern (SA534) occupies the upper portions of Mill Creek. The species was first found at the site in September of 2000. Additional surveys are needed to determine the extent and health of this population. The health of the population is dependent upon maintaining good water quality and habitat in the Mill Creek watershed.

SUSCON RAILROAD GRADE SITE (Pittston Twp.)
SP530 - This site consists of a population of a PA-Rare plant species (SP530) growing in disturbed habitat (the old WB-Eastern RR grade) that was last visited in 1997. This is a species of open areas that benefits from regular disturbance. No current threats are evident, although the species will eventually be eliminated by natural succession in the absence of disturbance. Future surveys could assess the condition of the habitat, as well as search for the rare animal species associated with this plant.


Pittston Township
Luzerne County, PA
N
W
E
S
NEW ST
PARSONAGE ST
SEARLE ST
ROCK ST
CENTER ST
WILLIAM ST
JAMES A MUSTO BP
MAIN ST
PLANE ST
MAIN ST
CHESTNUT ST
ZIEGLER ST
NORTHEAST EXTENSION
SPRING BROOK AV
PITTSTON AV
OAK ST
ARMSTRONG ROAD
Suscon Railroad
Grade Site
YATESVILLE RD
PITTSTON AV
OLD BOSTON RD
LAFLIN RD
WESTMINSTER RD
Mill Creek
At Suscon
State Game
Lands 91
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:50,000
0
0.5
1
2
Miles

PLAINS TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
GARDNER CREEK RESERVOIR							
Animal Species of Concern SA537	G4	S3S4		PC	5/11/00	E	
KIRBY PARK/ROUTE 309 BRIDGE SITE							
Falco peregrinus Peregrine Falcon SA531	G4	S1BS1N		PE	6/07/00	B	
Animal Species of Concern SA532	G5T4T5	SU		CR	6/07/00	E	**NEW**
PITTSTON ROOKERY							
Animal Species of Concern SA511	G5	S2S3B		PE	5/08/87	E	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
PLAINS FLATS							
Celithemis eponina Halloween Pennant	G5	S2S3			7/5/04	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
THE TUBS							
Potholes GE506	GNR	SNR			1979	E	

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

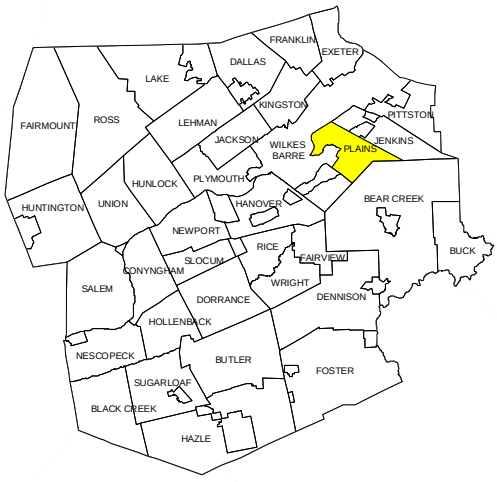
Seven Tubs Nature Area

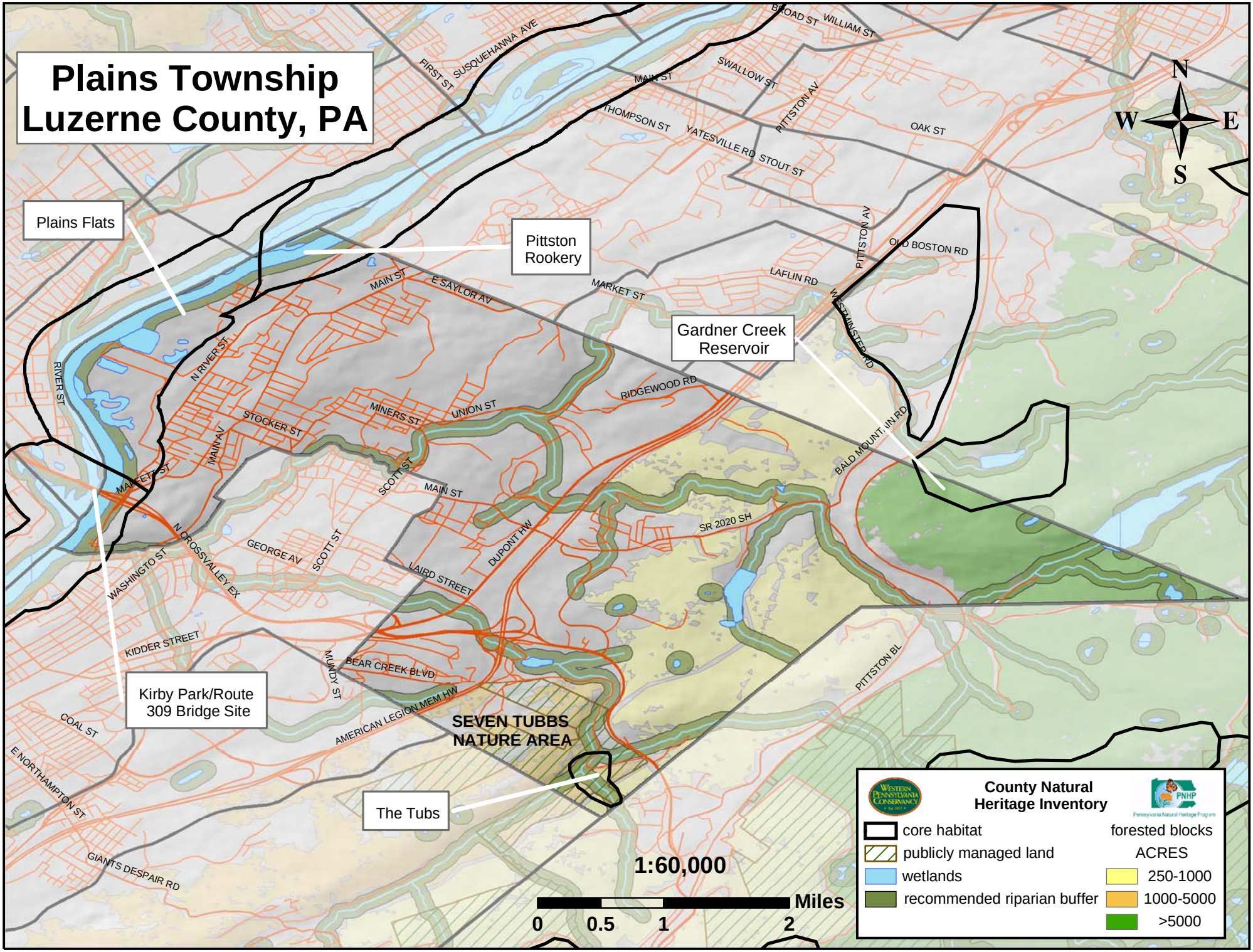
OTHER CONSERVATION AREAS:

None

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

** Please refer to Appendix II for Quality ranks.




Plains Township
Luzerne County, PA
Plains Flats
Pittston Rookery
Gardner Creek Reservoir
Kirby Park/Route 309 Bridge Site
SEVEN TUBBS NATURE AREA
The Tubs
N
S
E
W
BROAD ST
WILLIAM ST
SUSQUEHANNA AVE
FIRST ST
MAIN ST
SWALLOW ST
PITTSTON AV
THOMPSON ST
YATESVILLE RD
STOUT ST
OAK ST
OLD BOSTON RD
LAFLIN RD
MARKET ST
E SAYLOR AV
N RIVER ST
RIVER ST
STOCKER ST
MINERS ST
UNION ST
RIDGEWOOD RD
BALD MOUNTAIN RD
MAIN AV
MARKET ST
SCOTT ST
SR 2020 SH
DUPONT HW
GEORGE AV
N CROSSVALLEY EX
WASHINGTO ST
LAIRD STREET
KIDDER STREET
MUNDY ST
BEAR CREEK BLVD
AMERICAN LEGION MEM HW
PITTSTON BL
COAL ST
E NORTHAMPTON ST
GIANTS DESPAIR RD
1:60,000
Miles
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County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

GARDNER CREEK RESERVOIR (Jenkins & Plains Twps.) SA537 – This site consists of an extensive rock outcrop area north of the Gardner Creek reservoir. An animal species of concern exists at the site (SA537). The forest is relatively young (40+ years). The dominant trees includes chestnut oak (*Quercus prinus*) and other oaks, while the understory is dominated by huckleberry (*Gaylussacia sp.*), and blueberry (*Vaccinium sp.*). The hillside with the rock outcrops recently burned (spring of 2000). There are no apparent disturbances to the site at this time. An extensive clearcut or development of the site are potential threats. Additional surveys are needed to determine the status of the animal population.

KIRBY PARK/ROUTE 309 BRIDGE SITE (Wilkes-Barre City, Plains Twp., & Forty-Fort Boro.) SA531 **–** Peregrine Falcons, a G4, PA-Endangered animal species (SA531), have occurred at this site since 1999. The surrounding land use is transportation, business, recreational, and residential. The nearby shoreline is an alluvial substrate with fill around the bridge piers. The vegetation on the river banks includes silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), tree of heaven (*Ailanthus altissima*), white mulberry (*Morus alba*), crown vetch (*Coronilla varia*), dame's rocket (*Hesperis matronalis*), eastern ninebark (*Physocarpus opulifolius*), garlic mustard (*Allaria officinalis*), honeysuckle (*Lonicera sp.*), and Japanese knotweed (*Polygonum cuspidatum*). The surrounding present land use does not seem to disturb the animal species that occurs here. However, increased boat or jet ski traffic in the river due to the proposed inflatable dam is a possible threat.

In 2000 an animal species of concern was found along the Susquehanna River. Associated plant species include Silver Maple (*Acer saccharinum*), Elm (*Ulmus* sp.), Red Oak (*Quercus rubra*), Mulberry (*Morus* sp), American Basswood (*Tilia americana*), Catalpa (*Catalpa bignonioides*), Black Locust (*Robinia pseudoacacia*), Green Ash (*Fraxinus pennsylvanica*), Jewelweed (*Impatiens* sp), Japanese Knotweed (*Polygonum cuspidatum*), Reed Canary Grass (*Phalaris arundinacea*), Garlic Mustard (*Allaria officinalis*), and Nettles (*Urticaceae*). Surrounding land use includes navigable water to the south, with recreational facilities, residences, and businesses located to the west, east, and north. The floodplain and the river islands are seasonally flooded. The current threat to the species of concern is the proposed inflatable dam that could cause inundation of this floodplain or river islands. Changes in the hydrology could kill the large trees at the site that this species seem to prefer.

PITTSTON ROOKERY (Pittston & Exeter Boros. & Jenkins & Plains Twps.) SA511 –This site is an island in the North Branch of the Susquehanna River that was an active nesting area for an animal species of concern (SA511) for ten years. The island was not visited during the field surveys for the Natural Areas Inventory, but the nesting area has been reported to be no longer active. A field visit during breeding is needed to confirm this report.

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

PLAINS FLATS – NEW – An odonate species of concern, Halloween Pennant (*Celithemis eponina*), was seen at this site in 2004. Associated odonate species include Skimming Bluet (*Enallagma geminatum*), Common Whitetail (*Libellula (Plahemis) lydia*), Blue Dasher (*Pachydilplax longipennis*), Jane's Meadowhawk (*Sympetrum janeae*), Fragile Forktail (*Ischnura posita*), Twelve-spotted Skimmer (*Libellula pulchella*), Wandering Glider (*Pantala flavescens*), Yellow-legged Meadowhawk (*Sympetrum* vicinum), Common Green Darner (*Anax junius*), Unicorn Clubtail (*Arigomphus villosipes*), Familiar Bluet (*Enallagma civile*), Orange Bluet (*Enallagma signatum*), Common Baskettail (*Epitheca cyanosura*), Eastern Forktail (*Ischnura verticalis*), Widow Skimmer (*Libellula luctuosa*), Blue-fronted Dancer (*Argia apicalis*), Powdered Dancer (*Argia moesta*), Calico Pennant (*Celithemis elisa*), Prince

Baskettail (*Epitheca princeps*), Eastern Amberwing (*Perithemis tenera*), and Spot-winged Glider (*Pantala hymenaea*).

In 2000 a new animal species of concern was located at this site along the Susquehanna River. More surveys need to be done to determine the full extent of the population.

THE TUBS (Plains Twp.) GE525 **–** The Tubs is a Whirlpool Canyon with a series of falls over sandstone and conglomerate rock of the Pocono Formation. The canyon may have formed around 10,000 years ago when a meltwater stream flowing through a glacier plunged over the edge of the ice or ice cliff within the glacier (Geyer and Bolles, 1987). Wheelbarrow Run, which flows through the Tubs, is reported to have a naturally reproducing Brook Trout population. Today, this area is a county park that is used for passive recreation. Littering by visitors is a disturbance. The development of the surrounding land is a potential threat the quality of this site.

The PA-Rare **Lupine**.

Photo: PA Science Office of The Nature Conservancy

PLYMOUTH TOWNSHIP AND EDWARDSVILLE, LARKSVILLE, AND PLYMOUTH BOROUGHS

	PNHP Rank*		Legal Status*		Last Seen	Quality*	Status
	Global	State	Federal	State	(m/d/y)	*	
NATURAL HERITAGE AREAS:							
SHICKSHINNY MOUNTAIN RIDGETOP							
Animal Species of Concern	G4	S3S4		PC	4/20/04	E	**NEW**
Elymus trachycaulus Slender Wheatgrass	G5	S3		TU	7/01/03	B	**NEW**
Hesperia Leonardus Leonard's Skipper SP519	G4	S3S4			8/24/00	CD	**UPDATED**
Prunus pumila var. susquehanae Sand Cherry SA519	G5T4	S2		PT	8/24/00	CD	**UPDATED**
SUSQUEHANNA RIVER at HANOVER GREEN							
Animal Species of Concern	G5T4T5	SU			2000	E	**NEW**
SUSQUEHANNA RIVER at NANTICOKE							
Anodonta implicata Alewife Floater SA518A	G5	SNR		CU	9/29/95	D	**UPDATED**
Lampsilis cariosa Yellow Lampmussel SA518B	G3G4	S3S4		CU	9/29/95	D	**UPDATED**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
TILBURY KNOB							
Prunus pumila var. susquehanae Sand Cherry SP515	G5T4	S2		PT	6/17/99	D	**UPDATED**

LOCALLY SIGNIFICANT AREAS:

Shickshinny Mountain Slopes

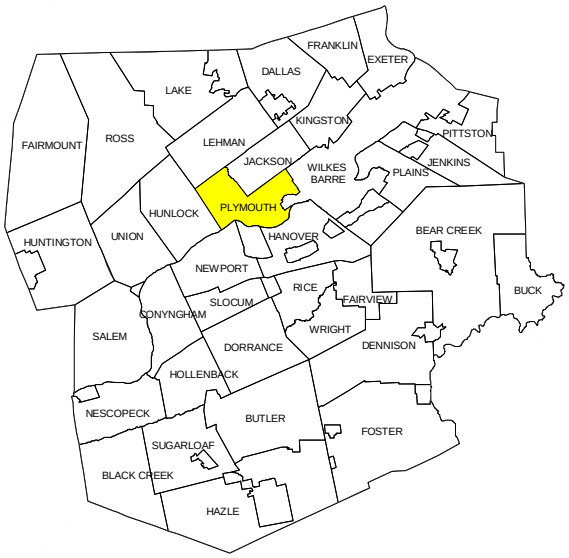
PUBLICLY MANAGED LANDS:

Lackawanna State Forest

Moon Lake Park

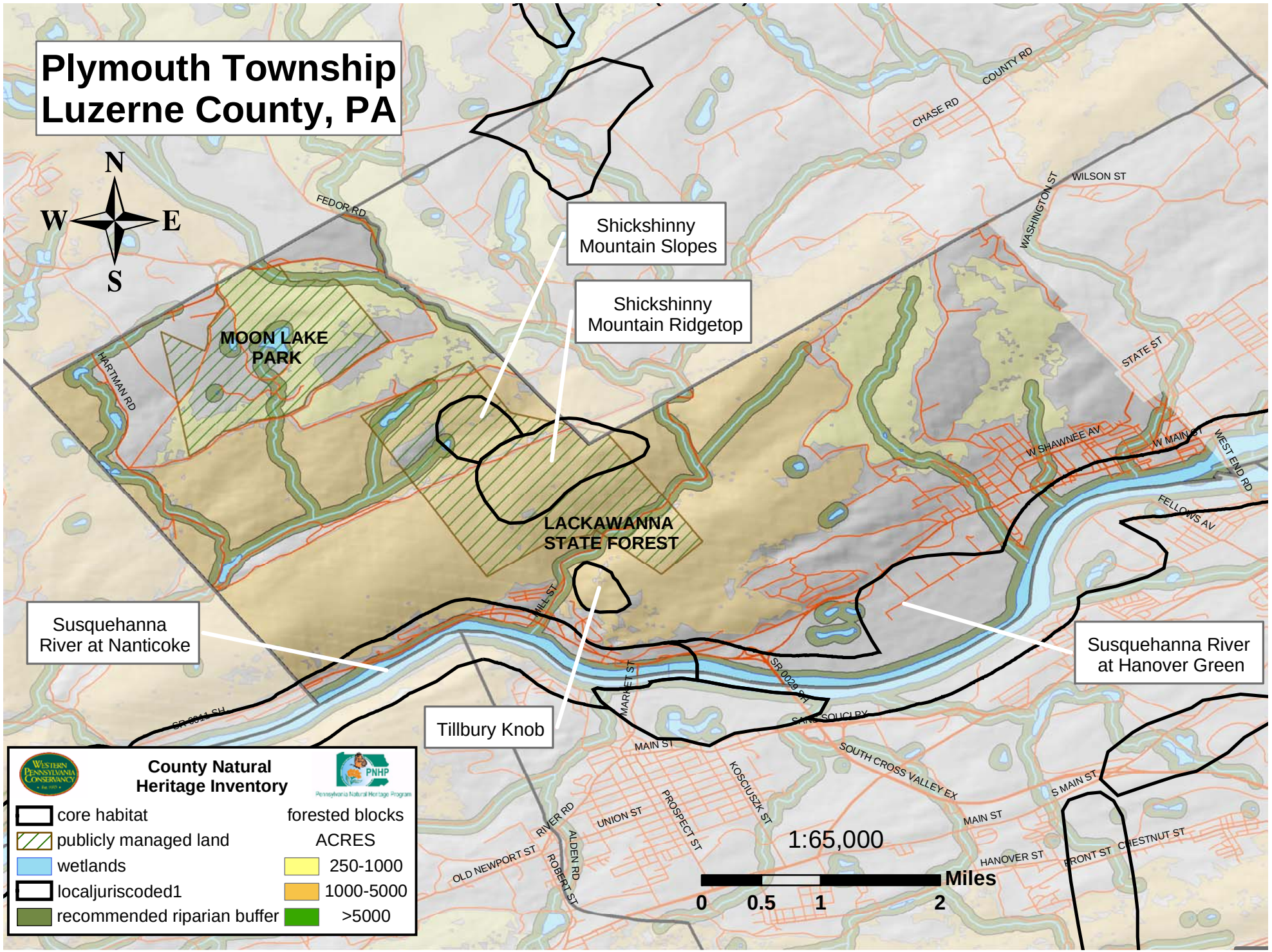
OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area



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

** Please refer to Appendix II for Quality ranks.


Plymouth Township
Luzerne County, PA
N
W
E
S
Shickshinny Mountain Slopes
Shickshinny Mountain Ridgetop
MOON LAKE PARK
LACKAWANNA STATE FOREST
Susquehanna River at Nanticoke
Tillbury Knob
Susquehanna River at Hanover Green
FEDOR RD
HARTMAN RD
CHASE RD
COUNTY RD
WASHINGTON ST
WILSON ST
STATE ST
W SHAWNEE AV
W MAIN ST
WEST END RD
FELLOWS AV
MILL ST
MARKET ST
SR 0029 SH
MAIN ST
SOUTH CROSS VALLEY EX
S MAIN ST
KOSCIUSZK ST
PROSPECT ST
UNION ST
RIVER RD
ALDEN RD
ROBERT ST
OLD NEWPORT ST
HANOVER ST
FRONT ST
CHESTNUT ST
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
localjuriscoded1
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:65,000
0
0.5
1
2
Miles

SHICKSHINNY MOUNTAIN RIDGETOP (Jackson & Plymouth Twps.) SA519 & SP519 - This site includes populations of a fair to poor-quality population of a PA-Rare plant species (SP519), and a population of an animal species of concern (SA519). The plant species of concern was growing out of thin soil on a narrow ridgetop spine. The plant species occurs in open habitat with areas of exposed conglomerate bedrock. The associated plant species include black huckleberry (*Gaylussacia baccata*), blueberry (*Vaccinium sp.*,) blackberry (*Rubus alleghaniensis*), hairgrass (*Deschampsia flexuosa*), sorrel (*Rumex acetosella*), dogbane (*Apocynum androsaefolium*), bracken fern (*Pteridium aquilinium*), cowwheat *(Melampyrum lineare),* rock-harlequin (*Corydalis sempervirens*), turkey-foot grass (*Andropogon gerardii*), and marginal wood fern (*Dryopteris marginalis*). The sparse overstory included pitch pine, (Pinus rigida), chestnut oak *(Quercus prinus*), and fire cherry (*Prunus pennsylvanica*). The site appears to have burned. Competition from blackberry or other species, succession to a closed canopy, and deer browse are all threats to this small population. However, there is likely to be additional habitat along the ridgetop to the southwest. No special management of the site is recommended.

