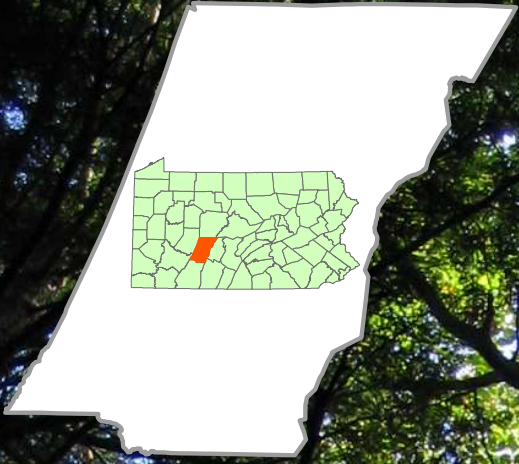


# Cambria County Natural Heritage Inventory



Clockwise from top left: Appalachian violet, wetland at Rogue's Harbor Run, Allegheny woodrat, Beaverdams wetland.  
Background: beech tree framed by hemlocks.





# CAMBRIA COUNTY NATURAL HERITAGE INVENTORY

**February 2007**

*Prepared for:*

**Cambria County Conservation District**

401 Candlelight Drive, Suite 221  
Ebensburg, Pennsylvania 15931

On behalf of

The Cambria County Commissioners

*Prepared by:*

**Pennsylvania Natural Heritage Program**

Western Pennsylvania Conservancy

209 Fourth Avenue

Pittsburgh, Pennsylvania 15222



The Pennsylvania Natural Heritage Program (PNHP) is a partnership between the Western Pennsylvania Conservancy (WPC), the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Game Commission (PGC), and the Pennsylvania Fish and Boat Commission (PFBC). PNHP is a member of NatureServe, which coordinates natural heritage efforts through an international network of member programs—known as natural heritage programs or conservation data centers—operating in all 50 U.S. states, Canada, Latin America and the Caribbean.

*This project was funded through grants supplied by the DCNR Wild Resource Conservation Program, the Department of Community and Economic Development, the Cambria County Alliance for Business and Industry, and the Conemaugh Valley Conservancy.*

Copies of this report are available in electronic format through the Pennsylvania Natural Heritage Program website ([www.naturalheritage.state.pa.us](http://www.naturalheritage.state.pa.us)), and through the Cambria County Conservation District.



## PREFACE

The Pennsylvania Natural Heritage Program (PNHP) is responsible for collecting, tracking and interpreting information regarding the Commonwealth's biological diversity. County Natural Heritage Inventories (CNHIs) are an important part of the work of PNHP. Since 1989, PNHP has conducted county inventories as a means to both gather new information about natural resources and to pass this information along to those responsible for making decisions about the resources in the county, including the community at large. This County Natural Heritage Inventory focuses on the best examples of living *ecological resources* in Cambria County. The county must address historic, cultural, educational, water supply, agricultural and scenic resources through other projects and programs. Although the inventory was conducted using a tested and proven methodology, it is best viewed as a preliminary report on the county's natural heritage. Keep in mind that there will be more places to add to those identified here and that this document can be updated as necessary to accommodate new information. We encourage additional inventory work across the county to further the efforts begun with this study.

Consider the inventory as an invitation for the people of Cambria County to explore and discuss their natural heritage— and to learn about and participate in the conservation of the living resources of the county. Ultimately, it will be up to the landowners and residents of Cambria County to determine how to use this information. Below are some examples of how the inventory can be used by various groups and people:

**Planners and Government Staff.** Typically, the planning office in a county administers county inventory projects. Often, the inventories are used in conjunction with other resource information (agricultural areas, slope and soil overlays, floodplain maps, etc.) in review for various projects and in comprehensive planning. Natural Heritage Areas may be included under various categories of zoning, such as conservation or forest zones; within parks and greenways; and even within agricultural security areas. There are many possibilities to provide for the conservation of Natural Heritage Areas within the context of public amenities, recreational opportunities and resource management.

**County, State and Federal Agencies.** In many counties, Natural Heritage Areas lie within or include state or federal lands. Agencies such as the Pennsylvania Game Commission, the Pennsylvania Bureau of Forestry, and the U.S. Army Corp of Engineers can use the inventory to understand the geographic extent of the ecological resources highlighted in Natural Heritage Areas. Agencies can also learn the requirements of the individual plant, animal, or community elements, and the general approach recommended for their protection. County Conservation Districts may use the inventories to focus attention on resources (e.g. high diversity streams or wetlands) and as a reference in encouraging good management practices.

**Environmental and Development Consultants.** Environmental consultants are called upon to plan for a multitude of development projects including road construction, housing developments, commercial enterprises and infrastructure expansion. Design of these projects requires that all potentially impacted resources be known and understood. Decisions made with inadequate information can lead to substantial and costly delays. County Natural Heritage Inventories provide a first look at biological resources, including plants and animals listed as rare, threatened or endangered in Pennsylvania and in the nation. Consultants can therefore see potential conflicts long before establishing footprints or developing detailed plans and before applying for permits. This allows projects to change early on when flexibility is at a maximum.

Environmental consultants are increasingly called upon to produce resource plans (e.g. Rivers Conservation Plans) that must integrate a variety of biological, physical and social information. County Natural Heritage Inventories can help to define watershed-level resources and priorities for conservation.

**Developers.** Working with environmental consultants, developers can consider options for development that add value and protect key resources. Incorporating greenspaces, wetlands and forest buffers into various kinds of development can attract homeowners and businesses that desire to have natural amenities nearby, as well as satisfy ordinances requiring openspace set asides. Just as parks have traditionally raised property values, so too can natural areas. County Natural Heritage Inventories can suggest opportunities where development and conservation can complement one another.

**Educators.** Curricula in primary, secondary and college level classes often focus on biological science at the chemical or microbiological level. Field sciences do not always receive the attention that they deserve. Natural areas can provide unique opportunities for students to witness, first-hand, the organisms and natural communities that are critical to maintaining biological diversity. Teachers can use County Natural Heritage Inventories to show students where and why local and regional diversity occur, and to aid in curriculum development for environment and ecology academic standards. With proper permission and arrangements, students can visit Natural Heritage Areas and establish appropriate research or monitoring projects.

**Conservation Organizations.** Organizations that have as part of their missions the conservation of biological diversity can turn to the inventory as a source of prioritized sites important to biodiversity in the county. Such a reference can help guide internal planning and define the essential resources that can be the focus of protection efforts. Land trusts and conservancies throughout Pennsylvania have made use of the inventories to do just this sort of planning and prioritization, and are now engaged in conservation efforts on highly significant sites in individual counties and regions.

## **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  
Robb Piper, Manager, Cambria County Conservation District

This project was funded by the Department of Conservation and Natural Resources Wild Resource Conservation Program, the Department of Community and Economic Development, the Cambria County Alliance for Business and Industry, and the Conemaugh Valley Conservancy.

Without the support and help from these people and organizations, the inventory would not have seen completion.

We encourage comments and questions. The success of the report will be measured by the use it receives and the utility it serves to those making decisions about resources and land use throughout the county. Thank you for your interest.

Jessica McPherson  
Ecologist  
Pennsylvania Natural Heritage Program  
Western Pennsylvania Conservancy



# EXECUTIVE SUMMARY

## Introduction

A healthy natural landscape is vital to the quality of life in human communities. It is also vital 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 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 landscape area 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 Classification

To provide the information necessary to plan for conservation of biodiversity at the species, community, and ecosystem levels, two types of Natural Heritage Areas, as well as designations from the Important Mammal Areas Project and Important Bird Areas Program, are included in the report.

### Natural Heritage Areas

#### Biological Diversity Area (BDA):

*Definition:* An area containing plants or animals of special concern at state or federal levels, exemplary natural communities, or exceptional native diversity. BDAs include both the immediate habitat and surrounding land important in the support of these special elements.

*Conservation Planning Application:* BDAs are mapped according to their sensitivity to human activities. "Core" areas delineate essential habitat that cannot absorb significant levels of activity without substantial impact to the elements of concern. "Supporting Natural Landscape" includes areas that maintain vital ecological processes or secondary habitat that may be able to accommodate some types of low-impact activities.

### Landscape Conservation Area (LCA):

*Definition:* A large contiguous area that is important because of its size, open space, habitats, and/or inclusion of one or more BDAs. Although an LCA includes a variety of land uses, it typically has not been heavily disturbed and thus retains much of its natural character.

*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, thereby minimizing fragmentation of these areas.

### **Important Bird Areas (IBA):**

The Pennsylvania Audubon Society administers the Pennsylvania IBA Program and defines an IBA as “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 criteria (<http://pa.audubon.org/iba>).

Conservation Planning Application: Planning for these areas should consider how best to maintain their value as bird habitat. The value of some large-scale IBAs may be due to the forest interior habitat contained within them; thus, the recommendations for LCA stewardship to minimize fragmentation are applicable. Natural communities that have a particular habitat value for birds (e.g., wetland) are typically the basis for smaller-scale IBAs; therefore, a high degree of protection should be given to these sites.

Conservation plans are in the process of being completed for all IBAs in the state.

### **Important Mammal Areas (IMA):**

The Important Mammal Areas Project (IMAP) is being carried out by a broad based alliance of sportsmen, conservation organizations, wildlife professionals, and scientists. Areas nominated must fulfill at least one of five criteria developed by the Mammal Technical Committee of the Pennsylvania Biological Survey (<http://www.pawildlife.org/imap.htm>).

Conservation Planning Application: Planning for these areas should consider how best to maintain their value as mammal habitat. The value of these sites may be associated with high mammalian diversity, high-density populations, occurrence of species of special concern, or educational potential. Stewardship plans are in the process of being completed for all IMAs in the state.

### **Methods**

Fifty-one out of 67 county inventories have been completed in Pennsylvania to date. The Cambria 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 Cambria 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 Cambria 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. 147) 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. Sites were not ground surveyed 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.

## Data Analysis

Data obtained during the 2003 and 2004 field seasons were 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 9.1 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. 145 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. County municipalities served as the organizing unit for the data.

## Results

Forty-three areas of ecological significance are recognized in the Cambria County Natural Heritage Inventory (**Figure 1**). This total includes 31 Biological Diversity Areas and 12 Landscape Conservation Areas that are categorized according to their significance to the protection of the biological diversity and ecological integrity of the region (**Table 1**). Significance ranks are Exceptional, High, Notable, and County. For a complete explanation of these ranks, see Appendix I, pg. 145.

\*\*\*\*\*see map and Table 1, next page\*\*\*\*\*

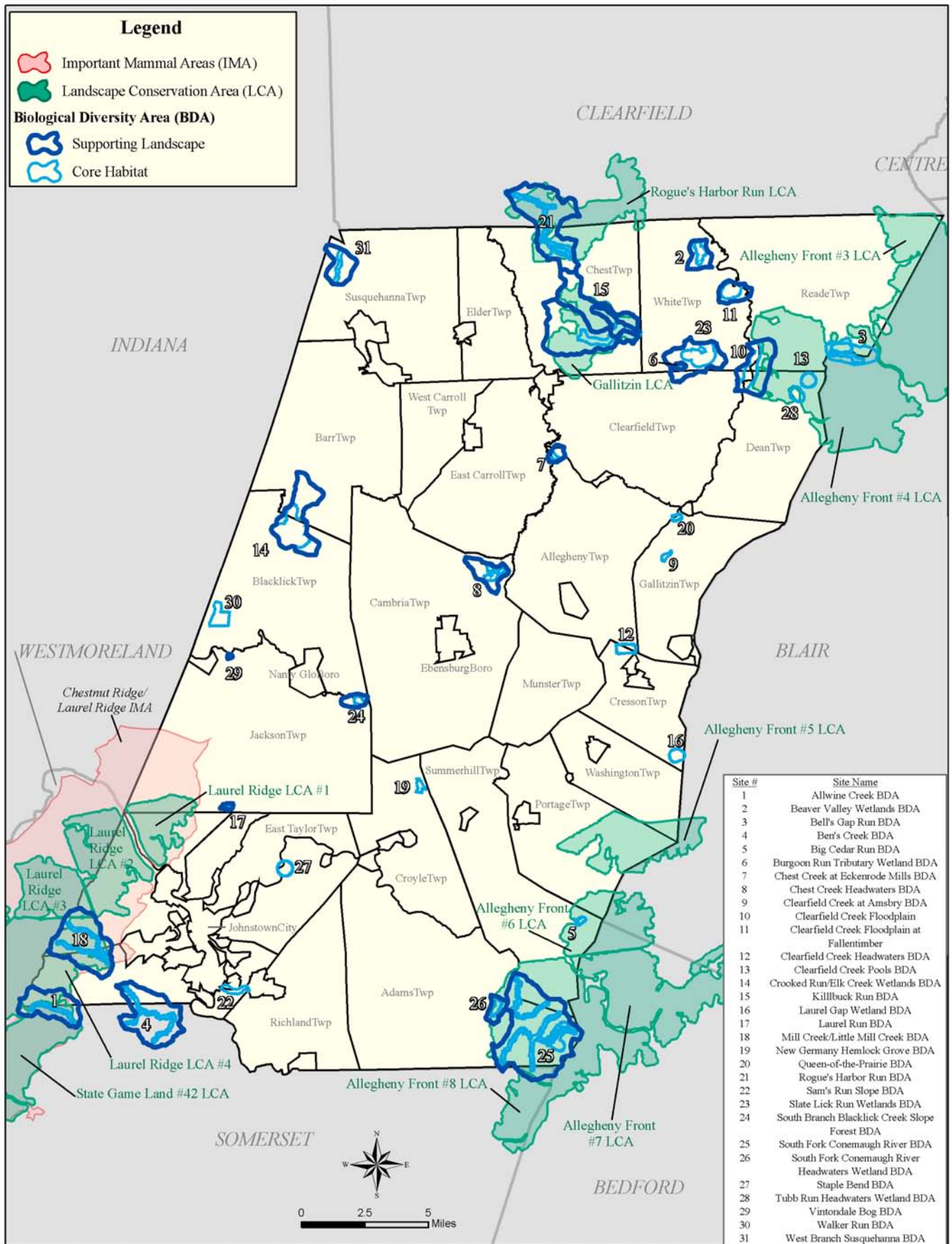


Figure 1. Natural Heritage Areas in Cambria County.

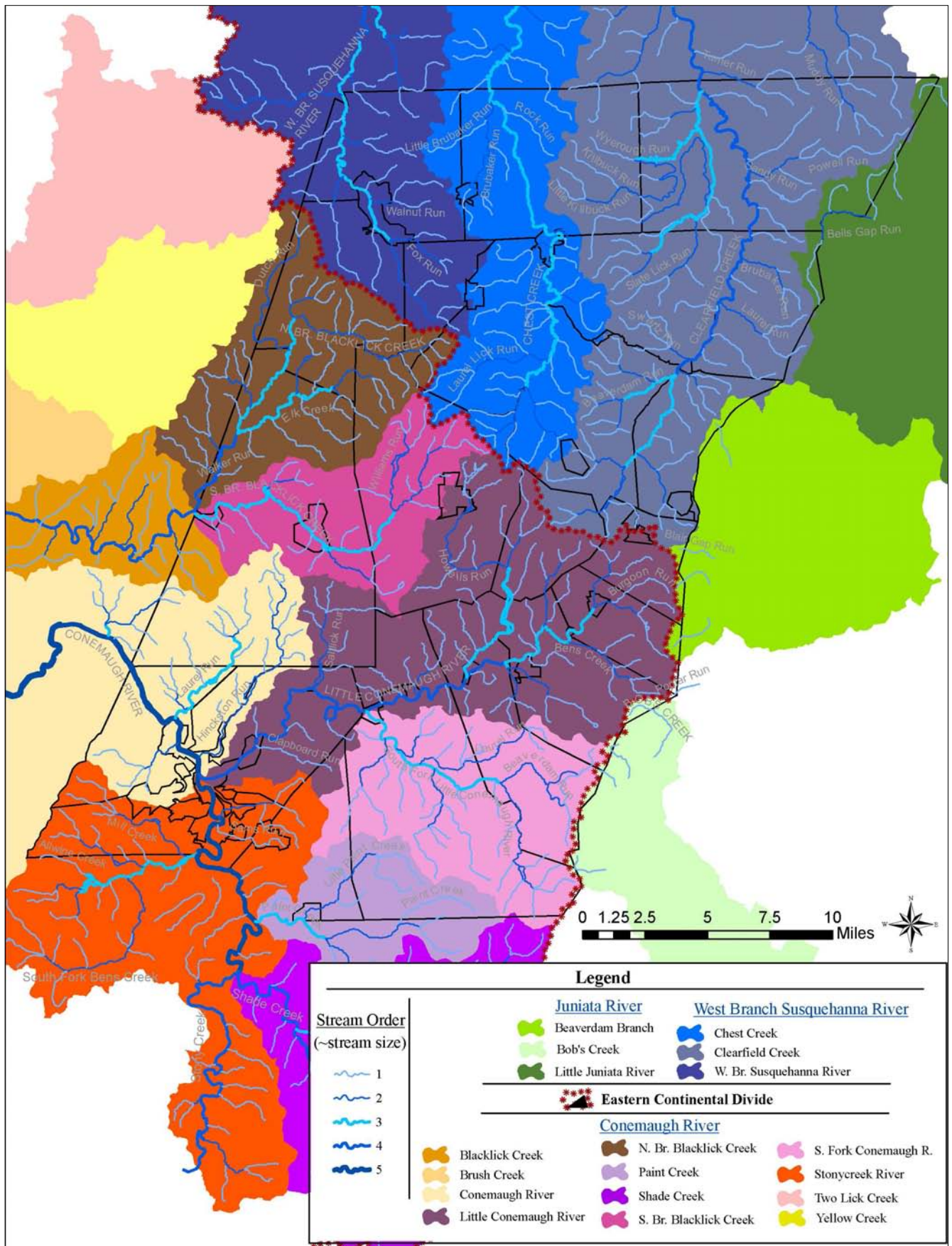


Figure 2. Watersheds of Cambria County.

**Table 1. Natural Heritage Areas Categorized by Significance**

| Site                               | Municipality   | Description   | Page |
|------------------------------------|--|---|------|
| <i>Exceptional</i>                 |  |   |      |
| Allegheny Front #3 LCA             | Antis Twp.<br>Gulich Twp.<br>Snyder Twp.<br>Reade Twp. | Large contiguous forest block   | 30   |
| Allegheny Front #4 LCA             | Reade Twp.<br>Antis Twp.<br>Dean Twp.                  | Large contiguous forest block   | 30   |
| Allegheny Front #8 LCA             | Summerhill Twp.<br>Adams Twp.                          | Exceptionally large block of contiguous forest  | 30   |
| Bell's Gap Run BDA                 | Reade Twp.   | A portion of the Bell's Gap Run Valley that supports a unique community on a calcareous outcrop formation, a plant species of special concern, a population of the Allegheny Woodrat, and an exceptionally mature, intact forest community. | 107  |
| Clearfield Creek Pools BDA         | Dean Twp.  | A series of natural vernal pools, inhabited by the federally threatened northeastern bulrush.   | 77   |
| Laurel Ridge LCA #4                | Johnstown Area   | Exceptionally large block of contiguous forest  | 32   |
| Rogue's Harbor Run BDA             | Chest Twp.   | Watershed of Rogue's Harbor Run and its tributaries, designated as Exceptional Value waters by the PA-DEP. Also contains a headwaters wetland complex and vernal pools.   | 63   |
| State Game Land #42 LCA            | Johnstown Area   | Exceptionally large block of contiguous forest  | 32   |
| <i>High</i>                        |  |   |      |
| Allegheny Front #7 LCA             | Summerhill Twp.  | Large contiguous forest block   | 30   |
| Allwine Run BDA                    | Johnstown Area   | Watershed of Allwine Creek, designated as Exceptional Value by the PA-DEP   | 97   |
| Beaver Valley Wetlands BDA         | White Twp.   | A stream valley with a unique and diverse hardwood riparian forest community.   | 125  |
| Ben's Creek BDA                    | Johnstown Area   | Watershed of Bens Creek, designated as Exceptional Value by the PA-DEP  | 97   |
| Chest Creek at Eckenrode Mills BDA | East Carroll Twp.<br>Allegheny Twp.                    | A natural area along Chest Creek with a mature stand of hemlock and a wetland complex with a diverse flora.   | 45   |
| Chest Creek Headwaters BDA         | Cambria Twp.   | Watershed above wetland area.   | 57   |
| Gallitzin LCA                      | Chest Twp.<br>Clearfield Twp.                          | Moderate-sized block of contiguous forest   | 32   |

**Table 1. Natural Heritage Areas Categorized by Significance**

| <b>Site</b>                                       | <b>Municipality</b>                                    | <b>Description</b>  | <b>Page</b> |
|---|--|---|-------------|
| Laurel Ridge LCA #1                               | Jackson Twp.<br>Johnstown Area                         | Moderate-sized block of contiguous forest   | 32          |
| Laurel Ridge LCA #2                               | Johnstown Area   | Moderate-sized block of contiguous forest   | 32          |
| Laurel Ridge LCA #3                               | Johnstown Area   | Moderate-sized block of contiguous forest   | 32          |
| Mill Creek/Little Mill Creek BDA                  | Johnstown Area   | Watershed of Mill Creek and Little Mill Creek, designated as Exceptional Value streams by the PA-DEP  | 97          |
| Rogue's Harbor Run LCA                            | Chest Twp.<br>Beccaria Twp.<br>White Twp<br>Chest Twp. | Moderate-sized block of contiguous forest   | 33          |
| South Fork Conemaugh River BDA                    | Adams Twp.<br>Summerhill Twp.                          | Watershed of the South Fork Conemaugh River headwaters, designated as Exceptional Value by the PA-DEP; also contains a large natural wetland complex. | 41          |
| South Fork Conemaugh River Headwaters Wetland BDA | Adams Twp.   | A large natural wetland complex.  | 41          |
| Tubb Run Headwaters Wetland BDA                   | Dean Twp.  | A headwaters wetland complex that is a mixture of shrub and herbaceous vegetation, with some beaver influence. Inhabited by rare insects.             | 78          |
| <i>Notable</i>                                    |  |   |             |
| Allegheny Front #5 LCA                            | Juniata Twp.<br>Washington Twp.<br>Portage Twp.        | Moderate size forest block  | 30          |
| Allegheny Front #6 LCA                            | Portage Twp.<br>Summerhill Twp.                        | Moderate size forest block  | 30          |
| Clearfield Creek at Amsbry BDA                    | Gallitzin Twp.   | A lowland forest along Clearfield Creek inhabited by the Appalachian violet   | 88          |
| Clearfield Creek Headwaters BDA                   | Cresson Twp.<br>Allegheny Twp.                         | Forested headwaters of Clearfield Creek, inhabited by the Appalachian violet, a plant species of special concern in PA.                               | 47          |
| Crooked Run/Elk Creek Wetlands BDA                | Barr Twp.,<br>Blacklick Twp.                           | A complex of wetlands, including forested seeps and a mosaic of shrub and graminoid communities.  | 51          |
| Laurel Gap Wetland BDA                            | Cresson Twp.<br>Juniata Twp.                           | A wetland with an open, sphagnum-sedge community and a hemlock-hardwood palustrine forest.  | 71          |
| Laurel Run BDA                                    | Jackson Twp.   | The habitat of a plant species of special concern, and the steep forested slopes above it.  | 91          |
| Queen-of-the-Prairie BDA                          | Allegheny Twp.<br>Gallitzin Twp.                       | An area inhabited by queen-of-the-prairie, a plant species of special concern in PA   | 47          |

**Table 1. Natural Heritage Areas Categorized by Significance**

| <b>Site</b>                                     | <b>Municipality</b>                                      | <b>Description</b>   | <b>Page</b> |
|---|--|--|-------------|
| <i>Notable</i>                                  |  |  |             |
| South Branch Blacklick Creek Slope Forest BDA   | Jackson Twp.   | A very mature stand of hemlock and beech forest  | 92          |
| Staple Bend BDA                                 | Johnstown Area   | A winter bat hibernation site and the disturbance-sensitive area surrounding it.                     | 99          |
| <i>County</i>                                   |  |  |             |
| Big Cedar Run BDA                               | Summerhill Twp.  | A hemlock palustrine forest at the mouth of Big Cedar Run.   | 111         |
| Burgoon Run Tributary Wetland BDA               | White Twp.   | A palustrine forested area fed by seepages.  | 127         |
| Clearfield Creek Floodplain BDA                 | White Twp.<br>Reade Twp.<br>Dean Twp.<br>Clearfield Twp. | Floodplain forest communities along Clearfield Creek   | 128         |
| Clearfield Creek Floodplain at Fallentimber BDA | White Twp.<br>Reade Twp.                                 | Floodplain forest communities along Clearfield Creek   | 130         |
| Killbuck Run BDA                                | Chest Twp.<br>White Twp.                                 | Forest and wetland communities along Killbuck Run and Little Killbuck Run.                           | 61          |
| New Germany Hemlock Grove BDA                   | Croyle Township  | A stand of exceptionally mature hemlock forest.  | 75          |
| Sam's Run Slope BDA                             | Johnstown Area   | A forested slope within a matrix of urban land, with a mature sugar maple-basswood forest.           | 99          |
| Slate Lick Run Wetlands BDA                     | White Twp.   | A wetland complex, largely forested, with a diverse and unique bottomland hardwood forest community. | 132         |
| Vintondale Bog                                  | Jackson Twp.   | A wetland with an acidic shrub swamp community.  | 93          |
| Walker Run BDA                                  | Blacklick Twp.   | A ravine with a mature, relatively intact hemlock-northern hardwoods forest community                | 51          |
| West Branch Susquehanna BDA                     | Susquehanna Twp.   | A section of the West Branch Susquehanna River with comparatively natural, forested floodplain       | 115         |

## Discussion and Recommendations

### Status of natural features today

Cambria County is situated between the ridgelines of Allegheny Front to the east and Laurel Ridge to the west. The western slope of the Allegheny Ridge is gentle and does not descend to the level of the eastern slope, as the lands to the west are uplifted. Laurel Ridge is one of the Allegheny Mountains, and its northern end reaches into Cambria County. Between these two major ridges, most of the landscape of the county is gently rolling hills dissected by stream valleys, with neutral to acidic soils derived from sandstone, shale, and siltstone. The Eastern Continental Divide also falls across the county, with its northeastern tributaries flowing into the Susquehanna River and eventually to the Chesapeake Bay and the Atlantic Ocean, and its southwestern tributaries flowing into the Ohio River to feed the Mississippi and the Gulf of Mexico.

Across this natural geography, the condition of the landscape and waterways of Cambria County has undergone considerable change over the course of human settlement. Industry, mining, agriculture, timber extraction, residential settlement, and transportation infrastructure development have all dramatically impacted the ecological character and capacity of the land. The condition of the natural landscape today closely reflects the history of these activities.

The county was settled by Europeans around the beginning of the 19<sup>th</sup> century, which resulted in increased agricultural cultivation, as well as the advent of large-scale timber and mineral extraction. During the timber boom in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, almost all of the forests in the county were clear-cut. Agriculture was also established in a patchwork pattern, except on the high-elevation ridges. Coal mining began in the late 19<sup>th</sup> century, and although it reached its height in the early- to mid- twentieth century, it continues today. Strip mining has been extensive in the county and deep-mining even more extensive, leaving an environmental legacy of landscapes scarred by soil and bedrock disruption, mine refuse dumps,

and many waterways polluted by abandoned mine discharges.

Johnstown was a major industrial center and continues to be a major urban center in Pennsylvania. The landscape of the Johnstown area, and the waterways that flow through it, are heavily impacted by its industrial past.

Finally, transportation and utility infrastructure construction has had a major impact on the landscape of Cambria County. The county has a rather extraordinary abundance of right-of-way corridors criss-crossing its forests today, as well as several major roadways (U.S. Rt. 22, State Routes 219 & 119), and a network of smaller roads. These corridors, especially modern highway routes, impact the ecological value of forest habitat; the largest right-of-ways and roads are major fragmenting features impeding the passage of wildlife.

### Forest Communities

Since the end of the timber boom at the beginning of last century, natural communities have re-developed in areas not devoted to other uses. Along the Allegheny Front and the Laurel Ridge, large areas of contiguous forest provide abundant habitat for forest dwelling species. Outside of these areas, much of the landscape is forested, but the pattern is a mosaic of forest and other uses, such that forests occur in small, discontinuous patches. Small forest fragments do not provide habitat usable by many native species. However, the forests of the county do help to maintain water quality in its streams. In the more extensive forested areas, there are several streams designated as Exceptional Value by the Pennsylvania Department of Environmental Protection (DEP), due to their ecological health. Outside of these extensively forested areas, much of the forest that remains is along stream channels, providing the beginnings of a network of riparian buffers that can greatly enhance water quality and aquatic habitat value.

Additionally, over-browsing by deer poses a threat to biological diversity and forest regeneration in many regions of the county.

Despite their variable condition today, the forests are a great asset to the ecological integrity of the county, and have the potential to offer even greater benefits with ecologically sensitive management into the future.

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. Today several such large, contiguous areas exist in the county, with potential to support species which are declining in other areas of the state and the continent due to lack of habitat. Furthermore, Laurel Ridge and the Allegheny Front are landforms that naturally form regional corridors of forest. However, today their value as corridors is diminished by fragmentation by right-of-ways and roads. With management to improve forest contiguity, even greater ecological benefits can be realized.

There is also potential to benefit biodiversity by managing some areas to become old-growth forests. 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 Cambria County today that are considered old growth, the large expanses of younger forests provide the potential for future development of this habitat type.

### Wetlands

Within the matrix of forest along the ridgelines in the county, and along the streams and rivers in the valleys, unique wetland communities including forested seepages, headwaters shrub swamps, vernal pools, and floodplain wetlands occur in flat areas where soils and topography allow accumulation of water. Although these communities occupy a comparatively small portion of the natural landscape, they are of particular value to the county's biodiversity because of the species they support. Groups of specialist species—such as amphibians that breed only in vernal ponds, or plant species that live only in particular types of wetlands—that would otherwise not be present in the county inhabit these areas. These habitats are especially important because they are regionally

threatened: one-half of Pennsylvania's wetlands have been lost or substantially degraded, and wetland and aquatic species that depend on these habitats are correspondingly declining.

### Aquatic communities

Cambria County has great variation in aquatic habitat types. The physical settings range from small, steep, headwaters channels, to mid-sized streams, to broad rivers. Water chemistry tends towards acidic, because most surface geology in most areas is sandstone and shale, which are sometimes naturally acidic and offer no buffering capacity against acidic inputs from acid rain or mining discharges. The ecological potential of these habitats is not fully known, because almost all of the larger waterways—North & South Branch Blacklick Creek, the Conemaugh River, and Clearfield Creek are heavily polluted by mine drainage. The most heavily polluted waterways support little life, but many of the smaller streams support some of the more tolerant fish and insect species. Pollution from agricultural runoff, mine drainage, and urban runoff remains an issue in many areas that impedes full biological recovery and can pose threats to human health. The larger rivers, a habitat which is imperiled throughout our region, have fared the worst, because they accumulate pollution from all upstream sources and because they are often subject to extensive physical modification.

### **Planning for biodiversity and ecological health tomorrow**

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

### Forests—maintain & increase contiguity

In the forested landscapes of the Laurel Ridge, the north-central portion of the county, and the Allegheny Front, objectives for large-scale

planning should include maintaining and increasing contiguity and connectivity of natural land. Contiguity is important for the enhanced habitat values outlined above; however, for many species it is equally critical that natural corridors are maintained that span between forest patches and that 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.

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, by orienting new infrastructure along existing corridors rather than through unfragmented natural landscapes, and by encouraging riparian buffer development.

#### A Riparian greenway network— many benefits

The county's network of streams provides a natural opportunity to develop ecological connectivity in the county's landscape. Forest already exists along many waterways, and establishment of riparian buffers where they do not currently exist conveys a multitude of benefits for water quality, soil preservation, and habitat value. Restoration of native vegetation to riparian corridors and buffers will help greatly in improving water quality and enhancing the habitat value of the waterways for various aquatic and semi-aquatic species. Furthermore, a riparian greenway network can also aid in reducing flooding damages, and improve the scenic beauty and recreational value of the waterways. Reduction in the release of pollutants into runoff, including sediments, nutrients, and chemical contaminants, will also be necessary to improve water quality. Attending to the basic ecological functions of streams and wetlands will pay dividends by ensuring the continued capacity of the land in supporting agriculture, maintaining healthy fisheries, and providing the quality of the life for which the region is known.

