



Clearfield County

Natural Heritage Inventory



Clockwise from above: Eastern Featherbells,
Mosquito Creek in Moshannon State Forest,,
Barred Owl, Mountain Laurel, wetlands at
Anderson Creek.



CLEARFIELD COUNTY NATURAL HERITAGE INVENTORY

Prepared for:

**The Clearfield County Planning Office
209 Locust St.
Clearfield, PA 16830**

Prepared by:

**Western Pennsylvania Conservancy
209 Fourth Avenue
Pittsburgh, PA 15222**

17 September 2004

This project was funded through grants supplied by the Department of Conservation and Natural Resources – Office of Wild Resource Conservation, the Department of Community and Economic Development, and Clearfield County.

Copies of this report are available in electronic format through Western Pennsylvania Conservancy's web site – www.paconserve.org – and through the Clearfield County Planning Office.

PREFACE

The Clearfield County Natural Heritage Inventory identifies and maps Clearfield County's most significant natural places. High quality landscapes, exemplary natural communities, rare and unique species and general habitat diversity were all considered as part of the study; these characteristics, and methods for evaluating areas within the county, are detailed in the report.

Although the inventory was conducted using a tested and proven methodology, it is best viewed as a preliminary report rather than the final word on the subject of Clearfield County's natural heritage. Further investigations could, and likely will, uncover previously unidentified areas of significance. Likewise, in-depth investigations of sites listed in this report could reveal features of further or greater significance than have been documented. We encourage additional inventory work across the county to further the efforts begun with this study.

These studies were conceived as ways to provide information about critical living resources for planning purposes at numerous levels within both the public and private sectors. Organizations may use the inventory to guide land acquisition and conservation decisions. Local municipalities and the counties may use it to help with comprehensive planning, zoning, and the review of development proposals. Developers, utility companies, and government agencies alike may benefit from access to this environmental information prior to the creation of detailed management or development plans. As of this writing, approximately two thirds of the counties in the commonwealth have completed inventories; each inventory bringing the state closer to fulfilling the goal of having studies completed for all counties by the end of 2006.

The ability of a community to establish a vision of the future and to bring it to fruition hinges upon its capacity to assemble information that will enable it to act effectively and wisely. There are many important resources present in Clearfield County that are not addressed in this inventory. Historic, cultural, educational, water supply, agricultural and scenic resources are among the many that the county must address through other projects and programs. This Natural Heritage Inventory focuses on the best examples of living *ecological resources* in Clearfield County. Although agricultural lands and open space may be included as part of inventory areas, the emphasis of the designation and delineation of the areas are the ecological values present.

The inventory does not confer protection to any of the areas listed in the report. It is, however, a tool for informed and responsible decision-making. Areas described in this report include both public and private lands. Permission obtained to visit sites for the purposes of this study does not confer any agreement of visitation for other purposes. Please respect the rules and regulations governing public lands and the rights and desires of private landowners when considering visits to any areas detailed in this report.

The Western Pennsylvania Conservancy (WPC) served as the principal investigator for the study and prepared the report and maps that are the products of the study. Established in 1932, Western Pennsylvania Conservancy is a private non-profit conservation organization headquartered in Pittsburgh. WPC's mission is to save the places we care about by connecting people to the natural world. As part of its mission, WPC works to sustain the natural heritage of the Commonwealth: its native plant, animal, and habitat resources. To reach its goals, WPC initiates conservation projects independently and establishes partnerships with agencies and organizations having similar interests.

Along with The Nature Conservancy and The Department of Conservation and Natural Resources, WPC is a partner in the Pennsylvania Natural Heritage Program (PNHP) which is responsible for collecting, tracking and interpreting information regarding the Commonwealth's biological diversity. County inventory projects are an important part of the work of PNHP.

Over the history of these studies, the format and presentation of information in the reports has changed as we strive to provide a more complete and usable document for the numerous users mentioned. We welcome comments and suggestions related to these changes. Any questions concerning sites, updates to the inventory, or the reports themselves may be addressed to the Western Pennsylvania Conservancy, 209 Fourth Avenue, Pittsburgh, PA 15222; phone: (412) 288-2777.

The Clearfield County Planning Commission administered this study. Requests for copies of the inventory can be addressed to the Clearfield County Planning Commission, 209 East Locust Street, Clearfield, PA 16830, phone: (814) 765-2641.

ACKNOWLEDGEMENTS

We would like to acknowledge the many citizens and landowners of the county and surrounding areas who volunteered information, time, and effort to the inventory and granted permission to access land.

We especially thank:

Dr. Carol Loeffler, pilot for the aerial reconnaissance of the county
Jodi McCluskey, Clearfield County Planning Director
Clearfield County Planning Commission
Robert G. Merrill, Pennsylvania Bureau of Forestry
Dr. Hank Webster, Pennsylvania State University-Dubois
Dr. Joseph Hummer, Pennsylvania State University-Dubois
Clearfield County NHI Advisory Committee

Many others contributed to the inventory effort. Without their help, the inventory would not have seen completion.

This report has incorporated ideas and approaches developed for conservation science initiatives recently undertaken in other states, most notably the Massachusetts BioMap project and the Maryland Green Infrastructure project; we gratefully acknowledge the vision of these projects as providing the basis for improved ways to represent conservation information in the Natural Heritage Inventory reports.

Jessica McPherson
Ecologist
Western Pennsylvania Conservancy

TABLE OF CONTENTS

Preface	i
Acknowledgements	i
Executive Summary	vi
Introduction	i
Background	
Ecological Science Background.....	2
NHI Mapping.....	5
Natural History Overview of Clearfield County.....	6
Physiology & Geology.....	6
Soils.....	6
Vegetation.....	11
Methods	15
Site Selection.....	15
Ground Survey.....	15
Data Analysis.....	16
Results	
Contiguous Forest Blocks.....	20
Landscape Conservation Areas.....	26
Important Bird Areas.....	36
Biological Diversity Areas—listed by township	
Beccaria Township, Coalport Borough, Glen Hope Borough, Irvona Borough.....	39
Bell Township, Mahaffey Borough, Newburg Borough.....	41
Bigler Township.....	47
Bloom Township.....	49
Boggs Township, Wallacetown Borough.....	53
Bradford Township.....	55
Brady Township, Troutville Borough.....	57
Burnside Township, Burnside Borough, New Washington Borough.....	59
Chest Township, Westover Borough.....	63
Cooper Township.....	67
Covington Township.....	69
Decatur Township, Osceola Borough, Chester Hill Borough.....	75
Ferguson Township.....	77
Girard Township.....	79
Goshen Township.....	85
Graham Township.....	89
Greenwood Township.....	95
Gulich Township, Ramey Borough.....	95
Huston Township.....	99
Jordan.....	107
Karthauss.....	109
Knox.....	111
Lawrence Township, Clearfield Borough.....	113
Morris Township.....	119
Penn Township, Grampian Borough, Lumber City Borough.....	121

Pike Township, Curwensville Borough.....	123
Pine Township.....	125
Sandy Township, Dubois City, Falls Creek Borough.....	133
Union Township.....	137
Woodward Township, Brisbin Borough, Houtzdale Borough.....	139
Recommendations.....	141
Glossary.....	145
Literature Cited.....	147
Appendices	
Appendix I: Significance Ranks.....	152
Appendix II: Pennsylvania Natural Heritage Program.....	152
Appendix III: CNHI Site Survey Form.....	154
Appendix IV: Natural Community Classification.....	156
Appendix V: Status of Species	
A. Federal Status.....	162
B. Pennsylvania Status.....	163
C. Global & State Element Ranks.....	166
Appendix VI: Plants and Animals of Special Concern in Clearfield County.....	168
Appendix VII: Sustainable Forestry Information Sources.....	170

LIST OF TABLES

Table 1. Natural Heritage Areas categorized by significance.....	viii
Table 2. Examples of Natural & Anthropogenic Disturbance.....	3
Table 3 Soil Associations of Clearfield County.....	10
Table 4 Synthesis of factors used for setting size thresholds for matrix-forming communities in the Northern Appalachians.....	17
Table 5 Summary Statistics of Contiguous Forest Blocks.....	24
Table 6. Ownership of lands within forested Landscape Conservation Areas.....	30

LIST OF FIGURES

Figure 1. Physiographic Provinces & Ecoregions of Clearfield County.....	7
Figure 2. Soil Associations of Clearfield County.....	9
Figure 3 Contiguous Forest Blocks in Pennsylvania.....	20
Figure 4 Contiguous Forest Blocks in Clearfield County.....	21
Figure 5. Biological Diversity Areas, Landscape Conservation Areas, and Important Bird Areas in Clearfield County.....	26
Figure 6. Watersheds of Clearfield County.....	30

EXECUTIVE SUMMARY

Introduction

A healthy natural landscape is vital to the quality of life in human communities and to the survival of the native biodiversity that is our natural heritage, connecting us to the past and the future of our communities and our cultural identity. For all of us, the natural landscape and the ecosystem processes it supports provide many services, such as clean water and clean air, and renew the resources from which we draw food, raw materials, and economic vitality. Industries that include forest products, fishing, outdoor recreation, and nature tourism depend upon a natural landscape that is well-stewarded and positioned for long-term sustainability.

The first steps in working towards stewardship of ecological health in our landscape are to characterize the ecosystems it hosts, understand how they function, and assess how they may be sensitive to human impacts. This report contributes to this endeavor by mapping the location and describing the character of many of the county's most significant ecological areas. Additionally, it provides information regarding their sensitivity to various land use activities.

The report focuses on identifying and documenting areas that support exemplary natural communities, broad expanses of intact natural ecosystems, and species of special concern. Its aim is to provide information to help county, state, and municipal governments, private individuals, and business interests plan development with the preservation of an ecologically healthy landscape for future generations in mind.

Maps are a key feature of the inventory, outlining the areas identified as supporting important ecological elements. The maps do not pinpoint the exact location of species of concern or natural communities but rather represent critical habitat and the surrounding area or landscape necessary to support critical habitats and the elements (plants, animals, natural communities) of concern. A summary table and a written description of the sites accompany each map. Potential threats and

recommendations for protection of the sites are included for each of the individual site descriptions.

Natural Heritage Inventory Mapping

To provide the information necessary to plan for conservation of biodiversity—at the species, community, and ecosystem levels—and continued function of ecosystem services, we provide a several-tiered system of maps.

Biological Diversity Areas (BDAs)

Ecological significance: BDAs are a group of sites intended to provide representative examples of all natural community/ecosystem types native to the study region. Biological Diversity Areas are ranked and described to highlight those areas in the best condition and those areas which make important contributions to biodiversity by harboring species or communities which have declined or are naturally uncommon in the state, region, or world.

Conservation Planning Application: BDAs are mapped according to their sensitivity to human activities. “Core” areas delineate essential habitat that can absorb very little activity without substantial impact to the natural features of concern. “Supporting Landscape” areas delineate lands that are not essential habitat, but support natural features of concern by maintaining vital ecological processes or secondary habitat. Supporting Landscape Areas may be able to accommodate some types of activity without detriment to natural resources of concern.

Contiguous Forest Blocks Map

Ecological Significance: To aid interpretation of the relative ecological value of forested lands in the county, we provide a map of all blocks of forest that contain more than 250 acres of core area. Table 5 (pg. 24) lists several statistics to further describe the ecological character of the blocks.

Conservation Planning Application: The information on forest block ecological characteristics listed in the table can be applied to a variety of different purposes. They can be used to compare the relative ecological significance of areas for forest conservation planning. The wetland and forest metrics may be relevant to species-focused plans or studies, and the stream and wetland metrics can help inform planning efforts for water quality and aquatic habitat conservation.

Landscape Conservation Areas (LCAs)

Ecological Significance: LCAs are designated around landscape features that function as a linking element within an aggregation of BDAs, and around large blocks of contiguous forest. Large areas of contiguous forest have unique and important ecological value because they are capable of supporting species that require interior forest conditions and have large territory sizes, and have the potential to support a forest ecosystem with long-term viability.

Conservation Planning Application: These large regions in relatively natural condition can be viewed as regional assets; they improve quality of life by providing a landscape imbued with a sense of beauty and wilderness, they provide a sustainable economic base, and their high ecological integrity offers unique capacity to support biodiversity and human health. Planning and stewardship efforts can preserve these functions of the landscape by limiting the overall amount of land converted to other uses, and by considering the large-scale pattern of the landscape while endeavoring to minimize fragmentation of natural cover. These goals can be facilitated by limiting new infrastructure development, including roads and sewer lines, within LCAs, and by utilizing existing cleared areas for new projects.

Important Bird Areas

Ecological Significance: IBAs are designated by the PA Audubon Society to

highlight those portions of the landscape especially important in supporting bird diversity.

Conservation Planning Application: Planning for these areas should consider how best to maintain their value as bird habitat. The value of large-scale IBAs arises from the interior forest habitat contained within them, and thus the recommendations for LCA stewardship to minimize forest fragmentation are applicable. Smaller-scale IBAs are typically based around natural communities that have particular habitat value, and thus a high degree of protection should be accorded to the sites.

Methods

Presently, thirty-eight County Inventories have been completed throughout Pennsylvania. The Clearfield County Natural Heritage Inventory followed the same methodologies as previous inventories, which proceeded in the following stages:

- site selection
- ground survey
- data analysis

Site Selection

A review of the Pennsylvania Natural Diversity Inventory (PNDI) database (see Appendix II) determined where sites for special concern species and important natural communities were known to exist in Clearfield County. Knowledgeable individuals were consulted concerning the occurrence of rare plants and unique natural communities in the county. Geological maps, USGS topographical maps, National Wetlands Inventory maps, USDA soil surveys, recent aerial photos, and published materials were also used to identify areas of potential ecological significance (Reschke 1990). Once preliminary site selection was completed, reconnaissance flights over chosen areas of the county were conducted. Wetlands were of primary interest during fly-overs in Clearfield County.

Ground Survey

Areas identified as potential sites were scheduled for ground surveys. After obtaining permission from landowners, sites were examined to evaluate the condition and quality of the habitat and to classify the communities present. Field survey forms (Appendix III, pg. 154) were completed for each site. The flora, fauna, level of disturbance, approximate age of community and local threats were among the most important data recorded for each site. In cases where permission to visit a site was not granted, when enough information was available from other sources, or when time did not permit, sites were not ground surveyed.

Data Analysis

Data obtained during the 2001 and 2002 field seasons was combined with prior existing data and summarized. All sites with species or communities of statewide concern, as well as exceptional examples of more common natural communities were selected as Biological Diversity Areas (BDAs). Spatial data on the elements of concern were then compiled in a geographic information system (GIS) format using ESRI ArcView 3.2a software. The boundaries defining each BDA were based on

physical and ecological factors, and specifications for species protection provided by jurisdictional government agencies. The BDAs were then assigned a significance rank based on size, condition, rarity of the unique feature, and the quality of the surrounding landscape (see Appendix I, pg. 152 for further description of ranks). Landscape Conservation Areas were designated around landscape features that provide a uniting element within a collection of BDAs, or large blocks of contiguous forest identified using GIS-based spatial analysis.

Results

The Clearfield County Natural Heritage Inventory recognizes areas of ecological significance— 29 Biological Diversity Areas and 11 Landscape Conservation Areas.

The results of the Natural Heritage Inventory for Clearfield County are summarized below in tabular form. Table 1 lists the Natural Heritage Areas categorized according to their significance to the protection of the biological diversity and ecological integrity of the region. Significance ranks are **Exceptional**, **High**, **Notable**, and **County** (for a full explanation of these ranks, see Appendix I, pg. 152).

Table 1. Natural Heritage Areas categorized by significance

Site	Municipality	Description	Page No.
<i>Exceptional Significance</i>			
Camp Wopsononock Forest BDA	Gulich Twp. Reade Twp.	A large natural area with several forest community types, natural wetland areas, and calcareous sandstone outcrop habitats.	96
Chest Creek Wetlands BDA	Bell Twp. Newburg Boro. Ferguson Twp.	A floodplain forest community and a seepage wetland community with a plant species of special concern.	42
Crystal Springs Bog BDA	Pine Twp.	A natural wetland and surrounding upland area that host three species of special concern	126
Dimeling Road BDA	Lawrence Twp.	A population of the Allegheny plum, a plant species of global and state concern.	114

Table 1. Natural Heritage Areas categorized by significance

Site	Municipality	Description	Page No.
Moshannon State Forest LCA	Gibson Twp. Huston Twp. Lawrence Twp. Goshen Twp. Girard Twp. Covington Twp. Karthaus Twp. Pine Twp.	The second-largest contiguous forest block identified in PA; supports a range of forest community types and many natural wetlands as well.	34
<i>High Significance</i>			
Bilger Rocks BDA	Bloom Twp.	A sandstone rock outcropping that hosts a plant species of special concern	50
Burnside Oxbow BDA	Burnside Twp.	Several wetland communities and a population of featherbells (<i>Stenanthium gramineum</i>), a plant species of special concern in Pennsylvania	60
Chest Creek South Floodplain BDA	Chest Twp.	A floodplain area hosting a heron rookery	64
Fulton Railroad Tunnel BDA	Lawrence Twp.	An area used as winter hibernation grounds by an animal species of special concern.	114
Panther Rocks BDA	Pine Twp.	A sandstone rock outcropping that hosts a plant species of special concern	128
Shagger's Inn Impoundment BDA	Lawrence Twp.	A shallow water impoundment used by osprey, a bird species of special concern, for nesting.	118
Twelvemile Run Tributaries BDA	Covington Twp. Gibson Twp.	Three natural wetlands and a plant species of special concern	71
Central Allegheny Front LCA	Woodward Twp. Gulich Twp.	A large contiguous forest block, mainly in Centre County.	31
Sandy Lick Creek Wetlands BDA	Sandy Twp. Union Twp.	A section of Sandy Lick Creek with several natural wetland complexes, hosting three species of special concern.	134
SW Elk State Forest LCA	Huston Twp. Snyder Twp.	A large contiguous forest block that falls across the Clearfield-Elk county line.	31
<i>Notable Significance</i>			
Anderson Creek & Whitney Run Wetlands BDA	Huston Twp. Pine Twp. Union Twp.	Portions of Anderson Creek and Whitney Run including many natural wetland areas	100
Cole Run BDA	Covington Twp. Karthaus Twp.	The watershed of Cole Run, a stream classified as Exceptional Value by the PA-DEP	70
Gifford Run Vernal Pools BDA	Girard Twp.	Several vernal pool communities	80
Gifford Run Wetlands BDA	Girard Twp. Goshen Twp.	A very large natural wetland complex in the headwaters of Gifford Run	81
Left Branch Moose Creek Headwaters BDA	Pine Twp.	A natural wetland with a unique plant community	127
Quehanna Right-of-Way BDA	Covington Twp.	Site hosting a plant of special concern	71
Rogue's Harbor Run BDA	Chest Twp.	The watershed of Rogue's Harbor Run, a stream classified as Exceptional Value by the PA-DEP	64
Wolf Run Wetland BDA	Sandy Twp.	A natural wetland in the headwaters of Wolf Run	135

Table 1. Natural Heritage Areas categorized by significance

Site	Municipality	Description	Page No.
Anderson Creek-Montgomery Creek LCA	Penn Twp. Lawrence Twp. Pine Twp. Union Twp. Bloom Twp. Pike Twp.	A large contiguous forest block containing the upper watershed of Anderson and Montgomery Creeks.	33
Bennett Branch Headwaters LCA	Huston Twp. Sandy Twp. Pine Twp. Union Twp.	A large contiguous forest block in the headwaters of Bennetts Branch	32
Haslett Run LCA	Penn Twp. Greenwood Twp. Brady Twp. Bell Twp.	A large contiguous forest block spanning Haslett Run, Bell Run, Curry Run, and Poplar Run; forest in variable condition.	30
S. Central Allegheny Front LCA	Gulich Twp.	A large contiguous forest block; although falling mainly in Centre & Blair Counties, its extension into SE Clearfield County supports the Camp Wopsononock BDA.	31
SGL # 77 LCA	Huston Twp. Sandy Twp.	A large block of contiguous forest spanning the Elk and Clearfield County line.	32
<i>County Significance</i>			
Bell's Landing Floodplain BDA	Greenwood Twp.	One of the few areas of natural floodplain along the West Branch Susquehanna River	92
Laborde Branch Wetlands BDA	Sandy Twp. Brady Twp.	Natural wetland habitat along the Laborde Branch floodplain	134
Laurel Run & Saunders Run BDA	Lawrence Twp. Huston Twp. Jay Twp. (Elk)	Seepage wetland communities in a forested landscape along Laurel & Saunders Run	115
Laurel Run Tributary Wetland	Huston Twp. Pine Twp.	A natural wetland in the headwaters of Laurel Run	101
Mosquito Creek-County Line Wetlands BDA	Benezette Twp. (Elk), Girard Twp.	A large complex of natural wetlands along Mosquito Creek	82
Parker Dam Beaver Ponds BDA	Huston Twp	This site recognizes two wetland complexes, both beaver-influenced, in the headwaters of Mud Run.	102
Robert's Run Wetlands BDA	Goshen Twp. Girard Twp.	Several natural wetland communities in the headwaters of Roberts Run	86
SB Elliot Cabins Wetland BDA	Pine Twp.	A natural wetland in the headwaters of Lick Run	129
South Bennett Branch Wetlands BDA	Huston Twp.	A seepage wetland and a riparian wetland habitat	105
Stony Run Headwaters Wetland BDA	Pine Twp.	Two natural wetland complexes in the headwaters of Stony Run	130
Montgomery Run LCA	Pine Twp. Union Twp.	A large, highly contiguous block of forest containing the watershed of Montgomery Run.	34
Moravian Run-Alder Run LCA	Cooper Twp. Graham Twp. Bradford Twp.	A contiguous block of forest around Moravian Run and Alder Run; uniquely intact in this region of the county.	33

Discussion and Recommendations

Status of natural features today

The landscape and waterways of Clearfield County have undergone considerable change over the course of human settlement, most notably from timber extraction, mining, and agriculture. During the timber boom in the early twentieth century, almost the entire landscape of the county underwent general clear-cutting, and subsequently there were widespread fires. Mining began with deep mine excavation, and transitioned to mostly strip mining operations as mining technology developed. Strip mining has been extensive, resulting in an environmental transformation of a large proportion of the county land. Another legacy of mining is widespread water pollution that seriously impairs aquatic ecosystems in many of the county's waterways. Throughout the county, the condition of ecological resources today closely reflects the history of human land use.

Although mining and timber extraction remain prevalent in the county, natural communities have redeveloped across large swaths of the landscape previously used for timber extraction, coal mining, and clay mining. Especially in the northern part of the county, there are large areas of contiguous forest that provide abundant habitat for forest dwelling species. Clearfield County spans several major regional topographic transitions—with the Allegheny Front bounding the western edge of the county, the extreme northern end of the Allegheny Mountains terminating in the southeastern part of the county, and an extension of the High Allegheny Plateau across the northern part of the county transitioning into rolling low plateau landscape to the west and into the West Branch Susquehanna River valley to the south. The forest ecosystems historically present reflected this position at the juncture of three ecoregions: the high-elevation northern areas were similar in ecological composition to the High Allegheny Plateau, the southeast had mesophytic-influenced forests, and the northwest was an extension of the Western Allegheny Plateau communities.

Today the condition of forest communities varies across the county. While many areas

have re-grown and redeveloped a broad ecological spectrum of natural forest communities, some areas are fragmented by roads, surface mined areas, artificial clearings, or utility rights-of-way. The character and quality of forested areas also reflects variable timber management practices, with some areas less sustainably managed to date than others. Over-browsing by deer poses a threat to biological diversity and forest regeneration in many regions of the county. Of the three ecoregions in the county, the High Allegheny Plateau has the greatest area of relatively intact forest, while the mesophytic-influenced and the Western Allegheny Plateau portions of the county are more fragmented, with fewer well-recovered examples of typical forest communities.

However, despite the variable condition of the forests, their contiguity is a great asset to the county's ecological integrity and is regionally important in sustaining mid-atlantic populations for many animal species. Contiguous forested areas offer enhanced habitat value over fragmented forested areas. While a number of generalist species can succeed and reproduce in small patches of forest, many species can only utilize large, unbroken tracts of forest. Because many of the forested areas in Clearfield County today are large, contiguous patches, they support species which are declining in other areas of the state and the continent due to lack of habitat.

The forests of Clearfield County have the potential for even greater significance to biodiversity in the future. Some species can only find appropriate habitat in old-growth forests, because the structures they need for shelter or the food sources they require are not present in younger forests. While there are few areas in Clearfield County today that are old growth, the large expanses of younger forests provide the potential for the future development — in ecologically strategic areas — of prime old growth habitat that can host species that are today in decline throughout the continent due to lack of habitat.

Within the matrix of forest in the county, unique communities including vernal pools, forested seepage wetlands, headwaters shrub swamps, sandstone rockhouses, and calcareous rock

outcrops occur in conjunction with specific topographic or geologic conditions. Although these communities are limited in their extent, occupying a comparatively small portion of the natural landscape in the county, they are of particular value to the county's biodiversity because they support groups of specialist species—such as amphibians that breed only in vernal ponds, or plant species that live only in acidic, northern-influenced wetlands—that would otherwise not be present in the county.

Planning for biodiversity and ecological health tomorrow

Provision for the future health of ecological resources in Clearfield County will require a combination of efforts to steward specific sites that host unique species and communities, broader-scale planning to maintain the unique contiguity of its forested regions, and restoration efforts to alleviate water pollution and restore ecological function to damaged landscapes and waterways.

Forests—contiguity and connectivity

In the forested landscapes, objectives for large-scale planning should include maintaining and increasing contiguity and connectivity of natural land. The extensive forested area in the northern portion of the county—part of the second-largest forest block in Pennsylvania—is regionally significant in supporting populations of interior forest-dependent species such as some neotropical migrant birds, and species that have large home range requirements such as the Northern goshawk or the fisher. Municipal and regional land use plans can support maintenance of forest contiguity by encouraging residential or commercial projects to re-develop in existing town centers or re-use previously altered landscapes, and by orienting new infrastructure along existing corridors rather than through unfragmented natural landscapes. Another planning consideration is the maintenance of natural landscape corridors that span between forest patches and connect forests, wetlands, and waterways. Many species—examples abound among birds, amphibians, and dragonflies—use an aquatic or wetland habitat in one phase of their life, then migrate to an upland, forested habitat for their adult life. Either habitat alone

cannot be utilized unless a corridor exists between them.

Aquatic Ecosystems—treasures and challenges

Clearfield County's waterways, ranging from remote mountain streams to the West Branch Susquehanna River, include some of the county's most scenic features and some of its greatest ecological challenges. Due to the impacts of acid deposition and extensive mining in a landscape of naturally acidic geology, most of the county's streams have low pH and aquatic ecosystems that range from slightly impaired to nearly devoid of life. Remediation of mine drainage pollution is the greatest challenge to restoration of water quality and living aquatic ecosystems in many of the county's waterways. In some areas reduction in the release of other pollutants into runoff, including sediments, nutrients, and chemical contaminants, will also be necessary to improve water quality. Stewardship or restoration of native forest communities in riparian buffers along waterways will greatly improve water quality and enhance the habitat value for various aquatic and semi-aquatic species. Attending to the basic ecological functions of streams and wetlands will pay dividends by ensuring the continued availability of quality water for human communities, enabling the restoration of healthy fisheries, and enhancing the quality of life for which the region is known.

Evaluating proposed activity within Natural Heritage Areas

A very important part of encouraging conservation of the Natural Heritage Areas identified within the Clearfield County Natural Heritage Inventory is the careful review of proposed land use changes or development activities that overlap with Natural Heritage Areas. The following overview should provide guidance in the review of these projects or activities.

Always contact the Clearfield County Planning Office. The County Planning Office should be aware of all activities that may occur within Natural Heritage Areas in the county so that they may interface with the County Conservation District and other necessary organizations or

agencies to better understand the implications of proposed activities. They also can supply guidance to the landowners, developers, or project managers as to possible conflicts and courses of action.

Once informed of the proposed activity, the County Planning Office should then contact the Pennsylvania Natural Heritage Program (Western Pennsylvania Conservancy office) for direction in arranging further review of the activity. Depending upon the resources contained within the Natural Heritage Area, the agencies/entities responsible for the resource will then be contacted. The points of contact and arrangements for that contact will be determined on a case-by-case basis by the County and PNHP. In general, the responsibility for reviewing natural resources is partitioned among agencies in the following manner:

- *U.S. Fish and Wildlife Service* for all federally listed plants or animals.
- *Pennsylvania Game Commission* for all state and federally listed terrestrial vertebrate animals.
- *Pennsylvania Fish and Boat Commission* for all state and federally listed aquatic vertebrate and invertebrate animals.
- *Pennsylvania Bureau of Forestry* for all state and federally listed plants.
- *Pennsylvania Natural Heritage Program (PNHP)* for all natural communities, terrestrial invertebrates and non-listed species.

PNHP and agency biologists can provide more detailed information with regard to the

location of the natural resources of concern in a project area, the needs of the particular resources in question, and about potential impacts of the project to those resources.

If a ground survey is necessary to determine whether significant natural resources are present in the area of the project, PNHP or an agency biologist will recommend a survey be conducted. PNHP, through Western Pennsylvania Conservancy, or other knowledgeable contractors can be retained for this purpose. Early consideration of natural resource impacts is recommended to allow sufficient time for thorough evaluation. Given that some species are only observable or identifiable during certain phases of their life cycle (i.e., the flowering season of a plant or the flight period of a butterfly), a survey may need to be scheduled for a particular time of year.

If the decision is made to move forward with a project in a sensitive area, WPC can work with municipal officials and project personnel during the design process to develop strategies for minimizing the project's ecological impact while meeting the project's objectives. The resource agencies in the state may do likewise.

Note that projects involving numerous activities that will require state permits will require a PNDI review. Consultation with WPC or another agency does not take the place of the PNDI review. However, early consultation and planning as detailed above can provide for a more efficient and better integrated permit review, and a better understanding among the parties involved as to the scope of any needed project modifications.

INTRODUCTION

A healthy natural landscape is vital to the quality of life in human communities and to the survival of the native biodiversity that is our natural heritage, connecting us to the past and the future of our communities and our cultural identity. For all of us, the natural landscape and the ecosystem processes it supports provide many services, such as clean water and clean air, and renew the resources from which we draw food, raw materials, and economic vitality. Industries including forest products, fishing, outdoor recreation, and nature tourism depend upon a natural landscape that is well-stewarded and positioned for long-term sustainability.

The first steps in working towards stewardship of ecological health in our landscape are to characterize the ecosystems it hosts, understand how they function, and assess how they may be sensitive to human impacts. This report contributes to this endeavor by mapping the location and describing the character of many of the county's most significant ecological areas. Additionally, it provides information regarding their sensitivity to various land use activities.

The report focuses on identifying and documenting areas that support exemplary natural communities, broad expanses of intact natural ecosystems, and species of special concern. Its aim is to provide information to help county, state, and municipal governments, private individuals, and business interests plan development with the preservation of an ecologically healthy landscape for future generations in mind.

Maps are a key feature of the Inventory, outlining the areas identified as supporting important ecological elements. The maps do not pinpoint the exact location of species of concern or natural communities but rather represent critical habitat and the surrounding area or landscape necessary to support critical habitats and the elements (plants, animals, natural communities) of concern. A summary table and a written description of the sites accompany each map. Potential threats and recommendations for protection of the sites are included for each of the individual site descriptions.

The existence of habitat for specific plants and animals and the rarity within the state of an area's natural communities are important selection criteria for Natural Heritage Areas, but equally important is the size and contiguousness of an area containing good quality natural features. Large areas provide the backbone that links habitats and allows plants and animals to shift and move across sizable portions of the landscape.

Particular species names, common and scientific, are provided in coordination with the appropriate jurisdictional agency. The U. S. Fish and Wildlife Service oversees the protection of federally threatened and endangered species. On the state level, plants and terrestrial invertebrates are under the jurisdiction of the Pennsylvania Department of Conservation and Natural Resources (DCNR). Mammals and birds are under the protection of the Pennsylvania Game Commission (PGC). Reptiles, amphibians and aquatic animals are under the jurisdiction of the Pennsylvania Fish and Boat Commission (PFBC). Some plant and animal species are under threat due to unauthorized collection or poaching and these species are therefore not identified within the text of this report in order to provide some measure of protection for the species.

An Advisory Committee made up of agencies' representatives, county and municipal officials, representatives of various groups and businesses in the county and interested residents helped to identify areas for consideration and guide the course and presentation of the findings of the study. Additionally, many landowners and residents provided valuable information and access to areas of interest during the study. Copies of the Clearfield County Natural Heritage Inventory are provided to each municipality in the county and are also available for review through the County Planning Office, the Clearfield County Library System and electronically through the Western Pennsylvania Conservancy's web site.

BACKGROUND

Ecological Science Background

• An Ecosystem Perspective

In order to ensure that the value natural landscapes offer to human quality of life continues to be available for future generations, management decisions must consider the health of entire ecosystems. All parts of an ecosystem are interconnected—the survival of any particular species or the continuation of a given natural process depends upon the system as a whole, and in turn itself contributes a role towards maintaining the system.

Ecosystem: “the complex of interconnected living organisms inhabiting particular area or unit of space, together with their environment and all their interrelationships and relationships with the environment.” –Ostroumov 2002

The Ecological Function of Biodiversity

Because an ecosystem's parts are interconnected, ecosystem health is fundamentally dependent on the condition of its components, which are its biological diversity, as well as the continuous variation in the physical condition of the landscape (geology, soil type, slope, moisture level, etc.). Biological diversity relates to ecosystem health on many levels. Individual plant, animal, and microbe species each play a role in sustaining ecosystem processes such as nutrient cycling, decomposition, and plant productivity: declines in native species diversity alter these processes (Naeem et al. 1999). Genetic diversity is vital to the long-term viability of species because it provides evolutionary potential, without which species may not be able to adapt successfully to environmental changes. The range of variation in the physical landscape and the action of ecological processes over time creates a variety of habitat types that provide for a broad range of native species and natural communities.

The distribution of species, along with habitat types and natural communities that support them across the landscape, is important to consider in conservation planning. For example, some types of plant communities are ubiquitous, such as red-oak mixed hardwood forests, and have a widespread distribution. Others are more restricted in the habitats they can occupy, such as a frog species that requires a particular type of wetland, such as a vernal pond. These species have a more limited distribution. For effective conservation, the full range of natural variation in habitat and community types must be protected.

Biological Diversity or Biodiversity- The variety of life in all its forms and all its levels of organization (i.e., ecosystem, species, genetics), including the ecological structures, functions, and processes at all of these levels

–Hunter 1990, Society of American Foresters 1991

Natural Resilience, Human Activities, & Conservation Stewardship

Nature has a great deal of resilience, but not all natural phenomena are alike and some are more sensitive than others. The various components of an ecosystem have different levels of sensitivity to disturbance and to human activities in the landscape, as well as differing capacities to recover following disturbance. Some species, natural processes, and communities tolerate or even depend upon natural disturbances; these are often also able to tolerate human-induced disturbances that have similar impacts. At the other end of the spectrum, species may be extremely sensitive to disturbance if they require very specialized habitats that form over a long period of time (such as a bog or a limestone outcrop), and they may have a poor ability to recover following disturbance if they reproduce slowly or disperse across the landscape slowly. Many ecosystem processes—such as nutrient formation and transport, or soil formation—are sustained by natural phenomena such as precipitation or decomposition, and the continued action of these forces will re-instate these processes following disturbance. However, natural processes operate at different rates; some natural processes operate very slowly, and some natural communities develop very slowly, and damage to these ecosystem components can take centuries to repair. Examples of such slow processes are the formation of soil on dry sandstone slopes, or the development of a peat bog community.

Although some species, including several rare species, are aided by on-site disturbance (e.g. clearing or mowing), in general, human-caused disturbance negatively impacts natural systems. With wide-ranging anthropogenic disturbance, some plant and animal species may be completely extirpated from an area because they cannot compete or survive under newly created conditions. Human disturbances are a permanent part of the landscape, but decisions about the type, timing, and extent of future disturbances are important to the natural ecological diversity that remains. Stewardship of the natural landscape to preserve its potential for future generations requires understanding of the diverse components of our ecosystems and consideration in our activities that we not exceed their capacity to recover.

Table 2. Examples of natural and anthropogenic disturbances (adapted from Scott et.al. 1999)*

<i>Natural Events</i>	<i>Anthropogenic Events</i>
<i>fire</i>	residential development
<i>disease epidemic</i>	road, trail, railroad line
<i>flood</i>	telephone line, utility line
<i>drought</i>	dam, canal
<i>hurricane/tornado/landslide</i>	commercial development
<i>landslide</i>	modern agriculture
<i>ice storm</i>	mining
	<i>logging</i>
	<i>grazing</i>

*Entries in italics denote reversible disturbances, while those in Roman usually represent long-term

The Effects of Human-Influenced Landscapes on Biodiversity and Ecosystem Function

Over the last three centuries, human settlement has created a landscape in which natural cover is interspersed with areas modified for cultural purposes. Several landscape characteristics have been found to explain variation in patterns of biodiversity within the landscape. These include the

amount of habitat fragmentation, edge characteristics, connectivity between habitat patches and diversity of habitats found with the landscape.

Habitat Fragmentation

Fragmentation of formerly continuous forested landscapes into smaller, more isolated tracts has an effect on plant and animal composition and structure. The size of a landscape and the way it is perceived varies among the individual species (Pearson et al. 1995). For small or relatively immobile species, such as plants or insects, a few hectares of habitat may be sufficient. Whereas other species such as the black bear, Northern Goshawk, bobcat, fisher, and Barred Owl— have large individual home ranges and require large expanses of forest to support a viable population. Dramatic declines have been documented across the region in some of these species and in others that depend on core forest and large tracts of forest (Yahner 1988, Hansen & Urban 1992, Robinson et al. 1995). Because few large, unfragmented areas of forest remain, those that do remain are especially important as refuges for these species. Pennsylvania has a high proportion of the forest land remaining in the mid-Atlantic states, and thus our forests are critically important to the regional survival of populations of birds and other forest wildlife (Goodrich et al. 2003, Rosenberg and Wells 1995).

Edge Effect

As a forested landscape is fragmented, the amount of forest edge relative to core areas increases. Traditionally, good wildlife management often was synonymous with created edge habitats since many “game” species are more abundant near edges. Today, it is recognized that many “non-game” species evolved within extensive areas of unfragmented forest. Consequently, edges may be detrimental due to the increased presence of predators and non-native species. Forest edges differ in vegetative structure, generally making them less suitable for native species and increasing the likelihood of success by invasives. The influence of an edge may extend up to 300’; therefore, those areas greater than 300’ from an edge are considered “core” forest areas that offer better-quality habitat conditions for “forest interior” species such as the Allegheny woodrat, woodland salamanders, Scarlet Tanager, Ovenbird, and Black-throated Blue Warbler. The pattern of human development has created a landscape in which the majority of forest in Pennsylvania is influenced by edge effects, and does not offer “core” conditions, because it borders roads, utility rights-of-way, and other non-forest uses (Goodrich et al. 2003).

Connectivity

The features that fragment natural cover into small tracts are often impassable to wildlife and interrupt the mechanisms by which plant propagules disperse. When a patch of natural landscape becomes isolated from other natural habitat, the short- and long- term survival of species within that patch are threatened. Many species depend on several habitat types in the course of their lives, and will immediately decline if isolated from one of the necessary habitats. For example, some species of salamander breed in wetlands but live in upland forest outside of breeding season. Even where a species can meet its habitat requirements within a patch, isolation threatens the long-term survival of a population by curtailing opportunities for immigration or emigration with neighboring areas. The presence of corridors may facilitate the movement of species across boundaries or through inhospitable habitats. These movements across the landscape not only help to sustain the numbers of a population, but also sustain its genetic viability by exchanging genetic material between populations. Over time, isolated small populations lose genetic diversity, and thus the capacity to respond to change in the environment (Ridley 2003).

Natural Heritage Inventory Mapping

Guiding Principles:

Noss (1992) suggests the following principles to guide conservation efforts:

1. Represent, in a system of protected areas, all native ecosystem types and seral stages across their natural range of variation
2. Maintain viable populations of all native species in natural patterns of abundance and distribution
3. Maintain ecological and evolutionary processes, such as disturbance regimes, hydrological processes, nutrient cycles, and biotic interactions, including predation.
4. Design and manage the system to be responsive to short-term and long-term environmental change and to maintain the evolutionary potential of lineages.

Additionally, we emphasize the importance of maintaining connectivity between habitats and contiguity of some large patches of habitat.

Key to Maps:

To provide the information necessary to plan for conservation according to these principles, we provide a several-tiered system of maps.

Biological Diversity Areas

Ecological significance: a group of sites intended to provide representative examples of all natural community/ecosystem types native to the study region. Biological Diversity Areas are ranked and described to highlight those areas in the best condition and those areas which make important contributions to biodiversity by harboring species or communities which have declined or are naturally uncommon in the state, region, or world.

Conservation Planning Application: Biological Diversity Sites are mapped according to their sensitivity to human activities. “Core” areas designate essential habitat that can absorb very little activity without substantial impact to the natural features of concern. “Supporting Landscape” areas designate lands that are not essential habitat, but support natural features of concern by maintaining vital ecological processes or secondary habitat. Supporting Landscape Areas may be able to accommodate some types of activity without detriment to natural resources of concern.

Contiguous Forest Blocks Map

Ecological Significance: To aid interpretation of the relative ecological value of forested lands in the county, we provide a map of all blocks of forest that contain more than 250 acres of core area. Table 5 (pg. 24) lists several statistics to further describe the ecological character of the blocks.

Conservation Planning Application: The information on forest block ecological characteristics listed in the table can be applied to a variety of different purposes. They can be used to compare the relative ecological significance of areas for forest conservation planning, the wetland and forest metrics may be relevant to species-focused plans or studies, and the stream and wetland metrics can help inform planning efforts for water quality and aquatic habitat conservation.

Landscape Conservation Areas

Ecological Significance: LCAs are designated around landscape features that function as a linking element within an aggregation of BDAs, and around large blocks of contiguous forest. Large areas of contiguous forest have unique and important ecological value because they are capable of supporting species that require interior forest conditions, species that have large territory sizes, and have the potential to support a forest ecosystem with long-term viability.

Conservation Planning Application: These large regions in relatively natural condition can be viewed as regional assets; they improve quality of life by providing a landscape imbued with a sense of beauty and wilderness, they provide a sustainable economic base, and their high ecological integrity offers unique capacity to support biodiversity and human health. Planning and stewardship efforts can preserve these functions of the landscape by limiting the overall amount of land converted to other uses, and by considering the large-scale pattern of the landscape while endeavoring to minimize fragmentation of natural cover when planning activities. These goals can be facilitated by limiting new infrastructure development, including roads and sewer lines, within LCAs, and by utilizing existing cleared areas for new projects.

Important Bird Areas

Ecological Significance: IBAs are designated by the PA Audubon Society to highlight those portions of the landscape especially important in supporting bird diversity.

Conservation Planning Application: Planning for these areas should consider how best to maintain their value as bird habitat. The value of large-scale IBAs arises from the interior forest habitat contained within them, and thus the recommendations for LCA stewardship to minimize forest fragmentation are applicable. Smaller-scale IBAs are typically based around natural communities that have particular habitat value, and thus a high degree of protection should be accorded to the sites.

Geologic Features

Ecological Significance: These include those areas that illustrate regional geologic processes, landforms or scenery and are those that are recognized as outstanding in Pennsylvania by Geyer and Bolles (1979, 1987). These places are not necessarily of importance to biological diversity and are therefore not considered Natural Heritage Areas. However, they are included as natural history features in the county.

Conservation Planning Application: These sites may be of interest for preservation due to their unique historic value, and often offer good opportunities for on-site natural history education.

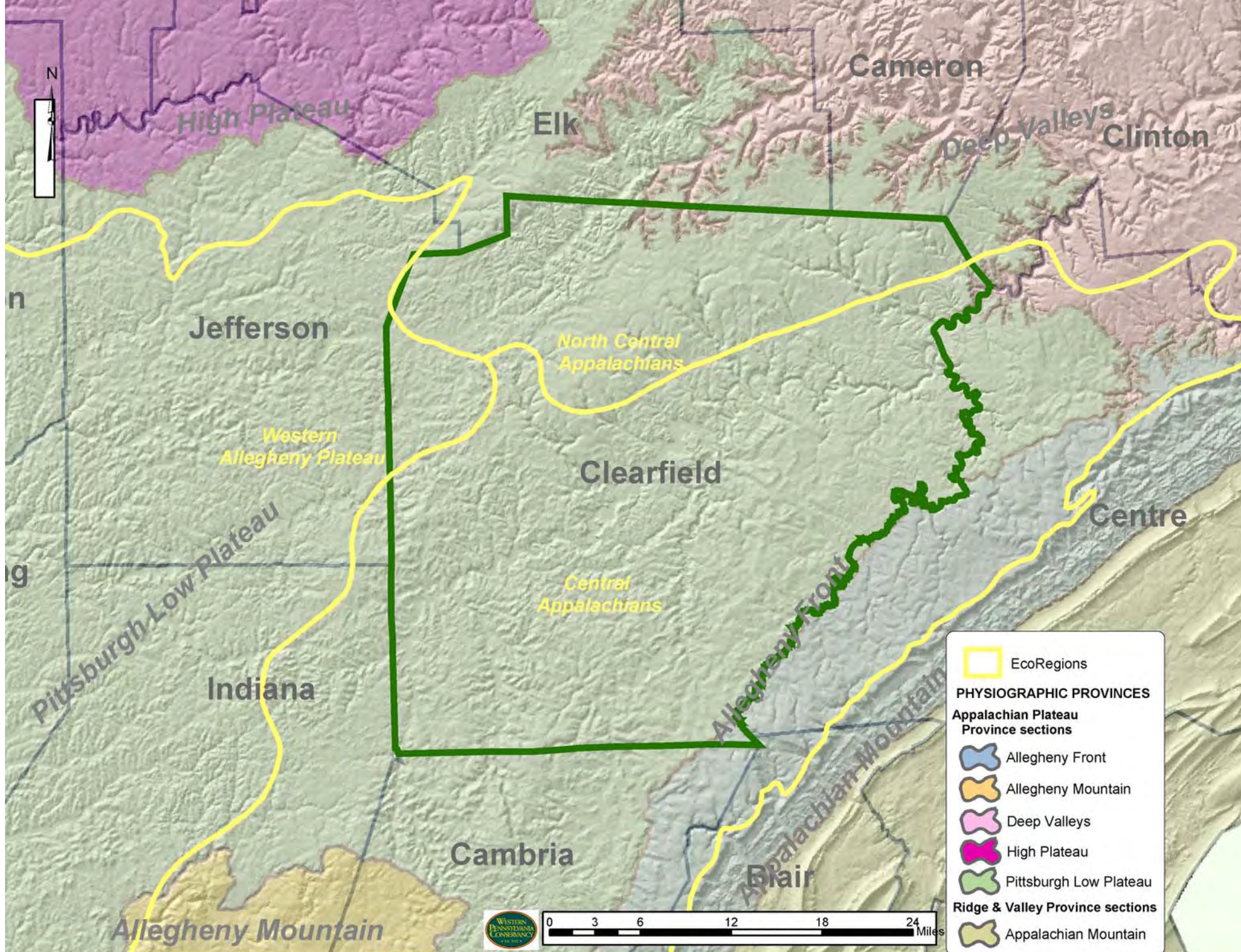


Figure 1. Physiographic Provinces & Ecoregions of Clearfield County

Natural History Overview of Clearfield County

The natural landscape is best described as an ecosystem, a term that describes a group of interacting living organisms and the physical environment they inhabit. Climate, topography, geology and soils are particularly important factors in the development of ecosystems (forests, fields, wetlands) and physical features (streams, rivers, mountains). 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 physiology, soils, surface water, and vegetation of Clearfield County.

Natural disturbances such as tornados, blow-downs, ice storms, and fires have historically played a large role in the formation of ecosystems. Human-induced disturbances have also influenced the character of ecosystems throughout history. Before European settlement, Native Americans cleared land for agriculture and settlement, and may also have set fires. Human activities since European settlement have been even more dramatically influential in forming and altering the character of Clearfield County's ecosystems, causing extinction of some species and the introduction of others.

Physiography and Geology

A physiographic province is a geographic region united by similar geology and other physical characteristics. Physiography influences a region's topography and climate. These two variables, along with bedrock type, significantly affect 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 regimes, certain plant communities are expected to occur within some provinces and not others.

Clearfield County lies entirely within the Pittsburgh Low Plateau Section of the Appalachian Plateau Physiographic Province (figure 1, pg 7). The Appalachian Plateau province is underlain by layers of rock, predominantly sandstones and shales, that originated from sediment deposition and compression. These layers were uplifted 500-400 million years ago when two island chains collided with the eastern edge of North America (the Taconic and Acadian orogenies – mountain-building events) to form a plateau elevated above the surrounding regions. Unlike the Ridge and Valley province to the east, the rock layers in the plateau region did not fold extensively to form mountain ridges; topographic relief at the surface in this area is mostly defined by stream valleys eroded and downcut over geologic time.

Although the land of Clearfield County shares a similar geologic history, it encompasses significant variation in climate due to strong elevational differences between different portions of the county. The county falls across the juncture of three ecoregions, the High Allegheny Plateau, the Western Allegheny Plateau, and the Central Appalachian Mountains (figure 1, pg. 9). The northern section of the county is higher elevation, an extension of the high plateau area to the north. The northwestern corner of the county falls across the easternmost edge of the Western Allegheny Plateau, and is lower in elevation than the High Allegheny Plateau and characterized by more rolling hills. The West Branch of the Susquehanna River has cut a deep valley through the center of the county; its tributaries, streams such as Bell Run, Haslett Run, and Poplar Run, descend several hundred meters from the high elevation plateau to meet the river channel. South of the river is the very northern extent of the Central Appalachian Mountains. This section of the county is generally lower elevation, except where the northern ends of the mountains lift the land into broadly rolling ridges.

The rock layers that reach the surface in Clearfield County are classified according to their age of origin into seven formation types: the Allegheny, Burgoon, Casselman, Glenshaw, Huntley Mountain, Mauch Chunk, and Pottsville, Rockwell, and Shenango-Oswayo (undivided). Sandstone is the predominant rock type in most of the county, with shale, conglomerate, siltstone, and coal layers also interspersed.

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

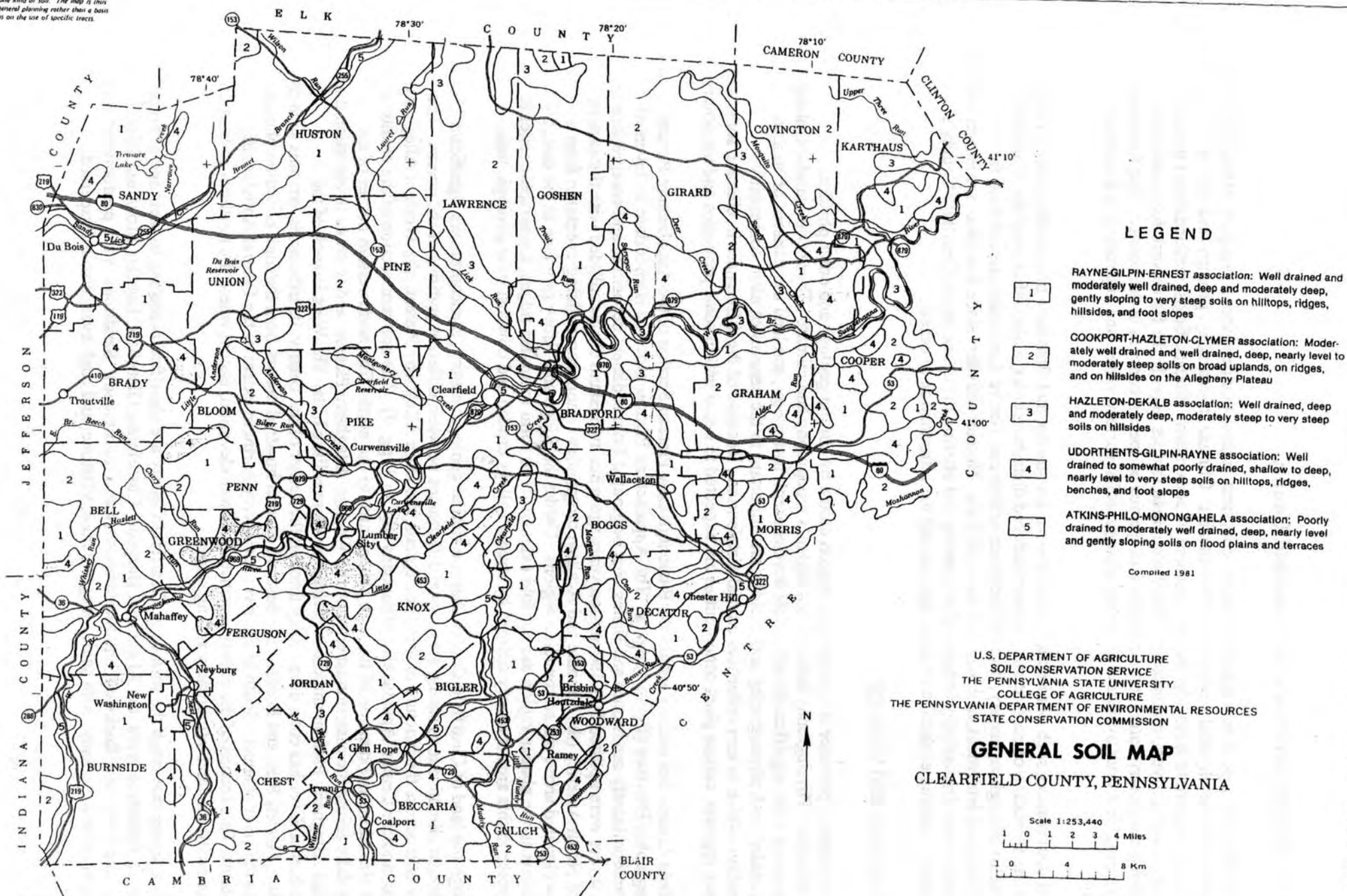


Figure 2. Soil Associations of Clearfield County

Table 3. Soil Associations of Clearfield County

Soil Association	Parent Materials	Description	Percentage of County	Land Use
Rayne-Gilpin-Ernest	Residuum weathered from shale, siltstone, and fine-grained sandstone	Well-drained and moderately well drained, deep and moderately deep, gently sloping to very steep soils on hilltops, ridges, hillsides, and foot slopes.	48	Primarily forest, mostly mixed hardwoods: some areas on hillsides used for pasture and hay, some hilltops and benches used for cultivated crops, hay, pasture. Use limitations are slope, erosion, and the seasonal high water table.
Cookport-Hazleton-Clymer	Residuum weathered from fine-grained and coarse-grained sandstone	Moderately well-drained and well drained, deep, nearly level to moderately steep soils on broad uplands, on ridges, and on hillsides on the Allegheny Plateau	28	Most areas of this association are in mixed hardwoods or are reverting to forest. Use limitations are slope, erosion, stones on the surface, and the seasonal high water table.
Hazleton-Dekalb	Residuum weathered from fine-grained and coarse-grained sandstone.	Well-drained, deep and moderately deep, moderately steep to very steep soils on hillsides	7	All areas of this association are wooded; slope and stones on the surface limit the soils of this association for most nonfarm uses.
Udorthents-Gilpin-Rayne	Udorthents (60%): material disturbed during mining. Gilpin & Rayne (15% each): residuum from shale, siltstone, and fine-grained sandstone.	Well drained to somewhat poorly drained, shallow to deep, nearly level to very steep soils on hilltops, ridges, benches, and foot slopes	13	Consists mostly of areas disturbed during surface-mining; most unmined areas reverting to forest, with some areas used for pasture and hay. Suited to farming, but Udorthents generally require reclamation. Slope, erosion, and the seasonal high water table are the main limitations.
Atkins-Philo-Monongahela	Atkins & Philo: Recent alluvium from sandstone, siltstone, and shale. Monongahela: old alluvium weathered from acid shale and sandstone	Poorly drained to moderately well drained, deep, nearly level and gently sloping soils on floodplains and terraces.	4	Much of the acreage of this association is wooded or used for urban development. Some areas are used for cultivated crops, hay, and pasture. Soils are suited to farming and trees; main limitations are erosion, the seasonal high water table, and flooding. Limited by flooding and seasonal high water table for most nonfarm uses.

Soils

Soil character exerts a strong influence on vegetation, as all plant species have individual requirements for nutrient availability, moisture levels, and pH level. A soil association is a natural grouping of soils based on similarities in climatic or physiographic factors and soil parent materials. It may include a number of soil types provided they are all present in significant proportions (Canadian Soil Information System, 2003). The soils of Clearfield County have been described in *Soil Survey of Clearfield County, Pennsylvania* (USDA, 1988). Table 3 (pg. 10) summarizes information from the Soil Survey about soil associations found in Clearfield County.

Vegetation

Forest Communities

Clearfield County is a predominantly forested landscape. As is true of most forests in Pennsylvania, the forests of Clearfield County are almost all second- or third- growth stands; there are few known areas of old-growth forest in the county. The three ecoregions which the county is at the juncture of each have characteristic forest community types, and the forests of Clearfield County appear to reflect its position at the transition zone between ecoregions. However, the current composition of the forests has been influenced not only by the range of variation in natural characteristics such as soil, geology, and climate, but also by the relatively extreme conditions experienced during recent history, including clearcutting and widespread fires near the turn of the century, decades of severe deer overbrowsing, and the acidification of soils from decades of industrially acidified precipitation.

The Central Appalachian Mountains originally contained mixed mesophytic forest in mesic conditions, and oak forests in drier sites. The mixed mesophytic forest is characterized by a diverse canopy with shared dominance among several species, and an extremely diverse herbaceous layer (Braun 1950). As Clearfield County is at the extreme northern edge of the Central Appalachian Mountains, mesic forests are limited to lower slopes at relatively low elevations. Many of the more southerly distributed species that characterize the mixed mesophytic forests are absent, and the overall diversity is not as high as is typical far south. The mesic forests of Clearfield County are mesophytic-influenced rather than true mixed mesophytic forests. Braun (1950) characterized the region along Allegheny Front and just west of the front as a transition zone, with mesic forests along valleys and coves originally composed of sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), tuliptree (*Liriodendron tulipifera*), red oak (*Quercus rubra*), basswood (*Tilia americana*), red maple (*Acer rubrum*), red elm (*Ulmus rubra*), ash (*Fraxinus sp.*), black cherry (*Prunus serotina*), shagbark hickory (*Carya ovata*), black birch (*Betula lenta*), chestnut (*Castanea dentata*), chestnut oak (*Quercus montana*), walnut (*Juglans nigra*), occasional white pine, (*Pinus strobus*) and hemlock (*Tsuga canadensis*).

On upper slopes, drier sites, and higher elevations, the forest communities are dominated by oaks – primarily chestnut oak (*Quercus montana*), but also red oak (*Quercus rubra*) and black oak (*Quercus velutina*). American chestnut (*Castanea dentata*) was once an important component of this forest, until the species was decimated by the chestnut blight in the early 20th century. Today, red maple and black birch are common, while white oak (*Quercus alba*), sassafras (*Sassafras albidum*), and black gum (*Nyssa sylvatica*) are occasional. There is often a shrub layer of mountain laurel (*Kalmia latifolia*) and blueberry (*Vaccinium angustifolium*, *V. pallidum*), and a heath-dominated understory.

The High Allegheny Plateau is characterized by northern hardwood and hemlock/white pine – northern hardwood forests. Few records exist describing the character of forests in this region previous to European settlement, and thus it is difficult to assess how the current composition of the forests compares to its historic condition. However, studies of land survey records in Allegheny National Forest, and of old growth areas in East Tionesta Creek suggest that the High Allegheny Plateau forests were once dominated by hemlock and beech, with white pine stands interspersed. Today those species are much less prevalent, while red maple, black cherry, and sugar maple have greatly increased (Whitney 1990, Braun 1950). The herbaceous layer is typified by a few ubiquitous species such as intermediate wood fern (*Dryopteris intermedia*), wild sarsaparilla

(*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), and partridgeberry (*Mitchella repens*). Mesic ravines and valleys typically have a stronger component of yellow birch and hemlock. In the northern plateau portion of Clearfield County, these communities are typical, while oak-heath communities similar to those described for the Central Appalachian Mountains are found at higher elevations and on dry slopes.

The original Western Allegheny Plateau forests appear to have been dominated by white oak (*Quercus alba*), with shagbark hickory (*Carya ovata*), red maple (*Acer rubrum*), shingle oak (*Quercus imbricaria*), scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus montana*), black oak (*Quercus velutina*), red oak (*Quercus rubra*), American chestnut (*Castanea dentata*), and black cherry (*Prunus serotina*) present in various mixtures.

In Clearfield County the less-disturbed forests tend to resemble the type characteristic of the ecoregion they fall within, but also display features of adjacent ecoregional types, especially following along the lines of topographic transitions. For example, the forests of the southern part of the county tend to contain a more diverse mixture of canopy trees, including species such as tulip poplar (*Liriodendron tulipifera*), green ash (*Fraxinus pensylvanica*), swamp white oak (*Quercus bicolor*), and cucumber magnolia (*Magnolia acuminata*), which have a more southerly distribution—and these species can also be found following the valleys that extend north of the West Branch into the High Allegheny Plateau. Conversely, forests with more northern species such as yellow birch (*Betula allegheniensis*) and wild sarsaparilla (*Aralia nudicaulis*) are found at higher elevations in the lower half of the county as well. In the southeast corner of the county, shingle oak (*Quercus imbricaria*), typical of Western Allegheny Plateau forests, is an important component of relatively undisturbed forests and reaches the northeast edge of its range.