The animal species of concern was collected from open grassy habitat along a large powerline right-of-way just north of the ridgetop. Additional surveys are needed to determine the extent of this population. The right-of-way contained a mixture of grasses and shrubby vegetation, including turkey-foot grass (*Andropogon gerardii*), goldenrod (*Solidago sp.*), and dogwood (*Cornus racemosa* and *Cornus florida*). The powerline runs the length of Shickshinny Mountain, presumably providing extensive additional potential habitat. Spraying of the powerline or the adjacent forest with pesticide could affect the population. This site occurs within Lackawanna State Forest.

A new plant species of concern, Slender Wheatgrass (*Elymus trachycaulus*), was located at this site in 2003. Associated species are *Solidago rugosa, Panicum clandestinum, Apocynum cannabinum,* and *Deschampsia flexuosa*. Threats are eventual succession. Exotic species and rare ATV traffic are disturbances.

A new animal species of concern was seen at this site in 2004. Associated species include *Quercus montana, Quercus rubra, Betula lenta, Vaccinium spp*., and *Gaylussacia baccata*.

SUSQUEHANNA RIVER at HANOVER GREEN (Hanover, Plymouth & Wilkes Barre Twps.) NEW – A new occurrence of an animal species of concern was located at this site in 2000. More surveys need to be conducted to assess the full extent of the population.

SUSQUEHANNA RIVER AT NANTICOKE (City of Nanticoke & Hunlock, Newport & Plymouth Twps.) SA518A & SA518B – Very few specimens of the two mussel species of concern were collected here in 1995. Surveys in 2000 failed to discover any live mussel fauna. This portion of the North Branch of the Susquehanna River has suffered from acid mine drainage, and water quality continues to be compromised by the inflow of Lackawanna River at Wilkes-Barre. It is possible that as the river recovers, the rare species will be able to re-establish itself from populations living above the Lackawanna or downstream of the mine-impact area. No special management is recommended.

A new animal species of concern was found at this site in 2000. Further surveys need to be done to determine the extent of the population.

TILBURY KNOB (Plymouth Twp.) SP515 – A poor-quality population of a PA-Rare plant species (SP515) occurs at this site on the crest of a red shale cliff in xeric, thin soils. The associated plant species

include hairgrass (*Agrostis hyemalis*), blueberry (*Vaccinum sp.*), Virginia pine (*Pinus virginiana*), sweet birch (*Betula lenta*), chokeberry (*Aronia sp.*), and various oak species. No special management is recommended for this site.

Locally Significant Area:

Shickshinny Mountain Slopes (Plymouth Twp.) – This **Locally Significant** site occurs on a saddle or cove on the north slope of Shickshinny Mountain, near the headwaters of Hunlock Creek. The forest community is second-growth northern-hardwood of intermediate age. The dominant tree species include sugar maple (*Acer saccharum*), American basswood (*Tilia americana)*, white ash (*Fraxinus americana*), black cherry *(Prunus serotina*), white oak (*Quercus alba*), and eastern hemlock (*Tsuga canadensis*). The site is designated as Locally Significant because of the high diversity of wildflower species present. Some of these species are associated with high-pH or nutrient-rich conditions. Several rock outcrops with small seeps occur just upslope of the site, perhaps the source of the rich soil conditions. Herbaceous and shrub species present include maple-leaved viburnum (*Viburnum acerifolium)*, witch-hazel (Hamamelis virginiana), striped maple *(Acer pensylvanicum*), Virginia creeper *(Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), maidenhair fern (*Adiantum pedatum*), false Solomon's seal (*Smilacina racemosa)*, wild sarsaparilla (*Aralia nudicaulis*), silvery spleenwort (*Deparia acrostichoides*), wire grass (*Brachyelytrum erectum)*, wild ginger (*Asarum canadense)*, bellwort (*Uvularia perfoliatum*), liver-leaf *(Hepatica americana*), baneberry (*Actaea rubra*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda claytoniana*), Canada mayflower (*Maianthemum canadense*), sweet-cicely *(Osmorhiza claytonii*), moonseed (*Menispermum canadense*), and many others. The site has potential for several rare plant species of concern and should be revisited in late spring. Establishing a small no disturbance zone around the site would prevent disturbance to the soil and the diversity of the wildflowers present.

RICE TOWNSHIP AND NUANGOLA BOROUGH

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
ANDY POND							
Rallus limicola Virginia Rail SA537	G5	S3B			6/08/99	E	
HAYSTACK MOUNTAIN							
Amelanchier humilis Serviceberry SP507A	G5	S1		PE	6/27/96	BC	**UPDATED**
Carex bicknellii Bicknell's Sedge	G5	S1		PE	7/10/01	C	**NEW**
Plant Species of Concern SP530A	G5	S3		PR	6/18/97	D	
Northern Appalachian Acidic Rocky Summit Community NC501	G?	S2			8/22/91	AB	
Oryzopsis pungens Slender Mountain-ricegrass SP530B	G5	S2		PE	6/18/97	D	
Potentilla tridentate Three-toothed Cinquefoil SP507B	G5	S1		PE	6/24/99	B	
Prunus pumila var. susquehanae Sand Cherry SP507C	G5T4	S2		PT	6/27/97	B	**UPDATED**
NUANGOLA LAKE							
Bidens discoidea Small Beggar-ticks	G5	S3		PR	9/16/03	B	**NEW**
Elatine minima Small Waterwort SP511A	G5	S4		DL	8/19/99	C	**DELISTED**
Lycaena epixanthe Bog Copper SA536	G4G5	S2			7/2002	E	**UPDATED**
Najas gracillima Thread-like Naiad SP502	G5?	S4		DL	7/07/88	E	**DELISTED**
Potamogeton robbinsii Flat-leaved Pondweed SP511B	G5	S4		DL	7/07/88	E	**DELISTED**
Xyris montana Northern Yellow-eyed Grass SP512	G4	S4		DL	8/19/99	B	**DELISTED**
NUANGOLA RAILROAD TUNNEL							
Myotis septentrionalis Northern Myotis SA531	G4	S3B, S3N		CR	4/27/02	E	**UPDATED**

PENOBSCOT MOUNTAIN RIDGETOP						
Ephemeral/Fluctuating Natural Pool NC526	G?	S3		6/21/00	E	
Helianthemum bicknellii Bicknell's Hoary Rockrose SP509	G5	S2	PE	8/09/90	D	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2	PT	8/09/90	D	**UPDATED**

LOCALLY SIGNIFICANT AREAS:

Nuangola Station Swamp

PUBLICLY MANAGED LANDS:

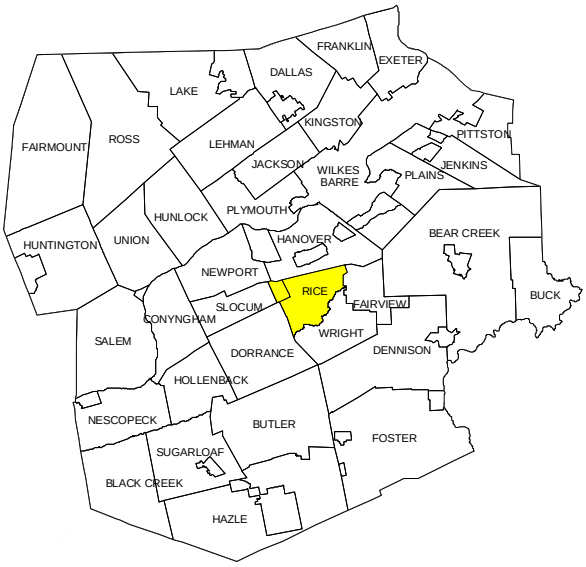
State Game Lands #207

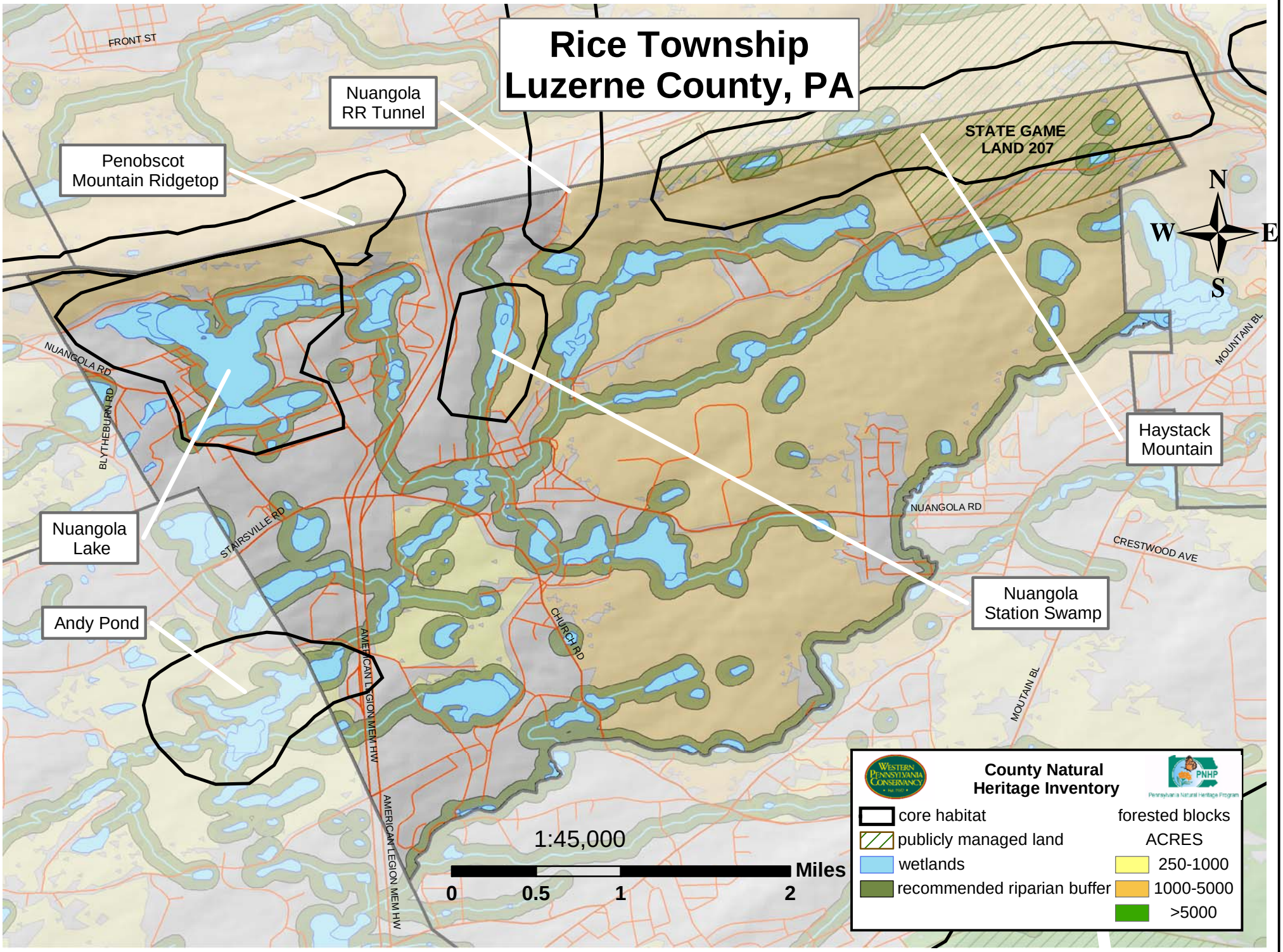
OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.

Bog Copper Butterfly (*Lycaena epixanthe*)
Photo: John Kunsman-PNHP




Rice Township
Luzerne County, PA
Nuangola RR Tunnel
Penobscot Mountain Ridgetop
STATE GAME LAND 207
Haystack Mountain
Nuangola Lake
Andy Pond
Nuangola Station Swamp
FRONT ST
NUANGOLA RD
BLYTHEBURN RD
STAIRSVILLE RD
AMERICAN LEGION MEM HW
CHURCH RD
MOUNTAIN BL
CRESTWOOD AVE
N
W
E
S
1:45,000
0
0.5
1
2
Miles
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

ANDY POND (Dorrance & Rice Twps.) SA537 – This site on private property has an estimated 35 acres of mixed shrub swamp and additional wetland habitats. An animal species of concern (SA537) was observed in the shrub wetland, but this animal will mainly use sedge and cattail areas. River otters (*Lutra canadensis*) were also observed at the site, but evidence of breeding and regular site-use is needed. The potential threats include development and changes in the hydrology of the marsh.

HAYSTACK MOUNTAIN (Rice, Fairview, and Hanover Twps.) SP507A, SP507B, SP507C, SP530A, SP530B, & NC501 **–** This site is a good- to excellent-quality high elevation (1,600-1,870 feet) Northern Appalachian Acidic Rock Summit Natural Community (NC501) characterized by open, rocky areas with sparse vegetation. A xeric oak forest (*Quercus montana*) and thickets of scrub oak (*Quercus ilicifolia*) surround these scattered open areas. Powerlines and jeep trails cut through the site located mostly on State Game Lands #207. Since 1996, five plant species of concern were identified at the site. The wildfires that periodically burn the area are actually good for the plant species that grow in this natural community. Fire suppression and trash dumping are potential threats to the plants.

A small population of a State Endangered plant species of concern, Bicknell's Sedge (*Carex bicknellii*) was located at this site in 2001. Associated species include *Deschampsia flexuosa, Andropogon gerardii, Polytrichum sp, Carex pensylvanica, Apocynum androsaemifolium*, and *Carex argyrantha*. The surrounding land use is hunting and outdoor recreation. A threat to the species of concern is fire, which appears to be a minimal component of the system.

NUANGOLA LAKE (Rice Twp. & Nuangola Boro.) –UPDATE- SP502, SP511A, SA511B, SP512, & SA536 - This is a large glacial lake, likely once an extensive bog lake before the outlet at its south end was dammed. Five different plants and one animal species of concern are found here, both in the lake itself and in the remnant bog mats around its edges. All of the plant species appear to be doing well. The aquatic species are dependent on maintaining the water quality of the lake. Because the lake shore has numerous cottages and homes and additional development has been proposed, water quality degradation is a threat. **The plant species SP502, *Najas gracillima* (Bushy Naiad), SP511A, *Elatine minima* (Small Waterwort), SP511B *Potamogeton robbinsii* (Flat-leaved Pondweed), and SP512, *Xyris montana* (Northern Yellow-eyed Grass), have been removed from the species of concern list.**

A good population of a plant species of concern, Small Beggar-ticks (*Bidens discoidea*) was found at this site in 2003. Associated plant species are *Bidens frondosa, Bidens comosa, Bidens cernua, Cicuta bulbifera, Vaccinium macrocarpon, Chamaedaphne calyculata,* and *Decodon verticillata*. Threats are turbulence and shoreline erosion due to high speed boating and nutrient enrichment. A disturbance is the high density housing around approximately two-thirds of the shoreline.

NUANGOLA RAILROAD TUNNEL (Hanover & Rice Twps.) SA531 **–** A small population of an animal species of concern has been documented in this tunnel on State Game Lands #207. Additional habitat information is needed. The animal species is periodically monitored by the PA Game Commission.

PENOBSCOT MOUNTAIN RIDGETOP (Hanover, Newport, Rice, & Slocum Twps.) SP509, SP522, & NC526 - The area consists of an Ephemeral/Fluctuating Pool Natural Community in a matrix of dry oak-heath forest. The rock strata here are tilted sharply upward, creating several parallel outcrops (some of conglomerate) running along the ridgetop, with the pools occurring in the "grooves" between the more resistant outcrops. The matrix forest canopy is open, with areas of lichen-covered rocks and graminoids

(*Carex sp*. and *Deschampsia sp*.). The common overstory species include sweet birch (*Betula lenta*), red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), and red maple (*Acer rubrum*). Striped maple (*Acer pensylvanicum*), serviceberry (*Amelanchier sp*.), and American chestnut (*Castanea dentata*) are all present in the understory. The shrub layer has the aforementioned species as well as upland low blueberry (*Vaccinium pallidum*), early low blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), wintergreen *(Gaultheria procumbens*), mountain laurel *(Kalmia latifolia),* and maple-leaved viburnum (*Viburnum acerifolium*). The groundcover is sparse and includes may-apple (*Podophyllum peltatum*), hairgrass (*Deschampsia flexuosa*), cowwheat (*Melampyrum lineare*), common Solomon's seal (*Polygonatum biflorum*), several sedge species (*Carex sp*.), marginal shield fern (*Dryopteris marginalis*), lichens, and mosses. The outcrops and openings provide habitat for two plant species of concern (SP502 & SP522) along the same ridgetop further east.

The individual pools themselves vary in depth and dominant vegetation. Four pools were visited; two were largely forested, and two consist of a mixture of tall shrub and herbaceous habitat. Additional pools are present that were not visited during this survey. Some of the pools exist as narrow, steep-sided depressions at the base of the rock outcrops. All of the pools had standing water up to 24 inches deep at the time of visit, and a substrate of sphagnum and/or dead oak leaves.

These pools have good potential for use by a variety of herptiles. Additional landowner information, early spring surveys, and mapping the extent of the natural community are needed.

Locally Significant Areas:

Nuangola Station Swamp (Rice Twp.) – This **Locally Significant** area is a mixed broadleaf-conifer swamp bisected by a small meandering stream. The swamp has numerous small pools and seeps and a well-developed micro-topography of pits and tip-up mounds. There are no recent signs of logging. Black ash (*Fraxinus nigra*) is notable for its abundance here. Other plant species at the site include hemlock (*Tsuga canadensis*), white pine, (*Pinus strobus*) yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), cinnamon fern (*Osmunda cinnamomea*), sphagnum moss (*Sphagnum sp*.), sedges (*Carex trisperma, Carex sp.),* partridgeberry (*Mitchella repens*), turtlehead *(Chelone glabra*), sensitive fern (*Onoclea sensibilis*), manna-grass (*Glyceria sp*.), crowfoot (*Ranunculus sp.*), and gold thread (*Coptis groenlandica*). There are ATV trails along the margin of the swamp and through its north end. No current threats are evident and allowing the forest to mature will improve the quality of the plant community.