#### Wetlands—worth saving

Natural wetlands that are in good condition are highlighted in this report; due to their scarcity and their high ecological importance, emphasis should be placed on conservation of wetland sites.

#### **Evaluating proposed activity within Natural Heritage Areas**

A very important part of encouraging conservation of the Natural Heritage Areas identified within the Cambria 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 Cambria 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 agencies or organizations to better understand the implications of proposed activities. They can also supply guidance to the landowners, developers, or project managers as to possible conflicts and courses of action.

The Cambria County Natural Heritage Inventory is *not* meant to be used as a substitute for environmental review, since information is constantly being updated as natural resources are both destroyed and discovered. Applicants for building permits and Planning Commissions should conduct free, online, environmental reviews to inform them of project-specific potential conflicts with sensitive natural resources. Environmental reviews can be conducted by visiting the Pennsylvania Natural Heritage Program's (PNHP) website, at <http://www.naturalheritage.state.pa.us/>.

If conflicts are noted during the environmental review process, the applicant is informed of the steps to take to minimize negative effects on the county's sensitive natural resources. If

additional information on species of special concern becomes available during environmental review, the review may be reconsidered by the jurisdictional agency. 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 reptiles, amphibians, and 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 species not falling under the above jurisdiction.

PNHP and agency biologists can provide more detailed information with regard to the location of natural resources of concern in a project area, the needs of the particular resources

in question, and the 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, an agency biologist will recommend a survey be conducted. 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 Natural Heritage Area, PNHP staff 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.

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.

# TABLE OF CONTENTS

|  |      |
|--|------|
| PREFACE.....   | i    |
| ACKNOWLEDGEMENTS.....                                    | iii  |
| EXECUTIVE SUMMARY.....                                   | v    |
| Introduction.....  | v    |
| Natural Heritage Inventory Classification.....           | v    |
| Methods.....   | vi   |
| Results.....   | vii  |
| Discussion and Recommendations.....                      | xiii |
| INTRODUCTION.....  | 5    |
| Natural History Overview of Cambria County.....          | 7    |
| METHODS.....   | 23   |
| RESULTS.....   | 25   |
| Landscape Conservation Areas.....                        | 25   |
| Background.....  | 25   |
| General Recommendations for LCA Conservation.....        | 29   |
| Cambria County LCAs.....                                 | 30   |
| Forest Certification Program Information.....            | 36   |
| Biological Diversity Areas (Listed By Municipality)..... | 39   |
| Summary Table Conventions.....                           | 39   |
| Townships  |      |
| Adams Township.....                                      | 40   |
| Allegheny Township.....                                  | 44   |
| Barr Township.....                                       | 48   |
| Blacklick Township.....                                  | 50   |
| Cambria Township.....                                    | 56   |
| Chest Township.....                                      | 60   |
| Clearfield township.....                                 | 68   |
| Cresson Township.....                                    | 70   |
| Croyle Township.....                                     | 74   |
| Dean Township.....                                       | 76   |
| East Carroll Township.....                               | 82   |
| East Taylor Township.....                                | 96   |
| Elder Township.....                                      | 84   |
| Gallitzin Township.....                                  | 86   |
| Jackson Township.....                                    | 90   |
| Johnstown Area.....                                      | 96   |
| Lower Yoder Township.....                                | 96   |
| Middle Taylor Township.....                              | 96   |
| Munster Township.....                                    | 102  |
| Portage Township.....                                    | 104  |
| Reade Township.....                                      | 106  |
| Richland Township.....                                   | 96   |
| Stonycreek Township.....                                 | 96   |
| Summerhill Township.....                                 | 110  |
| Susquehanna Township.....                                | 114  |
| Upper Yoder Township.....                                | 96   |
| Washington Township.....                                 | 120  |
| West Carroll Township.....                               | 122  |
| West Taylor Township.....                                | 96   |
| White Township.....                                      | 124  |
| Boroughs   |      |
| Ashville Borough.....                                    | 76   |

|  |     |
|--|-----|
| Carrolltown Borough.....   | 82  |
| Cassandra Borough.....   | 120 |
| Chest Springs Borough.....   | 44  |
| Conemaugh Township.....  | 96  |
| Cresson Borough.....   | 70  |
| Dale Borough.....  | 96  |
| Ehrenfeld Borough.....   | 74  |
| Ferndale Borough.....  | 96  |
| Gallitzin Borough.....   | 86  |
| Geistown Borough.....  | 96  |
| Hastings Borough.....  | 84  |
| Lilly Borough.....   | 120 |
| Loretto Borough.....   | 44  |
| Northern Cambria Borough.....  | 114 |
| Nanty Glo Borough.....   | 50  |
| Patton Borough.....  | 68  |
| Portage Borough.....   | 104 |
| Sankertown Borough.....  | 70  |
| Scalp Level Borough.....   | 96  |
| South Fork Borough.....  | 74  |
| Southmont Borough.....   | 96  |
| Summerhill Borough.....  | 74  |
| Tunnelhill Borough.....  | 86  |
| Vintondale Borough.....  | 90  |
| Westmont Borough.....  | 96  |
| Wilmore Borough.....   | 110 |
| GENERAL RECOMMENDATIONS.....   | 135 |
| GLOSSARY.....  | 139 |
| LITERATURE CITED.....  | 141 |
| Appendix I: Significance Ranks.....  | 145 |
| Appendix II: Pennsylvania Natural Heritage Program (PNHP).....                                   | 146 |
| Appendix III: Cambria County Natural Heritage Inventory Site Survey Form.....                    | 147 |
| Appendix IV: Classification of Natural Communities in Pennsylvania.....                          | 149 |
| Appendix V: Federal and State Endangered Species Categories, Global and State Element Ranks..... | 155 |
| Appendix VI: Plants and animals of special concern in Cambria County.....                        | 161 |
| Appendix VII: Sustainable Forestry Information Sources.....                                      | 162 |
| Appendix VIII: GIS data sources.....   | 164 |
| Appendix IX: Species Fact Sheets.....  | 166 |

## LIST OF TABLES

|   |    |
|---|----|
| Table 1. Natural Heritage Areas Categorized by Significance ..... | x  |
| Table 2. Soil Associations of Cambria County.....                 | 11 |
| Table 3. Prime Farmland Soils in Cambria County .....             | 12 |
| Table 4. Hydric Soils in Cambria County.....                      | 12 |

## LIST OF FIGURES

|  |      |
|--|------|
| Figure 1. Natural Heritage Areas in Cambria County.....  | viii |
| Figure 2. Watersheds of Cambria County.....  | ix   |
| Figure 3. Physiographic Provinces in Cambria County.....   | 8    |
| Figure 4. Soil Association Map of Cambria County.....  | 10   |
| Figure 5. Status of Eastern Brook Trout in Cambria County.....   | 18   |
| Figure 6. PA Department of Environmental Protection impaired stream designations in<br>Cambria County..... | 19   |
| Figure 7. Department of Environmental Protection 305(b) Stream Classification, Cambria County.....         | 21   |
| Figure 8. Forest Cover and Forest Fragmentation in Pennsylvania.....                                       | 26   |
| Figure 9. Interior Forest Habitat Blocks in Cambria County.....  | 27   |
| Figure 10. Areas in Cambria County meeting FSC standards for High Conservation Value Forests.....          | 37   |



## INTRODUCTION

Our natural environment is vital for human health and sustenance. A healthy environment provides clean air and water; supports fish, game and agriculture; and furnishes renewable sources of materials for countless aspects of our livelihoods and economy. In addition to these material services, a clean and healthy environment plays a central role in our quality of life, whether through its aesthetic value—found in forested ridges, mountain streams, and encounters with wildlife—or in the opportunities it provides for exploration, recreation, and education. Finally, a healthy natural environment supports economic growth by adding to the region’s attractiveness as a location for new business enterprises, and provides the basis for the recreation, tourism and forestry industries—all of which have the potential for long-term sustainability. Fully functional ecosystems are the key indicators of a healthy environment and working to maintain ecosystems is essential to the long-term sustainability of our economies.

An ecosystem is “the complex of interconnected living organisms inhabiting a particular area or unit of space, together with their environment and all their interrelationships and relationships with the environment” (Ostroumov 2002). All the parts of an ecosystem are interconnected—the survival of any species or the continuation of a given natural process depends upon the system as a whole, and in turn, these species and processes contribute to maintaining the system. An important consideration in assessing ecosystem health is the concept of biodiversity. Biodiversity can be defined as the full variety of life that occurs in a given place, and is measured at several scales: genes, species, natural communities, and landscapes.

Genetic diversity refers to the variation in genetic makeup between individuals and populations of organisms and provides a species with the ability to adapt successfully to environmental changes. In order to conserve genetic diversity, it is important to maintain natural patterns of gene flow through the migration of individual plants and animals across the landscape and the dispersal of pollen and seeds among populations (Thorne et al. 1996). Individual species 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).

A natural community is “an interactive assemblage of plant and animal species that share a common environment and occur together repeatedly on the landscape” (Massachusetts Biomap 2001). Natural communities are usually defined by their dominant plant species or the geological features on which they depend; examples include red maple swamp, hemlock forest, and serpentine grassland. Each type of natural community represents habitat for a different assemblage of species, hence identification and stewardship of the full range of native community types is needed to meet the challenge of conserving habitat for all species.

From an ecological perspective, a landscape is “a large area of land that includes a mosaic of natural community types and a variety of habitats for many species.” (Massachusetts Biomap 2001). At this scale, it is important to consider whether communities and habitats are isolated or connected by corridors of natural landscape traversable by wildlife, and whether the size of a natural landscape is sufficient to support viable populations and ecosystems. Because all the living and non-living elements of an ecosystem are interconnected and interdependent, it is essential to conserve native biodiversity at all these scales (genes, species, natural communities, and landscapes) if ecosystems are to continue functioning.

Pennsylvania’s natural heritage is rich in biodiversity and the state includes many examples of high quality natural communities and large expanses of natural landscapes. Over 20,000 species are known to occur in the state, and the extensive tracts of forest in the northern and central parts of the state represent a large fraction of the remaining areas of suitable habitat in the mid-Atlantic region for many forest-dependent species of birds and mammals. Unfortunately, biodiversity and ecosystem health are seriously threatened in many parts of the state by pollution and habitat loss. Of the 3500 species of animals and vascular plants that have been documented in the state, more than one in ten are imperiled, 156 have been

lost since European settlement, and 351 are threatened or endangered (Pennsylvania 21st Century Environment Commission 1998). Many of these species are imperiled because available habitat in the state has been reduced and/or degraded.

Fifty-six percent of Pennsylvania's wetlands have been lost or substantially degraded by filling, draining, or conversion to ponds (Dahl 1990). According to the Pennsylvania Department of Environmental Protection (DEP), 60% of those Pennsylvania lakes that have thus far been assessed for biological health are listed as impaired. Of 83,000 miles of stream in Pennsylvania, almost 70,000 miles have been assessed for water quality and nearly 11,000 miles have been designated as impaired due to abandoned mine discharges (AMD), acid precipitation, and agricultural and urban runoff (PA-DEP 2006). The species that depend on these habitats are correspondingly under threat: 58% of threatened or endangered plant species are wetland or aquatic species; 13% of Pennsylvania's 200 native fish species have been lost, while an additional 23% are imperiled; and among freshwater mussels— one of the most globally imperiled groups of organisms— 18 of Pennsylvania's 67 native species are extinct and another 22 are imperiled (Goodrich et al. 2003).

Prior to European settlement, over 90% of Pennsylvania's land area was forested. Today, 60% of the state is still forested, but much of this forest is fragmented by non-forest uses such as roads, utility right-of-ways, agriculture, and housing; only 42% is of the forest is interior forest habitat, and some of the species that depend upon interior forest habitat are in decline (Goodrich et al. 2003). In addition to habitat fragmentation, forest pests, acid precipitation (which causes nutrient leaching and stunted growth), overbrowsing by deer, and invasive species also threaten forest ecosystem health.

The Pennsylvania Natural Heritage Program (PNHP) assesses the conservation needs of animal and vascular plant species native to Pennsylvania. While Pennsylvania also hosts a diversity of other life forms such as mosses, fungi, bacteria, and protists, too little is known of these species to assess their conservation status. **The goal of this report is to identify areas important in sustaining biodiversity at the species, natural community, and landscape levels and provide that information to more fully inform land use decisions.** Using information from PNHP, County Natural Heritage Inventories (CNHIs) identify areas in the county that support Pennsylvania's rare, threatened or endangered species as well as natural communities that are considered to be rare in the state or exceptional examples of the more common community types. The areas that support these features are identified as Biological Diversity Areas (BDAs). At a broader scale, CNHIs recognize landscape-level features termed Landscape Conservation Areas (LCAs). LCAs identify areas of relatively intact natural landscape such as large areas of forest unbroken by roads or other fragmenting features; areas which function as a corridor connecting patches of natural landscape; and regions in which a high number of other biodiversity features are concentrated.

A description of each area's natural features and recommendations for maintaining their viability are provided for each BDA and LCA. Also, in an effort to provide as much information as possible focused on planning for biodiversity conservation, this report includes species and natural community fact sheets, references and links to information on invasive exotic species, and mapping from other conservation planning efforts such as the Pennsylvania Audubon's Important Bird Area Program. Together with other land use information, this report can help to guide the planning and land management necessary to maintain the ecosystems on which our living heritage depends.

## Natural History Overview of Cambria County

The climate, topography, geology and soils are particularly important in the development of ecosystems (forests, fields, wetlands) and physical features (streams, rivers, mountains) that occur in Cambria County. Disturbance, both natural and anthropogenic (human-caused), has been influential in forming and altering many of Cambria County's ecosystems, causing extinction of some species and the introduction of others. These combined factors provide the framework for locating and identifying exemplary natural communities and species of special concern in the county. The following sections provide a brief overview of the physiography, soils, surface water, and vegetation of Cambria County.

### Physiography and Geology

A physiographic province is a geographic region in which all parts are similar in geologic structure and climate and which has a unified geomorphic or surficial history. Physiography relates in part to a region's topography and climate. These two factors, along with bedrock type, significantly influence soil development, hydrology, and land use patterns of an area. Additionally, both physiography and geology are important to the patterns of plant community distribution, which in turn influences animal distribution. Because of the differences in climate, soils, and moisture regimes, certain plant communities would be expected to occur within some provinces and not others.

Although all of Cambria County falls within the Appalachian Plateau physiographic province, it includes several distinct topographic landforms that are classified into physiographic subsections—the Laurel Ridge of the Allegheny Mountains, the Allegheny Front, and the Low Plateau (**Figure 3**). Cambria County falls between the ridgelines of two of the Allegheny Mountains; Allegheny Ridge (at the county's eastern edge) and Laurel Ridge (at its western edge). The Allegheny Mountains are an old mountain chain characterized by broad ridges formed by underlying rock which has been mildly folded, in contrast to the intensely folded ridges of the Ridge and Valley to the east, and the generally horizontal strata of the Allegheny Plateau to the west (Braun 1950). Several long, broad ridges of the Alleghenies extend from Maryland north into Central Pennsylvania: Laurel Ridge, Chestnut Ridge, and Allegheny Ridge. Laurel Ridge reaches its northern extent in the middle of Cambria County, where it declines in elevation and is no longer a distinctly prominent landform, while the Allegheny Ridge declines somewhat in elevation across the county, but remains a prominent feature for many more miles to the northeast.

The Allegheny Ridge marks the division between the Ridge and Valley physiographic province and the Appalachian Plateau province. The western slope of the Allegheny Ridge is gentle and does not descend to the level of the eastern slope, as the lands to the west are uplifted. The rock underlying the Appalachian Plateau is layers of sandstone and shale 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. Most of the landscape is gently rolling hills dissected by stream valleys, with neutral to acidic soils derived from sandstone, shale, and siltstone. The Eastern Continental Divide also falls across the county, with its northeastern tributaries (Chest Creek, Clearfield Creek, and the headwaters of the West Branch Susquehanna River) flowing into the Susquehanna River to the Chesapeake Bay and the Atlantic Ocean, and its southwestern tributaries (the North and South Fork Blacklick Creek, North Branch Conemaugh River, South Branch Conemaugh River, and Little Conemaugh River) flowing into the Ohio River to feed the Mississippi and the Gulf of Mexico.

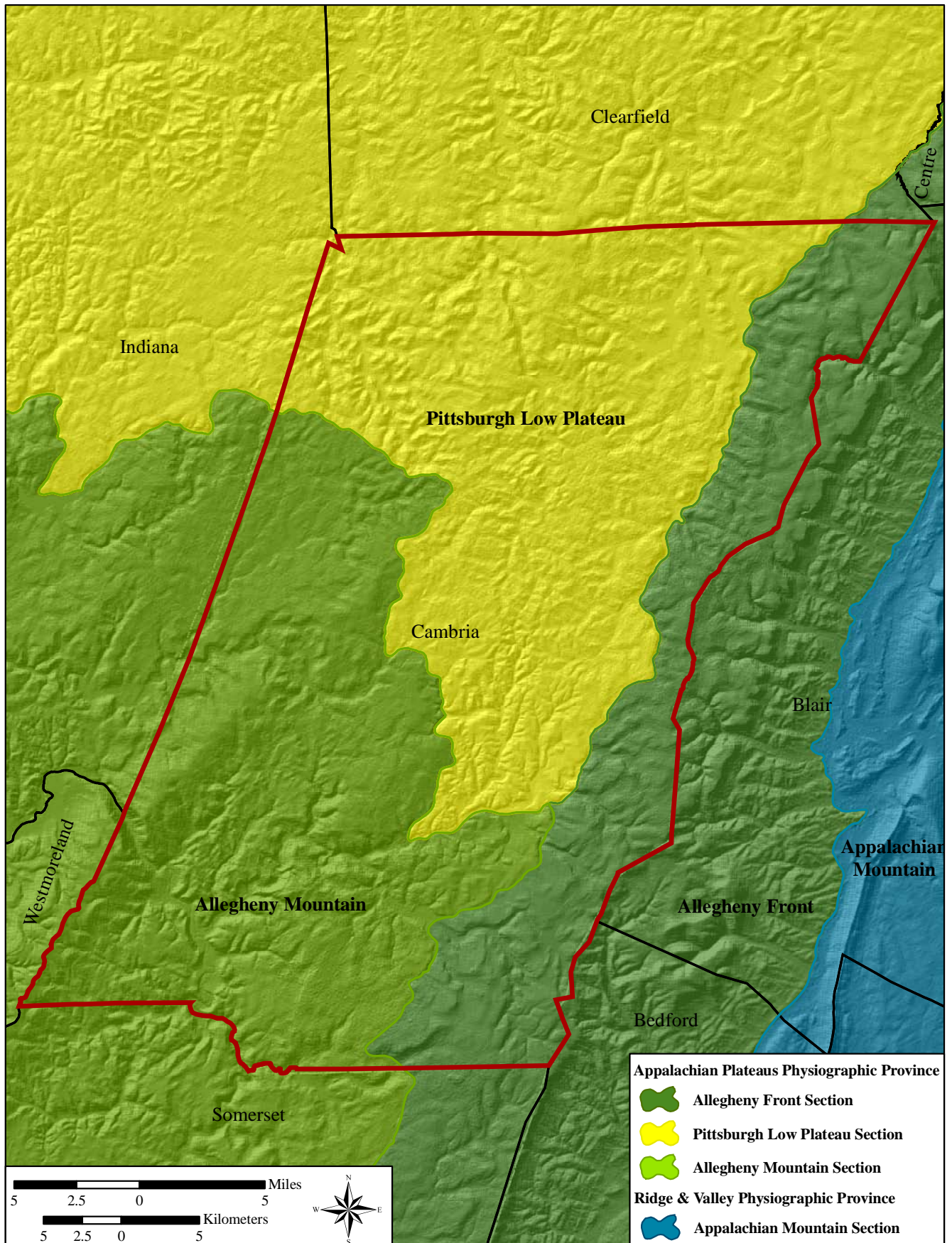


Figure 3. Physiographic Provinces in Cambria County.

## Soils

The soils of Cambria County are mainly derived from erosion or weathering of the sandstone, shale, and siltstone materials that predominate in the county's surface geology. They are acidic to neutral in chemistry, range from well-drained to poorly drained, often have an impervious layer present below the surface, and tend to be moderately deep to deep. In the extensive areas where surface mining has occurred, soils are much thinner, rockier, nutrient-poor, and often extremely well drained. This condition profoundly impairs the potential of the land to support regeneration of ecological communities similar to those naturally found in the region.

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. The soils of Cambria County have been described in Soil Survey of Cambria County, Pennsylvania (Farley 1985). The four soil associations recognized within the county are described in Table 2 and represented in **Figure 4**. Due to the similarity in bedrock and landform conditions in the county, many of these soils are broadly similar in their composition and characteristics.

## Vegetation

### Forest Communities

The mountain ridges hold the largest contiguous blocks of forest in the county. The Allegheny Front and the Laurel Ridge include large tracts of interior forest, while the intervening areas are a patchwork of different landuses, with small fragments of forest mainly along stream valleys. The northcentral region of the county also has some extensive forested areas.

Almost all of the forests in the county are second-growth or third-growth stands, except for a few remaining fragments where the maturity of the trees suggests they may not have ever been cut. Cambria County is in a transition area between major forest types, with oak – chestnut communities historically prevailing in the Ridge and Valley to the east, hemlock (white pine) – northern hardwood communities prevailing to the north, and mixed mesophytic communities prevailing to the west and south (Braun 1950). The mixed mesophytic type is characterized by a great diversity of species in the canopy and herbaceous layers, many of which are endemic to the southern Appalachian mountains. Cambria County is at the extreme northern edge of the range of this forest type, and no examples of mixed mesophytic primary growth remain. It once occupied lower elevation areas, especially slopes of stream valleys cut into the plateau-like valleys between the Allegheny ridges (Braun 1950).

In general, forest composition depends greatly on elevation, slope, and aspect. At lower elevations, the canopy is mixed, with typical species including tuliptree (*Liriodendron tulipifera*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), basswood (*Tilia americana*), cucumber magnolia (*Magnolia acuminata*), black cherry (*Prunus serotina*), white oak (*Quercus alba*), red oak (*Quercus rubra*), black birch (*Betula lenta*), hickories (shagbark, pignut, bitternut—*Carya ovata*, *Carya glabra*, and *Carya cordiformis*), and beech (*Fagus grandifolia*). Spicebush (*Lindera benzoin*), shadbush (*Amelanchier arborea*), and witch hazel (*Hamamelis virginiana*) are typical shrub or subcanopy species. The herbaceous layer is also typically diverse, with a mixture of northern and southern species. These forests may be considered mixed mesophytic-influenced in the diversity and heterogeneity of their composition.

On steep or convex slopes, chestnut oak (*Quercus montana*), red oak, and black gum (*Nyssa sylvatica*) increase in proportion and may dominate the canopy, and heaths such as mountain laurel (*Kalmia latifolia*), lowbush blueberry (*Vaccinium angustifolium*, *Vaccinium pallidum*), and teaberry (*Gaultheria procumbens*) may dominate the understory.

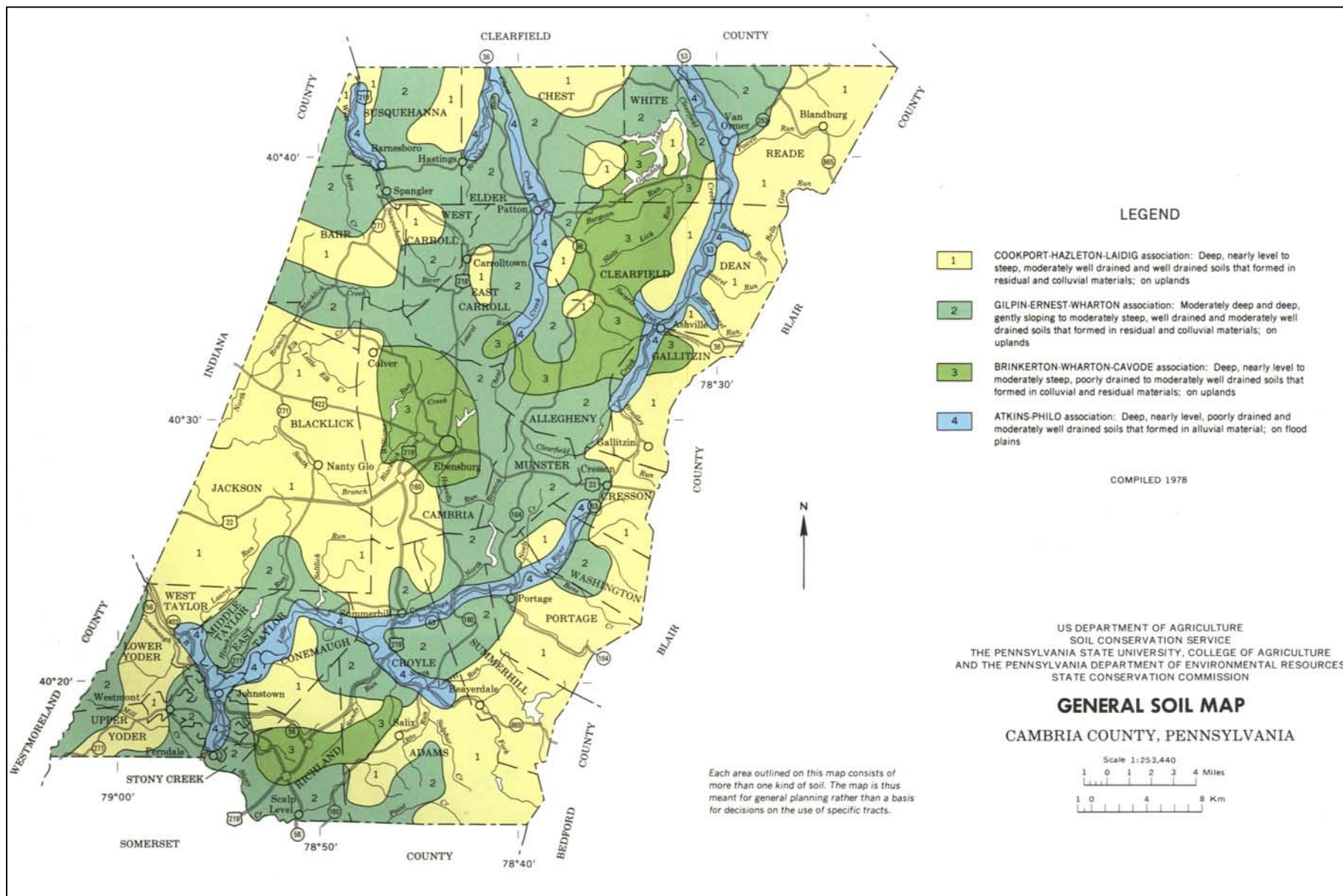


Figure 4. Soil Association Map of Cambria County.  
Reprinted from Soil Survey of Cambria County.

**Table 2. Soil Associations of Cambria County.**

| Soil Association                 | Parent Materials  | Description  | Percentage of County | Land Use   |
|----------------------------------|---|--|----------------------|--|
| <b>Cookport-Hazleton-Laidig</b>  | Residuum and colluvium weathered from acid sandstone, siltstone conglomerate, shale, and siltstone. | Deep; nearly level to steep; moderately well drained to well drained, occur on broad mountains and broad to narrow ridges that have colluvial side slopes dissected by drainageways. | 45                   | Primarily forest, with some areas used for crops or pasture, and a few areas in urban or industrial use. Main limitations are stoniness, slope, erosion, and a seasonal high water table.  |
| <b>Gilpin-Ernest-Wharton</b>     | Residuum and colluvium formed from acid shale and sandstone, and siltstone.                         | Moderately deep and deep, gently sloping to moderately steep, well drained and moderately well drained soils on ridges and hills that are dissected by drainageways.                 | 39                   | Most areas of this association are in cropland and woodland. Some areas are used for urban and industrial development. Limitations on uses are moderate depth to bedrock, a seasonal high water table, slow permeability, and slope. |
| <b>Brinkerton-Wharton-Cavode</b> | Residuum and colluvium formed from shale, sandstone, and acid gray clay shale.                      | Deep, nearly level to moderately steep, poorly drained to moderately well drained soils on broad ridges dissected by drainageways.   | 12                   | Most areas of this association are in crops, hay, and pasture. Main limitations on use are a seasonal high water table, slow permeability, and erosion.  |
| <b>Atkins-Philo</b>              | Alluvium washed from sandstone-, shale-, and siltstone-derived soils.                               | Deep, nearly level, poorly drained and moderately well drained soils in floodplains.   | 4                    | Most areas of this association are in pasture, woodland, and urban uses. Main limitations on uses are a seasonal high water table and flooding.  |

**Table 3. Prime Farmland Soils in Cambria County**

| <u>Map Symbol</u> | <u>Map Name</u>                                  |
|-------------------|--|
| AbB               | Albrights silt loam, 3 to 8 percent slopes       |
| CeA               | Cookport and Ernest soils, 0 to 3 percent slopes |
| CeB               | Cookport and Ernest soils, 3 to 8 percent slopes |
| GnB               | Gilpin silt loam, 3 to 8 percent slopes          |
| HaB               | Hazleton channery loam, 3 to 8 percent slopes    |
| HaC               | Hazleton channery loam, 8 to 15 percent slopes   |
| LaB               | Laidig loam, 3 to 8 percent slopes               |
| LkB               | Leck Kill silt loam, 3 to 8 percent slopes       |
| Ph                | Philo silt loam                                  |
| Po                | Pope silt lam                                    |
| RaB               | Rayne silt loam, 3 to 8 percent slopes           |
| WaB *             | Wharton silt loam, 3 to 8 percent slopes         |

\* Some nonprime farmland areas are included in this mapping unit; however, it is our best judgment that in this county, over 50 percent of this unit have slopes of less than 5.4 percent and this soil qualifies for prime farmland.

**Table 4. Hydric Soils in Cambria County**

| <u>Map Symbol</u> | <u>Map Name</u>  |
|-------------------|--|
| AmB               | Armagh silt loam, 0 to 8 percent slopes                |
| At                | Atkins silt loam                                       |
| BtB               | Brinkerton silt loam, 0 to 8 percent slopes            |
| BvB               | Brinkerton very stony silt loam, 0 to 8 percent slopes |
| NcB               | Nolo very stony sandy loam, 0 to 8 percent slope       |

Statewide Important Soils

|     |  |
|-----|--|
| AbC | Albrights silt loam,                                       |
| At  | Atkins silt loam   |
| BeB | Berks channery silt loam, 3 to 8 percent slopes            |
| BeC | Berks channery silt loam, 8 to 15 percent slopes           |
| BmB | Blairton silt loam, 3 to 8 percent slopes                  |
| BmC | Blairton silt loam, 8 to 15 percent slopes                 |
| BpC | Blairton-Berks channery silt loams, 8 to 15 percent slopes |
| CaB | Cavode silt loam, 3 to 8 percent slopes                    |
| CaC | Cavode silt loam, 8 to 15 percent slopes                   |
| CeC | Cookport-Ernest soils, 8 to 15 percent slopes              |
| GtC | Gilpin-Rayne silt loams, 8 to 15 percent slopes            |
| GwB | Gilpin-Weikert channery silt loam, 3 to 8 percent slopes   |
| GwC | Gilpin-Weikert channery silt loam, 8 to 15 percent slopes  |
| LaC | Laidig Loam, 8 to 15 percent slopes                        |
| LkC | Leck Kill silt loam, 8 to 15 percent slopes                |
| RaC | Rayne silt loam, 8 to 15 percent slopes                    |
| WaC | Wharton silt loam, 8 to 15 percent slopes                  |
| WgC | Wharton-Gilpin silt loams, 8 to 15 percent slopes          |

At higher elevations, beech, black birch, and sugar maple become the canopy dominants, and species such as cucumber magnolia and tuliptree are absent. Diversity tends to be lower in both the canopy and herbaceous layer, where northern species become more prominent.