Wetland Communities

Wetlands provide essential habitat for many plant and animal species, as well as valuable ecosystem services such as water filtration and flood control. The ecological character of a wetland is influenced by local soil type, disturbance history, bedrock composition, and hydrological regime. Types of wetlands range from forested seeps where groundwater saturates the surface only when heavy precipitation raises the water table, to open marshes that are continuously flooded, to low areas along streambanks that are flooded during high water events, to beaver meadows where the water level fluctuates over relatively long periods of time. Some types of wetland, such as those that are created by beaver dams, develop very quickly, and major changes can be observed in their character over mere decades. However, other types of wetland, such as sphagnum bogs, form extremely slowly, their present-day condition resulting from slow ecological processes operating over many thousands of years.

In the landscape of Clearfield County, wetlands occur naturally at the headwaters of streams, in the floodplains of streams and rivers, in areas where groundwater intercepts the surface of the ground (seepages and springs), and in beaver-impounded areas. Each of these settings provides different habitat values for native biodiversity. Wetlands resulting from excavations and impoundments are also present in the landscape; although they may provide habitat for typical wetland species, they were not included in this study because artificially created wetlands typically do not host as rich or distinctive an assemblage of native species as do natural wetlands.

Headwaters wetlands

These wetlands occur in broad depressions high in a watershed where precipitation accumulates before coalescing into a stream channel. They may also be fed by groundwater seepage. The underlying surface geology is predominantly sandstone, providing little mineral enrichment, and the wetlands appear to range in pH from somewhat acidic to highly acidic. Vegetation is usually patchy with vegetation structure responding to slight variations in elevation. Shrubs tend to occupy higher zones, graminoids (grass-like plants) occupy semi-saturated areas, while sphagnum and other emergent species occupy low, hydric areas. The historic condition of these wetland areas is somewhat uncertain, as there are no known descriptions from before the original forests were logged in the late 1800s. Many of the wetlands contain large white pine or hemlock stumps, indicating they were once forested; however, very little tree regeneration can be observed in the wetlands today. Removal of the forest canopy may have elevated the water table, thus

preventing the establishment of seedlings and permanently converting palustrine forested areas to open shrub or herbaceous wetlands. However, not all of the wetlands contain stumps, and these may have historically been open wetlands.

Understanding these wetlands is further complicated by questions about the role of peat formation and beaver activity in their history. The acidic character of the wetlands and the fact that a few of the wetlands today contain somewhat substantial peat accumulation suggests the possibility that some may have been peatlands. Peatlands develop when dead plant matter, usually sphagnum moss or graminoid vegetation, does not decompose and accumulates over a long period of time to form a spongy mat. Without mineral enrichment from surrounding bedrock, the environment typically becomes extremely acidic and nutrient poor. Few plant species can tolerate such conditions, and thus the community that develops consists of habitat specialists, many of which are rare species in Pennsylvania because there are very few such habitats. Climatic conditions are not highly favorable for peat formation. Also, beaver were historically a part of this landscape, and it is ambiguous what their role may have been to influence peatland development. Before European settlement the beaver population is estimated to have been much higher than it is today, and thus it is likely that beaver occupied these wetlands at least periodically if not continually, and that this disturbance is a natural part of their history and development. Beaver dams cause a cycle of ponding and vegetative re-colonization that might interrupt the process of peat formation, and also can convert forested wetlands to open wetlands. Today, several of the county's natural wetlands are currently occupied by beaver and others appear to contain former beaver ponds now undergoing succession.

Floodplain wetlands

Floodplain wetland communities occur along rivers and streams in low-lying areas. These locations are periodically inundated by the floodwaters of spring rains and snow melt or seasonal intense storm events, but may be dry for much of the year. They are predominantly forested, but also may have more open portions dominated by shrubs or herbs, especially where flood activity is most frequent and intense.

In central Pennsylvania, floodplain forests are characterized by a canopy containing some combination of silver maple (*Acer saccharinum*), eastern sycamore (*Platanus occidentalis*), tulip poplar (*Liriodendron tulipifera*), black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), or box-elder (*Acer negundo*). Shrubs and vines common to these forests include spicebush (*Lindera benzoin*), ninebark (*Physocarpus opulifolius*), silky dogwood (*Cornus amomum*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). Floodplain forest communities receive severe disturbances from floodwaters including erosion, scouring by ice and debris, and/or deposition of considerable quantities of sediment and debris. Only species with adaptations or tolerance for these kinds of conditions can survive here. However, conditions also tend to be relatively mesic and nutrient-rich, due to continual influx of organic material borne by floodwaters, and thus a unique and diverse plant community is typically present. In Clearfield County, the best examples of floodplain forest are found along the West Branch Susquehanna River and along broad floodplain areas of the large creeks in the southern portion of the county, such as Chest Creek and Clearfield Creek.

Seepage wetlands

A final major category of wetlands highlighted in this report are seepage wetlands. These wetlands form where underground water reaches the surface. Rainwater not only runs off the soil surface to accumulate in observable above-ground bodies of water, such as streams and lakes but drains through the soil to accumulate in and flow through bedrock layers, following fissures and areas of low density rock. Where groundwater intersects the surface, a broad area of saturated soil called a "seep" will form if the volume is low, and a concentrated stream of water termed a spring will be formed if the volume is higher. The seepage wetlands highlighted in this report form at the foot of slopes; precipitation received by the upland areas sinks down through loose, permeable layers of sandstone bedrock, is re-directed laterally upon

encountering a more dense layer of rock, and eventually emerges at the surface. Groundwater dissolves minerals from the bedrock layers through which it flows, and thus may substantially influence the chemical environment of a seepage wetland. Seeps in Clearfield County are expected to be fairly acidic, as the bedrock is predominantly sandstone, which contains few soluble minerals. They are typically shaded by forest canopy, and thus provide consistently cool and wet habitat conditions which certain plant and animal species thrive upon. Many species of salamanders use seeps, and typical plant species are jewelweed (*Impatiens sp.*), bee balm (*Monarda sp.*), slender manna-grass (*Glyceria melicaria*), golden ragwort (*Senecio aureus*), wood sorrel (*Oxalis acetosella*), scabrous sedge (*Carex scabrata*), northern awned sedge (*Carex gynandra*), mad-dog skullcap (*Scutellaria lateriflora*), marsh pennywort (*Hydrocotyle americana*), a sedge (*Carex torta*), marsh marigold (*Caltha palustris*), false nettle (*Laportea canadensis*), wood horsetail (*Equisetum sylvaticum*) and golden saxifrage (*Chrysosplenium americanum*).

Wetlands and Mining

Where mining has occurred in the upland areas above any wetland that receives seepage inputs, drainage through the disrupted bedrock layers will typically contaminate these groundwater flows with dissolved metals (mainly iron, aluminum, and manganese) and acids. Upon reaching the surface and encountering oxygen in the air, some of the metal compounds convert to solid form, thus accumulating in seepage areas as the orange (iron), bluish-white (aluminum), or black (manganese)-colored sediment characteristically associated with mining drainage. Aluminum, manganese, and high acidity are all toxic to aquatic life; iron is less toxic. However, the accumulation of sediments of any of the metals degrades aquatic habitats by blocking light needed by aquatic plants and microorganisms, and clogging the tissues of aquatic animals. The impacts of abandoned mine discharges (AMD) on a particular wetland will depend on the concentration of the contaminants in the discharge and the volume of the discharge, relative to the overall volume of the wetland.

METHODS

The methods used in the Clearfield County Natural Heritage Inventory followed established Pennsylvania Natural Heritage Program procedures, which are based on those used by Anonymous (1985), G.A. Reese et al. (1988), and A.F. Davis et al. (1990). Natural Heritage Inventories proceed in three stages: 1) site selection based on existing data, map and aerial photo interpretation, recommendations from local experts, and aerial reconnaissance; 2) ground surveys; and 3) data analysis and mapping.

Site Selection

Inventory site selection is guided by information from a variety of sources. A review of the Pennsylvania Natural Heritage Program database (see Appendix II, pg. 152) determined what locations were previously known for species of special concern and important natural communities in Clearfield County. Local citizens knowledgeable about the flora and fauna of Clearfield County were contacted for site suggestions. Individuals from academic institutions and state and federal agencies that steward natural resources (Penn State University-Dubois, PA Game Commission, PA Bureau of Forestry, PA Department of Environmental Protection, PA Fish Commission) were also contacted to obtain information about lands or resources they manage. National Wetland Inventory maps, compiled by the US Fish and Wildlife Service, were used to locate wetlands of potential ecological significance within the county. General information from other sources such as soil maps, geology maps, earlier field studies, and published materials on the natural history of the area helped to provide a better understanding of the area's natural environment.

Aerial photographs were reviewed to identify sites for ground survey. Initial study of aerial photos revealed large-scale natural features (e.g., contiguous forest, wetlands, vernal pools, shale barrens), disturbances (e.g., utility line rights-of-way, strip mines, timbered areas) and a variety of easily interpretable features. Some sites could be eliminated from consideration if they proved to be highly disturbed or fragmented or purely attributable to human-made features (e.g., impoundments, clearings, farm fields).

Once preliminary site selection was completed, reconnaissance flights over chosen areas of the county were undertaken. Information concerning extent, quality, and context within the landscape can be gathered easily from the air. Wetlands were of primary interest during fly-overs in Clearfield County. Based on these aerial surveys, some sites were eliminated from consideration if they proved to be highly disturbed, fragmented, or lacked the targeted natural feature.

Ground Surveys

Areas that were selected as inventory sites were scheduled for ground surveys. Biologists conducted numerous field surveys throughout Clearfield County during 2001 and 2002. Landowners were contacted and the sites were examined to evaluate the condition and quality of the habitat and to classify the plant communities present. Field survey forms (Appendix III, pg. 154) were completed for each site. Boundaries for each site were drawn on USGS 1:24,000 topographic maps. If any species of special concern was documented, and if the population was of sufficient size and vigor, a voucher specimen was collected to be archived in the herbarium of the Carnegie Museum of Natural History.

The flora, fauna, level of disturbance, approximate age of forest community, and local threats were among the most important data recorded for each site. In cases where landowner permission for site visits was not obtained, or enough information was available from other sources, sites were not ground surveyed.

Data Analysis

Biological Diversity Areas

Data on species of special concern and natural communities obtained during the 2001 and 2002 field seasons were combined with prior existing data and summarized. All sites with rare species and/or natural communities, as well as exceptional examples of more common natural communities were selected for inclusion in Biological Diversity Areas (BDAs). Plant species nomenclature follows Rhoads and Block (2000). Data on the occupied habitat area for each site selected was then compiled in a GIS format using ESRI ArcView 3.2a software. From the occupied habitat data, boundaries defining core habitat and supporting natural landscape for each BDA were determined based upon physical factors (e.g., slope, aspect, hydrology), ecological factors (e.g., species composition, disturbance regime), and buffer specifications provided by jurisdictional government agencies. Boundaries tend to vary in size and extent depending on the physical characteristics of a given site and the ecological requirements of its unique natural elements. For instance, two wetlands of exactly the same size occurring in the same region may require very different buffers if one receives mostly ground water and the other mostly surface water, or if one supports migratory waterfowl and the other does not. BDAs were then assigned a significance rank to help prioritize future conservation efforts. This ranking is based on the extent, condition, and rarity of the unique feature, as well as the quality of the surrounding landscape (see Appendix I for further description of ranks).

Landscape Conservation Areas

Landscape Conservations Areas (LCAs) were designated around landscape features that function as a linking element within an aggregation of BDAs, and/or large blocks of contiguous forest. LCAs designated around contiguous forest were identified by means of GIS analysis, refined through aerial photograph inspection, and selected based on size. Further analysis of blocks for comparison purposes was conducted to assess percent roadless area, miles of stream, acres of coniferous forest, and acres of natural wetlands.

Forest Block Identification

Forested areas in Clearfield County were first identified through a classification of Pennsylvania's National Land Cover Database (NLCD), downloaded from the Pennsylvania Spatial Data Access website (<http://pasda.psu.edu>). To identify blocks of contiguous core forest habitat, fragmenting features and edge-influenced forest areas were removed from the forested areas. Because the level of disturbance which effectively prevents movement is different for different species, contiguous forest blocks were identified at two levels. Tier I was designed to reflect the requirements of most vertebrates with relatively large territories (birds, larger mammals) and was used identify LCA boundaries. Fragmenting features for tier I were identified as: interstate, US route, and state route roads; major rivers and large streams. Tier II was designed to reflect the requirements of species more sensitive to fragmentation: small mammals, amphibians and reptiles, and large invertebrates. Fragmenting features were identified as: all features used for Tier I; all roads, regardless of substrate, 6 m or wider, as recorded in GIS map layers available from PennDOT and the Clearfield County Planning Office. The Tier II blocks identified roadless core habitat areas and were used as supplemental information to compare the quality of Tier I blocks. For both block tiers, edge-influenced forest areas were identified as any forest within 100 m of a fragmenting feature or a non-forest land cover type. A further buffer of 50 m was added to ensure that core forest area would be at least 100 m in width at all points within a contiguous forest block.

Block Refinement

Aerial photographs (Clearfield County Planning Office, 2000) were inspected to locate any powerline or pipeline right-of-ways, new roads, gas wells, mined areas, and other non-forest areas within contiguous forest blocks 5000 acres and above in size. NLCD forest data was re-analyzed using the more complete

fragmenting feature data to generate new Tier I and Tier II forest blocks. For Tier I, all non-forest areas, right-of-ways at least 40 m wide, and roads at least 30 m wide were considered fragmenting features. For Tier I, all roads or right of ways identifiable at a viewing scale of 1:24000 m were additionally considered fragmenting features.

Size Classification

Blocks were classified according to the area requirements for viable populations of various species groups that have large territory requirements or depend exclusively upon interior forest habitats, following Anderson and Vickery (in press). Sizes used for LCA classification are highlighted in the table below; species whose natural range does not extend to Pennsylvania were excluded. Also included in the size classification is the minimum size for a viable forest ecosystem, derived by considering the area required to absorb various types of natural disturbance (given in table), as well as the species' area requirements.

Table 4. Synthesis of factors used for setting size thresholds for matrix-forming communities in the Northern Appalachians. Disturbances are scaled to 4 x the largest severely disturbed patch size. Neotropical songbirds follow Robbins (1989). Other species are scaled for 25 times the mean female breeding territory. (Adapted from Anderson and Vickery, in press)

Scaling factor	Size Threshold in acres	Reference
Generalist species		
Bobcat	125,000	Fox & Brocke 1983
lynx	80,000	Burt & Grossenheider 1976
Fisher	75,000	Kelly 1977
moose	50,000	Crossley & Gilber 1983
Interior forest species		
Marten	30,000	Major et al, 1981
Fire (Lowland spruce fir)	27,000	Cogbill & Royte 2001
Minimum viable forest size	25,000	
Tornado	19,000	Peterson & Pickett 1991
Barred Owl	17,000	Mazur & James 2000
Severe downbursts	14,000	Stevens 1996
Northern Goshawk	10,500	Poole & Gill 2002
Neotropical migrants	9,000	Robbins 1989, Askins et al. 1987
Spruce Grouse	7,700	Ellison 1973
Hurricane	3,212	Foster et al. 1988
Black and white warbler	2,200	Poole and Gill 2002
Fire (northern hardwood)	250	Bormann & Likens 1979
woodland jumping mouse	25	Blair 1941
Deer mouse	25	Blair 1941
s. red backed vole	8	Blair 1941

LCA Selection & Site Ranking

All Tier I forest blocks with sufficient core forest habitat area to host viable populations of neotropical migrant bird species (9,000 acres) were selected as LCAs. Additionally, smaller forest blocks were selected in regions of the county where little intact natural landscape remains, to create a map that can serve as the basis for a network of natural ecosystems throughout the county.

State significance ranks were assigned to forest blocks based on their size as follows:

Significance rank	Size range	Rationale
Exceptional	> 90,000 acres	Highlights top regionally significant contiguous landscapes
High	25,000 – 90,000 acres	Meets minimum size for viable forest ecosystem
Notable	9,000 – 24,999 acres	Meets minimum size to host viable neotropical migrant bird populations
County	< 9,000 acres	

Comparative Metrics

Tier I blocks were further analyzed for a variety of comparative statistics, summarized in table 5 (pg. 24):

- o Acres of natural wetlands per block were calculated using the tabulate areas command and a vector data layer of NWI wetlands queried to remove all impounded, excavated, or human modified wetlands (those with Cowardin classification modifier –h, –x, or –d). These were excluded because in Clearfield County the presence of these modifiers almost always corresponds to wetlands that have resulted from mining excavation, and there is a clear difference in the biodiversity and environmental quality of these wetlands compared to naturally occurring wetlands.
- o Acres of coniferous forest per block were calculated using the tabulate areas command and the NLCD raster.
- o Percent roadless area per block was calculated using the tabulate areas command to determine total area of Tier II core area within each Tier I block, then dividing this sum by total area of the Tier I block.
- o Acres of BDAs were calculated using the tabulate areas command and the BDA shapefile.

Important Bird Areas

The Pennsylvania Important Bird Area Program is administered by the Pennsylvania Audubon Society. The information and definitions presented here are from their brochure and book, available on their website (Audubon 2002).

Definition: a site that is part of a global network of places recognized for their outstanding value to bird conservation. An IBA can be large or small, public or private and must meet one of several objective criteria. Since the IBA program is voluntary, there are no legal or regulatory restrictions.

To qualify as an IBA in Pennsylvania, a site must satisfy at least one of several criteria, as follows (Crossley 1998):

1. Any site having exceptional concentration* and/or diversity of birdlife when breeding, in winter, or during migration
2. Sites supporting state or federal endangered or threatened species
3. Sites supporting one or more species on Pennsylvania's "special concern" list
4. Sites containing representative, rare, threatened, or unique habitats, with birds characteristic of those habitats
5. Sites where long-term avian research or monitoring is in process

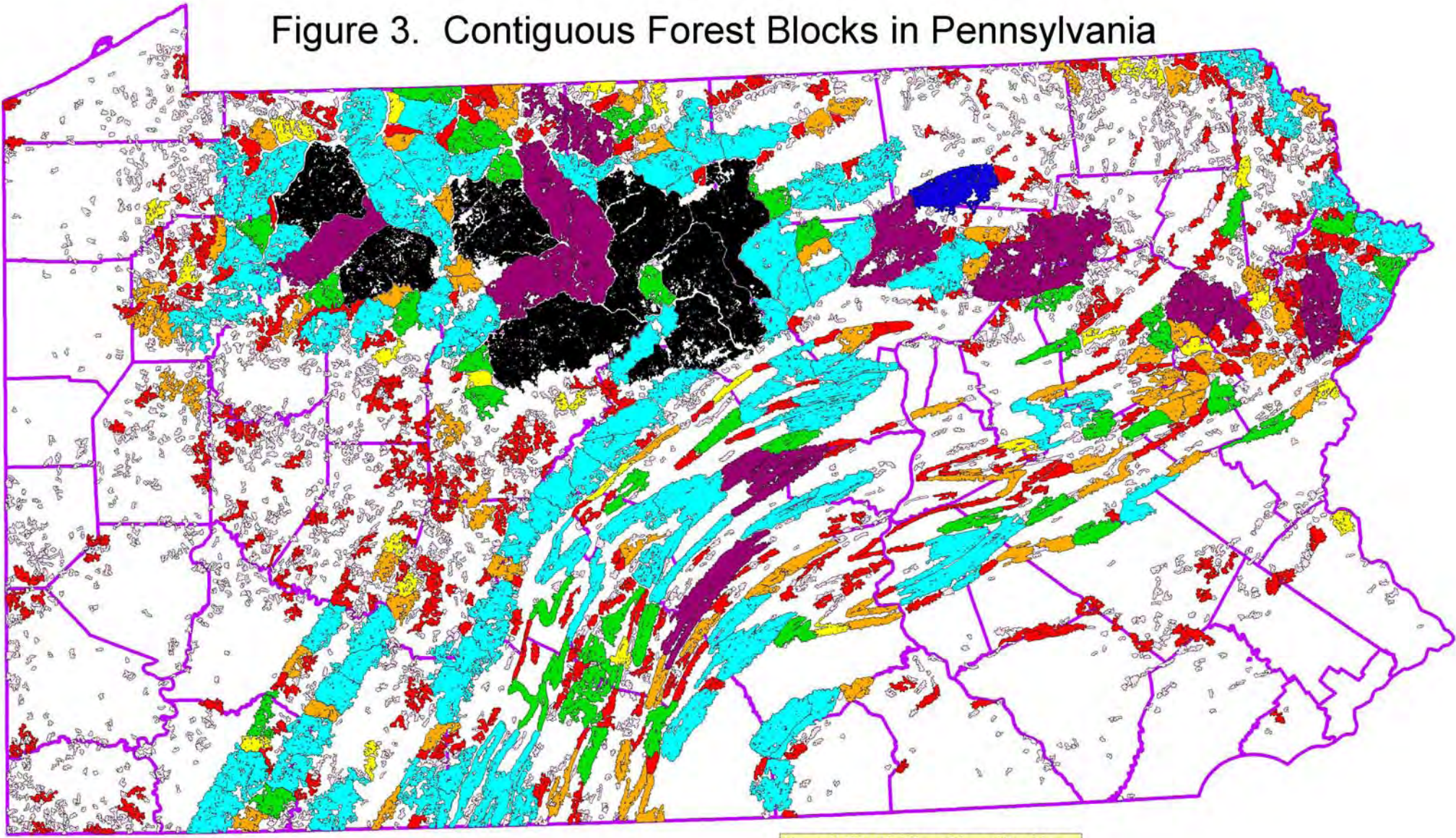
*Defined as: 2,000 waterfowl (at one time), 100 shorebirds (at once), 50 breeding pairs of wading birds, or 10,000 migrant raptors/season.

Pennsylvania's Important Bird Area (IBA) Program is part of a dynamic worldwide effort to identify and protect outstanding habitats for birds and all wildlife. The IBA concept was first developed in Europe (in 1985) by BirdLife International. The program's resounding success in the Old World quickly spread to North America, where the IBA Program has become pivotal to a continent-wide bird conservation strategy. Working in partnership with the American Bird Conservancy, the National Audubon Society has already identified over 400 Important Bird Areas in the U.S.

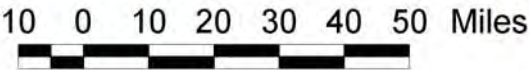
Pennsylvania was the first state to develop an IBA program in the United States. Based on strict scientific criteria (given above), a group of scientific advisors (known as the Ornithological Technical Committee) selected 73 IBA sites encompassing over one million acres of public and private lands. These areas include migratory staging areas, winter feeding areas and roost sites, and prime breeding areas for songbirds, wading birds and other species. They also include critical habitats, such as spruce-fir bogs, tidal salt marsh lands, bottomland hardwood swamps, and open grasslands. The technical committee, on an ongoing basis, will select additional IBA sites in Pennsylvania.

More information on the Important Bird Area program in Pennsylvania can be found on their website, at <http://pa.audubon.org/Ibamain.htm>.

Figure 3. Contiguous Forest Blocks in Pennsylvania



Forest Block Size Classifications



Acreage		Area-Sensitive Species Supported		Acreage		Area-Sensitive Species Supported	
	0 - 2199				17000 - 24999		Barred Owl
	2200 - 8999		Black and White Warbler		25000 - 74999		Viable forest ecosystem
	9000 - 10499		Neotropical Migrant Birds		75000 - 79999		Marten
	10500 - 16999		Northern Goshawk		80000 - 124999		Fisher
					125000 - 319244		Bobcat

Figure 4.
Contiguous Forest Blocks
of Clearfield County

Forest Block Size Classifications

Acreage

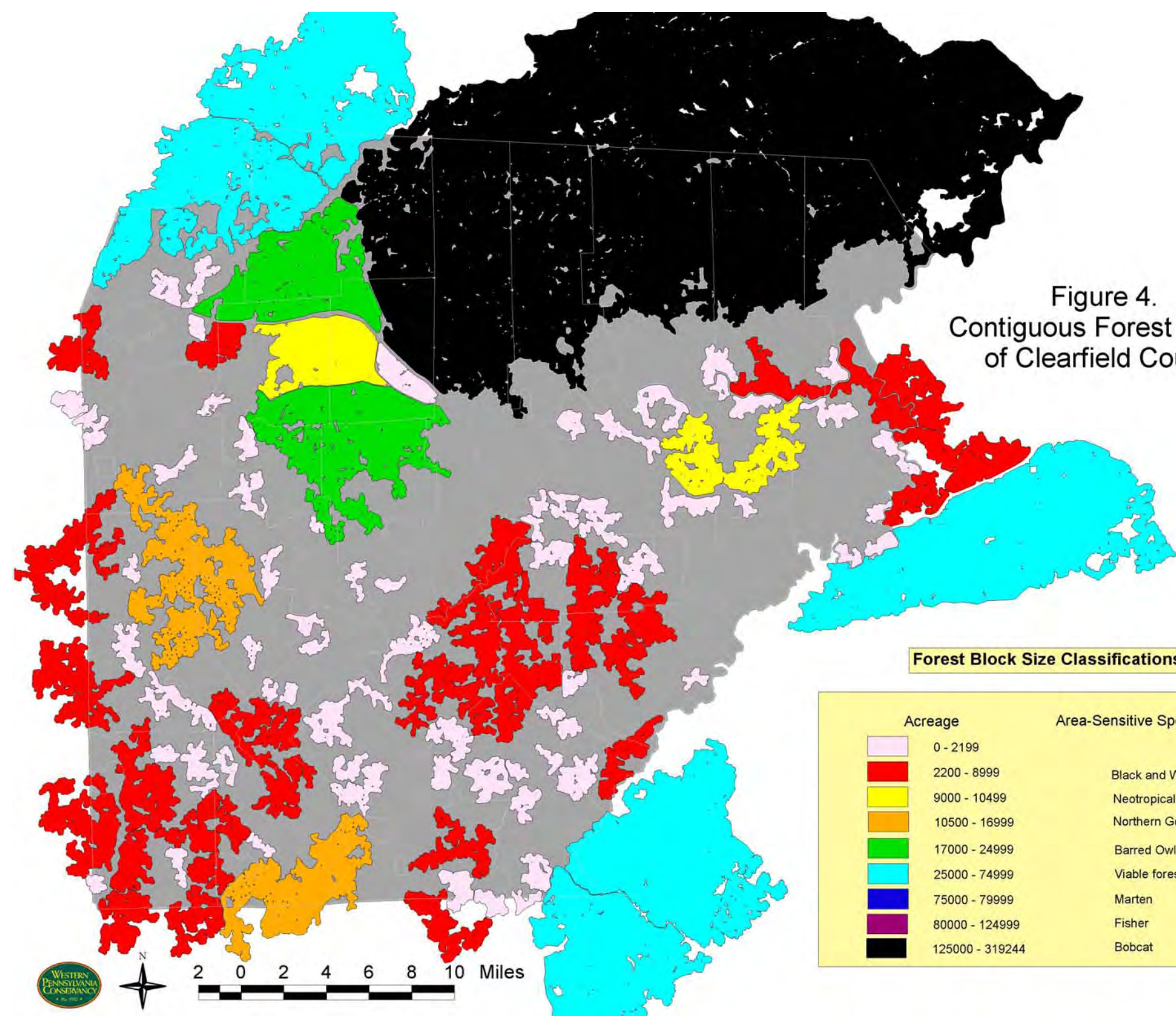
	0 - 2199
	2200 - 8999
	9000 - 10499
	10500 - 16999
	17000 - 24999
	25000 - 74999
	75000 - 79999
	80000 - 124999
	125000 - 319244

Area-Sensitive Species Supported

Black and White Warbler
Neotropical Migrant Birds
Northern Goshawk
Barred Owl
Viable forest ecosystem
Marten
Fisher
Bobcat



2 0 2 4 6 8 10 Miles



Forest Specialists

At risk in the region, at home in Northcentral PA

Interior Forest Habitat Species

Black and White Warbler



Requires 2,200 acres to sustain a viable population. (Poole & Gill 2002)

Ovenbird



This species will inhabit forests ranging in size from small woodlots to large forest expanses, but only breeds successfully in interior forest conditions

Yellow-billed cuckoo

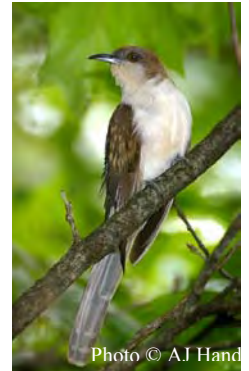


Scarlet tanager



17% of North America's Scarlet Tanagers nest in PA, but the species is declining at a rate of 1% a year in the state. Its habitat is mature hardwood and mixed deciduous forests. (Goodrich et al. 2003)

Black-billed cuckoo



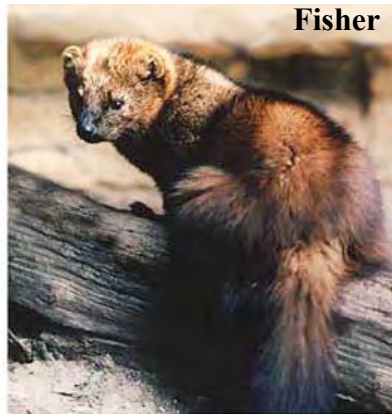
11% of PA's woodland nesting birds—species including the black-billed cuckoo and the yellow billed cuckoo—have declined significantly since 1980. (USGS BBS)

Northern goshawk



The Northern goshawk depends on the availability of large expanses of mature forest, because it has a large home range per pair, and its nesting habitat is large trees in mature forest. It can be detrimentally impacted by logging because it prefers dense canopy cover. (NatureServe 2004)

Fisher



The fisher was recently re-introduced to northern PA, including the Quehanna Wild Area. A viable population requires 75,000 acres of forest.

Marten



The marten is an example of an animal extirpated from Pennsylvania that may someday re-establish a population in northcentral PA's extensive forest lands. It requires 30,000 acres to sustain a viable population.

Species requiring large areas for individual home-range territories

Barred owl



The barred owl depends upon mature forest for nesting habitat (large trees, dead snags). It prefers a high degree of canopy cover, and declines in fragmented forests. Individual pairs may have a home range of 250-1200 acres (NatureServe 2004). The area estimated to be necessary to support a viable population is 17,000 acres (Anderson & Vickeray 2004).

RESULTS

Contiguous Forest Blocks in Clearfield County are listed in order of their size, largest to smallest. Figure 4 (pg. 21) shows the location of these maps in the county, while Figure 3 (pg. 20) is a statewide map of all contiguous forest blocks in Pennsylvania. Forest cover is most prevalent and most contiguous in the northcentral portion of the state; the size and contiguity of this large expanse of forest is unique and significant within the entire mid-atlantic region. The forest blocks of northern Clearfield County contribute significantly to northcentral PA's forest region.

Summary Statistics of Contiguous Forest Blocks

Acres of Natural Wetland—Wetlands are important for their habitat value to many species and their role in ecological processes such as nutrient cycling, water filtration, and flood mitigation (Mitsch and Gosselink 2000). In Clearfield County they occupy a limited extent in the landscape, in contrast to forest ecosystem types which are more abundant. Wetlands have been also disproportionately impacted by human disturbances (Mitsch and Gosselink 2000), and for these reasons merit special concern today.

Acres of Coniferous Forest—Forest types dominated by native conifers (white pine and hemlock are overwhelmingly the most prevalent of these) are much less common than deciduous forest types. Coniferous forests often have substantially different species composition in understory and shrub layers, different soil characteristics, and different physiognomic structure than deciduous communities, and thus represent a unique habitat type. Some species exclusively depend on coniferous forest habitat—notably forest interior bird species such as which are of regional concern (Goodrich et al. 2003, Green 1995).

Size—Forest block size categories (see map legend) were developed to reflect critical ecological thresholds, such as the minimum areas required for viable populations of forest interior species, the minimum areas required to absorb natural disturbances, and a calculation of minimum size for a viable forest ecosystem (Anderson and Vickery *in press*). See table 4 (pg. 17).

Percent Roadless Core Area—A higher percentage roadless core area is likely to correspond to greater overall health and long-term viability of the forest communities in a block. While the blocks are contiguous habitat for some species, other species perceive smaller features such as secondary roads, forest roads, and even trails as barriers to movement; thus a higher proportion of roadless area will provide more contiguous habitat for this category of species. Furthermore, the smaller-scale breaks in forest cover that are not barriers for many species do create edge conditions, and thus a higher proportion of roadless core area represents more habitat suitable for the most sensitive native forest species.

Biological Diversity Area Acres—Compares the total number of acres in each block that fall within designated Biological Diversity Areas. A measure of the amount of a forest block which directly supports the health of unique or high quality small patch communities or populations of species of special concern.

State Size Rank—The rank of the 10 largest blocks in Clearfield County among all blocks in Pennsylvania ranked by acreage.

Table 5. Summary Statistics of Contiguous Forest Blocks in Clearfield County

Size Rank	Size (Acres)	% Roadless Area	Acres Natural Wetlands	Acres Coniferous Forest	BDA Acres	State Size Rank
1	253453	49	124526	12259	26149	2
2	47258	65	30676	1593	--	
3	33219	48	15873	1711	--	74
4	32935	69	22614	736	--	76
5	25623	30	7701	1279	226	91
6	25172	61	15290	738	1106	105
7	22687	37	8299	2518	11	110
8	17282	28	4761	666	4871	145
9	16642	21	3529	2127	--	150
10	13045	34	4413	1108	2780	222
11	9995	42	4234	543	345	236
12	9082	23	2127	1883	--	
13	8653	23	2021	788	142	
14	7919	32	2545	955	--	
15	7913	22	1774	1100	246	
16	7382	26	1898	932	--	
17	6544	22	1436	1349	--	
18	6262	19	1174	809	--	
19	5897	31	1805	326	--	
20	5602	46	2598	206	--	
21	5476	15	830	790	--	
22	5455	25	1374	1789	--	
23	5423	26	1387	820	--	
24	4748	41	1934	576	--	
25	3546	26	916	655	--	
26	3309	28	938	263	--	
27	3289	15	499	805	--	
28	3213	17	536	331	--	
29	3087	45	1394	499	--	
30	3056	23	691	50	--	
31	3054	34	1028	517	--	
32	2842	38	1080	39	--	
33	2519	24	592	26	--	
34	2488	15	361	119	--	
35	2416	21	507	254	264	
36	2361	33	767	837	--	
37	2251	21	483	48	--	
38	2132	32	673	170	53	
39	2092	15	310	694	27	
40	1951	27	527	291	--	
41	1950	12	224	616	--	
42	1803	12	210	124	--	
43	1792	24	432	392	--	
44	1749	34	592	25	--	

Table 5. Continued

Size Rank	Size (Acres)	% Roadless Area	Acres Natural Wetlands	Acres Coniferous Forest	BDA Acres	State Size Rank
45	1740	9	161	256	--	
46	1740	14	241	424	--	
47	1613	19	307	389	--	
48	1601	19	312	111	--	
49	1545	18	271	16	--	
50	1482	9	133	404	--	
51	1398	17	242	364	--	
52	1315	29	382	550	--	
53	1300	6	77	198	--	
54	1234	18	219	331	--	
55	1228	21	260	197	--	
56	1211	23	282	400	--	
57	1192	19	225	415	262	
58	1141	8	86	298	--	
59	1110	10	115	25	--	
60	1103	3	38	113	98	
61	1068	6	63	9	--	
62	1033	30	314	30	--	
63	1030	32	330	623	--	
64	965	15	146	50	--	
65	937	16	146	18	--	
66	908	31	278	327	--	
67	896	9	83	296	--	
68	876	6	57	44	--	
69	857	21	183	282	--	
70	857	14	122	141	--	
71	854	22	189	87	--	
72	829	29	237	410	--	
73	770	39	303	222	--	
74	760	23	176	80	--	
75	691	10	70	246	--	
76	684	13	91	123	--	
77	680	12	85	134	--	
78	676	26	176	40	--	
79	656	39	257	4	--	
80	635	14	90	75	--	
81	606	12	73	112	--	
82	573	32	183	292	--	
83	570	9	50	71	--	
84	555	34	190	41	--	
85	541	20	109	14	--	
86	537	13	72	311	--	
87	524	16	83	248	10	
88	505	38	192	30	506	
89	501	17	87	120	9	

Table 5. Continued

Size Rank	Size (Acres)	% Roadless Area	Acres Natural Wetlands	Acres Coniferous Forest	BDA Acres	State Size Rank
90	491	15	76	6	--	
91	456	9	40	40	--	
92	454	15	68	131	--	
93	451	8	38	11	--	
94	448	17	74	26	--	
95	448	9	40	56	3	
96	444	8	35	10	--	
97	440	18	79	68	--	
98	436	8	35	96	--	
99	424	5	23	172	--	
100	419	22	93	81	--	
101	416	14	58	134	--	
102	411	20	81	164	--	
103	409	23	96	44	--	
104	403	14	58	37	--	
105	400	18	70	131	--	
106	391	7	26	139	--	
107	390	11	44	192	--	
108	370	19	70	9	--	
109	346	7	26	41	--	
110	330	13	42	50	--	
111	293	8	24	138	--	
112	287	4	12	32	--	
113	276	19	52	85	--	
114	273	5	14	64	--	
115	254	2	5	8	--	
116	250	13	32	0	--	

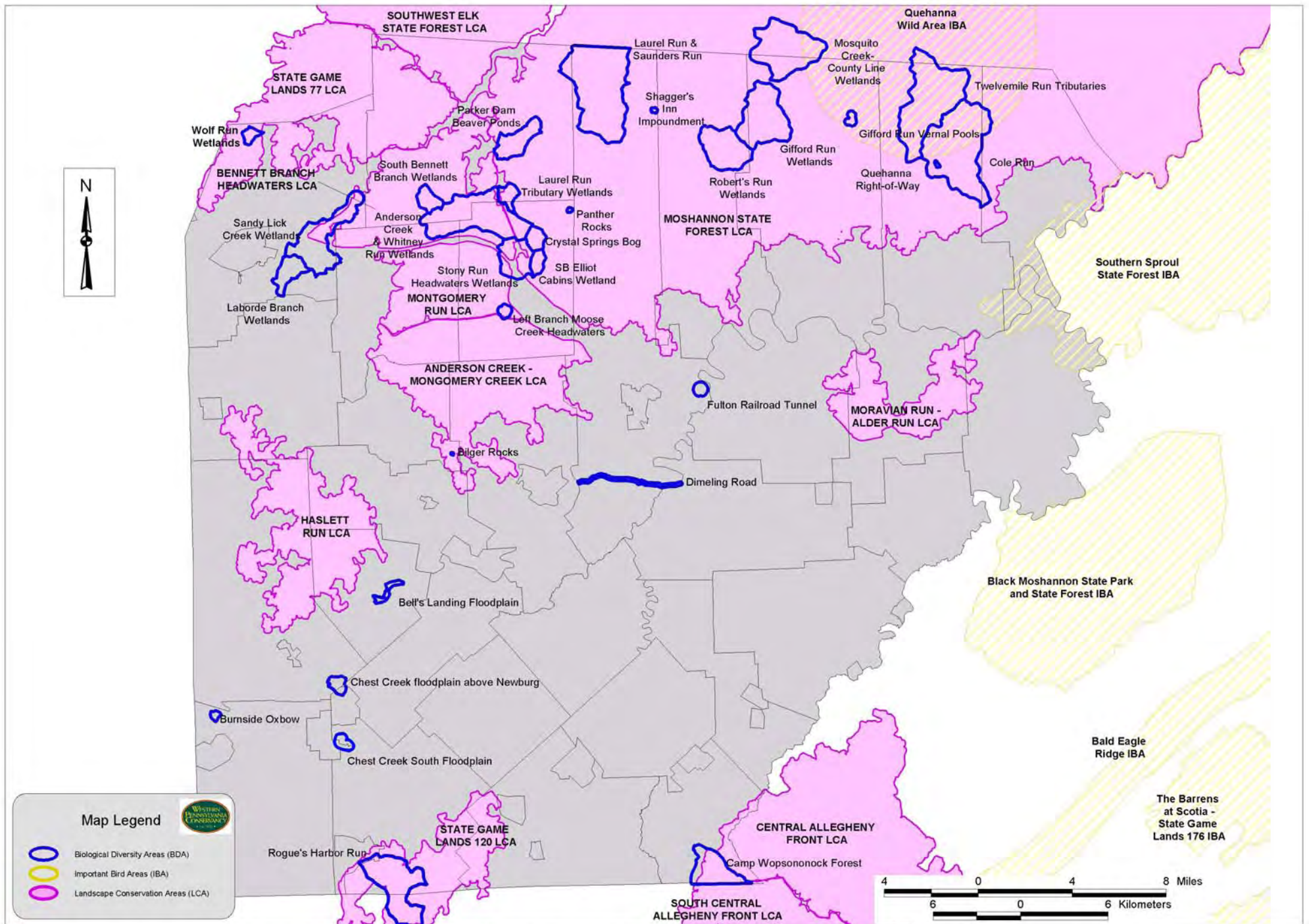


Figure 5. Natural Heritage Areas & Important Bird Areas of Clearfield County

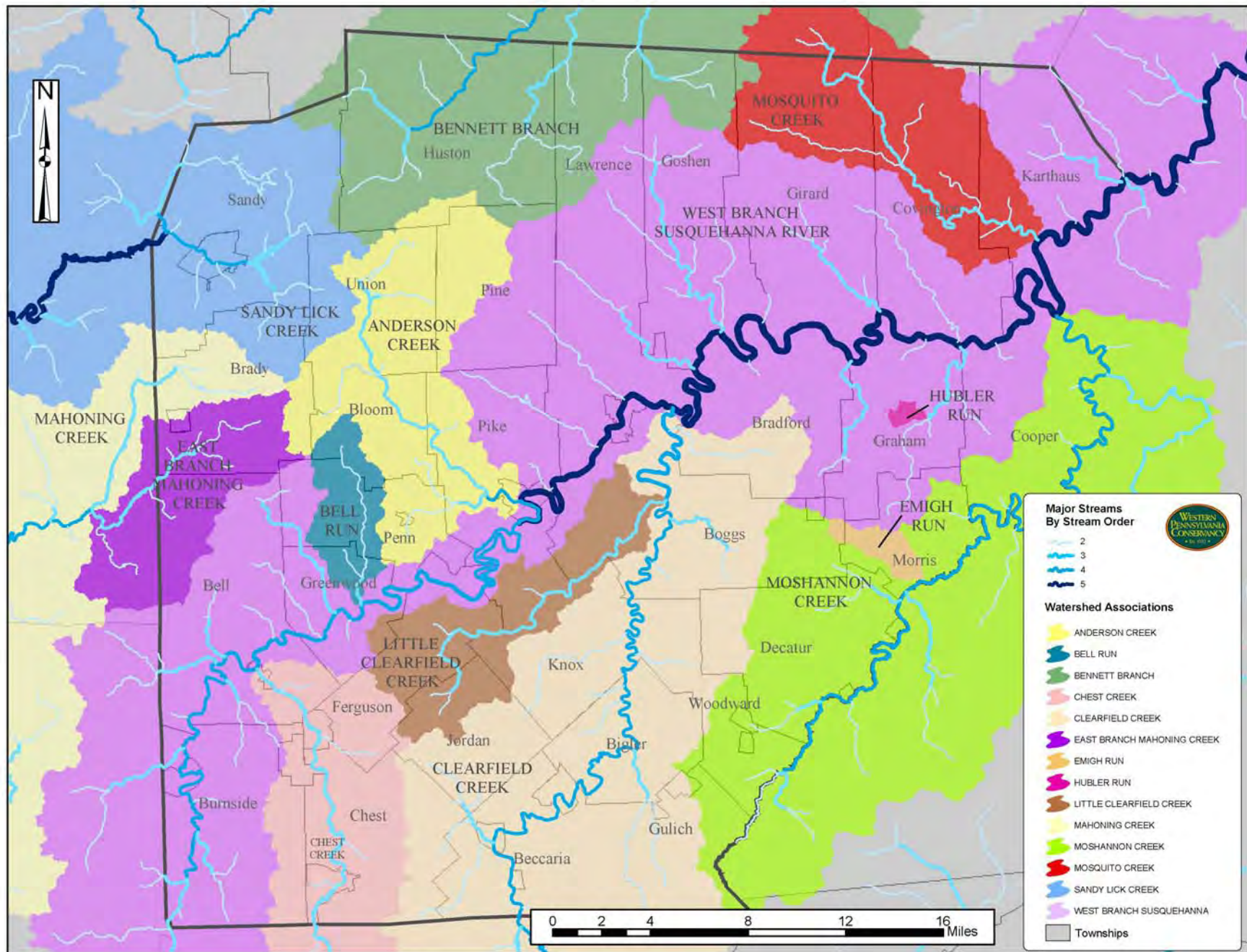


Figure 6 Watersheds of Clearfield County with active watershed groups

Landscape Conservation Areas

The Landscape Conservation Areas identified in this report are blocks of forest where contiguous core habitat is no less than 100 m wide at any point, that were at least 9,000 acres in size. (see methods, pg. 16). The unique ecological value of these forest ecosystems, arising from their size and contiguity, is that they have the capacity to be resilient to natural disturbances and to host a full range of native forest ecosystem biodiversity, including the most sensitive forest species that require interior forest conditions or large territories.

Conservation at the Landscape Scale

LCAs are large areas with ownership typically divided among many entities, individual, corporate, and public (Table 6, pg. 30). Because their unique value arises from large-scale contiguity of natural ecosystems, the greatest threat to their future viability is fragmentation of natural cover by interruptions in the forest landscape. Conservation of these areas' unique habitat value and their ability to continue providing ecosystem services will require coordinated efforts by the many landowners involved to preserve ecosystem health at the local scale and forest cover contiguity at the regional scale.

Features that fragment habitat for different species range from dirt trails to roads, gas wells, cleared areas, and land conversion for residential, urban, or industrial use. Species have different thresholds for what degree of disturbance will be a barrier to movement or make adjacent forest habitat unusable to them. However, as the collection of fragmenting features of all types grows, the amount of area influenced by edge effects grows and the ability of the ecosystem to support its most sensitive species declines. Fragmentation can be minimized by utilizing existing disturbances for new projects rather than clearing additional forest, by consolidating roads and right-of-ways where multiple routes exist, and by restoring unused cleared areas such as abandoned roads, wells, or mined areas to forest. When planning the path of a fragmenting land use change, impact can be minimized by avoiding complete division of the LCA; any feature which cuts completely across the contiguous forested area will effectively create two separate, smaller communities, while preservation of a linkage at least several hundred meters wide preserves overall contiguity of the forest block. The impact of individual features such as wells, roads, right-of-ways, or other clearings can also be minimized by the use of ecologically informed best management practices in construction and maintenance. (see Arkansas Forestry Commission reference pg. 147 for road management, Appendix VII on pg. 170 for further information sources)

In addition to forest contiguity, it is also important to steward forest ecosystem health— by managing for native diversity in plant, animal, and other species, and conserving ecologically important aspects of the physical landscape such as soil structure, naturally decomposing dead wood, and structural diversity in forest composition. Timber harvesting can be compatible with the ecological viability of the region if it is pursued according to a plan designed for the long-term sustainability of both the timber resource and the forest ecosystem, with the use of ecologically informed best management practices. Surface mining in previously unmined areas is not compatible with the ecological assets of the area. Mined areas create a permanent loss of habitat, as it is extremely difficult if not impossible to restore a forest ecosystem with healthy function and biodiversity in the environmental conditions that result after mining. Mining also causes water quality degradation that is difficult to remediate. A number of resources, listed in Appendix VII (pg 170), are available to private landowners interested in sustainably managing their forestlands for biodiversity conservation, forest health, and forest products including timber, mushrooms, and high-value medicinal herbs. A good place to start is the PA Bureau of Forestry's Forest Stewardship Program, which assists landowners in developing a forest management plan based on their envisioned goals for their land.

Table 6. Ownership of lands within forested Landscape Conservation Areas.

Landscape Conservation Area	Total Area	Private Ownership	Area in Clearfield County
Moshannon State Forest	253,453 acres	28%	134,300 acres
SW Elk State Forest	33,219 acres	69%	3,986 acres
Central Allegheny Front	32,935 acres	77%	1,317 acres
SGL #77	25,622 acres	77%	15,166 acres
S. Central Allegheny Front	25,171 acres	35%	1,006 acres
Anderson Creek – Montgomery Creek	22,687 acres	63%	All
Bennett Branch Headwaters	17,281 acres	49%	All
Haslett Run	16,641 acres	93%	All
SGL #120	13,044 acres	73%	9,391 acres
Montgomery Run LCA	9,995 acres	48%	All
Moravian Run – Alder Run	9,082 acres	99%	All

Clearfield County LCAs

Haslett Run LCA

Haslett Run LCA is a contiguous forest block 16,643 acres in size. Its size gives it the potential to host viable populations of neotropical migrant bird species (~9,000 acres needed), as well as the area-sensitive interior forest species the Northern Goshawk (~10,500 acres needed) and the Barred Owl (~17,000 acres).

This LCA spans the eastern continental divide between the Ohio and Susquehanna river basins. The divide is the highest elevation in the LCA, ~1800 feet. South of the divide, the terrain slopes downwards into the valley cut by the West Branch Susquehanna River. Several streams cut steeply through the slope down to meet the river: Laurel Run, Haslett Run, Curry Run, and Poplar Run. North of the divide, the LCA contains Beech Run and other small tributaries to the East Branch Mahoning Creek. Forest maturity is variable, with some areas in mature and diverse northern hardwood forest and other areas in very young regrowth.

Threats and Stresses

This LCA has a high density of fragmenting features— gas wells, access roads, and strip mines— dissecting its edges and embedded within it. The percentage of roadless core habitat is very low for this LCA, only 18%. This fragmentation increases the area impacted by edge effects, threatening the unique value of the LCA as habitat for interior-forest specialists. Strip mining and gas well development in surrounding areas have also resulted in water quality problems in several of the streams in this LCA.

Recommendations

As fragmentation is an especial problem in this LCA, it is highly recommended that further fragmentation be avoided and a more contiguous pattern of forest pursued through targeted restoration efforts. Pollution of waterways by mining discharges and gas extraction activities should also be addressed.

SGL #120 LCA

This LCA is a contiguous forest block 13,000 acres in size. Its size is sufficient that it may potentially host viable populations of neotropical migrant bird species (~9,000 acres required), and of the area-sensitive interior forest species the Northern Goshawk (~10,500 acres required). It is at the extreme northern terminus of Laurel Ridge in the Allegheny Mountain formation, in between the Chest Creek and Clearfield Creek valleys. From the highest elevations at the summit of the ridge formation, Rogue's Harbor Run flows west to Chest Creek, while Hockenberry Run and South Witmer Run flow east to Clearfield Creek. Where surveyed, upland areas had dry oak – heath forest communities, while valleys were typified by more mesic mixed forest communities with hemlock, red oak, red maple, and tulip poplar.

Threats and Stresses

The greatest causes of fragmentation in this area are the clearing of forest for gas wells and associated roads, the pattern of forest clearing on the State Game Land 120, and strip mining.

Recommendations

Fragmentation can be minimized by avoiding accumulation of a high density of gas wells, consolidating roads, and using best management practices that remove as little forest cover as possible and restore unused areas.

Central Allegheny Front LCA

This LCA is a block of contiguous forest along Allegheny Front, ~33,000 acres in size. Its size is sufficient to host viable populations of neotropical migrant bird species (~9,000 acres required), and of the area-sensitive interior forest species the Northern Goshawk (~10,500 acres required), the barred owl (17,000 acres required), and the marten (30,000 acres required). It also meets the size determined for a viable forest ecosystem, 25,000 acres (Anderson and Vickery *in press*). Only a small portion of this block at its western edge falls within Clearfield County.

S. Central Allegheny Front LCA

This LCA is ~25,000 acres in size and falls across the Allegheny Front. The Camp Wopsononock Forest BDA, in the southeastern corner of Clearfield County, is part of the LCA. Because of a geologic formation that runs through this LCA, there are several calcareous sandstone outcrop habitats embedded within the larger forest community. Vernal pools are another unique habitat type that can be found in this LCA in broad, flat areas that sometimes occur at high elevation watershed divides.

See Camp Wopsononock Forest BDA, pg. 96, for threats and stresses and recommendations for this area.

SW Elk State Forest LCA

This LCA, ~33,000 acres in size, is situated near the southern edge of the High Allegheny Plateau, at the watershed divide between the Ohio and Susquehanna river basins. Its size is sufficient to host viable populations of neotropical migrant bird species (~9,000 acres required), and of the area-sensitive interior forest species the Northern Goshawk (~10,500 acres required), the barred owl (17,000 acres required),

and the marten (30,000 acres required). It also meets the size determined for a viable forest ecosystem, 25,000 acres (Anderson and Vickery *in press*). Most of the LCA falls within Elk County, but the southern portion is within Clearfield County.

Most of the Clearfield County portion of the LCA is part of Moshannon State Forest.

SGL #77 LCA

This LCA is a contiguous forest block ~26,000 acres in size that falls across a substantial elevation gradient that is the juncture of the High Allegheny Plateau and the Western Allegheny Plateau, as well as the watershed divide between the Susquehanna and Ohio river basins. Its size is sufficient to host viable populations of neotropical migrant bird species (~9,000 acres required), and of the area-sensitive interior forest species the Northern Goshawk (~10,500 acres required) and the barred owl (17,000 acres required). It also meets the size determined for a viable forest ecosystem, 25,000 acres (Anderson and Vickery *in press*).

Threats and Stresses

The portions of this LCA that fall within Clearfield County are three peninsulas of forest that extend downwards from a larger contiguous area in Elk County; their viability and habitat potential could be improved by increased contiguity.

Recommendations

Contiguity could be improved by establishing forested corridors at least 300 m wide between the areas that are separate in Clearfield County.

Bennett Branch Headwaters LCA

This LCA is a contiguous forest block 17,000 acres in size. It falls mainly within the Western Allegheny Plateau ecoregion (the Pittsburgh Low Plateau physiographic province section), although the southeastern corner slopes upwards in elevation and grades into High Plateau. There are two major watershed divides that cross the LCA: in the western edge, the Eastern Continental divide passes through the LCA, separating the Ohio and Susquehanna river basins, and within the Susquehanna watershed portion of the LCA, Bennett Branch and its tributaries flow northeast into the main stem, while Anderson Creek and its tributaries flow southeast into the West Branch. This LCA has many areas of wetland habitat—several of which are highlighted as BDAs—embedded within it. The health and long-term viability of wetlands are greatly increased when they are situated within a forest matrix (Findlay and Bourdages 1999).

Threats and Stresses

Within this LCA there are several areas with sparse forest cover, young forest, or plantations of non-native conifer species.

Recommendations

Planning for this area should combine site-specific considerations with a view towards maintaining the contiguity and health of the overall landscape, and not exceeding its ability to absorb disturbance. Stewardship of forest surrounding wetland areas is especially important because of its value for enhancing the long-term viability of these habitats.

Moravian Run – Alder Run LCA

This LCA, 9,000 acres in size, is one of only two contiguous forest blocks of sufficient size to host viable populations of neotropical migrant bird species that remain in the lower-elevation region of the county south of the West Branch Susquehanna River. It contains the stream valleys and a large portion of the watersheds of two sizable streams, Moravian Run and Alder Run.

Threats and Stresses

Although its size gives it potential to be a quality forest habitat, in its current condition, this landscape does not provide ideal forest habitat conditions and may not support viable populations of interior forest species. Especially along Alder Run, the LCA includes many areas where forest canopy cover is somewhat sparse, young, or disturbed. Fragmentation from roads and other clearings is also a concern; the percentage of area that is roadless core area is low (22%). Of particular concern is the area near the juncture of the Moravian Run and Alder Run, where two right-of-ways in close proximity cross the LCA; these may fragment the block into two halves for some species.

Recommendations

Contiguity could be improved by consolidating the two ROWs, reducing their width, creating a corridor of forest across them, or increasing forest cover in the ROWs. In order to provide the ecological values the LCA's size suggests potential for, a majority of the area should be restored to forest ecosystems with plant diversity typical of expected community types, as well as a structure with sufficient density in the shrub and canopy layers to support interior-forest species.

Anderson Creek – Montgomery Creek LCA

This LCA includes the southern end of the High Allegheny Plateau section of the county, and extends south on the long slope downwards to the West Branch Susquehanna River valley along three streams that cut steeply through the slope. The lower-elevation regions of the river valley have been more extensively disturbed than the northern regions of the county, and among the West Branch's tributaries in Clearfield County, these streams—Anderson Creek, Hartshorn Run, and Montgomery Creek—are relatively intact and have potential as ecological corridors between the LCA and the river. The LCA is ~23,000 acres in size: an area sufficient to host viable populations of neotropical migrant bird species (~9,000 acres required), and of the area-sensitive interior forest species the Northern Goshawk (~10,500 acres required) and the barred owl (17,000 acres required).

Threats and Stresses

In the southwestern portion of the LCA, forest contiguity is threatened by a proliferation of small roads. Along Anderson Creek there are several smaller fragmenting features in the stream valley which may be barriers to some species. All three stream valleys are closely bordered by mined land in some portions of their length.

Recommendations

As Anderson Creek, Hartshorn Run, and Montgomery Creek have relatively intact forest cover extending towards the West Branch, these streams have potential as ecological corridors to connect the LCA and the river. To develop functional corridors forest cover would need to be restored along the stream sections between the LCA and the river. The restoration of natural cover to these streams will also improve water quality and aquatic ecosystem health, and can enhance their recreational and scenic value. Further encroachment of mining near the stream valleys should be avoided as it will reduce forest cover in areas

where core habitat is already narrow and is likely to detrimentally impact water quality. Fragmentation in the southwestern portion of the LCA should also be addressed (see above recommendations).

Montgomery Run LCA

This LCA is situated in the High Allegheny Plateau portion of Clearfield County, at the western edge of but entirely within the West Branch Susquehanna River watershed. Its broad topography contains most of the watershed of Montgomery Run, from the headwaters where its smallest tributaries originate to its juncture with Anderson Creek. The LCA is ~10,000 acres in size, large enough to host viable populations of neotropical migrant bird species. Adjacent lands to the north, south, and east are forested, but this LCA is separated from them by major highways: I-80 to the north, SR 153 to the east, and US route 322 to the east.

Threats and Stresses

This LCA appears to contain fairly mature and contiguous forest in much of its area. It has few secondary fragmenting features embedded within it, although there are patches where forest cover has been removed.

Recommendations

General recommendations given preceding the LCA descriptions for preserving forest ecosystem health and contiguity can be applied to steward the long-term ecological viability of this LCA.

Moshannon State Forest LCA

This LCA, ~254,000 acres in size, is one of the largest blocks of contiguous forest remaining in Pennsylvania. It covers an expansive region of High Allegheny Plateau in Clearfield and Elk Counties, and its size gives it the unique potential to host viable populations of species that have large individual home range territories—such as the bobcat (125,00 acres required for a population) and fisher (75,000 acres). The concentration of contiguous forest in north-central Pennsylvania is regionally significant to the viability of populations of forest-dependent species (Goodrich et al. 2003), and this LCA is a substantial portion of these forests.

The watershed divide between the main stem and west branch of the Susquehanna River runs roughly east-west through the center of the LCA, with streams in the northern half flowing north to the main stem and streams in the southern half flowing south to the West Branch. The topography of the landscape is broadly sloping in general, but several steep stream valleys—Trout Run, Mosquito Creek, Upper Three Runs, and Medix Run—cut through the plateau. Trout Run and Lick Run are two streams which have exceptionally intact forest along much of their length, stretching almost to their juncture with the West Branch Susquehanna River.

Embedded within the forest matrix of the LCA are high-quality examples of several more specialized community types that have been identified as BDAs—these include several acidic headwaters wetland communities, one series of vernal ponds, and habitats for several plant species of special concern. The area also provides excellent habitat for the timber rattlesnake (*Crotalus horridus*). This species is in global decline due to habitat loss and human persecution (NatureServe 2004), and the population found in this LCA is likely one of its remaining strongholds in the state of Pennsylvania.

Threats and Stresses

In some portions of the LCA the density of secondary fragmenting features such as rights-of way and dirt roads may degrade the usability of the habitat for some species. In many areas, the lack of tree regeneration and the sparse herbaceous layer suggest years of overbrowsing by deer; this condition threatens the biodiversity and future viability of the forest ecosystem.

Recommendations

General recommendations given previous to the LCA descriptions can be applied to reduce forest fragmentation. The problem of deer overbrowsing can be remedied by management to reduce the deer population. Potential activities within this region should be examined with specific attention to potential impacts on timber rattlesnakes. Trout Run and Lick Run are highly forested streams which have the potential to serve as ecological corridors connecting the West Branch Susquehanna River to the LCA. These streams are forested almost to their juncture with the West Branch, and restoration of contiguous forest at least 300 m wide in the intervening area could create a viable corridor.

Important Bird Areas

Clearfield County includes a portion of one Important Bird Area (see page pg. 18 for background regarding the IBA designation, including selection criteria). As these areas typically span several municipal divisions, they are described separately from the results grouped by municipality. As can be seen in Figure 3, the IBA extends beyond Clearfield County. Features described below pertain to the entire area and are not necessarily confined to Clearfield County.

Note: the following information is adapted from the Audubon Society of Pennsylvania IBA site descriptions (Audubon 2002).