ROSS TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
BEAR SWAMP							
Animal Species of Concern	G5	S3				E	**NEW**
BOULDER RUN SWAMP							
Acidic Shrub Swamp NC521	G5	S3			5/29/00	C	
Animal Species of Concern SA522, SA523	G5	S1S2B		PE	7/13/00	C	**UPDATED**
Ledum groenlandicum Common Labrador-tea SP521	G5	S3		PR	5/29/00	C	
HARRIS POND							
Myriophyllum heterophyllum Broad-leaved Water-milfoil	G5	S1		PE	8/14/03	E	**NEW**
HUNTINGTON CREEK							
Umbra pygmaea Eastern Mudminnow SA510	G5	S3		PC	8/11/98	E	
INDEFATIGABLE SWAMP							
Boreal Conifer Swamp NC534	G?	S3			6/13/00	BC	
Animal Species of Concern SA533	G5	S1S2B		PE	6/14/00	E	**UPDATED**
Ledum groenlandicum Common Labrador-tea SP534	G5	S3		PR	6/13/00	BC	
Plant Species of Concern SP532	G3	S1		PE	7/12/00	C	
Stellaria borealis Mountain Starwort SP533	G5	S1S2		TU	7/12/00	C	**UPDATED**
THE MEADOWS/BEECH LAKE							
Aegolius acadicus Northern Saw-whet Owl SA551	G5	S3B,S3N			5/04/00	E	
Anax longipes Comet Darner	G5	S1S2			6/26/04	E	**NEW**
Boyeria grafiana Ocellated Darner	G5	S3			9/07/02	E	**NEW**
Carterocephalus palaemon mandan Arctic Skipper SA525	G5T5	S2			6/1/02	B	**NEW**
Animal Species of Concern SA524	G4	S3			6/06/98	BC	
Cordulia shurtleffi American Emerald	G5	S3S4			6/26/04	E	**NEW**
Enallagma annexum Northern Bluet	G5	S3				E	**NEW**

Enallagma boreale Boreal Bluet	G5	S2		6/12/05	E	**NEW**
Gentiana linearis Narrow-leaved Gentian SP514A	G4G5	S4	DL	8/20/99	C	**DELISTED**
Glyceria borealis Small-floating Manna-grass SP514B	G5	S4	DL	8/20/99	CD	**DELISTED**
Gomphaeschna furcillata Harlequin Darner	G5	S2		6/25/05	E	**NEW**
Gomphaeschna furcillata Harlequin Darner	G5	S2		6/26/04	E	**NEW**
Leucorrhinia glacialis Crimson-ringed Whiteface	G5	S3S4		6/12/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4		6/26/04	E	**NEW**
Muhlenbergia uniflora Fall Dropseed Muhly SP514C	G5	S2	PT	9/10/99	D	**UPDATED**
Somatochlora walshii Brush-tipped Emerald	G5	S2		9/07/02	E	**NEW**
Utricularia purpurea Purple Bladderwort SP514D	G5	S4	DL	9/10/99	D	**DELISTED**
MOUNTAIN SPRINGS LAKES						
Bartonia paniculata Screw-stem SP512A	G5	S3	TU	9/01/99	C	**UPDATED**
Boloria selene myrina Silver Bordered Fritillary	G5	S1S3		8/02/05	B	**NEW**
Gentiana linearis Narrow-leaved Gentian SP512B	G4G5	S4	DL	9/01/99	B	**DELISTED**
Gentiana linearis Narrow-leaved Gentian SP513A	G4G5	S4	DL	8/20/99	CD	**DELISTED**
Glyceria borealis Small-floating Manna-grass SP512C, SP513C	G5	S4	DL	9/01/99	C	**DELISTED**
Muhlenbergia uniflora Fall Dropseed Muhly SP512D, SP513B	G5	S2	PT	9/01/99	BC	**UPDATED**
Utricularia purpurea Purple Bladderwort SP513D	G5	S4	DL	8/20/99	D	**DELISTED**
NEVEL SWAMP						
Acidic Broadleaf Swamp NC503	G5	S3		5/20/86	B	
OPOSSUM SWAMP						
Gaultheria hispidula Creeping Snowberry SP524A	G5	S3	PR	4/06/95	C	
Ledum groenlandicum Common Labrador-tea SP524B	G5	S3	PR	4/06/95	D	

SHINGLE RUN						
Enodia anthedon Northern Pearly-eye	G5	S3S4		7/24/99	E	**NEW**
Speyeria atlantis Atlantis Fritillary	G5	SU		7/24/99	E	**NEW**
Speyeria Aphrodite Aphrodite Fritillary	G5	S3S4		7/24/99	E	**NEW**
STATE GAME LANDS #57						
Animal Species of Concern SA502, SA518, SA519, SA520	G4	S3S4	PC	9/19/00	E	
SYLVAN LAKE						
Bidens discoidea Small Beggar-ticks	G5	S3	PR	10/07/03	BC	**NEW**
WOLF RUN HEADWATERS SWAMP						
Animal Species of Concern SA517A	G5	S2S3B,S3N		7/07/00	E	
Gentiana linearis Narrow-leaved Gentian SP516	G4G5	S4	DL	8/16/00	B	DELISTED
Lycaena epixanthe Bog Copper SA517B	G4G5	S2		7/07/00	E	

LOCALLY SIGNIFICANT AREAS:

Roaring Brook Swamp

PUBLICLY MANAGED LANDS:

State Game Lands #206

State Game Lands 13/57

Rickets Glen State Park

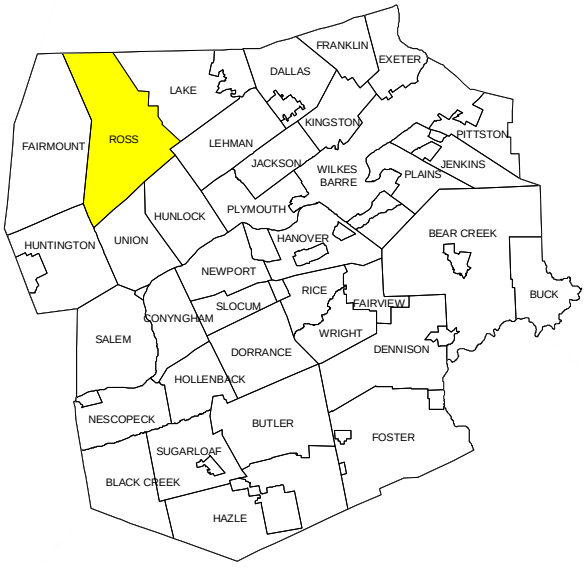
OTHER CONSERVATION AREAS:

North Mountain - Ricketts Glen State Park Important Bird Area

Ricketts Glen State Park / SGLs 57/13/16 Important Mammal Area

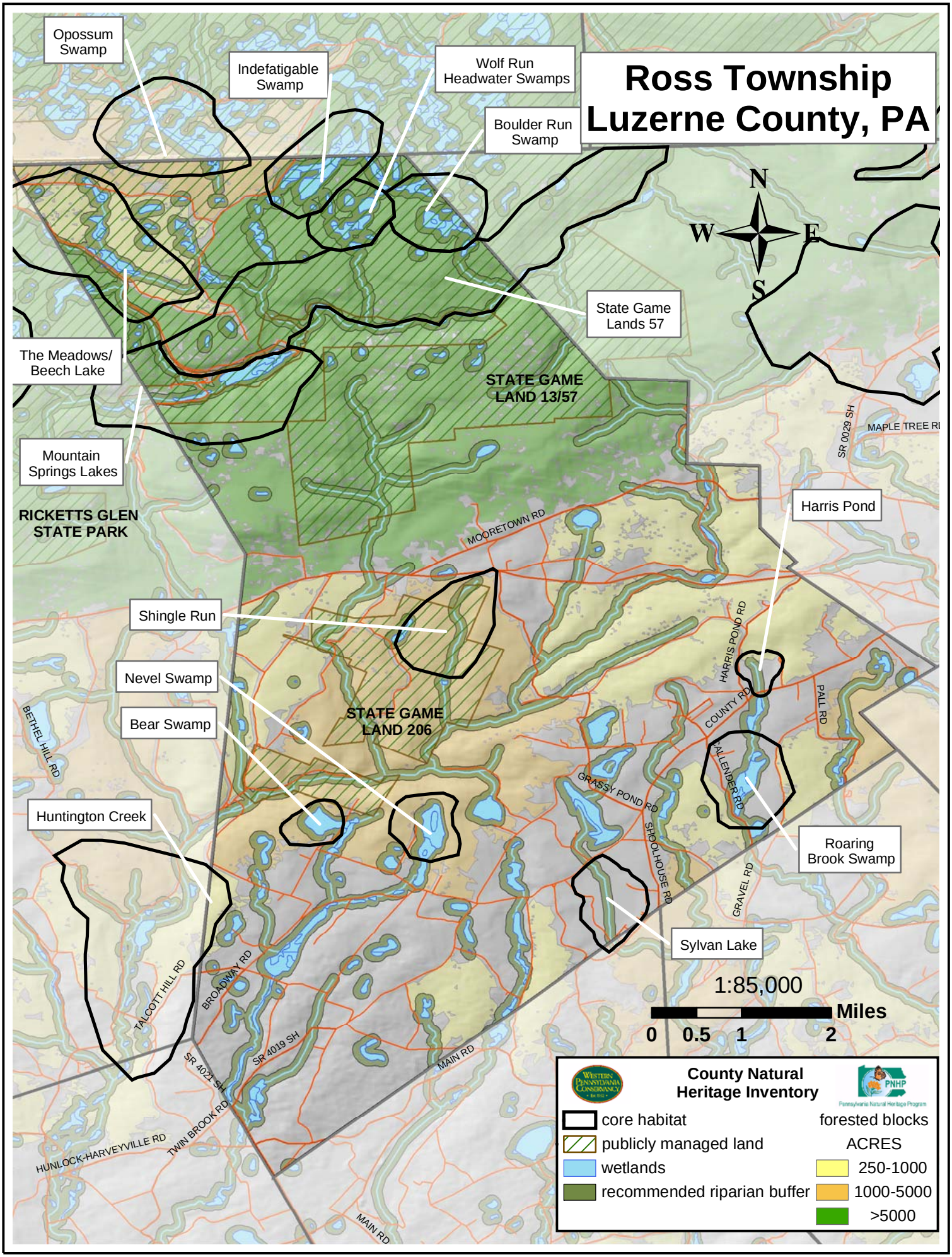
Bean Run - High Quality Cold Water Fishery

Wolf Run - High Quality Cold Water Fishery



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

** Please refer to Appendix II for Quality ranks.


Ross Township
Luzerne County, PA
Opossum Swamp
Indefatigable Swamp
Wolf Run Headwater Swamps
Boulder Run Swamp
State Game Lands 57
The Meadows/ Beech Lake
Mountain Springs Lakes
STATE GAME LAND 13/57
RICKETTS GLEN STATE PARK
Harris Pond
Shingle Run
Nevel Swamp
Bear Swamp
STATE GAME LAND 206
Huntington Creek
Roaring Brook Swamp
Sylvan Lake
MOORETOWN RD
HARRIS POND RD
COUNTY RD
PALL RD
FALLENDER RD
GRASSY POND RD
SCHOOLHOUSE RD
GRAVEL RD
BETHEL HILL RD
TALCOTT HILL RD
BROADWAY RD
SR 4021 SH
SR 4019 SH
MAIN RD
TWIN BROOK RD
HUNLOCK-HARVEYVILLE RD
SR 0029 SH
MAPLE TREE RD
N
W
E
S
1:85,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

BEAR SWAMP (Ross Twp.) - **UPDATE** - This area is a young-to-mid-successional forested swamp consisting of a mixture of conifers and hardwood species. There are occasionally large (15-inch diameter or more) white pine (*Pinus strobus*) trees but the average tree size is much smaller. The other overstory species include red spruce (*Picea rubens*), red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula alleghaniensis*). Sensitive fern (*Onoclea sensibilis*), cinnamon fern, (*Osmunda cinnamomea*), manna grass (*Glyceria sp*.), blue-bead lily (*Clintonia borealis*), sphagnum (*Sphagnum sp*.), skunk cabbage (*Symplocarpus foetidus*), turtlehead (*Chelone glabra*), Canada mayflower, (*Maianthemum canadense*) and various sedges (*Carex sp*.) are present in the groundcover. Hermit thrushes (*Catharus guttatus*), and black-capped chickadees (*Parus atricapillus*) are among the wildlife observed during a brief visit.

Roaring Brook Swamp (Ross Twp.) This Locally Significant area consists of a disturbed third-growth mixed broadleaf and conifer swamp on the east side of Roaring Brook. Hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), black ash (*Fraxinus nigra*), red maple (*Acer rubrum*), and white pine (*Pinus strobus*) occur in the overstory that has numerous gaps and openings. The understory plant species present include silky dogwood (*Cornus amomum*), arrow-wood (*Viburnum dentatum*), and winterberry (*Ilex verticillata*). The groundcover plant species include sedges (*Carex bromoides & Carex. sp.)*, bedstraw (*Gallium sp.*), skunk cabbage *(Symplocarpus foetidus*), sphagnum moss (*Sphagnum sp*), cinnamon fern (*Osmunda cinnamomea*), jewelweed (*Impatiens capensis*), horsetail *(Equisetum arvense*), wood fern (*Dryopteris celsa*) and goldenrods (*Solidago sp*.). A bird species of concern was also observed using the habitat, although reproduction at the site was not confirmed. Other bird species heard at the site include Louisiana waterthrush (*Seiurus motacilla*), ovenbird (*Seiurus aurocapillus*), veery (*Catharus fuscescens*), red-eyed vireo *(Vireo olivaceus*), eastern pewee (*Contopus virens*), and tufted titmouse (*Parus bicolor*). Marshy openings and old beaver impoundments along the creek break the canopy of the swamp. The avoidance logging in the wetland and in the buffering uplands will help this Locally Significant area to recover from past disturbances.

A reptile species reported from previous survey visits has since been added to the species of concern list. With this new information, this area is moved from the Locally Significant category to that of State-wide Significance.

BOULDER RUN SWAMP (Ross & Lake Twps.) SP521, SA522, SA523, & NC521 – This site is an Acidic Shrub Swamp Natural Community (NC521) near the edge of the Allegheny Front. The natural community grades into an upland red spruce forest to the northeast, a palustrine red spruce swamp to the northwest, and a highbush blueberry-sphagnum wetland to the south. A PA-Rare shrub (SP521) is one of the dominant plants found in the low-shrub swamp along with leatherleaf (*Chamaedaphne calyculata*). Additional dominant plants include black spruce (*Picea mariana*), red spruce (*Picea rubens*), highbush blueberry (*Vaccinium corymbosum*), large cranberry (*Vaccinium macrocarpon*), small *cranberry (Vaccinium oxycoccos*), sheep laurel (*Kalmia angustifolia*), pitcher plant (*Sarracenia purpurea*), sundew (*Drosera sp*.), sedges (*Carex trisperma* & *Carex canescens*), and sphagnum moss (*Sphagnum sp*.). The shrub swamp has deep peat soils and a small floating mat area adjacent to a pool.

Two breeding occurrences of a PA-Threatened animal species (SA522 & SA523) were documented. Bird species noted here included northern waterthrush (*Seiurus noveboracensis*), Canada warbler (*Wilsonia canadensis*), hairy *woodpecker (Picoides villosus*), Nashville warbler (*Vermivora ruficapilla*), blackburnian warbler (*Dendroica fusca*), and black and white warbler (*Mniotilta varia*). There is no sign of recent habitat disturbance at the site, although the early successional stage suggests beaver activity in the past. The preservation of the existing hydrology is important for the plant species found in the swamp. Additional

surveys are needed to assess the quality of the animal species. Logging in or near the swamp are possible threats to the site. The site is located on State Game Lands #57.

HARRIS POND – NEW – An excellent quality population of Broad-leaved Water-milfoil (*Myriophyllum heterophyllum*), a state endangered species, was discovered at this site in 2003. This aquatic plant species covers almost the entire lake. Threats to this species include mechanical or chemical removal.

HUNTINGTON CREEK (Fairmount, Huntington & Ross Twps.) SA510 – An S3, PA-Candidate animal species of concern (SA510) was identified during a 1998 survey of Huntington Creek. Additional surveys are needed to assess the population quality. Maintaining the hydrology, water quality, and water temperature of the creek are important for the survival of the species.

INDEFATIGABLE SWAMP (Ross Twp. in Luzerne County and Forkston Twp. in Wyoming County) NC534, SP532, SP533, SP534, and SA533 - Indefatigable Swamp is a large and diverse forested seepage swamp with a variety of different habitats, three rare plant species (SP532, SP533, and SP534) and one animal species of concern (SA533) on State Game Lands #57. A portion of this site continues on the Sweet Valley quadrangle. The swamp was designated as a marginal- to good-quality Boreal Conifer Swamp Natural Community (NC534). Red spruce (*Picea rubens*) and red maple (*Acer rubrum*) are the most abundant overstory species. Portions of the swamp have deep sphagnous peat and a depauperate strongly acidophilic vegetation, while others have evident springs and seeps and a more diverse flora. Species seen in more open, springy, presumably minerotrophic areas include red maple (*Acer rubrum*), mountain holly (*Nemopanthus mucronatus*), highbush blueberry (*Vaccinium corymbosum*), fowl mannagrass (*Glyceria striata*), mannagrass (*Glyceria melicaria*), jewelweed (*Impatiens sp*.), buttercup (*Ranunculus sp*.), a sedge (*Carex leptalea*), bugleweed (*Lycopus sp*.), violet (*Viola sp*.), false hellebore (*Veratrum viride*), smartweed (*Polygonum sp*.), dwarf red bramble (*Rubus pubescens*), cinnamon fern (*Osmunda cinnamomea*), marsh marigold (*Caltha palustris*), goldthread (*Coptis trifolium*), star violet (*Dalibarda repens*), Canada mayflower (*Maianthemum canadense*), crested shield fern (*Dryopteris cristata*), and sphagnum moss (*Sphagnum sp*). The more completely spruce and sphagnum dominated areas had pitcher plant (*Sarracenia purpurea*), a sedge (*Carex trisperma*), and a small population of SP534 (PA-Rare). An approximately 15-meter radius spring-fed pool in the center of the swamp is dominated by buckbean (*Menyanthes trifoliata*). Numerous canopy openings, often dominated by cinnamon fern (*Osmunda cinnamomea*), provide habitat for the state's best population of SP532 (G3, S1, PA-Endangered). These openings and associated tall shrub areas are likely breeding habitat for the listed animal species SA533 (S1S2B, PA-Threatened), heard at the site along with other species typical of boreal wetlands including brown creepers (*Certhia familiaris*), yellow-rumped warblers (*Dendroica coronata*), magnolia warblers (*Dendroica magnolia*), Canada warblers (*Wilsonia canadensis*), northern waterthrush (*Seiurus noveboracensis*), hermit thrush (*Catharus guttatus*), blackburnian warbler (*Dendroica fusca*), and common raven (*Corvis corax*). The northern saw-whet owl (*Aegolius acadicus*) and whip-poor-will (*Caprimulgus vociferus*) have been heard in nearby forests. SA533 is potentially using nearby wetlands and forest lands. Additional surveys for SA533 are needed to monitor the site and to check for evidence of reproduction. Another plant species seen at the swamp includes a marginal to good-quality population of an S1S2 species (SP533). There is no sign of current human activity in the swamp, and portions of the second growth spruce forest are beginning to mature. Heavy logging, road- building or other direct disturbances would be a threat to the continued recovery of this site as would disturbances to the surrounding hydrology.

THE MEADOWS/BEECH LAKE (Fairmount & Ross Twps.) –UPDATE- SP514A, SP514B, SP514C, SP514D, SA524, SA525, & SA551 – This site located on State Game Lands #57 is made up of a pond and an adjacent wetland known as the Meadows, and a small man-made area named Beech Lake. A young hardwood forest dominated by red maple (*Acer rubrum*) surrounds Beech Lake. Two plant species of concern

(SP514A & B) were identified in the Meadows area and two plant species of concern (SA514C&D) were found in Beech Lake. The plant species in both areas are small- to fair-quality populations that do not appear to have any imminent threats. Maintaining the present hydrology is important.

Additionally, three animal species of concern (SA524, SA525, & SA551) were discovered. The threats to SA524 & SA525 include mowing of the field in the spring and summer when the larvae are feeding on vegetation. A rotating schedule of mowing that includes mowing one-third of the field every year in late October is optimal for maintaining habitat for the species of concern. A field with mowed and unmowed areas provides a variety of vegetation height and structure. Additionally, at least six inches of stubble must be left as a vegetative buffer for overwintering eggs and larvae. The animal species SA551 would benefit from the preservation of larger trees and snags. Occasional sightings of an additional animal species of concern have been seen at the Meadows and artificial ponds along the west branch of Bean Run (State Game Lands #57). The sightings suggest that there is a small colony of this wetland bird in the general area, probably in a forested section of the State Game Lands near Beech Lake. Additional field surveys are needed to find the nesting areas of this species. A small portion of this site extends to the Dutch Mountain and Red Rock quadrangles. **The plant species SP514A, *Gentiana linearis* (Narrow-leaved Gentian), SP514B, *Glyceria borealis* (Small-floating Manna-grass), and 514D, *Utricularia purpurea* (Purple Bladderwort) have been removed from the species of concern list.**

Nine new odonate species of concern were identified from this site in 2002, 2004, and 2005, Comet Darner (*Anax longipes*), American Emerald (*Cordulia shurtleffi*), Crimson-ringed Whiteface (*Leucorrhinia glacialis*), Boreal Bluet (*Enallagma boreale*), Harlequin Darner (*Gomphaeschna furcillata*), Slaty Skimmer (*Libellula incesta*), Brush-tipped Emerald (*Somatochlora walshii*), Ocellated Darner (*Boyeria grafiana*), and Northern Bluet (*Enallagma annexum*). Associated odonate species include Common Green Darner (*Anax junius*), Calico Pennant (*Celithemis elisa*), Common Baskettail (*Epitheca cynosure*), Eastern Pondhawk (*Erythemis simplicicollis*), Eastern Forktail (*Ischnura verticalis*), Frosted Whiteface (*Leucorrhinia frigida*), Hudsonian Whiteface (*Leucorrhinia hudsonica*), Four-spotted Skimmer (*Libellula quadrimaculata*), Ashy Clubtail (*Gomphus lividus*), Blue Dasher (*Pachydiplax longipennis*), Hagen's Bluet (*Enallagma hageni*), Marsh Bluet (*Enallagma ebrium*, Spangled Skimmer (Libellula cyanea), and Sphagnum Sprite (Nehalennia gracilis).