### Wetland Communities

Wetlands include vegetation types important for the region, and provide essential habitat for many plant and animal species. The type of wetland existing in any given place depends on soil type, disturbance, and length and duration of flooding. In Cambria County, many of the wetlands are associated with streams or rivers and include floodplain forests, forested swamps, shrub swamps, and graminoid marshes. They may occur in floodplains or in headwaters of waterways. Two other important wetland types known from the area are seepage swamps and vernal pools. As with forest communities, the influence of bedrock geology on soil and water chemistry strongly influences the plant composition of wetland communities. Sandstone and shale bedrock predominates in Cambria County, thus most of its wetlands are fed by groundwater or surface water with neutral to acidic chemistry. The degree of acidity will influence the plant and animal composition of a wetland. Highly acidic wetlands tend to be dominated by sphagnum mosses and have low plant species diversity, although some of the species found are adapted to these conditions and not found in other habitats. They may support a variety of insect species adapted for acidic conditions. Amphibians typically breed in wetlands, but may be unsuccessful in highly acidic situations. More neutral water chemistry results in a greater diversity of plant and amphibian species.

#### *Floodplain and Riparian Wetlands*

Floodplain forests occur along rivers and streams in low-lying areas. These locations are periodically inundated by the floodwaters of spring runoff or runoff from intense storm events. In central Pennsylvania, where floodplains exist in relatively natural conditions, forests are characterized by a canopy containing some combination of silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), tuliptree (*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.

Floodplains on smaller waterways receive less intense disturbances but are still periodically flooded, which limits the kinds of vegetation that can occur on them. Pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), silver maple, red maple, ash, sycamore, and black walnut (*Juglans nigra*) are frequent on wetter bottomland soils associated with smaller creeks. Understory species include spicebush, violets (*Viola* spp.), nettles (*Urtica dioica*, *Laportea canadensis*), cut-leaved coneflower (*Rudbeckia laciniata*), golden alexanders (*Zizia aurea*) and many other wildflowers. Several species of special concern are frequently found in these habitats. In addition, floodplain forests also serve as a protective buffer against erosion; help provide cooling shade to the waterway; filter pollutants and excessive nutrients from runoff; and help alleviate flood damage along many of the area's creeks. Areas that have a history of flooding are poor choices for building sites, and are best left as natural floodplain.

In Cambria County, the best examples of natural floodplain habitats are found along Clearfield Creek, its tributary the Beaverdam Branch, and in a few areas along the headwaters of the West Branch Susquehanna River. The Conemaugh River and its tributaries, except in the headwaters, are heavily developed, and in undeveloped areas Japanese knotweed and other invasive species have become ubiquitously established.

### *Graminoid Marshes*

Graminoid marshes are wetlands dominated by grass-like plants such as cattails (*Typha latifolia*), sedges (*Carex* spp.), and grasses. These wetlands may be found in association with streams or in areas with ground water seepages. Graminoid marshes in the county are frequently formed as successional communities following beaver dams or other impoundments. These wetlands are frequently rich in species diversity, and provide important breeding habitat for numerous amphibians, reptiles and birds. Good examples are found in the Rogue's Harbor Run BDA, pg. 63; the South Fork Conemaugh River BDA, pg. 41; the Killbuck Run Wetland core area in the Killbuck Run BDA, pg. 61; and the Slate Lick Run Wetlands BDA, pg. 132.

### *Seepage Swamps*

Seepage swamps are relatively small, forested or shrub-dominated wetlands found on lower slopes where water emerges at the surface in a diffuse flow. These seep areas are frequently dominated by hemlock, yellow birch and red maple, with a thick understory of rhododendron (*Rhododendron maximum*), swamp azalea (*Rhododendron viscosum*), spicebush, and/or highbush blueberry (*Vaccinium corymbosum*). Common herbs in these seepage wetlands include skunk cabbage (*Symplocarpus foetidus*), violets, manna grass (*Glyceria* spp.), various sedges (*Carex* spp.), and ferns, including cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), and sensitive fern (*Onoclea sensibilis*). Sphagnum (*Sphagnum* spp.) and other mosses typically form a thick mat in these wetlands. Two good examples of this habitat in Cambria County are the Killbuck Run Palustrine Forest (Killbuck Run BDA, pg. 61) and the Chest Creek Headwaters BDA, pg. 57.

### *Vernal Pools*

Ephemeral/fluctuating or vernal pools are wetlands that fill annually from precipitation, surface water runoff, and rising groundwater (Kenney and Burne, 2000). The pools typically become completely dry through evaporation by late spring or summer. Since these ponds dry up during a portion of the year, they cannot support fish populations. During the brief time the pools contain water, and in the absence of fish, they become important breeding areas for a multitude of amphibian species (e.g., spotted salamander, *Ambystoma maculatum*), many of which breed solely in vernal pools. In Cambria County, vernal pool communities are found in broad, flat saddles along the Allegheny Front, and also in a similar topographic situation in the headwaters of Rogue's Harbor Run in the north-central portion of the county. Pools form in the center of broad, flat areas because there is no opportunity for drainage. They are often the origin point for stream tributaries.

### *High-elevation Headwaters Swamps or "Bogs"*

Often in flat areas near the origins of waterways, wetlands develop from accumulation of surface runoff and groundwater inputs. The character and extent of these wetlands often varies as beaver activity fluctuates over time. They may range from highly acidic herbaceous wetlands dominated by sphagnum moss, beaked rush (*Rhynchospora alba*), cottongrass (*Eriophorum virginicum*), and sedges (*Carex folliculata*, *Carex gynandra*, *Carex atlantica*); to shrublands with rough alder (*Alnus incana*), black huckleberry (*Gaylussacia baccata*), inkberry (*Nemopanthus mucronatus*), blueberries (*Vaccinium angustifolium*, *Vaccinium pallidum*), winterberry (*Ilex verticillata*); to varying degrees of forest cover with hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), black gum, and swamp shadbush (*Amelanchier laevis*). Often these wetlands will be a mosaic of woodland, shrubland, and herbaceous forms, depending upon subtle variations in elevation and seasonal saturation. They are often referred to as "bogs." True bogs, however, have a floating layer of peat at the surface at least 9" thick.

Because wetlands are relatively rare in central Pennsylvania, they are an important refuge for plants as well as important habitat for nesting and migrating birds. Many other animals groups such as amphibians, reptiles, dragonflies, damselflies, moths, and butterflies also depend on specific wetland habitats for all or a portion of their life cycles.

*Wetlands of Cambria County*



Seepage/back channel wetland along Laurel Run



Sphagnum moss-graminoid headwaters wetland  
(in South Fork Conemaugh River Headwaters Wetland)



Floodplain forest along Beaverdam Run

## Aquatic Ecosystems – Streams & Lakes

Cambria County is situated across the Eastern Continental Divide, with rolling topography cut by streams. Its northern portion contains headwaters streams feeding the West Branch Susquehanna River, which flows ultimately to the Chesapeake Bay, while the southern portion of the county is the headwaters of the Conemaugh River, which flows ultimately to the Mississippi River and the Gulf of Mexico. The county's far western edge also includes some portions of the headwaters of the Juniata River. There are no natural lakes in the county, although many streams have been dammed to create reservoirs.

The prevailing geology of acid sandstones, shales, and siltstones leads to streams that are naturally neutral to acidic in pH level. Because of the general absence of limestone or other calcareous geology, the streams tend to have little buffering capacity, and acidic pollution sources quickly alter the overall pH of a stream.

In the last two centuries, land cover changes have dramatically affected the health of aquatic ecosystems in the county. Widespread timbering in the late 19<sup>th</sup> and 20<sup>th</sup> centuries created erosion problems; deep mining in much of the county has left a legacy of mining discharges polluting many waterways, and strip mining also contributes to acidic runoff and erosion, resulting in pollution of streams with sediments, metals, and pH-altering chemicals. During the development of steel manufacturing and other heavy industries, waterways were used as conduits to carry wastes off-site—into the surrounding environments. Many efforts at remediation have reduced pollution problems from the severity of decades past, such that a good fraction of the waterways in the county have made gains in their ecological health. However, water quality in the county is still impaired in many areas by pollution from mine discharges, and by silt runoff from agricultural or residential areas. The naturally rolling topography of the land facilitates erosion, requiring vigilant implementation of soil conservation practices to prevent pollution from reaching the streams. Because of the degradation of many headwaters streams, most larger waterways carry substantial pollution loads—including the Conemaugh River, the West Branch Susquehanna River, Blacklick Creek, and Clearfield Creek. Chest Creek and the headwaters of the South Fork Conemaugh River are comparatively healthy.

In the most severely affected areas, the water is not safe for human consumption and supports no aquatic life. Less severely affected streams often support a range of species that are tolerant of pollution, but lack the full complement of species that would be present in a healthy system. Water pollution is absorbed by all aquatic organisms, and is concentrated by organisms higher in the food chain—thus posing risks for humans consuming fish or shellfish from any polluted waters. Most communities in Cambria County depend upon streams and reservoirs for drinking water, and in these areas water pollution directly impacts human health for all. Healthy streams and aquatic ecosystems are also important to the overall ecological health of the region because all animals depend on water, and because the aquatic and terrestrial systems are linked by many relationships of interdependence among species. Although many challenges remain in restoring the county's waterways to health, there are also headwaters watersheds that are now predominantly forested and in good health from which to build upon.

**Figure 6** shows which streams have been designated as impaired by the Pennsylvania Department of Environmental Protection (DEP), while **Figure 5** shows the DEP designations for aquatic ecosystem type and for watersheds of especial ecological value. Portions of five Exceptional Value streams fall within Cambria County: Allwine Creek and Mill Run in the southwest corner; Rogues Harbor Run along the northern border with Clearfield County; and the headwaters of Ben's Creek and the South Fork Conemaugh River in the southeastern corner of the county. Additionally, much of the headwaters of Chest Creek is designated High Quality, as well as Laurel Run (SW, flowing into the Conemaugh River), Saltlick Run, the headwaters of the North Fork Conemaugh River, Beaverdam Run, and Sandy Run (tributary to Clearfield Creek).

The Eastern Brook Trout Joint Venture (EBTJV) – a collaboration between government agencies, academic institutions, and conservation groups – recently published an assessment of the status of the native brook trout (throughout its historic range (Hudy et al. 2005). While aquatic ecosystems comprise an assemblage of many species of insects, fish, amphibians, and plants, in watersheds where the brook trout has historically been present, the health of its populations can serve as one indicator of overall ecological health. The report found that the dramatic land use changes of the last several centuries have greatly impacted the brook trout, reducing its historic range and diminishing its populations. The species has been eliminated from approximately one quarter of the habitat where it once occurred, and reduced to small headwaters habitats in another quarter. More information is available at: <http://www.easternbrooktrout.org>.

**Figure 5** shows the EBTJV report's assessment of subwatersheds in Cambria County. The brook trout has been extirpated from several subwatersheds, and greatly reduced (reproducing in only 10-49% of its historic habitat area) in a large portion of the county. Populations are only somewhat reduced in portions of the Stonycreek River watershed (Bens Creek), portions of the Conemaugh River watershed (Laurel Run, Hinckston Run, and St. Clair Run), and the headwaters of the North Fork Conemaugh River. In these watersheds there are reproducing populations in 50-90% of the historic habitat area. Additionally, the report found that brook trout are present in the headwaters of the South Fork Conemaugh River, but did not have enough data to assess how much of the historic range they now occupy.

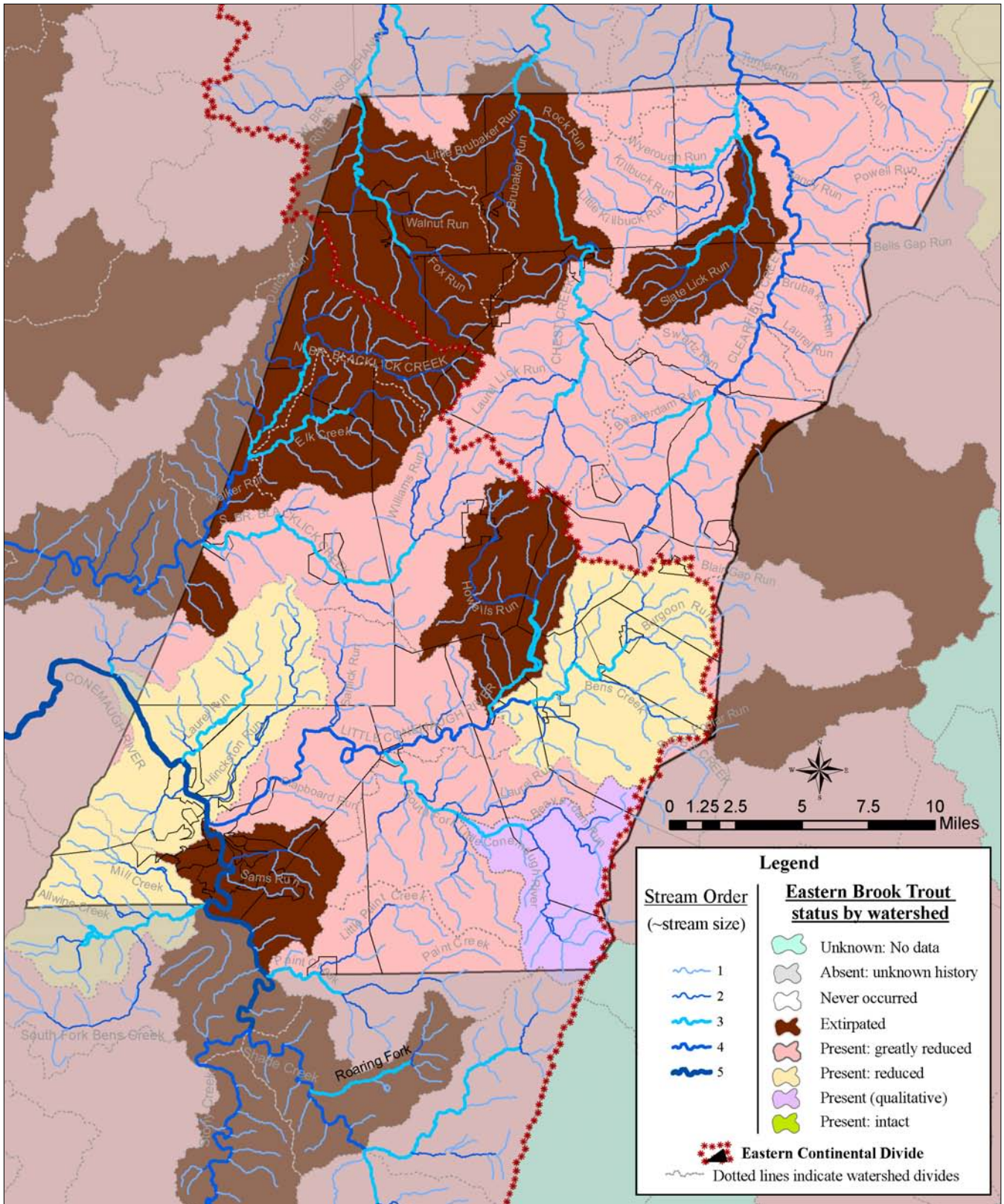


Figure 5. Status of Eastern Brook Trout in Cambria County.

Status assessed relative to the habitat historically occupied by the species. Data published by the Eastern Brook Trout Joint Venture: see page 16 for more detail.

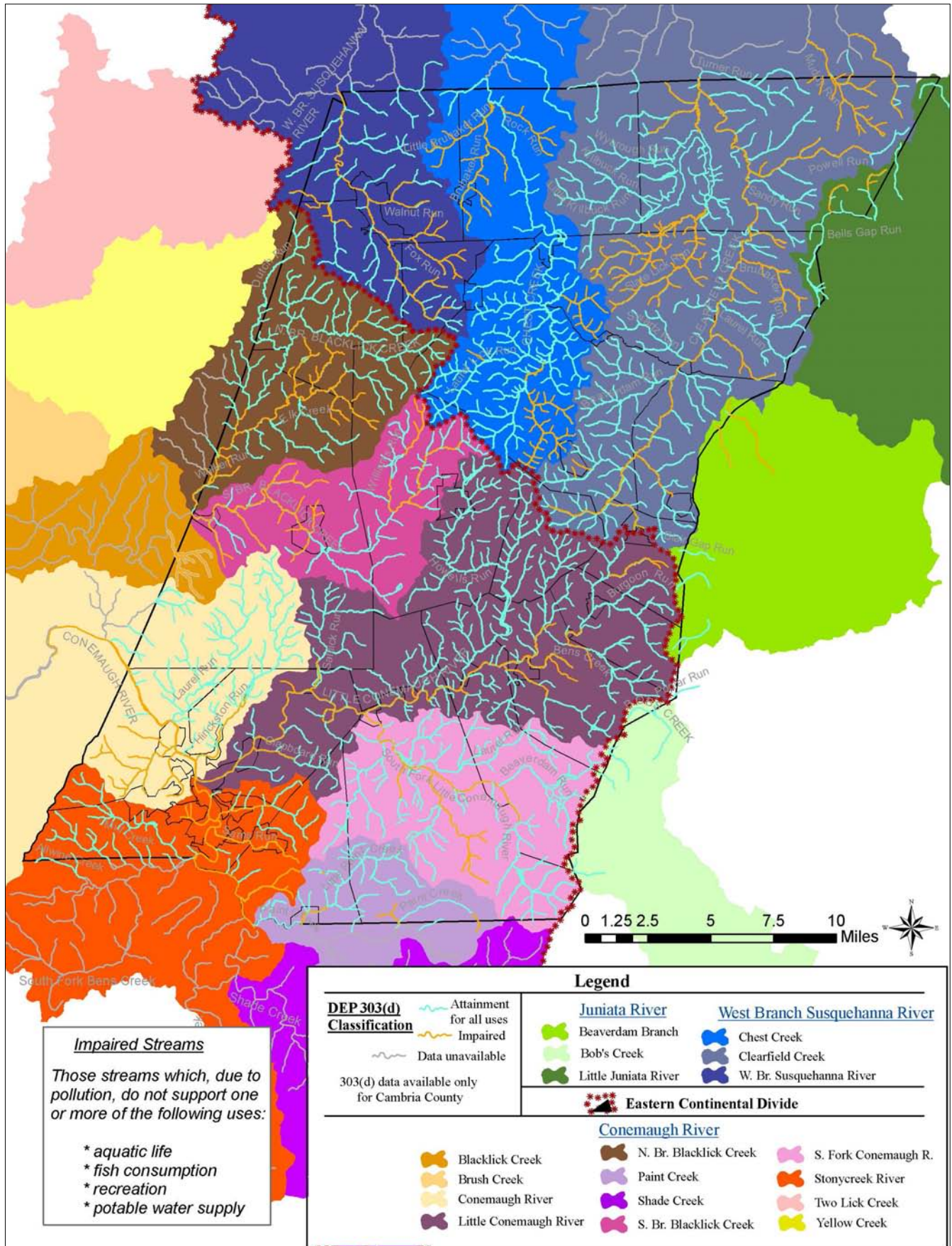


Figure 6. PA Department of Environmental Protection impaired stream designations in Cambria County.

## PA Department of Environmental Protection 305(b) Designations

The following definitions of 305(b) designations are taken from the Pennsylvania Code, Chapter 93.  
(<http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>)

**Trout Stocking Fishery:** Maintenance of stocked trout from February 15 to July 31, & maintenance & propagation of fish species & additional flora & fauna that are indigenous to a warm water habitat.

**Warm Water Fishery:** Maintenance and/or propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

**Cold Water Fishery:** Maintenance and/or propagation of fish species, including the family Salmonidae and additional flora and fauna, which are indigenous to a cold-water habitat.

**High Quality Waters:** A surface water that meets one or more criteria for excellent water quality, or has been designated as a Class A wild trout stream by the Fish and Boat Commission following public notice and comment. The criteria for water chemistry and biology (the support of a high quality aquatic community) are listed in PA Code § 93.4b.

**Exceptional Value Waters:** A surface water that meets one or more of the following conditions is an Exceptional Value Water:

- (1) The water meets the requirements of subsection (a) and one or more of the following:
  - i) The water is located in a National wildlife refuge or a State game propagation and protection area.
  - ii) The water is located in a designated State park natural area or State forest natural areas, National natural landmark, Federal or State wild river, Federal wilderness area or National recreational area.
  - iii) The water is an outstanding National, State, regional or local resource water.
  - iv) The water is a surface water of exceptional recreational significance.
  - v) The water achieves a score of at least 92% (or its equivalent) using the methods and procedures described in subsection (a)(2)(i)(A) or (B).
  - vi) The water is designated as a “wilderness trout stream” by the Fish and Boat Commission following public notice and comment.
- (2) The water is a surface water of exceptional ecological significance.

### Additional Notes on the designations:

- High Quality and Exceptional Value designations are protected, meaning that the water quality cannot be degraded beneath the conditions currently supported. As stream health is integrally dependent on the condition of land in the watershed, this protection extends to the watershed.
- Not all PA water bodies have been reviewed to determine whether they qualify as High Quality or Exceptional Value; review of a particular water body can be initiated by petition to the DEP.
- Standards for High Quality and Exceptional Value waters have changed in recent years to include more detailed chemical and biological criteria. Therefore, waterways designated prior to this change may not have been evaluated according to current criteria.
- Trout Stocking implies that water quality is sufficient for trout survival, but the stream may or may not support natural reproduction.

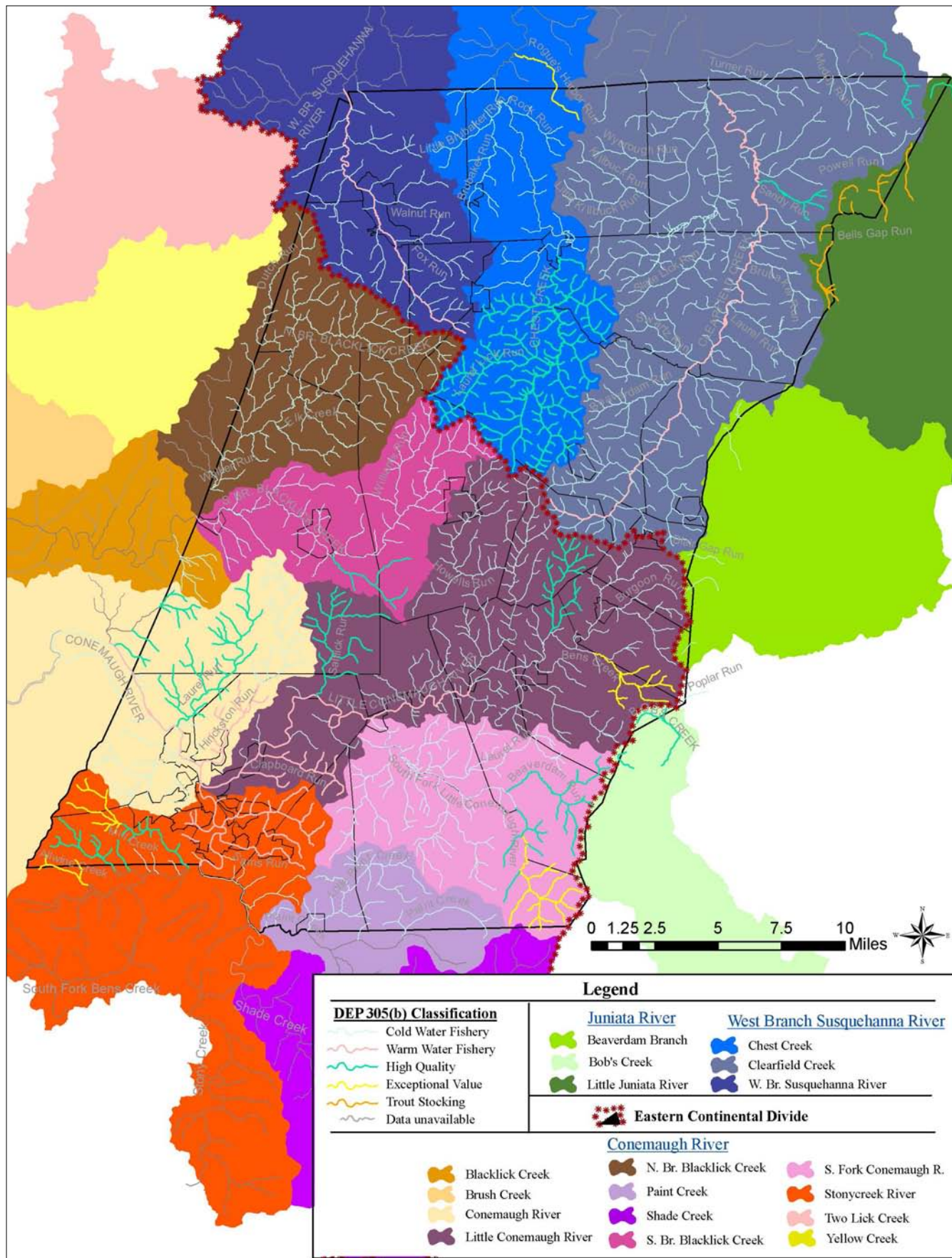


Figure 7. Department of Environmental Protection 305(b) Stream Classification, Cambria County.



## **METHODS**

Fifty-one county inventories have been completed in Pennsylvania to date. The methods used in the Cambria County Natural Heritage Inventory followed established Pennsylvania Natural Heritage Program procedures, which are based on those used by Anonymous (1985), Reese et al. (1988), and 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) determined what locations were previously known for species of special concern and important natural communities in Cambria County. Local citizens knowledgeable about the flora and fauna of Cambria County were contacted for site suggestions. Individuals from academic institutions and state and federal agencies that steward natural resources (e.g., Pennsylvania Game Commission, Pennsylvania Bureau of Forestry,) 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), disturbances (e.g., utility line right-of-ways, strip mines, timbered areas) and a variety of easily interpretable features. 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, contiguous blocks of forest, and limestone or sandstone cliffs were of primary interest during fly-overs in Cambria County. Based on aerial photo interpretation and aerial surveys, some sites were eliminated from consideration if they proved to be highly disturbed, fragmented, lacked the targeted natural feature, or were purely attributable to human-made features (e.g., impoundments, clearings, farm fields).

### **Ground Surveys**

Areas identified as inventory sites were scheduled for ground surveys. Biologists conducted field surveys throughout Cambria County during 2003 and 2004. 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 (see Appendix III) were completed for each site. Boundaries for each site were drawn on USGS 1:24,000 topographic maps. If a species of special concern was recorded and the population was of sufficient size and vigor, a voucher specimen was collected and archived in the herbarium of the Carnegie Museum of Natural History. The flora, fauna, level of disturbance, approximate age and condition of forest community, and local threats were among the most important data recorded for each site. Sites were not ground surveyed in cases where landowner permission for site visits was not obtained, or sufficient information was available from other sources.

### **Data Analysis and Mapping**

Data on species of special concern and natural communities obtained during the 2003 and 2004 field seasons were combined with prior existing data and summarized. Plant and animal species nomenclature follows that adopted by the Pennsylvania Biological Survey. Community descriptions primarily follow

Fike (1999); for systems not addressed in Fike (i.e., subterranean and non-vegetated habitats), Smith (1991) was followed.

### Biological Diversity Areas

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). Spatial data on the elements of concern were then compiled in a Geographic Information System (GIS) format using ESRI ArcView 9.0 software. Boundaries defining Core Habitat and Supporting Natural landscape for each BDA were derived from the occupied habitat data based upon Pennsylvania Natural Heritage Program conservation planning specifications for the elements of concern within the BDA. Specifications outline protocols for identifying land important in the support of elements of concern and are based on scientific literature and professional judgment for individual species or taxonomic groups of species. They may incorporate physical factors (e.g., slope, aspect, hydrology), ecological factors (e.g., species composition, disturbance regime), and 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 areas of very different size and extent for support 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 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) are delineated to include large areas of intact natural landscape, and to include areas important in large-scale ecological processes. LCAs may be large blocks of contiguous forest, extensive wetland complexes, areas linking ecologically significant features such as those recognized for BDAs, and otherwise comparatively (relative to an individual county) undisturbed, ecologically intact portions of the landscape.

In Cambria County, contiguous forest blocks were identified, and LCAs were selected from among these blocks based on several criteria: (1) contiguously forested areas of exceptional size, (2) blocks which were part of a ridgeline and separated from other large blocks only by minor fragmenting features, and (3) blocks which were adjacent to Biological Diversity Areas hosting species which depend upon forest habitat.

Blocks of contiguous forest were identified by means of GIS analysis, refined through aerial photograph inspection, and selected based on size. Forested areas were identified through a classification of 1992 National Land Coverage Data (NLCD), compiled from Landsat TM (thematic mapping) satellite imagery with a resolution of 30 meters, downloaded from the Pennsylvania Spatial Data Access (PASDA) website (<http://pasda.psu.edu>). Land coverage types used in the analysis were transitional, deciduous forest, coniferous forest, mixed forest, woody wetlands, and emergent herbaceous wetlands. Roads, active railroads, and utility right-of-ways were considered fragmenting features. Existing GIS data for roads, which included interstates, US and state highways, state, county and township roads, and active railroads, were combined with utility right-of-way locations digitized from aerial photos. Analysis to identify contiguous blocks of forest was conducted using the map calculator function of the Spatial Analyst Extension in ArcView 9.0. The results were then compared against aerial photos and any discernable non-forested areas were removed. Forest blocks less than 1 acre were then removed. Total acreage as well as core forest acreage were then calculated for all remaining blocks. A detailed description of the GIS analysis is available upon request from the GIS Specialist, Pennsylvania Natural Heritage Program.

# LANDSCAPE CONSERVATION AREAS (LCAs)

## Background

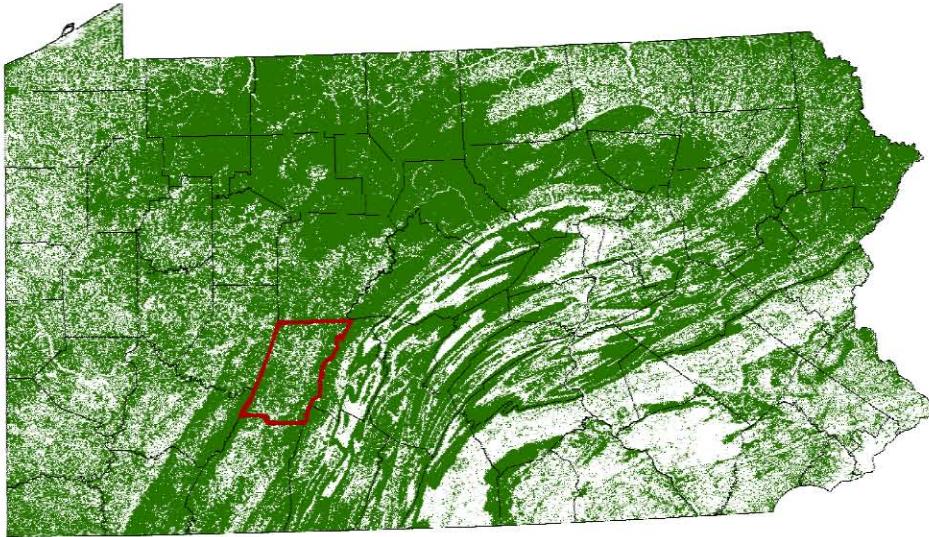
Prior to European settlement, forest covered more than 90 percent of Pennsylvania (Goodrich et al. 2003). Today, 62 percent of the state is forested, comprising an area of over 17 million acres (**Figure 8**; Goodrich et al. 2003, Myers et al. 2000). However, much of this forest exists as relatively small islands isolated by surrounding linear features such as roads, utility right-of-ways, and railroads, as well as non-forest lands. A number of studies have looked at the effects of roads and other linear features on the landscape. Ecological impacts of these fragmenting features include (1) direct mortality of wildlife from vehicles; (2) disruption of wildlife dispersal; (3) habitat fragmentation and loss; (4) imposition of edge effects; (5) spread of exotic species; (6) alteration of the chemical environment.