Quehanna Wild Area

Quehanna Wild area is an extensive forest area set aside to maintain the undeveloped character of the forest environment. The tract was originally state forest land that was sold and leased to the Curtiss Wright Corp. for jet engine and nuclear research in 1955. It was returned to the Commonwealth in 1966. The forest has been influenced by oak leaf roller and gypsy moth and experienced tornado damage in 1985. Timber rattlesnake, black bear, and elk rely on the varying forest types and low human density for prime habitat. Wykoff Run Natural Area supports stands of pines and hemlock that add to the diversity of vegetation and birds.

This site holds the long-term value of supporting diverse breeding species associated with different forest types. Deciduous woods provide habitat for breeding Cerulean and Prairie warbler. A pair of Golden Eagles has wintered in the area for the past 15 years. Other species include Whip-poor-will, Eastern Wood-Pewee, Least Flycatcher, Eastern Phoebe, Eastern Bluebird, Hermit Thrush, Cedar Waxwing, Black-and-white Warbler, Black-throated Green Warbler, Pine Warbler, Black-throated Blue Warbler, Chestnut-sided Warbler, Ovenbird, Rose-breasted Grosbeak, Indigo Bunting, and Eastern Towhee.

This area satisfies the following IBA criteria:

- Exceptional concentration and/or diversity of birdlife: It is a large, unfragmented tract with exceptional diversity of woodland species
- Site supporting state or federal endangered or threatened species: Bald eagle (1+ pair, wintering)
- Unique or representative habitat: The area contains a variety of age classes and forest types, including mixed oak, northern hardwood, red maple, aspen, gray birch, oak, white pine, hemlock, and spruce.

Conservation Status

Threats to the area include over-grazing by deer and natural pests like the gypsy moth. The area contains part of the popular Quehanna Trail and is used by hikers and backpackers. As it is designated by DCNR as a Wild Area set aside to maintain the undeveloped character of the forest environment, there is restricted land use: no new public access roads, no off-road motorized vehicles, no commercial harvests, no new camps allowed. Salvage logging is still permitted. DCNR maintains fix-up areas with insect mortality, regenerates areas to higher quality canopy forest, maintains deer fencing, and conducts elk studies.



Gifford Run Valley, west slope

Biological Diversity Areas (Listed by Municipality)

Detailed maps and description of Clearfield County's Natural Heritage Areas follow, organized by township. For each township a map, a summary table, and full report are provided. Townships are arranged alphabetically within each region. Boroughs are treated together with an adjacent township due to their small size.

Biological Diversity Areas, Landscape Conservation Areas, Managed Lands, and Important Bird Areas are indicated on the municipality maps and are labeled in bold.

Summary Table Conventions

A summary table of sites precedes each map and lists identified Biological Diversity Areas, Landscape Conservation Areas, and Managed Lands.

- Managed lands are listed after the Natural Heritage Areas
- A categorical designation of a site's relative significance is listed after the site name. Table 1 (pg. viii) summarizes sites by significance category. Definitions of the significance categories are outlined in Appendix I (pg. 152).
- Listed under each site name are any state-significant natural communities and species of special concern that have been documented within the area.
 - see Appendix IV (pg. 156) for a list of Natural Communities recognized in Pennsylvania.
 - Some species perceived to be highly vulnerable to intentional disturbance are referred to as “special animals” or “special plants” rather than by their species name. Within each site these species are numbered.
 - The PNDI (Pennsylvania Natural Diversity Inventory) rarity ranks, and current legal status (detailed in Appendix V, pg. 162) are listed for each community and species.
- The text that follows each table discusses the natural qualities of the site and includes descriptions, potential threats, and recommendations for protection.

Beccaria Township, Coalport Borough, Glen Hope Borough, & Irvona Borough

<u>PNDI Rank</u>		<u>Legal Status</u>			
Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

SGL #120 LCA		Notable Significance		
--------------	--	----------------------	--	--

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Beccaria Township, Coalport Borough, Glen Hope Borough & Irvona Borough

Beccaria Township, Coalport Borough, Glen Hope Borough & Irvona Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

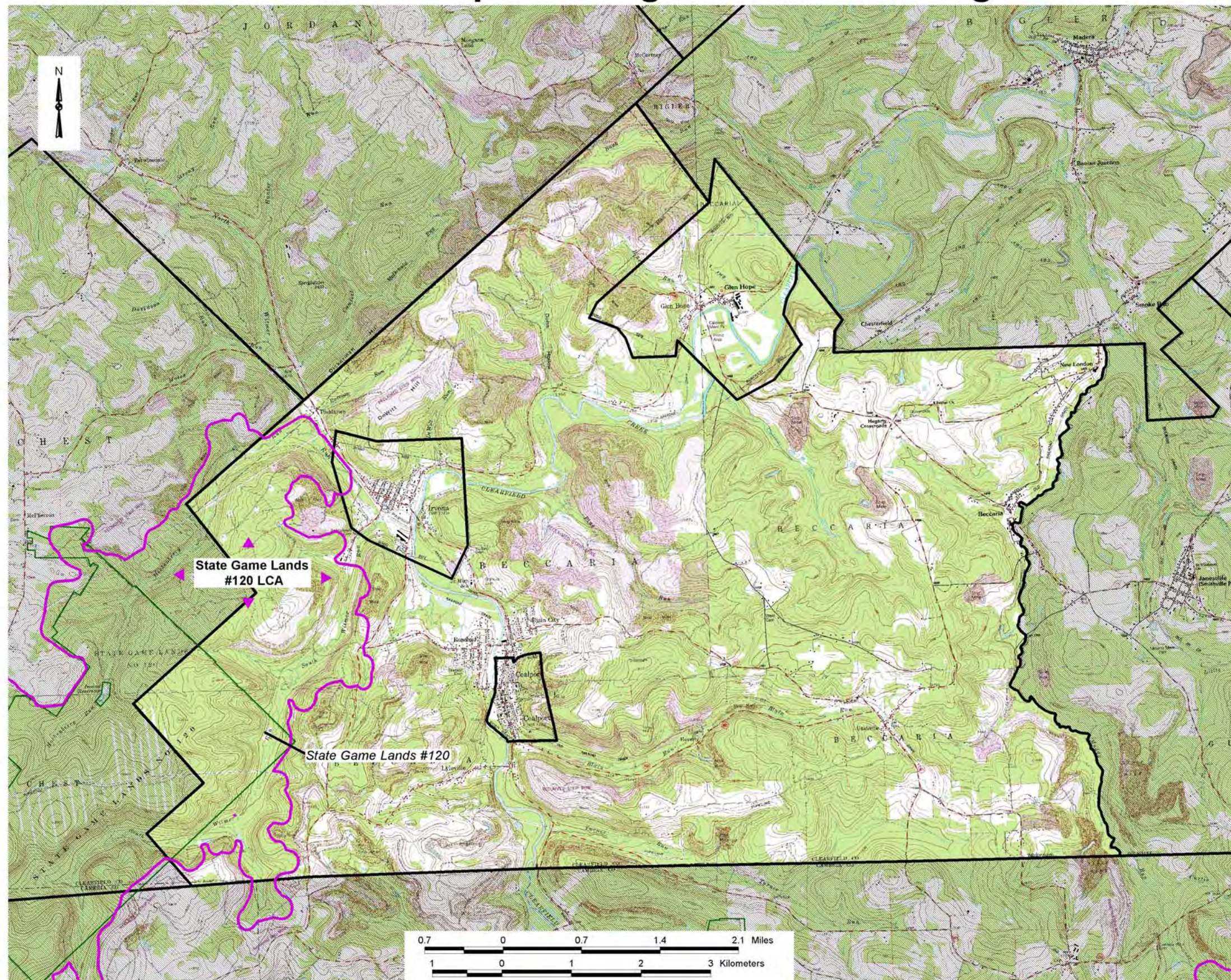
None

Landscape Conservation Areas:

State Game Lands #120

Managed Areas:

State Game Lands #120



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
 -  Landscape Conservation Areas (LCA)

BECCARIA TOWNSHIP

Most of the land in the township is forested, but there are significant challenges to the ecological health of the landscape. The pattern of forest cover in the township is very fragmented; while 65% of the township area has forest cover, only 26% is core forest habitat, and 11% is completely roadless core forest habitat. Strip mining and other mining have been extensive in the township, causing habitat degradation and water quality problems. Clearfield Creek, the township's major waterway, its tributaries North Witmer Run and Blaine Run, and Muddy Run, which forms the eastern boundary of the township, are all classified as impaired streams by DEP. The high proportion of land which has been strip mined— ~ 1/5 of the land area— (WPC GIS calculation, 2004) contributes to the problem of forest fragmentation, because without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Conservation priorities in the landscape of Beccaria Township would be remediation of water quality problems and forest stewardship to increase ecosystem health.

See pg. 31 for discussion of SGL #120 LCA.

GLEN HOPE BOROUGH

Most borough land is forested; the village of Glen Hope is situated alongside Clearfield Creek, and the borough also contains a substantial area of floodplain along Clearfield Creek. No Natural Heritage Areas were identified within the borough.

IRVONA BOROUGH

The landscape of Irvona borough consists mainly of the village of Irvona. Adjacent to the borough to the east is the SGL #120 Landscape Conservation Area. All of the Borough land is in the Clearfield Creek watershed. No Natural Heritage Areas were identified within the borough.

COALPORT BOROUGH

The landscape of Coalport Borough consists mainly of the village of Coalport. Coalport is situated on the bank of Clearfield Creek and all borough land is in the Clearfield Creek watershed. No Natural Heritage Areas were identified within the borough.

Bell Township, Mahaffey Borough, & Newberg Borough

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

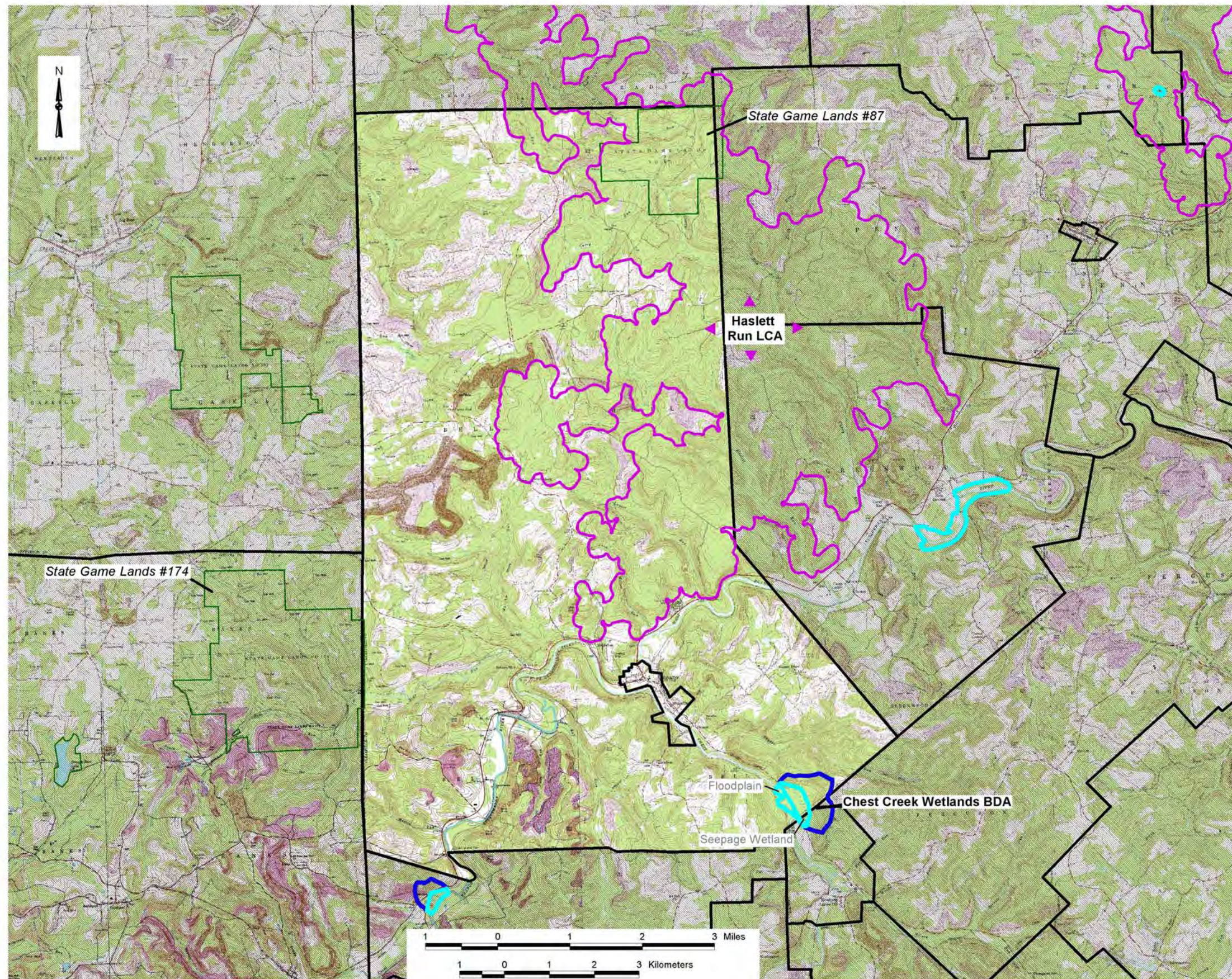
Chest Creek Wetlands		<i>Exceptional Significance</i>			
Eastern featherbells (<i>Stenanthium gramineum</i>)	G4G5	S1S2		2003	E
Hemlock palustrine forest		S3		2003	E

Haslett Run LCA		<i>Notable Significance</i>			
-----------------	--	-----------------------------	--	--	--

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Bell Township & Mahaffey Borough



Bell Township & Mahaffey Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Chest Creek Wetlands

Landscape Conservation Areas:

Haslett Run

Managed Areas:

State Game Lands #87
State Game Lands #174



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)**
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

BELL TOWNSHIP

Bell Township falls across the eastern continental divide, with a few tributaries in the northwestern portion draining into the Allegheny River while the majority of the township drains into the Susquehanna River. Two important ecological features are the Chest Creek Wetland and Floodplain BDAs and the Haslett Run LCA (see pg. 30); however, there are also significant challenges to the ecological health of the landscape in much of the township. The pattern of forest cover in the township is very fragmented; while 74% of the township area has forest cover, only 35% is core forest habitat, and 15% is completely roadless core forest habitat. The northeastern portion of the township is part of a large block of contiguous forest that contributes to the Haslett Run LCA. Strip mining and other mining have been extensive in the township, causing habitat degradation and water quality problems in many areas. Most of the township's waterways, including the West Branch Susquehanna River, Chest Creek, Whisky Run, Haslett Run, Curry Run, Deer Run, and Bear Run, are classified as impaired streams by the DEP. The high proportion of land which has been strip mined contributes to the problem of forest fragmentation, because without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Conservation priorities in the landscape of Bell Township would be remediation of water quality problems, forest stewardship to increase ecosystem health and contiguity, and stewardship of the Biological Diversity Area along Chest Creek.

Chest Creek Wetlands BDA

Description

This Biological Diversity Area highlights an area along Chest Creek with two distinct natural wetland communities.

The Floodplain core habitat area has natural floodplain communities in relatively good condition. Most of the area is forested, with silver maple (*Acer saccharinum*) and green ash (*Fraxinus pensylvanica*) prominent in the canopy. The understory is lush and diverse, with typical floodplain species such as jumpseed (*Polygonum virginianum*), false nettle (*Boehmeria cylindrica*), obovate beakgrass (*Diarrhena obovata*), jewelweed (*Impatiens sp.*). Box elder (*Acer negundo*) and dogwood (*Cornus sp.*) are important in the shrub layer.

The Seepage Wetland core habitat area has a large seepage wetland community that hosts a plant species of special concern in Pennsylvania: featherbells (*Stenanthium gramineum*). Most of the wetland is forested, with more open shrub- and herb- dominated patches also scattered where the water is deeper. The vegetative composition of the area is very heterogeneous. The wetland is fed by a fairly high volume of seepage from the base of the slope to its east. The western edge of the wetland is bounded by SR 36, and the long dike the road sits on appears to have influenced the natural hydrological pattern at the site, resulting in greater pooling of water at its edge.

The wetter forested areas have hemlock (*Tsuga canadensis*), swamp white oak (*Quercus bicolor*), and yellow birch (*Betula allegheniensis*), dominant at varying levels in the canopy. Some areas display the characteristic hummock- and pool- microtopography of a swamp forest, with hummocks formed around tree roots rising several feet above the muck or standing water of the prevailing elevation. The herbaceous layer is dominated by sphagnum moss or cinnamon fern (*Osmunda cinnamomea*). The upland forested areas have a diverse canopy including white pine (*Pinus strobus*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), ash (*Fraxinus sp.*), shagbark hickory (*Carya ovata*), red oak (*Quercus rubra*), white oak (*Quercus alba*), and beech (*Fagus grandifolia*). Some low, saturated areas have patches of tussock sedge (*Carex stricta*), buttonbush (*Cephalanthus occidentalis*), hop sedge (*Carex lupulina*), Tuckerman's sedge (*Carex tuckermanii*), or winterberry (*Ilex verticillata*).

Featherbells (*Stenanthium gramineum*)



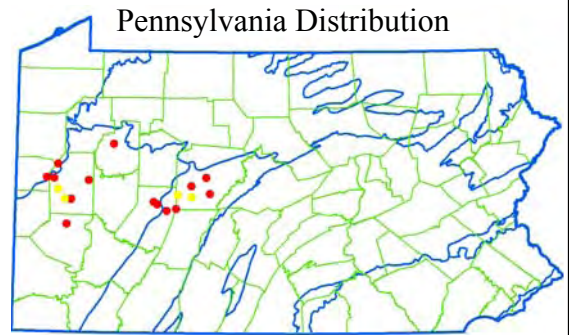
Western Pennsylvania Conservancy 2003

What It Looks Like:

This member of the Lily Family (Liliaceae) has an erect, leafy stem that can reach up to 6' tall. It is a slender perennial herb with a smooth stem that does not branch below the inflorescence.

Leaves: numerous stem leaves, 6" to 1.5' long and ¼"-1/2" wide, alternately arranged on stem & also basal, present at the time of flowering.

Flowers: present in terminal branching panicle that is 6"-2' long, flowers are variable in size and have 6 pointed petals (tepals), flowers appear in July through September



Pennsylvania Natural Heritage Program Data 2004

Where It Is Found:

In Pennsylvania, Eastern Featherbells appear to prefer moist woods and meadows, often associated with floodplain areas. In other parts of its range it is also found in drier sites. The plant is infrequent and imperiled in most of its wide range which extends from Pennsylvania, Ohio, Indiana, and Missouri south to Florida and Arkansas. Pennsylvania populations represent the northeastern boundary of this species' range and are concentrated in the western and central portions of the state.

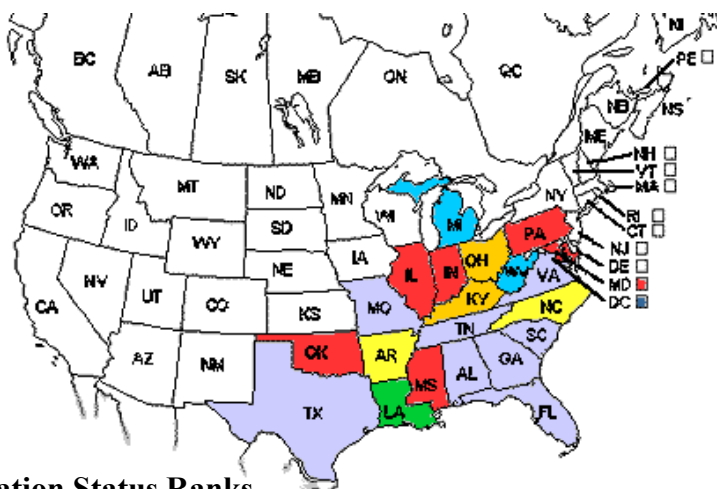
Why It Is Rare:

In parts of its range, including Illinois and Indiana, most land area has been converted for human use and very few sites with suitable habitat remain. Some evaluators suggest that the plant is highly correlated with little-disturbed natural areas, which can be due to highly specific habitat requirements or a low dispersal ability. In Pennsylvania, it has been documented from 21 sites, but 17 of these records have not been validated for at least 40 years, so an accurate assessment cannot be made of its abundance in the state. As it is associated with floodplains and other wetlands, habitat types which have been converted at a high rate over the last several decades, it may have declined due to habitat destruction.



Global Distribution

South-eastern North America. Northeastern limit of range falls within Pennsylvania.



NatureServe. 2003. NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe. Arlington, Virginia.

Conservation Status Ranks

(NatureServe)

G4G5: apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery/demonstrably secure globally may be rare in parts of its range

S1S2: critically imperiled in state because of extreme rarity or because of some factor(s) making it vulnerable to extirpation from the state/ imperiled in state because of rarity

Less saturated areas have vegetation more typical of floodplain forest, with goldenrods (*Solidago spp.*), and spicebush (*Lindera benzoin*) prevalent. Towards the southern end, the elevation is lower and the ground is saturated, resulting in a wet shrubland dominated by steplebush (*Spiraea tomentosa*), jewelweed (*Impatiens sp.*) and rough alder (*Alnus incana*).

The Supporting Natural Landscape is the immediate watershed above the wetlands. The condition of this area impacts the water quality in the wetlands. The terrain is steeply sloped and mainly forested, with oak species (*Quercus rubra*, *Quercus alba*, *Quercus montana*) and red maple (*Acer rubrum*) prominent in the canopy. The forested condition of this area also contributes to the long-term viability of the wetland areas, as wetlands embedded in forest have been documented to have enhanced integrity over wetlands surrounded by cultural land use types (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Floodplain core habitat area—Invasive exotic species have not spread extensively at this site to date; however, two species which can dominate floodplain communities, Japanese knotweed (*Polygonum cuspidatum*) and Japanese stiltgrass (*Microstegium vimineum*) were present.

Seepage wetland core habitat area—This wetland area is receiving pollution from road runoff (the heavily trafficked SR 36 forms its western boundary). The primary contaminants borne in road runoff are heavy metals, aromatic hydrocarbons (petroleum compounds), sediments, and salts. Heavy metals and aromatic hydrocarbons arise from wear of automotive parts and compounds, and the amounts released increase with traffic volume. Although they are released at low concentrations, these compounds are toxic to aquatic life, very slow to degrade, and accumulate over time. Sediments arise from erosion of non-paved, exposed soil; release of sediments into water bodies is harmful to aquatic plants and animals. Salt release results from applications of salt for road de-icing; chloride-based salts (sodium chloride, magnesium chloride, potassium chloride, etc.) can have detrimental impacts on vegetation, soil chemistry, and aquatic life (Environment Canada 2001).

Supporting Natural Landscape—Any herbicides, pesticides, or other toxic materials released in this area will drain into the wetland, where they may be toxic to its inhabitants. The area is highly vulnerable to soil erosion if forest cover is removed, due to the steeply sloping terrain. Erosion will result in sediment pollution in the wetlands, which degrades the habitat for many plant and animal species. Greatly decreased forest cover in this area may also diminish the long-term viability of the wetland community.

Recommendations

Floodplain core habitat area—these communities are adapted to natural disturbance, and can likely tolerate foot traffic without lasting damage. However, motorized vehicle traffic should be avoided, as it generates more intensive disturbance than is natural. Monitoring the distribution and abundance of invasive species at this site, to determine if they are spreading further, would provide a basis for evaluating whether removal strategies are warranted.

Seepage wetland core habitat area—If not already in place, best management practices for road runoff drainage along SR 36 may help to minimize the amount of contaminants entering the wetland. Runoff should be slowed and filtered in close proximity to the road, to minimize contaminants reaching the wetlands and the stream. The Arkansas Forestry Commission provides a good reference outlining BMP options, available at: <http://www.forestry.state.ar.us/bmp/roads.html>. Chloride salts should not be applied in this area; calcium magnesium acetate is an alternative de-icing compound which is less environmentally damaging.

Supporting Natural Landscape—To maintain good water quality for the wetlands, forest cover removal should be avoided on steeply sloped areas, and toxic materials (automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls, etc.) should not be released. Preservation of forest cover in this area, especially in such a pattern as to connect the wetland with surrounding forested areas, is likely to enhance prospects for the long-term health of this habitat.

MAHAFFEY BOROUGH

The landscape of Mahaffey Borough consists mainly of the village of Mahaffey. The northern portion of the borough drains directly into the West Branch Susquehanna River, while the southern portion drains into its major tributary, Chest Creek, which joins the West Branch just west of Mahaffey Borough. No Natural Heritage Areas were identified within the bounds of the borough.

NEWBURG BOROUGH

Newburg Borough is 83% forested; Chest Creek runs through the borough, and some of the floodplain habitat along the creek is in good ecological condition and has been recognized as the Chest Creek Floodplain BDA and the Chest Creek Wetlands BDA. Recommendations to maintain and improve the ecological health of the borough area are: conservation stewardship of the BDAs, with focus on maintaining forest connectivity in surrounding areas; and restoration of natural communities in other floodplain areas along Chest Creek.



Mountain Laurel (*Kalmia latifolia*)



Wetlands along Anderson Creek (pg. 100)

Bigler Township

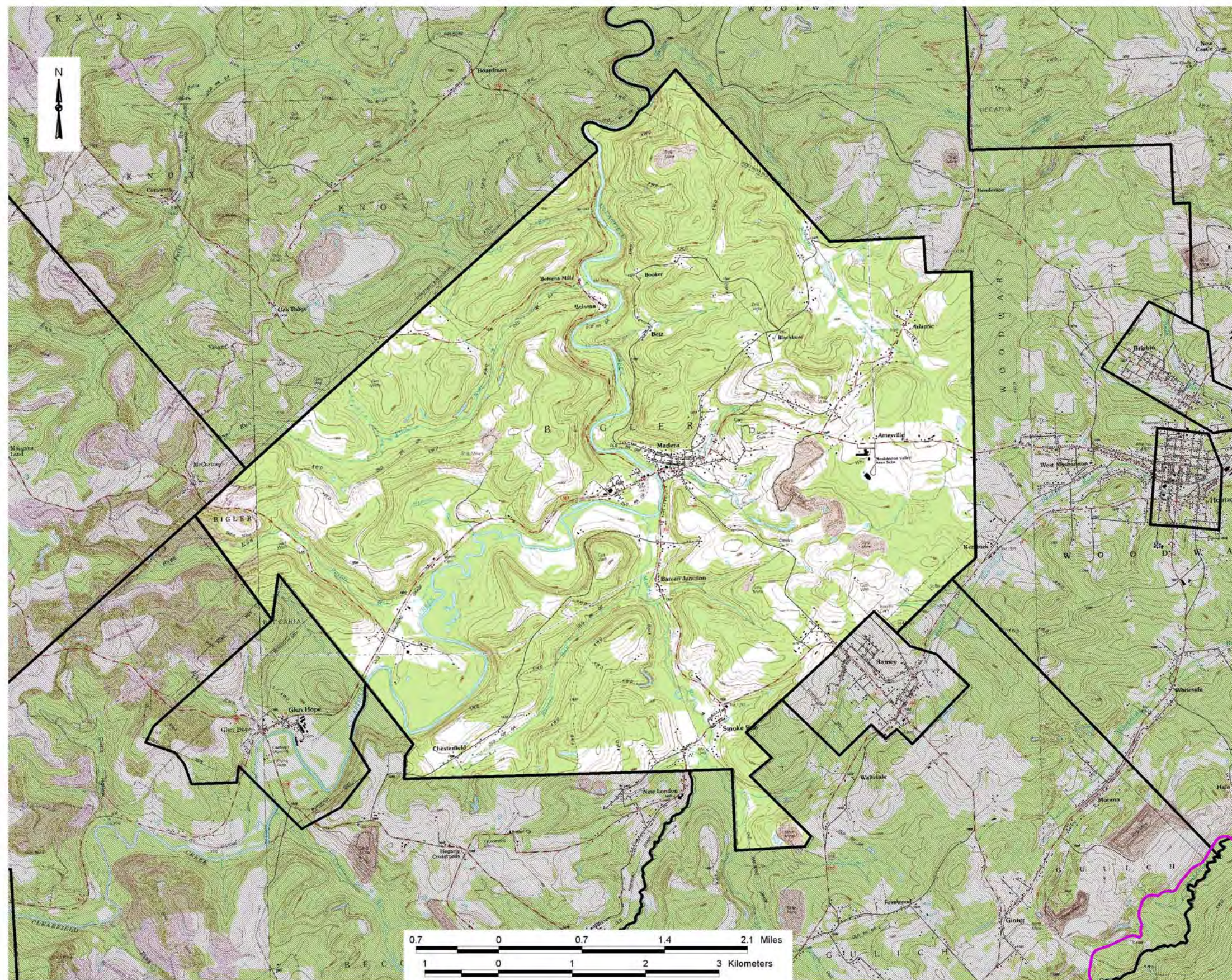
		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS: *none identified*

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Bigler Township



Bigler Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

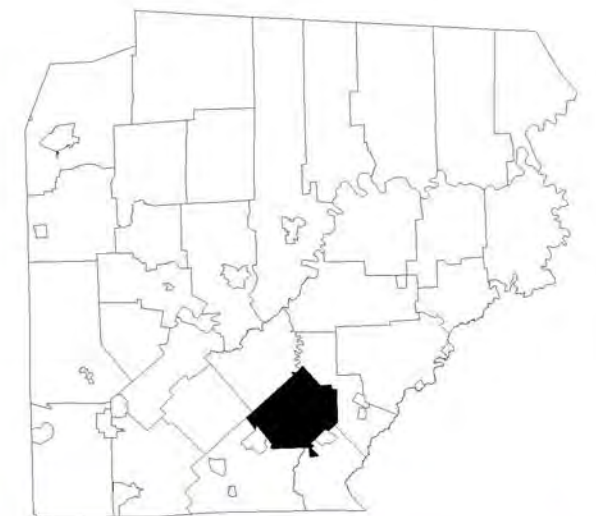
None

Landscape Conservation Areas:

None

Managed Areas:

None



Map Legend



Important Bird Areas (IBA)



Managed Lands

Biological Diversity Areas (BDA)



Supporting Natural Landscape



Core Habitat



Landscape Conservation Areas (LCA)

BIGLER TOWNSHIP

Bigler Township is 81% forested, and about half of the forested area is core forest habitat. A quarter of the forest is also roadless core habitat area. However, the core forest habitat areas are not part of large enough contiguous forest blocks to support viable populations of neotropical migrant bird species, thus no Landscape Conservation Areas were designated in the township. The township is almost all within the Clearfield Creek watershed, except for the southeastern corner which is the headwaters of Beaver Run, which flows into Moshannon Creek. Challenges to the ecological health of the landscape include forest fragmentation, degradation of terrestrial habitat from mining in some areas, and degradation of water quality due to mine drainage. Clearfield Creek, Muddy Run, and Banian Run are classified by the DEP as impaired streams due to mine drainage impacts. Forest stewardship to improve ecosystem health and forest contiguity, and remediation of water quality problems would be beneficial conservation objectives for the township landscape.

Bloom Township

		<u>PNDI Rank</u>		<u>Legal Status</u>	
		Global	State	Federal	State
		Last Seen		Quality	

NATURAL HERITAGE AREAS:

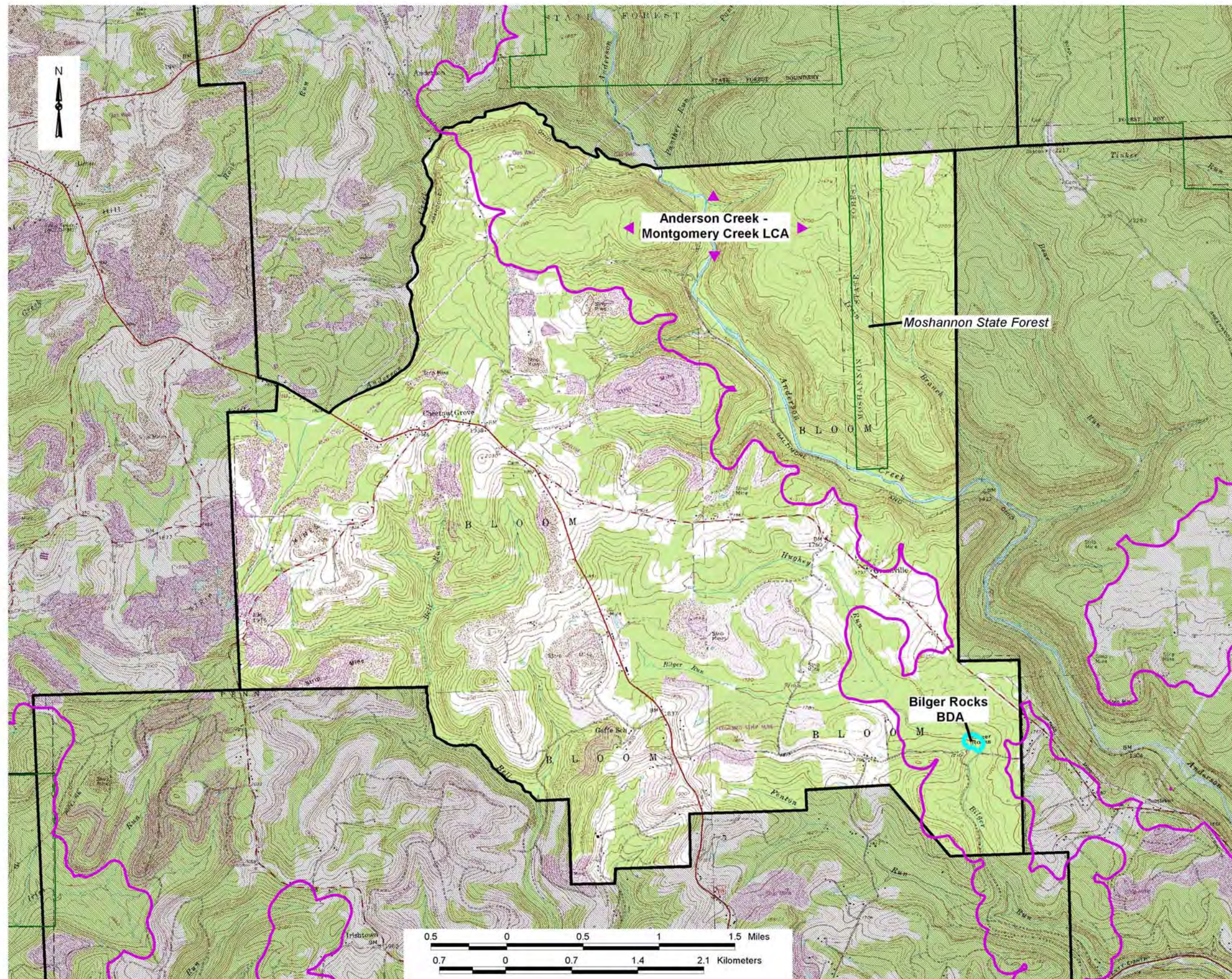
Bilger Rocks		<i>High Significance</i>			
Appalachian gametophyte (<i>Vittaria appalachiana</i>)	G4	S2		1989	E
Acidic cliff		--		2002	E

Anderson Creek-Montgomery Creek LCA		<i>Notable Significance</i>			
-------------------------------------	--	-----------------------------	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: Bilger Rocks (erosional remnant)

Bloom Township



Bloom Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

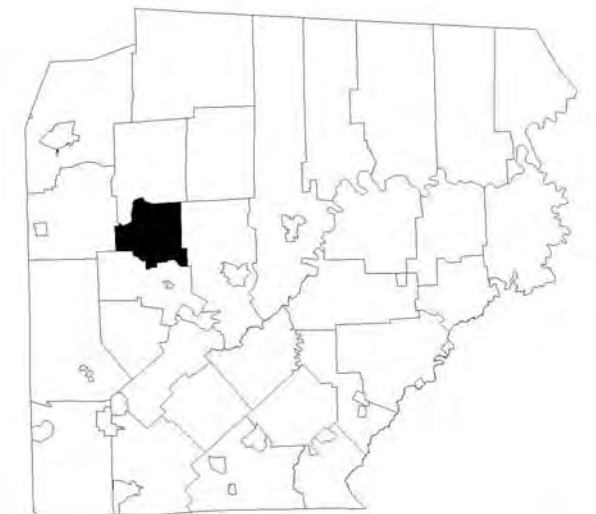
Bilger Rocks

Landscape Conservation Areas:

Anderson Creek - Montgomery Creek

Managed Areas:

Moshannon State Forest



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

BLOOM TOWNSHIP

The northeastern portion of Bloom Township is predominantly contiguous forest, and falls within the Anderson Creek – Montgomery Creek LCA. In the southeast corner of the township and also within the LCA, Bilger Rocks is an important biological diversity feature and is designated as a BDA. Outside of the LCA, the landscape is less forested and more fragmented, with no core forest habitat except along the headwaters of Bell Run. Water quality problems pose a significant challenge to the ecological health of the township; many of the streams within the township, including Anderson Creek, Little Anderson Creek, and Irvin Branch, are classified as impaired by DEP due to pollution from mine drainage and grazing. The township's most pressing conservation needs are stewardship of the contiguity and health of the forest ecosystem in the Anderson Creek – Montgomery Creek LCA (see pg. 33), and water quality remediation efforts.

Bilger Rocks BDA

Description

Bilger Rocks is a sandstone outcrop formation that hosts a population of the Appalachian gametophyte fern (*Vittaria appalachiana*). This species is an ancient and unique relict from a past climatic era, and its unusual characteristics provide insight into the development of the present-day climate and flora. The plant and animal assemblage living in this habitat is a unique community, termed an acidic cliff community (following Smith 1991, as there is no correspondent type listed in the more recent Fike 1999 classification).

Threats and Stresses

Because Bilger Rocks is a popular, publicly accessible site, the rock formations receive heavy foot traffic. Although foot traffic has damaged vegetation in many areas of the rocks, the Appalachian gametophyte populations may be somewhat protected by their tendency to grow deep within the rock formation in inaccessible areas. As the Appalachian gametophyte lives only in very protected environments within rockhouse formations, it is likely to be very sensitive to any change in the microclimatic conditions, especially any decrease in moisture levels, or increased exposure to wind and temperature variation.

Recommendations

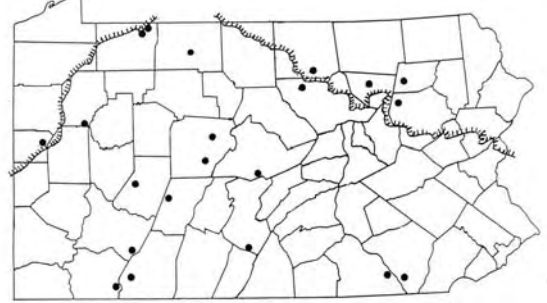
The fern's safety might be enhanced through signs informing visitors of its presence and describing its habitat and unique characteristics. In order to maintain the microclimate conditions needed by the fern within the rock formation, forest cover surrounding the rocks should remain intact.

Appalachian Gametophyte (*Vittaria appalachiana*)

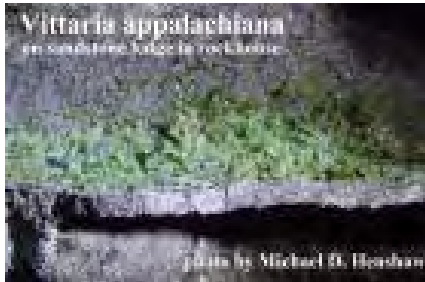
What It Looks Like:

Fern species have two phases in their life cycle. The first phase to develop when a fern spore germinates is the gametophyte. From this typically small and inconspicuous tissue grows the sporophyte, the leafy fronds of the fern. The Appalachian gametophyte is a unique fern species that has never been known to develop a sporophyte phase. Populations consist of many small gametophytes and resemble a bed of moss rather than the typical upright, leafy fern form. Most ferns reproduce through the spores produced by the sporophyte and the gametophyte does not reproduce at all; the Appalachian gametophyte has the unusual capacity to produce vegetative propagules (Farrar 1998).

Pennsylvania Distribution



Adapted from Parks 1989



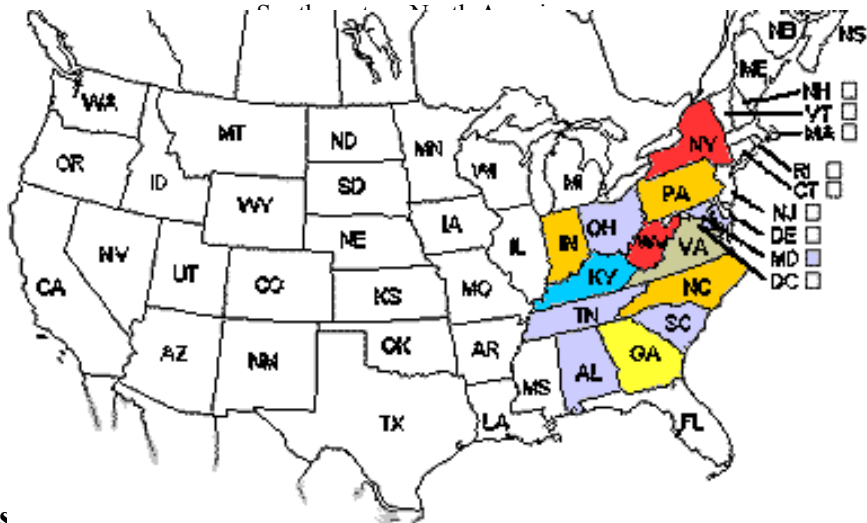
Where It Is Found:

The fern lives in moist crevices of sandstone rocks, and is found exclusively in the Appalachian mountains. There are several other species in the same family which are found in the southeastern U.S, and only one of these species is known to produce a sporophyte. Most species of this fern family are found in tropical climates, and do produce sporophytes (Farrar 1998).



It is theorized that the Appalachian gametophyte once occupied a much larger range, 15-50 million years ago when the climate of the area was tropical or subtropical, and had a typical fern life cycle including sporophyte and gametophyte phases. Upon the cooling of the climate with the Pleistocene-era glaciation, the species survived only in the highly sheltered environments of sandstone rockhouses, where temperatures very rarely reach freezing. Because in many other species of fern the sporophyte phase is more sensitive to cold temperatures than the gametophyte phase, it is theorized that the sporophyte phase of the Appalachian gametophyte could not survive in the cooler climates during and after glaciation, and thus the capacity of the fern to produce the sporophyte phase was eventually lost. The fern is rare today because of its highly specialized habitat requirements, and because its form of vegetative reproduction gives it a very limited ability to disperse to new locations. Several populations are known from areas north of the glaciation line, thus some dispersal must have taken place, but genetic studies suggest that many populations have had no new individuals immigrate for a very long time (Farrar 1998).

Global Distribution:



State/Province Conservation Status Ranks	
SX: Presumed Extirpated	
SH: Possibly Extirpated	
S1: Critically Imperiled	
S2: Imperiled	
S3: Vulnerable	
S4: Apparently Secure	
S5: Secure	
SR: reported	
S?: Unranked	
Under Review	

reServe. 2003. NatureServe Explorer: the encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. <http://www.natureserve.org/explorer>

Cons

G4: *Vittaria appalachiana* is abundant within its range. Much of its rock-shelter habitat is currently protected. This species is extremely vulnerable, however, to any changes in its specialized habitat.

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 vulnerable to extirpation from the state.

Boggs Township & Wallaceton Borough

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS: *none identified*

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Boggs Township & Wallaceton Borough

Boggs Township & Wallaceton Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

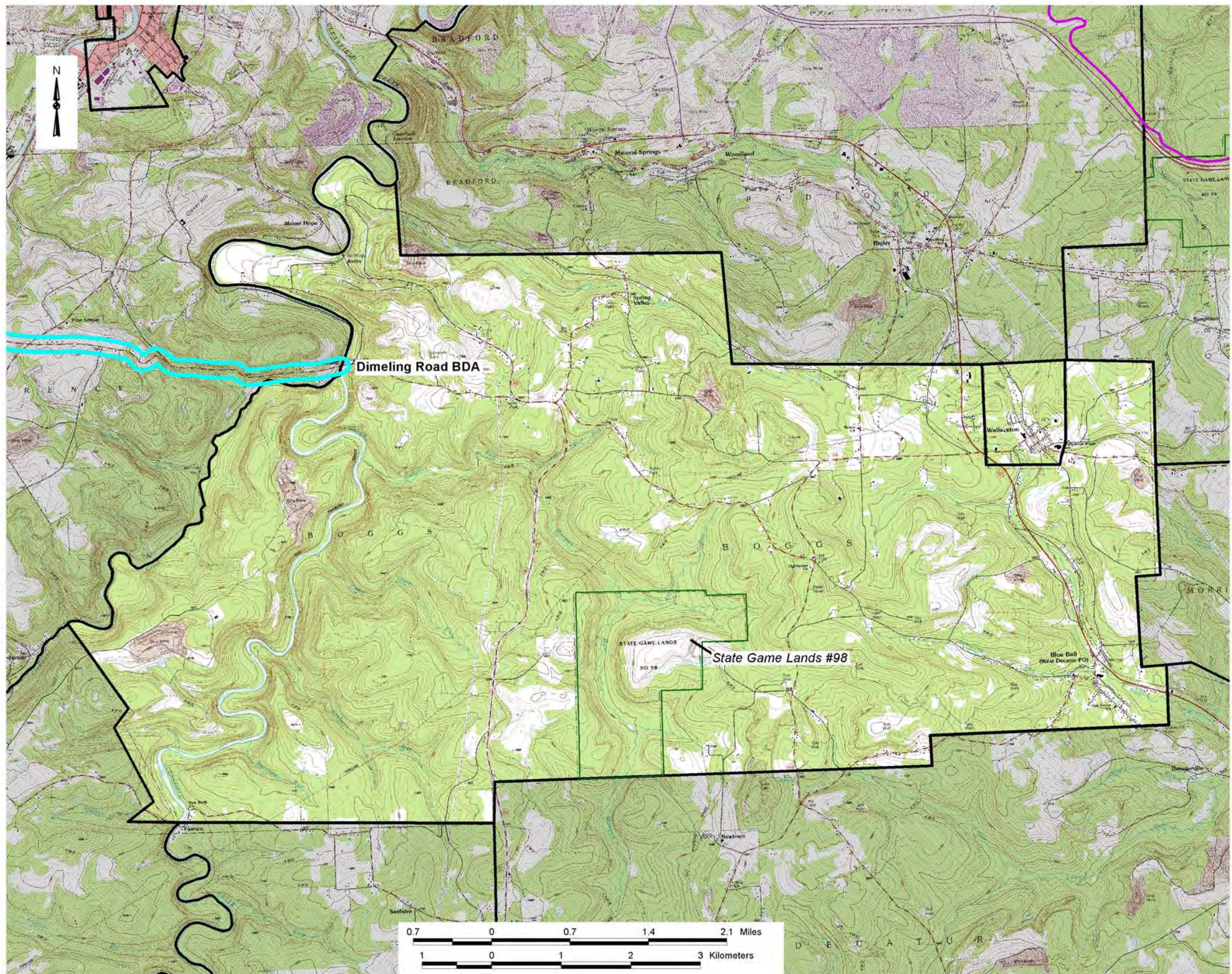
Dimeling Road

Landscape Conservation Areas:

None

Managed Areas:

State Game Lands #98



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

BOGGS TOWNSHIP

The landscape of the township is largely forested. The western two-thirds of the township fall within the Clearfield Creek watershed, while the eastern third, including Little Laurel Run, Laurel Run, and Simeling Run, drain into Chest Creek. About half the forested area is core forest habitat and a quarter of the forest is roadless core habitat. Several streams in the township— Clearfield Creek, Morgan Run, Long Run, Sanbourn Run, and Laurel Run— are classified as impaired streams due to mine drainage pollution. Conservation priorities to improve the ecological health of the landscape are forest stewardship to improve contiguity and forest ecosystem health, and water quality remediation for impaired streams. No Natural Heritage Areas were identified in the township.

WALLACETON BOROUGH

The landscape of the borough includes the village of Wallaceton and some surrounding forested areas. The southwestern half of the borough drains into Laurel Run, while the northeastern half drains into Moravian Run. No Natural Heritage Areas were identified in the township.

Bradford Township

<u>PNDI Rank</u> <u>Legal Status</u>					
Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

Moravian Run-Alder Run LCA		County Significance		
----------------------------	--	---------------------	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Bradford Township

Bradford Township Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

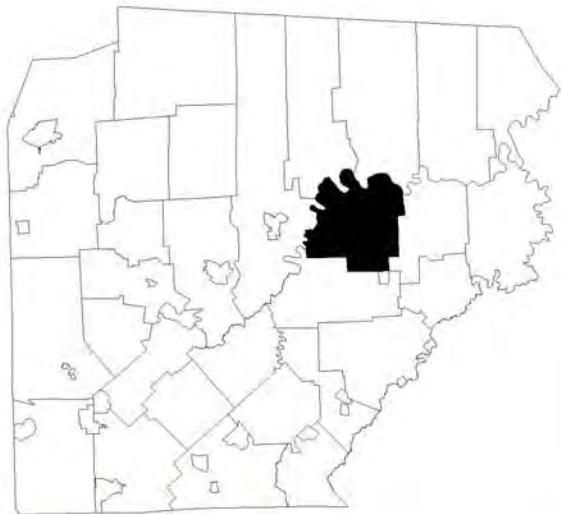
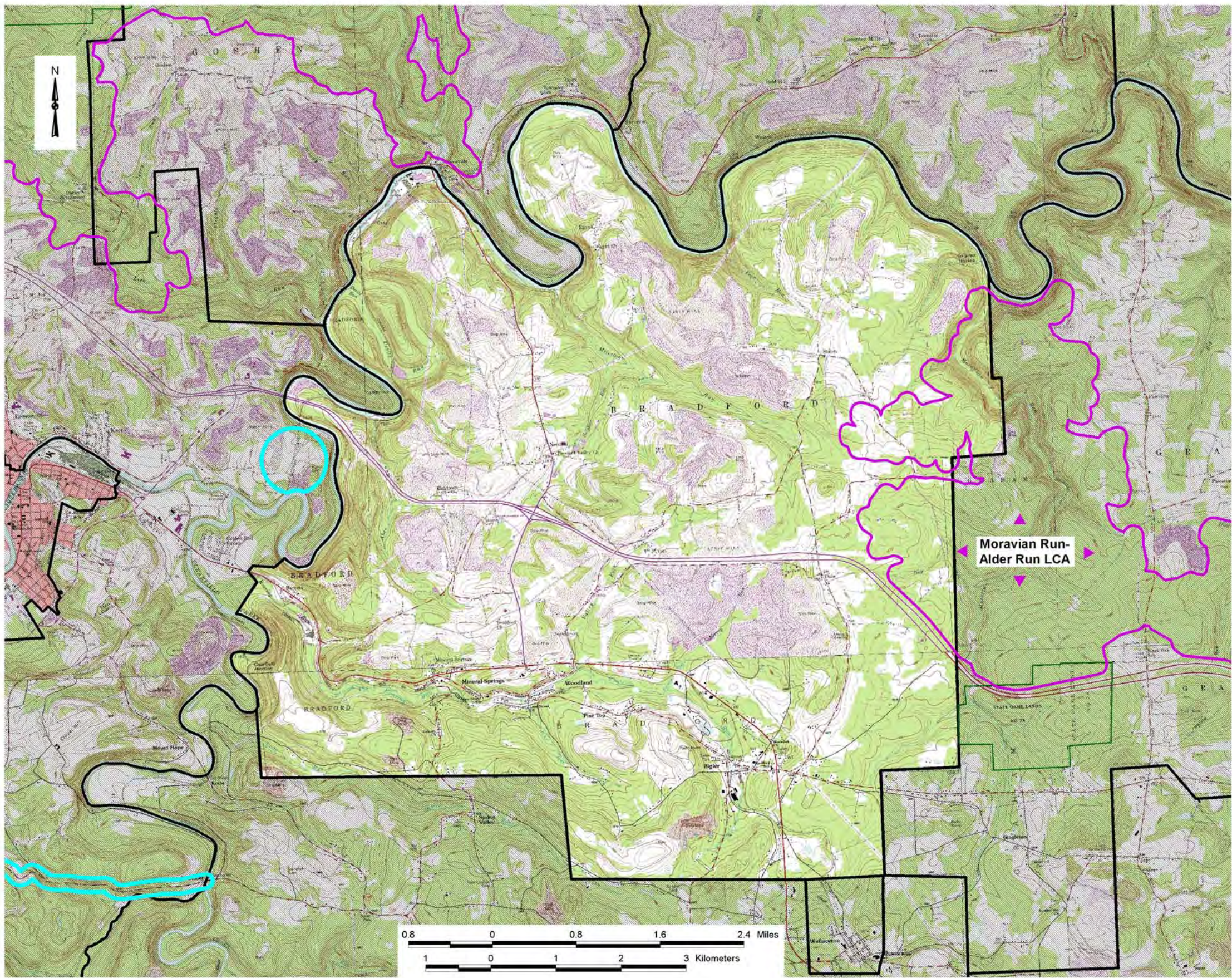
None

Landscape Conservation Areas:

Moravian Run - Alder Run

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

BRADFORD TOWNSHIP

The landscape of Bradford Township has significant challenges to its ecological health. Many of the streams in the township, including Roaring Run, Valley Fork Run, Jake Run, Millstone Run, and Moravian Run, are classified by DEP as impaired streams due to pollution from mine drainage. The northeastern edge of the township is forested and falls within the Moravian Run-Alder Run LCA (see pg. 33); in the remainder of the township, forest cover is low and very fragmented. The entire township drains into the West Branch Susquehanna River, which forms its northeastern boundary.

Brady Township & Troutville Borough

		<u>PNDI Rank</u>	<u>Legal Status</u>		
		Global	State	Federal	State
		Last Seen	Quality		

NATURAL HERITAGE AREAS:

Haslett Run LCA		Notable Significance	
-----------------	--	----------------------	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Brady Township & Troutville Borough

Brady Township & Troutville Borough Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

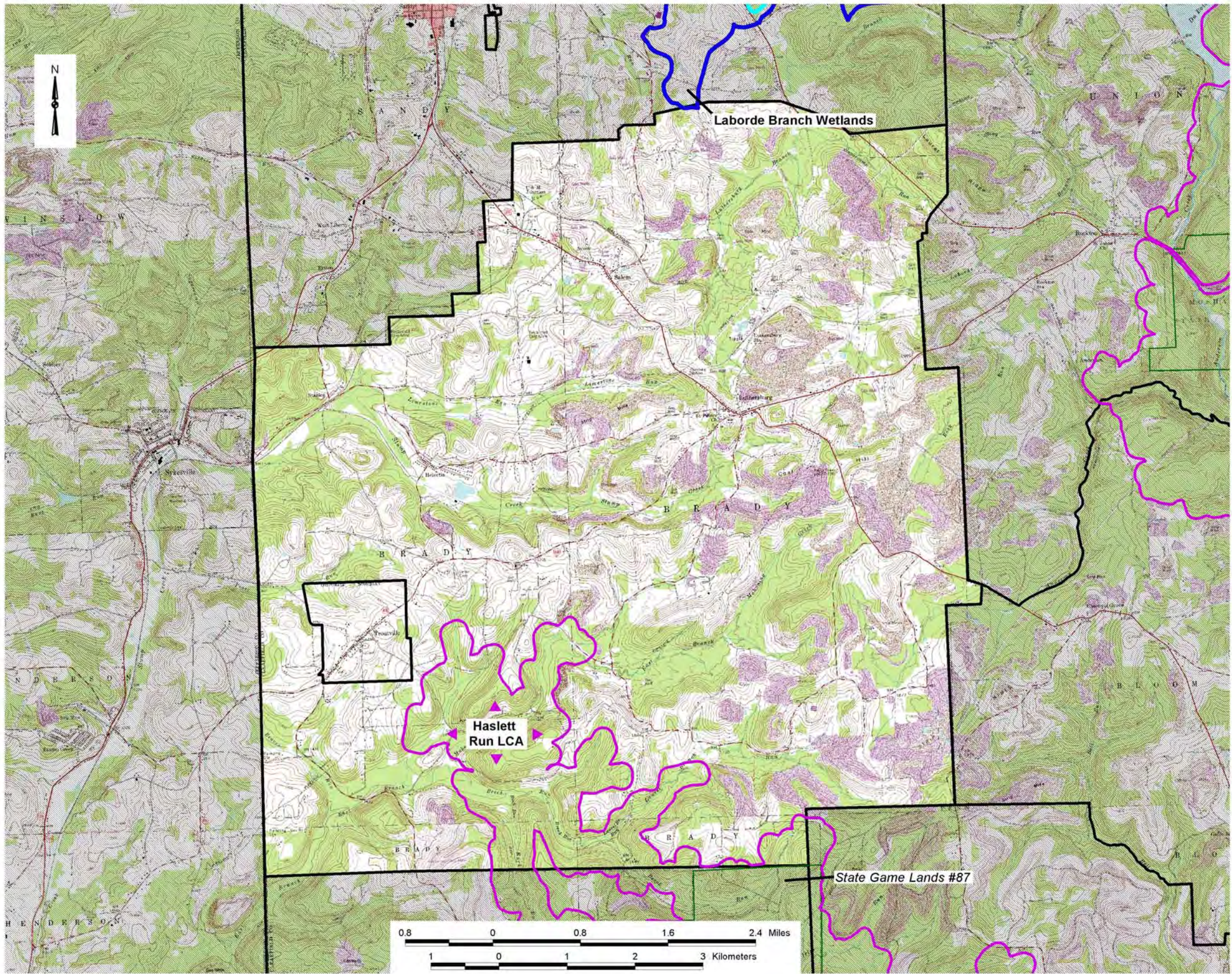
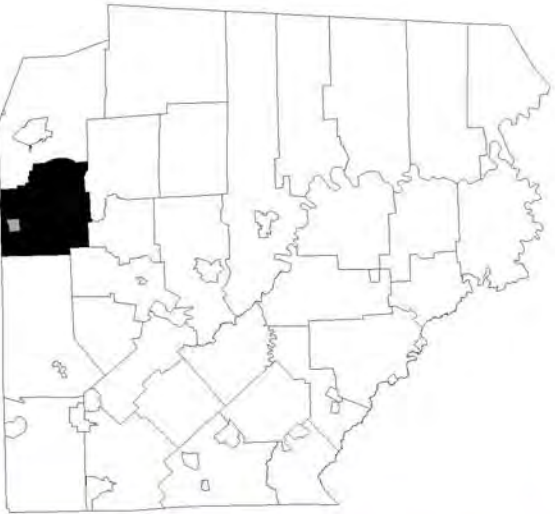
Laborde Branch Wetlands

Landscape Conservation Areas:

Haslett Run

Managed Areas:

State Game Lands #87



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

BRADY TOWNSHIP

Brady Township falls mainly within the Allegheny River watershed, although the eastern continental divide passes through the southeastern corner of the township, and the headwaters of Little Clearfield Creek fall within the Susquehanna River watershed. The landscape of the township has a low degree of forest cover. While 54% of land cover is forest, much of it is composed of small, fragmented patches; only 15% of the forest is core forest habitat, and only 4% is roadless core habitat. The most contiguous forest cover is found near the southern boundary of the township; this area is contiguous with a larger area of forest to the south that together form the Haslett Run LCA (see pg. 30). Water quality impairment is a substantial challenge to the ecological health of township streams; Little Anderson Creek and Rock Run in the Susquehanna Drainage, and Luthersburg Branch, Stump Creek, and Laurel Branch Run in the Allegheny Drainage are all classified as impaired streams by the DEP due to pollution from acid mine drainage and erosion-related siltation. East Branch Mahoning Creek is a notable exception to this trend. Good conservation priorities for the township would be stewardship of the Haslett Run LCA to maintain and increase the contiguity and ecological health of the forest ecosystem, remediation of water quality problems in impaired streams, and stewardship of unimpaired streams and their surrounding watersheds to maintain their health.

TROUTVILLE BOROUGH

The landscape of Troutville Borough is bisected by SR 410 and the village of Troutville; surrounding areas are mainly non-forested. The northern half of the borough drains into Poose Run while the southern half, including most of the village of Troutville, drains into two tributaries of Beaver Run. No Natural Heritage Areas were identified within the bounds of the borough.