A good quality population of a new butterfly species, Arctic Skipper (*Carterocephalus palaemon mandan*), was located at this site in 2002. Individuals were seen along a grassy road with open water on one side and mixed hardwood forest on the other.

MOUNTAIN SPRINGS LAKES (Fairmount & Ross Twps.) –UPDATE- SP512A, SP512B, SP512C, SP512D, SP513A, SP513B, SP513C, & SP513D – This site is the drained bed of a man-made lake known as Lake #1 or Splash Dam located in a mountainous area along Bowmans Creek. The land is public and is maintained by the PA Game Commission and The PA Fish & Boat Commission. A functional lake (Lake #2), which is used for public fishing, is found to the west and is included as part of this site. A block of woodland through which Bowman Creek flows separates the two lakes. Four plant species of concern (SP512A, B, C, & D) were identified in Lake #1 and four were identified in Lake #2 (SP513A, B, C, & D). Lake #1 has had two major disturbances: the destruction of the original vegetation caused by the construction of the dam, and the removal of the dam. There does not seem to be any obvious recent disturbances to this area (Lake #1). The dam at Lake # 2 is in poor condition. If the dam is no longer maintained, then the aquatic plants in the lake would be destroyed. It is likely that the land would revert back to a wetland and a different plant community would develop. The species of concern at both Lake #1 and Lake #2 should continue to thrive if the current land use is maintained. **The plant species SP512B and 513A, *Gentiana linearis* (Narrow-leaved Gentian),**

SP512C and 513C, *Glyceria borealis* (Small-floating Manna-grass), and SP513D, *Utricularia purpuea* (Purple Bladderwort) have been removed from the species of concern list.

A good population of a Lepidopteran species of concern, Silver Bordered Fritillary (*Boloria selene myrina*), was found at this site in 2005. Individuals observed nectaring on *Aster umbellatus* and other late season asters, and associated with Canadian Tiger Swallowtails and Pepper and Salt Skippers. They were observed in more shaded areas with sedges, false hellebore (*Veratrum viride*), and ferns and also in the open highbush blueberry-meadow sweet wetland.

NEVEL SWAMP (Ross Twp.) NC503 – Nevel Swamp is a good example of an Acidic Broadleaf Swamp Natural Community (NC503) on private property. A man-made impoundment exists at the southwest corner of the swamp. The swamp is dominated by red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), highbush blueberry (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). The threats include changes in the hydrology of the swamp and logging.

OPOSSUM SWAMP (Ross Twp. in Luzerne County & Forkston Twp. in Wyoming County) SP524A & SP524B - Opossum Swamp is a large wetland mostly composed of low shrubs less than two meters tall within State Gamelands #57. Two PA-Rare plant species of concern (SP524A & SP524B) were identified in 1995. Although neither population of these species is considered to be very high quality, more extensive searches may yield additional information that could increase the quality rank of one or both. Leatherleaf (*Chamaedaphne calyculata*) and highbush blueberry (*Vaccinium corymbosum*) are the dominant plant species with an assortment of grasses and sedges that indicate shallow peat deposits and low pH soil and water. The size of the wetland, along with the high density of wetlands on the plateau, makes this area of Luzerne & Wyoming Counties significant. There is good potential for other rare species to occur including birds, mammals, and plants. Fortunately, these wetlands are on lands protected by the Pennsylvania Game Commission.

SHINGLE RUN – NEW – Three new Lepidopteran species of concern, Northern Pearly-eye (*Enodia anthedon*), Aphrodite Fritillary (*Speyeria aphrodite*), and Atlantis Fritillary (*Speyeria atlantis*) was located at this site in 1999. Associated Lepidopteran species include Delaware Skipper (*Atrytone logan*) and Milbert's Tortoiseshell (*Nymphalis milberti*). Threats/disturbances include urban sprawl, insecticide use, herbicide use, and increased use of ATVs

STATE GAME LANDS #57 (Ross & Lake Twps.) SA502, SA518, SA519, & SA520 – This area has extensive south-southeast facing rocks and rock outcrops. Four separate occurrences of an animal species of concern have been documented. A deciduous forest dominated by black cherry (*Prunus serotina*), red maple (*Acer rubrum*), birch (*Betula sp*.), and striped maple *(Acer pensylvanicum*) shade the majority of the areas with suitable habitat. Additional visits are needed to adequately survey this area. The overgrown portions of the site may actually benefit from a very limited selective cut during the winter to remove larger trees shading the site.

SYLVAN LAKE – NEW – A population of a State Rare plant species, Small Beggar-ticks (*Bidens discoidea*), was located at this site. An Associated plant species is *Bidens comosa*. Compaction and very little vegetation near boat dock from heavy use is a disturbance close to the population.

WOLF RUN HEADWATERS SWAMP (Ross Twp.) –UPDATE- SP516, SA517A, & SA517B – A good population of an S3 plant species (SP516) is located in three wetlands at the headwaters of Wolf Run on State Game Lands #57. Each wetland is hydrologically connected. The wetlands are

fairly open in the center with a shrub border. The dominant vegetation includes cinnamon fern (*Osmunda cinnamomea*), red spruce (*Picea rubens*), sedges (*Carex stricta, Carex rustrata*, and *Carex folliculata*), highbush blueberry (*Vaccinium corymbosum*), groundberry (*Rubus hispidus*), mosses, cotton grass (*Eriophorum virginicum*), huckleberry (*Gaylussacia sp.*), soft rush (*Juncus effusus*), cranberry (*Vaccinium macrocarpon*), woolgrass (*Scirpus cyperinus*), three-way sedge (*Dulichium arundinaceum*), and swamp candles (*Lysimachia terrestris*). No serious disturbances were noted. The wetlands are located close to a trail, but trampling by hikers does not seem to pose a serious threat to this population. Deer browse is another threat, but few plants in the wetland seem to be impacted by this. The site should continue to be monitored.

Two animal species of concern (SA517A & SA517B) were identified at the site. Additional surveys are needed to assess both of these animal species. Changes in hydrology and logging are potential threats. A small portion of the site extends to the Dutch Mountain quadrangle. **The plant species SP516, *Gentiana linearis* (Narrow-leaved Gentian), has been removed from the species of concern list.**

Slaty Skimmer dragonfly (*Libellula incesta*)

SALEM TOWNSHIP AND SHICKSHINNY BOROUGH

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
DOGTOWN MINES							
Myotis leibii Eastern Small-footed Myotis	G3	S1B,S1N		PT	10/29/00	E	**NEW**
Myotis septentrionalis Northern Myotis SA506	G4	S3B,S3N		CR	9/29/94	E	**UPDATED**
Animal Species of Concern SA507	G2	SUB,S1N	LE	PE	10/19/95	BC	
ROUTE 11 BOAT LAUNCH							
Gomphus vastus Cobra Clubtail	G5	S3S4			7/26/05	E	**NEW**
Animal Species of Concern	G5	S2	LT	PT	7/03/05	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SUSQUEHANNA RIVER AT MOCANAQUA							
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)							
Animal Species of Concern	G5	S2B	LT	PT	2/22/06	E	**NEW**
Lampsilis cariosa Yellow Lampmussel	G3G4	S3S4		CU	2003	D	**NEW**
Animal Species of Concern	G3	S2		CU	2003	C	**NEW**
SUSQUEHANNA RIVERLANDS							
Animal Species of Concern	G5	S3				E	**NEW**
Enodia anthedon Northern Pearly Eye	G5	S3S4			6/26/99	E	**NEW**
Euphydryas phaeton Baltimore Checkerspot	G4	S2S4			6/26/99	E	**NEW**
Lontra canadensis Northern River Otter	G5	S3		CA		E	**NEW**
Poanes massasoit Mulberry Wing	G4	S3			7/25/97	E	**NEW**
Polites mystic Long Dash	G5	S3			7/25/97	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**

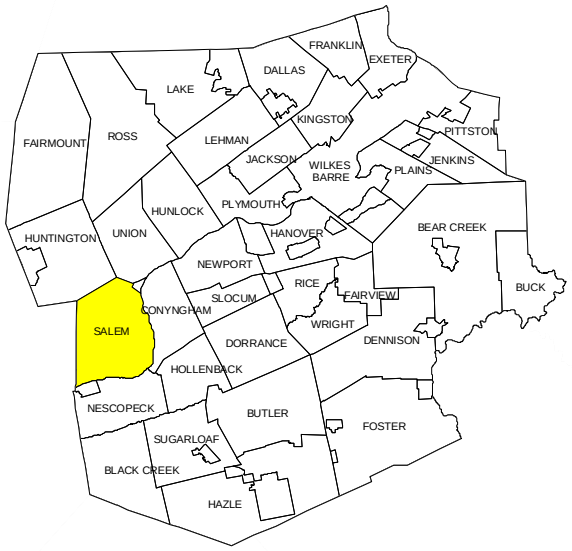
Speyeria Aphrodite Aphrodite Fritillary	G5	S3S4	6/26/99	E	**NEW**

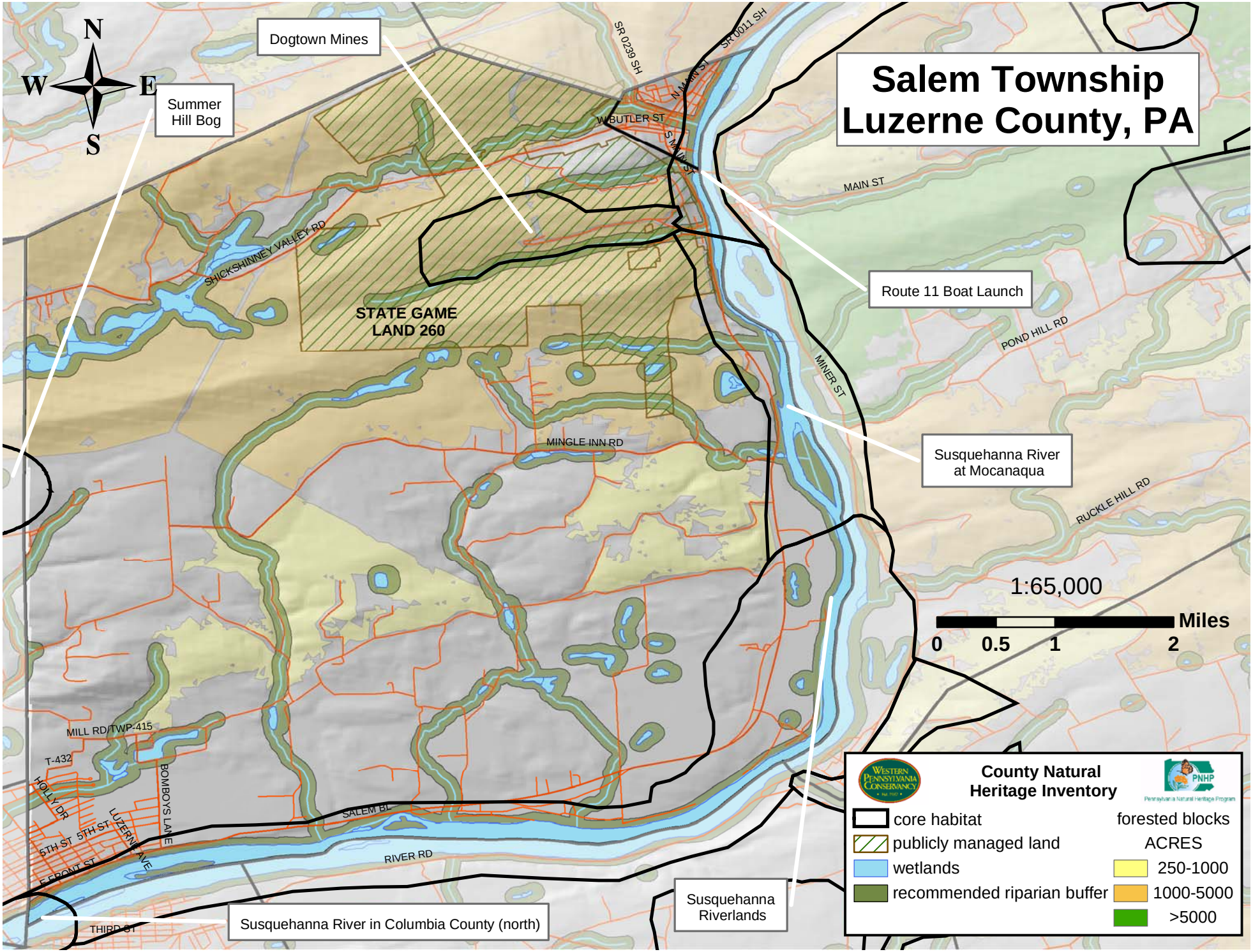
LOCALLY SIGNIFICANT AREAS:
Summer Hill Bog

PUBLICLY MANAGED LANDS:
State Game Lands #260

OTHER CONSERVATION AREAS:
Susquehanna Riverlands Important Bird Area
Wyoming Valley Important Mammal Area
Little Shickshinny Creek - High Quality Cold Water Fishery

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Salem Township
Luzerne County, PA
N
W
E
S
Dogtown Mines
Summer Hill Bog
Route 11 Boat Launch
Susquehanna River at Mocanaqua
Susquehanna River in Columbia County (north)
Susquehanna Riverlands
STATE GAME LAND 260
SR 0239 SH
SR 0011 SH
N MAIN ST
S MAIN ST
W BUTLER ST
MAIN ST
SHICKSHINNEY VALLEY RD
POND HILL RD
MINER ST
MINGLE INN RD
RUCKLE HILL RD
MILL RD/TWP-415
T-432
HOLLY DR
BOMBOYS LANE
LUZERNE AVE
5TH ST
E FRONT ST
SALEM BL
RIVER RD
THIRD ST
1:65,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

DOGTOWN MINES (Salem Twp.) SA506 & SA507 – This site on State Game Lands #260 contains a series of underground mine portals. Two animal species of concern were captured near one of the mine entrances. SA506 is a G4 species, while SA507 is Federally and PA-Endangered. In addition, the glens in the State Game Land have particularly nice hemlock (*Tsuga canadensis*) forests that provide habitat for Acadian Flycatchers (*Empidonax virescens*). Threats to the species of concern include mine collapse, logging of the woods near the mines, and coal extraction. Placing gates across the mine openings would also help to protect the site.

An additional PA-Threatened mammal species of concern was documented at this site in 2000.

ROUTE 11 BOAT LAUNCH – NEW – A Cobra Clubtail (*Gomphus vastus*) was seen at this site in 2005. Associated odonate species include Powdered Dancer (*Argia moesta*), Calico Pennant (*Caelithemis elisa*), Ashy Clubtail (*Gomphus lividus*), Eastern Forktail (*Ischnura verticalis*) Common Spreadwing (*Lestes disjunctus*), Swamp Spreadwing (*Lestes vigilax*), Illinois River Cruiser (*Macromia illinoiensis*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*Pantala hymenaea*), Ruby Meadowhawk (*Sympetrum rubicundulum*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).

A Federally and State Threatened species of concern was observed nesting along the Susquehanna River at this site in 2005. Human disturbance, including the creation of new trails threaten this species.

An animal species of concern was observed along the Susquehanna River in 2000. Additional surveys need to be conducted to determine the extent of this species.

SUSQUEHANNA RIVER AT MOCANAQUA – NEW – A new animal species of concern was located at this site in 2000. More surveys need to be conducted to assess the full extent of the population.

SUSQUEHANNA RIVER IN COLUMBIA COUNTY (NORTH)- (Nescopeck & Salem Twps. & Columbia County) - Two different **animal species of concern** were identified at this site in 1995. Biologists revisited the site in the fall of 2003 and again located these animals of concern. Individuals were found at several sites along the Susquehanna River between Berwick and Bloomsburg. Additional surveys are recommended to better estimate populations of these animal species of concern in the river. Associated species include the freshwater mussels eastern floater (*Pyganodon cataracta*) and creeper (*Strophitus undulatus*). Additional information on the life history of freshwater mussels can be viewed online at the US Fish and Wildlife Service web site: http://midwest.fws.gov/mussel/life_history.html. The river also provides a valuable migration corridor for many bird species, especially aquatic dependent species, but also many Neo-tropical passerine migratory species.

A State and Federally Threatened animal of concern was documented here in 1995. Care should be taken to avoid disturbing nest sites. Further surveys need to be done to determine the full extent of the population.

The Susquehanna River is subject to frequent flooding and seasonal low water levels. Scouring of the banks and islands by flood events and ice have created specialized habitats along the river floodplain. Several islands have distinctive "Big bluestem (*Andropogon gerardii*)-Indian grass (*Sorghastrum nutans*) river grasslands" natural tall grassland communities created as the result of these natural

disturbances. These areas are dominated by the two species the community type is named for and also include switch grass (*Panicum virgatum*) and Indian hemp (*Apocynum cannabinum*). The habitat grades into a "water willow (*Justicia americana*) – smartweed riverbed community" on the lowest island elevations, and into a "black willow scrub/shrub wetland", and "River birch – sycamore floodplain scrub" as the elevation increases, providing drier habitat. These natural communities are part of the "Riverbed – Bank – Floodplain Community Complex", a broadly defined mosaic of community types that typify the natural vegetation along the Susquehanna River in Luzerne County.

There are numerous examples of disturbance along the Susquehanna River. These animal species of concern are affected by numerous non-point sources of pollution including sedimentation from cultivated and developed land along the river, runoff from roadways, pesticide runoff from agricultural fields, discharge of chemical pollutants and thermal pollution. The main threat to these animals is reduction of water quality. The banks, floodplains and islands of the river are in areas infested with the invasive introduced plant species Japanese knotweed (*Polygonum cuspidatum*) and purple loosestrife (*Lythrum salicaria*). Control of established populations of these species is very difficult, so eradication of pioneer populations is the best way to control the spread of these species of plants.

Any of the above types of disturbances should be minimized where possible. Also, monitoring of these populations should continue into the future. Loss of individuals and reductions in population sizes should lead to an investigation into possible causes. Water quality should be monitored and pollution sources should be identified where possible. Forested buffers should be maintained and created where absent along the length of the river with logging operations refraining from cutting within 100 feet of the river edge. River bank forests help buffer the watershed from the effects of non-point sources of pollution including runoff from agricultural, residential and roadway settings. In addition, the river floodplain and corridor is usually an area of significantly higher biodiversity than the adjoining uplands. Much of the area's important biodiversity can be preserved by maintaining an intact, forested floodplain along the river. The effectiveness of the forested riverbanks as a habitat corridor would be diminished by fragmentation of the forest continuity by the construction of houses, businesses and additional roadways along the river. Local planning should discourage construction of new structures and roadways along the river, adjacent slopes and floodplain.

SUSQUEHANNA RIVERLANDS (Salem Twp.) This area consists of approximately 2,500 acres. Pennsylvania Audubon Society has designated it as a Pennsylvania Important Bird Area because it contains fairly extensive riparian and hillside forest (Crossley 1999). Both sides of the North Branch Susquehanna are protected for approximately one mile. The west-side of the park includes public picnic areas, riparian forest, hillside forest, and some marsh and swamp. The site is owned and managed for recreation and environmental education by PPL.

The riparian forest supports populations of yellow-throated vireo (*Vireo flavifrons*), warbling vireo (*Vireo gilvus*), American redstart (*Setaphaga ruticilla*), and northern parula (*Parula americana*). Both northern oriole (*Icterus galbula*) and orchard oriole (*I. spurius*) nest in forest and park land. Wetlands support good populations of swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), willow flycatcher (*Empidonax traillii*), and eastern bluebirds (*Sialis sialis*) nesting in natural cavities. The east side of the park (Sybertsville

Quadrant) encompasses many habitats, including hundreds of acres of oak – hickory – pine forest, cliffs, and abandoned fields. Oak-dominated forests support good populations of scarlet tanager *(Piranga olivacea*), ovenbird (*Seiurus aurocapillus*), wood thrush (*Hylocichla mustlina*), worm-eating warbler (*Helmitheros vermivorus*), pine warbler (*Dendroica pinus*), red-eyed vireo (*Vireo olivaceus*), and rose-breasted grosbeak (*Pheucticus ludovicianus*).