Roads can be a significant source of mortality for a variety of animals. Few if any terrestrial species are immune. Amphibians may be especially vulnerable to road-kill because their life histories often involve migration between wetland and upland habitats, and individuals are inconspicuous. One study conducted in southeastern Pennsylvania documented over 100 road-killed salamanders and frogs on a single-mile stretch of road during one rainy night in the spring breeding season (Goodrich et al. 2003). Large and mid-sized mammals are particularly susceptible to vehicle collisions on secondary roads, while birds and small mammals are most vulnerable on wider, high-speed highways (Forman & Alexander 1998). In Upper St. Clair Township, Pennsylvania, over the last four years, white-tailed deer mortality due to road-kills was approximately four times higher than mortality due to hunting (Upper St. Clair Township Department of Deer Management 2005). A total of 637 bobcats (*Lynx rufus*) were reported as road-kills in Pennsylvania from 1985 to 2000 (Goodrich et al. 2003). A 10-year study of road mortality in New Jersey recorded 250 dead raptors representing 12 species along a 90-mile section of road (Loos & Kerlinger 1993, cited in Goodrich et al. 2003).

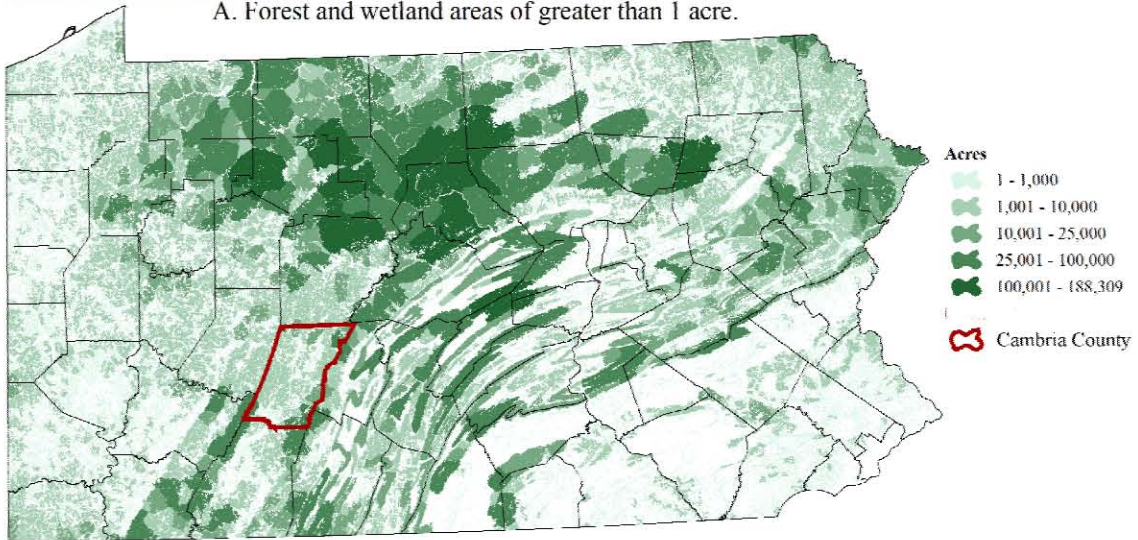
Animals may alter their behavior in the presence of a road. One study found that small forest mammals (e.g., eastern chipmunk, eastern gray squirrel, and deer mouse) were reluctant to venture onto road surfaces where the distance between forest margins exceeded 20 m. The same study concluded that a four-lane divided highway might be as effective a barrier to the dispersal of small forest mammals as a body of fresh water twice as wide (Oxley et al. 1974). A study conducted in North Carolina found that black bears shift their home ranges away from areas with high road densities (Brody & Pelton 1989). Songbirds seem to be especially sensitive to traffic noise; it interferes with their vocal communication and thus affects their territorial behavior and mating success (Seiler 2001).

Roads, wide trails, and grassy corridors can also function as barriers restricting the movement of invertebrates and amphibians. Populations of microhabitat-specific species like land snails and salamanders, which generally require moist habitats, may be isolated by inhospitable xeric corridors (Williams 1995, Blaustein et al. 1994). Some forest butterflies, like the West Virginia white (*Pieris virginiensis*), will not cross open habitats and its current rarity may be a function of habitat fragmentation and isolation (Williams 1995). Consequences of the isolation of populations include reduced genetic diversity and low recruitment rates that can, in turn, result in local extinctions (Seiler 2001).

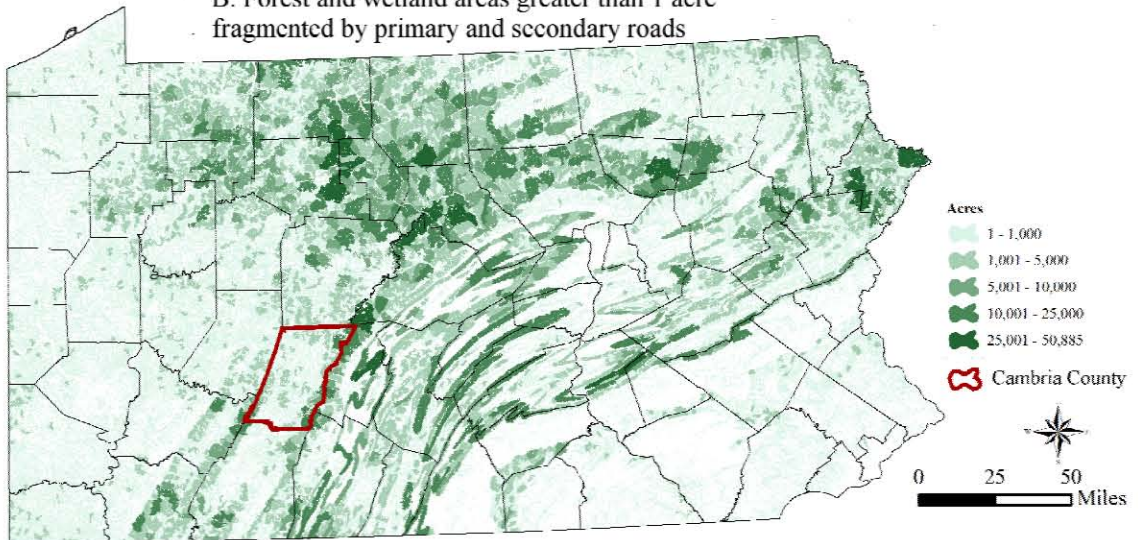
Fragmentation of formerly contiguous forested landscapes into smaller, isolated tracts has an effect on plant and animal distribution and community composition. When an extensive forest tract is fragmented, the resulting forest islands may lack the full range of microhabitats that existed in the original tract. If a habitat fragment lacks required microhabitat(s), or is smaller than the minimum area required by a given species, individuals of that species will not likely be found within that habitat fragment (Lynch & Whigham 1984). For example, the Louisiana Waterthrush (*Seiurus motacilla*) is rarely found in small woodlots because it requires upland forest streams within its territory, and most small woodlots lack this necessary component (Robbins 1980, Robinson 1995). Area-sensitive species such as Northern



A. Forest and wetland areas of greater than 1 acre.



B. Forest and wetland areas greater than 1 acre fragmented by primary and secondary roads



C. Forest and wetland areas greater than 1 acre fragmented by primary, secondary, and tertiary roads and active railroads.

Figure 8. Forest Cover and Forest Fragmentation in Pennsylvania.

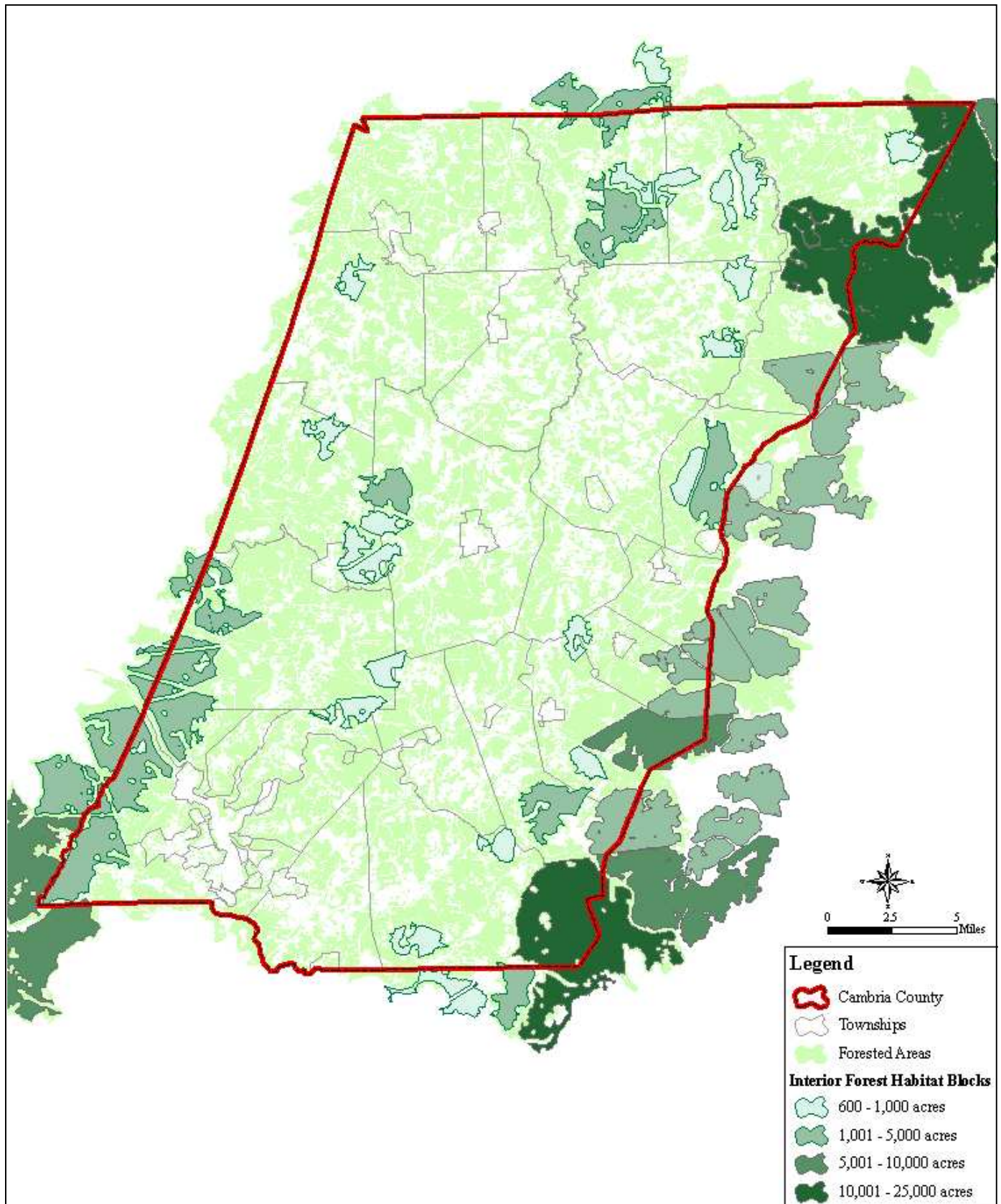


Figure 9. Interior Forest Habitat Blocks in Cambria County.

The highlighted blocks represent the forested areas with 600 acres or more of contiguous interior forest habitat. Underlying the blocks is forest cover. Although much of the county is forested, the pattern of fragmentation is such that little interior forest of a size usable by wildlife dependent on these conditions remains.

Goshawk (*Accipiter gentilis*), Barred Owl (*Strix varia*), bobcat, and timber rattlesnake (*Crotalus horridus*) require interior forest areas in excess of 6,000 acres to accommodate breeding and foraging territories (Squires & Reynolds 1997, Mazur & James 2000, Ciszek 2002, NatureServe 2005).

Along with a reduction in total forested area, forest fragmentation creates a suite of “edge effects” which can extend more than 300 meters into the remaining fragment (Forman & Deblinger 2000). Edge forest is composed of a zone of altered microclimate and contrasting community structure distinct from the interior, or core forest (Matlack 1993). Edge forest is typically characterized by a harsher environment than that of interior forest. Edges experience increased light intensity, altered insect and plant abundance, a depressed abundance and species richness in macroinvertebrate soil fauna, and a reduced depth of the leaf-litter layer (Yahner 1995, Haskell 2000, Watkins et al. 2003). The macroinvertebrate fauna found in leaf litter is significant for the pivotal role it plays in energy and nutrient cycling; these macroinvertebrates also provide prey for salamanders and ground-feeding birds. A number of studies have shown that the nesting success of forest-interior songbirds is lower near forest edges than in the interior because of increased densities of nest predators and brood parasites (reviewed in Murcia 1995).

Roads can act as corridors for plant dispersal, and exotic species increase their range by spreading along roadsides (Watkins et al. 2003). Vehicles and road-fill operations transport exotic plant seeds into uninfested areas, and road construction and maintenance operations provide safe sites for seed germination and seedling establishment (Schmidt 1989; Greenberg et al. 1997; Trombulak & Frissell 2000). Unpaved road edges often have exposed areas of mineral soil and suitable light and moisture conditions that allow exotic seeds to become established (Parendes & Jones 2000, Trombulak & Frissell 2000).

Road traffic and maintenance of right-of-ways contribute at least six different classes of chemicals to the environment: heavy metals, salt, organic pollutants, ozone, nutrients, and herbicides (Forman & Alexander 1998, Trombulak & Frissell 2000). Heavy metals, which include lead, aluminum, iron, cadmium, copper, and manganese, contaminate soils, plants, and invertebrates up to 200 m from roads, as well as vertebrate fauna foraging within the affected zone (Trombulak & Frissell 2000). One study found elevated lead concentrations in tissue of several small mammal species in a narrow zone by roads (Getz et al. 1977, cited in Forman & Alexander 1998). Deicing salts contribute ions to the soil, altering pH and soil chemical composition, which affects plant growth (Forman & Alexander 1998, Trombulak & Frissell 2000). Airborne sodium chloride from snowplowing may cause leaf injury to trees (e.g., white pine) up to 120 meters from a road, especially downwind and downslope (Forman & Alexander 1998). Organic pollutants such as dioxins and polychlorinated biphenyls (PCBs) are present in higher concentrations along roads and hydrocarbons may accumulate in aquatic ecosystems near roads (Trombulak & Frissell 2000). Vehicles produce ozone, which increases the concentration of this gas in the lower atmosphere where it acts as a greenhouse gas (Trombulak & Frissell 2000). Storm runoff from roads, particularly where roads abut or cross water bodies, results in the transport of nutrients and sediments into aquatic ecosystems (Trombulak & Frissell 2000). Herbicides are often applied to roadsides and utility right-of-ways to control woody plant growth. Forest edge and interior plant species can be damaged or destroyed by drifting or misapplied herbicide (Williams 1995, Forman & Frissell 2000).

Humans are an integral part of natural history, where we function as ecosystem engineers, altering the landscape around us to suit our needs. Some species benefit from human-induced changes, such as birds that inhabit the early successional and edge habitats provided by utility corridors or disturbance-adapted plants that colonize roadsides. But as is more often the case, species with specific habitat requirements tend to suffer declining numbers when faced with human encroachment. Given the pervasiveness of human influence throughout the northeastern United States, the ecological importance of large areas of relatively pristine habitat cannot be overestimated.

## General Recommendations for LCA Conservation

LCAs are large areas with ownership typically divided among many entities, individual, corporate, and public. 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. In Cambria County, the largest areas of contiguous forest occur along the Laurel Ridge and along the Allegheny Front; substantial forest areas are also found in the north-central part of the county. The Allegheny Front and Laurel Ridge have the potential to form corridors of natural landscape across the region. However, because they are long and linear, they are easily subject to fragmentation from roads and right-of-ways crossing them laterally.

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 on pg. 141 for road management; Appendix VII on pg. 162 for additional 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 Forest Management 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. 162), 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.

## Cambria County LCAs

The landscape of Cambria County is a mosaic of forest, agriculture, small towns, and lands used for industrial or extractive purposes. There is an extensive network of roads and pipeline or powerline corridors crisscrossing the county as well. Thus, although a large percentage of the county's land area is forested (63%), much of that forest occurs in small patches interrupted by infrastructure corridors or non-forest land uses. Only 23% of the forested area (14.5% of the county area) occurs in contiguous blocks that are large enough to be ecologically significant for forest-dependent species. A rough measure for the size necessary to be considered ecologically significant is the area needed for neotropical bird species to reproduce successfully, 600 acres (Robbins et al. 1989). **Figure 9** (pg. 27) shows the blocks of contiguous forest in Cambria County that are 600 acres in size or greater. The unique ecological value of large, contiguous forest ecosystems 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. These areas are crucial habitat for species such as neotropical migrant birds, bobcats, and bats. The portions of the county with the most contiguous forests are in the southwest corner, along Laurel Hill; in the northcentral region of the county, centered on Rogue's Harbor Run; and along the Allegheny Front at the eastern edge of the county. The largest contiguous forest blocks in these areas, which extend beyond the county borders to connect with extensive forests in neighboring counties, have been selected as Landscape Conservation Areas. Features such as ridgelines, which are typically heavily forested and unsuitable for intensive development or agriculture, also offer the potential to serve as corridors of natural landscape, providing regional connectivity between natural areas and providing migration routes for highly mobile and migratory species. In Cambria County, the features that most strongly offer this potential are the Allegheny Front and Laurel Ridge. **Figure 1** (pg. viii) maps all the Natural Heritage Areas in Cambria County, including the LCAs. **Figure 10** (pg. 37) displays the LCAs with a background of all forest cover in the county, providing a visual display of their relative contiguity.

### The Allegheny Front LCAs

#### Description

The Allegheny Front has the best potential of any of central Pennsylvania's large-scale features to serve as a regional corridor connecting the forests of West Virginia all the way up to the Allegheny National Forest. It remains largely forested, and includes large tracts of public land. It spans the border between Cambria and Blair Counties, with many contiguous forest areas shared by both. In this area, it is fragmented at regular intervals by roads and right-of-ways, and in some areas by past mining and timbering operations, but also includes the largest remaining contiguous blocks of forest habitat in both counties. These areas are also the watersheds of drinking water supply for Tyrone, Bellwood, and Altoona, and the forested condition of the land maintains good water quality. The forest types tend towards northern hardwoods communities where they are at least moderately mature. Sugar maple, beech, and black cherry are prominent and often extend even to higher elevation regions typically occupied by oak forest types, due to heavy oak mortality from past gypsy moth infestations. Younger forests are generally dominated by black birch or red maple saplings.

#### *Allegheny Front LCA #3 & #4*

Both these LCAs meet the estimated size necessary to sustain viable populations of neotropical migrant birds (9000 acres) and of the Northern Goshawk (10,500 acres), a bird of prey which has a very large individual home range territory (Anderson & Vickeray in press). Several Biological Diversity Areas are embedded within these forest blocks (see pg. 77; Tubb Run Headwaters Wetland BDA, pg. 78; and Bell's Gap Run BDA, pg. 107).

Below the southern boundary of Allegheny Front LCA #4, which is a very wide powerline right-of-way, the Allegheny Front in the east-central region of Cambria County is more fragmented. Forest cover is broken by several small roads and residential extensions of Altoona and Cresson, as well as fairly extensive surface-mined areas. U.S. Route 22 is a major fragmenting feature, and south of Rt. 22 the forest is regularly transected by several right-of-ways.

#### *Allegheny Front LCA #5, 6, 7, 8*

The southeastern part of Cambria County falls across a relatively intact section of the Allegheny Front. These LCAs are designated for several contiguous blocks of forest that are clustered together in this area.

Allegheny Front LCA #5 is a moderately large block of contiguous forest that is separated by relatively minor fragmenting features—two small roads—from smaller blocks to the north and east. Allegheny Front LCA #6 is also of moderate size, separated from the larger Allegheny Front LCA #7 by a large powerline right-of-way. It contains one Biological Diversity Area; the Big Cedar Run BDA (pg. 111). Allegheny Front LCA #8 is an exceptionally large block, which meets the estimated size necessary to sustain viable populations of neotropical migrant birds (9000 acres) and of the Northern Goshawk (10,500 acres), a bird of prey which has a very large individual home range territory. Over half of the LCA is also the headwaters of the South Fork Conemaugh River, which are designated as Exceptional Value (EV) stream reaches by the PA Department of Environmental Protection. The EV portions of the stream and their watershed are recognized as the South Fork Conemaugh River BDA (pg. 41). Another unique feature of the LCA is an extensive natural wetland, recognized as the South Fork Conemaugh River Headwaters Wetland BDA (pg. 43).

#### Threats and Stresses

The soil along the Allegheny Front is naturally somewhat acidic and nutrient poor, and the terrain is often very steeply sloped. Due to these factors, long-term forest ecosystem health in the region is especially vulnerable to soil erosion from removal of forest canopy or soil disturbance. It is also especially vulnerable to depletion of soil nutrients from overharvesting and acid rain. Mined areas high along Allegheny Front have left a legacy of acid discharge into some of the otherwise relatively pristine high mountain streams along the Allegheny Front. In some areas, past timber management practices have degraded forest quality. Encroachments on forest contiguity through developments extending out from road corridors or expansion of right-of-ways will threaten the unique habitat value of the Allegheny Front LCAs, currently the largest contiguous forested regions in Cambria County.

#### Recommendations

One step towards the maintenance and improvement of the health of these forest ecosystems is to conduct all forestry practices in the area according to a forest management plan which emphasizes long-term forest ecosystem health and employs best management practices for sustainable forestry.

Forest contiguity along the Allegheny Front can be enhanced by careful management of existing fragmenting features. Where possible, the width of the cleared areas associated with roads and right-of-ways should be minimized. Preservation of a closed or nearly-closed tree canopy over roads and right-of-ways will greatly enhance the ability of bird species to traverse these features and minimize impacts on the habitat value of adjacent forest. Care should be taken that management practices along roads, right-of-ways, mines, or developments adjacent to the LCAs do not introduce non-native species into these relatively intact native forest ecosystems.

## Laurel Ridge LCAs

### Description

Laurel Ridge is part of the Allegheny Mountain range and extends from Pennsylvania through West Virginia. In southwestern Pennsylvania, much of the ridge is in relatively intact natural condition, and there are extensive public lands. The broad slopes of the ridge also form the headwaters of many streams, which the forested condition of the landscape helps to preserve as high-quality habitat and valuable scenic features. Southwestern Cambria County is the northernmost extent of the extensive contiguous forests on the ridge. South of the Conemaugh Gorge, the ridge contains some of the most intact forested landscape in the county, while above the gorge, the ridge is much more fragmented.

#### *Laurel Ridge LCA #1*

Compared to the other blocks of contiguous forest along the ridge, this LCA is small— only 2,608 acres. It was selected as a county-significant site because it is the most intact forested area adjacent to the Conemaugh River within the county. It is separated from the larger blocks along Laurel Ridge to the south by the Conemaugh River, as well as State Route 403 and State Route 56 which run along the river.

#### *Laurel Ridge LCA #2*

At 5,000 acres, this is a moderate-sized forest block. It is separated from Laurel Ridge LCA #3 to the west by a large powerline right-of-way corridor.

#### *Laurel Ridge LCA #3, #4, and State Game Lands #42 LCA*

Laurel Ridge LCA #3 is 3,411 acres in size, but is separated from the much larger Laurel Ridge LCA #4 only by a relatively narrow utility right-of-way. At 11,245 acres, LCA #4 meets the estimated size necessary to sustain viable populations of neotropical migrant birds (9,000 acres) and of the Northern Goshawk (10,500 acres), a bird of prey which has a very large individual home range territory (Anderson & Vickeray in press). This LCA is also important in supporting the water quality and ecological function of several of Cambria County's most high-quality streams; it contains most of the Exceptional Value portions of the Mill Creek and Little Mill Creek watersheds, as well as a large portion of the watershed of Allwine Creek, a tributary to Bens Creek that is also designated as Exceptional Value (PA-DEP 2006). The State Game Lands #42 LCA falls mainly in Somerset and Westmoreland Counties.

### Threats and Stresses

Japanese knotweed (*Polygonum sachalinense*, *Polygonum cuspidatum*) has spread extensively in this area. It is pervasive along waterways, and the giant knotweed (*Polygonum sachalinense*) is spreading even in upland areas. The spread of this species in upland areas may have been facilitated by plantings for "reclamation" at former strip mine sites. However, the existence of extensive thickets in upland areas beyond the confines of former mine sites in southern Cambria County demonstrates that the species can successfully spread in upland areas, and thus it may threaten even intact forested areas.

### Recommendations

The most effective way to combat the spread of Japanese knotweed may be to monitor intact forested and riparian areas and remove early colonizing individuals. Once the species becomes established it is very difficult to eradicate.

The ecological value of these areas, especially for forest-dependent species and species with large home range territory sizes, can be enhanced by removing the fragmenting features that separate the LCAs, or by working to minimize their fragmenting impact. The relatively narrow right of way between LCA #3 and LCA #4 is a prime focus area for such work, because the fragmenting feature is somewhat small, and developing connections between the two areas will yield strong benefits by creating a very extensive area of contiguous forest. Landowners can plan for long-term stewardship of the health of their land by developing ecologically informed Forest Management Plans to guide future timber harvest or other uses.

## **Rogue's Harbor Run LCA & Gallitzin LCA**

### Description

The Rogue's Harbor Run LCA is a large area of contiguous forest that spans across north-central Cambria County into Clearfield County. Much of the LCA is also within the watershed of Rogue's Harbor Run, which is designated as Exceptional Value by the PA-DEP. The Rogue's Harbor Run BDA (pg. 63) describes several unique ecological communities found in this watershed.

The Gallitzin LCA is a large forested area west of Glendale Lake. Much of the LCA also falls within the Killbuck Run BDA (pg. 61). The LCA designation was given to highlight this area as one of the few examples of large contiguously forested blocks of land in the county; its boundaries correspond to the extent of contiguous forest. The BDA boundaries are drawn to watershed boundaries, since several of the important ecological features within the BDA are wetlands. The contiguous forest setting helps to support ecosystem processes such as nutrient cycling, water filtration, and plant and animal dispersal, that help to maintain the viability of the communities highlighted within the BDA.

### Threats and Stresses

The greatest causes of fragmentation in these LCAs are the clearing of forest for gas wells and associated roads, extensive clearcutting, and strip mining. In the Rogue's Harbor Run LCA, the pattern of forest clearing on the State Game Lands #120 also creates major disruption in the contiguity of the forest. The seeding of these clearcuts with exotic invasive plant species threatens the ecological integrity of the forests.

### 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 to forest in any projects conducted here. Plantings of invasive exotic species such as bush honeysuckle (*Lonicera tatarica*, *Lonicera morrowii*, *Lonicera mackii*), autumn olive (*Elaeagnus umbellata*), and Japanese barberry (*Berberis thunbergii*) should cease to prevent further dissemination of ecologically damaging species into native ecosystems.

Both of these LCAs are of moderate size, and their ecological value could be enhanced by the development of a corridor between them. The combined area would exceed 10,000 acres, meeting the area estimated to be necessary to host viable populations of neotropical migrant bird species (Anderson & Vickeray 2000). Such a corridor should be at least 400 meters wide, in order to provide a substantial area of core habitat conditions within the corridor. Several challenges exist to the creation of a corridor. There are extensive areas of strip mined land between the two LCAs, which are not suitable for a forest corridor without reclamation efforts specifically designed to re-develop a healthy native forest ecosystem. Typically, forest that regrows on former strip sites is very different in character than healthy native forest ecosystems; soils are thin and lack organic matter, many native species are not present, invasive species

are more prevalent, and canopy cover tends to be thinner. The best potential sites for development of a connecting corridor of natural landscape between the two LCAs may be east of St. Lawrence or along Clearfield Creek.

Landowners can plan for long-term stewardship of the health of their land by developing ecologically informed Forest Management Plans to guide future timber harvest or other uses.

# Forest Specialists

*At risk in the region, these species find homes in interior forest habitats*

*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



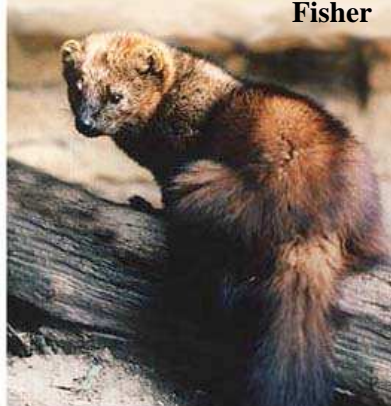
11% of PA's woodland nesting birds—species including the black-billed cuckoo and the yellow billed cuckoo—have declined significantly since 1980. (USGS BBS)

## 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).

# FOREST CERTIFICATION PROGRAM INFORMATION

Forest certification programs are important tools in safeguarding the long-term ecological health of forest resources. These programs develop a set of criteria for sustainable forest management, and offer accreditation to forest managers and producers of forest products if they demonstrate that their operations are consistent with the standards. The companies can then market their products with the stamp of the certification agency. The Forest Stewardship Council (FSC; [www.fsc.org](http://www.fsc.org)), an international stakeholder-owned network dedicated to promoting responsible management of the world's forests, offers a comprehensive certification program. Because the program's growing popularity is leading to requests for ecological information, and because there is a great deal of convergence between the regional FSC standards and the information provided in the Natural Heritage Inventory, we offer the following comparison of Natural Heritage Inventory (NHI) information and FSC standards to facilitate the use of the NHI report as a tool in certification. FSC standards are developed for each region by a local working group; Pennsylvania falls within the Appalachian Region.

The NHI report information is most applicable to principles #6, #7, and #9 of the Appalachia Regional Forestry Stewardship Standard (Appalachia Working Group of FSC - US 2005).

## Principle #6: Environmental Impact

### 6.1 Assessment of environmental impacts

The NHI report provides the following relevant information:

- Sites hosting Vulnerable, Imperiled, and Critically Imperiled Plant Community Types (G1-G3, S1-S3 according to NatureServe and Natural Heritage Databases).
- Threatened and Endangered species according to state and federal listings, as well as species ranked G1-G3 and S1-S3 according to NatureServe and Natural Heritage Databases
- The LCA, IBA and IMA designations are a resource to assess landscape-level ecological impacts.

### 6.2 Safeguards for unique species & their habitats

The NHI report identifies the habitat requirements of species meeting the above-listed criteria through the Biological Diversity Area designations, and recommendations regarding the compatibility of some forest management operations in these habitats are included. The report does not identify connectivity needs between populations, which the FSC standard requests.

### 6.4 Protection of representative samples of existing ecosystems

The BDAs and the natural communities described in the NHI report are a good reference for identifying representative samples of existing ecosystems. The report also provides context for understanding the conservation significance of these ecosystems. However, as the report focuses only on those sites of highest conservation concern in the county, it is not a comprehensive listing of all existing ecosystem types.

## Principle #7: Management Plan

The information contained in the NHI report can serve as baseline ecological data for use in developing a management plan.

## Principle #9: High Conservation Value Forests

The criteria recommended for the identification of High Conservation Value Forests (HCVF) are identical to the criteria used to identify Biological Diversity Areas in the NHI report, with one exception. The FSC standards include roadless areas of 500 acres or greater as High Conservation Value Forests, while such areas receive no NHI designation. As a tool for use in FSC certification, Figure 10 maps such areas, based on estimates from landcover data and inspection of recent aerial photography.