Burnside Township, Burnside Borough, & New Washington Borough

		<u>PNDI Rank</u>		<u>Legal Status</u>		Last Seen	Quality
		Global	State	Federal	State		

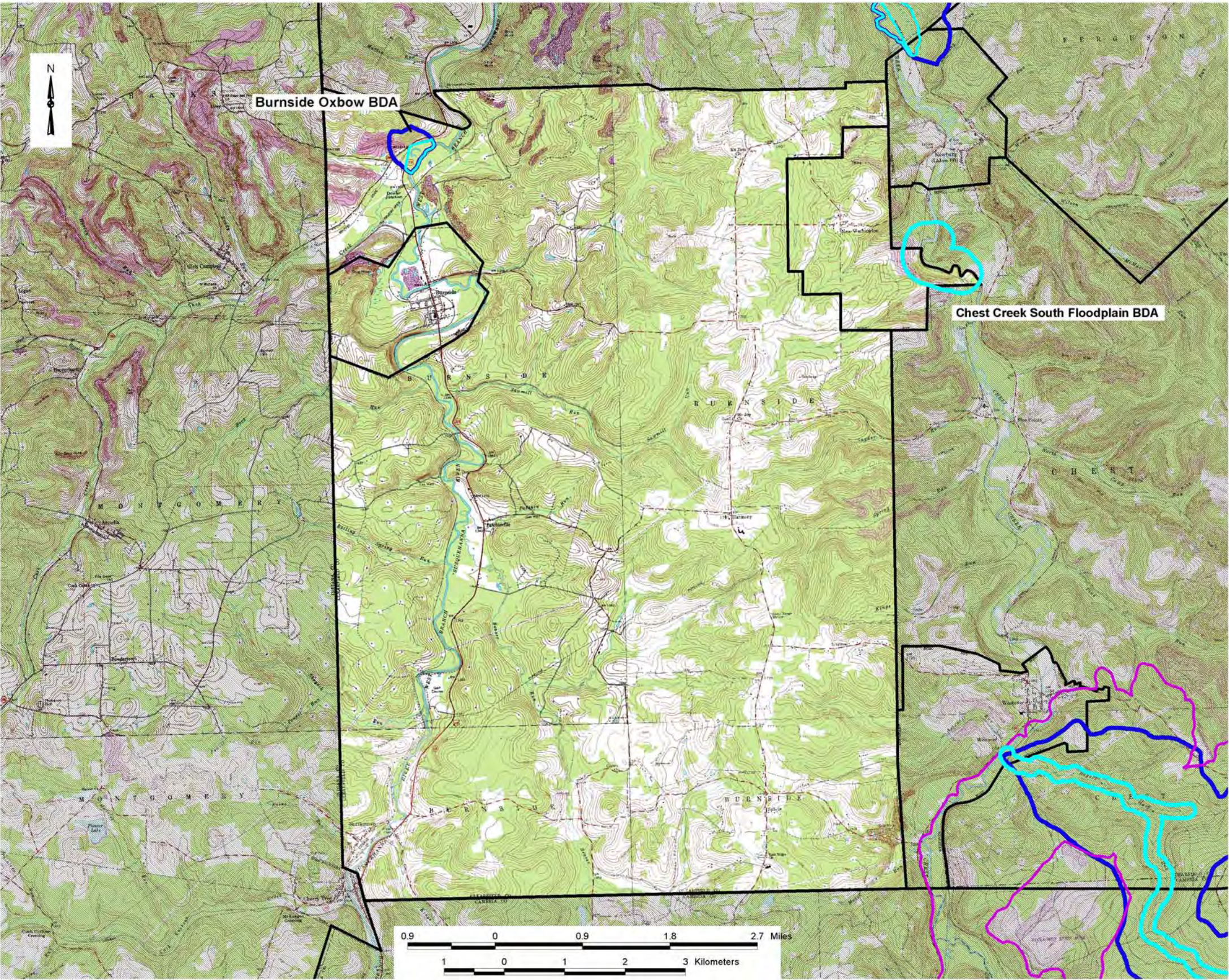
NATURAL HERITAGE AREAS:

Burnside Oxbow BDA		<i>High Significance</i>					
Eastern featherbells (<i>Stenanthium gramineum</i>)	S1S2	G4G5				2002	E
Chest Creek South Floodplain BDA		<i>High Significance</i>					
Heron rookery (<i>Ardea herodias</i>)	G5	S3S4				2004	E

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Burnside Township, Burnside Borough & New Washington Borough



Burnside Township, Burnside Borough & New Washington Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:
Burnside Oxbow
Chest Creek South Floodplain

Landscape Conservation Areas:
None

Managed Areas:
None



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

BURNSIDE TOWNSHIP

The West Branch Susquehanna River runs through Burnside Township, and all of the township falls within its watershed. Along the West Branch are many wetland areas; one of these is recognized as the Burnside Oxbow BDA. The landscape of the township has relatively high and contiguous forest cover: 80% is forested, with 60% core habitat and 25% roadless core habitat. Almost all the waterways in the township are classified as impaired streams by the DEP. To maintain and improve ecological health of the township landscape, good conservation objectives would be forest ecosystem stewardship and remediation of water quality problems, especially in the vicinity of wetlands such as the Burnside Oxbow BDA.

Burnside Oxbow BDA

Description

This BDA is designated to highlight several wetland communities and a population of featherbells (*Stenanthium gramineum*), a plant species of special concern in Pennsylvania. To the north and south of the confluence of Cush Creek and the West Branch Susquehanna River, there is a broad, flat floodplain. Although today it contains several wetland areas, it is difficult to determine which of these are of natural origin, or how the current vegetation compares to what may have existed in the past. The BDA surrounds two communities that appear to have natural origins.

In natural condition, a broad floodplain such as this may have been forested, with wetland conditions in seepages where the water table intersected the surface, in riparian areas directly adjacent to the waterways, or in low-lying depressions. Today, SR 219, SR 286, and an old railroad grade cross through the floodplain, all built on dikes raised above the general elevation. These dikes have interrupted natural drainage patterns and likely increased the proportion of the area covered in wetlands by impounding water behind them. The slope above the floodplain to the north has been strip mined, which may have also increased the amount of water flowing into the floodplain from seepage through the upland areas, as formerly intact rock layers are now fragmented and drain much more rapidly. Seepage from the mined area is clearly reaching the wetlands, as iron precipitate colors the water in some areas. It is also likely that the original vegetation was removed or disturbed to some degree in most of this floodplain area; thus, what exists today is a mixture of vegetative communities that have re-colonized cleared areas, in conditions somewhat different than those naturally present, and communities that occupy natural wetland situations which have been disturbed to a lesser degree.

Core Habitat Areas—One feature which is likely of natural origin is a depressional wetland between SR 219 and the river shore, which has the crescent-like, “oxbow,” shape that typically results when the course of a waterway shifts to pinch off and abandon a looping bend. The most prevalent species in the oxbow is rice cutgrass (*Leersia oryzoides*), with reed canarygrass (*Phalaris arundinacea*) also interspersed, and patches of more aquatic species scattered, including spatterdock (*Nuphar advena*), duck potato (*Saggitaria latifolia*), soft-stemmed bulrush (*Schoenoplectus tabernaemontani*), and American bur-reed (*Sparganium americanum*). Other herbaceous species include short-hair sedge (*Carex crinita* var. *crinita*), swamp candles (*Lysimachia* sp.), flat-topped goldenrod (*Euthamia graminifolia*), jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*) and a water smartweed species (*Polygonum punctatum*). Shrubs, including speckled alder (*Alnus incana*), smooth alder (*Alnus serrulata*), buttonbush (*Cephalanthus occidentalis*), and winterberry (*Ilex verticillata*), surround the oxbow and are scattered in its southern end. Some of the water here is colored orange.

The forest surrounding the oxbow and stretching to the shore of the West Branch Susquehanna River is also notable as a relatively intact example of a floodplain forest community. As is typical of

floodplain forests, the canopy is relatively open, with dense shrub and tall herbaceous growth in many areas. Shingle oak (*Quercus imbricaria*) and red maple (*Acer rubrum*) are the most prevalent species, and bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), silver maple (*Acer saccharinum*), beech (*Fagus grandifolia*), and black cherry (*Prunus serotina*) are also interspersed. Shrubs included blackberry (*Rubus sp.*), winterberry (*Ilex verticillata*), and the invasive exotic species Japanese barberry (*Berberis thunbergii*). In the zone closest to the river, the herbaceous layer consisted of dense, tall goldenrod (*Solidago sp.*) and Turk's cap lily (*Lilium superbum*). Other herbaceous species included false nettle (*Boehmeria cylindrica*), mayapple (*Podophyllum peltatum*), sedges (*Carex gracillima*, *Carex swanii*, *Carex bromoides*), meadow rue (*Thalictrum pubescens*), and marsh marigold (*Caltha palustris*).

The floodplain forest area also contained a small population of featherbells, a plant species of special concern in Pennsylvania. Featherbells is a tall (3-6'), perennial species in the Lily family that produces a 1-2' long spire of small, greenish-white flowers in July. The species has a broad geographic distribution (Florida west to Texas, and north to Michigan and Pennsylvania), but appears to be uncommon in much of this range (Natureserve 2003). It occupies a variety of habitats, including floodplains, meadows, various wetland types, and disturbed areas. In Pennsylvania, only four locations are known at present, two in Clearfield County and two in Butler County. However, 17 specimens collected from 30-100 years ago provide a record that the plant once existed in other areas. Most of these are in the Pittsburgh Low Plateau section of the Allegheny Plateau physiographic province, although two very early records are attributed to the Piedmont province at the Maryland-Pennsylvania border. Five historic locations were in Clearfield County: all of these were revisited during the course of this study, but plants were relocated only at the Burnside oxbow site. See fact sheet on pg. 43 for further information on this species.

Threats and Stresses

The accumulation of mining-related pollution in the wetland may degrade its habitat value for aquatic animal species, which are sensitive to increased acidity and sediment loads. Increased acidity may also alter the plant community composition, favoring species which are adapted to low pH.

Recommendations

The extent of mining-related pollution at this site should be further assessed to determine the severity of potential ecological impacts and any potential remediation. Within the Supporting Natural Landscape boundary, further mining should be avoided to preserve water quality in the wetland.

BURNSIDE BOROUGH

The landscape of Burnside Borough all falls within the watershed of the West Branch Susquehanna River, which runs through the township. About half the borough land is forested. No Natural Heritage Areas were identified within the borough.

NEW WASHINGTON BOROUGH

New Washington Borough falls within the Chest Creek watershed, except for the far western edge, which falls within the Deer Creek watershed. The landscape of the borough is largely forested. The southeastern corner of the township borders Chest Creek, and falls within the Chest Creek South Floodplain BDA (discussed in Chest Township section, pg. 63), home to a heron rookery.

Chest Township, Westover Borough

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

Chest Creek South Floodplain BDA		High Significance					
Heron rookery (<i>Ardea herodias</i>)	G5	S3S4			2004		E

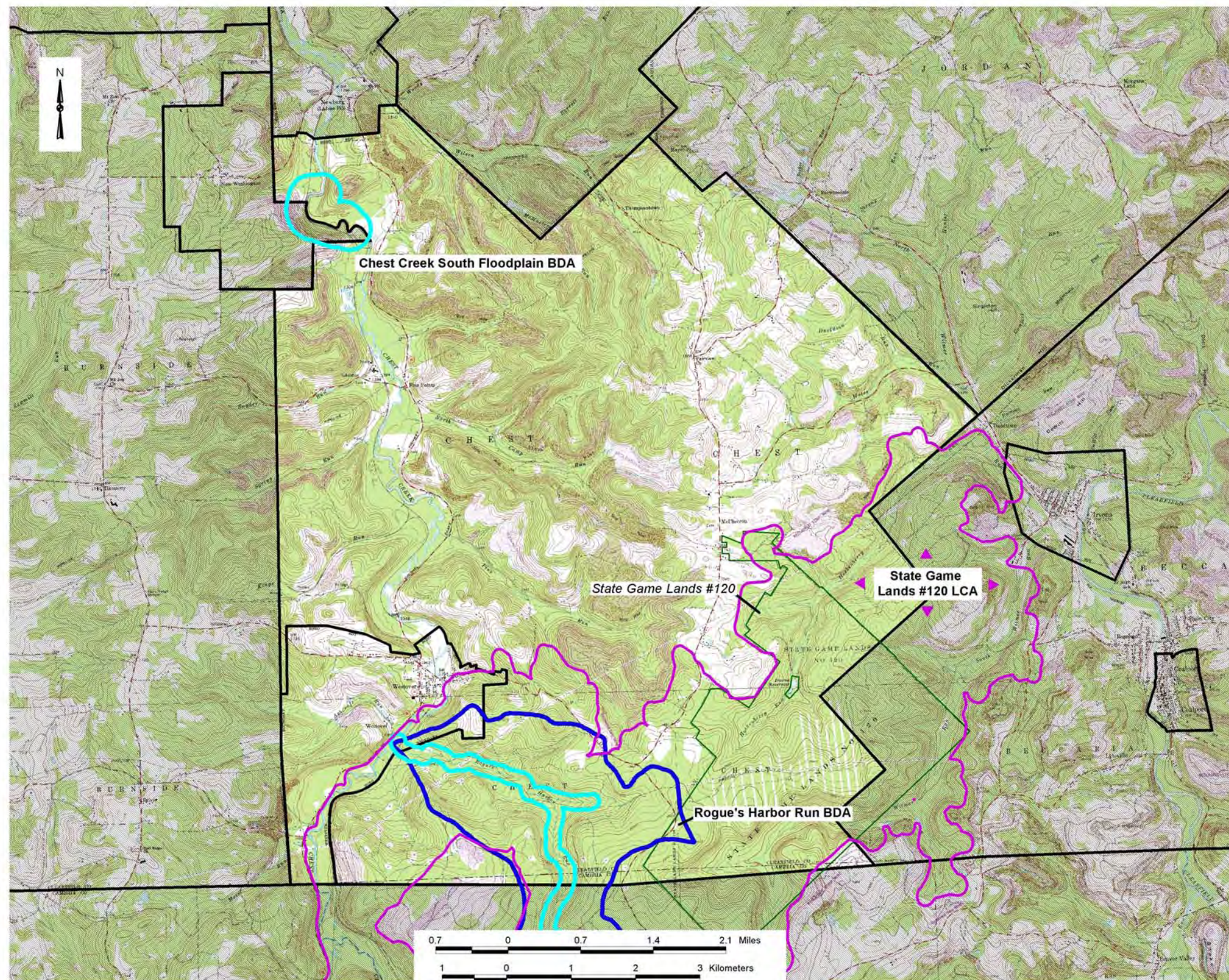
Rogue's Harbor Run BDA		Notable Significance					
Exceptional Value stream		--			--		--

SGL #120 LCA		Notable Significance					
--------------	--	----------------------	--	--	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Chest Township & Westover Borough



Chest Township & Westover Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:
Rogue's Harbor Run
Chest Creek South Floodplain

Landscape Conservation Areas:

State Game Lands #120

Managed Areas:

State Game Lands #120



Map Legend



- Important Bird Areas (IBA)
- Managed Lands

Biological Diversity Areas (BDA)

- Supporting Natural Landscape
- Core Habitat
- Landscape Conservation Areas (LCA)

CHEST TOWNSHIP

Chest Township is 71% forested, with 55% core habitat and 26% roadless core habitat. Roughly the western two-thirds of the township falls within the watershed of Chest Creek, the township's major waterway, while the eastern third of the township drains into Clearfield Creek. The relatively high proportion of core forest is an asset to the ecological health of the township landscape, and a large portion of the southern half of the township is recognized as the SGL #120 LCA (see pg. 31). However, there are also several substantial challenges to the ecological health: strip mining and other mining have been extensive in the township, causing habitat degradation and water quality problems. The high proportion of land which has been strip mined contributes to the problem of forest fragmentation in the northern half of the township, because without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Good conservation priorities for improving the ecological health of the landscape of Chest Township would be remediation of water quality problems, the establishment of a continuous natural riparian corridor along Chest Creek, and forest stewardship to increase ecosystem health and contiguity, especially within the SGL #120 LCA.

Chest Creek South Floodplain BDA

Description

This BDA is designated around a Great Blue Heron (*Ardea herodias*) rookery. The Great Blue Heron is a species of waterbird which breeds in colonies of up to several hundred nesting pairs. Colonies of nests are called "rookeries." The birds tend to prefer large, mature oak, beech, and sycamore trees, and may return to the same site for many years. Herons feed primarily on small fish. They may forage up to 15 kilometers from the rookery site.

Core Habitat Area—The core habitat area includes the nesting area as well as surrounding habitat important in maintaining suitable conditions at the nest site.

Threats and Stresses

Core Habitat Area—The months of April-June are the herons' breeding season, and they will be sensitive to loud noises or physical intrusions in the vicinity of the rookery, up to a distance of ~300 meters (Quinn and Milner 1999).

Recommendations

Core Habitat Area—In the wetland areas, further disturbances of greater intensity than unmotorized recreational traffic should be avoided because of the sensitivity of these habitats. Human visitation in this BDA during the months of April-June, as well as other disturbances resulting in loud noises—such as blasting, vehicle traffic, or shooting—may disturb the herons and negatively impact their breeding success.

Rogue's Harbor Run BDA

Description

This BDA is the watershed of Rogue's Harbor Run, a stream classified by the PA-DEP as Exceptional Value.

Core Habitat Area—The core habitat area includes perennially flowing reaches of the stream plus a 110 m buffer from the stream's banks. This area is especially important in supporting the health of the aquatic community, and when forested, provides important habitat to terrestrial species as well. A forested riparian buffer stabilizes stream hydrology, maintains the physical integrity of the stream channel, and intercepts sediments and chemicals. It also is critical in maintaining a natural cycle of nutrient input and uptake in the stream, providing a source for organic matter while filtering nutrients contained in runoff. A forested riparian buffer supports habitat conditions necessary for a diverse assemblage of native species in the stream: it regulates air and water temperatures, and provides food and cover for fish, amphibians, invertebrates, and other wildlife (Harding et al. 1998, Maryland DNR 1999, Chesapeake Bay Program 2000).

Supporting Natural Landscape—includes the watershed of the EV stream. In forested condition, the watershed maintains water quality and natural nutrient cycles for the stream.

Threats and Stresses

Core Habitat Area—Loss of forest cover within this area would likely result in physical degradation of the stream channel, erosion and sediment pollution in the stream, increased water temperatures, and disruption of natural nutrient cycles involving the stream.

Supporting Natural Landscape—if forest cover is substantially reduced in the watershed of the stream, water quality is likely to decline from sediment pollution and excessive nutrient input. Removal of forest cover on steep slopes is especially problematic as these areas are highly erodible.

Recommendations

Core Habitat Area—This area should remain forested; timbering and road development or other construction activities should be avoided, in order to preserve the function of the riparian buffer as habitat and to sustain the integrity of the stream ecosystem.

Supporting Natural Landscape—A high degree of forest cover should be maintained to protect the water quality of the stream and the ecological integrity of the aquatic ecosystem. Water quality impacts should be considered for any activities taking place here: ecologically detrimental pollutants should not be released, and any earth disturbing activities should employ appropriate erosion control measures and avoid steep slopes. Where roads exist, best management practices for road runoff management can help to mitigate its environmental impacts. The Arkansas Forestry Commission provides a good reference outlining BMP options, available at:

<http://www.forestry.state.ar.us/bmp/roads.html>. For dirt roads, the most critical need is to minimize erosion by vegetating surfaces where possible and constructing drainage management features. For paved roads, runoff should be slowed and filtered in close proximity to the road, to minimize contaminants reaching the wetlands and the stream.

Mining should be avoided within the watershed as it typically results in long-term water quality impairment that is difficult to remediate.

WESTOVER BOROUGH

Westover Borough is ~70% forested, and forest at the eastern edge of the township contributes to the SGL #120 LCA (see pg. 31). It is within the Chest Creek watershed.



Heron Rookery at Chest Creek Floodplain BDA (pg. 64)

Cooper Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

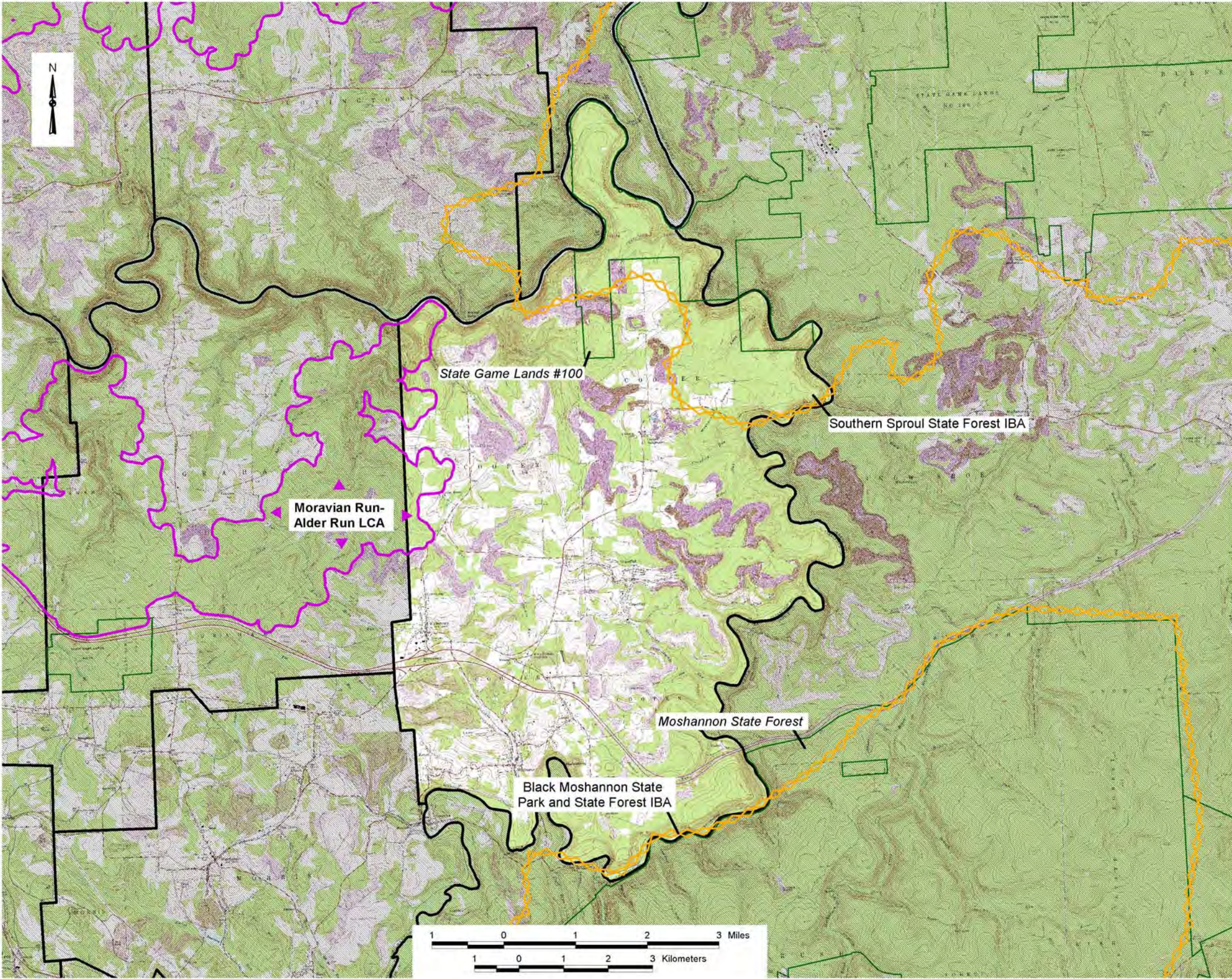
NATURAL HERITAGE AREAS:

Moravian Run-Alder Run LCA				County Significance		
----------------------------	--	--	--	---------------------	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Cooper Township



Cooper Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

Moravian Run - Alder Run

Managed Areas:

State Game Lands #100
Moshannon State Forest



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

COOPER TOWNSHIP

Cooper Township lies between the West Branch Susquehanna River, its northern boundary, and Moshannon Creek, which forms the township boundary to the east and south. Due to the extent of strip mining in Cooper Township, there are substantial challenges to the ecological health of the landscape. Natural forest cover is relatively low and extremely fragmented in pattern: total forest cover is 53%, but core forest habitat is only 21%, and roadless core habitat is 14%. Without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Conservation priorities to improve the ecological health of the township would be forest stewardship to improve contiguity and ecosystem health of forested areas, and restoration of mined areas. A small portion of the Moravian Run – Alder Run LCA is at the eastern edge of the township; for a description of this area see page 33.

Covington Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

Quehanna Right-of-Way BDA		<i>Notable Significance</i>					
Special plant species		G5	S2			2003	E

Cole Run BDA		<i>Notable Significance</i>					
Exceptional Value stream			--			--	--

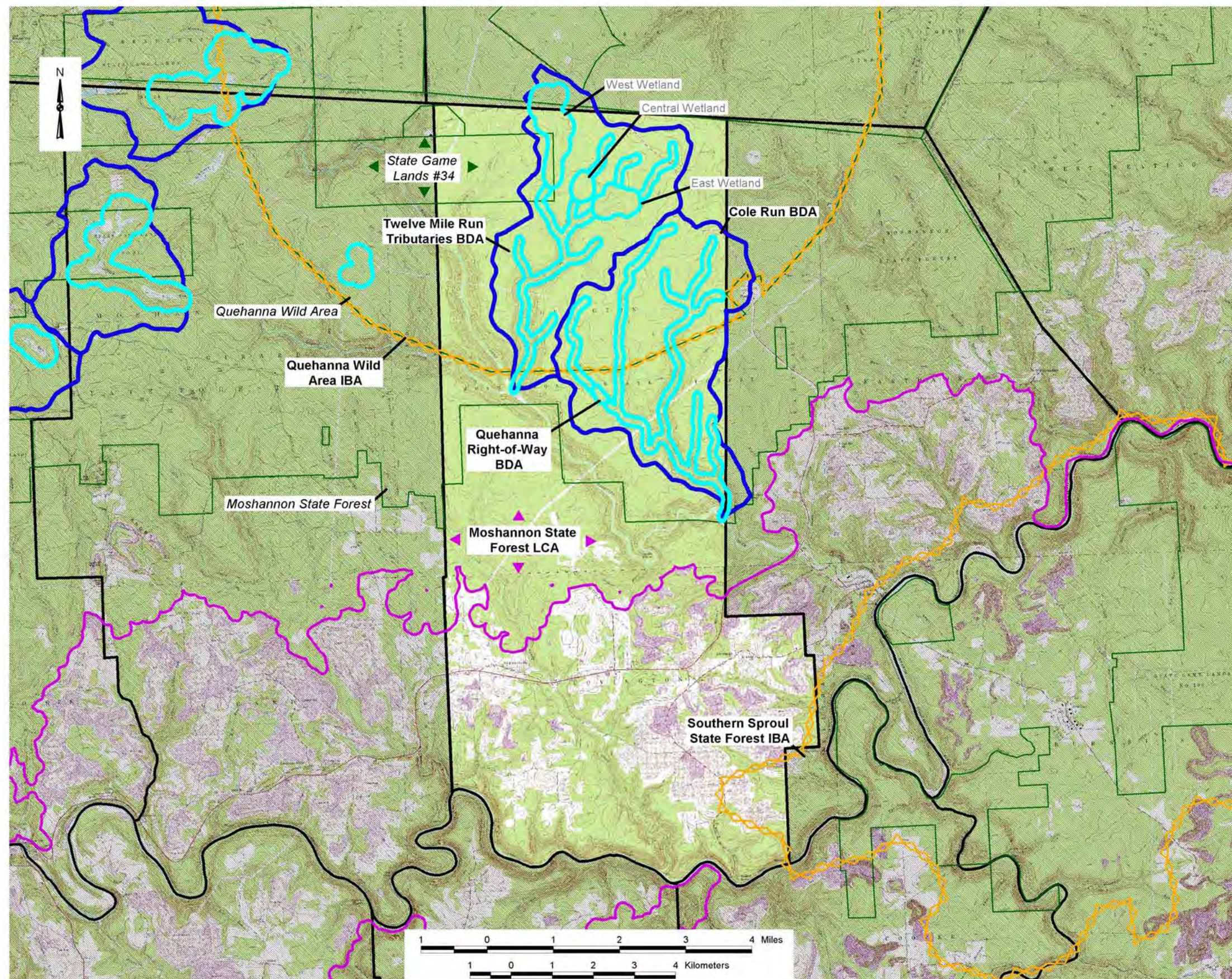
Twelvemile Run Tributaries BDA		<i>High Significance</i>					
Creeping snowberry (<i>Gaultheria hispidula</i>)		S3	G5			2002	E
Screwstem (<i>Bartonia paniculata</i>)		S3	G5			2002	E
Exceptional Value stream			--			--	--

Moshannon State Forest LCA		<i>Exceptional Significance</i>					
----------------------------	--	---------------------------------	--	--	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Covington Township



Covington Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

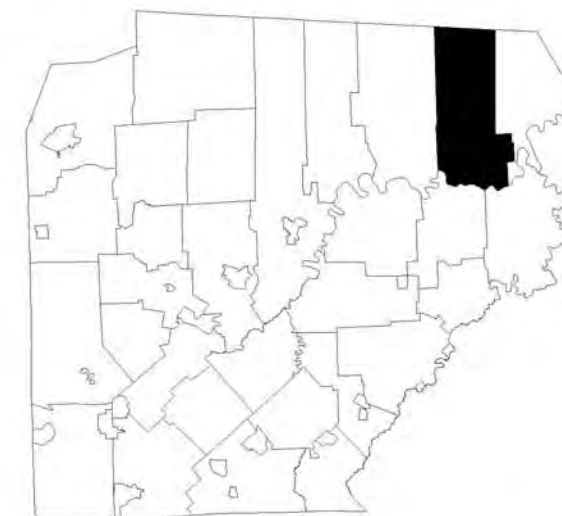
Cole Run
Quehanna Right of Way
Twelve Mile Run Tributaries

Landscape Conservation Areas:

Moshannon State Forest

Managed Areas:

Moshannon State Forest
Quehanna Wild Area
State Game Lands #34



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

COVINGTON TOWNSHIP

The northern half of Covington Township is almost completely forested, with few fragmenting features. It is part of the Moshannon State Forest LCA (see pg. 34), one of the largest blocks of contiguous forest in Pennsylvania. The township also contains several wetland habitats along tributaries to Twelvemile Run, which are recognized for their unique capacity to support biodiversity as the Twelvemile Run Tributaries BDA. The southern third of the township has been extensively strip mined, which presents substantial challenges to the landscape's ecological health. Without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Sandy Creek, the major waterway in this portion of the township, is classified as an impaired stream by the DEP due to mine drainage pollution. Conservation priorities for the township are the stewardship of the Moshannon State Forest LCA to sustain forest ecosystem health, and restoration of mined areas and impaired waters in the southern third of the township.

Cole Run BDA

Description

Cole Run is designated as an Exceptional Value stream by the PA Department of Environmental Protection.

Core Habitat Area—The core habitat area includes perennially flowing reaches of the stream plus a 110 m buffer from the stream's banks. This area is especially important in supporting the health of the aquatic community, and when forested, provides *important* habitat to terrestrial species as well. A forested riparian buffer stabilizes stream hydrology, maintains the physical integrity of the stream channel, and intercepts sediments and chemicals. It also is critical in maintaining a natural cycle of nutrient input and uptake in the stream, providing a source for organic matter while filtering nutrients contained in runoff. A forested riparian buffer supports habitat conditions necessary for a diverse assemblage of native species in the stream: it regulates air and water temperatures, and provides food and cover for fish, amphibians, invertebrates, and other wildlife (Harding et al. 1998, Maryland DNR 1999, Chesapeake Bay Program 2000).

Supporting Natural Landscape—includes the watershed of the EV stream. The forested condition of the watershed maintains water quality and natural nutrient cycles for the stream.

Threats and Stresses

The watershed area is managed as a PA Bureau of Forestry wild area; no imminent threats were observed.

Recommendations

Core Habitat Area—This area should remain forested; timbering and construction activities should be avoided, in order to preserve the function of the riparian buffer as habitat and to sustain the integrity of the stream ecosystem.

Supporting Natural Landscape—A high degree of forest cover should be maintained to protect the water quality of the stream and the ecological integrity of the aquatic ecosystem. Water quality impacts should be considered for any activities taking place here: ecologically detrimental pollutants (i.e., automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls) should not be released, and any earth disturbing activities should employ appropriate erosion control measures and avoid steep slopes.

Quehanna Right-of-Way BDA

Description

This area hosts a population of a plant species of special concern in Pennsylvania, the yellow-fringed orchid. The area of the BDA is core habitat for the population.

Threats and Stresses

As the plants occur in the vicinity of a powerline right-of-way, the potential impact of ROW management practices on the population should be investigated.

Recommendations

No management needs currently identified.

Twelvemile Run Tributaries BDA

Description

The core areas of this BDA are several wetlands, one of which supports two plant species of special concern in Pennsylvania, and the supporting natural landscape area is the watershed that supports the wetlands—as well as the water quality of Twelvemile Run, an Exceptional Value stream (PA-DEP). Two of the wetlands are hemlock palustrine forest communities formed around seepage areas; the more well-developed of these seeps supports a population of creeping snowberry (*Gaultheria hispidula*), and a population of screwstem (*Bartonia paniculata*). The third wetland is a large complex formed as a result of beaver activity.

For discussion of the needs of the Exceptional Value watershed, please see Cole Run BDA above.

East Wetland Core Habitat Area—The hemlock palustrine forest seepage area that supports the creeping snowberry and screwstem is along the easternmost tributary in the BDA. There is an extensive seepage area where two small drainages meet. Many spring channels flow out from slopes in various directions through this area. Generally the water is confined to channel beds, with banks higher and drier, but in the central portion there are broader low areas with springy sphagnum, which remain perennially saturated. A few very large white pine (*Pinus strobus*) are present, and smaller hemlocks (*Tsuga canadensis*) are common. Goldthread (*Coptis trifolia*), needle-and-thread grass (*Brachyelytrum erectum*), and three-seeded sedge (*Carex trisperma*) are very common under the somewhat elevated hemlock patches, with swamp dewberry (*Rubus hispidus*), northern long sedge (*Carex folliculata*), and bladder sedge (*Carex intumescens*) also present. In the sphagnum saturated areas at the center of the wetland, tawny cottongrass (*Eriophorum virginicum*), creeping snowberry

Creeping Snowberry (*Gaultheria hispidula*)



Western Pennsylvania Conservancy 2003

What It Looks Like:

This member of the heath family (Ericaceae) has trailing stems that can be mat-forming. It smells of wintergreen when crushed.

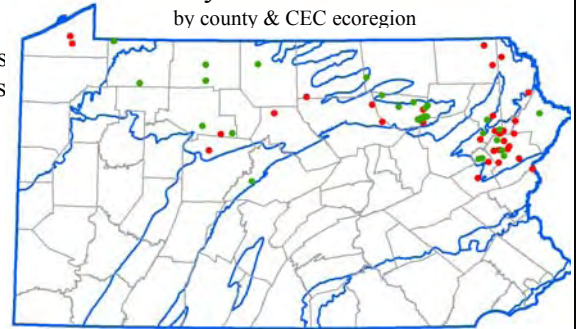
Leaves: dark green and oval, ~1/2" long, and have no teeth at the edges. Unlike cranberry plants, which the snowberry resembles somewhat, the leaves lie flat on the ground.

Flowers: small, white, five petals.

Fruits: white berries, ~1/2 in diameter, ripening in late summer.

Pennsylvania Distribution

by county & CEC ecoregion



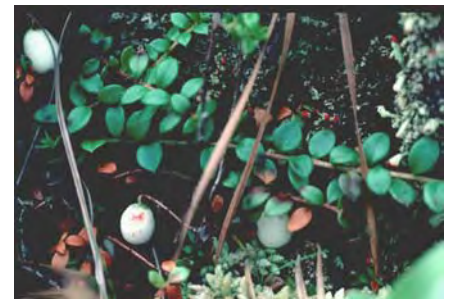
● current data ● records > 30 years old (19/4)
Pennsylvania Natural Heritage Program Data 2004

Where It Is Found:

The creeping snowberry is a typical plant of northern boreal forests. Pennsylvania is near the southern limit of its range; the locations where it is found in the state are sphagnum wetlands and wet coniferous forests with a northern character to the climate and flora. It may be found on raised hummocks and old hemlock stumps.

Why It Is Rare:

Pennsylvania is near the southern limit of its range, and the climatic conditions appear to be unsuitable except in a few habitat areas of a more northern character.



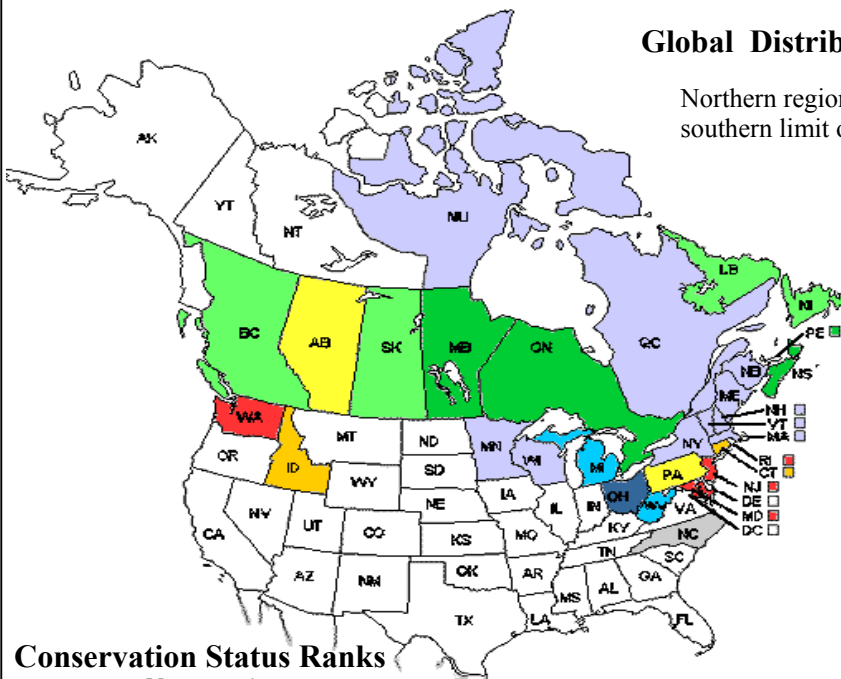
Western Pennsylvania Conservancy

Conservation Considerations:

The creeping snowberry is likely to be sensitive to changes in temperature or water regime at the sites it inhabits. Therefore, any modifications at a site which reduce the tree canopy or alter the natural hydrologic pattern may detrimentally impact a population.

Global Distribution

Northern regions of North America. Pennsylvania is near southern limit of range.



Conservation Status Ranks

(NatureServe)

G5: apparently secure globally; much more abundant northward

S3: Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation.



NatureServe. 2003. NatureServe Explorer:
An online encyclopedia of life [web application].
Version 1.8. NatureServe, Arlington, Virginia.
<http://www.natureserve.org/explorer>

(*Gaultheria hispidula*), and two species of screwstem (*Bartonia paniculata* and *Bartonia virginica*) are also found.

Central Wetland Core Habitat Area—The hemlock palustrine forest wetland along the middle tributary to Twelvemile Run is much less extensive; it consists of a broad, seasonally saturated area dominated by cinnamon- or interrupted- fern (*Osmunda sp.*) tussocks.

West Wetland Core Habitat Area—The wetland along the westernmost tributary to Twelvemile Run appears to have resulted from beaver activity. Active dams are present along the tributary, as well as previously dammed areas that now contain mud flats, meadows, and shrub thickets in various degrees of succession. Species included: steeplebush (*Spiraea tomentosa*), lowbush blueberry (*Vaccinium angustifolium*), sedges (*Carex gynandra*, *Carex intumescens*, *Carex folliculata*, *Carex lurida*), bur-reed (*Sparganium chlorocarpum*), marsh St. Johns'-wort (*Triadenum sp.*), cranberry (*Vaccinium macrocarpon*), needle-and-thread grass (*Brachyelytrum erectum*), lady's tresses (*Spiranthes cernua*), soft rush (*Juncus effusus*), fowl manna-grass (*Glyceria americana*), smooth blue aster (*Aster laevis*), wrinkle-leaf goldenrod (*Solidago rugosa*), and other goldenrods (*Solidago spp.*).

None of these wetlands have been surveyed to document animal inhabitants. All three are potential habitat for amphibians and aquatic or semi-aquatic insects such as dragonflies and damselflies, and much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. For amphibian and aquatic reptile species expected in this region of Pennsylvania, habitats with open water may host several of the more mobile species with migration distances averaging ~400 m, while species typical of habitats without open water have migration distances that average 50 m or less (Semlitsch and Bodie 2003).

Supporting Natural Landscape—The upland forest surrounding the wetlands is an oak-heath community with red maple mixed in the canopy, generally with little plant diversity in the understory. The herbaceous layer is generally dominated by bracken fern (*Pteridium aquilinum*) and heath species (*Vaccinium angustifolium*, *Gaultheria procumbens*); the lack of regeneration or shrubs and the low species diversity may be indicative of persistent overbrowsing. Some areas in the watershed have been timbered more recently and now contain young sapling regrowth.

Threats and Stresses

Core Habitat Areas—In the core areas, any forest canopy removal in the forest surrounding the wetlands could impact the quality of the habitat for amphibians. Canopy removal in the vicinity of a wetland will raise the temperatures in the wetland, potentially altering its habitat quality and species composition. In the East Wetland this could negatively impact the creeping snowberry population, as this species is adapted to more northern climates. Direct disturbances in the wetland area of any greater intensity than occasional foot traffic will damage the habitat.

Supporting Natural Landscape—Use of chemical weed and pest controls within the watershed of the wetlands may harm wetland flora and fauna. Timber removal and road construction or other removal of vegetative cover will increase sediment loads in runoff, which degrades water quality and can impair the capacity of the wetland habitat to support pollution-sensitive species. Mining or other extensive bedrock disturbances have the potential to create pollution that permanently and severely degrades water quality.

Recommendations

Core Habitat Areas—Within the wetlands themselves, activities of greater intensity than occasional foot traffic should be avoided due to the sensitivity of the habitat. Forest canopy removal operations

should be avoided within the core areas in order to avoid detrimentally impacting amphibian populations, and to help maintain the natural microclimate conditions in the wetland. Further surveys to document amphibian and insect species utilizing the wetlands are also recommended, as these groups are likely to form a significant component of the wetlands' biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—To preserve water quality and avoid harm to the inhabitants of the wetland, the release of toxic materials (automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls) should be prevented in the watershed. Timber removal, road construction, or other removal of vegetative cover should be avoided on steep slopes, and maintenance of high degree of total forest cover (75-90%) within the watershed will help to safeguard water quality for the future health of the wetlands. Mining or other extensive bedrock disturbance is not recommended as an activity compatible with the ecological health of the site.

**Decatur Township, Osceola Borough,
& Chester Hill Borough**

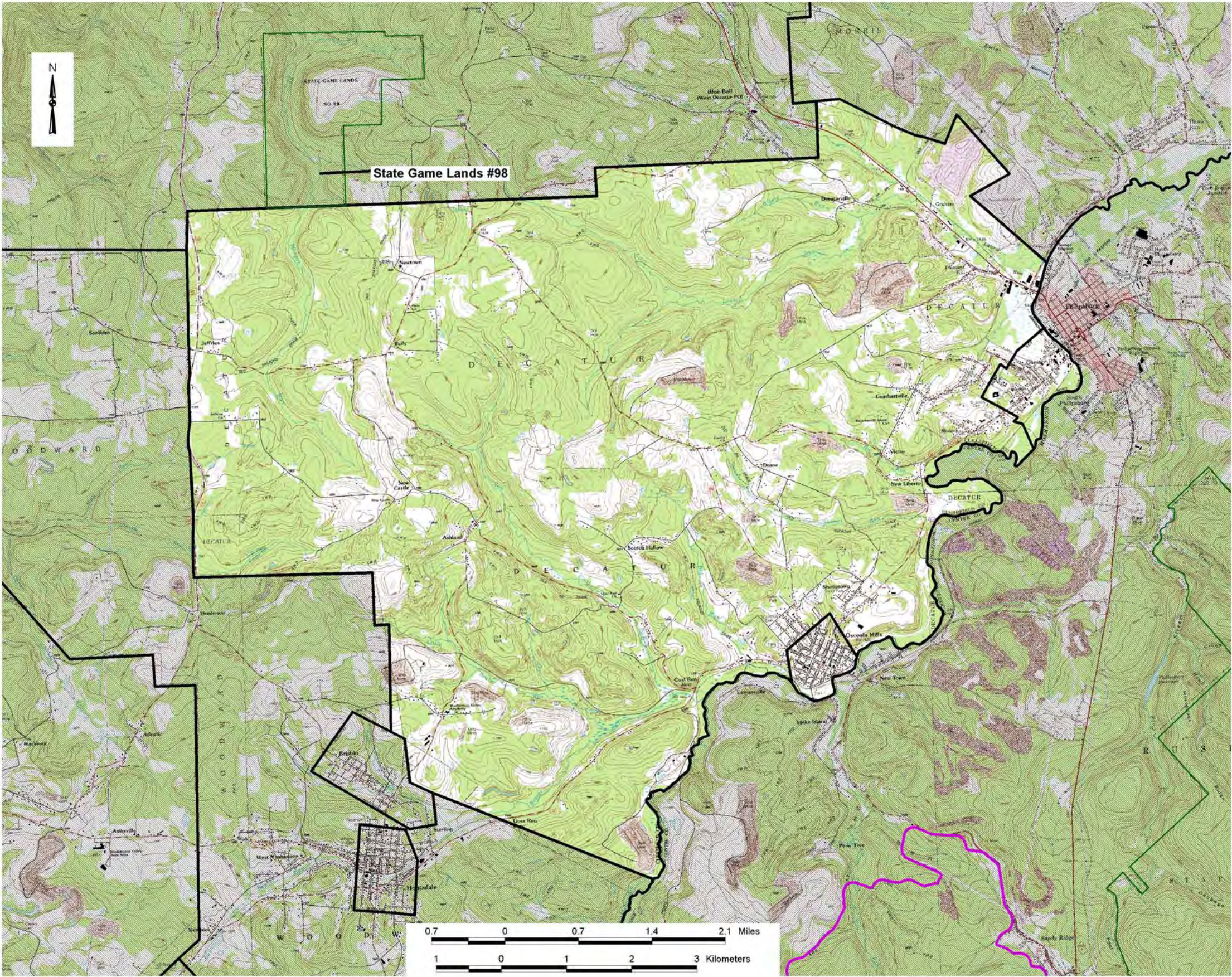
		<u>PNDI Rank</u>		<u>Legal Status</u>	
		Global	State	Federal	State
		Last Seen		Quality	

NATURAL HERITAGE AREAS: *none identified*

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Decatur Township, Chester Hill Borough & Osceola Borough



Decatur Township, Chester Hill Borough & Osceola Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

None

Managed Areas:

State Game Lands #98



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)**
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

DECATUR TOWNSHIP

Most of Decatur Township is in the Moshannon Creek watershed; the western portion drains into Morgan Run, a tributary of Clearfield Creek. The landscape of the township is roughly 72% forested, but much of the forest cover occurs in small and fragmented patches such that only 25% of the township is core forest habitat, and only 13% is roadless core habitat. The most contiguous areas are along Morgan Run, Coal Run, and Little Laurel Run. A good goal to improve the ecological health of the township landscape would forest stewardship to improve ecosystem health and contiguity, building upon the relatively intact areas mentioned above.

OSCEOLA BOROUGH

The landscape of Osceola Borough almost completely occupied by the town of Osceola Mills. It borders Moshannon creek.

CHESTER HILL BOROUGH

The landscape of Chester Hill Borough is occupied by the town of Chester Hill, and also includes some wetland areas near Moshannon Creek, which forms the Borough's eastern boundary. Pollution from mining discharges impairs the ecological health of these wetlands and of Moshannon Creek.

Ferguson Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

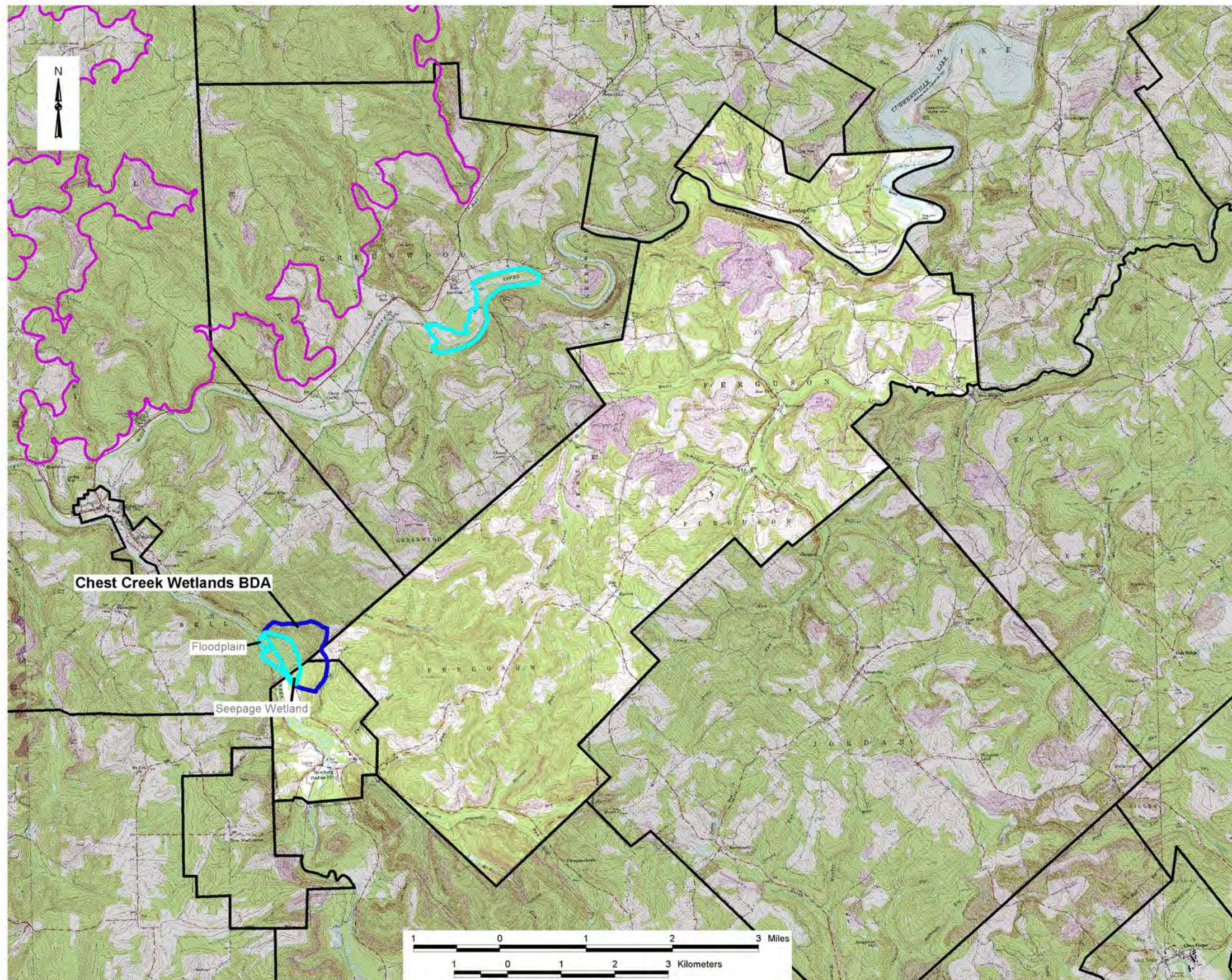
NATURAL HERITAGE AREAS:

Chest Creek Wetlands BDA		<i>Exceptional Significance</i>			
Eastern featherbells (<i>Stenanthium gramineum</i>)	G4G5	S1S2		2003	E
Hemlock palustrine forest		S3		2003	E

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Ferguson Township, Lumber City Borough & Newburg Borough



Ferguson Township, Lumber City Borough & Newburg Borough Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Chest Creek Wetlands

Landscape Conservation Areas:

None

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

FERGUSON TOWNSHIP

The southwestern portion of Ferguson Township falls within the Chest Creek watershed; Watts Creek, in the north-central portion of the township, drains directly into the West Branch Susquehanna River, and the eastern portion of the township—including Gazzam Run, Campbell Run, and Little Clearfield Creek—feeds Clearfield Creek, a major tributary of the West Branch. The landscape of Ferguson Township is largely forested (81%), but forest cover is interrupted by many fragmenting features, such that only 27% of the township is core forest habitat, and only 11% is roadless core habitat. A good goal for improving the ecological health of the landscape would be to increase contiguity and ecosystem health of forested areas.

Chest Creek Wetlands BDA

Discussed under Bell Township—see pg. 42.

Girard Township

	<u>PNDI Rank</u>	<u>Legal Status</u>
	Global State	Federal State Last Seen Quality

NATURAL HERITAGE AREAS:

Gifford Run Vernal Pools BDA		<i>Notable Significance</i>		
Herbaceous vernal ponds		S3S4	2002	E

Mosquito Creek-County Line Wetlands BDA		<i>County Significance</i>		
---	--	----------------------------	--	--

Robert's Run Wetlands BDA		<i>County Significance</i>		
---------------------------	--	----------------------------	--	--

Gifford Run Wetlands BDA		<i>Notable Significance</i>		
--------------------------	--	-----------------------------	--	--

Moshannon State Forest LCA		<i>Exceptional Significance</i>		
----------------------------	--	---------------------------------	--	--

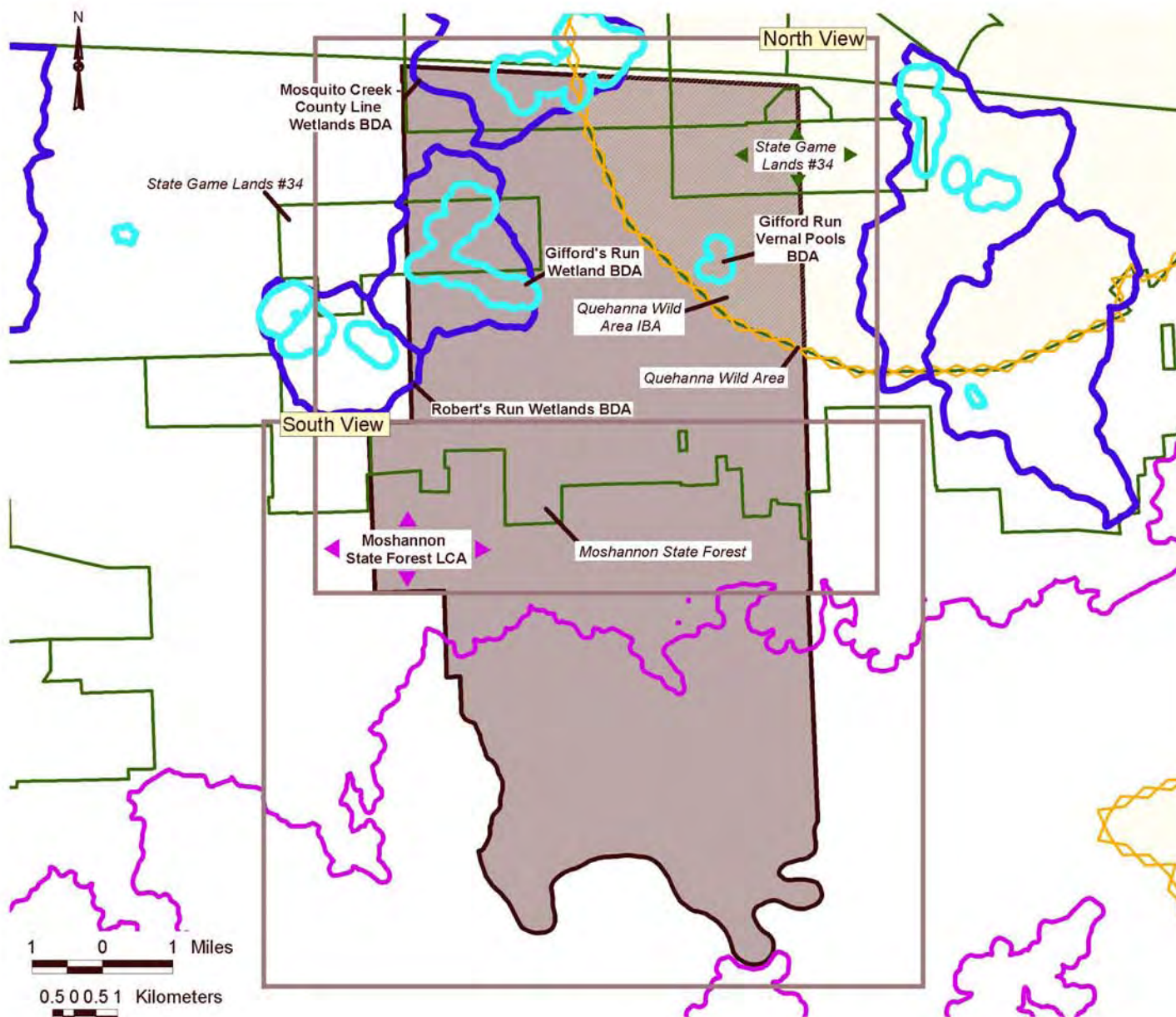
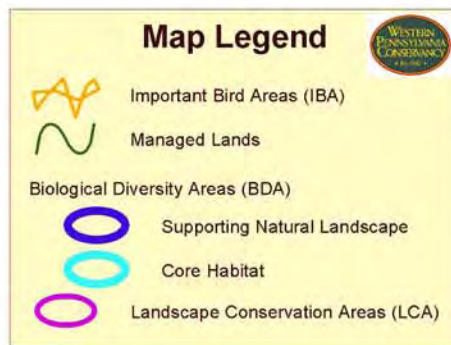
OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*



Girard Township (full view summary)

Clearfield County Natural Heritage Inventory



Biological Diversity Areas:

Supporting Landscape:

Gifford Run Vernal Pools
Gifford Run Wetlands
Mosquito Creek - County Line Wetlands
Robert's Run Wetlands

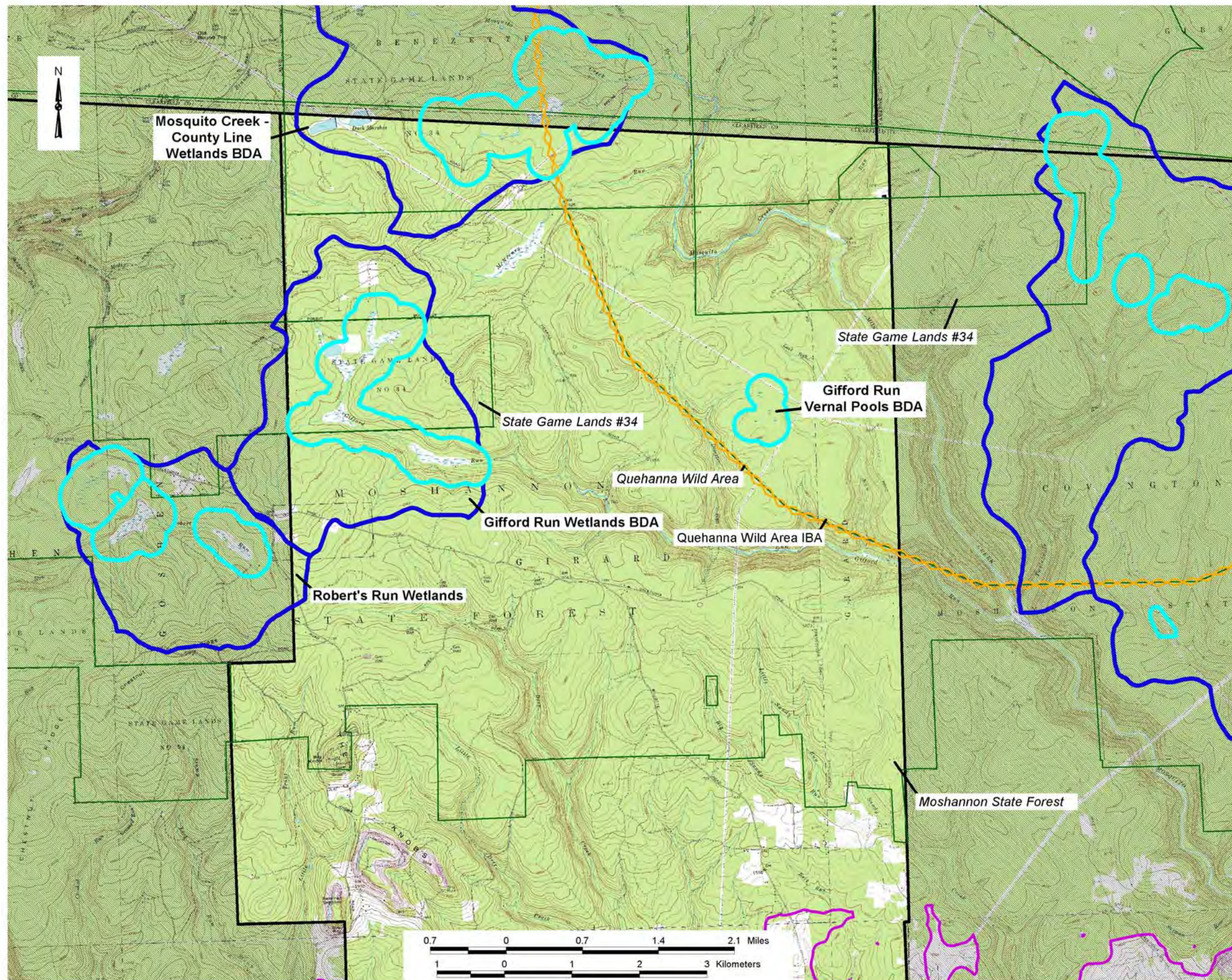
Landscape Conservation Areas:

Moshannon State Forest

Managed Areas:

Moshannon State Forest
Quehanna Wild Area
State Game Lands # 34

Girard Township (north view)



Girard Township (north view)

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

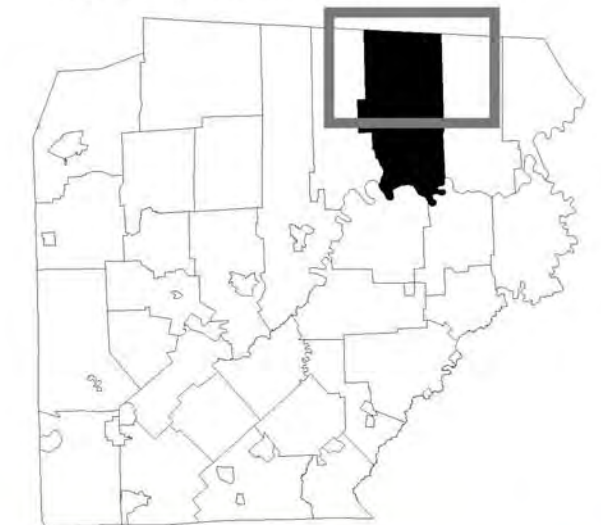
Gifford Run Vernal Pools
Gifford Run Wetlands
Mosquito Creek - County Line Wetlands
Robert's Run Wetlands

Landscape Conservation Areas:

None

Managed Areas:

Moshannon State Forest
Quehanna Wild Area
State Game Lands #34

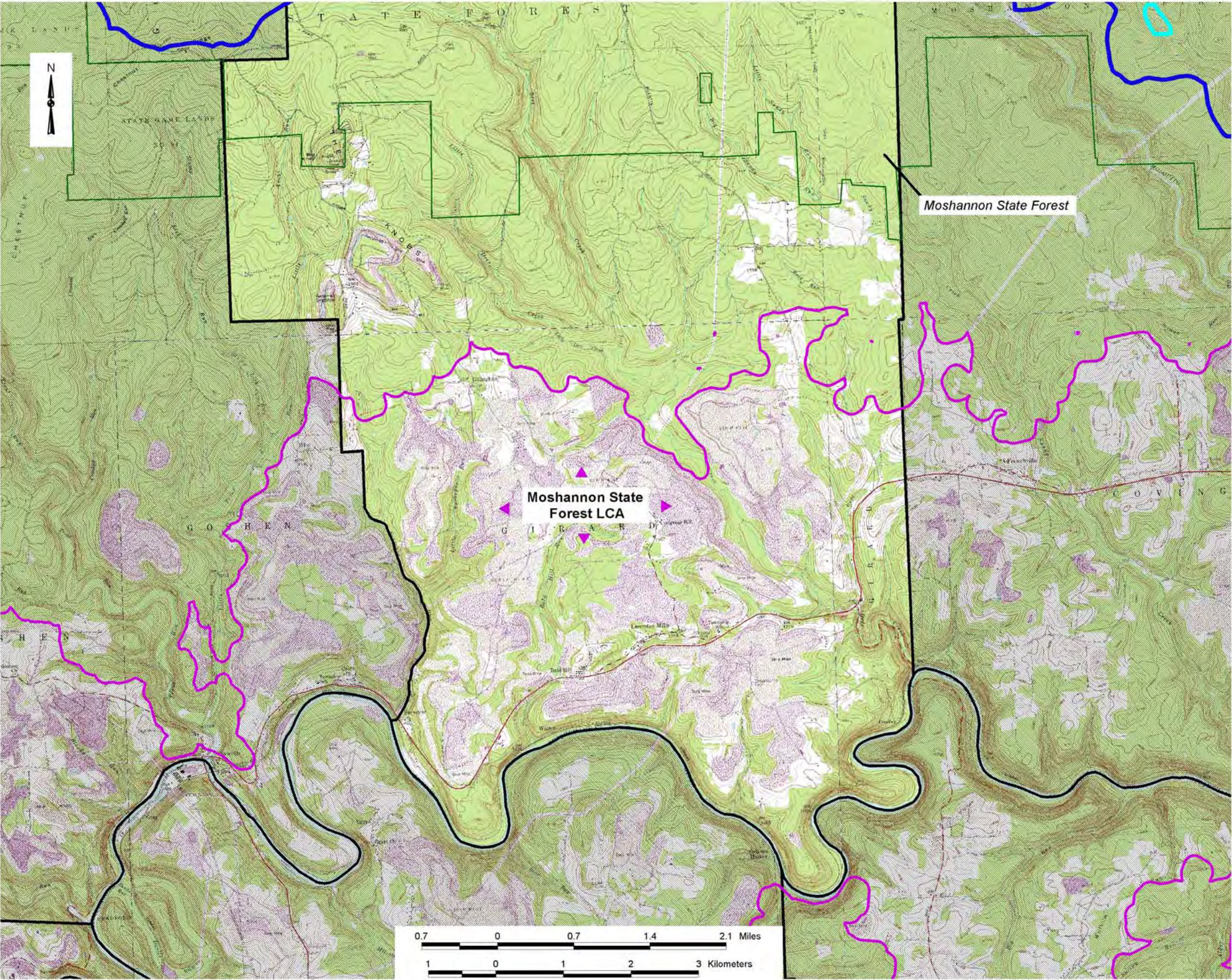


Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

Girard Township (south view)



Girard Township (south view)

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

Moshannon State Forest

Managed Areas:

Moshannon State Forest



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)**
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

GIRARD TOWNSHIP

The northern two-thirds of Girard Township are almost completely forested, and are part of one of the largest blocks of contiguous forest in Pennsylvania. This is recognized as the Moshannon State Forest LCA (see pg. 34). Within this matrix forest habitat are several habitat types that support unique complements of biodiversity: the Gifford Run Wetlands BDA, the Gifford Run Vernal Pools BDA, and the Mosquito Creek-County Line wetlands BDA. Most of the southern third of the township has been strip mined and thus faces substantial challenges to its ecological health. Without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. Ecological health of waterways in this portion of the township is also impaired by mine drainage pollution. Conservation priorities for the township are the stewardship of the Moshannon State Forest LCA to sustain forest ecosystem health and contiguity, and restoration of mined areas and impaired waters in the southern third of the township.