Gould Island, owned by PPL, has a fairly mature forest, especially on its downstream end. Here there are large specimens of silver maple (*Acer saccharinum)*, sycamore (*Platanus occidentalis*), and black maple (*Acer niger*). At least one state-listed bird species has nested here in the past, although none were observed in recent years.

The area contains a good diversity of reptile and amphibian species, including two reptile species of concern. Also, an animal species of concern and river otter have been frequently observed at this site.

The area contains a good diversity of reptile and amphibian species. A reptile species of concern was seen at this site. Further surveys need to be done to determine the extent of the population. Northern River Otters, a mammal species of concern, have also been seen at this site.

In 2000 an animal species of concern was seen at this site along the Susquehanna River. Further surveys are needed to determine the full extent of the population.

Five Lepidopteran species of concern were documented at this site in 1997 and 1999, Mulberry Wing (*Poanes massasoit*), Northern Pearly Eye (*Enodia anthedon*), Aphrodite Fritillary (*Speyeria aphrodite*), Long Dash (*Polites mystic*), and Baltimore Checkerspot (*Euphydryas phaeton*). Threats and disturbances for these species include BT spraying for gypsy moths, herbicides along roadside, draining of marsh, sand and gravel mining, sprawl, drought, and absence of many woodland species.

Locally Significant Area:

Summer Hill Bog - (Salem Township and Columbia County) – This **Locally Significant site** is a wetland habitat identified from aerial photographs and as part of a low-level reconnaissance flight over the county. The approximately 25 acre wetland at this site appears to be fairly well buffered by forests to the north and east, with agricultural fields adjacent to the south and west edges. Besides an apparent ditch running down the center of the wetland, the site appears to have had little recent disturbance. The wetland may be the result of, or enhanced by, beaver activity. There appears to be a ring of thick shrubs surrounding the edge of the wetland, with the expansive inner portions composed primarily of short shrubs and herbaceous vegetation, and may have floating vegetation mats.

A change in the hydrology of the wetland by damming or draining is the biggest threat to this site. There is an additional risk to the wetland from the potential loss of the forested buffer or the development of the adjacent agricultural landscape. Invasive species of plants are common detractors of otherwise quality habitats.

Modification of the existing hydrology should be strongly discouraged. This habitat would be severely degraded either by the construction of a dam to create a lake or by the draining of the wetland. The protection of existing forested buffers, and the creation of additional forested buffers will best protect this wetland habitat from all sources of disturbance. A ground survey of this site is needed to verify the type of habitat, and to identify the species composition of the wetland. A survey for wetland birds is also recommended.

SLOCUM TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
CRANBERRY POND							
Aeshna clepsydra Mottled Darner	G4	S2S3			9/10/05	E	**NEW**
Carex lasiocarpa Slender Sedge SP525A	G5	S3		PR	6/21/00	B	
Carex limosa Mud Sedge SP525B	G5	S2		PT	6/21/00	C	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4			6/25/05	E	**NEW**
Elatine americana Long-stemmed Water-wort	G4	SU		PE	7/27/01	C	**NEW**
Ischnura kellicotti Lilypad Forktail	G5	S1			6/25/05	E	**NEW**
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4			9/10/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4			6/25/05	E	**NEW**
Nannothemis bella Elfin Skimmer	G4	S1			6/25/05	E	**NEW**
Oligotrophic Glacial Kettlehole Bog NC503	G?	S3			6/21/00	BC	
Folstown Mud Pond		**(Locally Significant Area)**					**CHANGED**
Potamogeton robbinsii Flat-leaved Pondweed SP517A	G5	S4		DL	8/27/99	B	**DELISTED**
Utricularia purpurea Purple Bladderwort SP517B	G5	S4		DL	8/27/99	B	**DELISTED**
LILY LAKE							
Aeshna clepsydra Mottled Darner	G4	S2S3			9/10/05	E	**NEW**
Bidens discoidea Small Beggar-ticks	G5	S3		PR	9/16/03	E	**NEW**
Celithemis eponina Halloween Pennant	G5	S2S3			8/24/05	E	**NEW**
Elatine minima Small Waterwort SP501A	G5	S4		DL	7/27/01	B	**DELISTED**
Ischnura kellicotti Lilypad Forktail	G5	S1			6/25/05	E	**NEW**
Libellula incesta Slaty Skimmer	G5	S3S4			8/24/05	E	**NEW**
Myriophyllum heterophyllum Broad-leaved Water-milfoil	G5	S1		PE	7/27/01	E	**NEW**
Potamogeton robbinsii Flat-leaved Pondweed SP513	G5	S4		DL	8/27/99	B	**DELISTED**

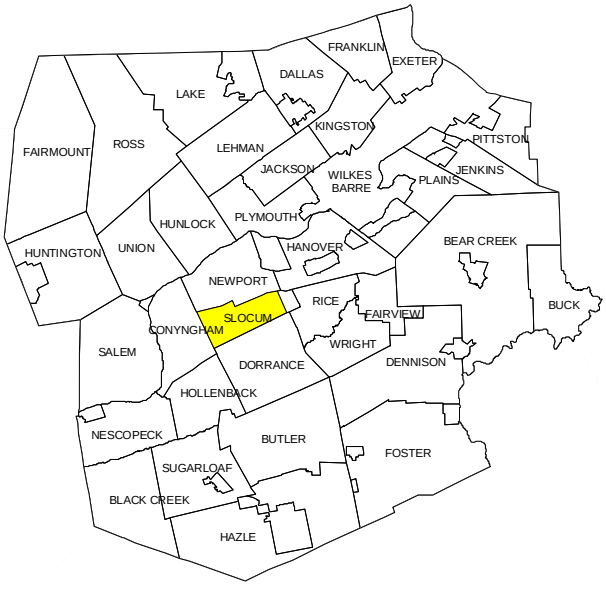
Schoenoplectus torreyi Torrey's Bulrush SP501B	G5?	S1	PE	8/13/92	C	
Sympetrum semicinctum Band-winged Meadowhawk	G5	S3S 4		9/10/05	E	**NEW**
Utricularia intermedia Flat-leaved Bladderwort	G5	S2	PT	7/27/01	E	**NEW**
PENOBSCOT MOUNTAIN RIDGETOP						
Ephemeral/Fluctuating Natural Pool NC526	G?	S3		6/21/00	E	
Helianthemum bicknellii Bicknell's Hoary Rockrose SP509	G5	S2	PE	8/09/90	D	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2	PT	8/09/90	D	**UPDATED**
SLOCUM MARSH						
Rallus limicola Virginia Rail SA527	G5	S3B		2000	E	

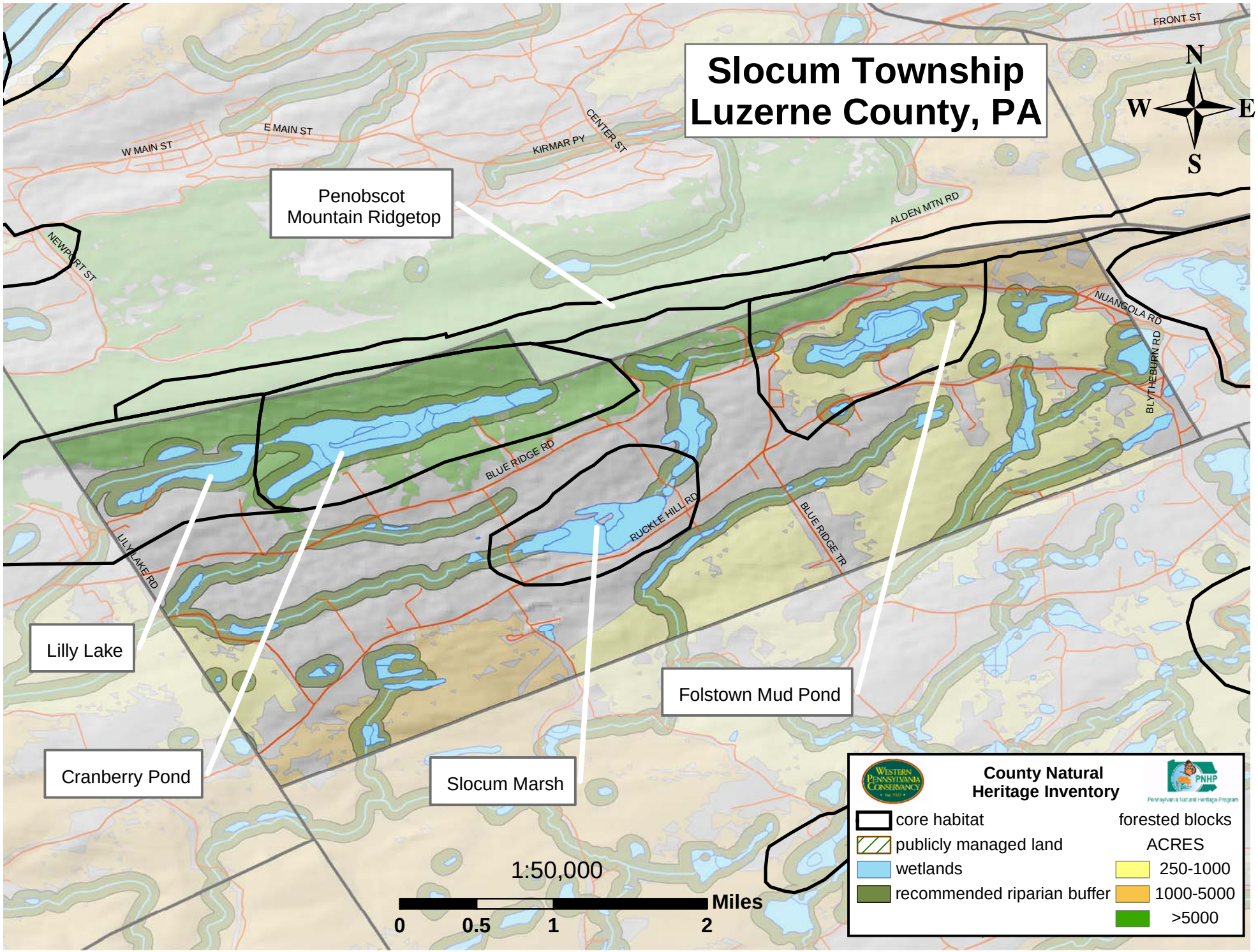
LOCALLY SIGNIFICANT AREAS:
Folstown Mud Pond

PUBLICLY MANAGED LANDS:
None

OTHER CONSERVATION AREAS:
Wyoming Valley Important Mammal Area

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Slocum Township
Luzerne County, PA
N
W
E
S
FRONT ST
W MAIN ST
E MAIN ST
KIRMAR PY
CENTER ST
ALDEN MTN RD
NEWPORT ST
NUANGOLA RD
BLYTHEBURN RD
BLUE RIDGE RD
RUCKLE HILL RD
BLUE RIDGE TR
LILLY LAKE RD
Penobscot
Mountain Ridgetop
Lilly Lake
Cranberry Pond
Slocum Marsh
Folstown Mud Pond
1:50,000
0
0.5
1
2
Miles
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

CRANBERRY POND (Newport & Slocum Twps.) NC503, SP525A, SP525B - Cranberry Pond is a large glacial "kettlehole" pond with concentric rings of vegetation surrounding open water in the center. It is a fair- to good-quality example of an Oligotrophic Glacial Kettlehole Bog Natural Community (NC503) that is located on private property. The gravel road around the west end of the pond forms an earth and rock dam that may have altered the hydrology somewhat. However, the low shrub and sedge areas appear intact and are largely free of exotic plant species. A good-quality population of a PA-Rare plant species (SP525A) is one of the dominant species over much of the floating mat. It is associated with leatherleaf (C*hamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*) cranberry (*Vaccinium sp.*), cotton-grass (*Eriophorum virginicum*), sedges (C*arex canescens* and *Carex. utriculata*), beak-rush (*Rhynchospora alba*), bog buckbean (*Menyanthes trifoliata*), Canada rush (*Juncus canadensis*), arrowhead (S*agittaria* sp.), pitcher-plant (*Sarracenia purpurea*), sundew (*Drosera intermedia),* and sphagnum moss (*Sphagnum sp.*). The abundance of this species may indicate a raised pH due to groundwater input or some influence of flooding. A fair-quality population of another plant species of concern (SP525B) occurs in mucky depressions near the edge of the open water with many of the same associated species. Both of these populations are reproducing and no immediate threats or management needs are apparent. The site also has an extraordinary diversity of amphibians, including the only Luzerne County occurrence of the northern cricket frog (*Acris crepitans crepitans*), and at least nine different species of salamanders.

This is one of the top priority sites for conservation in Luzerne County. There is a good diversity of bog flora and potential for additional plant, as well as animal species of concern to be found. Cranberry Pond is hydrologically linked to adjacent glacial wetlands (Folstown Mud Pond, Lily Lake). The health of the natural community and its associated species will depend on maintaining water quality throughout the watershed – upstream, upslope on Penobscot Mountain, and downstream at Lily Lake. The pond, the surrounding forest, and adjacent lands are owned by the farm south of the site. Efforts should be made to assist the landowner in continuing to protect this unique site for the future.

Six new odonate species of concern were located at this site in 2005, Sweetflag Spreadwing (*Lestes forcipatus*), Mottled Darner (*Aeshna clepsydra*), Elfin Skimmer (*Nannothemis bella*), Slaty Skimmer (*Libellula incesta*), Lilypad Forktail (*Ischnura kellicotti*), and American Emerald (*Cordulia shurtleffi*). Associated odonate species are Common Green Darner (*Anax junius*), Calico Pennant (*Celithemis elisa*), Racket-tailed Emerald (*Dorocordulia libera*), Marsh Bluet (*Enallagma Ebrium*), Hagen's Bluet (*Enallagma hageni*), Eastern Pondhawk (*Erythemis simplicicollis*), Fragile Forktail (*Ischnura posita*), Swamp Spreadwing (*Lestes vigilax*), Frosted Whiteface (*Leucorrhinia frigida*), Dot-tailed Whiteface (*Leucorrhinia intacta*), Chalk-fronted Corporal (*Libellula (Ladona) julia*), Spangled Skimmer (*Libellula cyanea*), Widow Skimmer (*Libellula luctuosa*), Four-spotted Skimmer (*Libellula quadrimaculata*), Sphagnum Sprite (*Nehalennia gracilis*), and Blue Dasher (*Pachydiplax longipennis*).

A fair populations of a State Endangered plant species of concern, Long-stemmed Water-wort (*Elatine americana*), was located at this sit in 2001. Associated plant species are *Sagittaria graminea* (submersed form) and *Eriocaulon aquaticum*. Threats and disturbances are heavy boat use and invasive species.

LILY LAKE (Conyngham, Newport & Slocum Twps.) –UPDATE- SP501A, SP501B, & SP513– This site is a natural glacial lake downstream of the Cranberry Pond site. Three plant species of concern occur at the site (SP510A, SP510B, and SP513). Two of these grow rooted in shallow water along the sandy shoreline at the west end of the lake near the outlet. The associated plant species include St. John's wort (*Hypericum virginicum),* pipewort (*Eriocaulon septangulare),* and grass-leaved arrowhead (*Sagittaria*

graminea). The third plant species is a floating aquatic species growing at the same site and floating throughout the lake. The plant is associated with pondweed (*Potamogeton epihydrus),* spike-rush (*Eleocharis palustris),* quillwort (*Isoetes sp.*), water-shield (*Brasenia schreberi*), and bladderworts *(Utricularia sp.*). There is a PA Fish and Boat Commission boat launch at this corner of the lake, and some habitat destruction has occurred. Nonetheless adequate habitat remains for the species of concern. Care should be taken to preserve the windward (southeastern) sandy shoreline areas from disturbance and to maintain a "no-wake" zone here to prevent excessive shoreline erosion by waves. **The plant species SP501A, *Elatine minima* (Small Waterwort), and SP513, Flat-leaved Pondweed (*Potamogeton robbinsii*) have been removed from the species of concern list.**

Three new plant species of concern have been identified at Lily Lake in 2001 and 2003, Flat-leaved Bladderwort (*Utricularia intermedia*), Broad-leaved Water-milfoil (*Myriophyllum heterophyllum*), and Small Beggar-ticks (*Bidens discoidea*). Threats to these species of concern are herbicides and invasive species. Disturbances include boat traffic and other recreational activities.

Five new odonate species have been located at Lily Lake in 2005, Band-winged Meadowhawk (*Sympetrum semicinctum*), Mottled Darner (*Aeshna clepsydra*), Slaty Skimmer (*Libellula incesta*), Halloween Pennant (*Celithemis eponina*), and Lilypad Forktail (*Ischnura kellicotti*). Further surveys need to be conducted to determine the extent of the populations.

PENOBSCOT MOUNTAIN RIDGETOP (Hanover, Newport, Rice, & Slocum Twps.) SP509, SP522, & NC526 - The area consists of an Ephemeral/Fluctuating Pool Natural Community in a matrix of dry oak-heath forest. The rock strata here are tilted sharply upward, creating several parallel outcrops (some of conglomerate) running along the ridgetop, with the pools occurring in the "grooves" between the more resistant outcrops. The matrix forest canopy is open, with areas of lichen-covered rocks and graminoids (*Carex sp*. and *Deschampsia sp*.). The common overstory species include sweet birch (*Betula lenta*), red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), and red maple (*Acer rubrum*). Striped maple (*Acer pensylvanicum*), serviceberry (*Amelanchier sp*.), and American chestnut (*Castanea dentata*) are all present in the understory. The shrub layer has the aforementioned species as well as upland low blueberry (*Vaccinium pallidum*), early low blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), wintergreen *(Gaultheria procumbens*), mountain laurel *(Kalmia latifolia),* and maple-leaved viburnum (*Viburnum acerifolium*). The groundcover is sparse and includes may-apple (*Podophyllum peltatum*), hairgrass (*Deschampsia flexuosa*), cowwheat (*Melampyrum lineare*), common Solomon's seal (*Polygonatum biflorum*), several sedge species (*Carex sp*.), marginal shield fern (*Dryopteris marginalis*), lichens, and mosses. The outcrops and openings provide habitat for two plant species of concern (SP502 & SP522) along the same ridgetop further east.

The individual pools themselves vary in depth and dominant vegetation. Four pools were visited; two were largely forested, and two consist of a mixture of tall shrub and herbaceous habitat. Additional pools are present that were not visited during this survey. Some of the pools exist as narrow, steep-sided depressions at the base of the rock outcrops. All of the pools had standing water up to 24 inches deep at the time of visit, and a substrate of sphagnum and/or dead oak leaves.

These pools have good potential for use by a variety of herptiles. Additional landowner information, early spring surveys, and mapping the extent of the natural community are needed.

SLOCUM MARSH (Slocum Twp.) SA527 **–** Slocum Marsh is a large 15 to 20-acre cattail wetland. An animal species of concern (SA527) has been using the marsh for breeding since 1998. The marsh is

surrounded by agriculture and previous disturbance has likely created the cattail marsh habitat that is appropriate for the animal species. Draining and pesticide use are potential threats. Additional visits are needed to determine the population size and to obtain a more detailed habitat description.