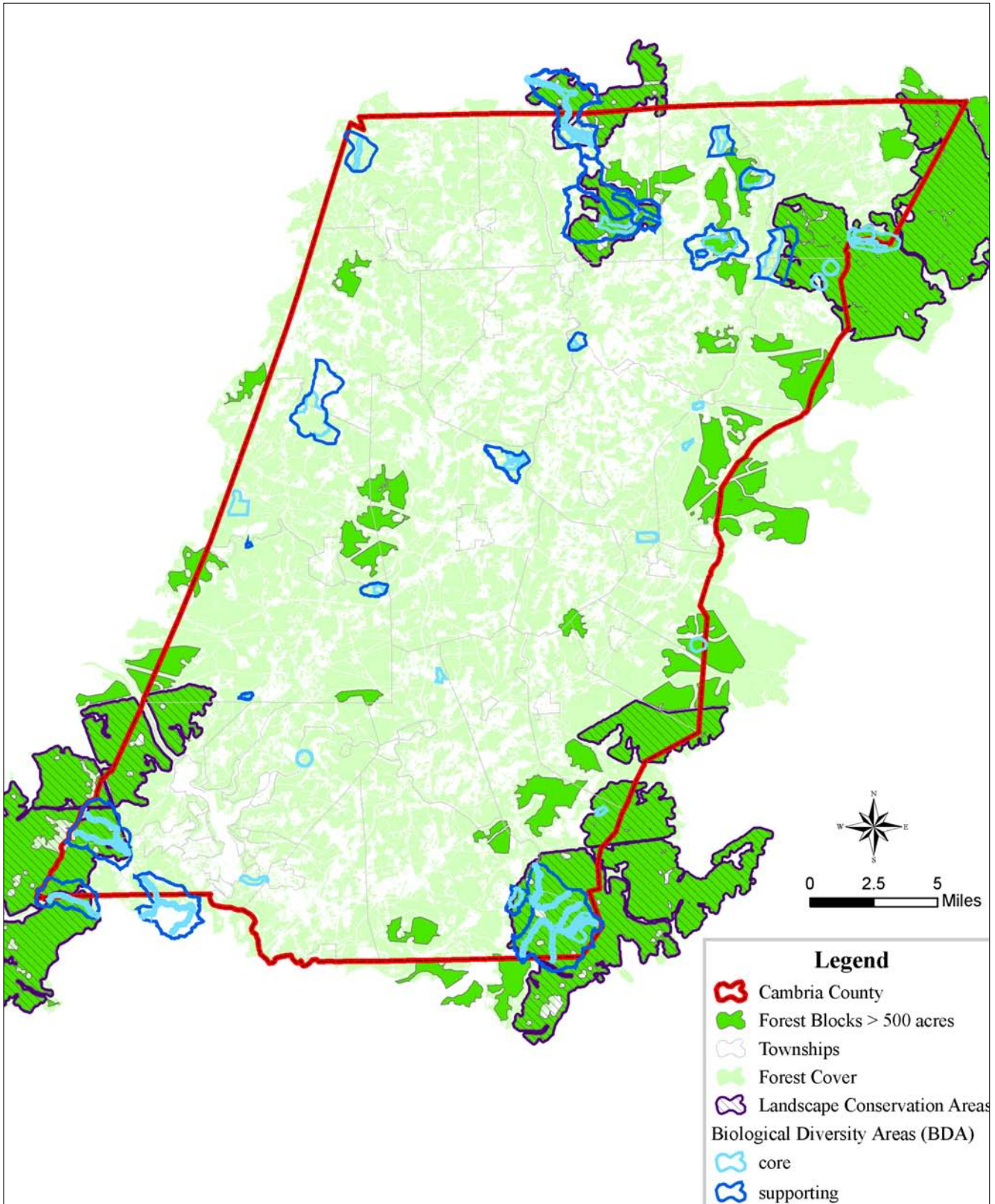


Figure 10. Areas in Cambria County meeting FSC standards for High Conservation Value Forests. Included are Biological Diversity Areas and roadless forested areas 500 acres and larger in size. Some of these forested areas have been designated as Landscape Conservation Areas. Forest blocks were identified through analysis of landcover data and examination of recent aerial photography, and not all areas have been ground-truthed.

## Principle # 9, continued: HCVF Areas and Timber Harvest

The FSC guidelines state “Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.” The guidelines require the development of a management plan, and specify “the management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach.”

Thus, the question of whether timber harvest can be pursued in HCVF areas depends upon whether timber harvest is compatible with a precautionary approach to the long-term viability of the particular element which resulted in that area being designated HCVF. If a site is designated HCVF because it hosts a rare plant or animal species, some timber harvest may be acceptable if it does not negatively impact the quality of the habitat for the species—however, if the species is sensitive to timber harvest, it will not be acceptable. For the Biological Diversity Areas designated in this report, which are considered HCVF areas because of the presence of a unique species or natural community, guidelines on the compatibility of timber harvest at the site are provided in individual site descriptions.

The FSC guidelines specify that timber harvest is not considered appropriate in un-entered and/or intact old growth forests (see glossary of FSC Appalachia Regional Standard (AWG-FSC 2005) for definitions).

Compatibility of timber harvest is very often scale-dependent: extensive landscapes generally can sustain limited timber harvest without detriment to long-term viability, while small areas often cannot. The Landscape Conservation Areas designated in this report are considered HCVF because they are roadless forested areas greater than 500 acres in size, and are uniquely large and contiguous forest ecosystems important in sustaining ecological function in the region. Timber harvest can be consistent with FSC certification in these areas provided these attributes are preserved. Timber harvest must be conducted in such a manner that it does not compromise the large-scale contiguity of interior forest habitat or significantly reduce its area, and meets other requirements for compliance with the FSC standards and the required management plan.

## **BIOLOGICAL DIVERSITY AREAS (LISTED BY MUNICIPALITY)**

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

Biological Diversity Areas, Landscape Conservation Areas, and Public Lands are indicated on the municipality maps and are labeled in bold. There are no Important Bird Areas in Cambria County.

### **Summary Table Conventions**

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

- Public 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. x) summarizes sites by significance category. Definitions of the significance categories are outlined in Appendix I (pg. 145).
- 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. 149) 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. 155) are listed for each natural 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.

This report does not intend to encourage visitation of private lands without explicit permission of the landowner. Also, the report does not contain all the detailed information required to manage the species of special concern; much of this information must be obtained by long-term monitoring which is outside the scope of this study. If more information is needed, ecological professionals at the Pennsylvania Natural Heritage Program or at the relevant state natural resource agencies should be contacted (see pg. xv for more information). Hopefully, this report will encourage communication between ecological professionals—at the PNHP and within state natural resource agencies—and municipalities, organizations, and individuals.

# Adams Township

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

*NATURAL HERITAGE AREAS:*

|                                |    |    |                          |  |      |   |
|--------------------------------|----|----|--------------------------|--|------|---|
| South Fork Conemaugh River BDA |    |    | <i>High Significance</i> |  |      |   |
| Exceptional Value stream       | -- | -- |                          |  | 1997 | E |

|   |    |    |                          |  |           |   |
|---|----|----|--------------------------|--|-----------|---|
| South Fork Conemaugh River Headwaters Wetland BDA |    |    | <i>High Significance</i> |  |           |   |
| sphagnum - beaked rush peatland                   | -- | S3 |                          |  | 7/23/2004 | E |

|                        |  |  |                                 |  |  |  |
|------------------------|--|--|---------------------------------|--|--|--|
| Allegheny Front #8 LCA |  |  | <i>Exceptional Significance</i> |  |  |  |
|------------------------|--|--|---------------------------------|--|--|--|

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Adams Township

## Cambria County Natural Heritage Inventory

### Adams Township

#### Biological Diversity Areas:

- South Fork Conemaugh River
- South Fork Conemaugh River Headwaters Wetland

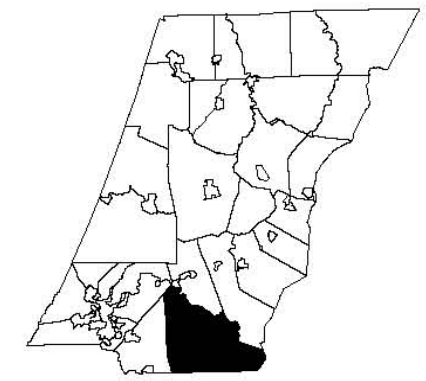
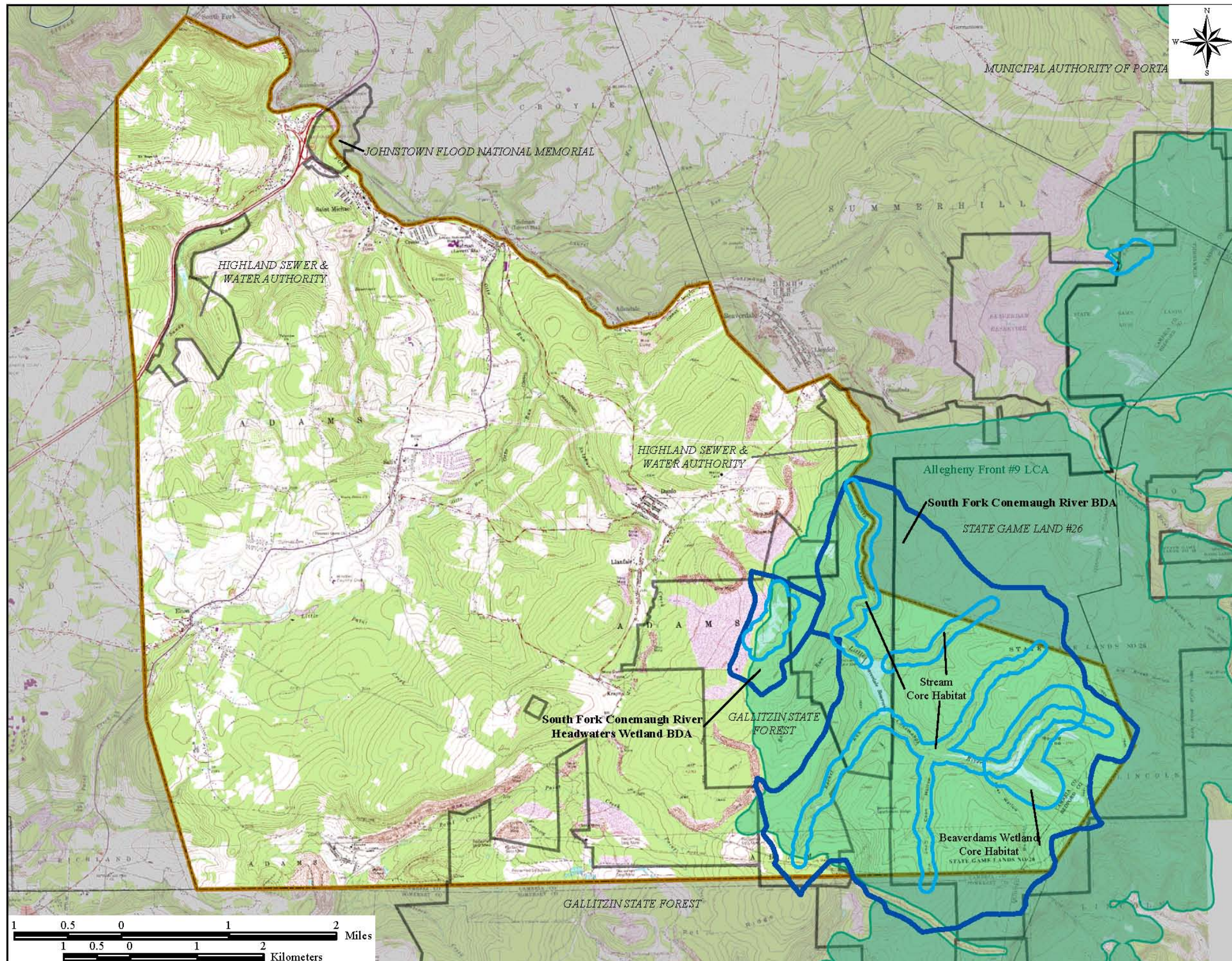
#### Landscape Conservation Areas:

- Allegheny Front #9

#### Public Lands:

- Gallitzin State Forest
- Johnstown Flood National Memorial
- State Game Land #26
- Highland Sewer & Water Authority\*
- Sandy Run, Beaverdale Reservoir

\*Note: water authority boundaries are approximate, intended for visual reference only



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## ADAMS TOWNSHIP

Adams Township includes the southernmost portion of the Allegheny Front in Cambria County, and high plateau landscape to the west of the Front. Nearly 80% percent of the township is forested, ~12% is agricultural or residential, and ~11% has been strip-mined. The eastern-most section of the township is largely intact forestland, and has high ecological value. It makes up most of the area which drains into the headwaters of the South Fork Conemaugh River, which are designated as Exceptional Value by the PA-DEP. This is part of the area designated as the Allegheny Front #8 Landscape Conservation Area (pg. 30). Just west of the area designated as the South Fork Conemaugh River BDA, however, there is an extensive area of strip-mined land stretching almost the length of the township. Further west along the plateau above the Allegheny Front, the land is a mosaic of forest, farms, and residential areas.

All of the township drains into the Conemaugh River; most of the area drains into its tributary the South Fork Conemaugh River, while the far southern reach of the township drains into Little Paint Creek and Paint Creek, tributaries to the Conemaugh River via Bens Creek, and the northern tip of the township contains most of two small tributaries to the Little Conemaugh River: Laurel Run and Custer Run. **Figures 6 and 7** (pg. 19, 21) map the PA-DEP's water quality designations for county streams.

Conservation priorities for Adams Township would be to steward the water quality and forest ecosystem health of the South Fork Conemaugh River headwaters; to remediate the vast strip-mined areas near Krayn, Dunlo, and Llanfair that have been left with minimal soil and sparse vegetation; and to steward the health of the BDAs in the township.

### South Fork Conemaugh River BDA

#### Description

This BDA is designated to recognize the reaches of the South Fork Conemaugh River that are designated as Exceptional Value by the PA-DEP, and the land important in supporting these waterways. The EV portions of the South Fork Conemaugh River are the small tributaries that arise along the western slope of the Allegheny Front and join together to form the headwaters of the river. The Beaverdale Reservoir in this section of the river provides drinking water for the Greater Johnstown Area. Further downstream, water quality of the South Fork Conemaugh River is impaired by abandoned mine drainage.

*Stream Core Habitat Areas:* The Core Habitat Area includes perennially flowing reaches of the stream plus a 110 meter 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 2005, Palone and Todd 1998).

*Beaverdams Wetland Core Habitat Area:* This Core Habitat Area encompasses an extensive wetland area and a surrounding forested buffer. The wetland is a mosaic of low shrubland and herbaceous graminoid growth. Steeplebush (*Spiraea tomentosa*) is dominant in many areas, and lowbush blueberry (*Vaccinium angustifolium*) is also common. Around the edges there is taller shrub growth in some portions, mainly

southern arrowwood (*Viburnum dentatum* var. *lucidum*). Higher, drier areas along the edges are dominated by bracken fern (*Pteridium aquilinum*), clubmoss (*Lycopodium obscurum*), needle-and-thread grass (*Brachyelytrum erectum*), and wrinkle-leaf goldenrod (*Solidago rugosa*). In the more saturated central areas prickly dewberry (*Rubus hispidus*) is common, as are northern awned sedge (*Carex gynandra*), woolgrass (*Scirpus cyperinus*), and poverty grass (*Danthonia compressa*). Lower, heavily saturated portions have common rush (*Juncus effusus*), bog clubmoss (*Lycopodiella inundata*), Virginia cottongrass (*Eriophorum virginicum*), roundleaf sundew (*Drosera rotundifolia*), and sphagnum moss (*Sphagnum* sp.), or rattlesnake mannagrass (*Glyceria canadensis*) and bur-reed (*Sparganium emersum*). None of the defined community types for palustrine shrublands or herbaceous wetlands match the vegetation at this site. The most closely related shrubland type is the highbush blueberry – meadowsweet type, although this wetland has lowbush blueberry and steeplebush as dominants rather than the title species. At the confluence of the two eastern-most tributary channels, and along the southern of these, there are beaver-impounded ponds with open water, edged in meadows of emergent vegetation, including rattlesnake mannagrass (*Glyceria canadensis*), tape-grass (*Vallisneria americana*), spikerushes (*Eleocharis* sp.), and simple-stem bur-reed (*Sparganium emersum*).

The forest surrounding the wetland is mainly a depauperate black cherry – northern hardwoods forest. The forest canopy is dominated by black cherry (*Prunus serotina*), red maple (*Acer rubrum*), black birch (*Betula lenta*), with American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*), and cucumber magnolia (*Magnolia acuminata*) occurring rarely. Striped maple (*Acer pensylvanicum*) is common in the understory, and serviceberry (*Amelanchier arborea*) is also present. The forest canopy is somewhat open, and species diversity is lower than expected in this community type, suggesting soil nutrient depletion or other legacies of past timbering practices may be inhibiting full forest recovery.

*Supporting Natural Landscape:* Includes the watershed of the EV stream. In a forested condition, the watershed maintains water quality and natural nutrient cycles for the stream.

### Threats and Stresses

*Stream 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.

*Beaverdams Wetland Core Habitat Area:* Timber removal in this area may degrade the habitat for amphibians, which depend upon forested areas surrounding their breeding habitats during part of their life cycles. It also may result in soil erosion and sediment pollution of the wetland areas.

*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

*Stream 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.

*Beaverdams Wetland Core Habitat Area:* Timber removal should be avoided within this area, in order to preserve water quality in the wetland and maintain the quality of the habitat for amphibians.

*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. A good step for landowners in the watershed is to develop an ecologically informed Forest Management Plan to guide future uses while stewarding the land's health. Plans should consider individual parcels in the context of the larger forested region and watershed of which they are a part.

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 their environmental impacts. The Arkansas Forestry Commission provides a good reference outlining BMP options (<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.

## **South Fork Conemaugh River Headwaters Wetland BDA**

### Description

This wetland is the headwaters of a tributary to the South Fork Conemaugh River. It has formed in a broad, flat area high in the watershed. It is extensive, a mosaic of patches dominated by various species of grasses and sedges, with small shrubs interspersed. Plant species diversity is relatively low, with many of the same species varying in dominance according to slight variations in elevation and soil saturation. The community is classified as a sphagnum – beaked rush peatland, a type which is of special concern in Pennsylvania. Sphagnum and polytrichum mosses, with rushes (*Juncus* sp.) interspersed, dominated the lowest, wettest areas. Northern long sedge (*Carex folliculata*), tawny cottongrass (*Eriophorum virginicum*), bristly dewberry (*Rubus hispidus*), three-seeded sedge (*Carex trisperma*), and white beaksedge (*Rhynchospora alba*) are also common herbaceous species. Cranberry (*Vaccinium macrocarpon*) forms occasional patches. Shrub species, which typically occur as small individuals scattered among herbaceous growth, include lowbush blueberry (*Vaccinium angustifolium*) and black chokeberry (*Photinia* sp.).

The water in the wetland is deep brown from tannic acids released by peat, and its chemistry is likely to be fairly acidic. No surveys of insect or amphibian life have been conducted through the NHI, but the habitat appears to be good for a diversity of species in these taxa, including some of special concern.

### Threats and Stresses

A strip mine site directly adjacent to and upslope of the wetland may threaten its water quality. Aside from this threat, the wetland's remoteness and its location high in the watershed protect it from other incursions.

### Recommendations

Water chemistry in the wetland should be evaluated to determine if it is receiving pollutants from mine drainage. Surveys should also be conducted for insects and amphibians at this wetland, as much of the wetland's diversity may be found in these taxa.

# Allegheny Township, Chest Springs Borough, & Loretto Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

*NATURAL HERITAGE AREAS:*

| Chest Creek at Eckenrode Mills BDA | <i>High Significance</i> |    |           |   |
|------------------------------------|--------------------------|----|-----------|---|
| hemlock palustrine forest          | --                       | S3 | 7/17/2003 | E |
| wet meadow                         | --                       | S5 | 7/17/2003 | E |

| Clearfield Creek Headwaters BDA                         | <i>Notable Significance</i> |    |           |   |
|---|-----------------------------|----|-----------|---|
| Appalachian blue violet ( <i>Viola appalachiensis</i> ) | G3                          | S2 | 5/31/2001 | E |

| Queen-of-the-Prairie BDA                          | <i>Notable Significance</i> |      |           |   |
|---|-----------------------------|------|-----------|---|
| queen-of-the-prairie ( <i>Filipendula rubra</i> ) | G4G5                        | S1S2 | 7/10/1996 | C |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none



Chest Creek at Eckenrode Mills BDA

# Allegheny Township, Chest Springs Borough, & Loretto Borough

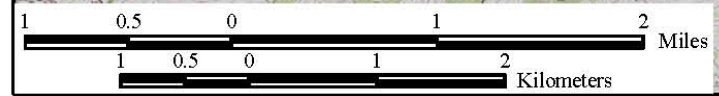
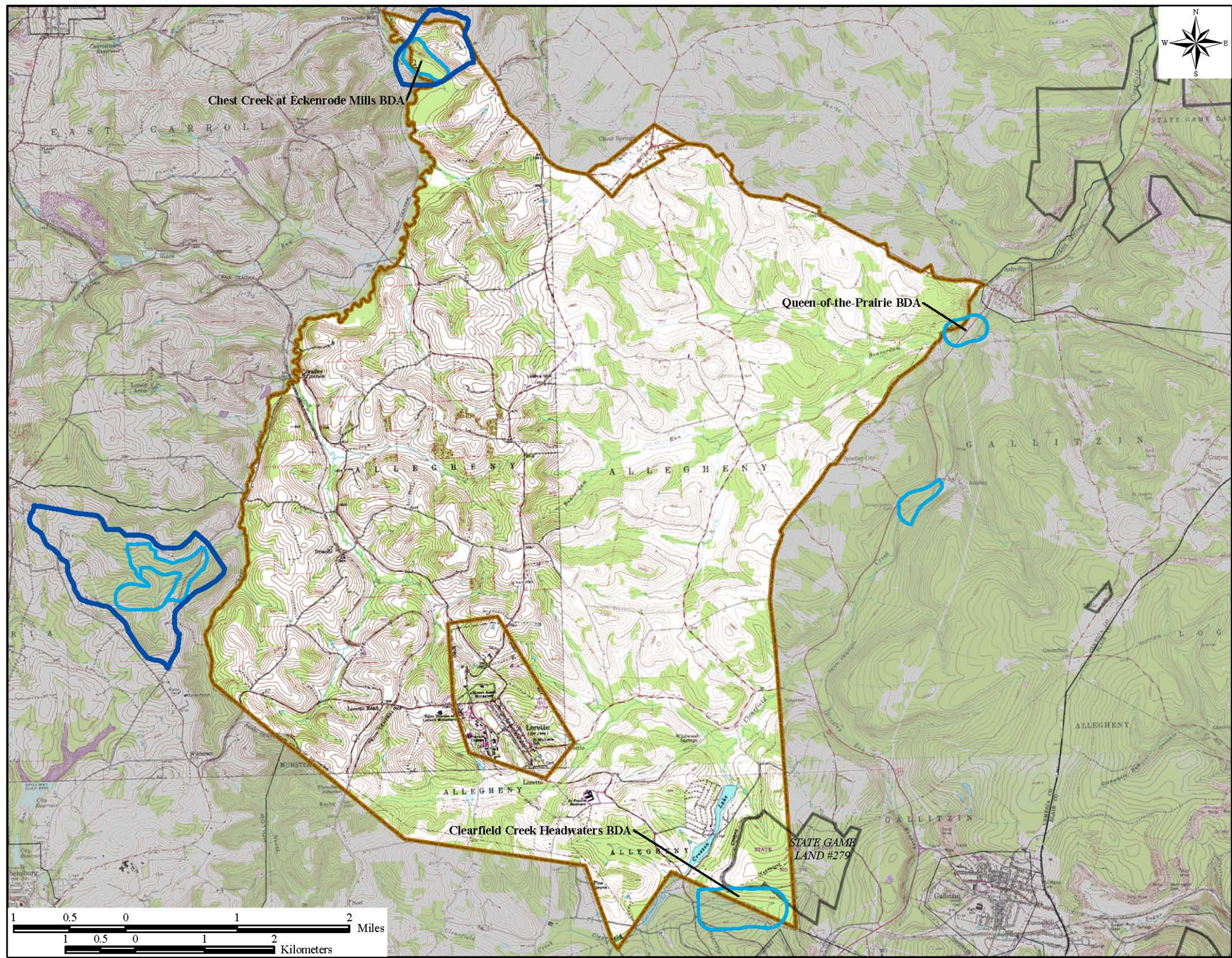
## Cambria County Natural Heritage Inventory

### Allegheny Township, Chest Springs Borough, & Loretto Borough

**Biological Diversity Areas:**  
 Chest Creek at Eckenrode Mills  
 Clearfield Creek Headwaters  
 Queen-of-the-Prairie

**Landscape Conservation Areas:**  
 None

**Public Lands:**  
 State Game Land #279



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
-  Complete
-  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
-  Supporting Landscape
-  Core Habitat

## ALLEGHENY TOWNSHIP

Allegheny Township is west of the Allegheny Front, and the landscape is characterized by rolling hills and many small stream valleys. The landscape is mainly agricultural and forested. While just over 50% of the township is forested, very little of this area is interior forest habitat. The forest occurs in small fragments, many of which are along stream channels. The forest habitat is suitable for edge species and generalists, but not for species that require interior forest conditions.

Allegheny Township spans the watershed divide between Chest Creek and Clearfield Creek. In its western half, many small tributaries drain northwest into Chest Creek, while in its eastern half, the tributaries flow southeast into Clearfield Creek. According to PA-DEP surveys, most of these streams appear to be in relatively good condition ecologically. All streams have been evaluated, and only the headwaters of Chest Creek north of Loretto, and the section of Clearfield Creek that passes through the southeast corner of the township, are designated as impaired. The Chest Creek headwaters are impaired by silt runoff from agriculture, while Clearfield Creek is impaired by acid mine drainage (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for Allegheny Township are: to maintain and improve riparian buffers along streams, and to steward the health of the Biological Diversity Areas in the township. Riparian buffers of contiguous, native forest and wetland vegetation along stream corridors serve the dual purposes of greatly enhancing habitat value for wildlife and improving water quality. Such buffers exist along portions of many of the township's streams; they can be enhanced by working to improve contiguity of forest buffers along streams, and working to increase their width in some areas. A buffer of at least 110 meters will provide habitat for many wildlife species (Harding et al. 1998, Maryland DNR 2005, Palone and Todd 1998).

### Chest Creek at Eckenrode Mills BDA

#### Description

*Core Habitat Area:* This site is notable for an interesting wetland community and a small patch of very mature hemlock forest. The forest along the north bank of the creek is predominantly very large, mature hemlock trees, possibly primary growth. The edge of the forest slopes to the floodplain of the creek, which is predominantly a wet meadow herbaceous wetland, although shrub and tree patches are intermixed occasionally.

The forest contains mainly upland species, but also includes some wetland species. Herbs include: wild leek (*Allium tricoccum*), Jack-in-the-pulpit (*Arisaema triphyllum*), star sedge (*Carex echinata*), graceful sedge (*Carex gracillima*), devil's darnig needles (*Clematis virginiana*), yellow fairybells (*Prosartes lanuginosa*), a rye-grass species (*Elymus* sp.), white avens (*Geum* sp.), hairy woodrush (*Luzula acuminata*), northern bugleweed (*Lycopus uniflorus*), Canada mayflower (*Maianthemum canadense*), Allegheny monkeyflower (*Mimulus ringens*), partridgeberry (*Mitchella repens*), a forget-me-not species (*Myosotis* sp.), mountain woodsorrel (*Oxalis montana*), common yellow oxalis (*Oxalis stricta*), golden ragwort (*Packera aurea*), mayapple (*Podophyllum peltatum*), white rattlesnakeroot (*Prenanthes alba*), waxflower shinleaf (*Pyrola elliptica*), skunk cabbage (*Symplocarpus foetidus*), New York fern (*Thelypteris noveboracensis*), eastern poison ivy (*Toxicodendron radicans*), sessileleaf bellwort (*Uvularia sessilifolia*), sweet white violet (*Viola blanda*), and a violet species (*Viola* sp.).

Shrubs include: Japanese barberry (*Berberis thunbergii*), autumn olive (*Elaeagnus* sp.), a gooseberry species (*Ribes* sp.), multiflora rose (*Rosa multiflora*), swamp rose (*Rosa palustris*), and southern arrowwood (*Viburnum dentatum* var. *lucidum*).

The wetland has a diverse flora. Shrub species include: gray alder (*Alnus incana*), winterberry (*Ilex verticillata*), white meadowsweet (*Spiraea alba*), and southern arrowwood (*Viburnum dentatum* var. *lucidum*). Herbaceous species include: swamp milkweed (*Asclepias incarnata*), smallspike false nettle (*Boehmeria cylindrica*), longhair sedge (*Carex comosa*), fringed sedge (*Carex crinita* var. *crinita*), nodding sedge (*Carex gynandra*), smoothsheath sedge (*Carex laevivaginata*), bristlystalked sedge (*Carex leptalea*), shallow sedge (*Carex lurida*), broom sedge (*Carex scoparia*), Tuckerman's sedge (*Carex tuckermanii*), intermediate woodfern (*Dryopteris intermedia*), blunt spikerush (*Eleocharis obtusa*), a willow-herb species (*Epilobium* sp.), flat-top goldentop (*Euthamia graminifolia*), stiff marsh bedstraw (*Galium tinctorium*), fowl mannagrass (*Glyceria striata*), jewelweed (*Impatiens capensis*), common rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), arrowleaf tearthumb (*Polygonum sagittatum*), woolgrass (*Scirpus cyperinus*), wrinkle-leaf goldenrod (*Solidago rugosa*), American bur-reed (*Sparganium americanum*), skunk cabbage (*Symplocarpus foetidus*), king of the meadow (*Thalictrum pubescens*), Fraser's marsh St. Johnswort (*Triadenum fraseri*), broadleaf cattail (*Typha latifolia*), and swamp verbena (*Verbena hastata*).

*Supporting Natural Landscape:* This area includes the immediate watershed upslope of the wetland, as the watershed influences the hydrological patterns that feed the wetland and the quality of the water that reaches the wetland. However, the wetland is also strongly influenced by Chest Creek, and thus the entire upstream watershed of the creek influences water quality in the wetland.

### Threats and Stresses

*Core Habitat Area:* Forest canopy removal in the area surrounding the wetland will likely result in soil erosion and sediment pollution accumulating in the wetland.

*Supporting Natural Landscape:* Any release of chemical pollutants into the watershed will result in their eventual accumulation in downslope landscapes and in the stream. Chemical pollutants harmful to aquatic life include: petroleum products, pesticides and herbicides, fertilizer runoff, automotive and home improvement chemicals, solvents and cleaners, etc. Activities that require earth-moving or expose bare soil may cause erosion and sedimentation of the stream. Bedrock disturbance may disrupt hydrological flows feeding the stream and result in drainage of toxic leachates into the stream.

### Recommendations

*Core Habitat Area:* Forest canopy removal should be avoided in the area surrounding the wetland, in order to preserve a natural buffer that filters pollutants. All activities in the area should be conducted with consideration of potential water quality impacts; release of chemical pollutants should be avoided.

*Supporting Natural Landscape:* All activities in the vicinity of this site should consider potential water quality impacts; use of chemical pollutants should be carefully controlled to avoid releasing these substances into the environment. Fertilizer use in upslope agricultural areas should not exceed uptake capacity. Best management practices should be employed to minimize and control erosion for any activities that require earth moving or expose bare soil. Any activities resulting in bedrock disturbance

should be carefully evaluated, and avoided if they will disrupt hydrological patterns or result in toxic leachates reaching the stream.

### **Queen-of-the-Prairie BDA**

See description under Gallitzin Township, pg. 87.

### **Clearfield Creek Headwaters BDA**

#### Description

This site is a forested floodplain along a tributary to Clearfield Creek where the Appalachian violet (*Viola appalachiensis*) has been observed to grow. The Appalachian violet is a species of global concern because its geographic distribution is limited to the southern Appalachian mountains. See fact sheet on pg. 170 for more information on this species.

#### Threats and Stresses

This species may be somewhat tolerant of disturbance in its habitat, as it has been observed growing along edges and in disturbed settings. However, disturbances directly impacting the plants would still pose a threat.

#### Recommendations

Some activity in the area, such as low-impact timber removal or non-motorized recreational use, may be possible without harm to the Appalachian violet population. However, if vegetation will be disturbed or removed extensively, surveys for Appalachian violet plants should be incorporated into planning so that the specific locations for disturbance activities do not coincide with plant populations.

## **CHEST SPRINGS BOROUGH**

The landscape of the Borough of Chest Springs is mainly residential. No Natural Heritage Areas have been identified within the borough. Conservation priorities for the borough would be to manage roads, stormwater and sewage to minimize runoff of nutrient, sediment, and chemical pollution into nearby waterways. Chest Springs Borough is along the watershed divide between Clearfield and Chest Creeks, and portions of the borough drain into the headwaters of both waterways.

## **LORETTO BOROUGH**

The landscape of the Borough of Loretto is mainly residential. No Natural Heritage Areas have been identified within the borough. Conservation priorities for the borough would be to manage roads, stormwater and sewage to minimize runoff of nutrient, sediment, and chemical pollution into nearby waterways. Loretto Borough falls across the watershed divide between Clearfield and Chest Creeks; the northwest tip of the borough drains into Chest Creek, while the rest of the borough drains into tributaries to Clearfield Creek.