Gifford Run Vernal Pools BDA

Description

This BDA recognizes several vernal pool natural communities. Vernal pools provide unique habitat conditions because the water levels fluctuate seasonally, sometimes drying up completely. Vernal pools are uncommon in the landscape of the high plateau; the Gifford Run pools represent the best example of this habitat type found in Clearfield County.

A variety of animal species utilize vernal pools, and some species require these habitats for survival. Jefferson and slimy salamanders breed exclusively in vernal pools, laying their eggs in the spring, then migrating outwards away from the pools to spend much of the rest of the year living in the surrounding forest. Invertebrate species such as fairy shrimp also depend upon vernal pools. The animal species composition is especially unique because the absence of fish enables the survival of many small organisms that would otherwise be eliminated by predation. Animal populations have not been surveyed, so no definitive information is available on species composition. The Core Habitat Area includes the ponds as well as 400 m of surrounding forest that may be used by amphibian species likely to inhabit the ponds; no Supporting Landscape area was designated given that all of the watershed of the vernal pools is captured within the 400 m distance.

The pools are dominated by shrub vegetation, but also include scattered trees and open herbaceous areas. The most prevalent shrub is huckleberry (*Gaylussacia baccata*), with bracken fern (*Pteridium aquilinum*) and lowbush blueberry (*Vaccinium angustifolium*) also common, and inkberry (*Nemopanthus mucronatus*) scattered. Greenbriar vine (*Smilax rotundifolia*) also formed patches in some ponds. Mosses (*Sphagnum* sp. and *Polytrichum* sp.) cover much of the substrate in the ponds. Herbaceous vascular plants, in scattered clumps and patches, include woolgrass (*Scirpus cyperinus*), three-way sedge (*Dulichium arundinacea*), spikerushes (*Eleocharis acicularis*, *Eleocharis palustris*), soft rush (*Juncus effusus*), poverty grass (*Danthonia* sp.), a sedge species (*Carex debilis*), and a panic grass species (*Panicum* sp.). Tree species are white oak (*Quercus alba*), and scrub oak (*Quercus ilicifolia*).

The canopy of the surrounding forest is composed of mixed oaks (*Quercus montana*, *Quercus alba*, *Quercus rubra*) and serviceberry (*Amelanchier* sp.), while the herbaceous layer has spreading ricegrass (*Oryzopsis asperifolia*) teaberry, (*Gaultheria procumbens*), bracken fern (*Pteridium aquilinum*), hay-scented fern (*Dennstaedtia punctilobula*), bellwort (*Uvularia sessilifolia*) and a sedge species (*Carex acrocystis*?).

Threats and Stresses

If amphibians are using the ponds for breeding grounds, they may use the surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003). Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Recommendations

Further surveys to document amphibian and insect species utilizing the ponds are recommended, to provide a baseline to guide future management decisions. These groups are likely to form a significant component of biodiversity in this habitat. Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbances to the forest floor avoided within 250 m of the pond edges in order to prevent degradation of amphibian habitat.

Gifford Run Wetlands BDA

Description

Core Habitat Area—The focus of this biological diversity area is the large wetland complex in the headwaters of Gifford Run. Six small drainages converge in these headwaters, and the broadly sloped landscape has provided opportunity for the development of extensive wetlands along much of the stream network in the area. The vegetative community types found in the wetland cannot be characterized according to the Community Classification, and thus their relative uniqueness in the state or region cannot be fully evaluated at this time. The site as a whole is unique because of its large size.

The wetlands are probably fed mainly by precipitation and surface runoff; although a few seepage areas were observed, their outflow appeared to be fairly low. The physical structure of the wetland and the vegetative species composition suggest beaver activity may have figured prominently in the development of parts of this wetland complex. The complex contains several large, flat patches of homogeneous vegetation, a structure which typically results in the aftermath of beaver impoundment.

The northernmost tributary confluence area is broad and flat, with very uniform vegetation dominated by northern long sedge (*Carex folliculata*), prickly bog sedge or star sedge (*Carex atlantica* or *C. echinata*) and swamp dewberry (*Rubus hispidus*), with small shrubs (*Aronia sp.*, *Ilex verticillata*) scattered occasionally. Further south the wetland area narrows, but becomes broad again where another small hollow joins Gifford Run; these areas are also fairly flat and dominated by dense speckled alder (*Alnus rugosa*), except at the edges where a more diverse collection of species occurs in the elevational transition zone. Further east of this central wetland area along Gifford Run is another broad wetland area, with more elevational complexity. Low, perennially hydric areas are dominated by mosses (principally *Sphagnum* spp. and *Polytrichum* sp.), rushes (*Juncus brevicaudatus*), tawny cottongrass (*Eriophorum virginicum*) or rattlesnake manna grass (*Glyceria canadensis*). Higher areas are dominated by shrubs (mainly *Spiraea tomentosa*, but also *Alnus incana*, *Viburnum recognitum*, and *Aronia sp.*), or graminoid species (*Carex intumescens*, *Carex echinata* or *C. atlantica*). The uppermost zone between the wetland and the surrounding forest is characterized by dense lowbush blueberry (*Vaccinium angustifolium*).

The Supporting Natural Landscape is the watershed above the wetlands. This area helps to maintain the water quality of the wetlands, and its forested condition enhances the long-term viability of the wetland communities. Between the wetland areas, the floodplain is higher and narrower, with small patches of shrub or herbaceous wetland and semi-palustrine forest, while upland areas surrounding the wetland are mainly terrestrial forest.

Threats and Stresses

Core Habitat Area—There is a large cabin and parking area very near the southern edge of the eastern-most wetland area. A broad range of substances harmful to wildlife and ecosystem health could potentially be introduced into the wetland by human activity here, including pest control chemicals, detergents, automotive fluids, septic materials, and exotic species.

Supporting Natural Landscape—Any herbicides, pesticides, or other chemicals released in this area will drain into the wetland, where they may be toxic to its inhabitants. If forest cover is removed, soil erosion could result in sediment pollution in the wetlands, which degrades the habitat for many plant and animal species. Greatly decreased forest cover in this area may also diminish the long-term viability of the wetland community.

Recommendations

Core Habitat Area—Users of the cabin should avoid bringing any toxic materials into the area; a good rule of thumb is to avoid substances not safe for human consumption. Septic systems should be carefully designed and/or upgraded to minimize discharge of nitrogen, solids, or contaminants, and regularly monitored to detect any maintenance needs.

Supporting Natural Landscape— To maintain good water quality for the wetlands, forest cover removal should be avoided on steeply sloped areas, appropriate erosion control BMPs should be applied if forest cover is disturbed in other areas, and toxic materials should not be released. Preservation of forest cover in this area, especially in such a pattern as to connect the wetland with surrounding forested areas, is likely to enhance prospects for the long-term health of this habitat.

Mosquito Creek Tributary-County Line Wetland BDA

Description

This BDA is designated around an extensive wetland complex in the headwaters of a tributary to Mosquito Run.

Core Habitat Area—Throughout the area, there are old beaver dams in various stages of succession, from ponds, to meadows, to re-growing shrub thickets. The plant species composition does not fit any of the community types described in the Pennsylvania Terrestrial and Palustrine Community Classification (Fike 1999), and thus cannot be easily compared to other wetlands to determine its uniqueness in the state. The plant species composition is similar to other wetlands observed in the high plateau region of the county, suggesting it is unlikely to be of state significance. It is locally significant as a wetland habitat.

Old stumps scattered throughout the wetland, suggesting it once had a canopy of large white pine or hemlock. Today, almost no tree regrowth has occurred. There are widely scattered individuals of red maple (*Acer rubrum*), white oak (*Quercus alba*), yellow birch (*Betula allegheniensis*), and smooth shadbush (*Amelanchier laevis*). The lowest areas of the wetland are saturated, with sphagnum moss cover. Herbaceous species include: swamp dewberry (*Rubus hispidus*), prickly bog sedge (*Carex*

atlantica), northern long sedge (*Carex folliculata*), (dominant in patches), bladder sedge (*Carex intumescens*) (dominant in patches), tawny cotton grass (*Eriophorum virginicum*), northern bog clubmoss (*Lycopodiella inundata*), a willow-herb species (*Epilobium leptophyllum*), cranberry (*Vaccinium macrocarpon*), round-leaved sundew (*Drosera rotundifolia*), skunk cabbage (*Symplocarpus foetidus*), small green woodland orchid (*Platanthera clavellata*), woolgrass (*Scirpus cyperinus*), northern awned sedge (*Carex gynandra*), water horehound (*Lycopus virginicus*), cowheat (*Melampyrum lineare*), marsh St. John's-wort (*Triadenum fraseri*), Polystichum moss, three-seeded sedge (*Carex trisperma*), broad leaf cattail (*Typha latifolia*), rattlesnake mannagrass (*Glyceria canadensis*), and cinnamon- or interrupted- fern (*Osmunda sp.*). Shrubs are scattered in these low areas.

Several small beaver ponds are present; typical herbaceous plant species include: three-way sedge (*Dulichium arundinacea*), a bur-reed species (*Sparganium chlorocarpum*), needle spike-rush (*Eleocharis acicularis*), Carex (scoparia?), and leafy bulrush (*Scirpus polyphyllus*). In the zone above the sphagnum, shrubs are more prevalent and in some areas dominant. Species include steeplebush (*Spiraea tomentosa*), maleberry (*Lyonia sp.*), lowbush blueberry (*Vaccinium angustifolium*, *Vaccinium pallidum*), speckled alder (*Alnus incana*), huckleberry (*Gaylussacia baccata*), and sweetfern (*Comptonia peregrina*). Lowbush blueberry is dominant in many areas. This higher shrub zone appears to experience great seasonal fluctuation in moisture level, from possible inundation in the spring to very dry conditions later in the summer. The herbaceous layer reflects these conditions through the prevalence of dry-adapted species, including: running pine (*Lycopodium clavatum*), bracken fern (*Pteridium aquilinum*), teaberry (*Gaultheria procumbens*), needle-and-thread grass (*Brachyelytrum erectum*), poverty grass (*Danthonia sp.*), broomsedge (*Andropogon virginicus*), flat-branched ground pine (*Lycopodium obscurum*), a sedge species (*Carex debilis*), and hawthorne (*Crataegus sp.*).

Surveys have not been conducted to document animal species utilizing the wetland; it may provide suitable habitat for amphibians, as well as semi-aquatic insects such as dragonflies and damselflies. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetland itself plus 250 m of surrounding forest that may be amphibian habitat.

The Supporting Natural Landscape is the immediate watershed of the wetland; much of it is forested. The watershed influences the water quality of the wetland, and its current forested condition supports the long-term viability of the wetland community (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Core Habitat Area—Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls within the watershed of the wetland may harm wetland flora and fauna.

Recommendations

Core Habitat Area—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbances to the forest floor avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—Chemical weed and pest controls, as well as the discharge of other toxic materials, should be avoided within the watershed.

Goshen Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

Robert's Run Wetlands BDA		County Significance			
---------------------------	--	---------------------	--	--	--

Gifford Run Wetlands BDA		Notable Significance			
--------------------------	--	----------------------	--	--	--

Moshannon State Forest LCA		Exceptional Significance			
----------------------------	--	--------------------------	--	--	--

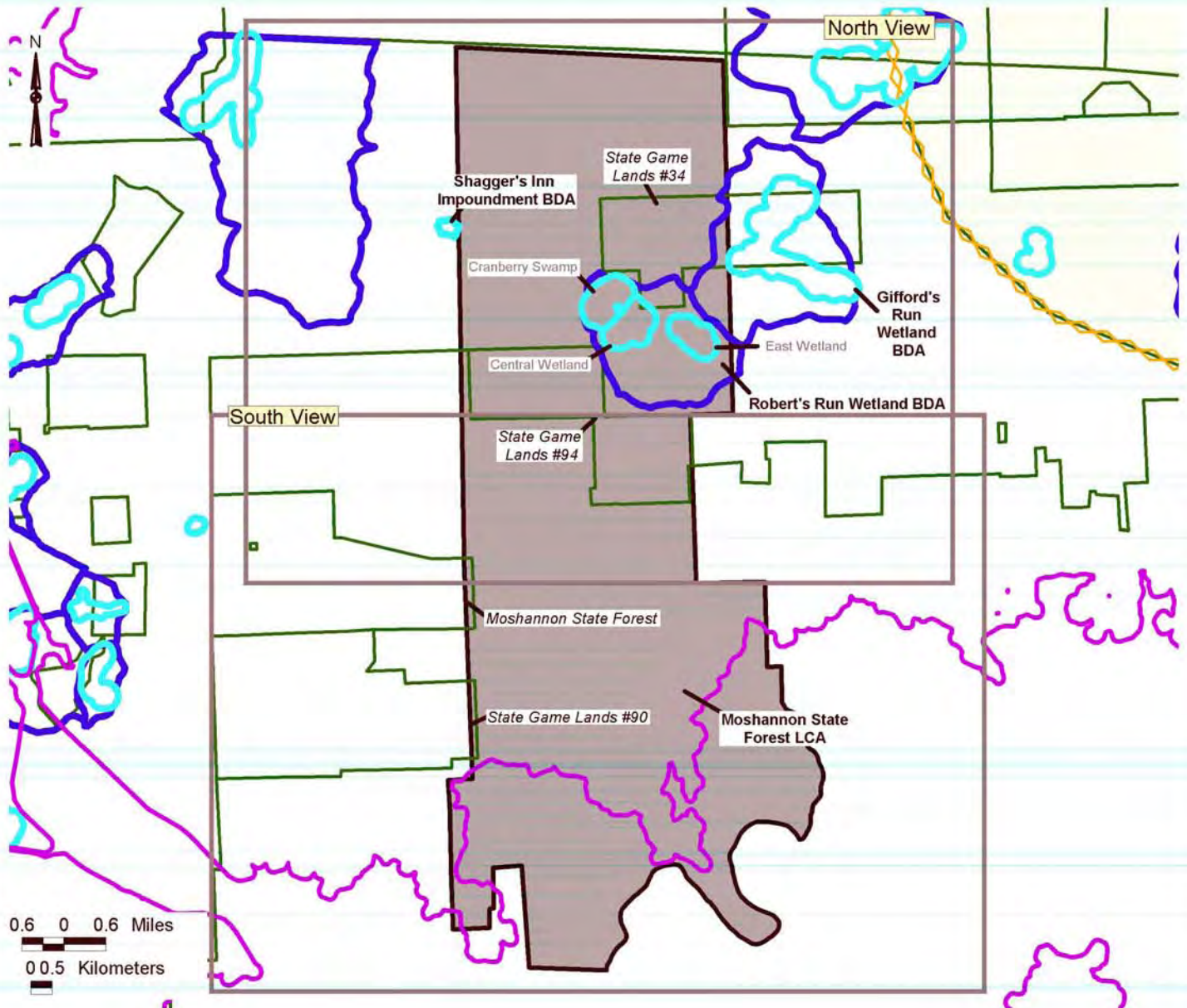
OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified



Goshen Township (full view summary)

Clearfield County Natural Heritage Inventory



Biological Diversity Areas:

Landscape Conservation Areas:

Managed Areas:

Supporting Landscape:

Gifford Run Wetlands
Robert's Run Wetlands
Shagger's Inn Impoundment

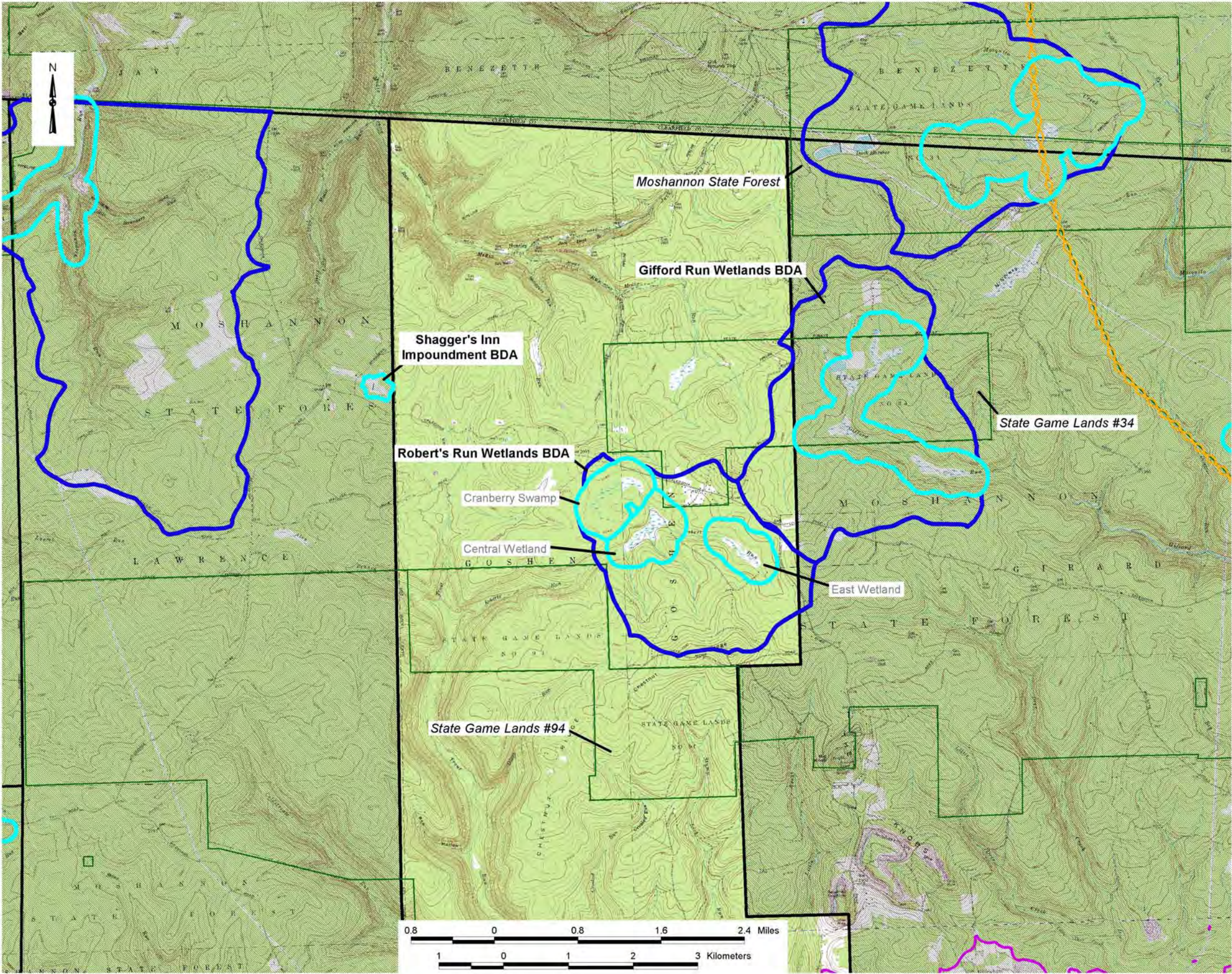
Moshannon State Forest

Moshannon State Forest
State Game Lands #34
State Game Lands #90
State Game Lands #94

Core Habitat:

Central Wetland
Cranberry Swamp
East Wetland

Goshen Township (north view)



Goshen Township (north view)

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

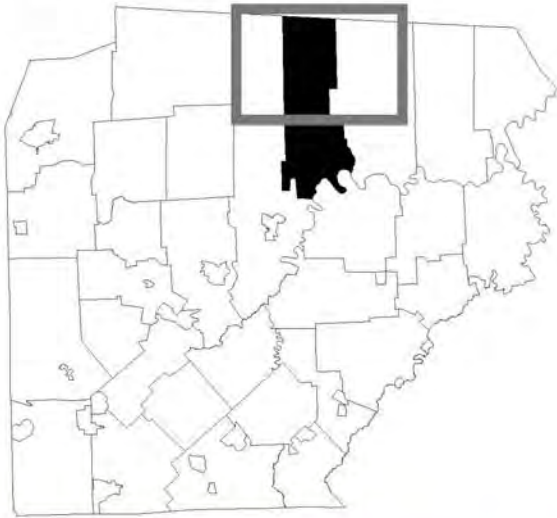
- Gifford Run Wetlands
- Robert's Run Wetlands
- Shagger's Inn Impoundment

Landscape Conservation Areas:

None

Managed Areas:

- Moshannon State Forest
- State Game Lands #34
- State Game Lands #94

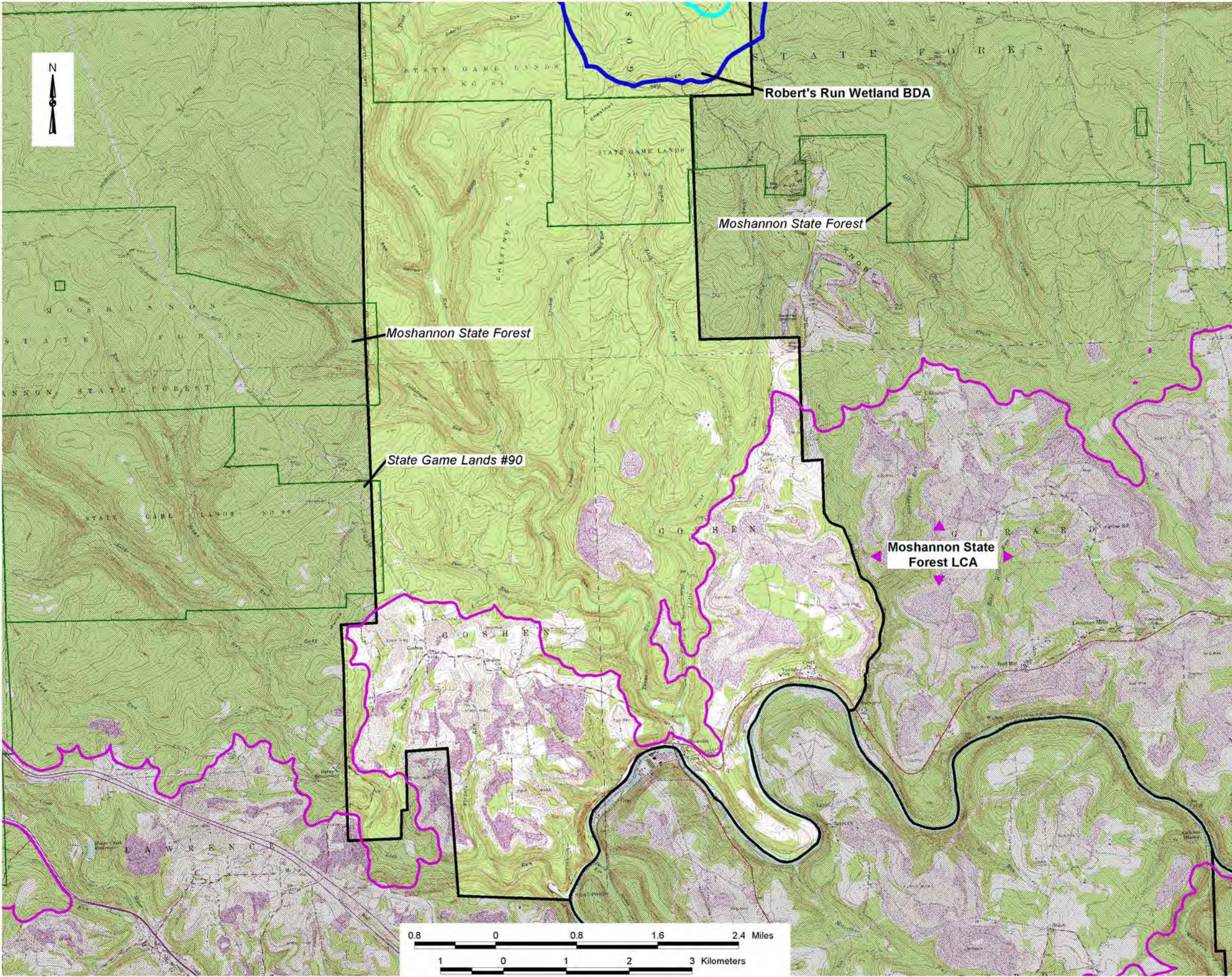


Map Legend

- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)



Goshen Township (south view)



Goshen Township (south view)

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

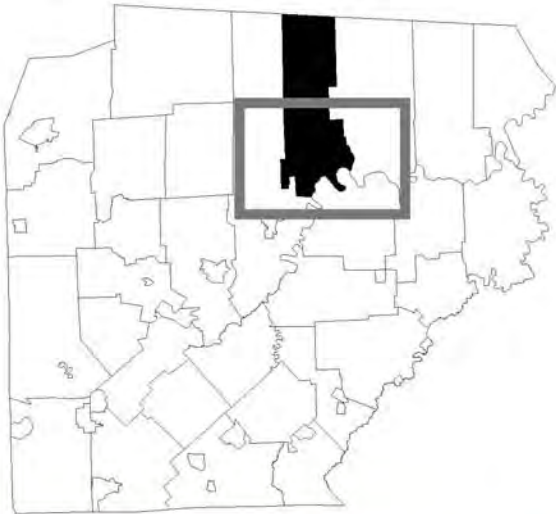
- Gifford Run Wetlands
- Robert's Run Wetlands
- Shagger's Inn Impoundment

Landscape Conservation Areas:

- Moshannon State Forest

Managed Areas:

- Moshannon State Forest
- State Game Lands #90



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

GOSHEN TOWNSHIP

Most of Goshen Township is forested, and falls within the Moshannon State Forest LCA (see pg. 34), one of the largest contiguous blocks of core forest habitat in Pennsylvania. Several natural wetlands in the headwaters of Roberts Run are recognized as the Roberts' Run Wetlands BDA. In contrast, the southeastern and southwestern corners of the township have been extensively strip mined and offer degraded habitat conditions for most species. Conservation priorities for the township are the stewardship of the Moshannon State Forest LCA to sustain forest ecosystem health and contiguity, and restoration of mined areas and impaired waters in the southern corners of the township.

Gifford Run Wetlands BDA

Discussed under Girard Township—see pg. 81.

Robert's Run Wetlands BDA

Description

This BDA highlights three wetlands in the headwaters of Robert's Run. Two of these are mosaics of different shrub and herbaceous communities, structurally influenced by beaver activity. The third, Cranberry Swamp, is almost completely dominated by cranberry (*Vaccinium macrocarpon*), with small patches of woody growth and other herbaceous species. None of these wetlands can be characterized using the Fike 1999 vegetation classification, and thus it cannot easily be compared to other wetland types to evaluate their statewide significance. However, they are locally significant as a cluster of minimally disturbed natural wetland habitats embedded in relatively mature, intact forest.

Cranberry Swamp Core Habitat Area is dominated almost exclusively by cranberry plants (*Vaccinium macrocarpon*), which forms a springy mat of continuous cover, up to ½ meter deep. Swamp dewberry (*Rubus hispidus*) is also scattered throughout. Small open areas have soft rush (*Juncus effusus*), three-way sedge (*Dulichium arundinacea*), three-seeded sedge (*Carex trisperma*), tawny cottongrass (*Eriophorum virginicum*), sedge (*Carex echinata*), and occasional small cinnamon- or interrupted- fern (*Osmunda* sp.) clumps. Near the center of the wetland, there is a dense stand of dead tree trunks, and surviving trees, mainly white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*), are scattered. Shrubs are also scattered in this area, including winterberry (*Ilex verticillata*) and inkberry (*Nemopanthus mucronata*). The edge of the wetland nearest Caledonia Pike has a wide band of sedge-dominated vegetation, mainly long sedge (*Carex folliculata*) but also patches of northern awned-sedge (*Carex gynandra*), and there is a large patch of broad-leaf cattail (*Typha latifolia*) towards the middle of the wetland. In most areas, the transition to upland forest is fairly abrupt. Much of the perimeter is edged in conifers. To the east the wetland is bordered by a distinctive-looking low but not quite wet forest, mainly yellow birch (*Betula allegheniensis*), with an understory almost completely carpeted in bristly clubmoss (*Lycopodium annotinum*), Hickey's groundpine (*Lycopodium hickeyi*), *Sphagnum* moss, and *Polytrichum* moss.

The Central Wetland Core Habitat Area includes a variety of vegetation types. At the northern end there is a sphagnum-dominated lawn; there are patches of hemlock palustrine forest, patches of mixed herb and shrub species, and beaver-influenced meadows and open ponds. The sphagnum lawn includes round leaved sundew (*Drosera rotundifolia*), cranberry (*Vaccinium macrocarpon*) and tawny cottongrass (*Eriophorum virginicum*). Herbaceous species in the mixed herb and shrub areas include: swamp dewberry (*Rubus hispidus*), needle and thread grass (*Brachyelytrum erectum*), many sedge species (*Carex canescens*, *Carex folliculata*, *Carex gynandra*, *Carex intumescens*, *Carex echinata*, *Carex atlantica*, and *Carex trisperma*), soft rush (*Juncus effusus*), cinnamon fern (*Osmunda*

cinnamomea), woolgrass (*Scirpus cyperinus*), marsh fern (*Thelypteris palustris*), and marsh St. John's-wort (*Triadenum fraseri*). A diverse variety of shrub species are present, including: huckleberry (*Gaylussacia baccata*), winterberry (*Ilex verticillata*), inkberry (*Nemopanthus mucronatus*), rhododendron (*Rhododendron maximum*), steplebush (*Spiraea tomentosa*), lowbush blueberry (*Vaccinium sp.*), and wild raisin (*Viburnum cassinoides*). Low meadow areas have skunk cabbage (*Symplocarpus foetidus*), rattlesnake manna grass (*Glyceria canadensis*), three-way sedge (*Dulichium arundinacea*), a spikerush species (*Eleocharis sp.*), and broad-leaf cattail (*Typha latifolia*). Tree species scattered in the wetland include black gum (*Nyssa sylvatica*), pitch pine (*Pinus rigida*), white pine (*Pinus strobus*), black cherry (*Prunus serotina*), American mountain ash (*Sorbus americana*) and hemlock (*Tsuga canadensis*).

The Eastern Wetland Core Habitat Area is similar in species composition and structure to the Central Wetland, although not quite as extensive. It includes patches of shrubs, herbaceous-dominated areas, and open ponds dammed by beaver.

None of these areas have been surveyed to document animal inhabitants. The eastern two wetlands with open water are potential habitat for amphibians, and all three may host aquatic or semi-aquatic insects such as dragonflies and damselflies. Much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetlands plus 250 m of surrounding forest that may be amphibian habitat.

The Supporting Natural Landscape is the immediate watershed of the wetlands; much of it is forested. The watershed influences the water quality of the wetland, and its current forested condition supports the long-term health and viability of the wetland communities (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Core Habitat Areas—Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls within the watershed of the wetland may harm wetland flora and fauna.

Recommendations

Core Habitat Areas—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbances to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—Chemical weed and pest controls, as well as the discharge of other toxic materials, should be avoided within the watershed.

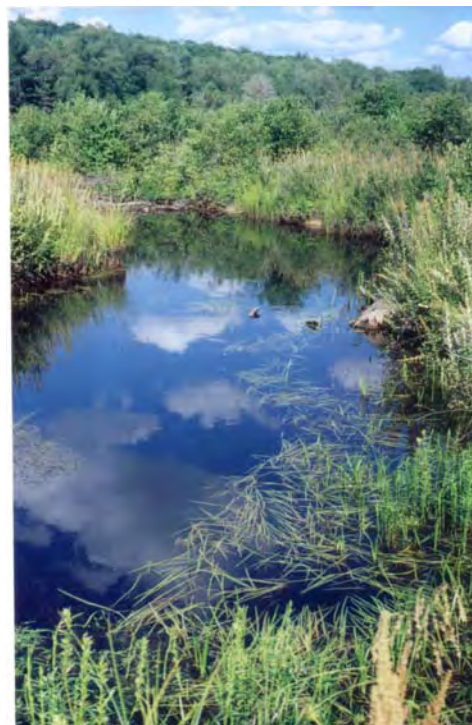


Gifford Run Wetlands (pg. 81)
Steeplebush (*Spirea tomentosa*) in bloom
(left), three-way sedge (*Dulichium
arundinaceum*) in fruit

Wetlands of Clearfield County



Left Branch Moose Creek Headwaters Wetland (pg. 127)
Winterberry (*Ilex verticillata*, red-berried shrub), inkberry
(*Nemopanthus mucronatus*, shrub to right), cinnamon fern
(*Osmunda cinnamomea*, fern in foreground)



Parker Dam Beaver Ponds (pg. 81)
Aquatic plants surrounded by shrub
wetland



Gifford Run Vernal Pools (pg. 80)

Wetlands are habitats of exceptional ecological importance, and serve many functions also valuable to people.

- Breeding habitat for many amphibian species
- Help to clean and filter water
- Provide natural flood control
- Typically host a high diversity of insect species
- Some types of wetlands—such as true bogs, calcareous fens, or mature floodplain forests—host species that can live nowhere else.

See pg. 12 for more information on wetland types of Clearfield County.

Graham Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

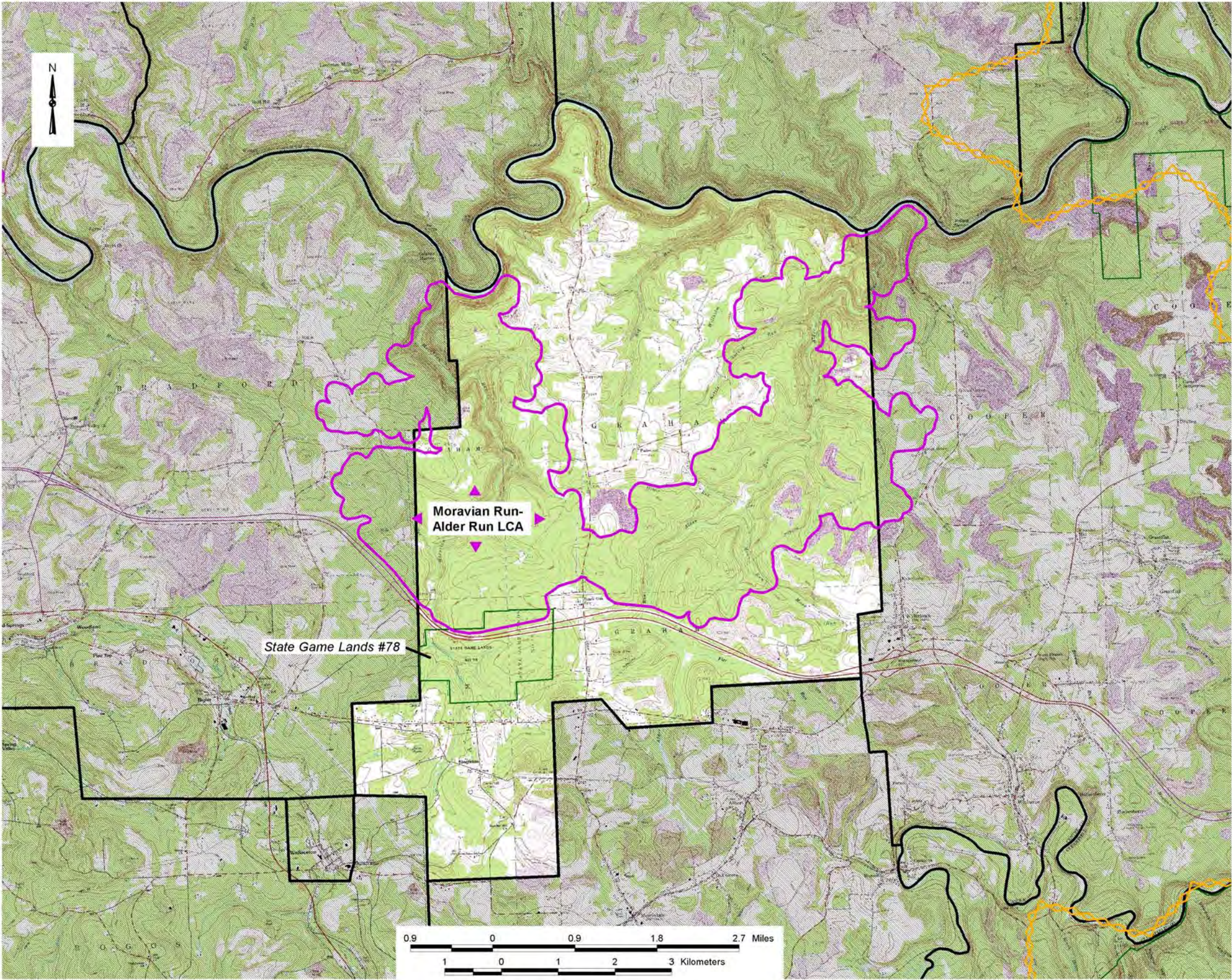
NATURAL HERITAGE AREAS:

Moravian Run-Alder Run LCA				County Significance		
----------------------------	--	--	--	---------------------	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Graham Township



Graham Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

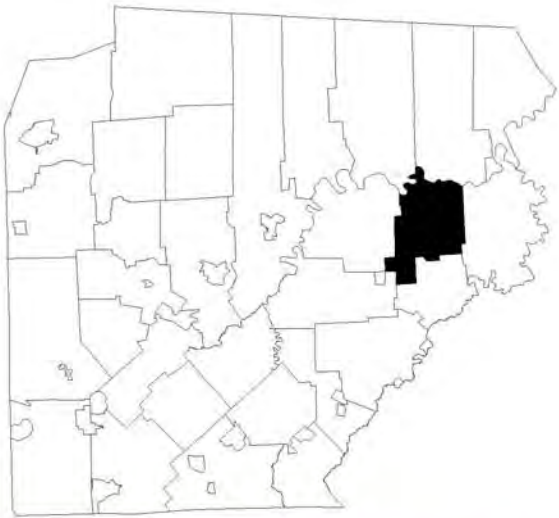
None

Landscape Conservation Areas:

Moravian Run - Alder Run

Managed Areas:

State Game Lands #78



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)**
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

GRAHAM TOWNSHIP

The landscape of Graham Township falls completely within the West Branch Susquehanna River watershed, and is 69% forested. The most contiguous portion of this forest is recognized as the Moravian Run – Alder Run LCA (see pg. 33). In other portions of the township forest cover is less extensive and occurs as smaller fragments that do not provide extensive core habitat conditions. Strip mining has also caused habitat degradation in some areas that will be difficult to restore to functional forest ecosystem. Aquatic ecosystem health in the township also faces challenges: several waterways in the township, including Alder Run, Moravian Run, Big Run, and Mons Run, are designated as impaired streams by the DEP due to mine drainage pollution. Conservation priorities for ecological health in the landscape of the township are stewardship of the Moravian Run – Alder Run LCA to improve forest ecosystem contiguity and health, and remediation of water quality problems in impaired streams.

Greenwood Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

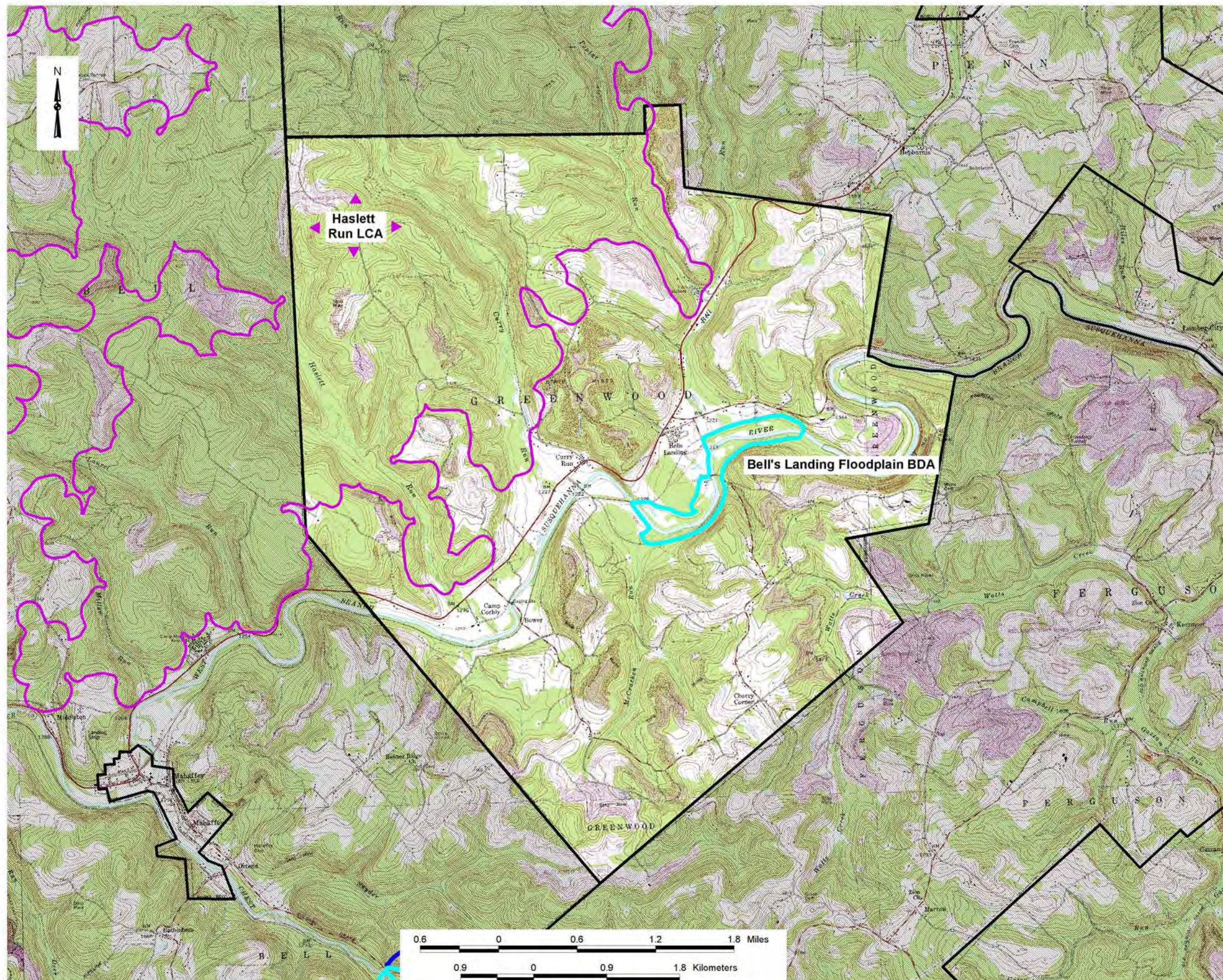
Bell's Landing Floodplain BDA		County Significance			
-------------------------------	--	---------------------	--	--	--

Haslett Run LCA		Notable Significance			
-----------------	--	----------------------	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Greenwood Township



Greenwood Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Bell's Landing Floodplain

Landscape Conservation Areas:

Haslett Run

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

GREENWOOD TOWNSHIP

Greenwood Township is bisected by the West Branch Susquehanna River and falls completely within its watershed. It has several ecological assets, including contiguous forested area that makes up a large portion of the Haslett Run LCA (see pg. 30), and a unique habitat in the Bell's Landing Floodplain BDA. There are also challenges to the ecological health of the landscape in the township from the impacts of strip mining, forest fragmentation, and water pollution. Without extensive restoration work, formerly stripped areas typically offer degraded habitat conditions for many species and may act as a barrier for the movement of some. In Greenwood Township strip mined areas and other cleared areas fragment natural forest cover into smaller pieces, decreasing its habitat value for species that depend on core forest habitat. Overall, the township is 70% forested, with 26% core forest habitat and only 1% roadless core habitat. Conservation goals for improving the ecological health of the landscape would be to improve forest contiguity and ecosystem health, especially within the Haslett Run LCA, to remediate water quality problems, and to restore strip mined areas.

Bell's Landing Floodplain BDA

Description

This BDA highlights a relatively intact natural floodplain area along the West Branch Susquehanna River. The West Branch is the largest waterway that passes through Clearfield County, but due to steep topography along its banks, floodplain areas are scarce. Additionally, most have been cleared for human uses. Although the Bell's Landing Floodplain BDA is not in pristine condition, it is important as a setting for an uncommon habitat type. The BDA is Core Habitat; no Supporting Landscape is designated.

The lowest portions of the floodplain have herbaceous or shrub vegetation; these open areas are most extensive near the confluence with Bell Run. This zone is frequently flooded and scoured by moving water or ice. Typical plant species include black willow (*Salix nigra*), heart-leaved willow (*Salix eriocephala*), slender willow (*Salix petiolaris*), shining willow (*Salix lucida*), water willow (*Justicia americana*), swamp milkweed (*Asclepias incarnata*), joe-pye weed (*Eupatorium* sp., pale St. John's-wort (*Hypericum ellipticum*), swamp candles (*Lysimachia terrestris*), moneywort (*Lysimachia nummularia*, non-native), a sedge sp. (*Carex torta*), and soft-stemmed bulrush (*Schoenoplectus tabernaemontani*).

The scour zone is not present throughout; in most areas there is an abrupt bank, a fairly narrow zone of herbaceous cover, and a zone of floodplain forest further back from shore. In the herbaceous zone, the invasive exotic species giant Japanese knotweed (*Polygonum sachalinense*) and reed canarygrass (*Phalaris arundinacea*) are very prevalent. Other species include: Canada bluejoint grass (*Calamagrostis canadensis*), deer tongue grass (*Panicum clandestinum*), sensitive fern (*Onoclea sensibilis*), a goldenrod species (*Solidago* sp.), carpenter's square (*Scrophularia marilandica*), and a sedge (*Carex torta*).

The canopy of the forested area was dominated by black cherry (*Prunus serotina*) and silver maple (*Acer saccharinum*); other species present included ash (*Fraxinus* sp.), oak (*Quercus* sp.), sugar maple (*Acer saccharum*), and serviceberry (*Amelanchier* sp.). The shrub layer was fairly sparse, with hawthorn (*Crataegus* sp.), witch-hazel (*Hamamelis virginiana*), and gooseberry (*Ribes* sp.). The herb layer is dominated in some areas by the invasive exotic species Japanese stilt-grass (*Microstegium vimineum*), but also contains many native species, including: jumpseed (*Polygonum virginianum*), hay-scented fern (*Dennstaedtia punctilobula*), stinging nettle (*Urtica dioica* ssp. *gracilis*), intermediate wood fern (*Dryopteris intermedia*), false hellebore (*Veratrum viride*), northern oatgrass (*Danthonia compressa*), skunk cabbage (*Symplocarpus foetidus*), enchanter's nightshade (*Circaea*

lutetiana), cutgrass (*Leersia virginica*), bedstraw (*Galium sp*), a rye-grass species (*Elymus sp.*), wild germander (*Teucrium canadense* var. *virginicum*), and sedges (*Carex pensylvanica*, *Carex swanii*).

Threats and Stresses

The greatest threat to this area is the prevalence of invasive exotic species. Japanese knotweed (*Polygonum sachalinense*, *Polygonum cuspidatum*) and reed canarygrass (*Phalaris arundinacea*) have displaced native vegetation along much of the herbaceous zone immediately adjacent to the river, while Japanese stiltgrass (*Microstegium vimineum*) threatens to displace native herbaceous species in the floodplain forest areas.

Recommendations

The communities of this BDA are adapted to natural disturbance, and can likely tolerate foot traffic without lasting damage. However, motorized vehicle traffic should be avoided, as it generates more intensive disturbance than is natural. Monitoring the distribution and abundance of invasive species at this site, to determine if they are spreading further, would provide a basis for evaluating whether removal strategies are warranted.

Gulich Township & Ramey Borough

		<u>PNDI Rank</u>	<u>Legal Status</u>		
		Global	State	Federal	State
		Last Seen		Quality	

NATURAL HERITAGE AREAS:

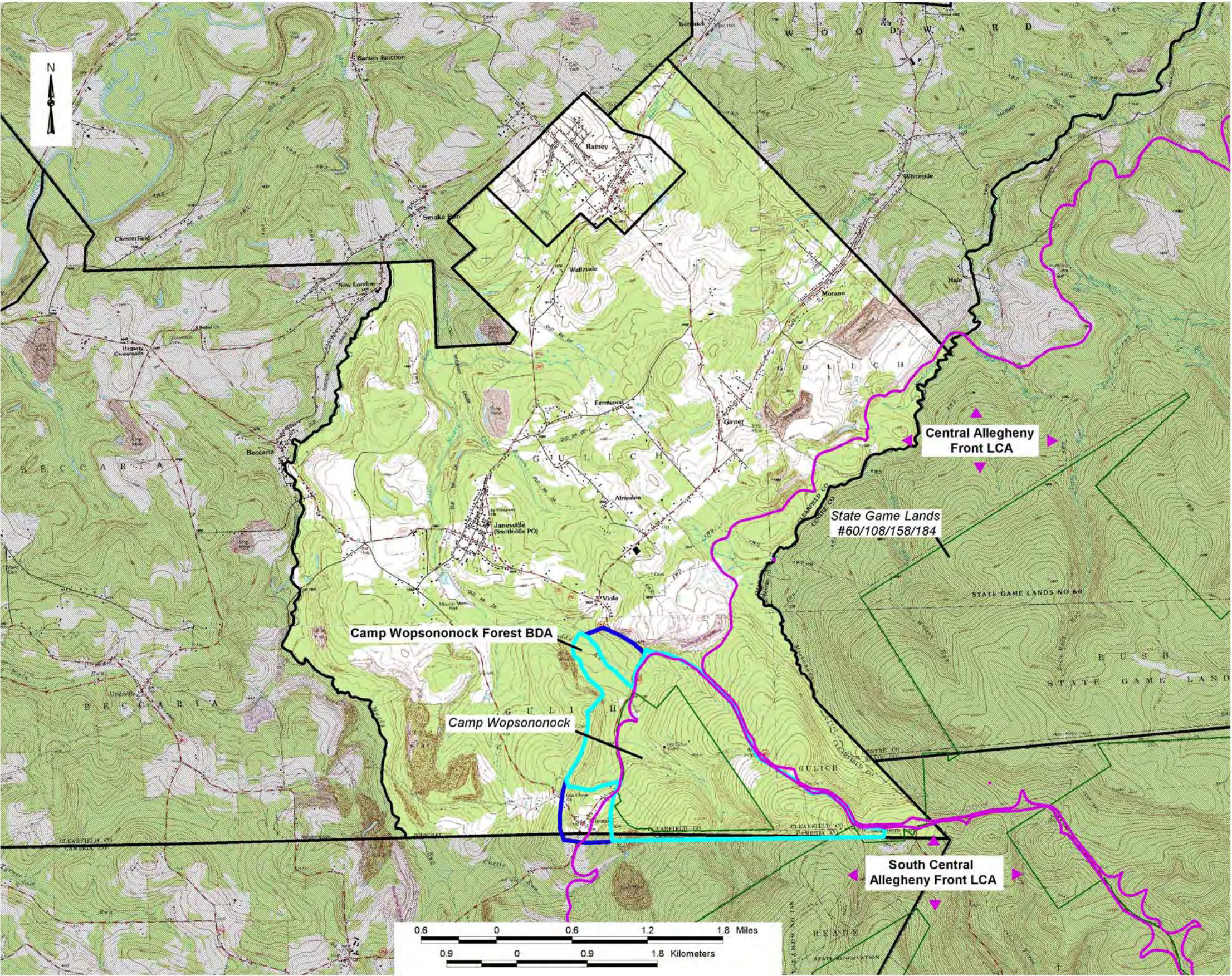
		<i>Exceptional Significance</i>			
Hairy rockcress (<i>Arabis hirsuta</i>)	G5	S1	2003	E	
Calcareous opening/cliff		S2	2003	E	

S. Central Allegheny Front LCA		<i>Notable Significance</i>			
--------------------------------	--	-----------------------------	--	--	--

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Gulich Township & Ramey Borough



Gulich Township & Ramey Borough Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

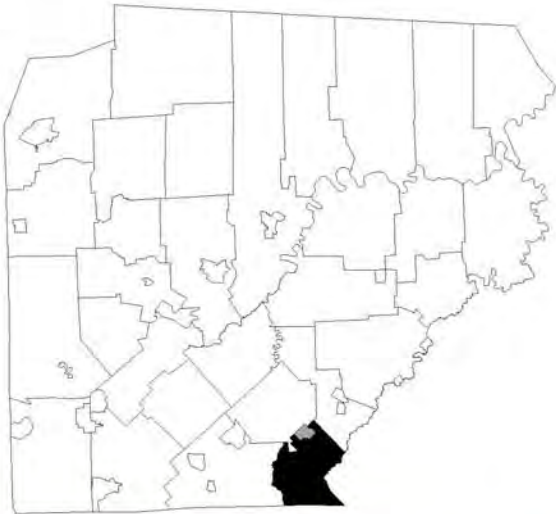
Camp Wopsononock Forest

Landscape Conservation Areas:

Central Allegheny Front
South Central Allegheny Front

Managed Areas:

Camp Wopsononock
State Game Lands #60/108/158/184



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

GULICH TOWNSHIP

The township is mostly within the Muddy Run watershed, except for Whiteside Creek and areas to the east, which drain into Moshannon Creek. It contains an exceptional ecological feature in the Camp Wopsononock BDA, one of the most intact forest communities in southern Clearfield County, which is also part of the S. Allegheny Front LCA (see pg. 31) and adjacent to the Central Allegheny Front LCA (see pg. 31). Although the township is 74% forested, outside of the BDA the forest occurs in smaller fragments which do not provide core habitat conditions; only 31% of the township is core forest habitat, and 19% roadless core habitat. Conservation goals for improving the ecological health of the landscape would be forest stewardship to improve ecosystem health and contiguity, especially in the area of the Camp Wopsononock BDA, and water quality improvement.

Camp Wopsononock Forest BDA

Description

This site, most of which falls within the Camp Wopsononock Recreation Area, is designated around the largest and most ecologically intact patch of forest remaining in the south-eastern portion of the county. This area is unique because the forest communities are natural types, the communities are relatively mature, and few disturbed areas interrupt its contiguity. Thus, it offers interior forest habitat conditions. It is an important habitat refuge for species that are unable to survive in the more heavily disturbed and fragmented forest conditions that characterize the landscape in much of this portion of the county.

The Core Habitat Area contains the most intact communities. Several types of natural community are present: dry oak – heath forest in the upland areas, red-oak mixed hardwood forest along the stream valley floor, hemlock forest also in the stream valley, and calcareous opening/cliff communities along several calcareous sandstone rock outcrops.

Along the southern slope of the valley of the eastern-most tributary to Little Muddy Run within the BDA, a transition in the bedrock geology intersects the surface. The bedrock in this BDA is sedimentary rocks formed in layers, and at the lower edge of the Mauch Chunk bedrock formation, just above the Burgoon Sandstone formation, there is a layer of calcareous sandstone termed the “Loyalhanna Limestone.” The Loyalhanna Limestone forms outcrops along the side of the valley slope, and these host an assemblage of calcium-loving plant species that were found nowhere else in Clearfield County. One species, the hairy rockcress (*Arabis hirsuta* var. *pyncocarpa*), is a Pennsylvania species of special concern. Although once known from about twenty locations in the state, only four locations have been observed in the last twenty years. Other species of the outcrops included: wild columbine (*Aquilegia canadensis*), wild sarsparilla (*Aralia nudicaulis*) walking fern (*Asplenium rhizophyllum*), maidenhair spleenwort (*Asplenium trichomanes*), white wood aster (*Eurybia divaricata*), pink lady's slipper (*Cypripedium acaule*), marginal wood fern (*Dryopteris marginalis*), shining clubmoss (*Huperzia lucidula*), flowering wintergreen (*Polygala paucifolia*), Solomon's seal (*Polygonatum biflorum*), resurrection fern (*Polypodium virginianum*), early saxifrage (*Saxifraga virginiana*), zigzag goldenrod (*Solidago flexicaulis*), an azalea species (*Rhododendron* sp.), Diervilla (*Diervilla lonicera*), a gooseberry species (*Ribes* sp.), and lowbush blueberry (*Vaccinium angustifolium*).

The dry oak – heath forest is the predominant community at the site, occupying the slopes and upland areas. Chestnut oak (*Quercus montana*) dominates the forest canopy, with red oak (*Quercus rubra*), white oak (*Quercus alba*), and red maple (*Acer rubrum*) intermixed. Black gum (*Nyssa sylvatica*) and sassafras (*Sassafras albidum*) are scattered in the understory. There is a fairly dense shrub layer of mountain laurel (*Kalmia latifolia*) and lowbush blueberry (*Vaccinium angustifolium*). The

herbaceous layer is somewhat sparse, with hay-scented fern (*Dennstaedtia punctilobula*), flowering wintergreen (*Polygala paucifolia*), teaberry (*Gaultheria procumbens*), chestnut oak seedlings, partridgeberry (*Mitchella repens*), trailing arbutus (*Epigaea repens*), and occasional pink lady's slipper orchids (*Cypripedium acaule*). The soil is sandy, and sandstone rocks are common on the surface. Lichens and mosses are prevalent on the rocks and forest floor.