Locally Significant Area:

Folstown Mud Pond (Newport & Slocum Twps.) –UPDATE- SP517A & SP517B **–** Folstown Mud Pond is a **Locally Significant** glacial wetland apparently impacted by damming and road - building at its western end. The pond may have once been a bog that was inundated when the pond was created. The pond, which is currently used for recreational for boating and fishing, has two parts connected by a narrow channel. The area of the pond closest to the road contains more sediment and floating aquatic plants. This part of the pond is dominated by water shield (*Brasenia schreberi*), water lily (*Nymphaea odorata*), and spatterdock *(Nuphar lutea*). Two good-quality populations of two different former PA-Rare plant species (SP517A & SA517B) were identified at the site**.** The threats to the site include nutrient and sediment load from nearby farms, homes, and the roadway. Management recommendations include protecting the water quality of the site and continued monitoring of the species of concern. **The plant species SP517A, *Potamogeton robbinsii* (Flat-leaved Pondweed), and SP517B, *Utricularia purpurea* (Purple Bladderwort), have been removed from the species of concern list. The rank for this site has been changed to Locally Significant.**

Carex lasiocarpa – many-fruited sedge
Photo: PNHP

Lilypad Forktail damselfly (*Ischnura kellicotti*)
Top: female, Bottom: male

SUGARLOAF TOWNSHIP AND CONYNGHAM BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**
	Global	State	Federal	State	(m/d/y)	

NATURAL HERITAGE AREAS:

None

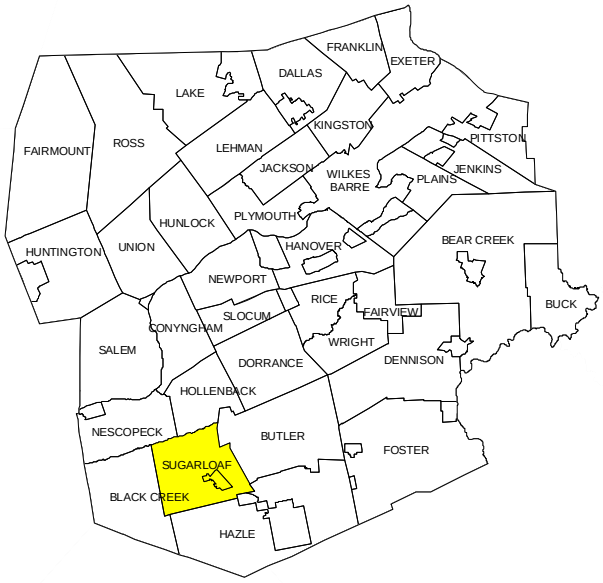
PUBLICLY MANAGED LANDS:

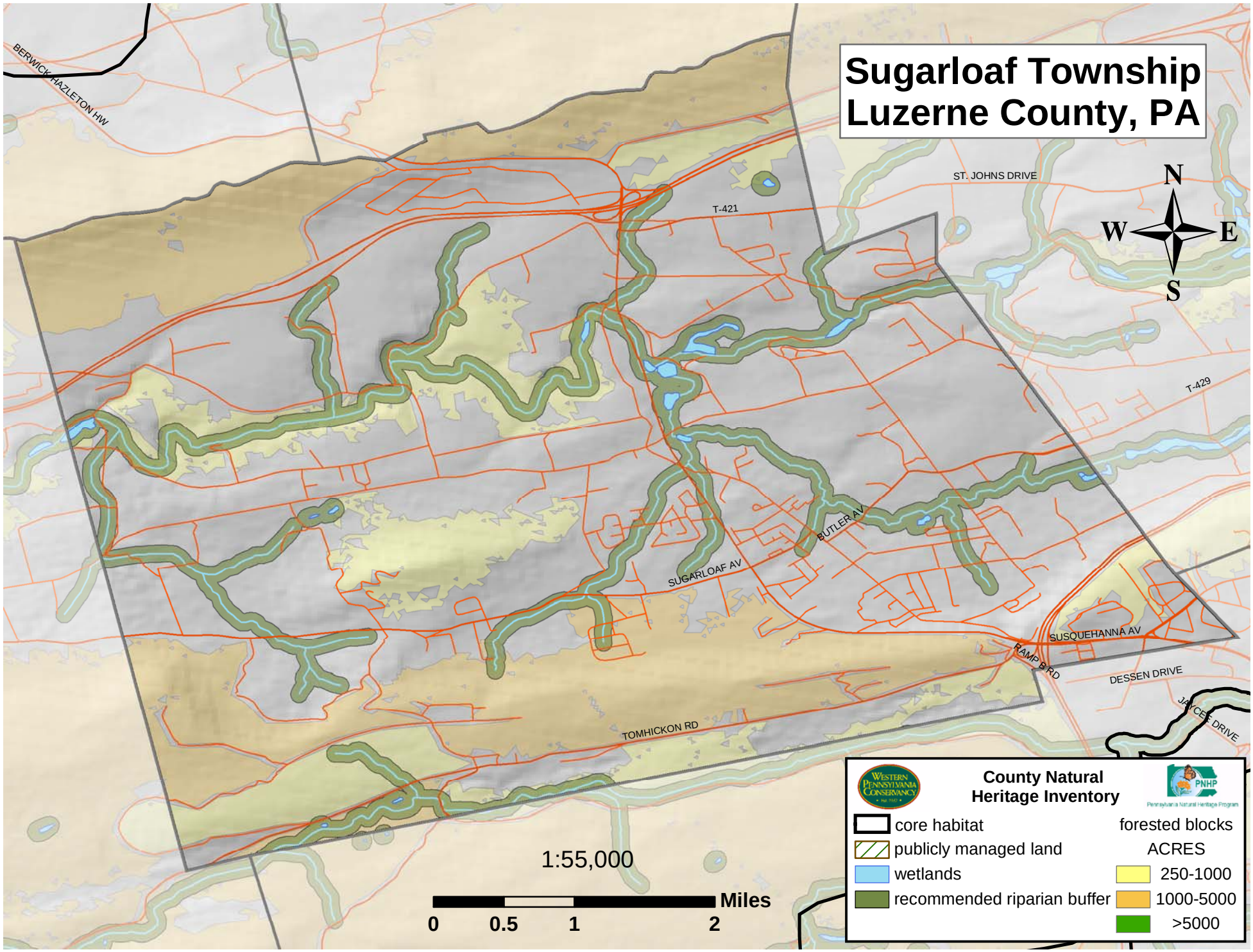
None

OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Sugarloaf Township
Luzerne County, PA
BERWICK-HAZLETON HW
ST. JOHNS DRIVE
T-421
T-429
N
W
E
S
BUTLER AV
SUGARLOAF AV
SUSQUEHANNA AV
RAMP B RD
DESSEN DRIVE
JAYCEE DRIVE
TOMHICKON RD
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
1:55,000
Miles
0
0.5
1
2

UNION TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ROUTE 11 BOAT LAUNCH							
Gomphus vastus Cobra Clubtail	G5	S3S4			7/26/05	E	**NEW**
Animal Species of Concern	G5	S2B	LT	PT	7/03/05	E	**NEW**
Animal Species of Concern	G5T4T5	SU		CR	2000	E	**NEW**
SYLVAN LAKE							
Bidens discoidea Small Beggar-ticks	G5	S3		PR	10/07/03	BC	**NEW**

LOCALLY SIGNIFICANT AREAS:

None

PUBLICLY MANAGED LANDS:

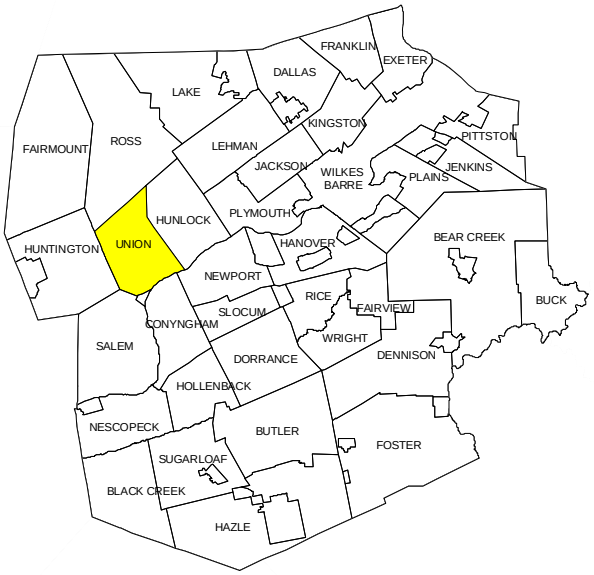
State Game Lands #224

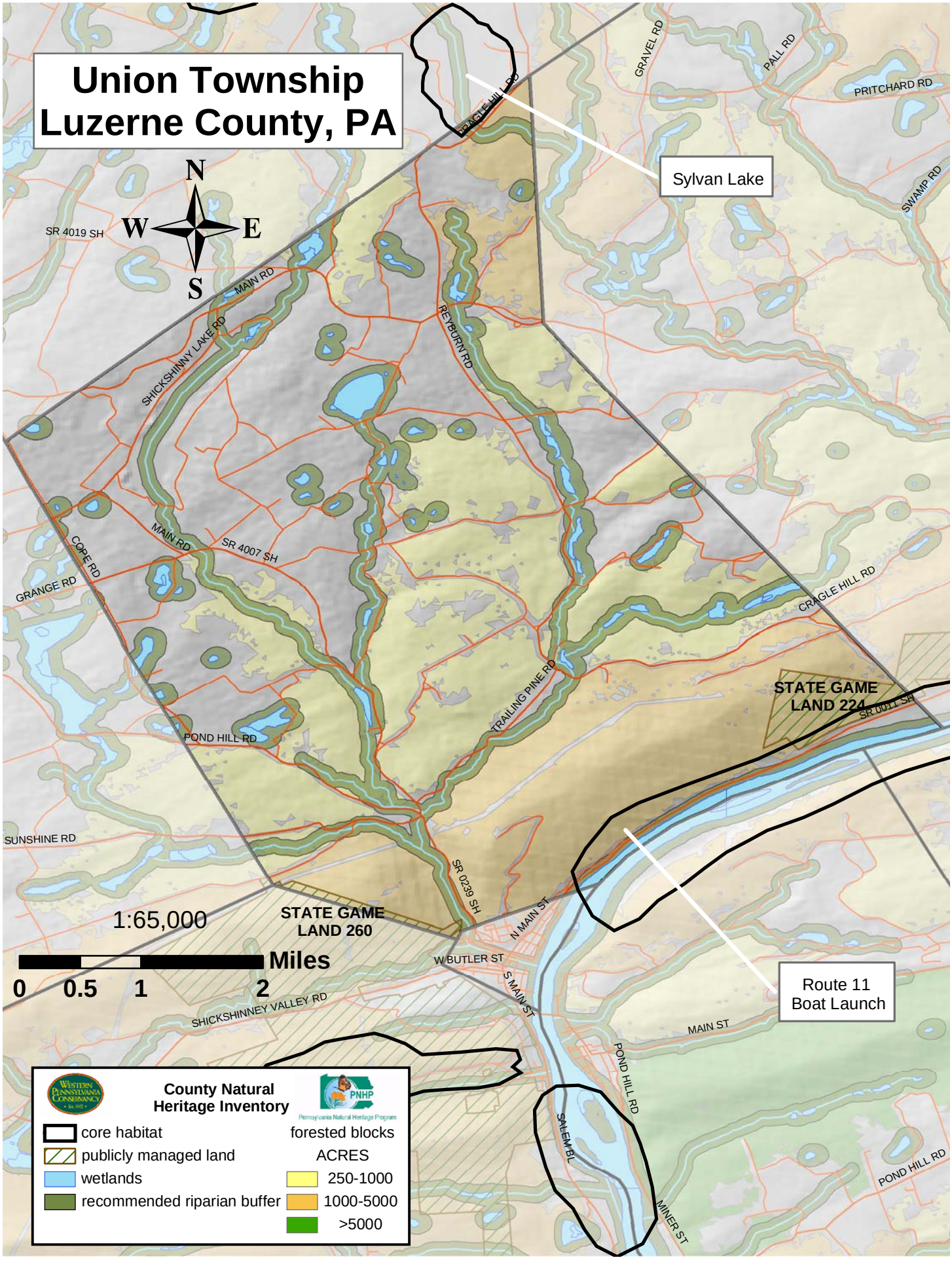
State Game Lands #260

OTHER CONSERVATION AREAS:

Wyoming Valley Important Mammal Area

*Please refer to Appendix I for an explanation of Ranks and State Status.
**Please refer to Appendix II for Quality ranks.




Union Township
Luzerne County, PA
N
W
E
S
Sylvan Lake
Route 11
Boat Launch
STATE GAME
LAND 260
STATE GAME
LAND 224
1:65,000
Miles
0
0.5
1
2
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
GRAVEL RD
PALL RD
PRITCHARD RD
EAGLE HILL RD
SWAMP RD
SR 4019 SH
MAIN RD
SHICKSHINNY LAKE RD
REYBURN RD
COPE RD
GRANGE RD
SR 4007 SH
CRAGLE HILL RD
TRAILING PINE RD
SR 0011 SH
POND HILL RD
SUNSHINE RD
SR 0239 SH
N MAIN ST
W BUTLER ST
S MAIN ST
SHICKSHINNEY VALLEY RD
MAIN ST
SALEM BL
MINER ST

SYLVAN LAKE – NEW – A population of a State Rare plant species, Small Beggar-ticks (*Bidens discoidea*), was located at this site. An Associated plant species is *Bidens comosa*. Compaction and very little vegetation near boat dock from heavy use is a disturbance close to the population.

ROUTE 11 BOAT LAUNCH – NEW – A Cobra Clubtail (*Gomphus vastus*) was seen at this site in 2005. Associated odonate species include Powdered Dancer (*Argia moesta*), Calico Pennant (*Caelithemis elisa*), Ashy Clubtail (*Gomphus lividus*), Eastern Forktail (*Ischnura verticalis*) Common Spreadwing (*Lestes disjunctus*), Swamp Spreadwing (*Lestes vigilax*), Illinois River Cruiser (*Macromia illinoiensis*), Wandering Glider (*Pantala flavescens*), Spot-winged Glider (*Pantala hymenaea*), Ruby Meadowhawk (*Sympetrum rubicundulum*), and Yellow-legged Meadowhawk (*Sympetrum vicinum*).

A Federally and State Threatened species of concern was observed nesting along the Susquehanna River at this site in 2005. Human disturbance, including the creation of new trails threaten this species.

An animal species of concern was observed along the Susquehanna River in 2000. Additional surveys need to be conducted to determine the extent of this species.

WILKES-BARRE TOWNSHIP, CITY OF WILKES-BARRE AND LAUREL RUN BOROUGH

	PNHP Rank*		Legal Status*		Last Seen	Quality**	Status
	Global	State	Federal	State	(m/d/y)		
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia The Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3	N/A	PR	8/24/00	CD	
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, SA507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed CinquefoilSP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2		PT	7/08/97	CD	**UPDATED**
Psectraglaea carnosa Pink Sallow SA506J, SA507D	G3	S1			10/08/97	BC	

Ridgetop Dwarf-Tree Forest NC505	G4	S3		1984	B	
Sideridis maryx SA506K	G4	S1S3		5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3		6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1	N/A	9/15/98	BC	
KIRBY PARK/ROUTE 309 BRIDGE SITE						
Falco peregrinus Peregrine Falcon SA532	G4	S1B,S1N	PE	7/17/05	E	**UPDATED**
Animal Species of Concern SA532	G5T4T5	SU	CR	6/07/00	E	**NEW**
SUSQUEHANNA RIVER at HANOVER GREEN						
Animal Species of Concern	G5T4T5	SU	CR	6/07/00	E	**NEW**

LOCALLY SIGNIFICANT AREAS:

Prospect Rock

PUBLICLY MANAGED LANDS:

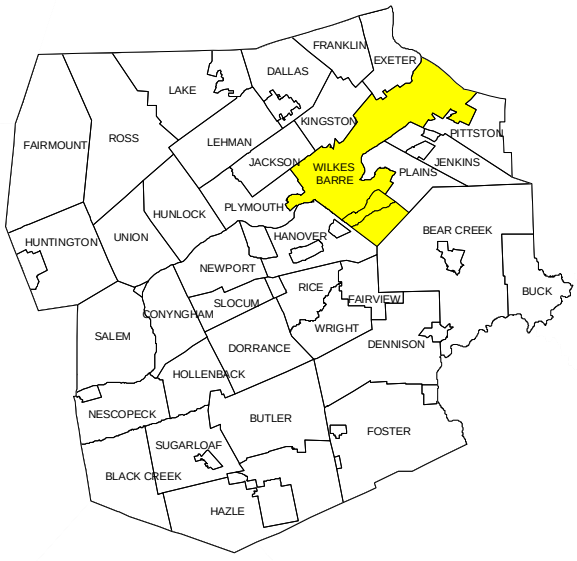
State Game Lands 119/187

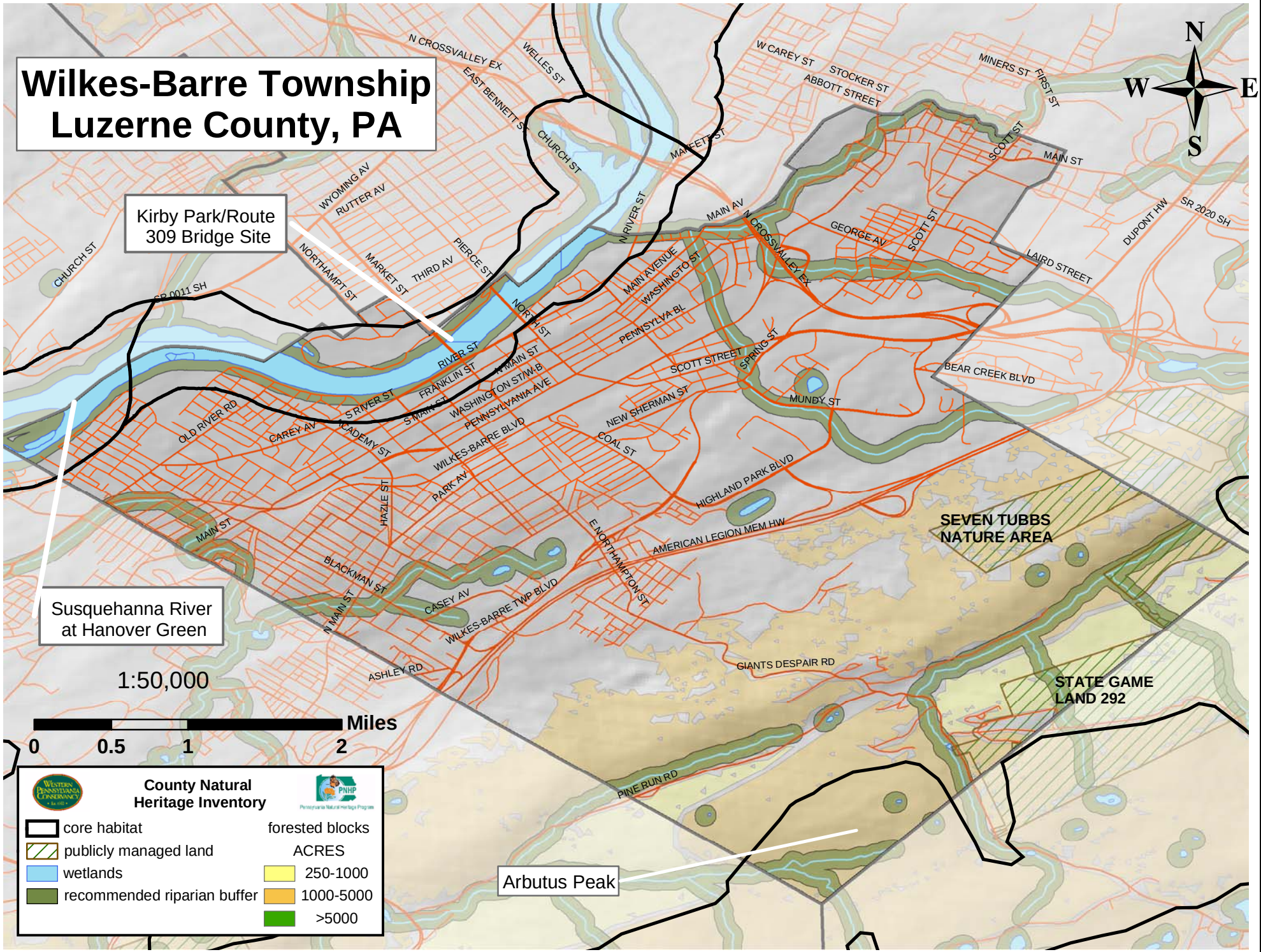
State Game Lands 207

OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Wilkes-Barre Township
Luzerne County, PA
Kirby Park/Route 309 Bridge Site
Susquehanna River at Hanover Green
Arbutus Peak
SEVEN TUBBS NATURE AREA
STATE GAME LAND 292
N
S
E
W
1:50,000
Miles
0
0.5
1
2
County Natural Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000
N CROSSVALLEY EX
EAST BENNETT ST
WELLES ST
CHURCH ST
MARKET ST
W CAREY ST
STOCKER ST
ABBOTT STREET
MINERS ST
FIRST ST
SCOTT ST
MAIN ST
WYOMING AV
RUTTER AV
NORTHAMPT ST
THIRD AV
PIERCE ST
N RIVER ST
MAIN AV
GEORGE AV
DUPONT HW
SR 2020 SH
LAIRD STREET
SR 0011 SH
MAIN AVENUE
WASHINGTO ST
PENNSYLVA BL
NORTH ST
RIVER ST
FRANKLIN ST
N MAIN ST
WASHINGTON ST/W-B
PENNSYLVANIA AVE
SCOTT STREET
SPRING ST
BEAR CREEK BLVD
MUNDY ST
NEW SHERMAN ST
COAL ST
WILKES-BARRE BLVD
PARK AV
S RIVER ST
S MAIN ST
ACADEMY ST
CAREY AV
OLD RIVER RD
HIGHLAND PARK BLVD
AMERICAN LEGION MEM HW
E NORTHAMPTON ST
HAZLE ST
MAIN ST
BLACKMAN ST
CASEY AV
WILKES-BARRE TWP BLVD
N MAIN ST
ASHLEY RD
GIANTS DESPAIR RD
PINE RUN RD

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp*.).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

Fifteen rare invertebrate animal species have been found at areas (three species were found at two location at the site) associated with the barrens and adjacent wetlands and more are expected to be found. Five of the species are Globally Rare (G3) or the subspecies is Globally Rare (G5T2T3). Several are new to the present-day fauna of PA - one species is known to utilize arctic/boreal habitats making Arbutus Peak an extreme southern location for it. Another is considered to be a southern species usually found on the New Jersey Pine Barrens. These species are typically dependent upon particular plant species for a portion of their lives; some use scrub oak to feed upon; while other use blueberries found in wetlands or in the barrens. Some species use the pitch pine while others appear to use cranberries and other plants found in the wetlands. One species that has not been found anywhere else but Pennsylvania, feeds exclusively on the flypoison plant (*Amianthium muscaetoxicum*). Another feeds on wild indigo (*Baptisia tinctoria*). Some of the species have very little life-history information and require more research. Most of them depend on plants that require plenty of sunlight found in shrubland or open woodland.

Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and

mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

KIRBY PARK/ROUTE 309 BRIDGE SITE (Kingston & Wilkes Barre Twps.) SA532 **–** This site is a municipal park that includes a large silver maple (50 + feet) floodplain forest along the Susquehanna River. A population of a PA animal species of concern (SA532) exists at this site and on nearby river islands (Richard & Monocanock Islands). The floodplain forest associated plant species include large silver maples (*Acer saccharinum*), elm (*Ulmus americana*.), red oak (*Quercus rubra*), white mulberry (*Morus alba*), American basswood (*Tilia americana*), catalpa (*Catalpa bignonioides*), black locust (*Robinia pseudoacacia*), green ash (*Fraxinus pennsylvanica*), jewelweed (*Impatiens sp*.), Japanese knotweed (*Polygonum cuspidatum*), reed canary grass (*Phalaris arundinacea*), garlic mustard (*Allaria officinalis*), and nettles (*Urticaceae*). A series of nature and biking trails run through the floodplain. The surrounding land use (Kirby Park) includes navigable water to the south, with recreational facilities, residences, and businesses located to the west, east, and north. Both the floodplain and the river islands are seasonally flooded. One current threat to the animal population is a proposed inflatable dam that could cause inundation of this floodplain or the river islands. Changes in the hydrology could kill the large trees used by the animal species of concern at the site. The present hydrology (seasonal flooding) should be maintained. The same animal species of concern occurs at various floodplain forest sites along the Susquehanna throughout much of the county. These sites are not mapped, as more descriptive information on the status of these populations is needed.

In 2000 an animal species of concern was documented along the Susquehanna River. Associated plant species include Silver Maple (*Acer saccharinum*), Elm (*Ulmus* sp.), Red Oak (*Quercus rubra*), Mulberry (*Morus* sp), American Basswood (*Tilia americana*), Catalpa (*Catalpa bignonioides*), Black Locust (*Robinia pseudoacacia*), Green Ash (*Fraxinus pennsylvanica*), Jewelweed (*Impatiens* sp), Japanese Knotweed (*Polygonum cuspidatum*), Reed Canary Grass (*Phalaris arundinacea*), Garlic Mustard (*Allaria officinalis*), and Nettles (*Urticaceae*). Surrounding land use includes navigable water to the south, with recreational facilities, residences, and businesses located to the west, east, and north. The floodplain and the river islands are seasonally flooded. The current threat to the species of concern is the proposed inflatable dam that could cause inundation of this floodplain or river islands. Changes in the hydrology could kill the large trees at the site that this species prefer.

SUSQUEHANNA RIVER at HANOVER GREEN (Hanover, Plymouth & Wilkes Barre Twps.) NEW – A new occurrence of an animal species of concern was located at this site in 2000. More surveys need to be conducted to assess the full extent of the population.

Locally Significant Area:

Prospect Rock (Laurel Run Boro.). This **Locally Significant** site is a large rock ledge about 2,000 feet in length that provides a grand view of the Wyoming Valley (Geyer and Bolles, 1987). The rock is made of white pebble conglomerate with the pebbles being so numerous that they touch each other (Geyer and Bolles, 1987).

The **Yellow-Fringed Orchid** is a plant species of concern found in Luzerne County.

Photo: Alan Gregory

WRIGHT TOWNSHIP

	PNHP Rank*		Legal Status*		Last Seen (m/d/y)	Quality**	Status
	Global	State	Federal	State			
NATURAL HERITAGE AREAS:							
ARBUTUS PEAK							
Amelanchier humilis Serviceberry SP502A	G5	S1		PE	5/08/95	E	**UPDATED**
Aplectoides condita A noctuid moth SA506A	G4	S2S3			5/27/98	C	
Chaetaglaea cerata A Sallow Moth SA506B	G3G4	S1			10/08/97	AC	
Diarsia rubifera SA506C	G5	SU			7/29/98	BC	
Epiglaea apiata Pointed Sallow SA506D, SA507A	G5	S3S4			10/08/97	AB	**UPDATED**
Erynnis persius persius Persius Duskywing SA506E	G5T1T3	S1S2			5/27/98	BC	**UPDATED**
Glena cognataria Blueberry Gray SA506F	G4	S1			6/24/98	AB	
Hemileuca maia Barrens Buckmoth SA519	G5	S1S2			8/24/00	CD	**UPDATED**
Itame sp. 1 nr. Inextricata Barrens Itame (Cf I. Inextricata) SA506G	G3G4	S1			6/24/98	C	**UPDATED**
Plant Species of Concern SP519	G5	S3		PR	8/24/00	CD	
Metaxaglaea semitaria Footpath Sallow Moth SA507B	G5	S2			10/08/97	C	
Panthea sp 1 SA506H	G4	SU			7/29/98	E	
Papaipema sp. 1 Flypoison borer moth SA506I, 507C	G2G3	S2			9/15/98	AB	
Potentilla tridentate Three-toothed Cinquefoil SP502B	G5	S1		PE	6/18/97	BC	
Prunus pumila var. susquehanae Sand Cherry SP522	G5T4	S2		PT	7/08/97	CD	**UPDATED**
Psectraglaea carnosa Pink Sallow SA506J, SA507D	G3	S1			10/08/97	BC	

Ridgetop Dwarf-Tree Forest NC505	G4	S3		1984	B	
Sideridis maryx SA506K	G4	S1S3		5/27/98	BC	
Sphinx gordius SA506L	G4	S1S3		6/24/98	BC	
Syngrapha epigaea A Noctuid Moth SA506M	G5	S1		9/15/98	BC	
NESCOPECK CREEK VALLEY						
Animal Species of Concern SA518	G5	S2S3B, S3N	CR	6/2000	AB	**UPDATED**
Aeshna tuberculifera Black-tipped Darner	G4	S2S3		6/26/05	E	**NEW**
Aeshna verticalis Green-striped Darner	G5	S3S4		8/20/05	E	**NEW**
Boyeria grafiana Ocellated Darner	G5	S3		8/04/01	E	**NEW**
Calopteryx amata Superb Jewelwing	G4	S2S3		7/06/01	E	**NEW**
Carex polymorpha Variable Sedge SP505	G3	S2	PT	7/21/00	A	**UPDATED**
Cordulia shurtleffi American Emerald	G5	S3S4		6/07/05	E	**NEW**
Eurybia radula Rough-leaved Aster SP520	G5	S2	PT	8/30/00	B	**UPDATED**
Helocordulia uhleri Uhler's Sundragon	G5	S3		7/30/03	E	**NEW**
Hesperia leonardus Leonard's Skipper SA519B	G4	S3S4		8/22/00	BC	**UPDATED**
Animal Species of Concern SA519A	G5	S3S4		8/20/00	E	
Lestes forcipatus Sweetflag Spreadwing	G5	S3S4		8/20/05	E	**NEW**
Lonicera hirsuta Hairy Honeysuckle SP516	G4G5	S1	PE	7/12/00	B	**UPDATED**
Plant Species of Concern SP515	G5	S3	PR	8/30/00	D	
Lygodium palmatum Hartford Fern SP506	G4	S4	DL	8/23/00	A	**DELISTED**
Metaxaglaea semitaria Footpath Sallow Moth SA523	G5	S2		10/03/00	E	
Najas gracillima Bushy Naiad SP522	G5?	S4	DL	7/18/00	E	**DELISTED**
Papaipema sp. 1 Flypoison Borer Moth	G2G3	S2		9/29/87	H	**NEW**

Rosa virginiana Virginia Rose	G5	S1	TU	7/01/94	BC	**NEW**
Schoenoplectus subterminalis Water Bulrush	G4G5	S3	PR	9/12/01	C	**NEW**
Utricularia geminiscapa Bladderwort SP521	G4G5	S4	DL	8/22/00	B	**DELISTED**
NESCOPECK MOUNTAIN BARRENS						
Ridgetop Dwarf-Tree Forest NC507	G4	S3		10/01/86	AB	

LOCALLY SIGNIFICANT AREAS:

None

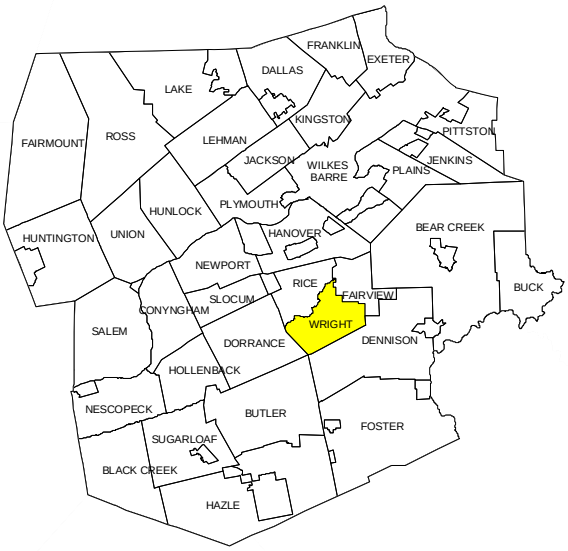
PUBLICLY MANAGED LANDS:

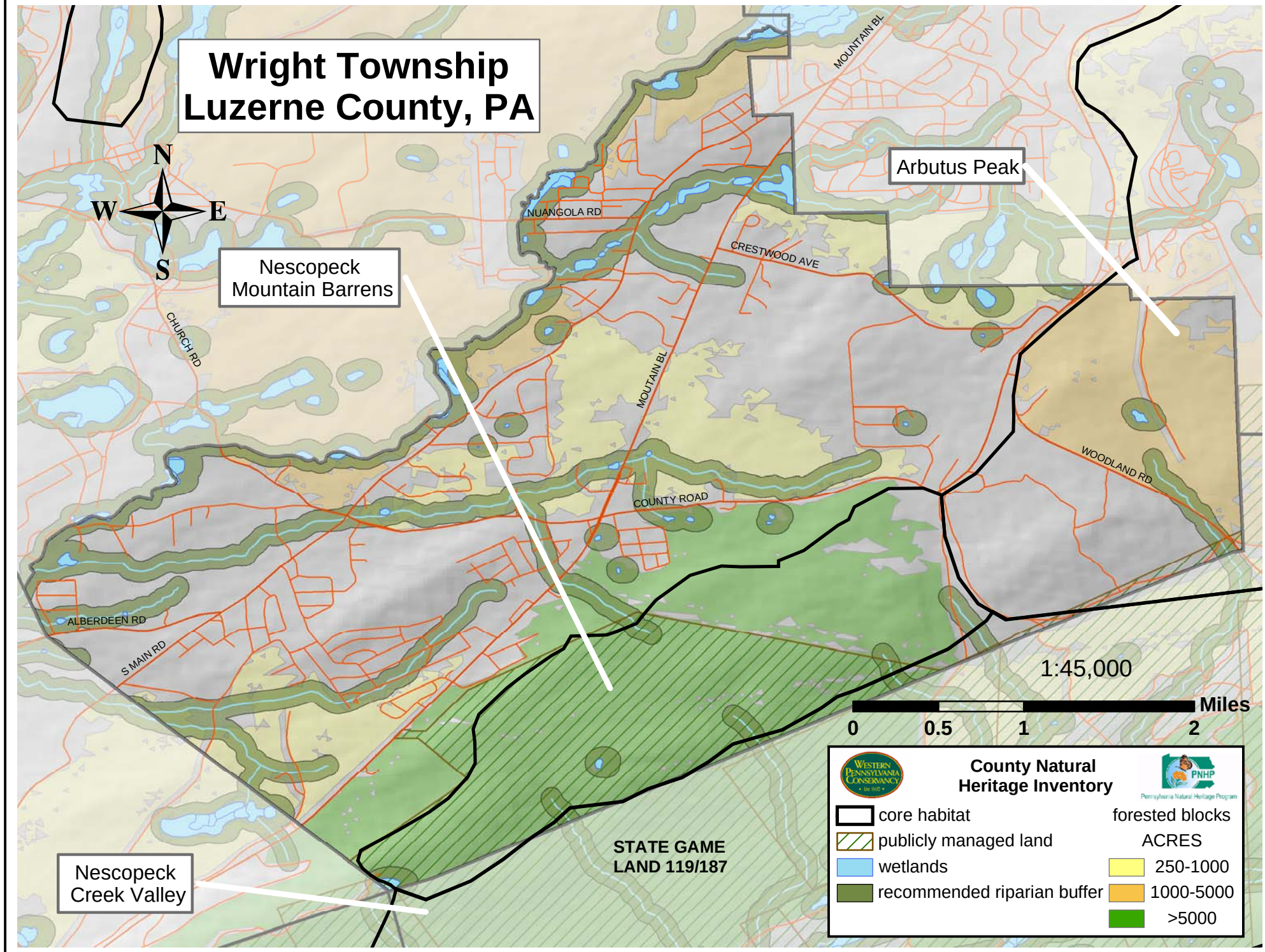
State Game Lands #119/187

OTHER CONSERVATION AREAS:

None

* Please refer to Appendix I for an explanation of Ranks and State Status.
** Please refer to Appendix II for Quality ranks.




Wright Township
Luzerne County, PA
N
W
E
S
Nescopeck
Mountain Barrens
Arbutus Peak
Nescopeck
Creek Valley
NUANGOLA RD
CRESTWOOD AVE
MOUNTAIN BL
MOUTAIN BL
CHURCH RD
COUNTY ROAD
WOODLAND RD
ALBERDEEN RD
S MAIN RD
STATE GAME
LAND 119/187
1:45,000
Miles
0
0.5
1
2
County Natural
Heritage Inventory
core habitat
publicly managed land
wetlands
recommended riparian buffer
forested blocks
ACRES
250-1000
1000-5000
>5000

ARBUTUS PEAK (Bear Creek, Dennison, Fairview, Hanover, & Wright Twps.& Laurel Run Boro.) SP502A, SP502B, SP519, SP522, SA505A, SA506B, SA506C, SA506D, SA506E, SA506F, SA506G, SA506H, SA506I, SA506J, SA506K, SA506L, SA506M, SA507A, SA507B, SA507C, SA507D, SA519, & NC505 - Arbutus Peak oak barrens (NC505) is a relatively large oak barrens complex of 5,000 to 6,000 acres southeast of Wilkes-Barre. It is located on the ridgetops in the townships of Bear Creek, Dennison, Hanover, Fairview and Wright, and Laurel Run Borough. The site is separated into two sub areas—one northwest of Crystal Lake reservoir that includes Penobscot Mountain Barrens, and one southwest of the lake that includes Arbutus Peak and Tunnel Road Barrens. The barrens are comprised of a complex of plant communities including Scrub Oak Shrubland, Low Heath Shrubland and Little Bluestem-Pennsylvania Sedge Opening (Fike 1999). The barrens are dominated by scrub oak (*Quercus ilicifolia*) with a variety of blueberries, huckleberries, and sheep laurel (ericaeous shrubs) as subdominants; pitch pine (*Pinus rigida*) is found in scattered locations. Small rocky "balds" are dominated by bare sandstone and conglomerate rock with lichens, mosses, and scattered shrubs and grasses. Mixed oak and other hardwood trees dominate the ravines between the barrens. There are also several swamp areas, such as Jimmy Kane Swamp, that are dominated by red maple (*Acer rubrum*), some red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and yellow birch (*Betula allegheniensis*), and a variety of shrubs and sedges (*Carex sp*.).

The open woodlands and shrub barrens require periodic disturbance. The primary driving forces creating and maintaining the barrens are fire, poor, dry, shallow soils and, in places, frost and wind. Fires have been both natural and man- made. Fires have killed off trees and allowed the scrub oaks and other species to thrive. Scrub oak and the ericaeous shrubs may actually promote fire due to their highly flammable leaves and debris (Latham et al 1996). The scrub oak and many of the blueberries sprout from the roots after a fire. Grasses and sedges respond well to the nutrients that are released and to the exposure to sun. Pitch pine, where it occurs, readily re-sprouts after a fire (unusual for a conifer). Unusual for these large barrens systems is the amount of wetland adjacent to the dry barrens. In Pennsylvania, only Long Pond Barrens in Monroe County appear to have more wetland associated with the barrens.

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Four plant species of special concern are also found within the barrens. One (SP522) is found on State Game Lands #119 and one (SP519) is found in the Tunnel Road Barren in State Game Lands #119 on the White Haven map. Two are found on Penobscot Mountain near the radio towers. All four are found where there are rock outcrops, little soil development and some disturbance either natural or caused by humans. These ridgetop areas probably have changed little over time and should remain as rock outcrops. The Tunnel Road site may need periodic disturbance since it is close to the old railroad bed and within a pitch pine-scrub oak woodland. There are only minimal threats to these species posed by trail and

mountain bikes and development such as for radio and cell towers. Some of the disturbance seems to actually benefit the species.

Arbutus Peak is one of the top sites in the county and may be one of the richest barrens for butterfly and moth animal groups in the Northeast. Based on comments received in our office from zoologists in New York and New Jersey, this barrens complex should be a high priority for conservation in Pennsylvania.

NESCOPECK CREEK VALLEY (Butler, Dennison & Wright Twps.) –UPDATE- SP505, SP506, SP515, SP516, SP520, SP521, SP522, SA518, SA519A, SA519B, & SA523 – This large natural area is centered about the upper watershed of Nescopeck Creek, encompassing portions of Nescopeck State Park and State Game Lands 187, and bordered by the Arbutus Peak site to the north. At least five rare animal and seven rare plant species have been documented at the site, occupying a variety of wetland and upland habitats. One of the most significant of these is an excellent quality population of a globally rare, PA-Endangered plant species (SP505) that occurs in scattered subpopulations throughout the upper Nescopeck Valley, in moist oak woods along the Nescopeck Creek and its south-flowing tributaries. The habitat usually consists of mixed oak-heath woods, often along the boundary between streamside wetlands and adjacent uplands. Tree species present include white oak (*Quercus alba),* black oak, (*Quercus velutina*), red maple *(Acer rubrum),* and white pine (*Pinus strobus).* The shrubs include witch hazel (*Hamamelis virginiana*), arrow-wood (*Viburnum sp.*), and various heaths *(Gaylussacia baccata, Kalmia latifolia, Vaccinium sp.).* The species of concern occurs in the groundcover and is associated with various sedge species (*Carex vestita, Carex stricta*), fly-poison (*Amianthium muscaetoxicum*), hay-scented fern (*Dennstaedtia punctiloba*), and wild sarsaparilla (*Aralia nudicaulis*).