# Barr Township

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

*NATURAL HERITAGE AREAS:*

| Crooked Run/Elk Creek Wetlands BDA           |    |      | <i>Notable Significance</i> |      |   |
|--|----|------|-----------------------------|------|---|
| skunk cabbage - golden saxifrage forest seep | -- | S4S5 |                             | 2005 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Barr Township

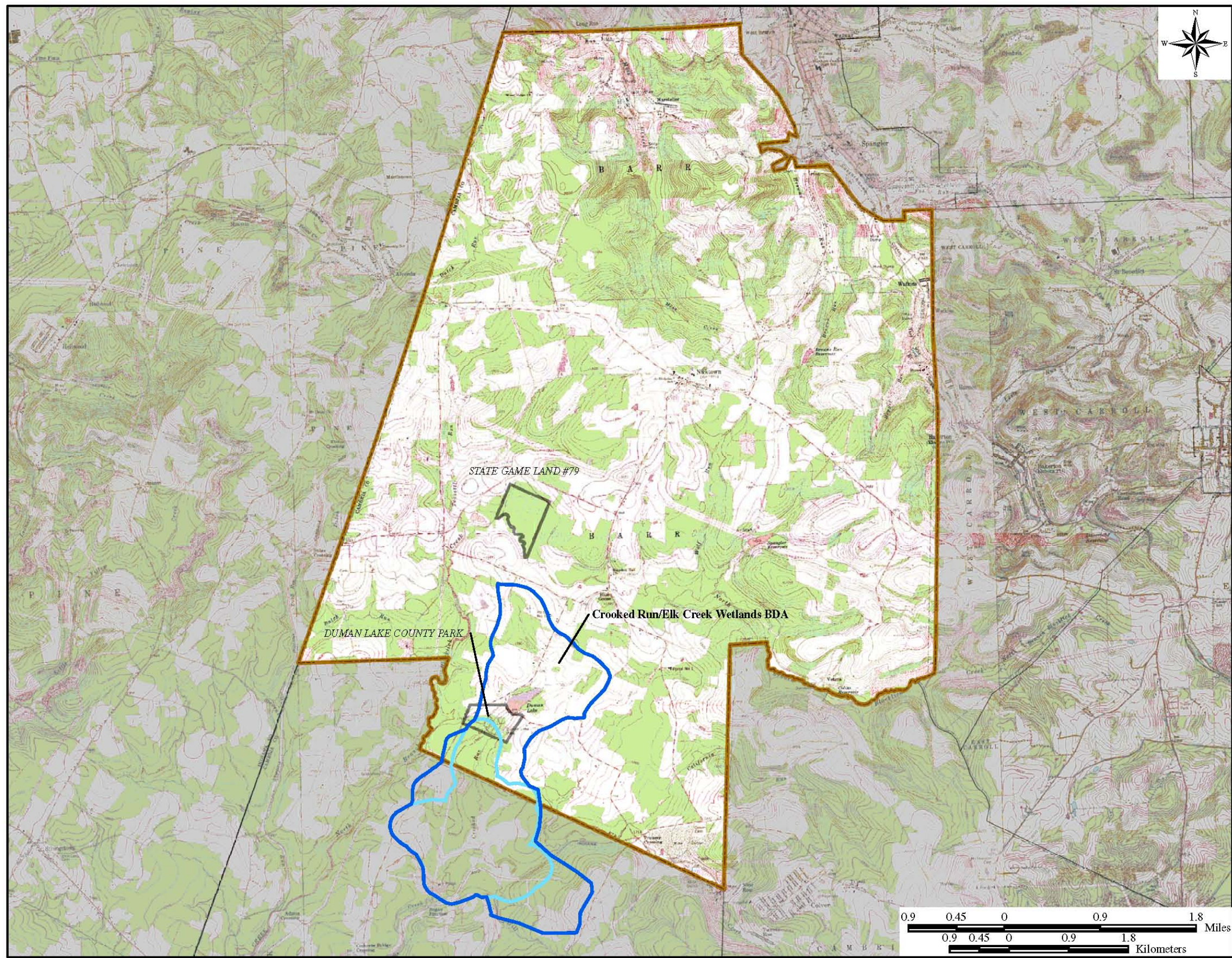
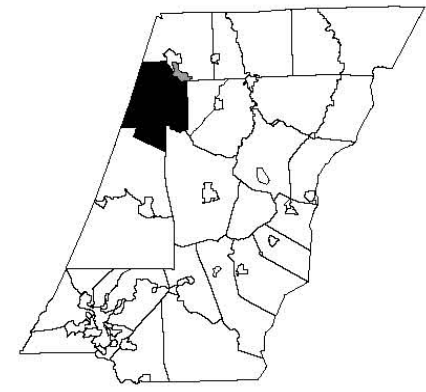
## Cambria County Natural Heritage Inventory

### Barr Township

**Biological Diversity Areas:**  
Crooked Run/Elk Creek Wetlands

**Landscape Conservation Areas:**  
None

**Public Lands:**  
Duman Lake County Park  
State Game Land #79



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
-  Complete
-  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
-  Supporting Landscape
-  Core Habitat

## **BARR TOWNSHIP**

Situated at the far northern end of the ridges of the Allegheny Mountains, Barr Township is a landscape of gently rolling hills and stream valleys. It includes part of the continental divide between the Susquehanna River watershed, which flows east to the Chesapeake Bay, and the Allegheny River watershed, which flows west into the Ohio River and eventually the Mississippi River. The Allegheny River watershed portion of the township— the southern half— includes a section of the North Branch Blacklick Creek and several of its tributaries: Teakettle Run, Wolf Run, and Dutch Run. California Run is classified as impaired for aquatic life by the PA-DEP because of mine drainage, while Crooked Run and another tributary in the headwaters of Elk Run are classified as impaired because of siltation from agricultural runoff. The remainder of the headwaters of North Branch Blacklick Creek are classified as suitable for aquatic life, except for the stream segment below the Spangler Reservoir, which is classified as impaired because of the dam. At the northern edge of the township, the headwaters of Long Run and Moss Creek, tributaries to the West Branch Susquehanna River, are classified as impaired streams due to erosion from previously strip mined areas in their watersheds. **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Nearly 70% of the township is forested, while 30% is agricultural. However, the township does not include very much interior forest habitat, as most of the forest occurs in relatively small blocks.

Conservation priorities for the township would include reducing water pollution and developing a network of riparian buffers along streams in the township. Riparian buffers improve water quality by filtering and slowing runoff, and also improve the wildlife habitat value of the stream by helping to regulate water temperatures and providing native vegetation for food and shelter. A buffer of native forest or wetland vegetation with a width of 110 meters will provide habitat for many wildlife species.

### **Crooked Run/Elk Creek Wetlands BDA**

See pg. 51 in Blacklick Township for description.

# Blacklick Township & Nanty Glo Borough

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

*NATURAL HERITAGE AREAS:*

| Crooked Run/Elk Creek Wetlands BDA           |    |      | <i>Notable Significance</i> |   |  |
|--|----|------|-----------------------------|---|--|
| skunk cabbage - golden saxifrage forest seep | -- | S4S5 | 2005                        | E |  |

| Walker Run BDA                      |    |    | <i>County Significance</i> |   |  |
|-------------------------------------|----|----|----------------------------|---|--|
| hemlock - northern hardwoods forest | -- | S5 | 2005                       | E |  |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Blacklick Township & Nanty Glo Borough

## Cambria County Natural Heritage Inventory

### Blacklick Township & Nanty Glo Borough

#### Biological Diversity Areas:

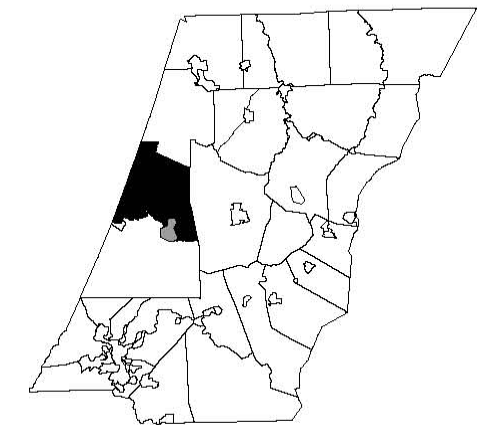
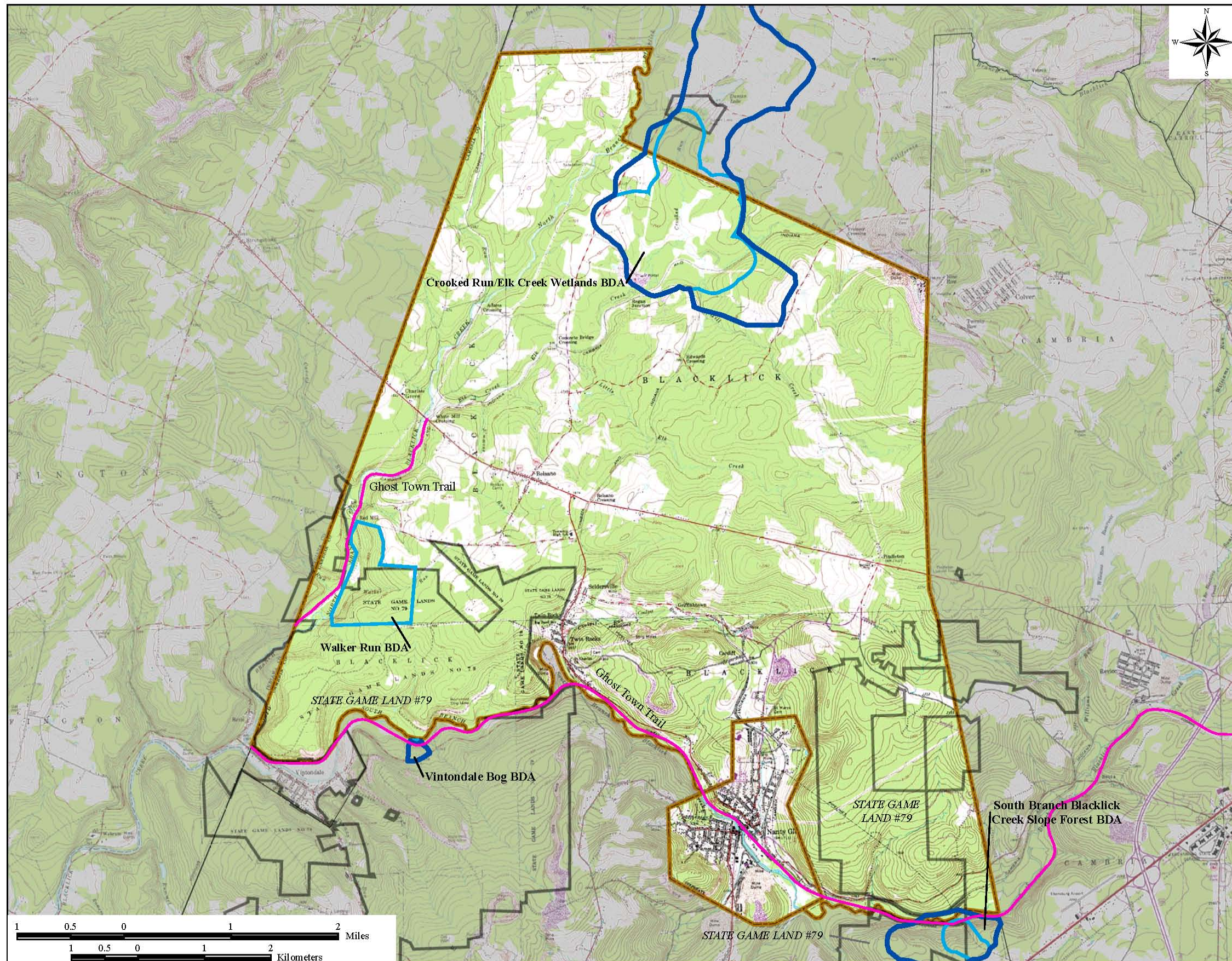
Crooked Run/Elk Creek Wetlands  
Walker Run

#### Landscape Conservation Areas:

None

#### Public Lands:

State Game Land #79



#### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## BLACKLICK TOWNSHIP

Blacklick Township, situated at the very northern end of the ridges of the Allegheny Mountains, is a landscape of gently rolling hills and stream valleys. The township is mainly forested, ~88%, while 8% of the land is agricultural. The forested areas are often fragmented by roads, right-of-ways, and other land uses, such that currently there is little interior forest habitat. Fragmented forests can be used by generalist species and species that prefer edges, but many native species, including neotropical migrant songbirds, require somewhat extensive areas of interior forest in order to successfully live and breed. However, there are many smaller areas of contiguous forest than may potentially be united to create interior forest conditions by mitigating the fragmenting impact of roads, right-of-ways, or other land uses. Currently, the largest extent of contiguous forest is over 700 acres near the northern boundary of the township along Elk Creek.

Blacklick Township drains into the North Branch Blacklick Creek and the South Branch Blacklick Creek. Due to the area's history of extensive coal mining, many of the waterways are now polluted by acid mine drainage. The South Branch Blacklick Creek is impaired for aquatic life below Vintondale, while the North Branch Blacklick Creek is classified as impaired from slightly above the confluence with Elk Run. Some of the smaller tributaries to the North Branch – Simmons Run, Little Elk Creek, and Hill Creek – are not classified as impaired, and the South Branch above Vintondale is not classified as impaired. **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for the township would include remediation of water pollution from mine drainage, remediation of mine waste sites, and mitigation of some fragmenting features in heavily forested areas in order to create greater area of interior forest habitat (see pg. 29 for more information).

### **Crooked Run/Elk Creek Wetlands BDA**

(See photos pg. 54)

#### Description:

This BDA is a complex of wetlands along Crooked Run and Elk Creek, and the surrounding forested watershed that supports the health of the wetlands. It includes extensive graminoid portions along the broad floodplains of the creeks (probably influenced by past beaver impoundment), with mosaics of shrub wetlands interspersed and along the edges, and forested seeps in some areas where the forest meets the edge of the wetland.

*Wetland Core Area:* The floodplains of the stream are broad in many areas, influenced by past beaver impoundments. There are extensive areas of herbaceous growth, with shrubs scattered and sometimes forming dense stands, especially along the outer edges. Shrub species include: gray alder (*Alnus incana*), winterberry (*Ilex verticillata*), an exotic bush honeysuckle species (*Lonicera* sp.), multiflora rose (*Rosa multiflora*), steeplebush (*Spiraea tomentosa*), arrowwood (*Viburnum recognitum*), and nannyberry (*Viburnum lentago*). Dominant herbaceous species included: prickly bog sedge (*Carex atlantica*), northern long sedge (*Carex folliculata*), nodding sedge (*Carex gynandra*), greater bladder sedge (*Carex intumescens*), swamp loosestrife (*Decodon verticillatus*), flat-top goldentop (*Euthamia graminifolia*), and woolgrass (*Scirpus cyperinus*). Additional herbaceous species included: swamp milkweed (*Asclepias incarnata*), yellow marsh marigold (*Caltha palustris*), smoothsheath sedge (*Carex laevivaginata*), shallow sedge (*Carex lurida*), necklace sedge (*Carex projecta*), needle spikerush (*Eleocharis acicularis*), blunt spikerush (*Eleocharis obtusa*), bog willowherb (*Epilobium leptophyllum*), common boneset

(*Eupatorium perfoliatum*), stiff marsh bedstraw (*Galium tinctorium*), rattlesnake mannagrass (*Glyceria canadensis*), melic mannagrass (*Glyceria melicaria*), fowl mannagrass (*Glyceria striata*), American marshpennywort (*Hydrocotyle americana*), common rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), marsh seedbox (*Ludwigia palustris*), northern bugleweed (*Lycopus uniflorus*), Allegheny monkeyflower (*Mimulus ringens*), sensitive fern (*Onoclea sensibilis*), arrowleaf tearthumb (*Polygonum sagittatum*), leafy bulrush (*Scirpus polyphyllus*), king of the meadow (*Thalictrum pubescens*), and Fraser's marsh St. Johnswort (*Triadenum fraseri*).

Along the west edge of the wetlands in some areas there are seepages, with unique wetland flora surrounded by semi-palustrine forest. Wetland herbaceous species of the seeps included: northern long sedge (*Carex folliculata*), drooping sedge (*Carex prasina*), needle spikerush (*Eleocharis acicularis*), white wood aster (*Eurybia divaricata*), flat-top goldentop (*Euthamia graminifolia*), stiff clubmoss (*Lycopodium annotinum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomea*), golden ragwort (*Packera aurea*), roundleaf goldenrod (*Solidago patula*), wrinkle-leaf goldenrod (*Solidago rugosa*), New York fern (*Thelypteris noveboracensis*), heartleaf foamflower (*Tiarella cordifolia*), and common blue violet (*Viola sororia*). Surrounding the wetlands is a moderately diverse mesic deciduous forest. Dominant canopy species were: red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), black cherry (*Prunus serotina*), American basswood (*Tilia americana*), and American beech (*Fagus grandifolia*). Other species that were scattered included cucumber-tree (*Magnolia acuminata*), black gum (*Nyssa sylvatica*), quaking aspen (*Populus tremuloides*), and scattered eastern hemlock (*Tsuga canadensis*), and black ash (*Fraxinus nigra*) is scattered near the wetland edges. Herbaceous species of the forest included: nightcaps (*Anemone quinquefolia*), Jack-in-the-pulpit (*Arisaema triphyllum*), bearded shorthusk (*Brachyelytrum erectum*), thicket sedge (*Carex abscondita*), Appalachian sedge (*Carex appalachica*), plantain-leaf sedge (*Carex plantaginea*), drooping sedge (*Carex prasina*), American golden saxifrage (*Chrysosplenium americanum*), Carolina springbeauty (*Claytonia caroliniana*), devil's darning needles (*Clematis virginiana*), threeleaf goldthread (*Coptis trifolia*), intermediate woodfern (*Dryopteris intermedia*), shining clubmoss (*Huperzia lucidula*), Pennsylvania clubmoss (*Lycopodium hickeyi*), clubmoss (*Lycopodium obscurum*), Canada mayflower (*Maianthemum canadense*), Indianpipe (*Monotropa uniflora*), mountain woodsorrel (*Oxalis montana*), mayapple (*Podophyllum peltatum*), Christmas fern (*Polystichum acrostichoides*), chokecherry (*Prunus virginiana*), bristly dewberry (*Rubus hispidus*), meadow spikemoss (*Selaginella apoda*), smooth carrionflower (*Smilax herbacea*), king of the meadow (*Thalictrum pubescens*), starflower (*Trientalis borealis*), sessileleaf bellwort (*Uvularia sessilifolia*), and roundleaf yellow violet (*Viola rotundifolia*).

*Supporting Natural Landscape:* The area designated as Supporting Natural Landscape is the watershed above the wetland. The area is partly forested and partly in agriculture, and also includes two abandoned mine discharge treatment facilities and the Duman Lake County Park.

### Threats and Stresses

*Wetland Core Area:* Abandoned mine discharges in the surrounding watershed may threaten the quality of the water in these wetlands. Currently two treatment facilities exist just upslope of the wetlands. Activities which could potentially damage the health of the wetland include removal of timber in the wetland areas, other earth disturbance in the wetland or adjacent forests, and release of chemical pollutants in the watershed. Timber removal may impact the health of the wetland by removing shade, which raises the temperature, increasing evaporation rates and changing the plant species composition; and by heavy-equipment damage to the fragile substrate of the wetland. Earth disturbances upslope of the wetlands can cause erosion, resulting in sediment pollution of the wetlands. Chemical pollutants could include petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc.; all of these can be toxic to aquatic life. Runoff of excess fertilizer, whether

from organic or chemical sources, can also be detrimental by causing nutrient enrichment of wetlands and waterways.

*Supporting Natural Landscape:* The watershed above the wetlands includes several farms and part of Duman Lake County Park, as well as forested areas. Any earth-moving activities, construction, or permanently exposed soil such as dirt roads may result in sediment runoff. The concerns described above regarding chemical pollutants apply in these areas as well. Further clearing of forested areas in the watershed would be likely to diminish water quality and habitat value in the streams and the wetlands.

### Recommendations

*Wetland Core Area:* To preserve the ecological health of this headwaters wetland area and the uniquely diverse forest surrounding it, timbering should be avoided or conducted only in upland areas on scattered trees with extremely low impact methods. Other earth disturbances should also be avoided in the wetland area. Any use of chemical pollutants in the watershed should be carefully controlled to avoid releasing the chemicals. Further surveys to document amphibian and insect life in this habitat are recommended. These taxa are likely to make up a substantial contribution to the overall biodiversity of the site, and survey information can provide a good baseline for management decisions. Permanent alterations to the wetland that impound or drain it, or damage the substrate, should be avoided. A forested buffer zone of ~250 m, where timbering activities are avoided, should be maintained around the edge of the wetland to help preserve water quality and provide habitat for semi-terrestrial species such as amphibians.

*Supporting Natural Landscape:* Best management practices for erosion control should be employed for construction, earth-moving, tillage, and dirt roads within the watershed. The wetland will benefit from careful management of activities at farms and the park in the watershed to avoid release of chemical pollutants. Also, conservation of existing forests and increasing forested areas within the watershed will help to improve water quality and habitat value in the streams and wetlands. A good step for landowners in the watershed is to develop an ecologically informed Forest Management Plan to guide future uses while stewarding the land's health. Plans should consider individual parcels in the context of the larger landscape and watershed of which they are a part.

## **Walker Run BDA**

### Description:

This BDA is designated around a ravine with an exceptionally mature and diverse forest community. The forest canopy contains many mature trees, including the following species: red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), common serviceberry (*Amelanchier arborea*), yellow birch (*Betula alleghaniensis*), sweet birch (*Betula lenta*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), cucumber-tree (*Magnolia acuminata*), black cherry (*Prunus serotina*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), eastern hemlock (*Tsuga canadensis*). The shrub layer is composed of American witchhazel (*Hamamelis virginiana*) and rhododendron (*Rhododendron maximum*).

The slopes of the ravine have a diverse flora, including some species sensitive to deer browsing. The steepness of the slopes may offer some refuge from deer browse pressure. Herbaceous species included: wild sarsaparilla (*Aralia nudicaulis*), Jack-in-the-pulpit (*Arisaema triphyllum*), Canadian wildginger (*Asarum canadense*), bearded shorthusk (*Brachyelytrum erectum*), eastern hayscented fern (*Dennstaedtia punctilobula*), intermediate woodfern (*Dryopteris intermedia*), shining clubmoss (*Huperzia lucidula*),

clubmoss (*Lycopodium obscurum*), Canada mayflower (*Maianthemum canadense*), Indian cucumber (*Medeola virginiana*), mountain woodsorrel (*Oxalis montana*), smooth Solomon's seal (*Polygonatum biflorum*), rock polypody (*Polypodium* sp.), Christmas fern (*Polystichum acrostichoides*), western brackenfern (*Pteridium aquilinum*), roundleaf greenbrier (*Smilax rotundifolia*), American basswood seedlings (*Tilia americana*), red trillium (*Trillium erectum*), and a violet species (*Viola* sp.).

Near the mouth of the ravine, there are some small seepage areas that host a typical assemblage of shade-tolerant wetland plants, including nodding sedge (*Carex gynandra*), greater bladder sedge (*Carex intumescens*), drooping sedge (*Carex prasina*), white turtlehead (*Chelone glabra*), white wood aster (*Eurybia divaricata*), melic mannagrass (*Glyceria melicaria*), American marshpennywort (*Hydrocotyle americana*), jewelweed (*Impatiens* sp.), mountain woodsorrel (*Oxalis montana*), clearweed (*Pilea* sp.), a smartweed species (*Polygonum* sp.), a buttercup species (*Ranunculus* sp.), wrinkle-leaf goldenrod (*Solidago rugosa*), and a violet species (*Viola* sp.).

### Threats and Stresses

This ravine is a small area with an exceptionally diverse and mature forest community. Timber removal will degrade the unique qualities of the community, and is also likely to cause soil erosion and physical disruption due to the steep topography.

### Recommendations

Timber removal or other activities which reduce forest canopy cover or require earth-moving should be avoided in this area to preserve its unique ecological qualities. A good step for landowners at this site would be the development of a Forest Management Plan to monitor the health of the forest.

## **NANTY GLO BOROUGH**

The landscape of Nanty Glo Borough is primarily residential or urban. No Natural Heritage Areas have been identified within the borough. Good conservation priorities for the township are remediation of mine waste sites and mine drainage pollution.

*Crooked Run/Elk Creek Wetlands BDA*



# Cambria Township & Ebensburg Borough

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

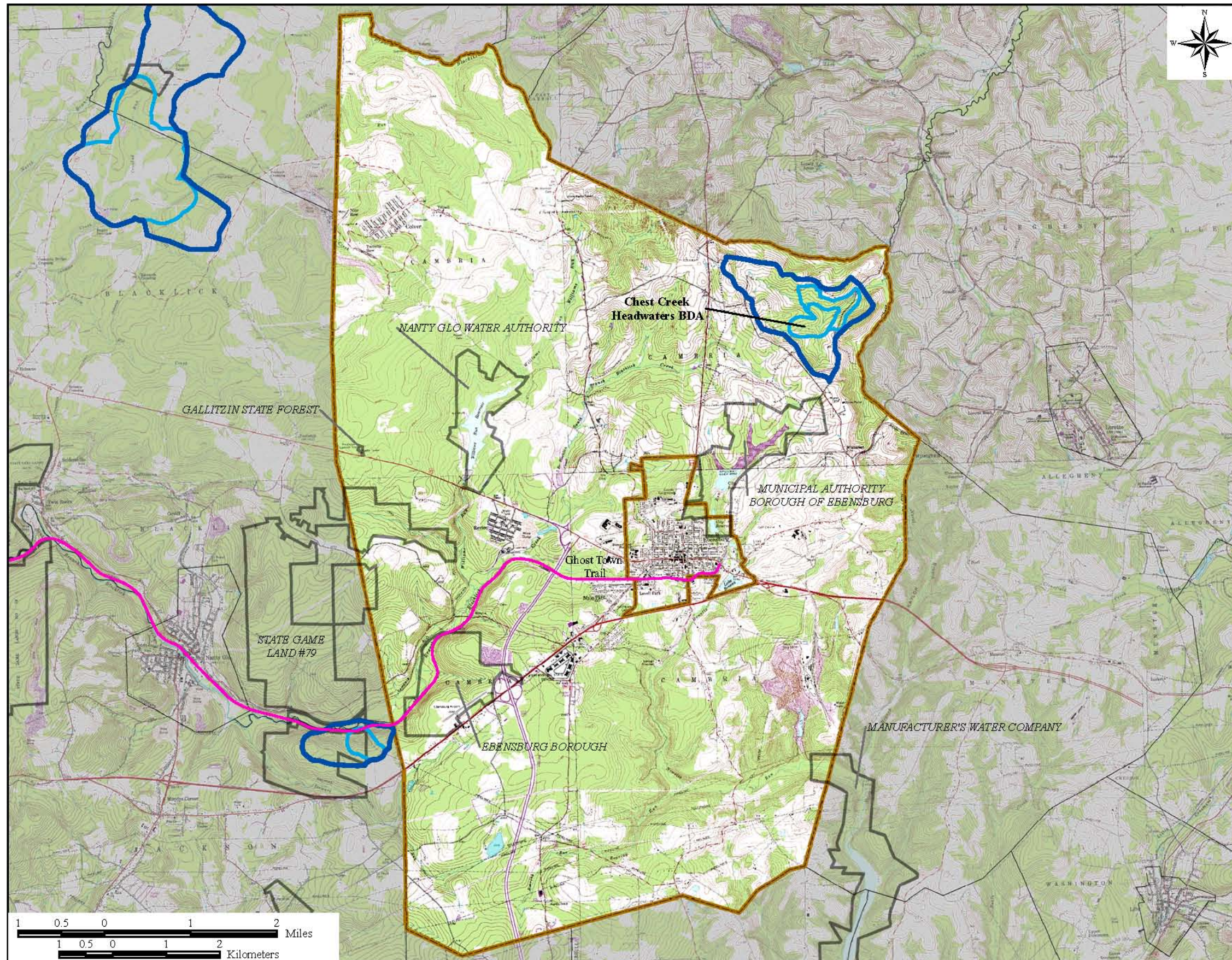
*NATURAL HERITAGE AREAS:*

| Chest Creek Headwaters BDA    |    | <i>High Significance</i> |  |          |   |
|-------------------------------|----|--------------------------|--|----------|---|
| sugar maple - basswood forest | -- | S4                       |  | 7/8/2003 | E |
| hemlock palustrine forest     | -- | S3                       |  | 7/8/2003 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Cambria Township & Ebensburg Borough



## Cambria County Natural Heritage Inventory

### Cambria Township & Ebensburg Borough

#### Biological Diversity Areas:

Chest Creek Headwaters

#### Landscape Conservation Areas:

None

#### Public Lands:

Gallitzin State Forest  
State Game Land #79  
Ebensburg Borough\*  
Nanty Glo Water Authority\*

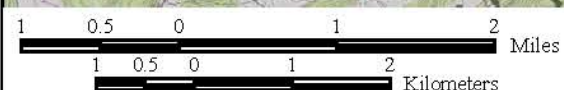
\* Note: water authority property boundaries are approximate, intended for visual reference only



#### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat



## CAMBRIA TOWNSHIP

Cambria Township is a landscape of rolling hills and stream headwaters. Much of the township (72%) is forested, while 22% is agricultural, and almost 4% is urban. Forest cover is fragmented by roads, right-of-ways, and other land uses, such that little of the forest is interior forest habitat. Fragmented forests offer habitat to generalist species and those species that prefer edges, but do not provide suitable conditions for interior forest species—including many neotropical migrant songbirds—to live and breed successfully. The largest area of contiguous forest in the township is over 1300 acres, located along the western edge north of State Game Land #179. At this size, it may be capable of supporting populations of songbirds which can breed successfully (Robbins et al. 1989 suggests some species require at least 1000 acres), if other habitat parameters are appropriate.

Cambria Township includes headwaters tributaries to four waterways: the North Branch Blacklick Creek (in the northwest corner of the township), the South Branch Blacklick Creek (in the central portion of the township), the North Branch Little Conemaugh River (in the southeast corner of the township), and Chest Creek (in the northeast corner of the township). The watershed divide at the northern edge of the township between the Chest Creek and the Blacklick Creek watersheds is also the Eastern Continental Divide between the Susquehanna and the Ohio river basins. The Chest Creek tributaries and the North Branch Conemaugh River tributaries have been assessed by the PA-DEP and classified as suitable for aquatic life. Of the two tributaries to the North Branch Blacklick Creek that fall within the township, the headwaters of California Run are classified as suitable for aquatic life, while Elk Run is impaired by abandoned mine drainage. The main stem of the South Branch Blacklick Creek is impaired by abandoned mine discharges, while its tributary Williams Run is impaired by siltation from agriculture (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities in Cambria Township would be work to maintain and improve stream health by remediating mine drainage problems and establishing riparian buffers along stream corridors; to manage large areas of contiguous forest to preserve ecological health and contiguity; and to steward the Biological Diversity Area in the headwaters of Chest Creek.

### Chest Creek Headwaters BDA

#### Description

This site is a hemlock-forested seepage wetland at the juncture of two small headwaters tributaries to Chest Creek. The area along the stream, especially where the tributaries join, is broad, low, and has extensive seepages. The canopy is hemlock and hemlock-mixed hardwoods. The seeps are generally densely vegetated with a fairly diverse mix of species typical of this habitat. This natural community is classified as a hemlock palustrine forest, a type considered of special concern in Pennsylvania. Above the low seepage areas is deciduous forest, a high-quality example of the sugar maple – basswood type, with a diverse age-structure, well-developed shrub layer, and exceptionally diverse understory. Several species typically sensitive to deer-browse were fairly abundant here: eastern leatherwood (*Dirca palustris*), red trillium (*Trillium erectum*), large-flowered trillium (*Trillium grandiflorum*), and painted trillium (*Trillium undulatum*), suggesting the area is hunted or otherwise managed to reduce deer browse pressure.