The hemlock forest community occurs along the broad valley of the southeast branch of the creek before it turns north at its juncture with another tributary. The canopy is dominated almost exclusively by hemlock, and there is almost no herbaceous layer. There are patches of dense rhododendron (*Rhododendron maximum*) along the floodplain and valley floor. This area has a high potential for hosting bird species that depend upon coniferous forest habitats.

Upstream and downstream of the hemlock forest is red oak – mixed hardwood forest. Downstream, the width of the stream is substantial, and the bank has occasional vegetated terraces. Species included several sedges (*Carex prasina*, *Carex lupulina*, *Carex debilis*, *Carex folliculata*), soft rush (*Juncus effusus*), heart-leaved aster (*Eurybia divaricata*), fowl manna-grass (*Glyceria striata*), sensitive fern (*Onoclea sensibilis*), marsh pennywort (*Hydrocotyle americana*), slender manna-grass (*Glyceria melicaria*), perfoliate boneset (*Eupatorium perfoliatum*), and New York fern (*Thelypteris noveboracensis*).

Upstream of the hemlock forest, the stream channel is dry, and the floodplain is broad and flat. The canopy includes red maple (*Acer rubrum*), black birch (*Betula lenta*), white or green ash (*Fraxinus americana* or *Fraxinus pensylvanica*), black cherry (*Prunus serotina*), blue beech (*Carpinus caroliniana*), and red oak (*Quercus rubra*). Shrubs include witch hazel (*Hamamelis virginiana*), (*Rhododendron maximum*), mountain laurel (*Kalmia latifolia*), lowbush blueberry (*Vaccinium angustifolium*), and deerberry (*Vaccinium stamineum*). In the herbaceous layer, New York fern (*Thelypteris noveboracensis*) and hay-scented fern (*Dennstaedtia punctilobula*) are dominant; other species include: a sedge (*Carex laxiflora*), bellwort (*Uvularia sessilifolia*), rattlesnake-root (*Prenanthes alba*), sweet white violet (*Viola blanda*), downy yellow violet (*Viola pubescens*), American dog violet (*Viola labradorica*), common blue violet (*Viola sororia*), carrion-flower (*Smilax herbacea*), wild sarsparilla (*Aralia nudicaulis*), intermediate wood fern (*Dryopteris intermedia*), northern maidenhair fern (*Adiantum pedatum*), Christmas fern (*Polystichum acrostichoides*), bishop's mitre-wort (*Mitella diphylla*), hog-peanut (*Amphicarpa bracteata*), mayapple (*Podophyllum peltatum*), wild licorice (*Galium circaezens*), wakerobin (*Trillium erectum*), indian cucumber root (*Medeola virginica*), Canada mayflower (*Maianthemum canadense*), partridgeberry (*Mitchella repens*), silvery glade fern (*Athyrium filix-femina*), running pine (*Diphasiastrum digitatum*), Hickey's ground pine (*Lycopodium hickeyi*), bristly clubmoss (*Lycopodium annotinum*), cinnamon fern (*Osmunda cinnamomea*), teaberry (*Gaultheria procumbens*), and pink lady's slipper (*Cypripedium acaule*). On the slopes surrounding the valley, the canopy includes shagbark hickory (*Carya ovata*), sugar maple (*Acer saccharum*), and red maple (*Acer rubrum*); the herbaceous layer is a dense carpet of hay-scented fern (*Dennstaedtia punctilobula*), which can be an indicator of overbrowsing.

Higher in the valley, several small channels arise from springs and seeps. In the most extensive such area, hemlock dominates the canopy, although hardwoods are also present. The herb layer is sparse, mainly scattered Canada mayflower (*Maianthemum canadense*), except in seepage areas, where there are patches of small cinnamon- or interrupted- fern (*Osmunda sp.*), water horehound (*Lycopus sp.*), violets, starflower (*Trientalis borealis*), *Athyrium filix-femina*, and long beech fern (*Phegopteris connectilis*). Seepage areas can provide breeding habitat for amphibian species such as spring peepers, wood frogs, and also may support a variety of salamander species in their adult phase.

The Supporting Landscape Areas are adjacent portions of the immediate watershed that contain recovering forest or additional usages.

Threats and Stresses

Core Habitat Area—The natural landscape of the site is generally in good condition. Although some fragmenting features, including dirt roads, pipeline right-of-ways, and water management facilities, interrupt its contiguity, their impact as fragmenting features is mitigated because they are relatively narrow and have natural verges and substrate. Some areas along the stream beds and banks, and in the vicinity of the old boy scout camp facilities, are observably more open and less diversely vegetated, reflecting selective logging and perhaps also heavy foot traffic in times past.

Recommendations

Core Habitat Area—Several considerations can help to preserve the ecological integrity of the site while plans are developed to accommodate other uses. The site is relatively small and a major feature of its importance is its condition as an area of contiguous natural forest; thus, care should be taken to maximize the contiguity of natural landscape. Features such as roads and pipelines should be minimally employed. Natural forested edges and an overall narrow width are good design principles for minimizing their impact as fragmenting features for wildlife. Structures and areas of more intensive use can be clustered together near already-existing edges, rather than spaced separately or placed in forest interior areas, to minimize the amount of forest habitat that is disturbed. If timber removal is conducted at the site, sensitive areas should be avoided and an overall canopy cover level of at least 70% should be maintained.

Supporting Landscape Area—precautions to safeguard water quality should be taken in this area, to support its continued ecological health and its use as a water supply source. Mining and the release of harmful substances (automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls) should be avoided to prevent contamination of water with toxins, and appropriate erosion control measures should accompany any activity involving earth disturbance or forest cover removal to prevent sediment pollution. Regrowth of native forest communities in these areas can also augment the size and contiguity of the core area.

RAMEY BOROUGH

The landscape of Ramey Borough is mainly occupied by the village of Ramey. Most of the township drains into Little Muddy Run; the western portion drains into Muddy Run, and the eastern edge drains into Beaver Run. No Natural Heritage Areas were identified within the borough.

Huston Township

		<u>PNDI Rank</u>		<u>Legal Status</u>		
		Global	State	Federal	State	Last Seen Quality

NATURAL HERITAGE AREAS:

Anderson Creek & Whitney Run Wetlands BDA				<i>Notable Significance</i>		
Hemlock palustrine forest				S3	2002	E

Laurel Run & Saunders Run BDA				<i>County Significance</i>		
-------------------------------	--	--	--	----------------------------	--	--

Laurel Run Tributary Wetland BDA				<i>County Significance</i>		
----------------------------------	--	--	--	----------------------------	--	--

Parker Dam Beaver Ponds BDA				<i>County Significance</i>		
-----------------------------	--	--	--	----------------------------	--	--

South Bennett Branch Wetlands BDA				<i>County Significance</i>		
-----------------------------------	--	--	--	----------------------------	--	--

Bennett Branch Headwaters LCA				<i>Notable Significance</i>		
-------------------------------	--	--	--	-----------------------------	--	--

Moshannon State Forest LCA				<i>Exceptional Significance</i>		
----------------------------	--	--	--	---------------------------------	--	--

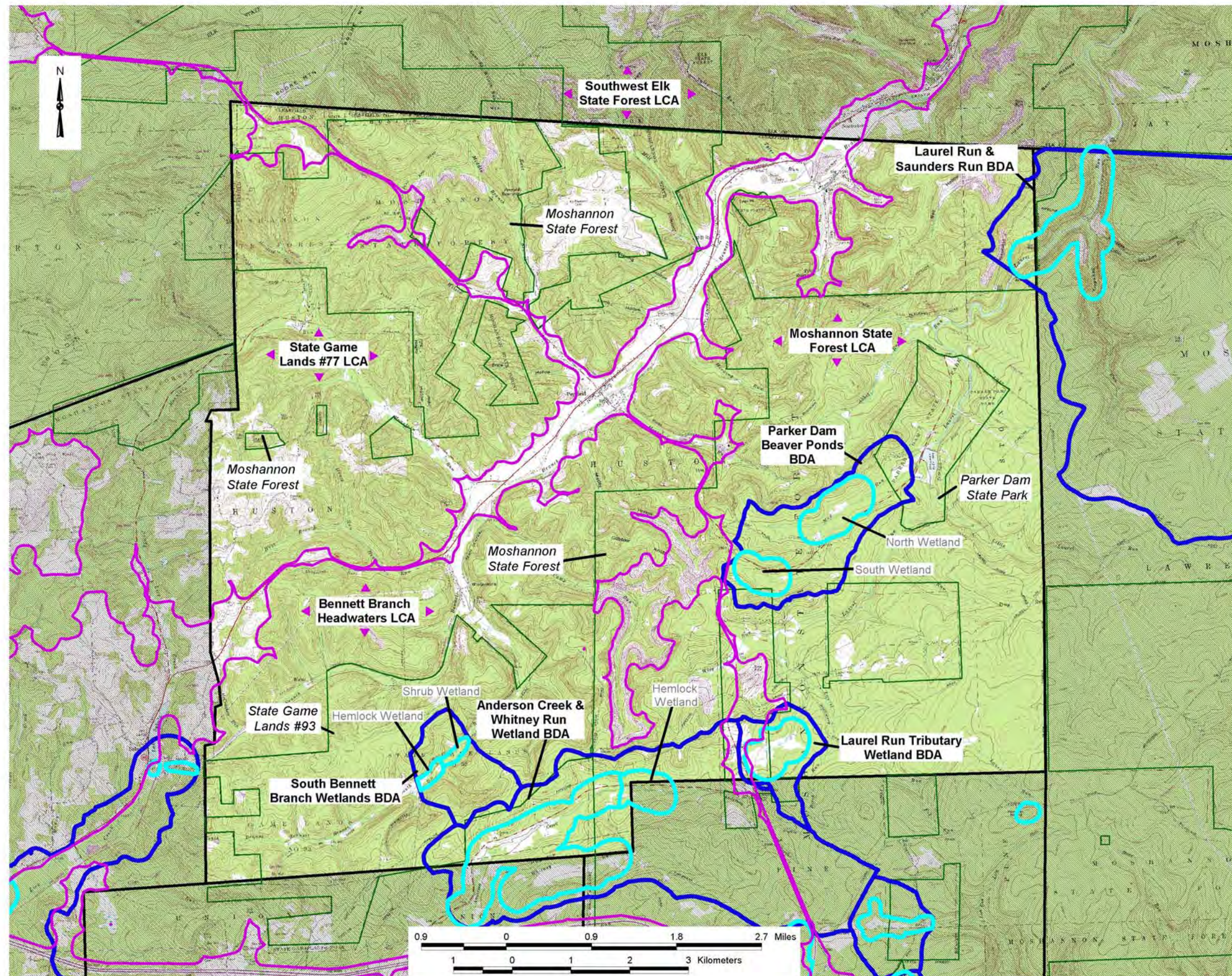
SGL # 77 LCA				<i>Notable Significance</i>		
--------------	--	--	--	-----------------------------	--	--

SW Elk State Forest LCA				<i>High Significance</i>		
-------------------------	--	--	--	--------------------------	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Huston Township



Huston Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Anderson Creek & Whitney Run Wetlands
Laurel Run Tributary Wetlands
Parker Dam Beaver Ponds
South Bennett Branch Wetlands

Landscape Conservation Areas:

Bennett Branch Headwaters
Moshannon State Forest
Southwest Elk State Forest
State Game Lands #77

Managed Areas:

Moshannon State Forest
Parker Dam State Park
State Game Lands #93



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

HUSTON TOWNSHIP

The landscape of Huston Township is almost all forested, with an exceptionally high degree of contiguity: 92% of the area is forested, 76% is core forest habitat, and 38% is roadless core habitat. The township is bisected by SR 255 and SR 153, which meet at Penfield. These roads bound the forest blocks that make up four LCAs that occupy most of the township: Moshannon State Forest LCA (see pg. 34), SW Elk State Forest LCA (see pg. 31), Bennett Branch Headwaters LCA (see pg. 32), and SGL 77 LCA (see pg. 32). The township also contains several unique or high quality wetland and riparian habitats that are recognized as BDAs. Careful stewardship can maintain or improve the ecological health of the forest ecosystem and the unique habitats of the township.

Anderson Creek and Whitney Run Wetlands BDA

Description

This Biological Diversity Area is designated around a section of Anderson Creek above the Dubois Reservoir, and its tributary, Whitney Run. The area includes many wetlands along the floodplains of the streams, and the natural landscape is relatively intact in comparison to much of the creek. Several different wetland community types are present, which each provide unique habitat value. The ecological value of the wetland communities is enhanced by the relatively intact condition of the surrounding upland landscape, which helps to maintain water quality and wetland health, as well as providing a large contiguous area within which native species can move and disperse.

The *Core Habitat Areas* include the wetlands, as well as a 250 m buffer to capture critical habitat area for amphibian species the wetland may support. The wetland areas include several natural communities recognized by the PA plant community classification (Fike 1999): tussock sedge marsh, hemlock palustrine forest, and alder-sphagnum wetlands. Other types not well described by the Community Classification are also present. Most of the wetlands likely developed as a result of past beaver activity, except the hemlock palustrine forest, which is fed by groundwater seepage. The hemlock palustrine forest community is in the *Hemlock Wetland Core Habitat Area*.

The *Supporting Natural Landscape* is the watershed surrounding the wetlands. The ecological value of the wetland communities is enhanced by the relatively intact condition of the surrounding upland landscape, which helps to maintain water quality and wetland health, as well as providing a large contiguous area within which native species can move and disperse.

Threats and Stresses

Core Habitat Area—Anderson Creek Road follows Anderson Creek closely through the length of this BDA, and thus road runoff is likely entering the creek and the wetlands along its western bank. Several non-paved roads also run through the BDA. The primary contaminants borne in road runoff are heavy metals, aromatic hydrocarbons (petroleum compounds), sediments, and salts. Heavy metals and aromatic hydrocarbons arise from wear of automotive parts and compounds, and the amounts released increase with traffic volume. Although they are released at low concentrations, these compounds are toxic to aquatic life, very slow to degrade, and accumulate over time. Sediments arise from erosion of non-paved, exposed soil; release of sediments into water bodies is harmful to aquatic plants and animals. Dirt roads can be a major source of sediment runoff. Salt release results from applications of salt for road de-icing; chloride-based salts (sodium chloride, magnesium chloride, potassium chloride, etc.) can have detrimental impacts on vegetation, soil chemistry, and aquatic life (Environment Canada 2001).

Supporting Natural Landscape— Any toxic materials released in this area will drain into the wetland, where they may harm its inhabitants. If forest cover is removed, soil erosion could result in sediment pollution in the wetlands, which degrades the habitat for many plant and animal species. Greatly decreased forest cover in this area may also diminish the long-term viability of the wetland communities.

The area north and south of the hemlock palustrine forest is primarily vegetated with non-native conifers. Forests of native tree species provide better habitat value for most native plant and animal species.

Recommendations

Core Habitat Area—Best management practices for road runoff management can help to mitigate its environmental impacts. The Arkansas Forestry Commission provides a good reference outlining BMP options, available at: <http://www.forestry.state.ar.us/bmp/roads.html>. For dirt roads, the most critical need is to minimize erosion by vegetating surfaces where possible and constructing drainage management features. For paved roads, runoff should be slowed and filtered in close proximity to the road, to minimize contaminants reaching the wetlands and the stream.

Supporting Natural Landscape— To maintain good water quality for the wetlands, forest cover removal should be avoided on steeply sloped areas, appropriate erosion control BMPs should be applied if forest cover is disturbed in other areas, and toxic materials (automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls) should not be released. Preservation of forest cover in this area, especially in such a pattern as to connect the wetland with surrounding forested areas, is likely to enhance prospects for the long-term health of this habitat. Restoration of native trees to areas planted with non-native conifers will enhance habitat value.

Laurel Run & Saunders Run BDA

Discussed under Lawrence Township—see pg. 115.

Laurel Run Tributary Wetland BDA

Description

This BDA is designated around a wetland in the headwaters of a tributary to Laurel Run. The wetland has been influenced by beaver activity, and includes a mosaic of different herbaceous and shrub communities. The communities cannot be characterized using the Fike 1999 vegetation classification, and thus the wetland cannot easily be compared to other wetland types to evaluate its statewide significance. While they appear to resemble other communities commonly found in the area and are not likely to be of statewide concern, the area is locally significant as a natural wetland habitat.

Core Habitat Area—The area is mainly herbaceous, with about 30% shrub cover of silky willow (*Salix sericea*) and steplebush (*Spiraea tomentosa*) occurring in patches. A few small channels meander through the wetland. Herbaceous cover included extensive patches loosely dominated by cattails (*Typha latifolia*), a sedge species (*Carex folliculata*), or swamp dewberry (*Rubus hispidus*). Generally interspersed and very common were American bur-reed (*Sparganium americanum*), sphagnum moss (*Sphagnum* sp.), tawny cottongrass (*Eriophorum virginicum*), round-leaved sundew (*Drosera rotundifolia*), sedges (*Carex lurida*, *Carex intumescens*), and wrinkle-leaved goldenrod

(*Solidago rugosa*). Other species included a bent-grass species (*Agrostis sp.*), heart-leaved tearthumb (*Polygonum sagittatum*), a violet species (*Viola sp.*), northern awned sedge (*Carex gynandra*), woolgrass (*Scirpus cyperinus*), a rush species (*Juncus sp.*), and bog clubmoss (*Lycopodiella inundata*). The margins of the wetland were slightly higher, and were dominated by needle-and-thread grass (*Brachyelytrum erectum*), bracken fern (*Pteridium aquilinum*), New York fern (*Thelypteris noveboracensis*), and a lowbush blueberry species (*Vaccinium sp.*). The core habitat area includes the wetland habitat and 250 m of surrounding upland area, which may be used by different species of amphibians.

This area has not been surveyed to document animal inhabitants. It is potential habitat for amphibians and also may host aquatic or semi-aquatic insects such as dragonflies and damselflies. Much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetland plus 250 m of surrounding forest that may be utilized by amphibians.

Supporting Landscape Area—The supporting landscape is the immediate watershed above the wetland; the condition of this area influences the quality of the water draining into the wetland. The surrounding forest consisted of plantations of introduced conifer species, with white spruce (*Picea alba*) on one side, and red pine (*Pinus resinosa*) on the other.

Threats and Stresses

Water color and sediment in the wetland suggests iron deposition, which may indicate the wetland is receiving acid mine drainage pollution from nearby strip mined areas.

Recommendations

Core Habitat Area—The wetland should be assessed to determine if it is receiving acid mine drainage and how severe the problem is. Amphibian and invertebrate surveys are also recommended to gather baseline data for future management decisions, as much of the diversity of wetlands often consists of these taxa. The utility of the adjacent forest area as habitat for native species might be improved by the establishment of native forest communities in place of exotic conifer species.

Supporting Landscape Area—To maintain good water quality for the wetlands, appropriate erosion control BMPs should be applied if forest cover is disturbed, and toxic materials (automotive fluids, petrochemicals, solvents, detergents, fertilizers, chemical pest controls) should not be released within the Supporting Landscape Area. Preservation of forest cover in this area, especially in such a pattern as to connect the wetland with surrounding forested areas, is likely to enhance prospects for the long-term health of this habitat.

Parker Dam Beaver Ponds BDA

Description

This site recognizes two wetland complexes, both beaver-influenced, in the headwaters of Mud Run.

The South Wetland Core Habitat Area is a wetland complex consisting of several ponds, with dams between them, along a tributary channel to Mud Run. At the edge there is a zone of shallow water and deep sediment, with aquatic and emergent vegetation, including rattlesnake manna grass (*Glyceria canadensis*) and two species of bur-reed (*Sparganium chlorocarpum* and *Sparganium americanum*).

Along the stream channel connecting the eastern-most pond and the next pond west, there is palustrine forest with cinnamon- or interrupted- fern (*Osmunda sp.*) tussocks and a mix of other herbaceous species. There are patches of shrub around the ponds, mainly of silky willow (*Salix sericea*). The banks of the next pond west also include open, herbaceous areas with a drier suite of species, dominated by blueberry (*Vaccinium sp.*) and (*Danthonia spicata*). Throughout the area scattered individuals of exotic species were observed, including: yarrow (*Achillea millefolium*), multiflora rose (*Rosa multiflora*) two species of hawkweed (*Hieracium aurantiacum*, *Hieracium caespitosum*), and heal-all (*Prunella vulgaris*). Of these, multiflora rose is the only species considered to be invasive. The eastern-most pond is bounded on the east by a powerline right-of-way; otherwise the surrounding areas are forested.

Herbaceous species included: sphagnum moss (*sphagnum sp.*), a species of bent-grass (*Agrostis sp.*), broom sedge (*Andropogon virginicus*), pussytoes (*Antennaria sp.*), Jack-in-the-pulpit (*Arisaema triphyllum*), beggar ticks (*Bidens sp.*), sedges (*Carex folliculata*, *Carex gynandra*, *Carex leptalea*, *Carex lurida*, *Carex scoparia*, *Carex stipata*), virgin's bower (*Clematis virginiana*), northern oat grass (*Danthonia compressa*), poverty grass, (*Danthonia spicata*), hay-scented fern (*Dennstaedtia punctilobula*), spinulose wood fern (*Dryopteris carthusiana*), crested wood fern (*Dryopteris cristata*), a spikerush species (*Eleocharis sp.*), perfoliate boneset (*Eupatorium perfoliatum*), flat-top goldenrod, (*Euthamia graminifolia*), a bedstraw species (*Galium sp.*), slender mannagrass (*Glyceria melicaria*), fowl mannagrass (*Glyceria striata*), touch-me-not (*Impatiens sp.*), soft rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), water purslane (*Ludwigia palustris*), water horehound (*Lycopus sp.*), Canada mayflower (*Maianthemum canadense*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), wood sorrel (*Oxalis acetosella*), mayapple (*Podophyllum peltatum*), heart-leaved tearthumb (*Polygonum sagittatum*), bracken fern (*Pteridium aquilinum*), wintergreen (*Pyrola chlorantha*), creeping buttercup (*Ranunculus repens*), sheep sorrel (*Rumex acetosella*), woolgrass (*Scirpus cyperinus*), two bur-reed species (*Sparganium chlorocarpum*, *Sparganium sp.*), New York fern (*Thelypteris noveboracensis*), foamflower (*Tiarella cordifolia*), cattail (*Typha latifolia*), blue vervain (*Verbena hastata*), and swamp dewberry (*Rubus hispidus*).

Shrub species included witch hazel (*Hamamelis virginiana*), silky willow (*Salix sericea*), and meadow sweet (*Spiraea alba*).

North Wetland Core Habitat Area—The northern tributary to Mud Run contains a large wetland complex, as well as a unique forest community along the stream corridor above the wetlands. The stream corridor is surrounded by early-successional vegetation, fields of dense goldenrod (*Solidago rugosa*) with aspen (*Populus tremuloides*) forming an open canopy. White pine (*Pinus strobus*) saplings also form dense stands in some areas. The stream itself was dry upon observation, with a channel ~1 m wide and ½ to 1 m deep. The forest immediately surrounding the stream was a mesic mix of hardwoods, including: red maple (*Acer rubrum*), shagbark hickory (*Carya ovata*), hickory (*Carya sp.*), ash (*Fraxinus sp.*), hop hornbeam (*Ostrya virginiana*), black cherry (*Prunus serotina*), white oak (*Quercus alba*), muscle beech (*Carpinus caroliniana*), basswood (*Tilia americana*). Hemlock (*Tsuga canadensis*) is also scattered and forms occasional patches. The stream terraces were generally densely vegetated with a diverse and somewhat mesic suite of herbaceous species, including: Jack-in-the-pulpit (*Arisaema triphyllum*), an aster species (*Aster prenanthiodes*), lady fern (*Athyrium filix-femina*), needle-and-thread grass (*Brachyelytrum erectum*), marsh marigold (*Caltha palustris*), a sedge (*Carex stipata*), goldthread (*Coptis trifolia*), hay-scented fern (*Dennstaedtia punctilobula*), silvery glade fern (*Deparia acrostichoides*), a wood fern species (*Dryopteris sp.*), slender mannagrass (*Glyceria melicaria*), fowl mannagrass (*Glyceria striata*), touch-me-not (*Impatiens sp.*), a cutgrass species (*Leersia sp.*), bishop's mitrewort (*Mitella diphylla*), bee balm (*Monarda didyma*), sensitive fern (*Onoclea sensibilis*), interrupted fern (*Osmunda claytoniana*), wood sorrel (*Oxalis acetosella*), heart-leaved tearthumb (*Polygonum sagittatum*), bracken fern (*Pteridium aquilinum*), wintergreen (*Pyrola chlorantha*), shinleaf (*Pyrola elliptica*), a buttercup species (*Ranunculus hispidus*), New York fern (*Thelypteris noveboracensis*), foamflower (*Tiarella*

cordifolia), poison ivy (*Toxicodendron radicans*), false hellebore (*Veratrum viride*), a violet species (*Viola sp.*), and swamp dewberry (*Rubus hispidus*).

The beaver impounded wetlands include a variety of successional stages, including open water, shrub thickets, and low meadow. Prevalent shrubs include silky willow (*Salix sericea*) and steplebush (*Spiraea tomentosa*). Black cherry (*Prunus serotina*), shining willow (*Salix lucida*), and the invasive exotic species multiflora rose (*Rosa multiflora*) were also present.

Herbaceous species included: (*Agrostis sp.*), white wood aster (*Aster divaricatus*), an aster species (*Aster prenanthioides*), needle-and-thread grass (*Brachyelytrum erectum*), sedges (*Carex annectens*, *Carex crinita ssp. crinita*, *Carex frankii*, *Carex gynandra*, *Carex projecta*, *Carex scoparia*), ox-eye daisy (*Chrysanthemum leucanthemum*), virgin's bower (*Clematis virginiana*), crested wood fern (*Dryopteris cristata*), a spikerush species (*Eleocharis palustris*), two species of willow herb (*Epilobium ciliatum*, *Epilobium leptophyllum*), two species of horsetail (*Equisetum arvense*, *Equisetum sylvaticum*), flat-top goldenrod (*Euthamia graminifolia*), a bedstraw species (*Galium trifidum*), rattlesnake mannagrass (*Glyceria canadensis*), reed mannagrass (*Glyceria grandis*), slender mannagrass (*Glyceria melicaria*), fowl mannagrass (*Glyceria striata*), marsh pennywort (*Hydrocotyle americana*), pale St. John's-wort (*Hypericum ellipticum*), touch-me-not (*Impatiens capensis*), soft rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), cutgrass (*Leersia virginica*), water purslane (*Ludwigia palustris*), a water horehound species (*Lycopus sp.*), bugleweed (*Lycopus uniflorus*), Allegheny monkeyflower (*Mimulus ringens*), partridgeberry (*Mitchella repens*), sensitive fern (*Onoclea sensibilis*), cinnamon- or interrupted- fern (*Osmunda sp.*), deer tongue grass (*Panicum clandestinum*), a smartweed species (*Polygonum punctatum*), heart-leaved tearthumb (*Polygonum sagittatum*), old field cinquefoil (*Potentilla simplex*), a buttercup species (*Ranunculus hispidus*), woolgrass (*Scirpus cyperinus*), leafy bulrush (*Scirpus polyphyllus*), mad-dog skullcap (*Scutellaria lateriflora*), golden ragwort (*Senecio aureus*), wrinkle-leaved goldenrod (*Solidago rugosa*), a bur-reed species (*Sparganium chlorocarpum*), New York fern (*Thelypteris noveboracensis*), cattail (*Typha latifolia*), false hellebore (*Veratrum viride*), and blue vervain (*Verbena hastata*).

The invasive exotic species reed canarygrass (*Phalaris arundinacea*) was present but not dominant.

Neither wetland has been surveyed to document animal inhabitants. Both are potential habitat for amphibians, as well as aquatic or semi-aquatic insects such as dragonflies and damselflies. Much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat.

Supporting Natural Landscape— includes the immediate watershed of the wetland and the core areas that extend outside the watershed; this area supports the water quality of the wetland. The forest surrounding the wetlands is sparse and young in some areas, and more mature in others. Tree species included: red maple (*Acer rubrum*), yellow birch (*Betula allegheniensis*), dogwood (*Cornus florida*), hawthorn (*Crataegus sp.*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), white pine (*Pinus strobus*), quaking aspen (*Populus tremuloides*), white oak (*Quercus alba*), hemlock (*Tsuga canadensis*), and muscle beech (*Carpinus caroliniana*).

Threats and Stresses

Core Habitat Areas— Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls, or discharge of other toxic materials within the watershed of the wetland may harm wetland flora and fauna.

Recommendations

Core Habitat Areas—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disruption to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape— Chemical weed and pest controls, as well as the discharge of other toxic materials, should be avoided within the watershed.

South Bennett Branch Wetlands BDA

Description

This area is designated for two natural wetland communities.

The Hemlock Wetland Core Habitat Area is designated around the seepage wetland communities that occur in an area where the floodplain of South Bennett Branch Creek is broad and forested. The forest is a hemlock-northern hardwoods community; canopy species include sugar maple (*Acer saccharum*), yellow birch (*Betula allegheniensis*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), basswood (*Tilia americana*), and hemlock (*Tsuga canadensis*), with mature muscle beech (*Carpinus caroliniana*) in the understory layer.

In the herbaceous layer, the drier areas have typical northern hardwoods species such as: hog peanut (*Amphicarpea bracteata*), enchanter's nightshade (*Circaea lutetiana*), hay-scented fern (*Dennstaedtia punctilobula*), fancy fern (*Dryopteris intermedia*), a bedstraw species (*Galium trifidum*), hepatica (*Hepatica acutiloba*), Canada mayflower (*Maianthemum canadense*), Indian cucumber root (*Medeola virginica*), Christmas fern (*Polystichum acrostichoides*), rattlesnake root (*Prenanthes alba*), New York fern (*Thelypteris noveboracensis*), and poison ivy (*Toxicodendron radicans*). The seepage areas vary from sparse vegetation dominated by sphagnum mosses, wood sorrel (*Oxalis montana*), and *Carex torta*, to a more diverse assemblage of wetland species that include: a bentgrass species (*Agrostis sp.*), Jack-in-the-pulpit (*Arisaema triphyllum*), zig-zag aster (*Aster prenanthioides*), needle-and-thread grass (*Brachyelytrum erectum*), Marsh marigold (*Caltha palustris*), golden saxifrage (*Chrysosplenium americanum*), dwarf enchanter's nightshade (*Circaea alpina*), horsetail (*Equisetum arvense*), two bedstraw species (*Galium sp.*), fowl mannagrass, (*Glyceria striata*), pennywort (*Hydrocotyle americana*), touch-me-not (*Impatiens capensis*), wood nettle (*Laportea canadensis*), cutgrass (*Leersia virginica*), Allegheny monkeyflower (*Mimulus ringens*), sensitive fern (*Onoclea sensibilis*), clearweed (*Pilea sp.*), Jacob's ladder (*Polemonium reptans*), heart-leaved tearthumb (*Polygonum sagittatum*), jumpseed (*Polygonum virginianum*), heal-all (*Prunella vulgaris*), a buttercup (*Ranunculus hispidus*), leafy bulrush (*Scirpus polyphyllus*), golden ragwort (*Senecio aureus*), meadow rue (*Thalictrum sp.*), foamflower (*Tiarella cordifolia*), and a violet species (*Viola sp.*).

Shrub Wetland Core Habitat Area—Downstream of the forested seepage area there are also more open riparian wetlands. The development of these may have been influenced by beaver activity; some signs of disturbance also indicate portions of the area may have been cleared for other uses and is now reverting to natural cover. Shrub cover is variable, ~50%, and includes: speckled alder (*Alnus*

incana), Morrow's honeysuckle (*Lonicera morrowii*), silky willow (*Salix sericea*), meadow sweet (*Spiraea alba*), and hawthorn (*Crataegus sp.*). The herbaceous layer contains some of the species listed above for the seepage wetlands, as well as additional species more adapted to open areas: swamp dewberry (*Rubus hispidus*), pearly everlasting (*Anaphalis margaritacea*), swamp milkweed (*Asclepias incarnata*), northern awned sedge (*Carex gynandra*), bladder sedge (*Carex intumescens*), other sedge species (*Carex lurida*, *Carex scoparia*, *Carex comosa*, *Carex crinita*, *Carex stipata*), a spikerush species (*Eleocharis sp.*), slender mannagrass (*Glyceria melicaria*), soft rush (*Juncus effusus*), water purslane (*Ludwigia palustris*), cinnamon- or interrupted- fern (*Osmunda sp.*), woolgrass (*Scirpus cyperinus*), goldenrod (*Solidago rugosa*), a goldenrod species (*Solidago sp.*), broad-leaf cattail (*Typha latifolia*), and blue vervain (*Verbena hastata*).

The Supporting Natural Landscape is the watershed of the wetland; it is mainly forested, and supports the water quality of the wetlands.

Threats and Stresses

Core Habitat Areas—Several invasive exotic species are present at this site; two, Japanese barberry (*Berberis thunbergii*) and Morrow's honeysuckle (*Lonicera morrowii*), are shrub species that can become dominant in forests and greatly reduce native plant diversity. Presently they occur at low numbers in the forests, and are somewhat more prevalent in open areas. The seepage wetlands contain shade-adapted plant species and will be sensitive to any forest canopy removal in the area.

Supporting Natural Landscape—Erosion of dirt roads in the area may result in sediment pollution reaching the wetlands.

Recommendations

Core Habitat Areas—As the Japanese barberry and Morrow's honeysuckle are not yet well established in the forested areas, a program of periodic survey and shrub removal may yet prevent them from becoming problematic. To preserve the microclimatic conditions of the wetland, full forest canopy should be maintained in the forested floodplain area and an upslope buffer of at least 100 yards.

Supporting Natural Landscape—A high degree of forest cover should be maintained to protect the water quality and the ecological integrity of the wetlands. Water quality impacts should be considered for any activities taking place here: ecologically detrimental pollutants should not be released, and any earth disturbing activities should employ appropriate erosion control measures and avoid steep slopes. Best management practices for road runoff management can help to mitigate its environmental impacts. The Arkansas Forestry Commission provides a good reference outlining BMP options, available at: <http://www.forestry.state.ar.us/bmp/roads.html>. For dirt roads, the most critical need is to minimize erosion by vegetating surfaces where possible and constructing drainage management features.

Jordan Township

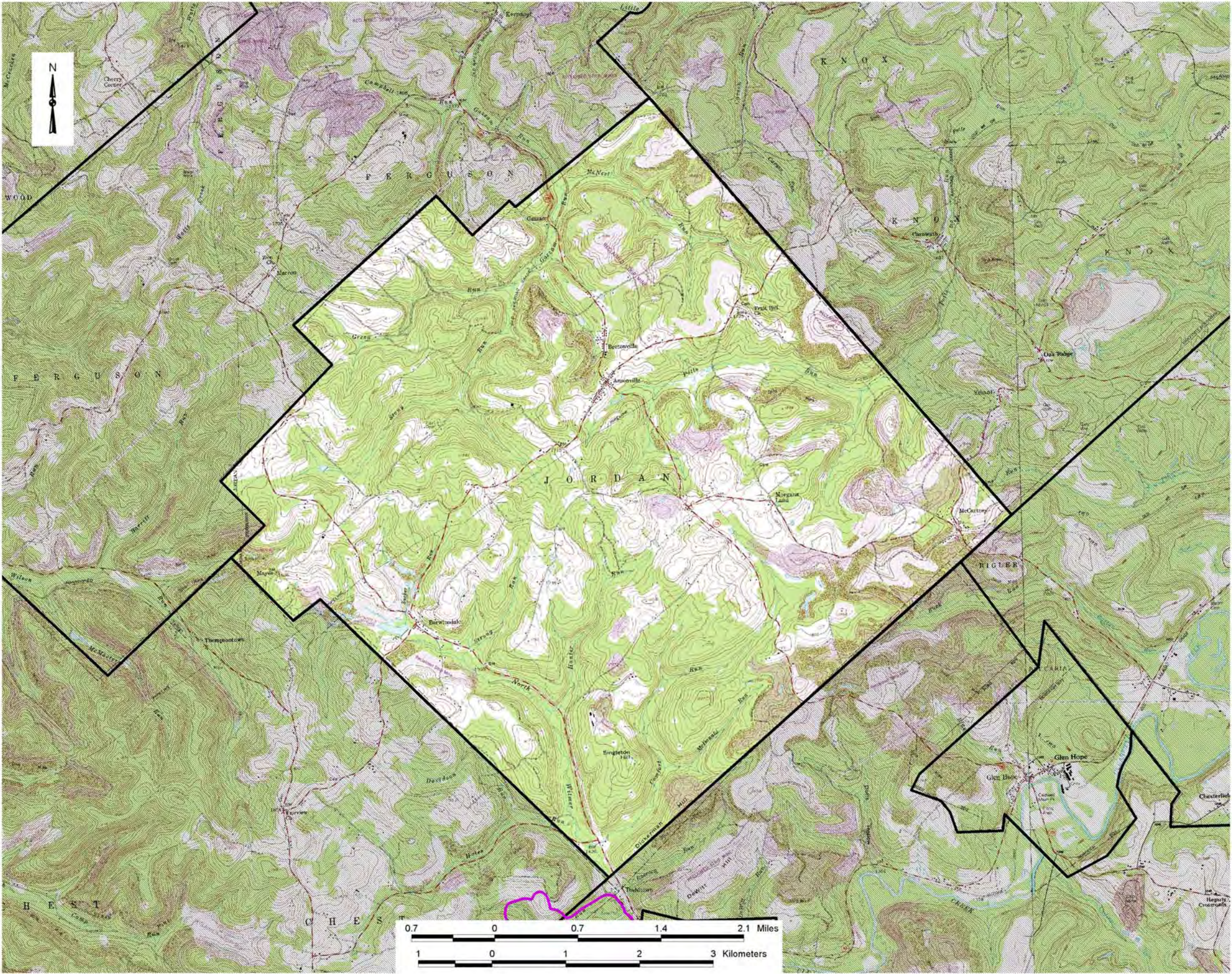
		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS: none identified

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Jordan Township



Jordan Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

None

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

JORDAN TOWNSHIP

Jordan Township falls within the Clearfield Creek watershed. It is 61% forested, but only 27% of the township area is core forest habitat. Due to the extent of strip mining in the township, there are significant challenges to the ecological health of the landscape. Strip mined areas provide degraded habitat conditions for many species, and may be a barrier to the movement of some species as well. Goals for improving the ecological health of the township landscape would be to improve the contiguity and ecosystem health of forested areas, building upon and connecting the largest blocks; to remediate water quality problems; and to restore strip mined areas.

Karthaus Township

		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

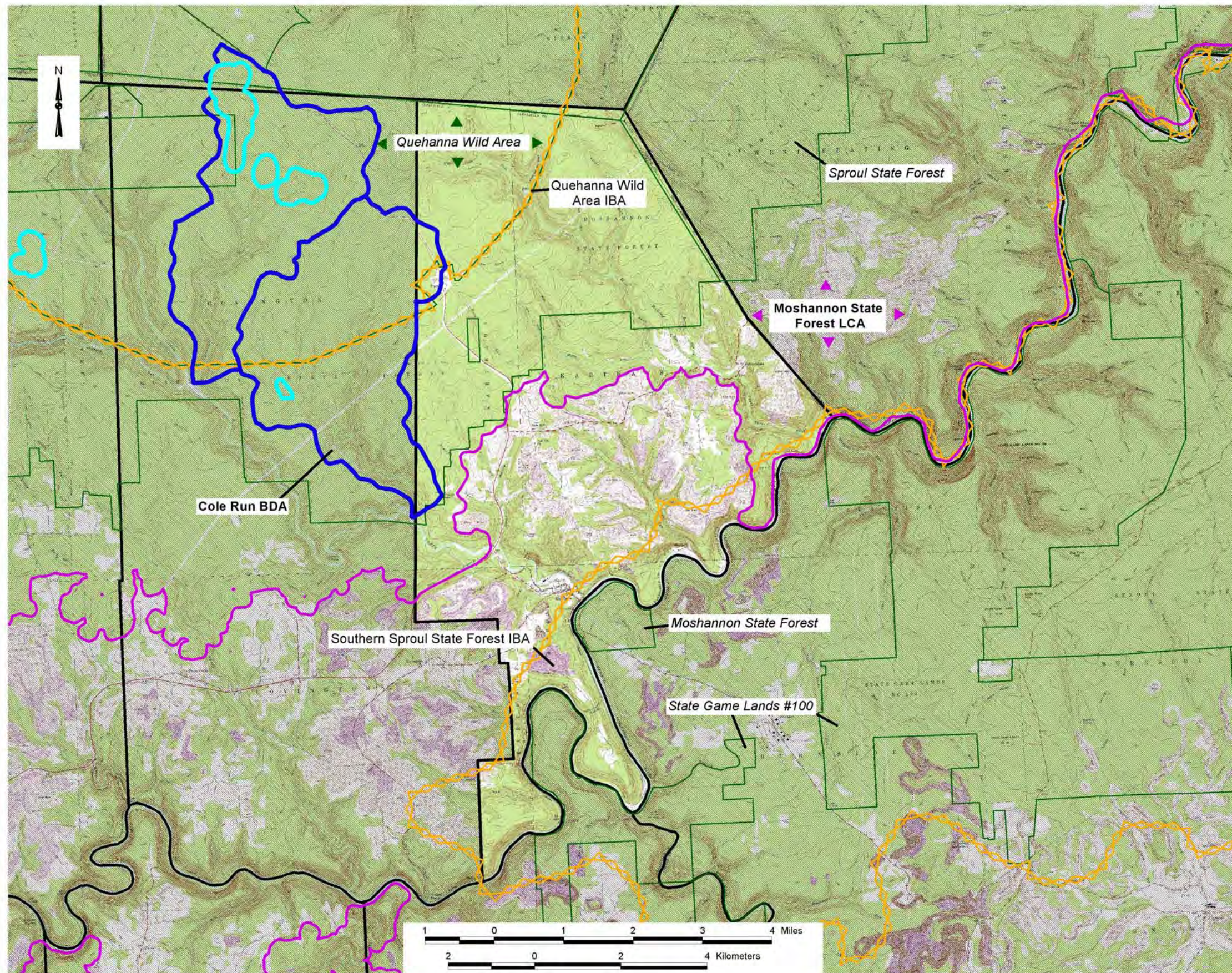
Cole Run BDA		Notable Significance			
Exceptional Value stream		--		--	--

Moshannon State Forest LCA		Exceptional Significance			
----------------------------	--	--------------------------	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Karthaus Township



Karthaus Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Cole Run

Landscape Conservation Areas:

Moshannon State Forest

Managed Areas:

Moshannon State Forest
Quehanna Wild Area
Sproul State Forest
State Game Lands #100



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

KARTHAUS TOWNSHIP

The northern half of Karthaus Township is almost completely forested, while the southern half is extensively mined. The forest in the northern half is largely unfragmented by major roads, and almost the entire area is core forest habitat. Much of the area is also roadless core habitat. It forms part of the Moshannon State Forest LCA (see pg. 34), one of the largest blocks of contiguous forest in Pennsylvania. Karthaus Township is in the watershed of the West Branch Susquehanna River, which forms its southern and eastern boundary. Conservation priorities for the township are the stewardship of the Moshannon State Forest LCA to sustain forest ecosystem health and contiguity, and restoration of mined areas and impaired waters in the southern half of the township.

Cole Run BDA

Discussed under Covington Township—see pg. 70.

Knox Township

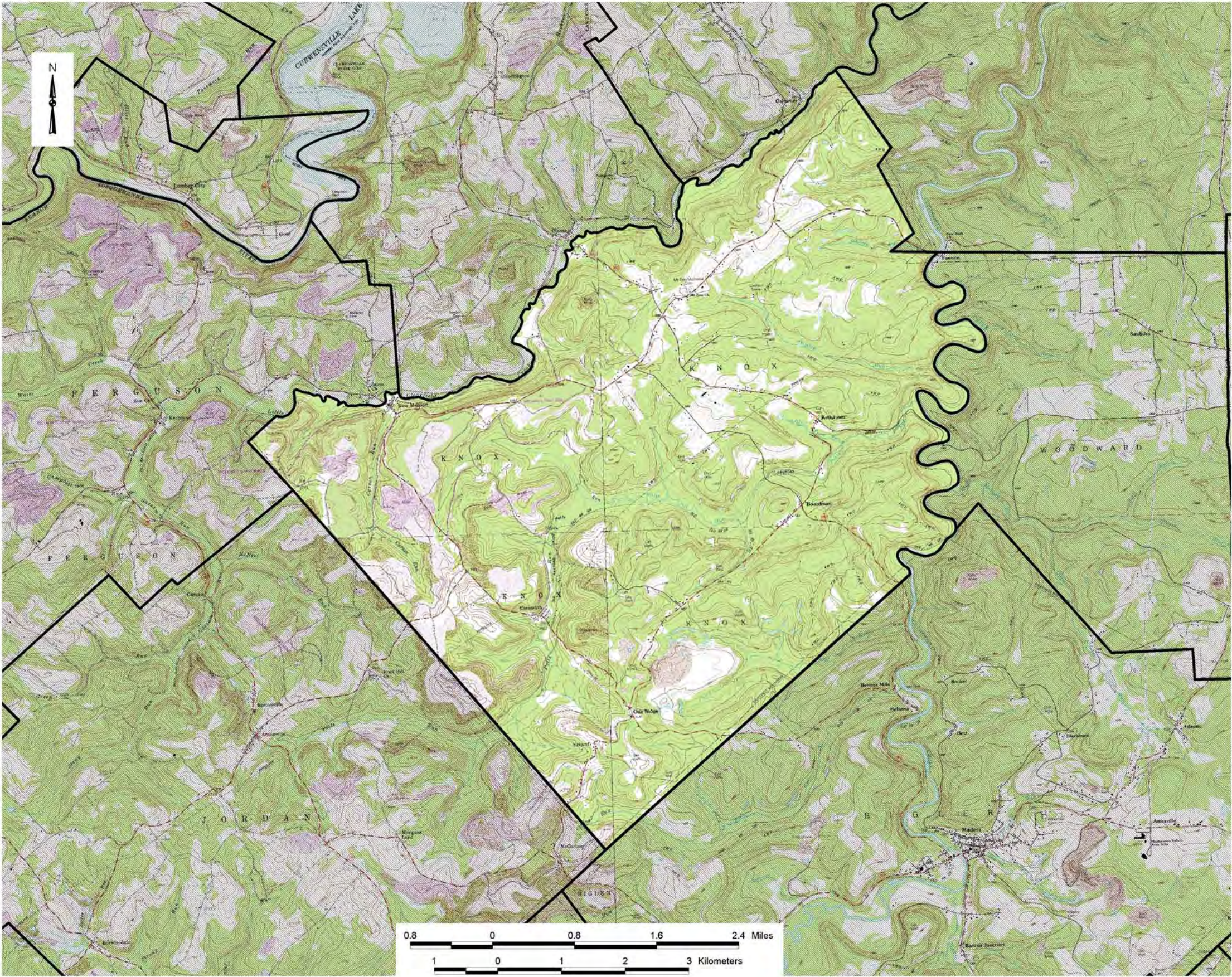
		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS: *none identified*

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Knox Township



Knox Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

None

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)**
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

KNOX TOWNSHIP

Knox Township is in the watershed of Clearfield Creek. It is 78% forested, and while 45% of the township area is also core forest habitat, blocks of contiguous forest were not sufficiently large to designate LCAs in any of the township. The somewhat extensive areas which have been strip mined are a challenge to the future ecological health of the landscape in Knox township; strip mined areas provide degraded habitat conditions for many species, and may be a barrier to the movement of some species as well. Suggested goals for improving the ecological health of the township landscape would be to improve the contiguity and ecosystem health of forested areas, building upon and connecting the largest blocks of forest; to remediate water quality problems; and to restore strip mined areas.

Lawrence Township & Clearfield Borough

		PNDI Rank		Legal Status	
		Global	State	Federal	State
		Last Seen		Quality	

NATURAL HERITAGE AREAS:

Dimeling Road BDA		Exceptional Significance			
Allegheny plum (<i>Prunus allegheniensis</i>)		G4	S2S3	1995	E
Fulton Railroad Tunnel BDA		High Significance			
Northern myotis (<i>Myotis septentrionalis</i>)		G4	S3	2000	E
Laurel Run & Saunders Run BDA		County Significance			
Shagger's Inn Impoundment BDA					
Osprey (<i>Pandion halieetus</i>)		G5	S2	2003	E
Anderson Creek-Montgomery Creek LCA		Notable Significance			
Moshannon State Forest LCA		Exceptional Significance			

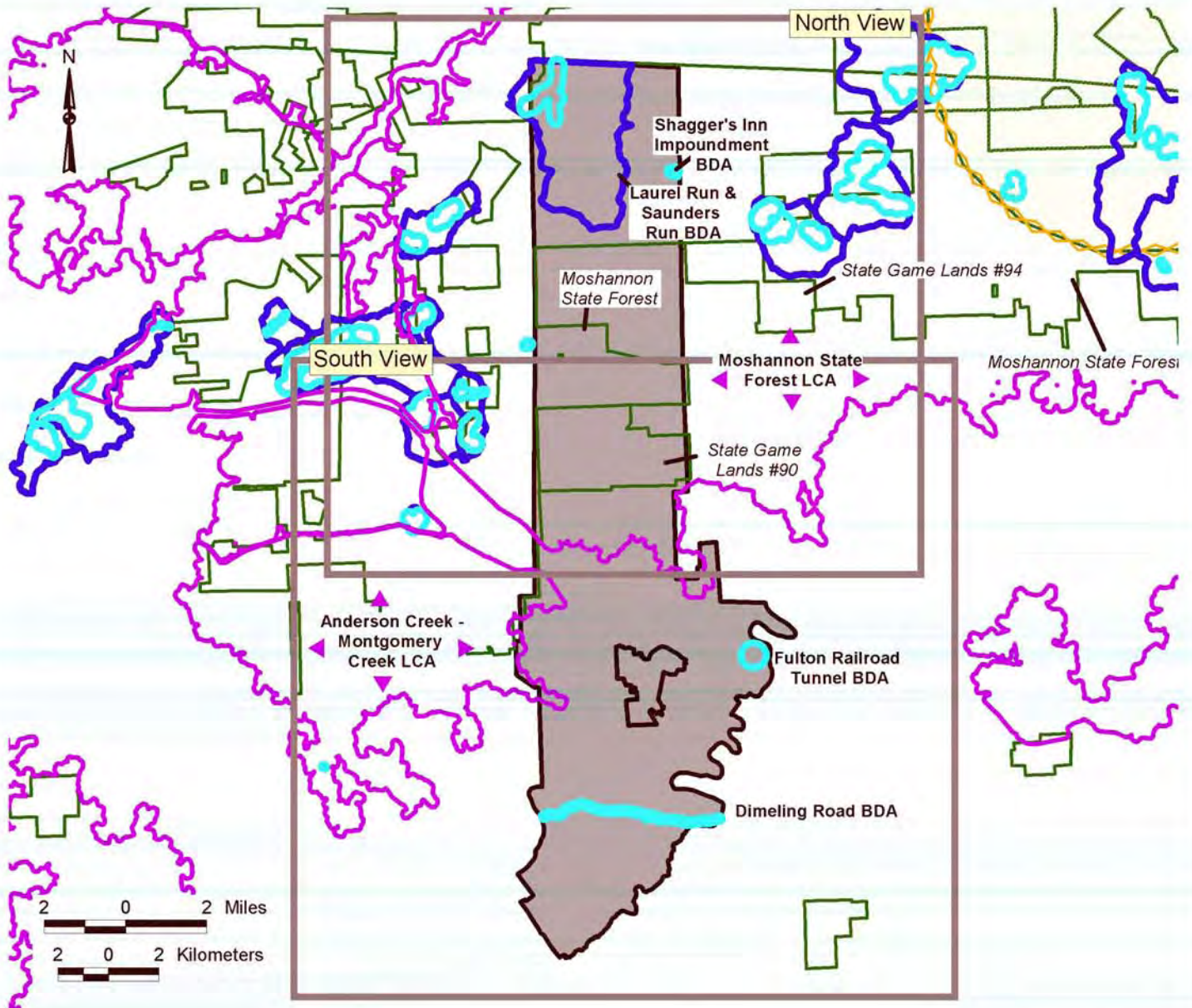
OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified



Lawrence Township & Clearfield Borough (full view summary)

Clearfield County Natural Heritage Inventory



Biological Diversity Areas:

Landscape Conservation Areas:

Managed Areas:

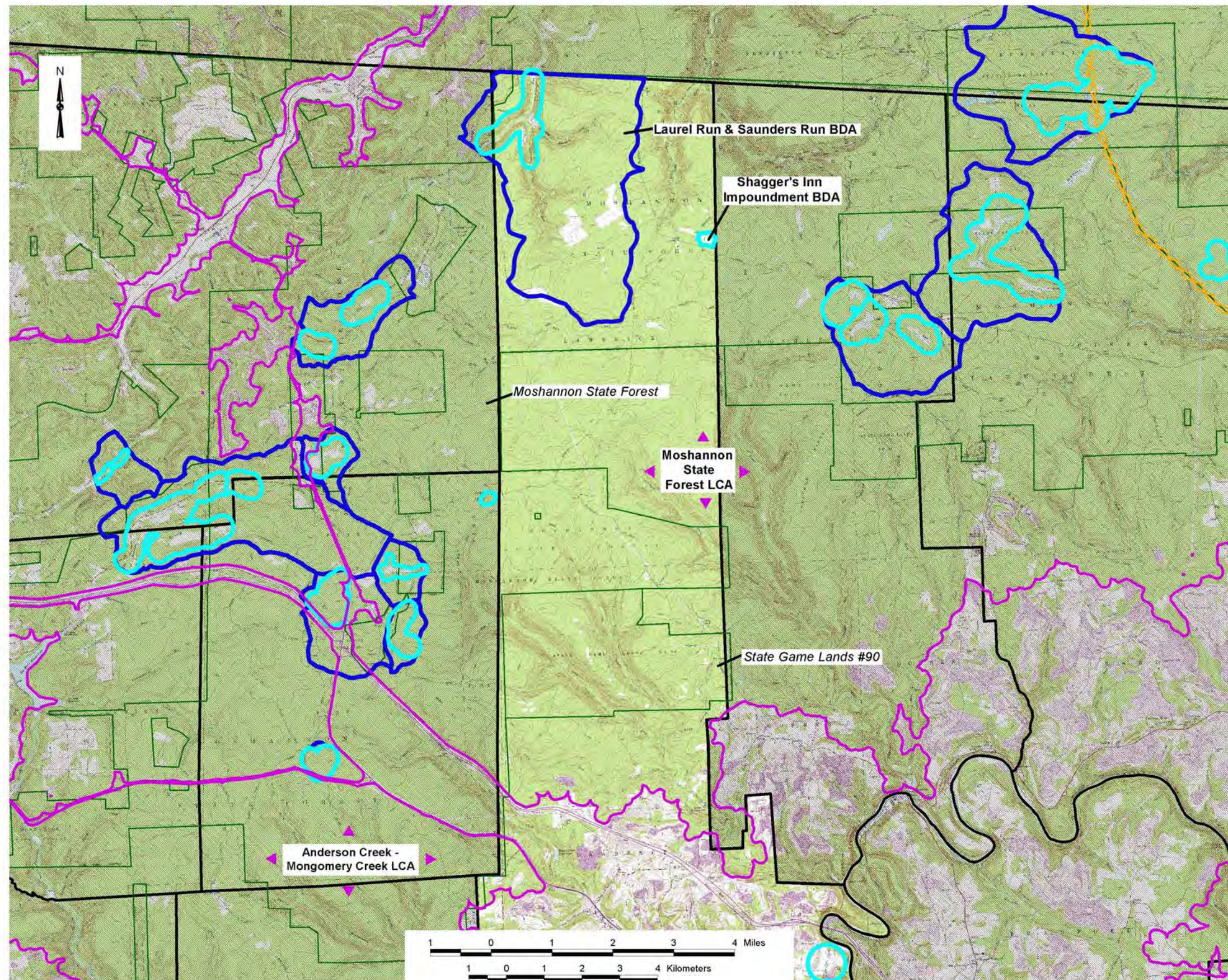
Supporting Landscape:

Dimeling Road
Fulton Railroad Tunnel
Laurel Run & Saunders Run
Shagger's Inn Impoundment

Anderson Creek - Montgomery Creek
Moshannon State Forest

Moshannon State Forest
State Game Lands #90

Lawrence Township & Clearfield Borough (north view)



Lawrence Township & Clearfield Borough (north view) Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

Laurel Run & Saunders Run
Shagger's Inn Impoundment

Landscape Conservation Areas:

Anderson Creek - Montgomery Creek
Moshannon State Forest

Managed Areas:

Moshannon State Forest
State Game Lands #90



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

LAWRENCE TOWNSHIP

Lawrence Township spans from the Elk-Clearfield county line south past the West Branch Susquehanna River to Little Clearfield Creek, its southern boundary. The watershed divide between the West Branch and the main stem of the Susquehanna River falls across the northern end of the township; Laurel Run, Saunders Run, Little Laurel Run, and Little Medix Run flow north into the main stem, while waterways to the south flow into the West Branch. The northern two-thirds of the township has highly contiguous forest cover, and makes up part of the Moshannon State Forest LCA (see pg. 34), one of the largest contiguous forest blocks in Pennsylvania. In this area, there are also unique and intact habitats along Laurel Run and Saunders Run that have been designated as a BDA. In the southern third of the township the landscape is a mixture of strip mines, forest, and urban land. Forested areas at the western edge of the township are contiguous with and make up part of the Anderson Creek-Montgomery Run LCA (see pg. 33). In other areas forest cover occurs in much smaller patches, except along Little Clearfield Creek, where there is potential for a contiguously forested riparian corridor. Recommendations for improving ecological health in the township are: stewardship of forest land, especially within the LCAs and along Little Clearfield Creek, to maintain contiguity and improve ecosystem health; restoration of a forest corridor along Montgomery Creek between the West Branch and the LCA to improve connectivity; stewardship of BDA areas; and remediation of water quality problems.

Dimeling Road BDA

Description

This area highlights a roadside where there is a population of the Allegheny plum (*Prunus allegheniensis*), a small tree species that has a very limited global range. The main portion of its range is the Appalachian mountains of central Pennsylvania, Maryland and West Virginia, and there is a disjunct population in northern Michigan as well. Clearfield County is the northeastern edge of the Appalachian population's range. The Allegheny plum is often found in dry, sandy open habitats (Natureserve 2000). It may grow singly as a small tree or shrub, or form clonal thickets. The area of the BDA is the core habitat for the species.

Threats and Stresses

Roadside maintenance activities could harm this population.

Recommendations

Herbicides should not be used along the stretch of road identified in this BDA. Road maintenance activities extending beyond the edge of pavement should not be undertaken without consultation with a botanist, to avoid damage or destruction of Allegheny plum trees.

Fulton Railroad Tunnel BDA

Description

This BDA is designated because several individuals of the northern myotis (*Myotis septentrionalis*), an animal species of special concern, were found to be using the tunnel as a winter hibernaculum. This species hibernates in caves and other sheltered environments during the winter. It has fairly specific environmental requirements for suitable hibernation habitat, and its use of the tunnel is evidence that it contains some areas with the appropriate temperature and humidity conditions. It is considered a species of special concern because a relatively low number of individuals have been

documented in Pennsylvania. It hibernates in relatively small groups compared to other species and thus is more difficult to locate than more colonial species. The area of the BDA is core habitat, including the hibernaculum and adjacent forested areas. The forested areas at the northern end of the tunnel along the West Branch Susquehanna River likely provide important foraging habitat for the animals when they emerge from hibernation.

Threats and Stresses

The species can be negatively impacted by disturbances in its hibernaculum during the winter months. Even low levels of noise, heat, or light can be sufficient to disturb this species, and individuals that are roused out of hibernation may use up the energy reserves needed to survive in the spring. Physical disturbance of the rock surrounding the tunnel or the tunnel entrances could alter internal environmental conditions, which may make it unusable for this species.

Recommendations

The tunnel should be left undisturbed during the months of November through March, which is the season when bats hibernate, and physical disturbances to the bedrock in the area should be avoided. If uninvited human traffic is a problem here, the installation of a special bat gate can serve to better secure the tunnel from frequent disturbance. However, the gate must be installed very carefully in order to prevent rendering the tunnel unusable to bats. Please consult the Pennsylvania Game Commission for assistance with bat gate installation. Blasting and other bedrock disruption should be avoided within at least 400 m of the tunnel entrance. The forested areas at the northern end of the tunnel along the West Branch Susquehanna River should be left in natural condition, and insecticide spraying should be avoided as the bats depend upon insects for food.

Laurel Run & Saunders Run BDA

Description

This BDA is designated to highlight the extensive forested seep communities that occur along the floodplains of Laurel Run and Saunders Run, as well as the intact forested watersheds that support the seep communities and the water quality of the stream.

Core Habitat Area—The floodplain of Laurel Run is broad in the core area of the BDA, with back channels and depressions meandering along the base of the slope. The non-saturated portions of the floodplain have hemlock-tuliptree-birch forest communities: there is a moderate-aged hardwood-to mixed hardwood-hemlock canopy, dominated by yellow birch (*Betula allegheniensis*) and hemlock (*Tsuga canadensis*), with green ash (*Fraxinus pensylvanica*) occasional, a moderate-density shrub layer of rhododendron (*Rhododendron maximum*) and witch hazel (*Hamamelis virginiana*), and an herb layer dominated by New York fern (*Thelypteris noveboracensis*) or needle and thread grass (*Brachyelytrum erectum*).