The additional rare species at the site occur in separate, disparate habitats within Nescopeck State Park and Sate Game Lands 187. SA518**,** which is an animal species that is a candidate for PA-Rare status, utilizes one of the pine plantations adjacent to the Nescopeck Creek for nesting. This animal is extremely sensitive to disturbance while nesting. Three invertebrate species of concern (SA519B, SA523, & SA541) were found in various habitats including dry woods and old fields. One of these species, SA541, is a G2G3 species that is only known to occur in Pennsylvania. SA519A is a vertebrate species of concern that has been found in several disturbed roadside habitats with sandy soils and open basking areas. One population of this animal was seriously affected by construction of the beach for the State Park. Finally, several plant species of concern (SP506, SP515, SP516, SP520, SP521, & SP522) have been found in some of the streamside wetlands and seeps within the State Park. These habitats are dominated by sphagnum mosses (*Sphagnum sp.*), sedges (*Carex trisperma, Carex folliculata*), and rushes (*Juncus effusus).* Recent fieldwork completed by Dr. Ann Rhoads of Morris Arboretum has uncovered several new plant species of concern in these habitats and small impoundments along Nescopeck Creek, as well as new subpopulations of the globally rare species discussed above. Maintaining buffers around the wetlands and the water quality of Nescopeck Creek (a High Quality–Cold Water Fishery) will help these species of concern to persist at the site.

Disturbances to the site include the creation of Lake Francis and other impoundments along the Creek, a variety of ATV and jeep trails, logging, management activities in the State Game Lands, and recent construction of facilities for the State Park. Despite these disturbances, the valley is largely forested and undisturbed by past anthracite mining. Efforts should be made to manage the park to protect the wild nature of much of the valley (especially by protecting the forests along the Creek tributaries) and the associated species of concern. This site extends to the White Haven quadrangle. **The plant species SP506, Hartford fern *(Lygodium palmatum),* SP521 Bladderwort (*Utricularia geminiscapa*), and SP522, Bushy Naiad (*Najas gracillimaas*) have been removed from the species of concern list.**

Field surveys in 2001, 2003, and 2005 located seven new odonate species of concern, Uhler's Sundragon, Superb Jewelwing, Ocellated Darner, Black-tipped Darner, Sweetflag Spreadwing, Green-striped Darner, and American Emerald. Associated odonate species include Shadow Darner, Fawn Darner, Swamp Darner, Ashy Clubtail, and Dragonhunter.

Two plant species of concern were also identified from this site in 1994 and 2001, Water Bulrush (*Schoenoplectus subterminalis)* and Virginia Rose (*Rosa virginiana*). Associated species are *Hamamelis virginiana, Lonicera hirsuta, Quercus ilicifolia, Rubus sp., Corylus cornuta, C. americana, Solidago rugosa,* and *Lysimachia quadrifolia.* Threats include deer browse; it appears that deer stripped this forest recently - perhaps large numbers of deer wintered here along the creek.

A new moth species of concern, Barrens Buckmoth (*Hemileuca maia*) was identified from this site in 2001 along a powerline right-of-way. Associated plant species include Scrub Oak, Sweet Fern, Highbush Blueberry, Lowbush Blueberry, Chestnut Oak, Red Maple, Black Racer, Grey Treefrog, Chestnut-sided Warbler, Whip-poor-will, Ovenbird, Common Yellowthroat, Ruffed Grouse, Eastern Chipmunk, Grey Fox, Raccoon, Whitetail Deer.

NESCOPECK MOUNTAIN BARRENS (Dennison and Wright Twps.) *NC507* - This site is an example of a Ridgetop Dwarf-Tree Forest Natural Community (NC507). It consists mainly of a scrub oak (*Quercus ilicifolia)* forest stretching across several summit areas along a sandstone ridgetop. The natural community occurs on the most exposed portions, with taller oak forests occupying the ravines between the balds. The vegetation ranges from open areas of sandstone bedrock, hairgrass (*Deschampsia flexuosa*), little bluestem (*Schizachyrium scoparius*), and blueberry (*Vaccinium sp*.) to dense scrub oak (*Quercus ilicifolia*) and emergent pitch pines (*Pinus rigida*). Some of the pitch pines show evidence of past fires; fires are a natural process that is necessary to maintain the plant community. This habitat is also appropriate for rare Lepidopteran species; although none have been found at this site, several were found in similar habitat at the adjacent Arbutus Peak site. This site is part of State Game Lands 187.

A recently delisted species, the **climbing fern (*Lygodium palmatum*)** is found in large numbers in the Luzerne County. This plant climbs over other vegetation and has a vine-like appearance. The climbing fern prefers moist soils and thrives in the mesic barrens habitats in the county.
Photo: PNHP

RECOMMENDATIONS AND SUMMARY

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

1. **All sites that are ranked 1 or 2 (Table 1) should be targeted immediately for protection and/or management of the site and the surrounding lands.** Privately-owned lands at these sites may be protected through a combination of conservation easements and acquisition to encourage current land use or make improvements in land use where needed.

2. **Management plans on public and private lands should address species of special concern and natural communities and assess the need for additional acres to complete protection**. Each element located within a given site will need to be addressed in new management plans for that area. Many of the already-protected sites are in need of additional land to complete protection and/or are in need of management to ensure the continued existence of the associated natural elements. Efforts are already underway to refine management plans for some of the high quality natural areas on public lands in the counties.

3. **Conservation easements or other low cost protection can be pursued on lower-ranked sites**. All sites of lower rank but with good to excellent populations of species of special concern or good natural communities on private land should receive protection too, but conservation easement or some type of tax incentive may be more appropriate. Conservation easements are designed to allow landowners the current use of their land while protecting the owner and the resource from outside development pressure. Management plans will be needed to ensure that these sites remain high-quality natural areas. Where easements are not possible, any proposals for significant land use changes should be scrutinized carefully by county and municipal planners.

4. **Low quality sites (e.g., with marginal or poor populations of listed species in marginal areas) should be carefully assessed before pursuing protection or management efforts.** The rare elements may be important for the maintenance of biological diversity at the local level, but costs and efforts for protecting these sites need to be weighed against other sites that will be left unprotected which truly have the potential for long-term viability of elements. However, these sites may have other qualities, such as scenic or recreation value, that make them worth protecting.

5. **Locally Significant sites (Table 2) may be protected as higher priority sites are completed or as new information emerges**. These are sites in the counties that do not have exemplary natural communities or known occurrences of rare species, but that could be excellent sites for County or Township parks or as natural areas within existing parks (sites within existing managed areas will need to be included in management plans). Those that can serve more than one purpose—recreation, environmental education, wildlife habitat, flood and sediment control, water supply, etc.—are ideal. Species of special concern that may be found in some of these areas in future surveys can fit into County park or preserve plans.

6. **Protection of the reservoirs, wetlands, rivers, and creeks of Luzerne county is vital, especially those that protect biodiversity, supply drinking water, and are attractive recreational resources**. Many of the sites containing rare species, natural communities or locally significant habitats in Luzerne county are associated with water. Protection of these watersheds is the only way to ensure the viability of natural habitats and water quality. Cooperative efforts on land use among municipal, county, state, and federal agencies, developers, and residents can lessen the impact of development on the watersheds and plant communities of the three counties. Protecting 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.

7. **Minimize encroachment on the parks and conservation lands throughout Luzerne county**. Existing parks and conservation lands provide habitat for a number of plant and animal species and may be important not only on a county-wide level, but also on a regional scale. For example, they may serve as nesting or wintering areas for birds or as stop-over areas during migration. Where appropriate, more land should be added or agreements worked out with abutting landowners to minimize encroachments that may threaten native flora and fauna.

8. **Counties and township officials can encourage landowners whose land includes waterways to maintain vegetated buffer zones along shorelines**. Vegetated buffers (preferably of PA-native plant species) help reduce erosion and sedimentation and help to shade and cool the water. This in turn benefits aquatic animal life, including the fisheries. These buffers also provide habitat for other wildlife species and help to create a diversity of habitats along the creek or stream.

9. **Scrutinize development proposals for their impact on entire watersheds not just the immediate impact area**. Certainly, new housing and commercial development can be given close scrutiny before it is allowed in the areas outlined in this report and careful review can be required within any watershed in the county. Townships can also require minimum setbacks from all water bodies to help protect water quality. Landowners within any particular watershed can act on their own to protect water by forming watershed associations to voluntarily monitor and screen proposals in their localities.

10. **Development plans should provide for creating natural buffers between the development and the core preserve area, be it a barrens community, wetland, water body**, **or forest**. Care should be taken to ensure that protected natural areas do not become "islands" surrounded by development. When a wetland or woodland is completely surrounded by development, even if there are no direct impacts, the site is effectively isolated and its value for wildlife is reduced. If possible, networks or corridors of woodlands or greenspace should be preserved linking sensitive natural areas to each other. Cluster development could be used to allow the same amount of development on much less land in such areas, but most importantly, leave much of the land intact as corridors for wildlife and native plants.

11. **Grassroots organizations are needed**. County and municipal governments can do much of the work necessary to plan for the protection and management of the natural areas identified in this report. However, grassroots organizations are needed to assist with identifying landowners who wish to protect their land, providing information about easements to landowners, 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. The North Branch Land Trust is one organization already working to protect lands in Luzerne county**.** This report is intended as a tool to help these organizations as well as other local watershed associations and land trusts in their efforts.

On the quad maps in this report, we have outlined the watersheds or subwatersheds where the natural communities and species of special concern occur. These areas should be viewed as zones of potential impact; protection of the entire area may not be necessary. Smaller buffer areas have been designated for locally significant sites. The core areas where the communities and species occur need to be given the most attention and fee title acquisition may be appropriate. Land uses that do not impact these important sites should be encouraged for the buffer zones.

We wish to emphasize that this Natural Areas Inventory is only a beginning. New sites with good natural communities and species of special concern wait to be discovered. Plant communities and plant and animal populations are dynamic, constantly changing with time and conditions. As this information is received and updated in the Pennsylvania Natural Diversity Inventory data base, so too will the Natural Areas Inventories. If there are any questions about the impact of the proposed development or other activity, we suggest that our office, the Pennsylvania Natural Heritage Program - Eastern Office, be consulted at (717) 948-3962. Questions regarding protection methods and tools for planning should be directed to the Luzerne County Planning Commission at (570) 825-1560 or the Luzerne County Office of Community Development at (570) 824-7214.

GLOSSARY

Acidophilic – a plant that requires or prefers acidic soil conditions.

Alluvium – material such as sand, silt, or clay that is deposited on land by streams.

Anthropogenic – human caused.

ATV – all-terrain-vehicle.

Bald – A rocky or stony area with little or no vegetation.

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. Fire is a natural process in the ridgetop barrens of Luzerne County.

Bt (*Bacillus thuringiensis*) – an insecticide, which is produced by the fermentation of a bacterium (Bt), used to control many caterpillar-type pests (e.g., gypsy moth).

Bog – a nutrient poor, acidic peatland that receives water primarily from direct rainfall with little or no input from groundwater or runoff; vegetation consists primarily of peat moss and ericaceous shrubs.

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.

DBH – The diameter of a tree at breast height.

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.

Fragipan – A very dense soil layer that prevents water from draining quickly through the soil.

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.

Hemic – an organic soil in which the plant remains show a good degree of decomposition (between 1/3 and 2/3 of the fibers are still visible after rubbing the material between the fingers).

Hibernacula – A location where animals hibernate.

Hibernation – The period of winter inactivity during which time normal physiological processes are reduced and a significant decrease in body temperature occurs. In Pennsylvania, true hibernation is shown by woodchucks, jumping mice, and bats.

High-Quality Coldwater Fisheries (HQ-CWF) – DEP designation (PA Code, Chapter 93) for a stream or watershed that has excellent quality waters and environmental or other features that require special water quality protection.

Hydrology – water system of an area including both surface water and ground water.

Kame – a short ridge or mound of sand and gravel deposited during the melting of glacial ice.

Kettle – a depression left in a mass of glacial drift, apparently formed by the melting of an isolated block of glacial ice.

Lepidoptera – moths and butterflies.

Listed species – species that is monitored and considered to be of concern by PNHP.

Littoral – the area where water meets land, the shoreline.

Mesic – moist, not saturated.

Minerotrophic – groundwater fed; influenced by water that has been in contact with bedrock or soil, and is richer in mineral content than rainwater.

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.

Oligotrophic – poor to extremely poor in nutrients; typically describes dilute waters with low base metal ion concentrations.

Peat – partially decomposed remains of plant material in which at least some of the plant parts are still distinguishable.

POSCIP – Plant of Special Concern in Pennsylvania.

Potential Natural Area – used by the Pennsylvania Natural Heritage Program 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.

R-O-W – Strip of land occupied or intended to be occupied by a street, crosswalk, railroad, electric transmission line, oil or gas pipeline, water main, sanitary or storm sewer line, or other special use.

Sapric – Organic soils (muck) in which most of the plant material is decomposed and the original constituents cannot be recognized.

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.

Understory – layer of shrubs and small trees between the herbaceous layer and the canopy.

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 Natural Heritage Program, 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 hardwoods 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 SENSITIVITY: **OWNER**

HABITAT SKETCH:

APPENDIX IV: Ranking Definitions

FEDERAL and STATE STATUS, and the Pennsylvania Natural Heritage Program (PNHP) 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.

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	Poor occurrence: protection of the occurrence may be worthwhile for historical reasons or only if no higher ranked occurrences exist. A D-rank community is severely disturbed, its structure and composition been greatly altered, and recovery to original conditions, despite management and time, essentially will not take place. A D-rank population of a sensitive species is very small with a high likelihood of dying out or being destroyed, and exists in a highly disturbed and vulnerable habitat.
E	Verified as extant, but has not been given a rank; additional information needed to evaluate quality.

* Intermediate ranks may also be assigned.

APPENDIX VI: Special Plants and Animals of Luzerne County

PLANTS

SCIENTIFIC NAME	COMMON NAME
Amelanchier humilis	Serviceberry
Amelanchier sanguinea	Roundleaf serviceberry
Aster radula	Rough-leaved aster
Bartonia paniculata	Screw-stem
Bidens discoidea	Small Beggar-ticks
Carex disperma	Soft-leaved Sedge
Carex lasiocarpa	Slender sedge
Carex limosa	Mud sedge
Carex oligosperma	Few-seeded sedge
Carex polymorpha	Variable sedge
Elatine americana	
Elatine minima	Small waterwort
Eleocharis olivacea	Capitate spike-rush
Elymus trachycaulus	Slender Wheatgrass
Eurybia radula	Rough-leaved Aster
Gaultheria hispidula	Creeping snowberry
Gentiana linearis	Narrow-leaved gentian
Glyceria borealis	Small-floating manna-grass
Helianthemum bicknellii	Bicknell's hoary rockrose
Juncus filiformis	Thread rush
Ledum groenlandicum	Common labrador-tea
Lonicera hirsuta	Hairy honeysuckle
Lupinus perennis	Lupine
Lygodium palmatum	Hartford fern
Megalodonta beckii	Beck's water-marigold
Muhlenbergia uniflora	Fall dropseed muhly
Myriophyllum heterophyllum	Broad-leaved water-milfoil
Najas gracillima	Bushy naiad
Orontium aquaticum	Golden club
Oryzopsis pungens	Slender mountain-ricegrass
Panicum xanthophysum	Slender panic-grass
Platanthera blephariglottis	White fringed-orchid
Platanthera ciliaris	Yellow-fringed orchid
Polemonium vanbruntiae	Jacob's-ladder
Polystichum braunii	Braun's holly fern
Potamogeton gramineus	Grassy Pondweed
Potamogeton robbinsii	Flat-leaved pondweed
Potamogeton vaseyi	VAsey’s Pondweed
Potentilla tridentata	Three-toothed cinquefoil
Prunus pumila var. depressa	Sand Cherry
Prunus pumila var. *susquehanae*	Sand cherry
Ranunculus aquatilis var diffusus	White water crowfoot
Ribes lacustre	Swamp currant
Rosa virginiana	Virginia Rose
Schoenoplectus subterminalis	Water Bulrush
Schoenoplectus torreyi	Torrey's bullrush
Stellaria borealis	Mountain starwort

Streptopus amplexifolius	White twisted-stalk
Utricularia cornuta	Horned bladderwort
Utricularia geminiscapa	Bladderwort
Utricularia intermedia	Flat-leaved Bladderwort
Utricularia purpurea	Purple bladderwort
Viola selkirkii	Great-spurred violet
Xyris montana	Northern yellow-eyed grass

ANIMALS

SCIENTIFIC NAME	COMMON NAME
Accipiter gentilis	Northern goshawk
Aegolius acadicus	Northern saw-whet owl
Aeshna clepsydra	Mottled Darner
Aeshna constricta	Lance-tipped Darner
Aeshna tuberculifera	Black-tipped Darner
Aeshna verticalis	Green-striped Darner
Anax longipes	Comet Darner
Anodonta implicata	Alewife floater
Aplectoides condita	A noctuid moth
Ardea herodias	Great blue heron
Argia bipunctulata	Seepage Dancer
Arigomphus furcifer	Lilypad Clubtail
Botaurus lentiginosus	American bittern
Boloria selene myrina	Silver Bordered Fritillary
Boyeria grafiana	Ocellated Darner
Calopteryx aequabilis	River Jewelwing
Calopteryx amata	Superb Jewelwing
Carterocephalus palaemon mandan	Arctic skipper
Cathanus ustulatus	Swainson’s Thrush
Celithemis eponina	Halloween Pennant
Chaetaglaea cerata	A sallow moth
Chlosyne harrisii	Harris' checkerspot
Circus cyaneus	Northern harrier
Cistothorus palustris	Marsh wren
Clemmys guttata	Spotted Turtle
Cordulia shurtleffi	American Emerald
Crotalus horridus	Timber rattlesnake
Diarsia rubifera	A moth
Dorocordulia lepida	Petite Emerald
Empidonax flaviventris	Yellow-bellied flycatcher
Enallagma aspersum	Azure Bluet
Enallagma boreale	Boreal Bluet
Enallagma laterale	New England Bluet
Enodia anthedon	Northern Pearly-eye
Epiglaea apiata	Pointed sallow
Erynnis persius persius	Persius duskywing
Euphydryas phaeton	Baltimore Checkerspot
Falco peregrinus	Peregrine falcon
Gallinago delicata	Wilson’s snipe
Glaucomys sabrinus	Northern Flying Squirrel
Glena cognataria	Blueberry gray

Gomphaeshna furcillata	Harlequin Darne
Gomphus adelphus	Mustached Clubtail
Gomphus descriptus	Harpoon Clubtail
Gomphus vastus	Cobra Clubtail
Haliaeetus leeucocephalus	Bald Eagle
Helicordulia uhleri	Uhler's Sundragon
Hemileuca maia	Barrens buckmoth
Hemipachnobia monochromatea	Sundew Cutworm Moth
Hesperia leonardus	Leonard's skipper
Heterodon platirhinos	Eastern hognose snake
Ischnura kellicotti	Lilypad Forktail
Itame sp 1	Barrens Itame (cf i. Inextricata)
Lampsilis cariosa	Yellow lampmussel
Lestes eurinus	Amber-winged Spreadwing
Lestes forcipatus	Sweetflag Spreadwing
Leucorrhinia glacialis	Crimson-ringed Whiteface
Libellula incesta	Slaty Skimmer
Lontra canadensis	Northern River Otter
Lycaena epixanthe	Bog copper
Metaxaglaea semitaria	Footpath sallow moth
Myotis lebii	Eastern Small-footed Myotis
Myotis septentrionalis	Northern myotis
Myotis sodalis	Indiana or social myotis
Nannothemis bella	Elfin Skimmer
Nycticorax nycticorax	Black-crowned night-heron
Ophiogomphus carolus	Riffle Snaketail
Ophiogomphus mainensis	Maine Snaketail
Pandion haliaetus	Osprey
Panthea sp 1	A moth
Papaipema sp 1	Flypoison borer moth
Platyperigea meralis	A Noctuid Moth
Poanes massasoit	Mulberry Wing
Polites mystic	Long Dash
Porzana carolina	Sora
Psectraglaea carnosa	Pink sallow
Pyganodon cataracta	Eastern Floater
Rallus limicola	Virginia rail
Satyrodes eurydice	Eyed Brown
Sciurus niger vulpinus	Eastern fox squirrel
Sideridis maryx	A moth
Somatochlora elongata	Ski-tailed Emerald
Somatochlora incurvata	Incurvate Emerald
Somatochlora walshii	Brush-tipped Emerald
Speyeria aphrodite	Aphrodite Fritillary
Speyeria atlantis	Atlantis Fritillary
Sphinx gordius	Gordian sphinx
Sympetrum semicinctum	Band-winged Meadowhawk
Syngrapha epigaea	A moth
Umbra pygmaea	Eastern mudminnow