Species of the hemlock seeps:

In the hemlock forested seepage area, the tree canopy includes hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), a juneberry species (*Amelanchier* sp.), and yellow birch (*Betula alleghaniensis*), while

shrub species included common elderberry (*Sambucus nigra* ssp. *canadensis*), and red elderberry (*Sambucus racemosa*).

Herbaceous species include: sphagnum moss (*sphagnum* sp.), Jack-in-the-pulpit (*Arisaema triphyllum*), an aster species (*Aster* sp.), a beggarticks species (*Bidens* sp.), nodding sedge (*Carex gynandra*), bristlystalked sedge (*Carex leptalea*), drooping sedge (*Carex prasina*), eastern rough sedge (*Carex scabrata*), wild basil (*Clinopodium vulgare*), eastern hayscented fern (*Dennstaedtia punctilobula*), field horsetail (*Equisetum arvense*), common boneset (*Eupatorium perfoliatum*), white avens (*Geum canadense*), melic mannagrass (*Glyceria melicaria*), fowl mannagrass (*Glyceria striata*), a St. Johns-wort species (*Hypericum* sp.), jewelweed (*Impatiens* sp.), hairy woodrush (*Luzula acuminata*), fan clubmoss (*Lycopodium digitatum*), Indian cucumber (*Medeola virginiana*), partridgeberry (*Mitchella repens*), scarlet beebalm (*Monarda didyma*), sensitive fern (*Onoclea sensibilis*), mountain woodsorrel (*Oxalis montana*), lesser purple fringed orchid (*Platanthera psycodes*), a buttercup species (*Ranunculus* sp.), a sanicle species (*Sanicula* sp.), meadow spikemoss (*Selaginella apoda*), skunk cabbage (*Symplocarpus foetidus*), New York fern (*Thelypteris noveboracensis*), painted trillium (*Trillium undulatum*), and a violet species (*Viola* sp.).

Species of the sugar maple – basswood forest:

Canopy trees include red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), and black locust (*Robinia pseudoacacia*). Shrubs and understory trees include a raspberry species (*Rubus* sp.), red elderberry (*Sambucus racemosa*), devil's walkingstick (*Aralia spinosa*), and striped maple (*Acer pensylvanicum*).

The herbaceous layer includes: wild leek (*Allium tricoccum*), Jack-in-the-pulpit (*Arisaema triphyllum*), a grape fern species (*Botrychium* sp.), bearded shorthusk (*Brachyelytrum erectum*), white bear sedge (*Carex albursina*), white edge sedge (*Carex debilis*), graceful sedge (*Carex gracillima*), plantain-leaf sedge (*Carex plantaginea*), Swan's sedge (*Carex swanii*), broadleaf enchanter's nightshade (*Circaea lutetiana*), bluebead (*Clintonia borealis*), eastern hayscented fern (*Dennstaedtia punctilobula*), yellow fairybells (*Prosartes lanuginosa*), intermediate woodfern (*Dryopteris intermedia*), Canadian woodnettle (*Laportea canadensis*), hairy woodrush (*Luzula acuminata*), fan clubmoss (*Lycopodium digitatum*), clubmoss (*Lycopodium obscurum*), mayapple (*Podophyllum peltatum*), smooth Solomon's seal (*Polygonatum biflorum*), Christmas fern (*Polystichum acrostichoides*), littleleaf buttercup (*Ranunculus abortivus*), smooth carrionflower (*Smilax herbacea*), long beechfern (*Phegopteris connectilis*), green false hellebore (*Veratrum viride*), halberd-leaf yellow violet (*Viola hastata*), and a violet species (*Viola* sp.).

### Threats and Stresses

Activities that could potentially damage the health of the wetland include removal of timber in the wetland areas, other earth disturbance in the wetland or adjacent forests, and release of chemical pollutants in the watershed. Timber removal may impact the health of the wetland by removing shade, which raises the temperature, increasing evaporation rates and changing the plant species composition; and by heavy-equipment damage to the fragile substrate of the wetland. Earth disturbances upslope of the wetlands can cause erosion, resulting in sediment pollution of the wetlands. Chemical pollutants include petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc.; all of these can be toxic to aquatic life. Runoff of excess fertilizer can also be detrimental by causing nutrient enrichment of wetlands and waterways.

## Recommendations

To preserve the ecological health of this headwaters wetland area and the uniquely diverse forest surrounding it, timbering should be avoided or conducted only in upland areas through removal of scattered trees with extremely low impact methods. A good step for landowners would be the development of Forest Management Plans to monitor and maintain forest health in conjunction with other uses. Individual parcels should be considered in the context of the larger landscape and watershed of which they are a part. Invasive species and deer-browsing impacts, which are both currently of low concern at this site, should be monitored and addressed if the need arises.

Other earth disturbances should also be avoided in the wetland area. Any use of chemical pollutants—herbicides, pesticides, solvents, automotive chemicals, etc.—in the watershed should be carefully controlled to avoid releasing the chemicals.

## EBENSBURG BOROUGH

The borough of Ebensburg is mainly urban land, occupied by the city of Ebensburg. However, the borough also contains several forested hillsides, and reservoirs that provide drinking water. No Natural Heritage Areas were identified within the bounds of Ebensburgh Borough. Good conservation priorities for the borough would be management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of nearby streams and reservoirs. Stewardship of forest health, and maintenance of forest cover, on lands surrounding reservoirs will aid in good water quality.

# Chest Township

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

*NATURAL HERITAGE AREAS:*

| Killbuck Run BDA                                       |    | <i>County Significance</i> |  |  |           |   |
|--|----|----------------------------|--|--|-----------|---|
| black cherry - northern hardwood forest                | -- | S4                         |  |  | 9/23/2004 | E |
| sugar maple - basswood forest                          | -- | S4                         |  |  | 9/23/2004 | E |
| hemlock (white pine) - red oak - mixed hardwood forest | -- | S4                         |  |  | 9/23/2004 | E |
| hemlock palustrine forest                              | -- | S3                         |  |  | 8/28/2003 | E |

| Rogue's Harbor Run BDA                      |    | <i>Exceptional Significance</i> |  |  |           |   |
|---|----|---------------------------------|--|--|-----------|---|
| Exceptional Value stream                    | -- | --                              |  |  | --        | A |
| herbaceous vernal pond                      | -- | S3S4                            |  |  | 9/30/2004 | E |
| herbaceous wetland community (unclassified) | -- | --                              |  |  | 9/30/2004 | E |
| palustrine forest community (unclassified)  | -- | --                              |  |  | 9/30/2004 | E |

| Gallitzin LCA |  | <i>High Significance</i> |  |  |  |
|---------------|--|--------------------------|--|--|--|
|---------------|--|--------------------------|--|--|--|

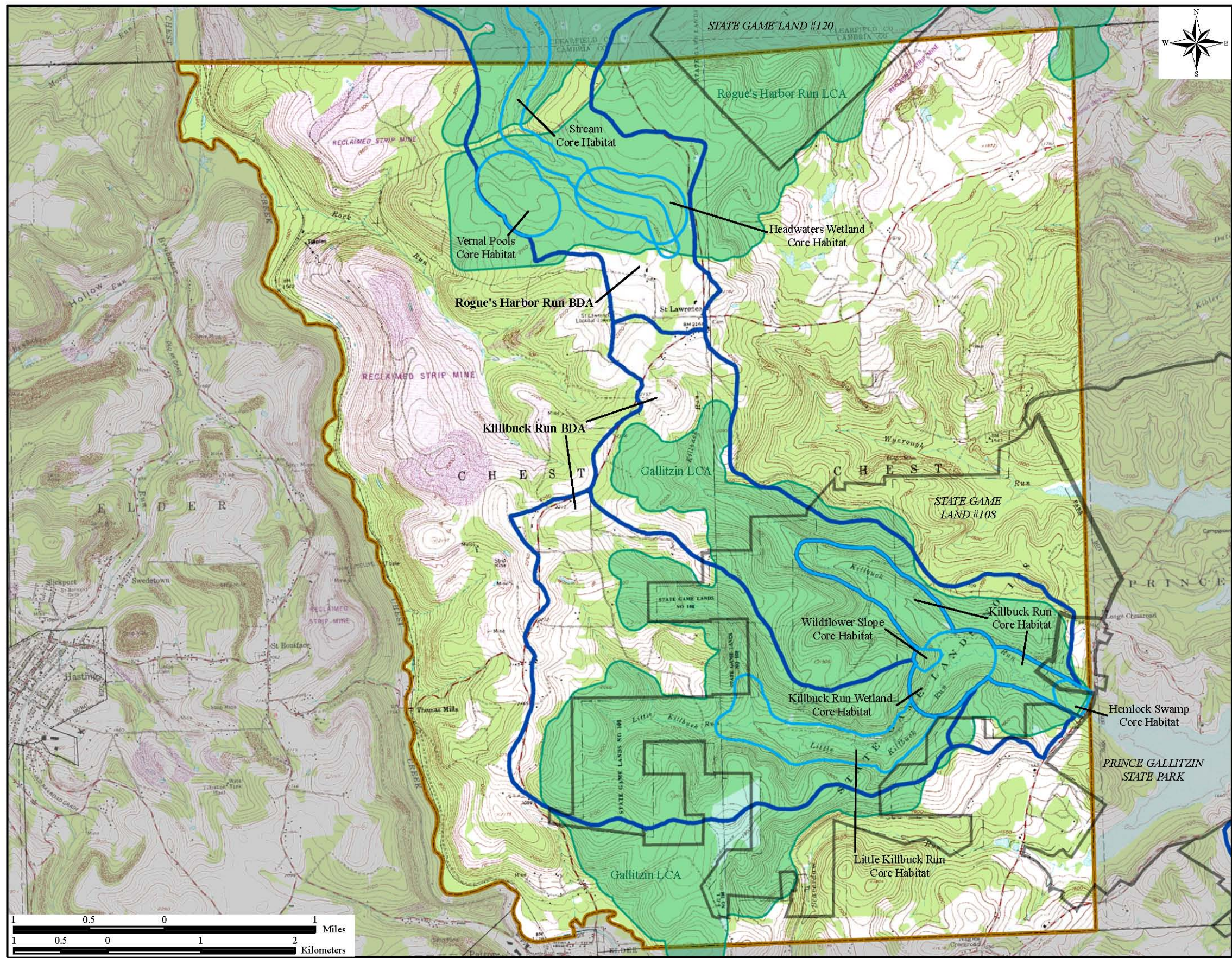
| Rogue's Harbor Run LCA |  | <i>High Significance</i> |  |  |  |
|------------------------|--|--------------------------|--|--|--|
|------------------------|--|--------------------------|--|--|--|

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Chest Township

## Cambria County Natural Heritage Inventory Chest Township



### Biological Diversity Areas:

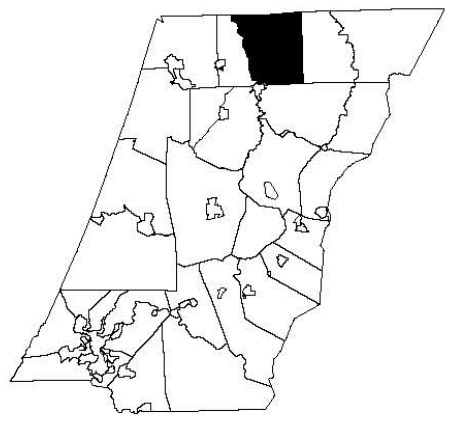
- Killbuck Run
- Rogue's Harbor Run

### Landscape Conservation Areas:

- Gallitzin
- Rogue's Harbor Run

### Public Lands:

- Prince Gallitzin State Park
- State Game Land #108
- State Game Land #120



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
-  Complete
-  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
-  Supporting Landscape
-  Core Habitat

## CHEST TOWNSHIP

Chest Township contains some of the most intact and extensive forested areas in the county, as well as some of the most extensive expanses of strip-mined lands. The Rogue's Harbor Run LCA and the Gallitzin LCA are notable areas of contiguous, relatively intact forest. See pg. 33 for description and recommendations concerning these areas. The streams in these LCAs have good water quality and habitat value for wildlife. However, one tributary to Chest Creek within the township, Brubaker Run, is classified as impaired for aquatic life by the PA-DEP due to pollution from acid mine drainage. **Figures 6 and 7** (pg. 19, 21 **Error! Reference source not found.**) map DEP water quality designations for county streams.

Good conservation priorities for the township are ecological stewardship of the LCAs and BDAs to maintain their health and contiguity, and remediation of water pollution problems from acid mine drainage.

### Killbuck Run BDA

#### Description

This area is designated as a BDA because it is a relatively contiguous forested watershed with several intact forest and wetland communities representative of those typical in the region. Along Killbuck Run is a hemlock palustrine forest, and black-cherry – northern hardwoods forest community. At the confluence of Killbuck Run and Little Killbuck Run is a beaver-impounded shrub and herbaceous meadow wetland. Just above the wetland, the floodplain of Little Killbuck Run has some saturated areas; otherwise it is a generally mesic hemlock – red oak – mixed hardwood forest with a few seeps. The southeast-facing lower slope near the confluence of Killbuck Run and Little Killbuck Run, just above the road, has a sugar maple – basswood canopy with a rich mix of mesic species in the herb layer (Wildflower Slope Core Habitat Area). There is also a little bit of seepage arising on the slope. The ridge between the two streams contains some areas of well-developed second-growth dry oak – heath forest, and some areas of extremely dense shrubs and saplings that have regrown following clearcutting.

*Hemlock Swamp Core Habitat Area:* This floodplain area near the mouth of Killbuck Run has many seepages and a good example of a hemlock palustrine forest. The tree canopy is dominated by eastern hemlock (*Tsuga canadensis*) and black ash (*Fraxinus nigra*), with a few emergent eastern white pines (*Pinus strobus*). The shrub layer is sparse, with northern spicebush (*Lindera benzoin*) scattered occasionally. On the forest floor, the typical hemlock palustrine forest mound-and-pool structure—raised hummocks surrounding tree trunks and decaying stumps, surrounded by saturated low-lying areas—has developed. The herbaceous layer includes many species typical of seepage wetlands: heartleaf foamflower (*Tiarella cordifolia*), three-seeded sedge (*Carex trisperma*), bristly buttercup (*Ranunculus hispidus*), American golden saxifrage (*Chrysosplenium americanum*), clearweed (*Pilea* sp.), a mniium moss (*Mnium* sp.), broadleaf enchanter's nightshade (*Circaea lutetiana*), mountain woodsorrel (*Oxalis montana*), jewelweed (*Impatiens* sp.), sensitive fern (*Onoclea sensibilis*), graceful sedge (*Carex gracillima*), a violet species (*Viola* sp.), western oakfern (*Gymnocarpium dryopteris*), crookedstem aster (*Symphotrichum prenanthoides*), Canadian woodnettle (*Laportea canadensis*), sweet woodreed (*Cinna arundinacea*), Greek valerian (*Polemonium reptans*), drooping sedge (*Carex prasina*), Jack-in-the-pulpit (*Arisaema triphyllum*), and American marshpennywort (*Hydrocotyle americana*). On hummocks and raised areas the herbaceous species are typical of cool northern hardwoods forests: white avens (*Geum canadense*), white wood aster (*Eurybia divaricata*), red trillium (*Trillium erectum*), fragrant bedstraw

(*Galium triflorum*), Virginia creeper (*Parthenocissus quinquefolia*), Canada mayflower (*Maianthemum canadense*), intermediate woodfern (*Dryopteris intermedia*), and common ladyfern (*Athyrium filix-femina*).

**Killbuck Run Core Habitat Area:** This area includes the stream, as well as a riparian buffer area along its banks. In the upper portions of the watershed, along the stream, its floodplain, and the lower slopes of the valley, the predominant forest type is a black cherry – northern hardwood community. Canopy species include black cherry (*Prunus serotina*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and eastern hemlock (*Tsuga canadensis*). Shrubs include northern spicebush (*Lindera benzoin*), American witchhazel (*Hamamelis virginiana*), and striped maple (*Acer pensylvanicum*). The herbaceous layer is somewhat diverse, indicating a lack of intense deer browsing pressure. Species include: bluntlobe grapefern (*Botrychium oneidense*), plantain-leaf sedge (*Carex plantaginea*), Christmas fern (*Polystichum acrostichoides*), wreath goldenrod (*Solidago caesia*), New York fern (*Thelypteris noveboracensis*), birch (*Betula* sp. seedlings), bearded shorthusk (*Brachyelytrum erectum*), white wood aster (*Eurybia divaricata*), common cinquefoil (*Potentilla simplex*), sessileleaf bellwort (*Uvularia sessilifolia*), partridgeberry (*Mitchella repens*), eastern rough sedge (*Carex scabrata*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), zigzag goldenrod (*Solidago flexicaulis*), crookedstem aster (*Symphyotrichum prenanthoides*), golden ragwort (*Packera aurea*), twisted sedge (*Carex torta*), sharplobe hepatica (*Hepatica nobilis* var. *acuta*), fan clubmoss (*Lycopodium digitatum*), and clubmoss (*Lycopodium obscurum*).

**Little Killbuck Run Core Habitat Area:** This core area includes the stream and a riparian buffer area. The forest surrounding Little Killbuck Run in the floodplain and lower valley slopes is mainly a hemlock – red oak – mixed hardwood forest, with varying degrees of hemlock cover. Tree canopy species include: red maple (*Acer rubrum*), American hornbeam (*Carpinus caroliniana*), shagbark hickory (*Carya ovata*), a hawthorn species (*Crataegus* sp.), American beech (*Fagus grandifolia*), northern red oak (*Quercus rubra*), American basswood (*Tilia americana*), and eastern hemlock (*Tsuga canadensis*). The shrub layer contains some wetland species in the floodplain areas: pussy willow (*Salix discolor*), white meadowsweet (*Spiraea alba*), and southern arrowwood (*Viburnum dentatum* var. *lucidum*). The exotic invasive species multiflora rose (*Rosa multiflora*) and Morrow's honeysuckle (*Lonicera morrowii*) are also present. Herbaceous species include: a sedge species (*Carex* spp.), white wood aster (*Eurybia divaricata*), bigleaf aster (*Eurybia macrophylla*), jewelweed (*Impatiens* sp.), partridgeberry (*Mitchella repens*), gaywings (*Polygala paucifolia*), arrowleaf tearthumb (*Polygonum sagittatum*), Christmas fern (*Polystichum acrostichoides*), a cinquefoil species (*Potentilla* sp.), bristly buttercup (*Ranunculus hispidus*), eastern swamp saxifrage (*Saxifraga pensylvanica*), wrinkle-leaf goldenrod (*Solidago rugosa*), crookedstem aster (*Symphyotrichum prenanthoides*), purplestem aster (*Symphyotrichum puniceum*), and New York fern (*Thelypteris noveboracensis*).

**Wildflower Slope Core Habitat Area:** This area is a forest with a distinctly mesic composition, classified as a sugar maple – basswood forest community. The tree canopy is dominated by sugar maple (*Acer saccharum*) and American basswood (*Tilia americana*), with a few scattered eastern hemlock (*Tsuga canadensis*). The herbaceous layer has some species of moist areas, due to the seeps that arise on the hill; the diversity may also be enhanced by the difficulty the slope poses for browsing deer. Species include: wild sarsaparilla (*Aralia nudicaulis*), Canadian wildginger (*Asarum canadense*), nodding sedge (*Carex gynandra*), black bugbane (*Cimicifuga racemosa*), bead lily (*Clintonia* sp.), richweed (*Collinsonia canadensis*), autumn coralroot (*Corallorhiza odontorhiza*), woodland horsetail (*Equisetum sylvaticum*), white wood aster (*Eurybia divaricata*), bigleaf aster (*Eurybia macrophylla*), hepatica (*Hepatica nobilis*), fan clubmoss (*Lycopodium digitatum*), Canada mayflower (*Maianthemum canadense*), sensitive fern (*Onoclea sensibilis*), Christmas fern (*Polystichum acrostichoides*), common elderberry (*Sambucus nigra* ssp. *canadensis*), zigzag goldenrod (*Solidago flexicaulis*), crookedstem aster (*Symphyotrichum*

*prenanthoides*), heartleaf foamflower (*Tiarella cordifolia*), a violet species (*Viola* sp.), and a grape species (*Vitis* sp.).

**Killbuck Run Wetland Core Habitat Area:** At the confluence of Little Killbuck Run and Killbuck Run, a wetland dominated by shrubs and graminoids (grass-like plants) has developed, possibly related to beaver activity. It is a mosaic of patches of shrub cover, upland areas with old-field vegetation, and low, saturated areas with wetland species. The dominant shrub species are pussy willow (*Salix discolor*), southern arrowwood (*Viburnum dentatum* var. *lucidum*), and steeplebush (*Spiraea tomentosa*). Black willow (*Salix nigra*) is also scattered. Upland species include: goldentop (*Euthamia graminifolia*), giant goldenrod (*Solidago gigantea*), and deertongue (*Dichanthelium clandestinum*). The lower, wetter areas contain species such as: wrinkle-leaf goldenrod (*Solidago rugosa*), flat-top rice cutgrass (*Leersia oryzoides*), leafy bulrush (*Scirpus polyphyllus*), swamp milkweed (*Asclepias incarnata*), marsh seedbox (*Ludwigia palustris*), arrowleaf tearthumb (*Polygonum sagittatum*), simple-stem bur-reed (*Sparganium emersum*), jewelweed (*Impatiens capensis*), dotted smartweed (*Polygonum punctatum*), softstem bulrush (*Schoenoplectus tabernaemontani*), rough bedstraw (*Galium asprellum*), purpleleaf willowherb (*Epilobium coloratum*), Allegheny monkeyflower (*Mimulus ringens*), and climbing false buckwheat (*Polygonum scandens*).

**Supporting Natural Landscape:** This is the watershed of Killbuck Run and Little Killbuck Run. These lands are important in maintaining the water quality of the streams. The upland areas are a mixture of recently cut shrub and sapling growth and good quality second-growth dry oak – heath forest.

#### Threats and Stresses

A road has been constructed along the north bank of Little Killbuck Run, within 20-50 meters of the stream, causing erosion and degradation of the slope in some areas. Some invasive species also line the road. Along Little Killbuck Run there are also a few old clearings, perhaps once homesteads or pastures. In the ridge between the streams, and the slope east of Killbuck Run, there has been extensive clearcutting in some areas, with dense shrub and sapling regrowth.

#### Recommendations

The road along Little Killbuck Run should be managed to prevent erosion and slope destabilization. To minimize suitable habitat for invasive species colonization, and to minimize the fragmenting impact of the road, its width should be reduced and native forest vegetation restored close along its edge. A closed tree canopy across a dirt road greatly minimizes its fragmenting impact for many bird species. Timber removal should be avoided close to the streams and along highly erodible slopes. Development of a site-based management plan with ecological health of the forests as a primary goal can provide an informed, balanced guide for timber management decisions.

### **Rogue's Harbor Run BDA**

#### Description

This BDA is the watershed of Rogue's Harbor Run, designated as Exceptional Value (EV) by the PA-DEP. The stream headwaters are in Cambria County, and the stream continues into Clearfield County. The headwaters of Rogue's Harbor Run contain a beaver-impounded herbaceous and shrub wetland complex, as well as several discrete pools along a shallow tributary drainage to the main channel. The stream, the wetland, and the vernal ponds are designated as Core Habitat Areas. The site is important in

the county because it contains several wetlands and an ecologically healthy stream within a matrix of fairly extensive natural forest in good condition. It is the only site with vernal pools documented in the county that is not along the Allegheny Front.

*Headwaters Wetland Core Habitat Area:* The landowner reports that beaver have long occupied the headwaters wetland area. The eastern end of the wetland is a bog-like area dominated by sphagnum moss and cranberries (*Vaccinium macrocarpon*). Also scattered in this area are shrubs, including winterberry (*Ilex verticillata*) and lowbush blueberry (*Vaccinium pallidum*); hemlock and red maple seedlings; and a few stems of cattail (*Typha latifolia*). Other herbaceous species include northern long sedge (*Carex folliculata*), star sedge (*Carex echinata*), three-seeded sedge (*Carex trisperma*), sundew (*Drosera rotundifolia*), and bog clubmoss (*Lycopodiella inundata*). The substrate is likely saturated much of the year, possibly with standing water in spring. Further to the west the sphagnum gives way to a series of ponds, meadows, and shrublands in various stages of succession following beaver activity. Shrub areas tend to be dominated by southern arrowwood (*Viburnum dentatum* var. *lucidum*), pussy willow (*Salix discolor*), and winterberry (*Ilex verticillata*). Meadow areas are dominated by herbaceous emergent species, including American bur-reed (*Sparganium americanum*), rattlesnake manna grass (*Glyceria canadensis*), three-way sedge (*Dulichium arundinaceum*), and woolgrass (*Scirpus cyperinus*). Other herbaceous species include: common rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), a chokeberry species (*Photinia* sp.), and bristly dewberry (*Rubus hispidus*).

The forest at the site is relatively mature second growth that in most areas shows no sign of recent or extensive disturbance, although a few stumps suggest there has been scattered logging. At the edge of the wetland there is a unique semi-palustrine forest community, with a diverse mix of both wetland and upland species. The species composition does not match any of the types defined in Terrestrial and Palustrine Plant Communities of Pennsylvania (Fike 1999), but the community is considered an important feature of this site. The canopy includes sassafras (*Sassafras albidum*), white oak (*Quercus alba*), eastern hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*). The shrub layer contains spicebush (*Lindera benzoin*), witch hazel (*Hamamelis virginiana*), and winterberry (*Ilex verticillata*). Above the semi-palustrine area the species composition shifts somewhat, with white oak increasing, chestnut oak (*Quercus montana*) becoming important, and yellow birch and hemlock less important. Mountain laurel (*Kalmia latifolia*) and witch hazel form a moderately dense shrub layer.

*Vernal Pools Core Habitat Area:* Vernal pools are a community type considered of conservation concern in Pennsylvania. Vernal pools provide unique habitat conditions because the water levels fluctuate seasonally, sometimes drying up completely. Because they do not have fish, many species of animal can survive in the ponds that would be preyed upon by fish in other aquatic habitats—including amphibian larvae, fairy shrimp, and a variety of invertebrate species. Jefferson and spotted salamanders (*Ambystoma jeffersoniana*, *Ambystoma maculatum*) were documented breeding in the pools at Rogue's Harbor Run. The salamanders lay their eggs in the vernal pools in early spring, then migrate to burrows in the surrounding forest. They may migrate up to 400 m. The eggs hatch into larvae, which live in the pools until they metamorphose into the adult form. They depend exclusively upon vernal pools for breeding habitat, and an individual will return year after year to the same pool to breed.

The pools were approximately 10–15 meters in diameter and had standing water at the time of survey, thus were likely remain wet all year, although some fluctuation of the water level may occur. Three pools were observed; two had little vegetation, and one had fairly extensive patches of herbaceous emergent vegetation. Plant species diversity was very low, with only floating manna grass (*Glyceria septentrionalis*), cinnamon or interrupted fern (*Osmunda* sp.), silvery sedge (*Carex canescens*), a beggarticks species (*Bidens* sp.), and hop sedge (*Carex lupulina*) observed.

*Stream Core Habitat Area:* The Core Habitat Area includes perennially flowing reaches of the stream plus a 110-meter 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 2005, Palone and Todd 1998).

*Supporting Natural Landscape:* This area includes the watershed of the EV stream. In forested condition, the watershed maintains water quality and natural nutrient cycles for the stream and the wetlands.

### Threats and Stresses

*Headwaters Wetland Core Habitat Area:* This area is naturally in flux due to the beaver activity that periodically alters the water regime to flood some areas, while other areas undergo succession from ponds to meadows to shrublands. Any physical disturbances that permanently drain or impound the wetland or alter the substrate will upset this natural cycle and degrade the habitat value of the wetland. Timbering in surrounding areas may result in soil erosion and sediment pollution reaching the wetland, and it may damage the habitat for amphibians, many species of which depend on a forest zone of ~250 meters surrounding a wetland (Semlitsch and Bodie 2003).

*Vernal Pools 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, and other direct disturbances to the structure of the forest floor, may also degrade the habitat for amphibians.

*Stream 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. Release of chemical pollutants in the watershed will also likely drain into the stream or wetlands. Chemical pollutants that are harmful to aquatic life and ecological health include petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc.

### Recommendations

*Headwaters Wetland Core Habitat Area:* Further surveys to document amphibian and insect life in this habitat are recommended. These taxa are likely to make up a substantial component of the overall biodiversity of the site, and survey information can provide a good baseline for management decisions. Permanent alterations to the wetland that impound or drain it, or that damage the substrate, should be avoided. A forested buffer zone of ~250 m, where timbering activities are avoided, should be maintained around the edge of the wetland to help preserve water quality and provide habitat for semi-terrestrial species such as amphibians.

*Vernal Pools Core Habitat Area:* Further surveys to document insect species and other amphibians 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 surrounding the wetland that Jefferson and spotted salamanders and other amphibians may occupy, it is recommended that a full forest canopy be maintained and that disturbances to the forest floor be avoided within 250 meters of the pond edges in order to prevent degradation of amphibian habitat.

*Stream 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. The development of an ecologically informed Forest Management Plan to guide future use is a good step for long-term stewardship of the land's health. Water quality impacts should be considered for any activities taking place here: ecologically detrimental pollutants (pesticides, herbicides, automotive chemicals, etc.) should not be released into the environment, 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 their environmental impacts. The Arkansas Forestry Commission provides a good reference outlining BMPs (<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.

Rattlesnake fern  
*Botrychium virginianum*



Above: Blunt-lobed grape fern (*Botrychium oneidense*) with golden spore stalk, center-right. This species is somewhat uncommon and occurs only in moist forest conditions. Light green plant, lower left: sensitive fern (*Onoclea sensibilis*). Enchanter's nightshade seedlings (*Circea alpina*), center.