The seeps and back channels have a diverse wetland flora, including: buttercup (*Ranunculus* sp.), slender manna-grass (*Glyceria melicaria*), hairy buttercup (*Ranunculus hispidus*), Christmas fern (*Polystichum acrostichoides*), golden ragwort (*Senecio aureus*), long beech fern (*Phegopteris connectilis*), lady fern (*Athyrium filix-femina*), Northern wood-sorrel (*Oxalis acetosella*), intermediate wood fern (*Dryopteris intermedia*), sedges (*Carex scabrata*, *Carex scoparia*, *Carex intumescens*, *Carex gynandra*, *Carex stipata*, *Carex frankii*, *Carex torta*, *Carex leptalea*), mad-dog skullcap (*Scutellaria lateriflora*), cinnamon or interrupted fern (*Osmunda* sp.), bee balm (*Monarda didyma*), a chickweed species (*Stellaria longifolia*), crested wood fern (*Dryopteris cristata*), marsh pennywort (*Hydrocotyle americana*), jewelweed (*Impatiens capensis*), marsh marigold (*Caltha*

palustris), wood nettle (*Laportea canadensis*), mosses (*Mnium* sp., others), foamflower (*Tiarella cordifolia*), sensitive fern (*Onoclea sensibilis*), bedstraw (*Galium* sp.), horsetail (*Equisetum sylvaticum*), and golden saxifrage (*Chrysosplenium americanum*). The Fike (1999) community type this area most resembles is the skunk cabbage-golden saxifrage forest seep.

The stream bank has a rocky shore with sandy soil, and occasional vegetated terraces with a diverse mix of plant species. The most prevalent is a sedge, *Carex torta*. Other species include: silky willow (*Salix sericea*), joe-pye weed (*Eupatorium fistulosum*), a boneset species (*Eupatorium perfoliatum*), deer tongue grass (*Panicum clandestinum*), dewberry (*Rubus hispidus*), tall meadow rue (*Thalictrum pubescens*), wild clematis (*Clematis virginiana*), alder (*Alnus* sp.), flat-topped goldenrod (*Euthamia graminifolia*), rattlesnake mannagrass (*Glyceria canadensis*) fowl mannagrass (*Glyceria striata*), many-leaved bulrush (*Scirpus polyphyllus*), enchanter's nightshade (*Circaea lutetiana*), woolgrass (*Scirpus cyperinus*), swamp milkweed (*Asclepias incarnata*), blue vervain (*Verbena hastata*), a willow herb (*Epilobium* sp.), monkeyflower (*Mimulus ringens*), a sedge (*Carex stipata*), rattlesnake plaintain (*Goodyera pubescens*), wrinkle-leaf goldenrod (*Solidago rugosa*), and white wood aster (*Aster divaricatus*). A few individuals of the invasive exotic shrub multiflora rose (*Rosa multiflora*) are present.

North of the Saunders Run-Laurel Run confluence is a shrub wetland community that does not match any of the types described in the Fike 1999 classification. Shrubs form about 50% cover in the wetland. The topography is very uneven, with low sphagnum areas and drier upland mounds. Shrubs species included smooth alder (*Alnus serrulata*), steplebush (*Spiraea tomentosa*), lowbush blueberry (*Vaccinium pallidum*, *Vaccinium angustifolium*), huckleberry (*Gaylussacia baccata*), a willow species (*Salix* sp.), and a gooseberry species (*Ribes* sp.). Small trees, including hemlock (*Tsuga canadensis*) beech (*Fagus grandifolia*) and muscle beech (*Carpinus caroliniana*) were scattered. Herbs included above-mentioned wetland species, as well as several species of dry, open areas: swan's sedge (*Carex swanii*), trailing arbutus (*Epigaea repens*), dalibarda (*Dalibarda repens*); the exotic species heal-all (*Prunella vulgaris*), dock (*Rumex* sp.), and yarrow (*Achillea millefolium*); and broad-leaf cattail (*Typha latifolia*).

South of the Saunders Run-Laurel Run confluence, the land forms a point, sloping steeply down to a relatively narrow flat floodplain. The flat area is forested, with hemlock, and contains a spring and several seepage areas. The spring is mainly sphagnum, with a few herbaceous species interspersed (*Glyceria melicaria*, *Carex torta*, *Gymnocarpium* sp., *Oxalis acetosella*), while the seepage areas are more heavily vegetated and similar to above described areas.

Saunders Run is a tributary to Laurel Run. The stream is smaller and the floodplain narrower, but seeps and back channel areas are extensive. The species composition is similar to the seeps along Laurel Run. The surrounding watershed contains fairly intact, mature deciduous forest. The canopy includes red maple (*Acer rubrum*), black cherry (*Prunus serotina*), white ash (*Fraxinus americana*), muscle beech (*Carpinus caroliniana*), tulip poplar (*Liriodendron tulipifera*), sugar maple (*Acer saccharum*), black birch (*Betula lenta*), American basswood (*Tilia americana*), red oak (*Quercus rubra*), and American beech (*Fagus grandifolia*). The herb layer in most areas is dense hay-scented fern (*Dennstaedtia punctilobula*). Other species include forest sedges (*Carex laxiculmis*, *Carex debilis*, *Carex pensylvanica*), Canada mayflower (*Maianthemum canadense*), grapevine (*Vitis* sp.), Christmas fern (*Polystichum acrostichoides*), and partridgeberry (*Mitchella repens*). The lower slope of the valley and the floodplain also had patches of rhododendron (*Rhododendron maximum*).

South of the Saunders Run confluence, the floodplain of Laurel Run has less seepage influence; the main hydrological influence appears to be flooding. Well-defined back channels are present on both sides of the stream, but are without vegetation, and rocky in some areas. Additional floodplain species present here include ryegrass (*Elymus* sp.), a lily species (*Lilium* sp.), and water-parsnip (*Sium suave*). The slope to the east is forested, with red maple (*Acer rubrum*) and black birch (*Betula*

allegheniensis) dominant in the canopy, and red oak (*Quercus rubra*) occasional. Rhododendron forms a dense shrub layer, and the herb layer is generally sparse, with occasional clumps of intermediate wood fern or hay-scented fern. To the west the forest is mixed hardwoods similar to previous description.

This area has not been surveyed to document animal inhabitants. It is potential habitat for amphibians and also may host aquatic or semi-aquatic insects such as dragonflies and damselflies. Much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetland areas plus 250 m of surrounding forest that may be utilized by amphibians.

Supporting Natural Landscape—Is the immediate watershed of the seepage wetlands along Laurel and Saunders Run; this area influences the quality of the water draining into the wetlands. The site is important because the communities of note occur within a relatively mature and intact forested watershed, which greatly enhances their future health and viability.

Threats and Stresses

Core Habitat Area—Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians. Extensive canopy removal can also alter the temperature and light conditions in the wetland, leading to changes in the plant and animal species composition. Release of herbicides or pesticides could damage the wetland plant and animal species.

Supporting Natural Landscape—Earth disturbing activities or removal of forest canopy within the Saunders Run watershed or the Laurel Run watershed above the seepage communities could result in nutrient and sediment pollution of the wetlands and the streams. These activities would be particularly damaging if conducted in areas of steep slopes, as these are more vulnerable to erosion.

A powerline right-of-way crosses Laurel Run near the south end of the core area of the BDA. Runoff from any chemicals employed to maintain the right-of-way could detrimentally impact the wetland communities in the floodplain. Any bedrock disturbance in the immediate watershed could alter the natural flow of groundwater that feeds the seepage wetlands. Mining would likely result in groundwater pollution, and the accumulation of pollutants in the wetlands where the groundwater emerges to the surface.

Recommendations

Core Habitat Area—A full forest canopy should be maintained in the core area, and disturbances to the forest floor avoided. Surveys should be conducted for amphibians and invertebrates, to establish baseline information about the wetlands' diversity to guide future management decisions. Much of the biodiversity of wetlands is often found in its invertebrate taxa, while both amphibians and invertebrates can have habitat requirements needing special management.

Supporting Natural Landscape—The future health of the natural communities along Laurel Run and Saunders Run, as well as the health of the streams themselves, can best be maintained by stewarding the health of the surrounding watershed. It is recommended that forest cover removal and any earth-disturbing activities are avoided in the floodplain and on the steep slopes of the valleys, and that any

forest cover removal operations in the upper watershed be small-scale and conducted with appropriate erosion control precautions. Mining and other bedrock disturbances should not be conducted in the immediate watershed of the seepage wetlands.

Shagger's Inn Impoundment

Description

This BDA is designated because the Shagger's Inn shallow water impoundment is used as a nest site by a pair of Osprey. The Osprey is a large, fish-eating bird that declined greatly in the 1960s and 1970s because the ubiquitously released pesticide DDT inhibited its ability to reproduce. Since the banning of this compound the species has rebounded considerably. However, its population is still low in many areas across its range, and it is tracked as a species of special concern in Pennsylvania. The mapped area is core habitat.

Threats and Stresses

Disturbances in the area during breeding season may impair the birds' breeding success.

Recommendations

Loud noises and other disturbances should be minimized during the months of March-June.

CLEARFIELD BOROUGH

The landscape of Clearfield Borough is occupied mainly by the city of Clearfield and contains little natural cover. It is within the watershed of the West Branch Susquehanna River, which flows through the city. No Natural Heritage Areas were identified within the bounds of the borough.

Morris Township

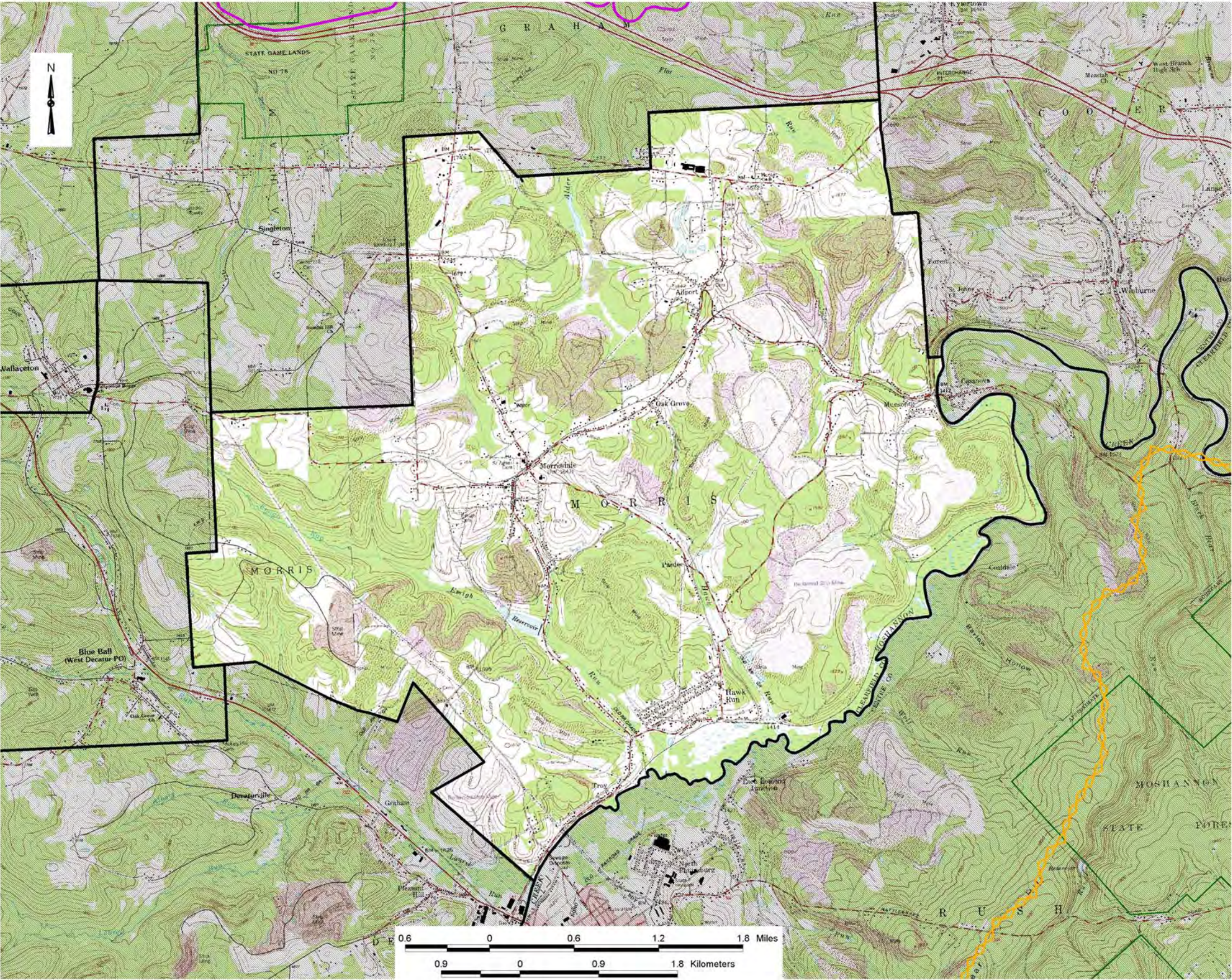
		<u>PNDI Rank</u>		<u>Legal Status</u>			
		Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS: none identified

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Morris Township



Morris Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

None

Managed Areas:

None



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

MORRIS TOWNSHIP

Most of Morris Township is in the watershed of Moshannon Creek, while Alder Run flows directly into the West Branch Susquehanna River. The ecological health of the landscape and the waterways of the township has been impaired by extensive mining. Morris Township has the highest percentage of mined area of all townships in Clearfield County, a conservative estimate is 35%. Improving ecological health in the township landscape will require remediation of mine drainage pollution, restoration of mined areas, and ecologically-informed stewardship of unmined areas with natural cover. No Natural Heritage Areas were identified within the township.

Penn Township, Grampian Borough, & Lumber City Borough

		<u>PNDI Rank</u>	<u>Legal Status</u>		
		Global	State	Federal	Last Seen Quality

NATURAL HERITAGE AREAS:

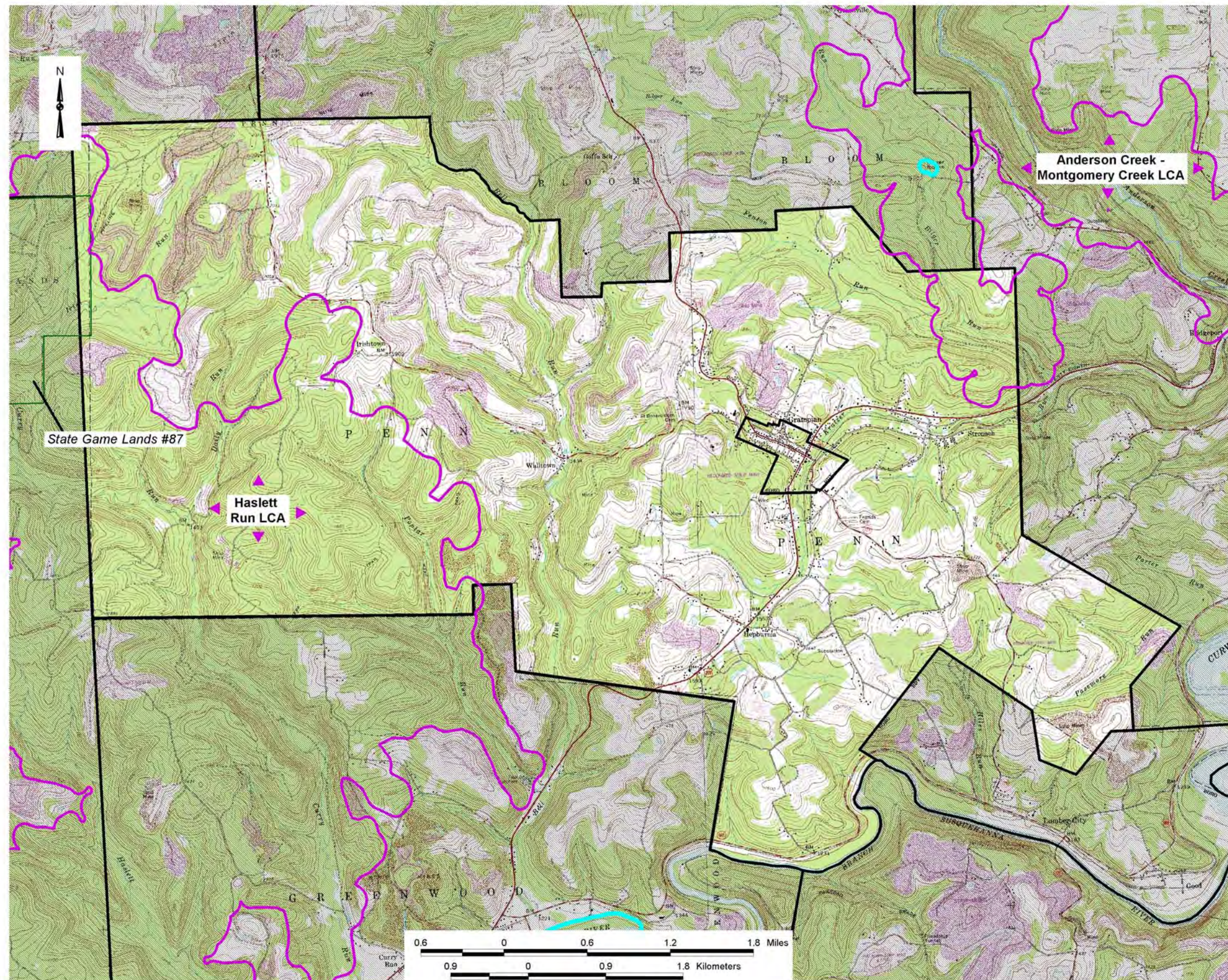
Haslett Run LCA					<i>Notable Significance</i>
-----------------	--	--	--	--	-----------------------------

Anderson Creek-Montgomery Creek LCA					<i>Notable Significance</i>
-------------------------------------	--	--	--	--	-----------------------------

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Penn Township & Grampian Borough



Penn Township & Grampian Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

Anderson Creek - Montgomery Creek
Haslett Run

Managed Areas:

State Game Lands #37



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
 -  Landscape Conservation Areas (LCA)

PENN TOWNSHIP

Penn Township falls almost entirely within the watershed of the West Branch Susquehanna River, except for a small area in the northwest corner of the township that is in the Ohio drainage. The streams of the western portion of the township— Bell Run and Curry Run—flow directly into the river, while Kratzer Run flows first to Anderson Creek. About 65% of the township is forested, while at least 20% of the township has been strip mined. In the western portion of the township there is a large block of contiguous forest that makes up about a third of the Haslett Run LCA (see pg. 30), while a smaller forested area in the northeastern corner of the township contributes to the Anderson Creek – Montgomery Run LCA (see pg. 33). The somewhat extensive areas which have been strip mined are a challenge to the future ecological health of the landscape in Penn township; strip mined areas provide degraded habitat conditions for many species, may be a barrier to the movement of some species, and usually result in water quality impairment. Goals for improving the ecological health of the township landscape would be to improve the contiguity and ecosystem health of forested areas, especially in the LCAs; to remediate water quality problems; and to restore strip mined areas.

GRAMPIAN BOROUGH

The landscape of Grampian Borough is mainly occupied by the village of Grampian. It is in the Kratzer Run watershed. No Natural Heritage Areas were identified in the borough.

LUMBER CITY BOROUGH

The borough of Lumber City falls mainly within the watershed of the West Branch Susquehanna River and its tributary Hiles Run, and is bounded to the south by the West Branch. The borough is 76% forested, but due to the density of fragmenting features very little of this area is core forest habitat. Recommendations for improving the ecological health of the township landscape are: restoration of a forested corridor along the banks of the West Branch, and forest stewardship to improve contiguity and ecosystem health. No Natural Heritage Areas were identified within the borough.

Pike Township & Curwensville Borough

	<u>PNDI Rank</u>	<u>Legal Status</u>			
	Global	State	Federal	State	Last Seen Quality

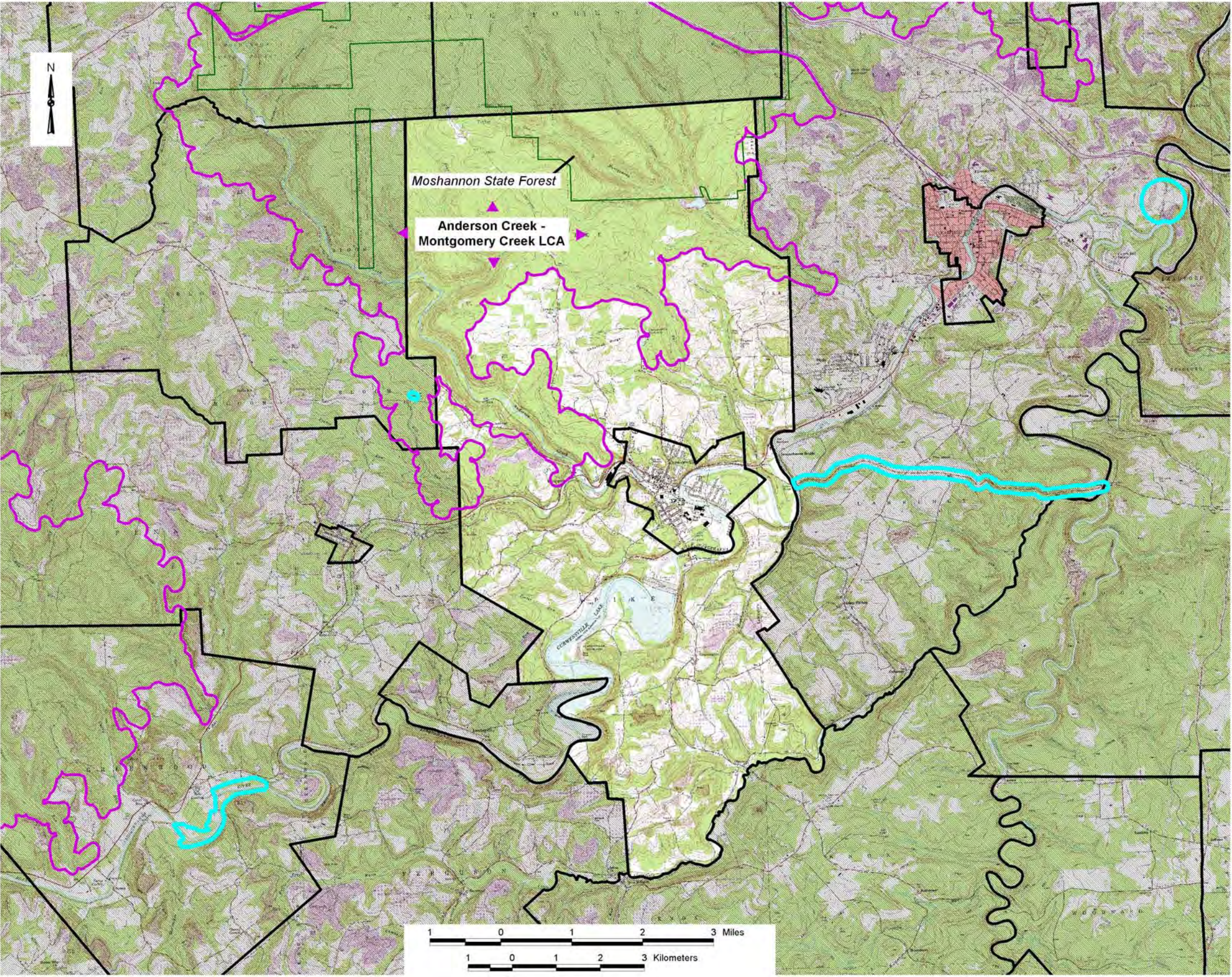
NATURAL HERITAGE AREAS:

Anderson Creek-Montgomery Creek LCA	Notable Significance				
-------------------------------------	----------------------	--	--	--	--

OTHER CONSERVATION AREAS: *none identified*

GEOLOGIC FEATURES: *none identified*

Pike Township & Curwensville Borough



Pike Township & Curwensville Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

Anderson Creek - Montgomery Creek

Managed Areas:

Moshannon State Forest



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)**
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

PIKE TOWNSHIP

Pike Township contains much of the watershed area of Anderson Creek and Montgomery Creek, two major tributaries to the West Branch Susquehanna River. The extensively forested area in the northern portion of the township that surrounds these two streams is part of the Anderson Creek – Montgomery Creek LCA (see pg. 33). This large block of contiguous forest habitat, extends from the headwaters of these streams almost to the West Branch; Anderson Creek and Montgomery Run are probably the most contiguously forested riparian corridors among the tributaries to the West Branch in Clearfield County. However, the health of the aquatic ecosystems of Anderson Creek is seriously impaired by mine drainage pollution. Recommendations for improving the ecological health of the landscape in the township are: restoration to extend the forest corridor along Anderson Creek all the way to the West Branch, perhaps focusing on a route to the west of Curwensville; stewardship of forested areas, especially in the LCA, to improve ecosystem health and contiguity; and remediation of water quality problems.

CURWENSVILLE BOROUGH

The landscape of Curwensville is mainly occupied by the town of Curwensville. It is bounded by Anderson Creek and the West Branch Susquehanna River. The development of riparian corridors along these waterways could provide a public green space and help protect against flood damage, while improving ecological contiguity between the Anderson Creek - Montgomery Creek LCA and the river.

Pine Township

		<u>PNDI Rank</u>	<u>Legal Status</u>		
		Global	State	Federal	State
				Last Seen	Quality

NATURAL HERITAGE AREAS:

Anderson Creek & Whitney Run Wetlands BDA			<i>Notable Significance</i>		
Hemlock palustrine forest			S3	2002	E

Crystal Springs Bog BDA					
Creeping snowberry (<i>Gaultheria hispidula</i>)		G5	S3	2002	E
Special plant species		G5	S2	2002	E
Bog sedge (<i>Carex paupercula</i>)		G5	S3	2002	E

Laurel Run Tributary Wetland BDA			<i>County Significance</i>		
----------------------------------	--	--	----------------------------	--	--

Left Branch Moose Creek Headwaters BDA			<i>Notable Significance</i>		
--	--	--	-----------------------------	--	--

Panther Rocks BDA			<i>High Significance</i>		
Acidic cliff			?	1989	E
Appalachian gametophyte (<i>Vittaria appalachiana</i>)		G4	S2	1989	E

SB Elliot Cabins Wetland BDA			<i>County Significance</i>		
------------------------------	--	--	----------------------------	--	--

Stony Run Headwaters Wetland BDA			<i>County Significance</i>		
----------------------------------	--	--	----------------------------	--	--

Anderson Creek-Montgomery Creek LCA			<i>Notable Significance</i>		
-------------------------------------	--	--	-----------------------------	--	--

Bennett Branch Headwaters LCA			<i>Notable Significance</i>		
-------------------------------	--	--	-----------------------------	--	--

Montgomery Run LCA			<i>County Significance</i>		
--------------------	--	--	----------------------------	--	--

Moshannon State Forest LCA			<i>Exceptional Significance</i>		
----------------------------	--	--	---------------------------------	--	--

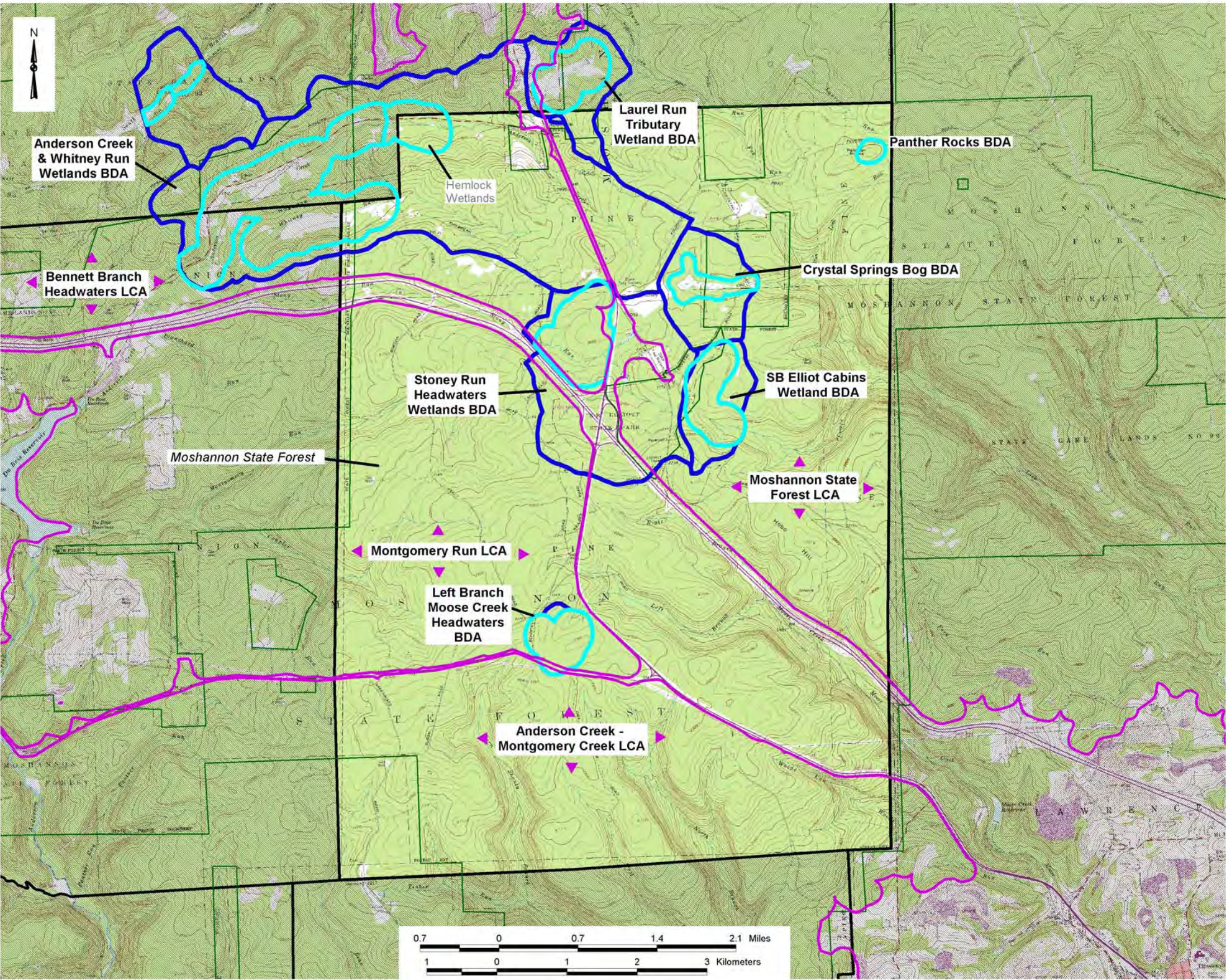
OTHER CONSERVATION AREAS:

none identified

GEOLOGIC FEATURES:

Panther Rocks, erosional remnant

Pine Township



Pine Township Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

- Anderson Creek & Whitney Run Wetlands
- Crystal Springs Bog
- Laurel Run Tributary Wetland
- Left Branch Moose Creek Headwaters
- Panther Rocks
- SB Elliot Cabins Wetland
- Stony Run Headwaters Wetlands

Landscape Conservation Areas:

- Anderson Creek - Montgomery Creek
- Bennett Branch Headwaters
- Montgomery Run
- Moshannon State Forest

Managed Areas:

- Moshannon State Forest



Map Legend

- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)



PINE TOWNSHIP

Pine Township is in the watershed of the West Branch Susquehanna River except for the very northern edge, which drains into tributaries to the main stem of the Susquehanna River. The township is 81% forested and has the highest percentage of its area in core forest habitat of any township in the county. However, I-80 and SR 153 cross through the township, and the forest is divided into three separate blocks: the Anderson Creek – Montgomery Creek LCA (see pg. 33) to the southwest, Moshannon State Forest LCA (see pg. 34) to the east, and the Bennett Branch Headwaters LCA (see pg. 32) to the north. Several unique wetland habitats are designated as BDAs within the LCAs. Forest stewardship to improve ecosystem health and contiguity is the major recommendation for this township.

Anderson Creek & Whitney Run BDA

Discussed under Huston Township—see pg. 100.

Crystal Springs Bog BDA

Description

This BDA is designated around populations of three plant species of special concern in Pennsylvania and their habitats. Two species, the bog sedge (*Carex paupercula*) and the creeping snowberry (*Gaultheria hispidula*—see fact sheet pg. 72), inhabit the wetland at the center of the BDA. The third species inhabits an adjacent upland area.

The Core Habitat Area includes the wetland and the special plant population. The wetland is in a headwaters basin, fed by surface water drainage from the surrounding watershed. The underlying and surrounding bedrock is principally sandstone and conglomerate, and thus contributes little mineral enrichment to the soil. The vegetation suggests the wetland is acidic and nutrient-poor. Several decades ago a peat harvesting operation utilized this wetland, thus there may have been a substantial peat layer in the past. Today, although sphagnum is present, there is not a deep layer.

Sphagnum and Polytrichum sp. mosses are prevalent throughout the wetland; most of the area contains a typical suite of acid-loving wetland species, with low tussocks formed around small clumps of cinnamon fern (*Osmunda cinnamomea*) and low shrubs. Shrub species include: black chokecherry (*Aronia sp.*), huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium pallidum* and *Vaccinium angustifolium*), inkberry (*Nemopanthus mucronatus*), wild raisin (*Viburnum cassinoides*), and steplebush (*Spiraea tomentosa*). Herbaceous species include: rushes (*Juncus effusus*), swamp dewberry (*Rubus hispidus*), round-leaved sundew (*Drosera rotundifolia*), bog clubmoss (*Lycopodiella inundata*), a poverty-grass species (*Danthonia sp.*), cottongrass (*Eriophorum virginicum*), white beaked-rush (*Rhynchospora alba*), bur-reed (*Sparganium chlorocarpon*) and other sedges (*Carex gynandra*, *Carex folliculata*, *Carex trisperma*, *Carex canescens*, *Carex lurida*, *Carex echinata*, *Carex atlantica*).

The eastern end, which is impounded somewhat by an old stone dam that is now breached at one end, is dominated by cranberry (*Vaccinium macrocarpon*) and woolgrass (*Scirpus cyperinus*). The western end is the broadest section of the wetland, and is also deeper in its central portion. This area contains patches of species adapted to hydric conditions, including: cattail (*Typha latifolia*), rice cutgrass (*Leersia oryzoides*), bog sedge (*Carex paupercula*), three-way-sedge (*Dulichium arundinacea*), and rattlesnake manna grass (*Glyceria canadensis*). On the southern edge, many tussocks have creeping snowberry (*Gaultheria hispidula*), as well as several species of drier forest conditions, including: Dalibarda (*Dalibarda repens*), teaberry (*Gaultheria procumbens*), a ground

pine species (*Lycopodium dendroideum*), trailing arbutus (*Epigaea repens*), and northern starflower (*Trientalis borealis*).

The Supporting Natural Landscape is the watershed surrounding the wetland. It is mainly forested, and contributes to the maintenance of water quality in the wetland and to its long-term viability. Wetlands surrounded by forest have been documented to have enhanced long-term health over wetlands surrounded by cultural land uses.

Threats and Stresses

There is a tree nursery to the west of the wetland, within its watershed. If fertilizers are applied improperly in or in excess amount, nutrient runoff may reach the wetland. Nutrient enrichment could result in changes to the species composition of the wetland. Potentially damaging runoff could also result from pest control compounds applied within the watershed.

Recommendations

Supporting Natural Landscape— Chemical pest controls should not be used within the watershed: if they are used, species-specific rather than broad-spectrum compounds are recommended to minimize harm to native species. If fertilizer is applied for tree cultivation at the nursery, care should be taken to minimize runoff, by limiting application to an amount which can be absorbed by plants, and by utilizing methods that do not leave fertilizer exposed during rainfall events. Preservation of forest cover in this area, especially in such a pattern as to connect the wetland with surrounding forested areas, is likely to enhance prospects for the long-term health of this habitat.

Laurel Run Tributary Wetland BDA

Discussed under Huston Township—see pg. 101.

Left Branch Moose Creek Headwaters

This BDA is designated around an extensive acidic headwaters wetland. The wetland does not match any of the types described by the Fike 1999 vegetation classification, and thus it cannot easily be compared to other wetland types to evaluate its statewide significance. However, it is locally significant as a minimally disturbed natural wetland habitat embedded in relatively mature, intact forest. In comparison to other wetlands surveyed in the county, it is in very good condition and its surrounding areas are very intact. It is also the only wetland in Clearfield County found to have pitch pine (*Pinus rigida*); it may be an example of a community similar to a type of wetland found in the Poconos.

The wetland is mainly herbaceous vegetation, but also includes shrub patches of varying density, and scattered pitch pine (*Pinus rigida*) and black gum (*Nyssa sylvatica*) trees. *Sphagnum* and *Polystichum* moss are common throughout the wetland. The dominant herbaceous species is northern long sedge (*Carex folliculata*); other species include tawny cottongrass (*Eriophorum virginicum*), cinnamon or interrupted fern (*Osmunda* sp.), swamp dewberry (*Rubus hispidus*), several sedge species (*Carex trisperma*, *Carex gynandra*, *Carex canescens*), woolgrass (*Scirpus cyperinus*), a rush (*Juncus brevicaudatus*), screwstem (*Bartonia virginica*), and a bentgrass species (*Agrostis* sp.). Shrub species include inkberry (*Nemopanthus mucronatus*), huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium angustifolium*), arrow-wood (*Viburnum recognitum*), black chokecherry (*Aronia* sp.), and winterberry (*Ilex verticillata*).

In low-lying areas near the wetland, the surrounding forest was semi-palustrine. The canopy included black gum (*Nyssa sylvatica*), hemlock (*Tsuga canadensis*), red oak (*Quercus rubra*), white pine (*Pinus strobus*), and yellow birch (*Betula allegheniensis*). There is a moderately dense layer of tall shrubs, primarily mountain laurel (*Kalmia latifolia*) and witch hazel (*Hamamelis virginiana*). The herbaceous layer included patches of sphagnum and cinnamon or interrupted fern (*Osmunda* sp.), as well as terrestrial species such as New York fern (*Thelypteris noveboracensis*), goldthread (*Coptis trifolia*), bracken fern (*Pteridium aquilinum*), starflower (*Trientalis borealis*), and spreading ricegrass (*Oryzopsis asperifolia*). Further upland the forest canopy transitions to mainly red maple (*Acer rubrum*) and red oak (*Quercus rubra*).

Surveys have not been conducted to document animal species utilizing the wetland; it may provide suitable habitat for amphibians, as well as semi-aquatic insects such as dragonflies and damselflies. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the wetland area and a surrounding buffer of 250 m of forest are designated Core Habitat Area.

The immediate watershed of the wetland is the Supporting Natural Landscape; as the wetland is in the headwaters and the watershed is small, there is only a small area of the watershed that extends outside of the core habitat area.

Threats and Stresses

Core Habitat Area—State Route 322 passes within 200 m of the wetland to the south. While the broad topography and the forested buffer likely afford some protection against pollutant runoff, the distance is within the area around the wetland that may be used by amphibians. Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Recommendations

Core Habitat Area—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbance to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions. The forest between the wetland and the two major highways in its close proximity should be left intact, to buffer the impact of noise pollution and runoff.

Panther Rocks BDA

Description

This BDA is designated around a geologic feature, Panther Rocks, which provides habitat for a plant species of special concern in Pennsylvania, the Appalachian gametophyte (*Vittaria appalachiana*—see fact sheet on pg. 51). The BDA is Core Habitat Area; no Supporting Natural Landscape area was designated.

Threats and Stresses

Foot traffic on the rock formation could potentially damage the Appalachian gametophyte populations, although they may be somewhat protected by their tendency to grow deep within the rock formation in inaccessible areas. As the Appalachian gametophyte lives only in extremely sheltered conditions within rockhouse formations, it is likely to be very sensitive to any change in the microclimatic conditions, especially any decrease in moisture levels, or increased exposure to wind and temperature variation.

Recommendations

The fern's safety might be enhanced through signs informing visitors of its presence and describing its habitat and unique characteristics. In order to maintain the microclimate conditions needed by the fern within the rock formation, forest cover surrounding the rocks will need to remain intact.

SB Elliot Wetland BDA

Description

This BDA is designated around a wetland. The plant species composition of the wetland does not fit any of the community types described in the Pennsylvania Terrestrial and Palustrine Community Classification (Fike 1999), and thus cannot be easily compared to other wetlands to determine its uniqueness in the state. However, the plant species composition is similar to other wetlands observed in the high plateau region of the county, suggesting it is unlikely to be of state significance. It is of local significance because natural wetlands provide habitat that many species require for survival.

Core Habitat Area—The vegetation is mainly herbaceous in the central portion, which appears to remain wet for most of the year. Around the outside edges, which appear to experience very dry conditions later in the season, lowbush blueberry (*Vaccinium angustifolium* and *Vaccinium pallidum*) forms a dense thicket. Stumps in the wetland indicate it was forested relatively recently.

In the central, saturated portion of the wetland, portions are dominated by patches of northern awned sedge (*Carex gynandra*) or northern long sedge (*Carex folliculata*). Woolgrass and cinnamon- or interrupted- fern form tussocks. In low areas, there are round-leaved sundew (*Drosera rotundifolia*), bog clubmoss (*Lycopodiella inundata*), and white beaked-rush (*Rhynchospora alba*). Swamp dewberry (*Rubus hispidus*), tawny cottongrass (*Eriophorum virginicum*), *Sphagnum* sp. moss, and *Polystichum* sp. moss are ubiquitous. Other species include cowheat (*Melampyrum lineare*), water horehound (*Lycopus* sp.), small green woodland orchid (*Platanthera clavellata*), broad-leaved cattail (*Typha latifolia*). In some areas peat accumulations are at least a foot deep. Although the wetland is predominantly herbaceous, lowbush blueberry, huckleberry and small trees are scattered occasionally.

The higher areas at the wetland edges are mainly dense lowbush blueberry (*Vaccinium angustifolium*, and scattered *Vaccinium pallidum* clumps as well), with bracken fern (*Pteridium aquilinum*), needle-and-thread grass (*Brachyelytrum erectum*), northern oatgrass (*Danthonia compressa*), and teaberry (*Gaultheria procumbens*) also dominant in places.

At northern end and along western border, the transition from wetland to hardwood forest is fairly abrupt. At southern end, a stream leads out of the wetland, with palustrine hemlock-mixed hardwood forest immediately surrounding it. Herbaceous species include northern awned sedge (*Carex gynandra*), northern long sedge (*Carex folliculata*), bladder sedge (*Carex intumescens*), three-seeded sedge (*Carex trisperma*), goldthread (*Coptis trifolia*), New York fern (*Thelypteris noveboracensis*), slender manna-grass (*Glyceria melicaria*), Indian cucumber root (*Medeola virginica*), and starflower

(*Trientalis borealis*). Further south the forest becomes more scattered hardwoods (*Fagus grandifolia*, *Acer rubrum*, *Betula sp.*), eventually opening to another small wetland much like the northern area, but with more shrub cover and the additional species false hellebore (*Veratrum viride*).

This area has not been surveyed to document animal inhabitants. It is potential habitat for amphibians and aquatic or semi-aquatic insects such as dragonflies and damselflies, and much of the biodiversity of wetlands often consists of these taxa. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159 to 290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetlands plus 250 m of surrounding forest that may be amphibian habitat.

The Supporting Natural Landscape is the immediate watershed of the wetland; much of it is forested. The watershed influences the water quality of the wetland, and its current forested condition supports the long-term health and viability of the wetland community (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Core Habitat Area—Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls, or other discharge of toxic materials within the watershed of the wetland may harm wetland flora and fauna.

Recommendations

Core Habitat Area—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbance to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—Chemical weed and pest controls and other discharge of toxic materials should be avoided within the watershed.

Stony Run Headwaters Wetland BDA

Description

This BDA highlights an extensive wetland complex in the headwaters of Stony Run.

Core Habitat Area—The wetland includes several different community types associated with the broad range of hydrological conditions across the site. An active beaver dam has inundated part of the wetland area, and appears to be changing the character of surrounding areas as well. The plant species composition does not fit any of the community types described in the Pennsylvania Terrestrial and Palustrine Community Classification (Fike 1999), and thus cannot be easily compared to other

wetlands to determine its uniqueness in the state. The plant species composition is similar to other wetlands observed in the high plateau region of the county, which suggests it is unlikely to be of state significance. Locally, the area is somewhat unique because it hosts a broad range of community types and contains fairly deep peat in some areas.

Broad outlying areas of the wetland are only seasonally inundated; these are characterized by tussocks of cinnamon- or interrupted- fern (*Osmunda sp.*) as the dominant herbaceous vegetation. Sphagnum moss and three-seeded sedge (*Carex trisperma*) are also common, and other sedges (*Carex folliculata*, *Carex projecta* or *crisatella*) scattered among the fern tussocks.

The predominant vegetation at the site is a mosaic of shrub and herbaceous species, variably dominated by different sedge and shrub species. Prevalent sedge species include *Carex echinata*, *Carex canescens*, *Carex folliculata*, *Carex gynandra*, *Carex intumescens*, and woolgrass (*Scirpus cyperinus*). Shrubs present include lowbush blueberry (*Vaccinium angustifolium* and *Vaccinium pallidum*), with-rod (*Viburnum cassinoides*), steeplebush (*Spiraea tomentosa*), huckleberry (*Gaylussacia baccata*), arrow-wood (*Viburnum recognitum*), mountain laurel (*Kalmia latifolia*), winterberry (*Ilex verticillata*), inkberry (*Nemopanthus mucronatus*), and sweetfern (*Comptonia peregrina*). Other species present are swamp dewberry (*Rubus hispidus*), poverty grass (*Danthonia spicata*), needle and thread grass (*Brachyelytrum erectum*), teaberry (*Gaultheria procumbens*), running-pine (*Lycopodium clavatum*), ground pine (*Lycopodium hickeyi*), New York fern (*Thelypteris noveboracensis*), deer tongue grass (*Panicum clandestinum*), swamp candles (*Lysimachia sp.*), rattlesnake mannagrass (*Glyceria canadensis*), wrinkle-leaved goldenrod (*Solidago rugosa*), a sedge species (*Carex debilis*), rice cutgrass (*Leersia oryzoides*), cutgrass (*Leersia virginica*), fowl mannagrass (*Glyceria striata*), soft rush (*Juncus effusus*), and leafy bulrush (*Scirpus polyphyllus*).

Sapling and adult trees are scattered, and include: Pitch pine (*Pinus rigida*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), white oak (*Quercus alba*), black gum (*Nyssa sylvatica*), and yellow birch (*Betula allegheniensis*). The northern end becomes boggy, with general sphagnum cover, sedge and cottongrass (*Eriophorum virginicum*) tussocks, round-leaved sundew (*Drosera rotundifolia*), and areas of open muck with standing water.

Surveys have not been conducted to document animal species utilizing the wetland; it may provide suitable habitat for amphibians, as well as semi-aquatic insects such as dragonflies and damselflies. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetlands plus 250 m of surrounding forest that may be amphibian habitat.

The Supporting Natural Landscape is the immediate watershed of the wetland; much of it is forested. The watershed influences the water quality of the wetland, and its current forested condition supports the long-term health and viability of the wetland community (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Core Habitat Area— Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls within the watershed of the wetland may harm wetland flora and fauna. The watershed of the wetland contains two major highways, I-80 and SR 153, which isolate the wetland on three sides from surrounding natural areas. Highway runoff also contains many water quality pollutants; although studies show these compounds mainly accumulate within 50 m of the roadside, the high traffic volume and the possibility of local hydrological patterns conducting runoff into the wetland raises concern that pollutants could be reaching the wetland. See Anderson Creek BDA, pg. 100, for further information on road runoff pollution.

Recommendations

Core Habitat Area—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbance to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—Chemical weed and pest controls, as well as other discharges of toxic materials, should be avoided within the watershed. The wetland should be evaluated to determine whether highway runoff pollutants are accumulating within it.

Sandy Township, Dubois City, & Falls Creek Borough

<u>PNDI Rank</u>		<u>Legal Status</u>			
Global	State	Federal	State	Last Seen	Quality

NATURAL HERITAGE AREAS:

Laborde Branch Wetlands BDA					
-----------------------------	--	--	--	--	--

Sandy Lick Creek Wetlands BDA		<i>High Significance</i>			
Highbush cranberry (<i>Viburnum trilobum</i>)	G5T5	S3S4		2002	D
Northern myotis (<i>Myotis septentrionalis</i>)	G4	S3		1996	E
Heron rookery (<i>Ardea herodias</i>)	G5	S3S4		2003	E

Wolf Run Wetland BDA		<i>Notable Significance</i>			
----------------------	--	-----------------------------	--	--	--

Bennett Branch Headwaters LCA		<i>Notable Significance</i>			
-------------------------------	--	-----------------------------	--	--	--

SGL # 77 LCA		<i>Notable Significance</i>			
--------------	--	-----------------------------	--	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Sandy Township, Dubois City & Falls Creek Borough

Sandy Township, Dubois City & Falls Creek Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

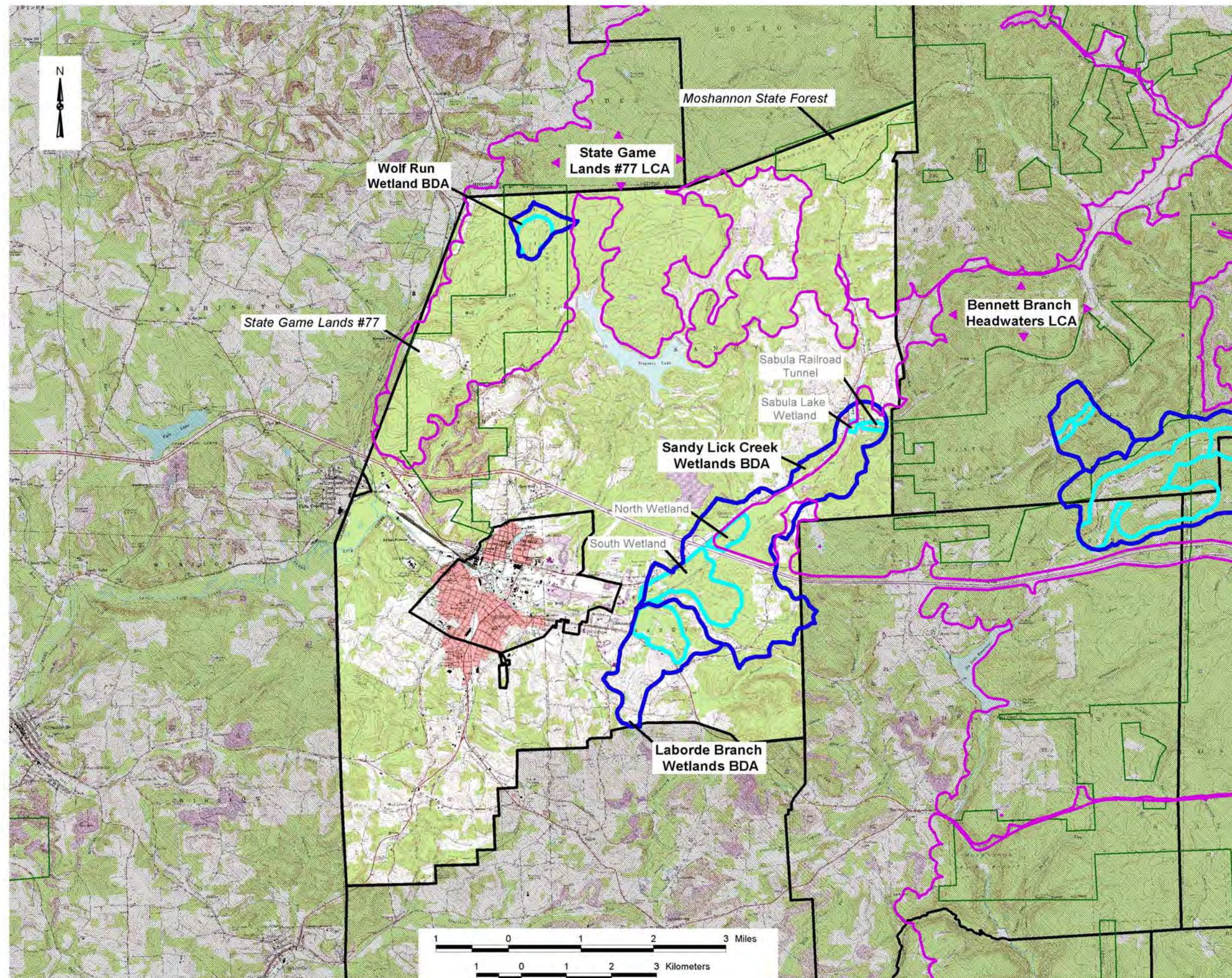
Laborde Branch Wetlands
Sandy Lick Creek Wetlands
Wolf Run Wetlands

Landscape Conservation Areas:

Bennett Branch Headwaters
State Game Lands #77

Managed Areas:

Moshannon State Forest
State Game Lands #77



Map Legend



-  Important Bird Areas (IBA)
-  Managed Lands
- Biological Diversity Areas (BDA)
 -  Supporting Natural Landscape
 -  Core Habitat
-  Landscape Conservation Areas (LCA)

SANDY TOWNSHIP

Sandy Township falls almost entirely within the watershed of the Allegheny River, except for the northern and eastern edges, which drain into the Susquehanna. The township is 77% forested, but only 36% core forest habitat. Three large patches of forest in the north of the township connect in Elk County to form the SGL #77 LCA (see pg. 32). The landscape along Sandy Lick Creek and the Laborde Branch is unique in the county because its broad topography has facilitated the development of extensive wetlands along these streams. These communities are recognized as the Sandy Lick Creek and Laborde Branch BDAs. Recommendations for improving ecological health in the landscape of the township are: stewardship and restoration of the wetland BDAs and their surrounding landscape, especially focused on maintaining connectivity of the wetlands with Moshannon State Forest LCA to the east; and stewardship of forested lands, especially within LCAs, to maintain ecosystem health and contiguity.

Sandy Lick Creek & Laborde Branch Wetlands BDA

Description

Between the dam at Lake Sabula and the city of Dubois, Sandy Lick Creek meanders through relatively flat topography, and many wetlands have developed along its banks. Various portions of the wetlands have been disturbed by other uses and are not in pristine condition, but do provide habitat for many species, including two features of special concern in Pennsylvania: a heron rookery, and a population of the highbush cranberry (*Viburnum trilobum*). The heron rookery is in the South Wetland core area, while the highbush cranberry is in the Sabula Lake Wetland core area. This BDA also contains an old railroad tunnel that is used by an animal species of special concern in PA. The Sabula Railroad Tunnel core area is the area of concern for this species. The Laborde Branch joins Sandy Lick Creek just above the city of Dubois, and also contains areas of wetland habitat in its immediate watershed, the Laborde Branch Wetlands core area.

The wetlands are variable in composition, including many saturated- to hydric herbaceous-dominated areas, as well as shrub or palustrine forested areas. Native species include: ostrich fern (*Matteuccia struthiopteris*), marsh St. Johnswort (*Triadenum sp.*), a bur-reed species (*Sparganium sp.*), jewelweed (*Impatiens sp.*), sensitive fern (*Onoclea sensibilis*), steeplebush (*Spiraea tomentosa*).

The Great Blue Heron is a species of waterbird which breeds in colonies of up to several hundred nesting pairs. Colonies of nests are called “rookeries;” the birds tend to prefer large, mature oak, beech, and sycamore trees, and may return to the same site for many years. Herons feed primarily on small fish. They may forage up to 15 kilometers from the rookery site.

See Fulton Railroad Tunnel BDA (pg. 114) for discussion of the Northern myotis (*Myotis septentrionalis*) and its habitat needs.

Supporting Natural Landscape for this BDA is the immediate watershed of the wetlands, upon which the water quality of the wetlands depends.

Threats and Stresses

Core Areas—Several invasive species have sizable populations, but have not yet displaced native species in all areas: Morrow’s honeysuckle (*Lonicera morrowii*), reed canarygrass (*Phalaris arundinacea*), and yellow iris (*Iris pseudacris*). A heavily trafficked road, SR 255, follows the creek in this area, influencing the natural hydrology of the area and probably resulting in greater impoundment of water between the road and the creek. The months of April-June are the herons’

breeding season, and they will be sensitive to loud noises or physical intrusions in the vicinity of the rookery, up to a distance of ~300 m (Quinn and Milner 1999).

Supporting Natural Landscape—there are several potential sources of water quality pollution within the watershed. SR 255 is very close to the wetland areas, I-80 crosses over the watershed, and there are several dirt roads as well; see Anderson Creek Wetlands BDA, pg. 100, for discussion of road-related pollution. Industrial activities within the watershed are also a potential source of pollutants.

Recommendations

Core Habitat Areas—In the wetland areas, further disturbances of greater intensity than unmotorized recreational traffic should be avoided because of the sensitivity of these habitats. Human visitors to the South Wetland core area—the area of the heron rookery— should keep a distance of at least 300 m during the months of April-June. Other disturbances resulting in loud noises— such as blasting, vehicle traffic, or shooting— should also be avoided during these months. See the Fulton Railroad Tunnel BDA recommendations regarding the Northern myotis (pg. 114).

Supporting Natural Landscape—Within the watershed and along the roads that border the wetlands, chloride-based salts should not be used. Calcium magnesium acetate is an effective alternative de-icer that does not have the detrimental environmental impacts of the chloride-based de-icers. See Anderson Creek Wetlands BDA, pg. 100, for further recommendations to minimize road-related pollution. Foraging areas for the herons, especially wetlands, within a minimum radius of 4 km (2.5 miles) the colony should be protected from development and should have a surrounding disturbance free buffer zone of at least 100 m (328 ft) (Quinn and Milner 1999). Discharges associated with industrial activities should be carefully monitored to assure that they do not contain harmful compounds at unsafe levels.

Wolf Run Wetland BDA

Description

This BDA is drawn around an extensive acidic headwaters wetland with a diverse flora.

Core Habitat Area—The wetland is situated in the center of a large forested area in State Game Lands #77, in a broad depression where several drainages converge to form a tributary to Wolf Creek. Most of the wetland is a mosaic of patches dominated by different herbaceous and shrub species; the species composition of the shrub and herb areas does not fit any of the community types described in the Pennsylvania Terrestrial and Palustrine Community Classification (Fike 1999), and thus cannot be easily compared to other wetlands to determine its uniqueness in the state. However, relative to other wetlands in the high plateau physiographic region of Clearfield County, the plant community is diverse, including several species not documented from any other site. In the north-central portion of the wetland, there is a hemlock palustrine forest community, a type considered of special concern in Pennsylvania. This site is also the only relatively undisturbed headwaters wetland of natural origin documented from the portion of Clearfield County that falls in the Allegheny River watershed.

In the open portion of the wetland, herbaceous species include: swamp dewberry (*Rubus hispidus*), several sedge species (*Carex intumescens*, *Carex scoparia*, *Carex gynandra*), round-leaved sundew (*Drosera rotundifolia*), nodding ladies'-tresses (*Spiranthes cernua*), needle and thread grass (*Brachyelytrum erectum*), woolgrass (*Scirpus cyperinus*), tawny cottongrass (*Eriophorum virginicum*), marsh fern (*Thelypteris palustris*), cattail (*Typha latifolia*), rice cutgrass (*Leersia oryzoides*), wrinkle-leaved goldenrod (*Solidago rugosa*), a bur-reed (*Sparganium* sp.), and heart-leaved tearthumb (*Polygonum sagittatum*). Shrubs species include lowbush blueberry (*Vaccinium angustifolium*), black chokecherry (*Aronia* sp.), willow (*Salix* sp.), and winterberry (*Ilex verticillata*).

The hemlock palustrine forest has a sphagnum substrate, with many raised hummocks forming over root structures. Shrubs, including spicebush (*Lindera benzoin*) and witch hazel (*Hamamelis virginiana*), and young hemlocks are plentiful. Additional herbaceous species in this area include: slender manna-grass (*Glyceria melicaria*), purple-stemmed aster (*Aster puniceus*), scabrous sedge (*Carex scabrata*), and three-seeded sedge (*Carex trisperma*.)

Surveys have not been conducted to document animal species utilizing the wetland; it may provide suitable habitat for amphibians, as well as semi-aquatic insects such as dragonflies and damselflies. Some of these species primarily inhabit wetlands, while others also depend on upland areas surrounding a wetland for habitat. Because amphibians may depend on surrounding habitat up to a distance of 159-290 meters (Semlitsch and Bodie 2003), the core habitat area includes the wetland itself plus 250 m of surrounding forest that may be amphibian habitat.

The Supporting Natural Landscape is the immediate watershed of the wetland; it is almost entirely forested. The watershed influences the water quality of the wetland, and its current forested condition supports the long-term health and viability of the wetland community (Mensing et al. 1998, Findlay and Bourdages 2000, Spackman and Hughes 1995, Barclay 1980, Karr and Schlosser 1978).

Threats and Stresses

Core Habitat Area—Amphibians are sensitive to the physical structure and microclimatic conditions (i.e., temperature, moisture level) on the forest floor. Forest canopy removal within this area may negatively impact the quality of the habitat for amphibians by increasing temperatures and decreasing humidity on the forest floor. Compaction, removal or disruption of herbaceous growth and organic debris, or other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Supporting Natural Landscape—Use of chemical weed and pest controls or other discharge of toxic materials within the watershed of the wetland may harm wetland flora and fauna.

Recommendations

Core Habitat Area—Based on the area range which amphibians may occupy surrounding the wetland, it is recommended that a full forest canopy be maintained and disturbance to the forest floor be avoided within 250 m of the wetland edge in order to avoid detrimentally impacting amphibian populations. Further surveys to document amphibian and insect species utilizing the wetland are also recommended, as these groups are likely to form a significant component of the wetland's biodiversity, to provide a baseline to guide future management decisions.

Supporting Natural Landscape—Chemical weed and pest controls and other discharges of toxic materials should be avoided within the watershed.

DUBOIS CITY

The city landscape is largely urban. Sandy Lick Creek runs through the city, and the area within the city limits is all within the Sandy Lick Creek watershed. No Natural Heritage Areas were identified within the city.

FALLS CREEK BOROUGH

The borough landscape is occupied by the village of Falls Creek. It falls across the watershed divide between Wolf Run to the northeast and Sandy Lick Creek to the southwest. No Natural Heritage Areas were identified within the borough.

Union Township

	<u>PNDI Rank</u>	<u>Legal Status</u>		
	Global	State	Federal	State
				Last Seen Quality

NATURAL HERITAGE AREAS:

Anderson Creek & Whitney Run Wetlands BDA		Notable Significance		
Hemlock palustrine forest		S3	2002	E

Sandy Lick Creek Wetlands BDA		High Significance		
Highbush cranberry (<i>Viburnum trilobum</i>)	G5T5	S3S4	2002	D
Northern myotis (<i>Myotis septentrionalis</i>)	G4	S3	1996	E
Heron rookery (<i>Ardea herodias</i>)	G5	S3S4	2003	E

Anderson Creek-Montgomery Creek LCA		Notable Significance		
-------------------------------------	--	----------------------	--	--

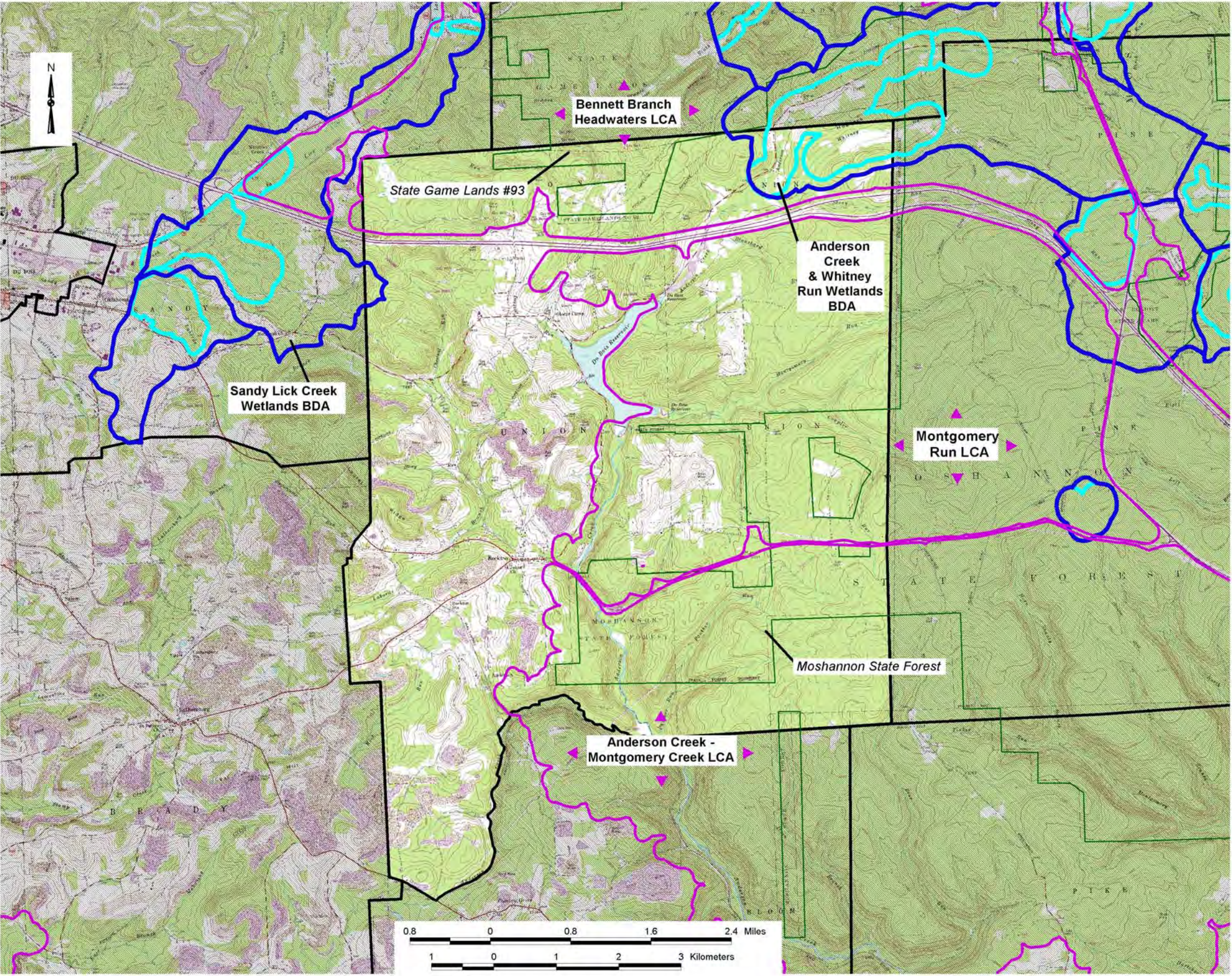
Bennett Branch Headwaters LCA		Notable Significance		
-------------------------------	--	----------------------	--	--

Montgomery Run LCA		County Significance		
--------------------	--	---------------------	--	--

OTHER CONSERVATION AREAS: none identified

GEOLOGIC FEATURES: none identified

Union Township



Union Township

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

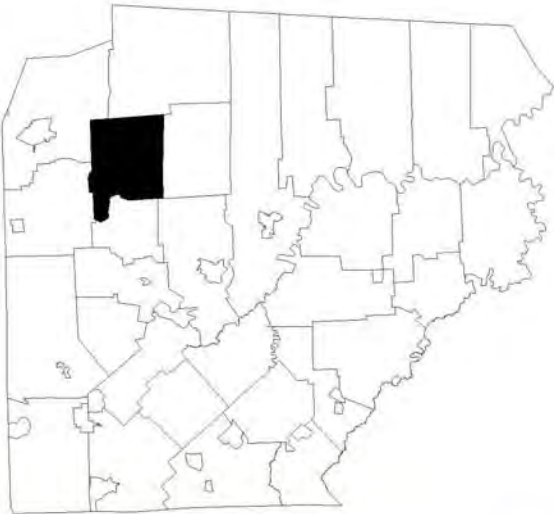
Anderson Creek & Whitney Run Wetlands
Sandy Lick Creek Wetlands

Landscape Conservation Areas:

Anderson Creek - Montgomery Creek
Bennett Branch Headwaters
Montgomery Run

Managed Areas:

Moshannon State Forest
State Game Lands #93



Map Legend



- Important Bird Areas (IBA)
- Managed Lands
- Biological Diversity Areas (BDA)**
 - Supporting Natural Landscape
 - Core Habitat
- Landscape Conservation Areas (LCA)

UNION TOWNSHIP

The eastern continental divide crosses through Union Township, separating the Susquehanna River basin from the Ohio River basin. The landscape of the township is 85% forested, with a high degree of contiguity in most areas. However, the forest is divided by the two major highways— US route 322 and I-80— that cross through the township, into blocks that contribute to three separate LCAs: Bennett Branch Headwaters LCA (see pg. 32) to the north, Montgomery Run LCA (see pg. 34) between I-80 and US route 322, and Anderson Creek – Montgomery Creek LCA (see pg. 33) to the south. Forest stewardship to maintain contiguity and improve ecosystem health, especially in LCA areas, is recommended in this township.

Anderson Creek & Whitney Run Wetlands BDA

Discussed under Huston Township—see pg. 100.

Sandy Lick Wetlands BDA

Discussed under Sandy Township—see pg. 134.

Woodward Township, Brisbin Borough, & Houtzdale Borough

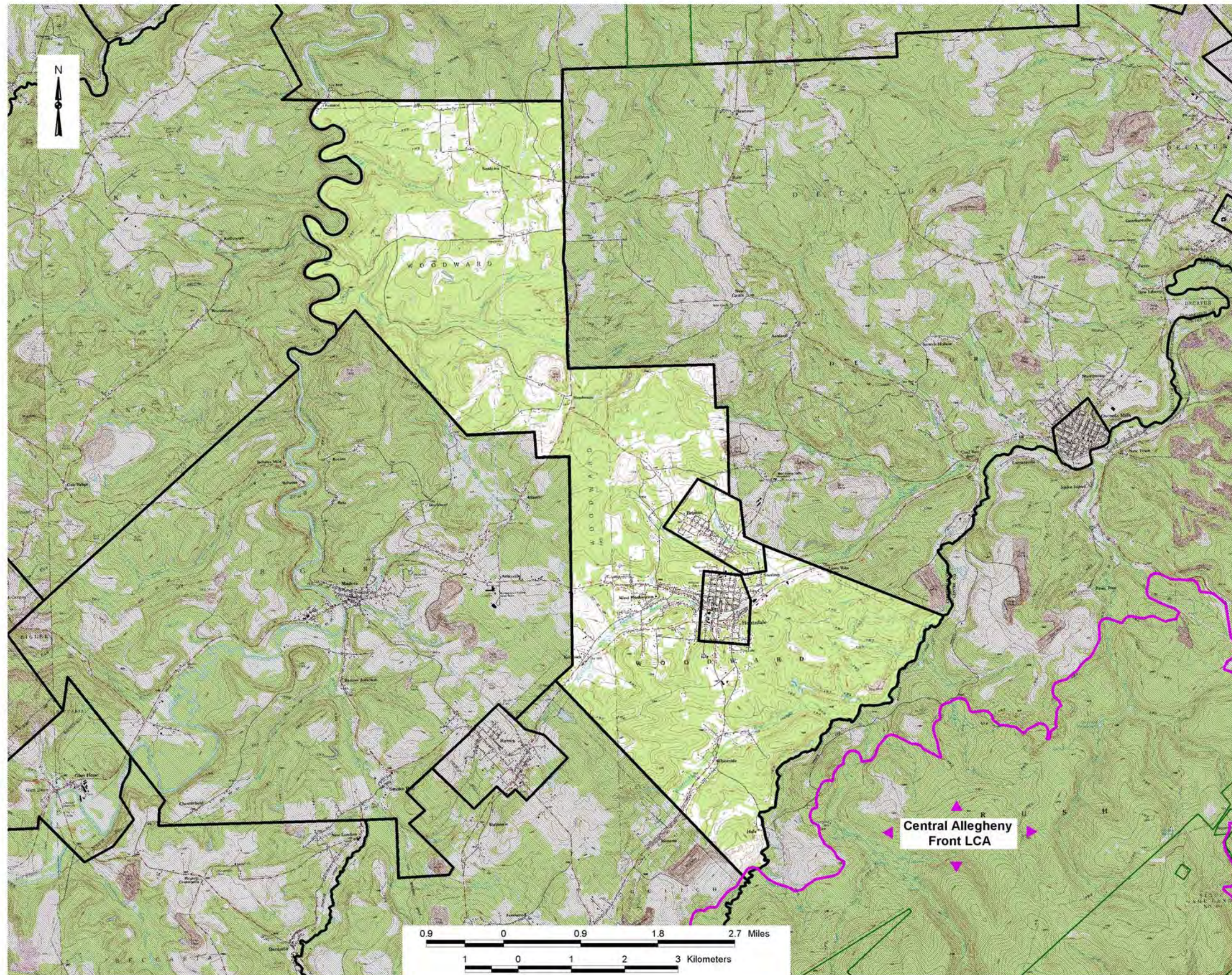
		<u>PNDI Rank</u>		<u>Legal Status</u>	
		Global	State	Federal	State
		Last Seen		Quality	

NATURAL HERITAGE AREAS:
none identified

OTHER CONSERVATION AREAS:
none identified

GEOLOGIC FEATURES:
none identified

Woodward Township, Brisbin Borough, & Houtzdale Borough



Woodward Township, Brisbin Borough & Houtzdale Borough

Clearfield County Natural Heritage Inventory

Biological Diversity Areas:

None

Landscape Conservation Areas:

Central Allegheny Front

Managed Areas:

None



Map Legend



Important Bird Areas (IBA)



Managed Lands

Biological Diversity Areas (BDA)



Supporting Natural Landscape



Core Habitat



Landscape Conservation Areas (LCA)

WOODWARD TOWNSHIP

Woodward Township is bounded to the southeast by Moshannon Creek, and to the northwest by Clearfield Creek, and the watershed divide between these two major streams falls in the middle of the township. Morgan Run and its tributaries flow west to Clearfield Creek, while Whiteside Run and Beaver Run flow east to Moshannon Creek. The township is 82% forested, and about half this area is core forest habitat. However, within the township there were no contiguous forest blocks of sufficient size for designation as an LCA. Recommendations for improvement of ecological health in the township landscape are: to improve the contiguity and ecosystem health of forested areas, building upon and connecting the largest blocks; and to remediate water quality problems, especially along Morgan Run and its tributaries, which are impaired by mine drainage pollution (DEP).

BRISBIN BOROUGH

The landscape of Brisbin Borough is occupied mainly by the village of Brisbin. It is in the watershed of Goss Run, a tributary to Beaver Run and eventually Moshannon Creek.

HOUTZDALE BOROUGH

The landscape of Houtzdale Borough is occupied mainly by the village of Houtzdale. It is in the watershed of Beaver Run, a tributary of Moshannon Creek.

RECOMMENDATIONS

The following are general recommendations for protection of natural heritage areas (NHAs) within a county. Approaches to protecting a NHA 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 when incorporated into a long-term, large-scale plan, 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 NHAs on private land.**

Conservation easements protect land while leaving it in private ownership. An 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 and will not be extinguished with new ownership. Tax incentives may apply to conservation easements donated for conservation purposes.

Lease and management agreements also allow the landowner to retain ownership and temporarily ensure protection of land. There are no tax incentives 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, protection of a watershed, forest or agricultural land with land trust offering technical expertise.

Land acquisition by a conservation organization can be at fair market value 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. 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 lands should be examined for acquisition when a NHA is present on either property and there is a need of additional land to complete protection of the associated natural features.

Fee simple acquisition is when a buyer purchases land outright and has 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.

Unrestricted donations of land are welcomed by land trusts. The donation of land entitles the donor to a charitable deduction for the full market value, as well as a release from the responsibility of managing the land. If the land is donated because of its conservation value, the land will be permanently protected. A donation of land that is not of high biological significance may be sold, with or without restrictions, to a conservation buyer and the funds used to further the land trust's conservation mission.

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 NHAs are in need of additional management recommendations to ensure the continued existence of the associated natural elements. Incorporate site-specific recommendations into existing management plans or prepare new plans. Recommendations 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, and agriculture; and implementing sustainable forestry practices. For example, some species simply require continued availability of a natural community while others may need specific management practices such as canopy thinning, mowing, or burning to maintain their habitat requirements.

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 habitat value, especially for species of special concern, and agreements should be worked out to minimize activities that may threaten native flora and fauna.

3. Protect bodies of water.

Protection of reservoirs, wetlands, rivers, and creeks is vital for ensuring the health of human communities and natural ecosystems; especially those that protect biodiversity, supply drinking water, and are attractive recreational resources. Many rare species, unique natural communities or locally significant habitats occur in wetlands and water bodies and are directly dependent on natural hydrological patterns and water quality for their continued existence. Ecosystem processes also provide clean water supplies for human communities and do so at significant cost savings in comparison to water treatment facilities. Hence, protection of high quality watersheds is the only way to ensure the viability of natural habitats and water quality. 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 NHAs.

Development plans should provide for natural buffers between disturbances and NHAs. Disturbances may include construction of new roads and utility corridors, non-sustainable 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. Staff at the Pennsylvania Natural Heritage Program (PNHP) or natural resources agencies can provide further guidance regarding buffer considerations appropriate for various kinds of natural resources within NHAs, e.g., barren community, wetland, water body, or forest.

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.

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 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 can 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, and providing information about easements, land acquisition, and management and stewardship of protected sites. Increasingly, local watershed organizations and land trusts are taking proactive steps to accomplish conservation at the local level. When activities threaten to impact ecological features, the responsible agency should be contacted. If no agency exists, private groups such as conservancies, land trusts and watershed associations should be sought for ecological consultation and specific protection recommendations.

7. Manage for invasive species.

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

- The *Mid-Atlantic Exotic Plant Pest Council* (MA-EPPC) is a non-profit organization (501c3) dedicated to addressing the problem of invasive exotic plants and their threat to the Mid-Atlantic region's economy, environment, and human health by: providing leadership; representing the mid-Atlantic region at national meetings and conferences; monitoring and disseminating research on impacts and controls; facilitating information development and exchange; and coordinating on-the-ground removal and training. A membership brochure is available as a pdf file at <http://www.ma-eppc.org>.
- Several excellent web sites exist to provide information about invasive exotic species. The following sources provide individual species profiles for the most troublesome invaders, with information such as the species' country of origin, ecological impact, geographic distribution, as well as an evaluation of possible control techniques.
 - The Nature Conservancy's Weeds on the Web at <http://tncweeds.ucdavis.edu/>
 - The Virginia Natural Heritage Program's invasive plant page at <http://www.dcr.state.va.us/dnh/invinfo.htm>
 - The Missouri Department of Conservation's Missouri Vegetation Management Manual at <http://www.conservation.state.mo.us/nathis/exotic/vegman/>
 - U.S. Department of the Interior, National Park Service invasive species monitoring resources at: <http://science.nature.nps.gov/im/monitor/invasives.htm> (under construction).

- The following site is a national invasive species information clearinghouse listing numerous other resources on a variety of related topics: <http://www.invasivespecies.gov/>

GLOSSARY

Alluvium: detrital deposits made by streams on riverbeds, flood plains, and alluvial fans; Especially a deposit of silt or silty clay laid down during time of flood.

Ambystomid: a small to moderate-sized terrestrial or semiaquatic New World salamander. Ambistomid salamanders possess lungs, as compared to plethodontid salamanders, which do not.

Anthropogenic: human caused.

Bedrock: the solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Biocide: a natural or synthetic substance toxic to living organisms. Some ecologists advocate the use of this term instead of ‘pesticides’, since most pesticides are also toxic to species other than the target pest species. Indirectly, pesticides may also affect non-target organisms detrimentally in many other ways (e.g. by loss of food species or loss of shelter) so that the effects of pesticides may also be felt throughout a whole ecosystem. The term ‘biocide’ indicates this property more clearly than ‘pesticide’.

Biological Diversity Area (BDA): An area containing and important in the support of plants or animals of special concern at state or federal levels, exemplary natural communities, or exceptional native diversity.

Bituminous coal: coal that contains more than 14% volatile matter. It is dark brown to black and burns with a smoky flame. Bituminous coal is the most abundant type of coal.

Bog: a low-nutrient, highly acidic wetland where sphagnum peat accumulates to the point where plant roots have minimal contact with either surface water or groundwater.

Calcareous: containing calcium carbonate. When the term is used to describe a type of rock, it implies that as much as 50% of the rock is calcium carbonate. Limestone is the most important and widely distributed of the carbonate rocks.

Calciphilic: thriving in environments rich in calcium salts.

Colluvium: weathered rock debris that has moved down a hill slope chiefly by gravity; includes talus and cliff debris.

Ecology: the study of relations between organisms and their natural environment, living and nonliving.

Ecosystem: The biotic (living) community and its abiotic (nonliving) environment functioning as a system.

Endemic: a species or other taxonomic group that is restricted to a particular geographic region, owing to such factors as isolation or response to soil or climatic conditions.

Eutrophication: the process of nutrient enrichment (usually by nitrates and phosphates) in aquatic ecosystems, such that the productivity of the system ceases to be limited by the availability of nutrients. It occurs naturally over geologic time, but may be accelerated by human activities (e.g., sewage disposal or agricultural run-off).

Food-web: a conceptual diagram that represents the feeding relationships of organisms within an ecosystem. It consists of a series of interconnecting food-chains, and shows the transfer of energy

from primary producers (green plants) through a series of organisms that eat and are eaten. Only some of the many possible relationships can be shown in such a diagram and it is usual to include only one or two carnivores at the highest trophic levels.

Geomorphic: pertaining to the form of the earth or of its surface features.

Instar: an insect larva that is between one moult (ecdysis) of its exoskeleton and another, or between the final ecdysis and its emergence in the adult form. Instars are numbered and there are usually several during larval development.

Landscape Conservation Area (LCA): A large contiguous area; important because of its size, contiguous forest, open space, habitats, and/or inclusion of one or more Biological Diversity Areas, and although including a variety of land uses, has not been heavily disturbed and thus retains much of its natural character.

Mast: a fruit, especially of beech, but also of oak, elm, and other forest trees.

Mesic: refers to an environment that is neither extremely wet (hydric) nor extremely dry (xeric).

Mineral soil: a soil composed predominantly of, and having its properties determined Predominantly by, mineral matter. Usually contains < 20 percent organic matter, but may contain an organic surface layer up to 30 centimeters thick.

Mycorrhiza: a close physical association between a fungus and the roots of a plant, from which both fungus and plant appear to benefit; a mycorrhizal root takes up nutrients more efficiently than does an uninfected root. A very wide range of plants can form mycorrhizas of one form or another and some plants appear incapable of normal development in the absence of their mycorrhizal fungi.

Old-field ecosystem: develops on abandoned farmland as the land gradually reverts to forest.

Physiographic Province: A region of which all parts are similar in geologic structure and Climate and which has consequently had a unified geomorphic history; a region whose relief features and landforms differ significantly from that of adjacent regions.

Riparian: pertaining to or situated on the bank of a body of water, especially of a river.

Toe slope: The lowest part of a slope or cliff; the downslope end of an alluvial fan.

Trophic level: A step in the transfer of energy within a food-web. There may be several trophic levels within a system, for example: producers (autotrophs), primary consumers (herbivores), and secondary consumers (carnivores); further carnivores may form fourth and fifth levels.

Vernal: occurring in the spring.

Xeric: a dry, as opposed to a wet (hydric) or intermediate (mesic) environment.

Xerophyte: a plant that can grow in very dry conditions and is able to withstand periods of drought.

LITERATURE CITED

- Anonymous. 1985. A preliminary inventory of natural areas of the Hoosier National Forest. Indiana Department of Natural Resources, Indianapolis, Indiana. Unpublished report. 197 p.
- Anderson, M.G. and B. Vickery. In press. Scaling the coarse filter: determining the adequate size of ecosystem-based reserves. *Conservation Biology*.
- Arkansas Forestry Commission. Best Management Practices Guidelines: Roads. Available online at: <http://www.forestry.state.ar.us/bmp/roads.html>. Accessed: May 2004.
- Audubon Society of Pennsylvania. Important Bird Areas Project. (2002). Retrieved from <http://pa.audubon.org/Ibamain.htm> on May 5, 2004.
- Barclay, J.S. 1980. Impact of stream alterations on riparian communities in southcentral Oklahoma. Fish and Wildlife Service Contract 14-16-0008-2039. FWS/OBS-80/17. Washington, DC: Government Printing Office.
- Brown, M.T., J. M. Schaefer, and K. H. Brandt. 1990. Buffer zones for water, wetlands and wildlife in East Central Florida. Prepared for the East Central Florida Regional Planning Council, Winter Park, FL. Gainesville, FL: Center for Wetlands, Univ. of FL. 71 pp.
- Braun, E.L. 1950. Deciduous forests of eastern North America. The Free Press, MacMillan Publ. Co., New York. 596 p.
- Crossley, G.J. 1998. Important bird areas in Pennsylvania. Stackpole Books, Mechanicsburg, PA. 192 p.
- Davis, A.F., T.L. Smith, A.M. Wilkinson, E.B. Drayton, and G.J. Edinger. 1990. A natural areas inventory of Lancaster County, Pennsylvania. Pennsylvania Science Office of the Nature Conservancy, Middletown, Pennsylvania. 165 p.
- DeMauro, M. M. 1993. Colonial nesting bird responses to visitor use at Lake Renwick heron rookery, Illinois. *Natural Areas Journal* 13:4-9.
- East-West Gateway Coordinating Council. Highway Runoff and Water Quality Impacts. 2000. <http://www.ewgateway.org/pdf/files/library/aq/wqhwyywords.pdf>. (Accessed: February 5, 2004).
- Ecological Regions of North America—Towards a Common Perspective. 1997. Secretariat of the North American Commission for Environmental Cooperation. ISBN 2-922305-18-X. Available online: ftp://ftp.epa.gov/wed/ecoregions/na/CEC_NAeco.pdf. Accessed: March 2004.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1992. Birds in Jeopardy: the Imperiled and Extinct Birds of the United States and Canada, Including Hawaii and Puerto Rico. Stanford University Press, Stanford, California. 259 pp.
- Environment Canada. 2001. "Priority Substances List Assessment Report—Road Salt." Full report available from Environment Canada: email PSL.LSIP@ec.gc.ca Summary available online: <http://www.ec.gc.ca/nopp/roadsalt/en/index.htm> (Accessed: February 5, 2004).
- Farrar, DR. 1998. "The tropical flora of rockhouse cliff formations in the eastern United States." Journal of the Torrey Botanical Society 125 (2): 91-108

- Findlay, C.S., and J. Bourdages. 2000. Response time of wetland biodiversity to road construction on adjacent lands. *Conservation Biology* 14 (2): 86-94.
- Fike, Jean. 1999. Terrestrial & Palustrine Plant Communities of Pennsylvania. Pennsylvania Natural Diversity Inventory. 86 p.
- Geyer, A.R. and W.H. Bolles. 1979. Outstanding Scenic Geologic Features of Pennsylvania. Environmental Geology Report 7, PA Department of Environmental Resources, Bureau of Topographic and Geologic Survey. 508 p.
- Geyer, A.R. and W.H. Bolles. 1987. Outstanding Scenic Geologic Features of Pennsylvania, Vol. 2. Environmental Geology Report 7, PA Department of Environmental Resources, Bureau of Topographic and Geologic Survey. 270 p.
- Gibbs, J. P. 1991. Spatial relationships between nesting colonies and foraging areas of great blue Donovan, T.M., F.R. Thompson III, J. Faaborg, and J. R.
- Hallowich, J.S. 1988. Soil Survey of Clearfield County, Pennsylvania. USDA Soil Conservation Service; in cooperation with Pennsylvania State University, College of Agriculture and Pennsylvania Department of Environmental Resources, State Conservation Commission. 132 pg.
- Goodrich, L.J., M. Brittingham, J.A. Bishop, and P. Barber. 2003. "Wildlife Habitat in Pennsylvania: Past, Present, and Future. Published by the Pennsylvania Department of Conservation and Natural Resources. Accessed 1/15/03 at:
- Green, J.C. 1995. Birds and Forests: a management and conservation guide. State of Minnesota, Department of Natural Resources.
- Hansen, J.H., and D.L. Urban. 1992. Avian response to landscape pattern: the role of species' life histories. *Landscape Ecology* 7:163-180.
- Harris, L. D. 1984. The fragmented forest. University of Chicago Press, Chicago, IL. 211 pp.
- Harding, J. S., E.F. Benfield, P.V. Bolstad, G.S. Helfman, and E.B.D. Jones II. 1998. Stream biodiversity: the ghost of land use past. *Proc. Natl. Acad. Sci. USA* 95:14843-14847.
- Hunter, M.L., Jr. 1990. *Wildlife, forests, and forestry: principles of managing forests for biological diversity*. Prentice-Hall, Englewood Cliffs, New Jersey, USA.
- Kapos, V., G. Ganade, E. Matsui, and R.L. Victoria. 1993. C-13 as an indicator of edge effects in tropical rainforest reserves. *Journal of Ecology* 81: 425-432.
- Karr, J.R. and I.J. Schlosser. 1978. Water resources and the land-water interface. *Science* 201, 229-234.
- Mensing, D.M., S.M. Galatowitsch, and J.R. Tester. 1998. Anthropogenic effects on the biodiversity of riparian wetlands of a northern temperate landscape. *Journal of Environmental Management* 53, 349-377.
- Mitsch, W.J. and J.G. Gosselink. 2000. Wetlands. 3rd ed.. John Wiley and Sons, Inc. New York, 920 pp.

- Naeem., S. (Chair), F.S. Chapin III., R. Costanza, P.R. Ehrlich, F.B. Golley, D.U. Hooper, J.H. Lawton, R.V. O'Neill, H.A. Mooney, O.E. Sala, A.J. Symstad, and D. Tilman. 1999. Biodiversity and ecosystem functioning: maintaining natural life support processes. *Issues In Ecology* #4. 11p.
- NatureServe. 2003. "Stenanthium gramineum." NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: November 25, 2003).
- NatureServe. 2004. "Accipter gentilis." NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: August 19, 2004).
- Pennsylvania Code, Title 25 "Environmental Quality," Chapter 93 "Water Quality Standards," Section 91 "Drainage List L" Available: <http://www.pacode.com/secure/data/025/chapter93/s93.91.html> Accessed: 5-6-04
- Probst. 1995 Reproductive success of migratory birds in habitat sources and sinks. *Conservation Biology* 9:1380-1395.
- Quinn, T., and R. Milner. 1999. Great blue heron (*Ardea herodias*). In E. M. Larsen and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available <http://wdfw.wa.gov/hab/phs/vol4/gbheron.htm>
- Reese, G.A., D.A. Albert, S.R. Crispin, L.A. Wilsmann, and S.J. Ouwinga. 1988. A natural Heritage inventory of Oakland County, Michigan. Volume I: Technical Report: Michigan Natural Features Inventory, Lansing, Michigan. 242 p.
- Reschke, C. 1990. Techniques used for the inventory of rare ecological communities in New York State. pp. 102 –105. In R.S. Mitchell, C.J. Sheviak and D.J. Leopold (eds.), Ecosystem management: rare species and significant habitats. New York State Museum Bulletin 471. 314 p.
- Rhoads, A.F. and T.A. Block. 2000. The plants of Pennsylvania: an illustrated manual. University of Pennsylvania Press, Philadelphia. 1061 p.
- Rhoads, A.F. and W.M. Klein, Jr. 1993. The vascular flora of Pennsylvania: annotated checklist and atlas. American Philosophical Society, Philadelphia, PA. 636 p.
- Ridley, M. 2004. Evolution. 3rd ed. Blackwell Science. 777p.
- Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. *Science* 267:1987-1990.
- Rosenberg, K. V. and J. V. Wells. 1995. Importance of geographic areas to Neotropical migrant birds in the Northeast. Final report to U. S. Fish and Wildlife Service, Region-5, Hadley, MA.
- Semlitsch, Raymond D. and J. Russell Bodie. 2003. "Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles." *Conservation Biology* 17 (5): 1219-1228.
- Sevon, W.D. 2000. Physiographic provinces of Pennsylvania (Color), 4th edition, scale 1:2,000,000, 8.5" X 11". (Harrisburg: PA DCNR, Bureau of Topographic and Geologic Survey). (GIS version, Pennsylvania's Physiographic Regions: PA Explorer CD-ROM Edition, Environmental Resources Research Institute, 1996.)

- Smith, T.L. 1991. Classification of Natural Communities in Pennsylvania. Pennsylvania Natural Diversity Inventory, The Nature Conservancy, Middletown, PA.
- Society of American Foresters. 1991. Biological diversity in forest ecosystems. SAF Publication 91-03. Society of American Foresters, Bethesda, Maryland, USA.
- Spackman, S.C. and Hughes, J.W. 1995. Assessment of minimum stream corridor width for biological conservation: species richness and distribution along mid-order streams in Vermont USA. *Biological Conservation* 71, 325-332.
- Weber, T. 2004. Maryland's Green Infrastructure Assessment. Maryland Department of Natural Resources. Available online: http://dnrweb.dnr.state.md.us/download/bays/gia_doc.pdf. Accessed: May 2004.
- Yahner, R.H. 1988. Changes in wildlife communities near edges. *Conservation Biology* 2:333-339.

GIS DATA SOURCES

- Bedrock geologic units of Pennsylvania, scale 1:250,000. Digital datasets prepared by C.E. Miles, T.G. Whitfield, from published 1980 state geologic map. 2001. Pennsylvania Bureau of Topographic and Geologic Survey, DCNR. Available online: <http://www.dcnr.state.pa.us/topogeo/gismaps/digital.aspx>. Accessed: 2001.
- Bishop, Joseph A. 1998. Managed Lands in Pennsylvania. Pennsylvania GAP Analysis Project, Environmental Resources Research Institute.
- Bishop, Joseph A. 2003. IBA core polygon boundaries.
- Clearfield County GIS Office, 2000. Black and white digital photographs, countywide, resolution 1:12,000.
- Ecological regions of North America, Level III. 1997. North American Commission for Environmental Cooperation. Available online: http://www.epa.gov/wed/pages/ecoregions/na_eco.htm. Accessed: March 2004.
- Local roadways in Clearfield County, Pennsylvania. 2003. Pennsylvania Department of Transportation, Bureau of Planning and Research, Geographic Information Division.
- National Elevation Dataset for Clearfield County, Pennsylvania, U.S. Geological Survey, EROS Data Center 1999 (Hill shade map).
- National Land Cover Data Set for Pennsylvania; Albers Grid. Compiled from Landsat satellite TM imagery (circa 1992) with spatial resolution of 30 m. USGS 1999.
- National Wetlands Inventory ArcInfo Coverages. U.S. Fish and Wildlife Service. Available online: <http://wetlands.fws.gov/Maps/maps.htm>. Accessed: June 2001.
- Pennsylvania Minor Civil Divisions: PA Explorer CD-ROM Edition, Environmental Resources Research Institute, from the Pennsylvania Department of Transportation's civil divisions data set 1996.
- Pennsylvania Natural Diversity Inventory (PNDI) Spatial Database. Pennsylvania Natural Heritage Program, 2004.
- Pennsylvania's Physiographic Regions: PA Explorer CD-ROM Edition, Environmental Resources Research Institute, 1996. (see Sevon in references for map authorship).
- Pennsylvania-Small Watershed, Environmental Resources Research Institute, Pennsylvania Department of Environmental Protection, 5/3/1997.
- State maintained roadway centerlines of Pennsylvania, 2003. Pennsylvania Department of Transportation, Bureau of Planning and Research, Geographic Information Division.
- Streams of Clearfield County. PA Explorer CD-ROM Edition, Environmental Resources Research Institute, 1996.
- USGS 1:24,000 Topographic quadrangles. Pennsylvania Spatial Data Access (PASDA), downloaded 2000. <http://www.pasda.psu.edu/>

APPENDIX I

SIGNIFICANCE RANKS

The Natural Heritage Areas that have qualified for inclusion in this report are ranked according to their significance as areas of importance to the biological diversity and ecological integrity of Clearfield County. The four significance ranks are: **Exceptional**, **High**, **Notable**, and **County** significance. These ranks have been used to prioritize all identified sites and suggest the relative attention that sites should receive for protection.

Exceptional: Sites that are of exceptional importance for the biological diversity and ecological integrity of the county or region. Sites in this category contain one or more occurrences of state or national species of special concern or a rare natural community type that are of a good size and extent and are in a relatively undisturbed condition. Sites of exceptional significance merit quick, strong and complete protection.

High: Sites that are of high importance for the biological diversity and ecological integrity of the county or region. These sites contain species of special concern or natural communities that are highly ranked, and because of their size or extent, relatively undisturbed setting, or a combination of these factors, rate as areas with high potential for protecting ecological resources in the county. Sites of high significance merit strong protection in the future.

Notable: Sites that are important for the biological diversity and ecological integrity of the county or region. Sites in this category contain occurrences of species of special concern or natural communities that are either of lower rank (G and S rank) or smaller size and extent than exceptional or high ranked areas, or are compromised in quality by activity or disturbance. Sites of notable significance merit protection within the context of their quality and degree of disturbance.

County: Sites that have great potential for protecting biodiversity in the county but are not, as yet, known to contain species of special concern or state significant natural communities. Often recognized because of their size, undisturbed character, or proximity to areas of known significance, these sites invite further survey and investigation. In some cases, these sites could be revealed as high or exceptional sites.

APPENDIX II

PENNSYLVANIA NATURAL HERITAGE PROGRAM (PNHP)

The Pennsylvania Natural Heritage Program (PNHP) was established in 1982 as a joint effort of the Western Pennsylvania Conservancy, the Pennsylvania Department of Conservation and Natural Resources (formerly the Pennsylvania Department of Environmental Resources), the Bureau of Forestry, and the Pennsylvania Science Office of The Nature Conservancy. PNHP is part of a network of "Natural Heritage Programs" that utilize common methodology developed by The Nature Conservancy and refined through NatureServe – the organization that represents the network of Natural Heritage Programs – and the individual programs themselves. Natural Heritage Programs have been established in each of the 50 United States, as well as in Canada and Latin America.

PNHP collects and stores locational and baseline ecological information about rare plants, rare animals, unique plant communities, significant habitats, and geologic features in Pennsylvania. Presently, the PNHP database is Pennsylvania's chief storehouse of such information with approximately 15,500 detailed occurrence records that are stored as computer files. Additional data are stored in extensive manual files documenting over 150 natural community types, more than 5000 plant and animal species, and about 1100 managed areas. As part of its function, PNHP provides reviews of projects that require permits as issued by the Pennsylvania Department of Environmental Protection (DEP). This environmental review function of the PNHP is referred to as PNDI or the Pennsylvania Natural Diversity Inventory.

As part of the information maintained by PNHP, a system of "global ranks" and "state ranks" is used to describe the relative degree of rarity for species and natural communities. This system is especially useful in understanding how imperiled a resource is throughout its range, as well as understanding the state rarity for resources that do not have official state status such as invertebrate animals and natural communities of organisms. A summary of global and state ranks can be found in Appendix V.

PNHP is valuable for its ability to supply technically sound data that can be applied in making natural resource decisions, thereby streamlining the decision making process. Information on the occurrences of elements (species and natural communities) of special concern gathered from museums, universities, colleges, and recent fieldwork by professionals throughout the state is used by Western Pennsylvania Conservancy to identify the areas of highest natural integrity and significance in Clearfield County.

APPENDIX III

CLEARFIELD COUNTY NATURAL HERITAGE INVENTORY SITE SURVEY FORM

Site Name: _____

County: _____ Municipality: _____

Quad Name: _____ Quad Code: _____ 10,10: _____

Land Owners (include best method of contact, date contacted, and method of permission):

Directions to Site:

Site Elevation: _____ Site Size: _____ Aspect: _____

Aerial Photo Int. Air Photo #: _____ Photo Type: _____
Comments from Aerial Photo Interpretation:

Aerial Reconnaissance Date: _____ Team: _____
Comments from Aerial Survey:

Ground Survey Date: _____ Team: _____
Community Type(s):

Setting of Community(s):

Conditions:

Description of site (quality, vegetation, significant species, aquatic features, notable landforms, natural hazards, age, etc.):

Evidence of Disturbance (logging, grazing, mining, past agriculture, erosion, sedimentation, filling, draining, exotic flora, etc.):

Recovery Potential:

Surrounding Land Use:

Threats to Site and Management/Protection:

Previously Identified EO's:

Species:

Accepted for inclusion in report: _____ Rejected: _____ Date:

Reason:

APPENDIX IV

CLASSIFICATION OF NATURAL COMMUNITIES IN PENNSYLVANIA

CNHIs and the status of natural community classification in Pennsylvania:

Terrestrial & Palustrine Plant Communities of Pennsylvania (Fike 1999) is the most current community classification system for Pennsylvania's palustrine and terrestrial plant communities. This report was developed by the Pennsylvania Natural Diversity Inventory (PNDI) to update and refine Smith's 1991 report Classification of natural communities in Pennsylvania (draft), the first effort dedicated specifically to the classification of natural communities in Pennsylvania. Work is ongoing to improve the current classification system. Future editions may define new community types or alter currently defined types. Aquatic communities (lakes, streams, and rivers), communities where vegetation is absent or not a definitive characteristic (caves, scree slopes), and communities resulting from extensive human disturbance (early stages of forest regrowth, old agricultural fields, manmade wetlands, etc.), are not addressed in this classification. Until more extensive classification work can be completed to define these types of communities and incorporate them into a single state-wide framework, the County Natural Heritage Inventory reports will provisionally refer to features of ecological interest that fall outside the Fike 1999 system using categories described in Smith 1991.

Community Ranks

As with species that are of concern, ranks have been assigned to rate the rarity of each natural community type identified for Pennsylvania. Appendices Vc and Vd list criteria for global and state ranks. In most cases, the global extent of these communities has yet to be fully evaluated, and no global rarity rank has been assigned. Work is ongoing to refine these ranks and to further develop the ranking system to rate the relative quality of communities within a type.

FIKE 1999 TYPES

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>TERRESTRIAL FORESTS:</i>		
Hemlock (white pine) forest	G5	S4
Serpentine pitch pine – oak forest	G2	S1
Serpentine Virginia pine – oak forest	G2	S1
Pitch Pine – mixed oak forest	G?	S4
Virginia pine – mixed hardwood forest	G?	S5
Dry white pine (hemlock) – oak forest	G?	S4
Hemlock (white pine) – northern hardwood forest	G?	S5
Hemlock (white pine) – red oak – mixed hardwood forest	G?	S4

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>TERRESTRIAL FORESTS (con't.):</i>		
Hemlock – tuliptree – birch forest	G?	S4
Rich hemlock – mesic hardwoods forest	G?	S2S3
Dry oak –heath forest	G?	S4S5
Dry oak – mixed hardwood forest	G?	S3
Red oak – mixed hardwood forest	G?	S5
Northern hardwood forest	G?	S4
Black cherry – northern hardwood forest	G?	S4
Tuliptree – beech – maple forest	G?	S4
Sugar maple – basswood forest	G?	S4
Mixed mesophytic forest	G?	S1S2
Sweet gum – oak coastal plain forest	G?	S1
Red maple (terrestrial) forest	G?	S5
Black-gum ridgetop forest	G?	S3
Aspen/gray (paper) birch forest	G?	S?
Black locust forest	G?	SW
<i>PALUSTRINE FORESTS:</i>		
Black Spruce- tamarack peatland forest	G?	S3
Red Spruce palustrine forest	G?	S3
Hemlock palustrine forest	G5	S3
Hemlock – mixed hardwood palustrine forest	G?	S3S4
Red spruce – mixed hardwood palustrine forest	G?	S3
Bottomland oak – hardwood palustrine forest	G5	S2
Red maple – black-gum palustrine forest	G5	S3S4
Red maple – black ash palustrine forest	G?	S2S3
Red maple – magnolia Coastal Plain palustrine forest	G?	S1
Great Lakes Region lakeplain palustrine forest	G?	S1
Sycamore – (river birch)- box elder floodplain forest	G?	S3
Silver maple floodplain forest	G?	S3
Red maple – elm – willow floodplain swamp	G?	S2
<i>TERRESTRIAL WOODLANDS:</i>		
Pitch pine – heath woodland	G4	S2
Pitch pine – scrub oak woodland	G4	S2
Red spruce rocky summit	G?	S1
Pitch pine – rhodora – scrub oak woodland	G?	S1
Pitch pine – mixed hardwood woodland	G4	S2S3

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>TERRESTRIAL WOODLANDS (con't):</i>		
Virginia pine – mixed hardwood shale woodland	G?	S2
Red-cedar – mixed hardwood rich shale woodland	G?	S1S2
Dry oak – heath woodland	G4	S3
Birch (black-gum) rocky slope woodland	G?	S2
Yellow oak – redbud woodland	G?	S2
Great Lakes Region scarp woodland	G?	S1S2
Great Lakes Region bayberry – cottonwood community	G?	S1
<i>PALUSTRINE WOODLANDS:</i>		
Pitch pine – leatherleaf woodland	G?	S2
Black spruce – tamarack palustrine woodland	G?	S2
Red spruce palustrine woodland	G?	S2S3
Red maple – highbush blueberry palustrine woodland	G5	S4
Red maple – sedge palustrine woodland	G5	S4
Red maple – mixed shrub palustrine woodland	G?	S4
<i>TERRESTRIAL SHRUBLANDS:</i>		
Red-cedar – prickly pear shale shrubland	G?	S2
Red-cedar – pine serpentine shrubland	G2	S1
Red-cedar – redbud shrubland	G?	S2
Low heath shrubland	G4	S1
Low heath – mountain ash shrubland	G?	S2
Scrub oak shrubland	G4	S3
Rhodora – mixed heath – scrub oak shrubland	G?	S1
<i>PALUSTRINE SHRUBLANDS:</i>		
Buttonbush wetland	G?	S4
Alder – ninebark wetland	G?	S3
Alder – sphagnum wetland	G5	S4
Highbush blueberry – meadow-sweet wetland	G5	S5
Highbush blueberry – sphagnum wetland	G?	S5
Leatherleaf – sedge wetland	G?	S3
Leatherleaf – bog rosemary	G?	S2
Leatherleaf – cranberry peatland	G?	S2S3
Water-willow (<i>Decodon verticillatus</i>) shrub wetland	G?	S3
River birch – sycamore floodplain scrub	G?	S4
Poison sumac – red-cedar – bayberry fen	G2	S1
Buckthorn – sedge (<i>Carex interior</i>) – golden ragwort fen	G2G3	S1
Great Lakes Region scarp seep	G?	S1
Great Lakes Region bayberry – mixed shrub palustrine shrubland	G?	S1

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>TERRESTRIAL HERBACEOUS OPENINGS:</i>		
Side-oats gramma calcareous grassland	G2	S1
Calcareous opening/cliff	G?	S2
Serpentine grassland	G?	S1
Serpentine gravel forb community	G?	S1
Great Lakes Region dry sandplain	G?	S1
<i>HERBACEOUS WETLANDS:</i>		
Bluejoint – reed canary grass marsh	G?	S5
Cat-tail marsh	G?	S5
Tussock sedge marsh	G?	S3
Mixed forb marsh	G3G4	S3
Herbaceous vernal pond	G?	S3S4
Wet meadow	G?	S5
Bulrush marsh	G?	S3
Great Lakes Region palustrine sandplain	G?	S1
Prairie sedge – spotted joe – pye – weed marsh	G?	S1S2
Open sedge (<i>Carex stricta</i> , <i>C. prairea</i> , <i>C. lacustris</i>) fen	G?	S1
Golden Saxifrage – sedge rich seep	G?	S2
Skunk cabbage – golden saxifrage forest seep	G?	S4S5
Serpentine seepage wetland	G?	S1
Golden saxifrage – Pennsylvania bitter-cress spring run	G?	S3S4
Sphagnum – beaked rush peatland	G?	S3
Many fruited sedge – bladderwort peatland	G?	S2
Water-willow (<i>Justicia americana</i>) – smartweed riverbed community	G?	S4
Riverside ice scour community	G?	S1S2
Big bluestem – Indian grass river grassland	G?	S3
Pickernel-weed – arrow-arum – arrowhead wetland	G3G4	S4
Spatterdock – water lily wetland	G?	S4
<i>COMMUNITY COMPLEXES:</i>	Complexes not ranked	
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		

SMITH 1991 TYPES

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>SUBTERRANEAN COMMUNITIES:</i>		
Solution Cave Terrestrial Community	G?	S3
Solution Cave Aquatic Community	G?	S3
Tectonic Cave Community	G?	S3S4
Talus Cave Community	G?	S2S4
 <i>DISTURBED COMMUNITIES:</i>		
Bare Soil	G?	S?
Meadow/Pastureland	G?	S?
Cultivated Land	G?	S?
Successional Field	G?	S?
Young Miscellaneous Forest	G?	S?
Conifer Plantation	G?	S?
 <i>ESTUARINE COMMUNITIES:</i>		
Deepwater Subtidal Community	G?	S1
Shallow-Water Subtidal Community	G?	S1
Freshwater Intertidal Mudflat	G3G4	S1
Freshwater Intertidal Marsh	G3G4	S1
 <i>RIVERINE COMMUNITIES:</i>		
Low-Gradient Ephemeral/Intermittent Creek	G?	S5
Low-Gradient Clearwater Creek	G?	S3S4
Low-Gradient Clearwater River	G?	S2S3
Low-Gradient Brownwater Creek	G?	S2S3
Medium-Gradient Ephemeral/Intermittent Creek	G?	S5
Medium-Gradient Clearwater Creek	G?	S3
Medium-Gradient Clearwater River	G?	S?
Medium-Gradient Brownwater Creek	G?	S3
High-Gradient Ephemeral /Intermittent Creek	G?	S5
High-Gradient Clearwater Creek	G?	S3
High-Gradient Clearwater River	G?	S?
High-Gradient Brownwater Creek	G?	S?
Waterfall and Plungepool	G?	S3S4
Spring Community	G?	S1S2
Spring Run Community	G?	S1S2

COMMUNITY NAME	GLOBAL RANK	STATE RANK
<i>LACUSTRINE COMMUNITIES:</i>		
Glacial Lake	G?	S1
Nonglacial Lake	G?	S2
Artificial Lake	---	---
Natural Pond	G?	S2S3
Artificial Pond	---	---
Stable Natural Pool	G?	S?
Ephemeral/Fluctuating Natural Pool	G?	S1
Artificial Pool	---	---
Ephemeral/Fluctuating Limestone Sinkhole	G?	S1

APPENDIX V

FEDERAL AND STATE ENDANGERED SPECIES CATEGORIES, GLOBAL AND STATE ELEMENT RANKS

Several federal and state legislative acts have provided the authority and means for the designation of endangered, threatened, rare, etc. species lists. Those acts and status summaries follow. However, not all of the species or natural communities considered by conservation biologists (e.g., Pennsylvania Biological Survey) as "special concern resources" are included on the state or federal lists. In this county inventory report, "N" denotes those special concern species that are not officially recognized by state or federal agencies. Therefore: N = No current legal status, but is considered to be of special concern in Pennsylvania, or is under review for such consideration, by conservation biologists. Contact the Pennsylvania Natural Heritage Program for more information.

APPENDIX V_a

FEDERAL STATUS

All Plants and Animals: Legislative Authority: U.S. Endangered Species Act (1973), U.S. Fish and Wildlife Service, February 21, 1990, 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 throughout all or a significant portion of their ranges.

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

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

{N = No current legal status, but is considered to be of special concern in Pennsylvania, or is under review for such consideration, by conservation biologists. Contact the Pennsylvania Natural Heritage Program for more information.}

APPENDIX V_b

PENNSYLVANIA STATUS

Native Plant Species: Legislative Authority: Title 25 Chapter 82, Conservation of Native Wild Plants, January 1, 1988; 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 are 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 their future decline, or if the species is greatly exploited by man.
- PR = Pennsylvania Rare - Plant species which are uncommon within this Commonwealth because they may be found in restricted geographic areas or in low numbers throughout this Commonwealth.
- PX = Pennsylvania Extirpated - Plant species believed by the Department to be extinct within this Commonwealth. These plants may or may not be in existence outside the Commonwealth.
- PV = Pennsylvania Vulnerable - Plant species which are in danger of population decline within this Commonwealth because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.
- TU = Tentatively Undetermined - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.

{N = No current legal status, but is considered to be of special concern in Pennsylvania, or is under review for such consideration, by conservation biologists. Contact the Pennsylvania Natural Heritage Program for more information.}

Animals - The following state statuses are used by the Pennsylvania Game Commission (Legislative Authority: Title 34, Chapter 133 pertaining to wild birds and mammals, Game and Wildlife Code, revised Dec. 1, 1990) and by the Pennsylvania Fish and Boat Commission (Legislative Authority: Title 30 Chapter 75 pertaining to fish, amphibians, reptiles and aquatic organisms, Fish and Boat Code, revised February 9, 1991):

PE = Pennsylvania Endangered

Birds & mammals - 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 is 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 are 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, amphibians, reptiles & aquatic organisms - All species declared by: 1) 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) are declared by the Pennsylvania Fish and Boat Commission, Executive Director to be threatened with extinction and appear on the Pennsylvania Endangered Species List published by the Pennsylvania Bulletin.

PT = Pennsylvania Threatened

Birds & mammals - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose population within the Commonwealth are decreasing or are heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that are 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, amphibians, reptiles & aquatic organisms - All species declared by: 1) 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) are declared by the Pennsylvania Fish and Boat Commission Executive Director 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.

{N = No current legal status, but is considered to be of special concern in Pennsylvania, or is under review for such consideration, by conservation biologists. Contact the Pennsylvania Natural Heritage Program for more information.}

Internal Fish and Boat Commission Status Category:

PC = Pennsylvania Candidate - Species that exhibit the potential to become Endangered or Threatened in the future. Pennsylvania populations of these taxa are: 1) "rare" due to their decline, distribution, restricted habitat, etc.; 2) are "at risk" due to aspects of their biology, certain types of human exploitation, or environmental modification; or, 3) are considered "undetermined" because adequate data is not available to assign an accurate status.

This category is unofficial and has no basis in any law (i. e., Chapter 75, Fish and Boat Code), as do the Endangered and Threatened categories.

Invertebrates - Pennsylvania Status: No state agency is assigned to develop regulations to protect terrestrial invertebrates, although a federal status may exist for some species. Aquatic invertebrates are regulated by the Pennsylvania Fish And Boat Commission, but have not been listed to date.

Although no invertebrate species are presently state listed, conservation biologists unofficially assign numerous state status and/or state rank designations. NOTE: Invertebrate species are regularly considered under the U.S. Endangered Species Act for federal status assignments.

APPENDIX V_c

GLOBAL AND STATE RANKING

Global and State Ranking is a system utilized by the network of 50 state natural heritage programs in the United States. Although similar to the federal and state status designations, the ranking scheme allows the use of one comparative system to "rank" all species in a relative format. Unlike state or federal status designation guidelines, the heritage ranking procedures are also applied to natural community resources. Global ranks consider the imperilment of a species or community throughout its range, while state ranks provide the same assessment within each state. Although there is only one global rank used by the heritage network, state ranks are developed by each state and allow a "one-system" comparison of a species or communities imperilment state by state. For more information, contact the Pennsylvania Natural Heritage Program.

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.
- G? = Not ranked to date.

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 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 (occurring only once or a few times) or casual (occurring more regularly but not every year) 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 or catalpa in eastern states).
- SH = Of historical occurrence in the state, perhaps having not been verified in the past 20 years, and suspected to be still extant.
- SN = Regularly occurring, usually migratory and typically nonbreeding species for which no significant or effective habitat conservation measures can be taken in the state.
- SR = Reported from the state, but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.
- SU = Possibly in peril in state but status uncertain; need more information.
- SX = Apparently extirpated from the state.
- SZ = Not of significant conservation concern in the state, invariably because there are no (zero) definable element occurrences in the state, although the taxon is native and appears regularly in the state.
- S? = Not ranked to date.

NOTE: The study of naturally occurring biological communities is complex and natural community classification is unresolved both regionally and within Pennsylvania. The Global and State Ranking of natural communities also remains difficult and incomplete. Although many natural community types are clearly identifiable and are ranked, others are still under review and appear as G? and/or S?

APPENDIX VI

PLANTS AND ANIMALS OF SPECIAL CONCERN IN CLEARFIELD COUNTY

Documented in the Pennsylvania Natural Diversity Inventory database since 1960

<u>Scientific Name</u>	<u>Common Name</u>	<u>State Rank</u>	<u>Global Rank</u>	<u>Pg. #</u>
Animals				
<i>Ardea herodias</i>	Great blue heron (rookery)	S3S4	G5	
<i>Crotalus horridus</i>	Timber rattlesnake	S3S4	G4	
<i>Myotis septentrionalis</i>	Northern long eared bat	S3	G4	
<i>Pandion halieetus</i>	Osprey	S2	G5	
Plants				
<i>Arabis hirsuta</i>	Hairy rock-cress	S1	G5	
<i>Carex paupercula</i>	Bog sedge	S3	G5	
<i>Gaultheria hispidula</i>	Creeping snowberry	S3	G5	See pg. 72
<i>Platanthera ciliaris</i>	Yellow-fringed orchid	S2	G5	
<i>Prunus allegheniensis</i>	Allegheny plum	S2S3	G4	
<i>Stenanthium gramineum</i>	Eastern featherbells	S1S2	G4G5	See pg. 43
<i>Viburnum trilobum</i>	Highbush cranberry	S3S4	G5T5	
<i>Vittaria appalachiana</i>	Appalachian gametophyte	S2	G4	See pg. 51



Allegheny Plum
(*Prunus alleghaniensis*)



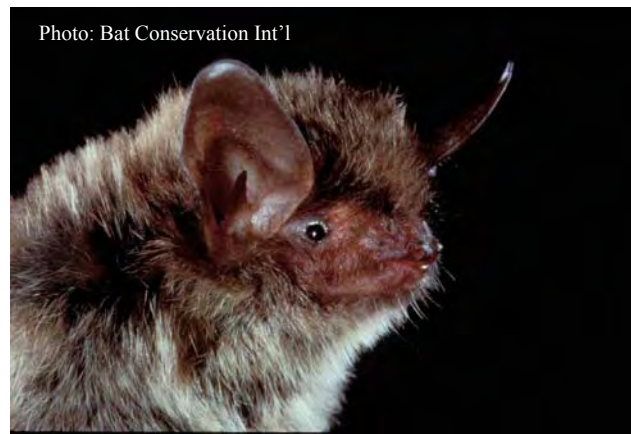
Highbush cranberry
(*Viburnum trilobum*)



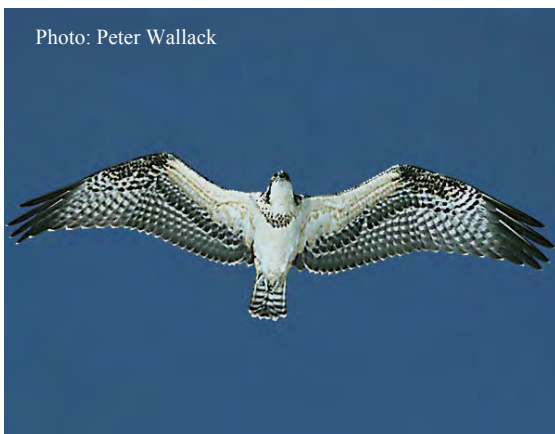
Hairy rock-cress (*Arabis hirsuta*)



Yellow-fringed orchid
(*Platanthera ciliaris*)



Northern long-eared bat
(*Myotis septentrionalis*)



Osprey
(*Pandion halieetus*)



Bog sedge
(*Carex paupercula*)

APPENDIX VII

SUSTAINABLE FORESTRY INFORMATION SOURCES

The ***Pennsylvania Forest Stewardship Program*** is a voluntary program that assists forest landowners in better managing their forestlands by providing information, education, and technical assistance. Participation in the program is open to private landowners who own between 5 and 1,000 acres of forestland. For more information, go to <http://www.cas.psu.edu/docs/CASDEPT/FOREST/Stewardship/1page.html> or contact:

Jim Finley, Assistant Director for Extension
The Pennsylvania State University
School of Forest Resources
7 Ferguson Building
University Park, PA 16802
(814) 863-0401
E-mail: fj4@psu.edu

The ***Forest Land Enhancement Program*** complements the Forest Stewardship Program by providing landowners with cost-share dollars to implement their management plans and follow-up technical assistance to encourage the achievement of their long-term forest management goals. For more information, contact:

Jim Stiehler, Forest Stewardship Coordinator
DCNR - Bureau of Forestry
6th Floor, Rachel Carson State Office Building
P.O. Box 8552
Harrisburg, PA 17105-8552
(717) 787-4777

The ***Forest Legacy Program*** acts to purchase conservation easements or title from willing private landowners. In this program, federal funding is administered through the state Bureau of Forestry to foster protection and continued use of forested lands that are threatened with conversion to non-forest uses. Emphasis is given to lands of regional or national significance. For more information, go to <http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml> or contact:

Gene Odato, Chief, Rural & Community Forestry Station
DCNR – Bureau of Forestry
6th Floor, Rachel Carson State Office Building
P.O. Box 8552
Harrisburg, PA 17105-8552
(717) 787-6460
E-mail: godato@state.pa.us

The ***Sustainable Forestry Initiative*** (SFI) program is a voluntary, industry-driven effort developed to ensure that future generations will have the same abundant, healthy, and productive resources we enjoy today. Created in 1995 by the American Forest and Paper Association (the national trade organization representing the United States forest products industry), SFI is a program of comprehensive forestry and conservation practices. Through the SFI of PA program, landowners receive the information they need to enhance their ability to make good forest management decisions, and loggers learn safer, more productive skills and proper environmental practices. For more information, go to <http://www.sfi of pa.org/> or contact:

SFI® of PA
315 S. Allen Street, Suite 418
State College, PA 16801
(814) 867-9299 or (888) 734-9366
E-mail: sfi@penn.com

Forest Landowner Associations provide information and educational programs to help members better manage their forest resources. For more information, contact:

Woodland Owners of Centre County
Box 403
Huntingdon, PA 16652

Mifflin County Forest Landowners' Association
152 East Market Street, Suite 100
Lewistown, PA 17044

Woodland Owners of the Southern Alleghenies
c/o Christine T. Gruitt, Secretary
1482 Town Creek Road
Clearville, PA 15535
E-mail: dgruitt@mindspring.com
(Bedford and Fulton Counties)

The ***Forest Stewardship Volunteer Initiative Project*** has an excellent web site providing general information and links to publications on sustainable forestry.
<http://vip.cas.psu.edu/index.html>