*Rogue's Harbor Run BDA*



Graminoid wetland at  
Rogue's Harbor Run BDA

Emergent vegetation, cinnamon  
fern, and shrubs in wetland at  
Rogue's Harbor Run BDA



*Below, right:* Cattails & hemlocks  
*Below:* Cranberries growing in  
sphagnum moss. Rogue's Harbor  
Run BDA



# Clearfield Township & Patton Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

*NATURAL HERITAGE AREAS:*

| Chest Creek at Eckenrode Mills BDA |    |    |  |  |           |                          |
|------------------------------------|----|----|--|--|-----------|--------------------------|
|                                    |    |    |  |  |           | <i>High Significance</i> |
| hemlock palustrine forest          | -- | S3 |  |  | 7/17/2003 | E                        |
| wet meadow                         | -- | S5 |  |  | 7/17/2003 | E                        |

| Clearfield Creek Floodplain BDA  |    |    |  |  |      |   |
|----------------------------------|----|----|--|--|------|---|
| floodplain forest (unclassified) | -- | -- |  |  | 2003 | E |

| Slate Lick Run Wetlands BDA               |    |    |  |  |      |   |
|---|----|----|--|--|------|---|
| unique wetland communities (unclassified) | -- | -- |  |  | 2003 | E |

| Gallitzin LCA |  |  |  |  |  |                          |
|---------------|--|--|--|--|--|--------------------------|
|               |  |  |  |  |  | <i>High Significance</i> |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Clearfield Township & Patton Borough

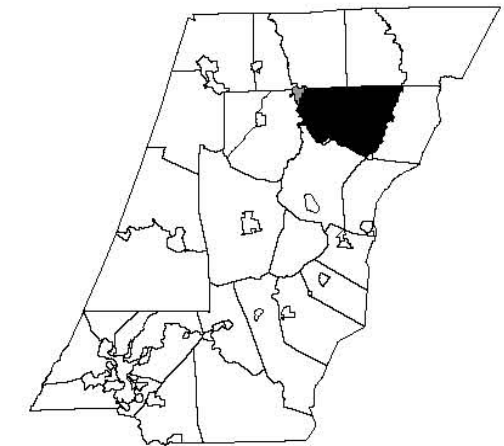
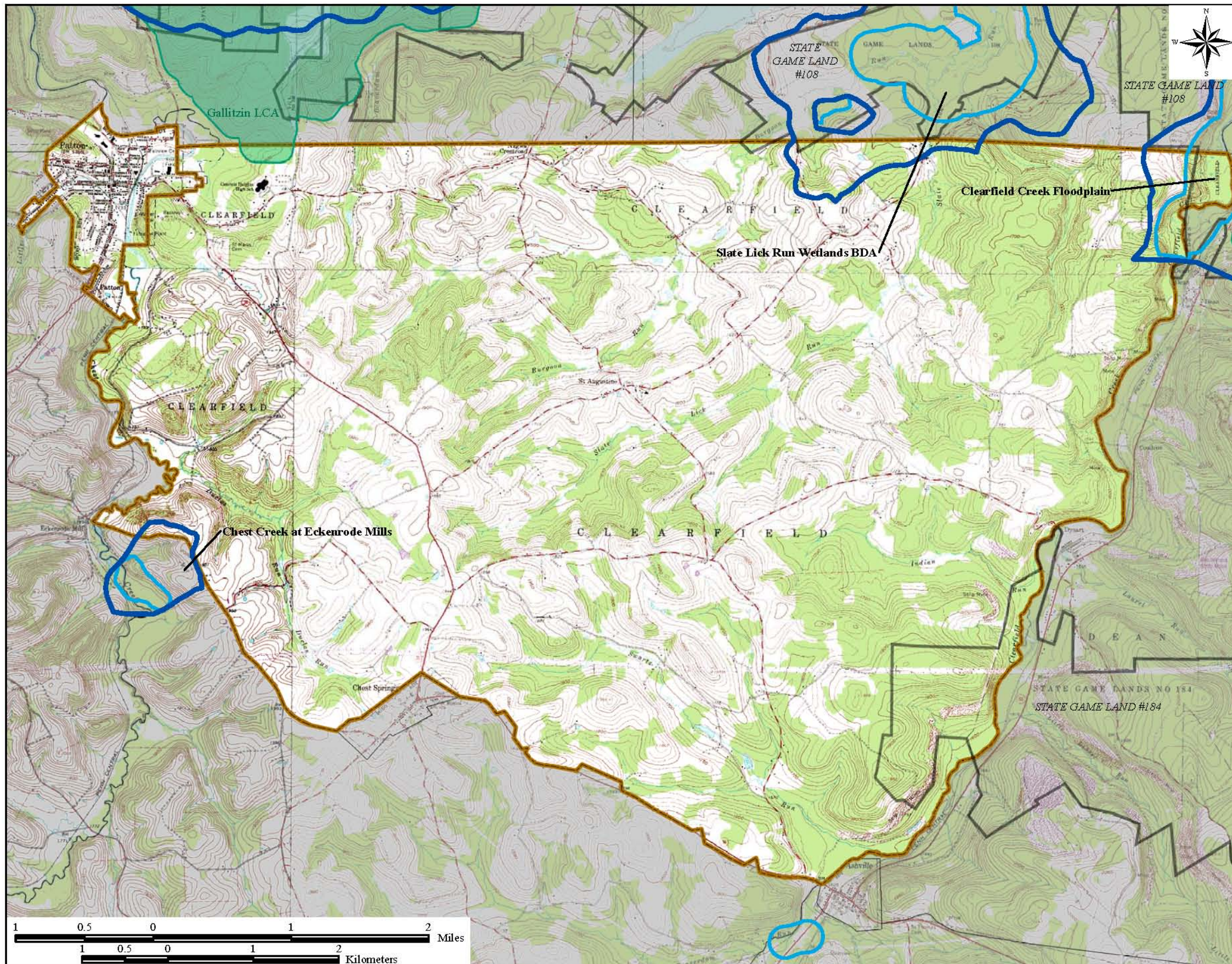
## Cambria County Natural Heritage Inventory

### Clearfield Township & Patton Borough

**Biological Diversity Areas:**  
 Clearfield Creek Floodplain  
 Chest Creek at Eckenrode Mills  
 Slate Lick Run Wetlands

**Landscape Conservation Areas:**  
 Gallitzin

**Public Lands:**  
 State Game Land #108  
 State Game Land #184



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## **CLEARFIELD TOWNSHIP**

The landscape of Clearfield Township is largely agricultural. The most extensive forested areas are along Clearfield Creek at the eastern edge of the township. Smaller forest fragments also occur along stream valleys. The township's major stream valleys, Slate Lick Run and Burgoon Run, are classified as impaired for aquatic life by the PA-DEP due to silt pollution from agricultural runoff, while tributaries to Duclos Run at the western edge of the township are impaired by acid mine drainage (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation objectives for the township would be the remediation of water pollution problems. Establishing riparian buffers of native vegetation along streams greatly reduces silt pollution reaching the stream, and also enhances the value of the stream and riparian area as wildlife habitat. A width of 110 meters will provide habitat for many wildlife species (Harding et al. 1998, Maryland DNR 2005, Palone and Todd 1998). The northeastern corner of the township is within the Gallitzin LCA (see pg. 33).

### **Chest Creek at Eckenrode Mills BDA**

Please see description under Allegheny Township, pg. 44.

### **Clearfield Creek Floodplain BDA**

Please see description under White Township, pg. 124.

### **Slate Lick Run Wetlands BDA**

Please see description under White Township, pg. 124.

## **PATTON BOROUGH**

The landscape of Patton Borough is largely residential and urban. No Natural Heritage Areas have been identified within the borough boundaries. Conservation priorities for the borough would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of nearby waterways. A recent Growing Greener project to improve the floodwall and the stream habitat where Chest Creek flows through Patton has been completed, resulting in the installation of a meander to provide more natural stream habitat conditions at the floodwall area.

# Cresson Township, Cresson Borough, & Sankertown Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

*NATURAL HERITAGE AREAS:*

| Clearfield Creek Headwaters BDA                         | <i>Notable Significance</i> |    |           |   |
|---|-----------------------------|----|-----------|---|
| Appalachian blue violet ( <i>Viola appalachiensis</i> ) | G3                          | S2 | 5/31/2001 | E |

| Laurel Gap Wetland BDA          | <i>Notable Significance</i> |    |           |   |
|---------------------------------|-----------------------------|----|-----------|---|
| hemlock palustrine forest       | --                          | S3 | 8/19/2003 | E |
| sphagnum - beaked rush peatland | --                          | S3 | 8/19/2003 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

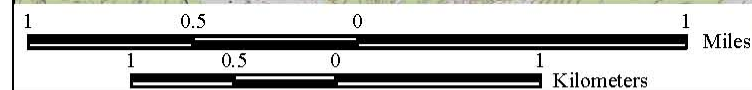
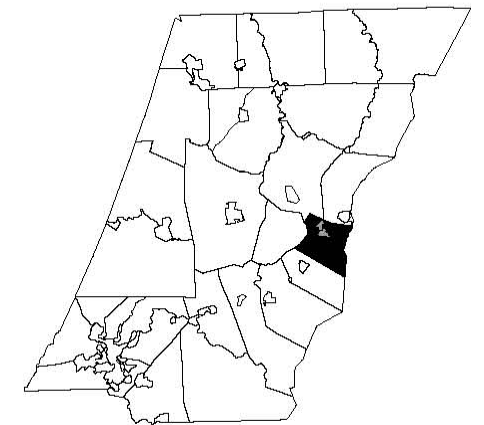
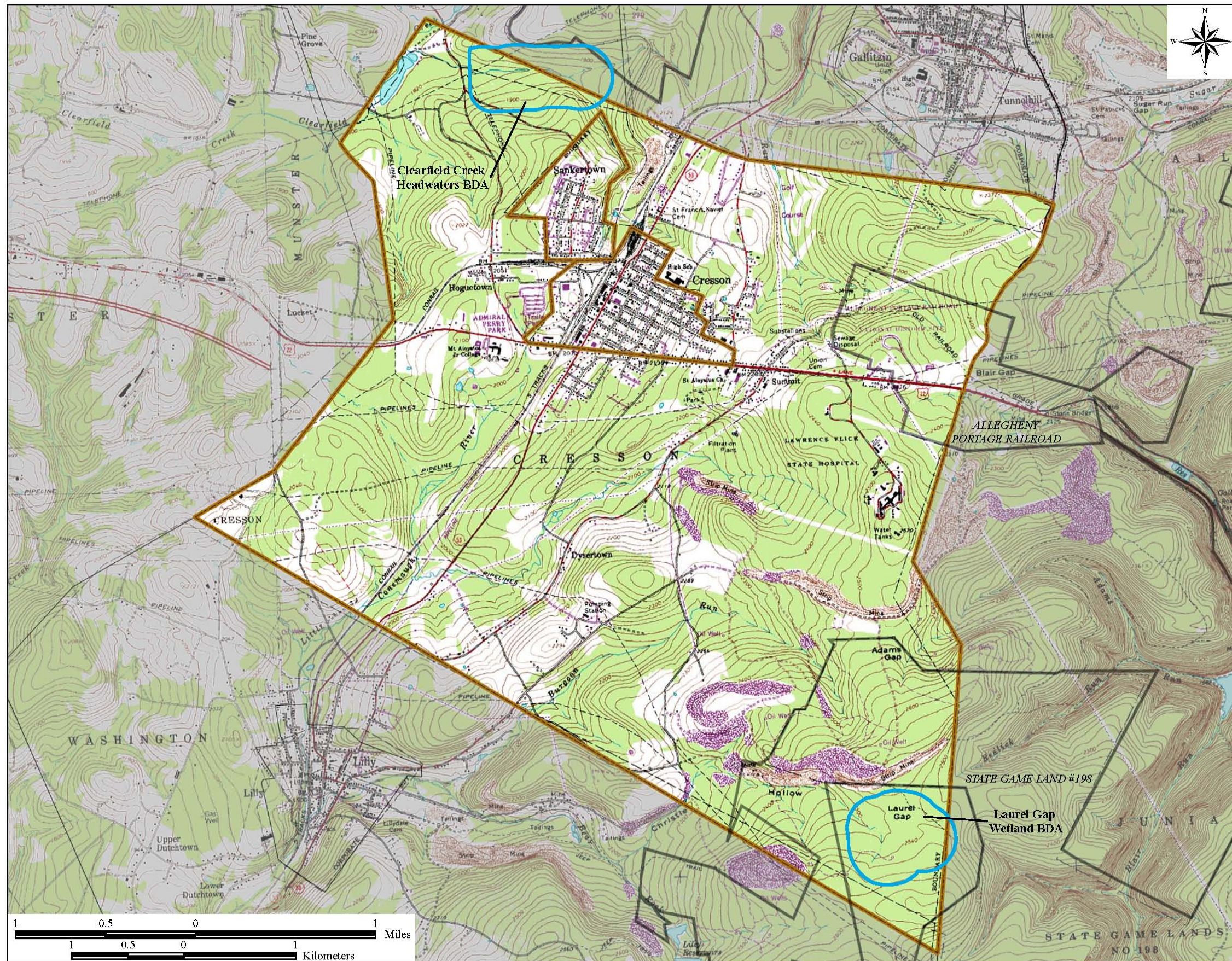
# Cresson Township, Cresson Borough, & Sankertown Borough


## Cambria County Natural Heritage Inventory Cresson Township & Borough, & Sankertown Borough



**Biological Diversity Areas:**  
Clearfield Creek Headwaters  
Laurel Gap Wetland

**Landscape Conservation Areas:**  
None

**Public Lands:**  
Allegheny Portage Railroad  
State Game Land #198



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## CRESSON TOWNSHIP

Cresson Township is situated at the summit of the Allegheny Front and includes a portion of its western slope. The majority of the township area is forested (81%), but the habitat value of the forest for many species is impaired by the prevalence of fragmenting features such as roads, including US Rt. 22 and old Rt. 22, urban areas, and strip mines. The township also includes a portion of the Eastern Continental Divide between the Ohio and Susquehanna River basins, which in this area is the watershed divide between Clearfield Creek to the north and tributaries to the Little Conemaugh River to the south. About half of the stream miles in the township have been assessed and found suitable for aquatic life by the PA-DEP, while half—one tributary to Clearfield Creek and one tributary to the Little Conemaugh River—were found to be impaired by acid mine drainage (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams. A good conservation objective for the township would be remediation of acid mine drainage pollution and conservation of native forested riparian buffers along streams, which already exist in many areas.

### Clearfield Creek Headwaters BDA

See description under Allegheny Township, pg. 47.

### Laurel Gap Wetland BDA

#### Description

This site is a wetland high on the Allegheny Front, in the headwaters of Redlick Run. The central part of the wetland is open, generally dominated by interrupted fern (*Osmunda claytonii*), but also including a few open herbaceous areas with saturated hydric soil and sphagnum canopy. Other herbaceous species and a few shrubs are rather sparsely interspersed, including screwstem (*Bartonia virginica*), silvery sedge (*Carex canescens*), northern awned sedge (*Carex gynandra*), poverty grass (*Danthonia compressa*), needle spikerush (*Eleocharis acicularis*), cottongrass (*Eriophorum virginicum*), black huckleberry (*Gaylussacia baccata*), common rush (*Juncus effusus*), a rush species (*Juncus* sp.), Virginia water horehound (*Lycopus virginicus*), small green wood orchid (*Platanthera clavellata*), prickly dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), and lowbush blueberry (*Vaccinium angustifolium*). Surrounding the open wetland is a palustrine forest, with upland and wetland species intermingled. Sphagnum patches, likely saturated in the wet seasons, are interspersed with very slightly higher areas where there are pink lady's slippers (*Cypripedium acaule*), clubmosses (*Lycopodium hickeyi*, *Lycopodium obscurum*, *Lycopodium digitatum*), bracken fern (*Pteridium aquilinum*), New York fern (*Thelypteris noveboracensis*), starflower (*Trientalis borealis*), interrupted fern, and lowbush blueberry (*Vaccinium angustifolium*). There is a moderately dense shrub cover of mountain laurel (*Kalmia latifolia*) and witch hazel (*Hamamelis virginiana*). The tree canopy includes red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), sassiffrass (*Sassiffrass albidum*), and eastern hemlock (*Tsuga canadensis*).

#### Threats and Stresses

As this wetland occurs in a broad depression fed by surface runoff from surrounding areas and is currently forested, any substantial forest canopy thinning or removal in the vicinity is likely to dramatically alter the hydrological regime. A forest canopy maintains cool temperatures at the surface, while also influencing the water balance through tree uptake and transpiration. When deforested, such areas tend to transition from a relatively stable condition of saturation all year round to a regime of

flooding in the spring and drought in the summer, which in turn alters the habitat value for plant and animal species.

Another potential threat is surface mining in the watershed, which may directly damage the wetland or result in mine drainage polluting the wetland.

### Recommendations

It is recommended that surveys be conducted to document amphibians and insects at this wetland, as these taxa likely contribute a substantial portion of the site's biodiversity. Survey information will provide baseline information for management decisions. Forest canopy removal should be avoided within 250 meters of the wetland areas, in order to maintain a natural hydrological regime and quality habitat for amphibians, some species of which depend both on the wetland and the surrounding forest areas (Semlitsch and Bodie 2003).

## **CRESSON BOROUGH**

The landscape of Cresson Borough is largely residential and urban. No Natural Heritage Areas have been identified within the borough boundaries. Conservation priorities for the borough would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of nearby waterways. The borough falls across the Eastern Continental Divide, with most of the land draining south into tributaries of the Little Conemaugh River and eventually the Ohio River.

## **SANKERTOWN BOROUGH**

The landscape of Sankertown Borough is largely residential and urban. No Natural Heritage Areas have been identified within the borough boundaries. Conservation priorities for the borough would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of nearby waterways. The borough falls across the Eastern Continental Divide, with most of the land draining north into tributaries of Clearfield Creek and eventually the Susquehanna River.



Laurel Gap Wetland BDA (*above & below*)



The open area of this wetland is dominated by sphagnum moss and tussocks of interrupted fern (foreground & center background); the white-tufted seedheads of cottongrass are also visible in the photo.

# Croyle Township, Ehrenfeld Borough, South Fork Borough, Summerhill Borough

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

*NATURAL HERITAGE AREAS:*

| New Germany Hemlock Grove BDA                  | <i>County Significance</i> |    |  |  |      |   |
|--|----------------------------|----|--|--|------|---|
| hemlock (white pine) -northern hardwood forest | --                         | -- |  |  | 2005 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Croyle Township Ehrenfeld Borough, South Fork Borough, & Summerhill Borough

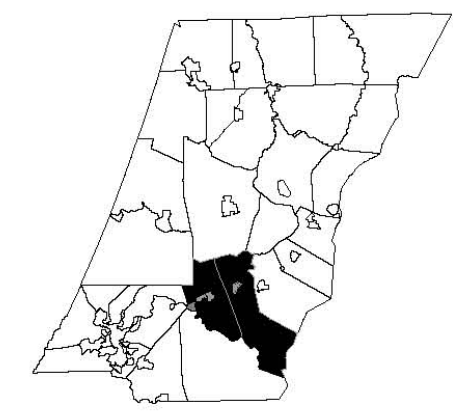
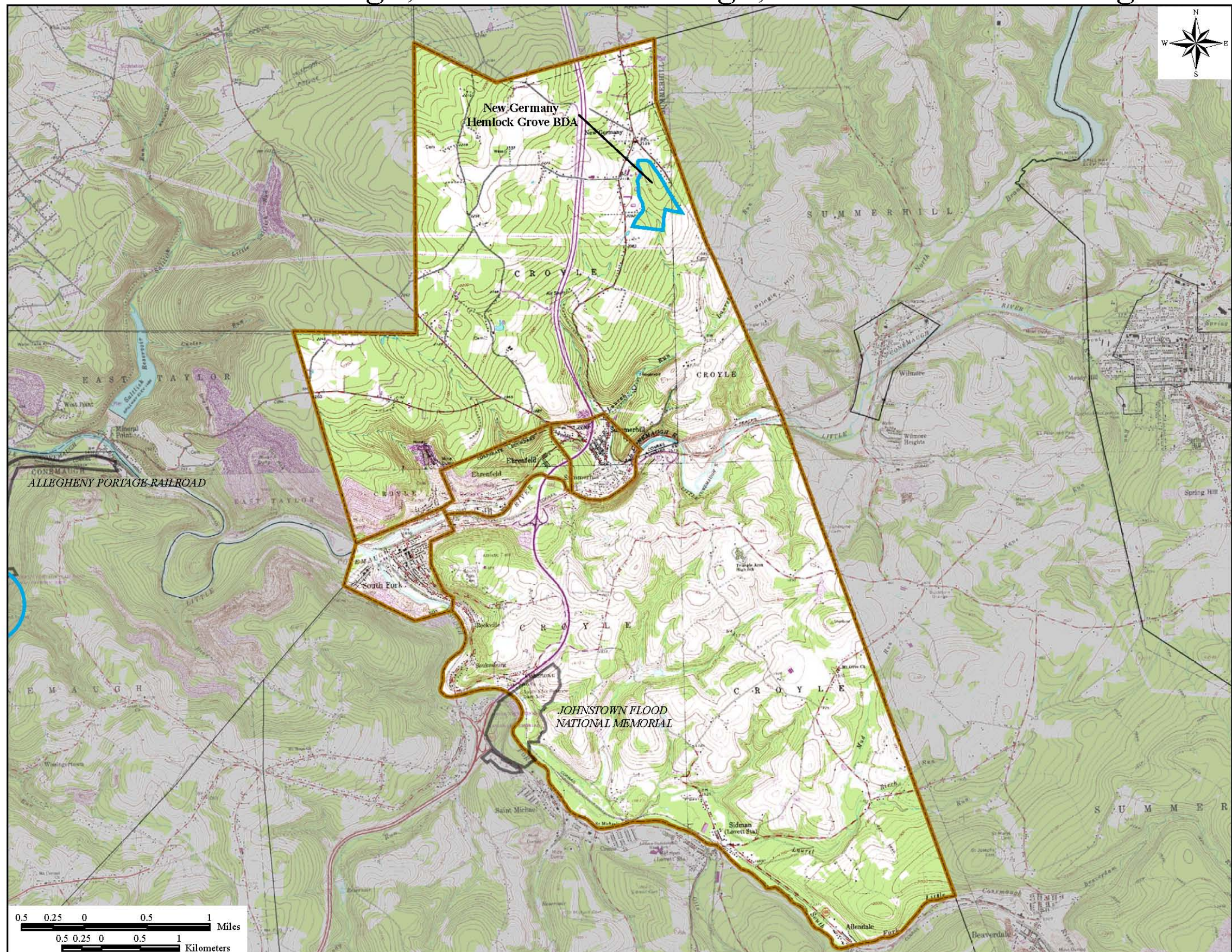
## Cambria County Natural Heritage Inventory

### Croyle Township, Ehrenfeld Borough, South Fork Borough, Summerhill Borough

**Biological Diversity Areas:**  
New Germany Hemlock Grove

**Landscape Conservation Areas:**  
None

**Public Lands:**  
Johnstown Flood National Memorial



### Legend

- Municipality Boundary
- PUBLIC LAND
- Trail**
- Complete
- Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
- Supporting Landscape
- Core Habitat

## **CROYLE TOWNSHIP**

Croyle Township includes two major watershed divides. One divide is between the South Fork Conemaugh River, which forms the township's southern boundary, and the Little Conemaugh River, which cuts through the center of the township. At its northern edge, the township meets the Eastern Continental Divide between the Susquehanna and the Ohio River basins. While about 65% of the township is forested, the forested areas are fragmented by roads, powerline right-of-ways, and non-forest land uses, such that there is no interior forest habitat of sufficient size to be useful to most wildlife species requiring such habitat. The forests can provide habitat for generalist species and for species which prefer edges, however.

All of the stream reaches of Croyle Township have been assessed by the PA-DEP to determine if they support aquatic life. The South Fork Conemaugh River and the Little Conemaugh River are both classified as impaired for aquatic life because of acid mine drainage pollution. However, their tributaries are classified as suitable for aquatic life (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities in Croyle Township would be the remediation of acid mine drainage pollution and development of a network of riparian buffers along waterways. In many areas riparian buffers of native forest already exist along the township's streams; water quality and habitat value will be further enhanced by filling gaps to make these areas contiguous, and by widening buffers where necessary to at least 110 m, a width which provides habitat for many wildlife species (Harding et al. 1998, Maryland DNR 2005, Palone and Todd 1998).

### **New Germany Hemlock Grove BDA**

#### Description

This site includes a small fragment of forest with very mature hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*), and sugar maple (*Acer saccharum*) trees. The area is surrounded by cleared land in agricultural use or pasture. The stand is an interesting example of very mature forest. It may offer some of the habitat values of old-growth forest, such as tree cavities, but many species that depend on old growth conditions require a much larger area to support a viable population.

#### Threats and Stresses

Logging would remove the unique feature of this site: its large trees.

#### Recommendations

Logging should be avoided in this area. Enhancing the contiguity and health of surrounding forested areas will create a larger matrix of forest, improving the habitat value of this stand for forest specialists.

## **EHRENFELD BOROUGH, SOUTH FORK BOROUGH, & SUMMERHILL BOROUGH**

The landscape of these adjacent boroughs is mainly residential and urban. No Natural Heritage Areas have been identified within their boundaries. Good conservation objectives for the boroughs would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of the Little Conemaugh River.

## Dean Township & Ashville Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

### NATURAL HERITAGE AREAS:

| Clearfield Creek Floodplain BDA  |    |    | County Significance |  |      |   |
|----------------------------------|----|----|---------------------|--|------|---|
| floodplain forest (unclassified) | -- | -- |                     |  | 2003 | E |

| Clearfield Creek Pools BDA                              |    |      | Exceptional Significance |  |           |   |
|---|----|------|--------------------------|--|-----------|---|
| northeastern bulrush ( <i>Scirpus ancistrochaetus</i> ) | G3 | S3   |                          |  | 8/21/2003 | E |
| herbaceous vernal pond                                  | -- | S3S4 |                          |  | 8/21/2003 | E |
| wet meadow  | -- | S5   |                          |  | 8/21/2003 | E |

| Tubb Run Headwaters Wetland BDA               |    |    | High Significance |  |           |   |
|---|----|----|-------------------|--|-----------|---|
| special animal ( <i>Special animal 1</i> )    | G5 | S2 |                   |  | 8/13/2003 | B |
| special animal ( <i>Special animal 2</i> )    | G4 | S3 |                   |  | 8/13/2003 | B |
| headwaters wetland communities (unclassified) | -- | -- |                   |  | 2003      | E |

| Allegheny Front #4 LCA |  |  | Exceptional Significance |  |  |  |
|------------------------|--|--|--------------------------|--|--|--|
|------------------------|--|--|--------------------------|--|--|--|

OTHER CONSERVATION AREAS: none

GEOLOGIC FEATURES: none

# Dean Township & Ashville Borough

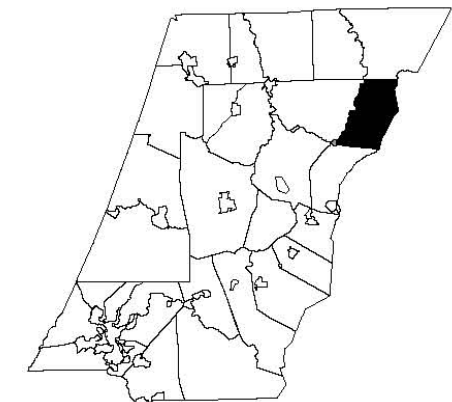
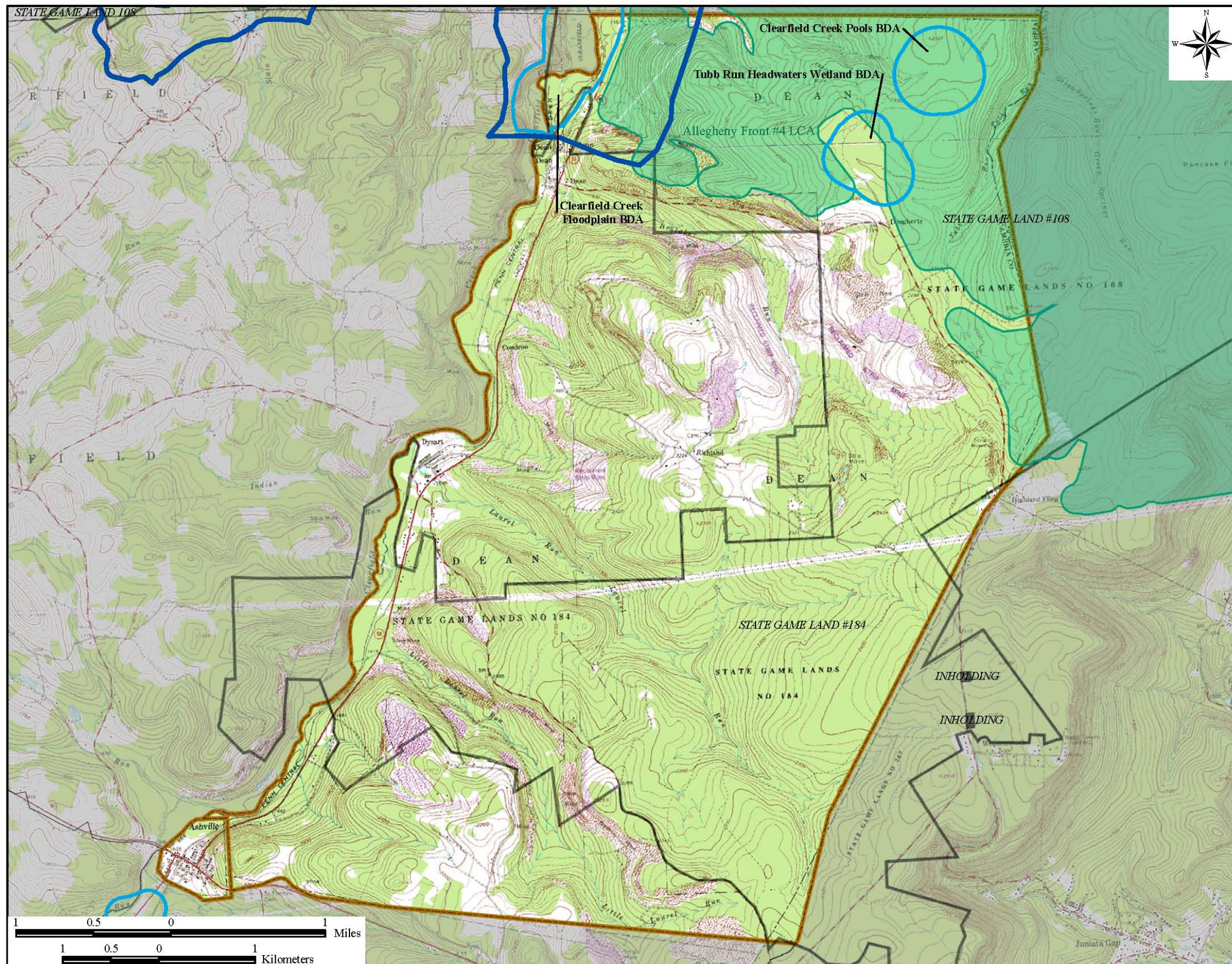
## Cambria County Natural Heritage Inventory


### Dean Township & Ashville Borough








**Biological Diversity Areas:**  
 Clearfield Creek Floodplain  
 Clearfield Creek Pools  
 Tubb Run Headwaters Wetland

**Landscape Conservation Areas:**  
 Allegheny Front #4

**Public Lands:**  
 State Game Lands #108 & #184



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
-  Complete
-  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
-  Supporting Landscape
-  Core Habitat

## DEAN TOWNSHIP

Dean Township is situated along the western slope of the Allegheny Front. Clearfield Creek forms the western boundary of the township. Along the creek valley are the towns of Dean and Dysart, and along the slope of the Allegheny Front there is very little settlement or development, but extensive strip mining. Although almost 20% of the land in the township has been strip mined, those areas which have not been mined are forested, and offer interior forest habitat conditions because there are few fragmenting features. The northern end of the township forms part of a large block of contiguous forest that has been recognized as Allegheny Front LCA #4 (see pg. 30 for more information), and also includes two wetland habitats that have been recognized as Biological Diversity Areas. The central portion of the township, inside State Game Lands #184, also forms a substantial area of contiguous forest. At 2,500 acres, this forest block is large enough to potentially support successful breeding of some of the species which require interior forest habitat, and even large enough to support a viable population of the Black-and-white Warbler (*Mniotilta varia*), an indicator species that requires interior forest habitat (Anderson & Vickeray in press).

Dean Township includes several tributaries that flow west off the Allegheny Front into Clearfield Creek: Brubaker Run, Laurel Run, Little Laurel Run, and several smaller unnamed streams. The water quality and ecological condition of many of these streams has been heavily impacted by the extensive mining in the township. Little Laurel Run, Brubaker Run, the small tributary immediately to the south of Brubaker Run, and the northernmost unnamed tributary in the township have all been classified as impaired for aquatic life due to mine drainage pollution by the PA-DEP (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for Dean Township would be ecological forest management to preserve the health and contiguity of the forested areas, remediation of acid mine drainage pollution of the township's waterways, and reclamation of strip mined lands to support native forest.

### Clearfield Creek Floodplain BDA

Please see description under White Township, pg. 124.

### Clearfield Creek Pools BDA

#### Description

This broad saddle of flat land between the valleys of a tributary to Bell's Gap Run and a tributary to Clearfield Creek contains diffuse wetlands at either end, just above where the stream channels coalesce, and a series of vernal pools between these diffuse wetlands. The vernal pools are a unique natural community type considered to be of conservation value in Pennsylvania; they also host a population of the northeastern bulrush (*Scirpus ancistrochaetus*), which is one of the two plant species listed under the Federal Endangered Species Act that are found in western Pennsylvania. See fact sheet, pg. 171, for more information on this species.

Vernal pools provide unique habitat conditions because the water levels fluctuate seasonally, sometimes drying up completely. Because the pools do not have fish, many species of animal can survive there that would be preyed upon by fish in other aquatic habitats— including amphibian larvae, fairy shrimp, and a

variety of invertebrate species. No amphibians were documented breeding in these pools. Because the habitat appears ideal for amphibians, it should be determined whether the pools are exceptionally acidic; such conditions can develop over time from acid rain in poorly buffered soils. Typical species that use vernal pools include Jefferson, spotted, and marbled salamanders. These species lay their eggs in vernal pools in early spring, then migrate to burrows in the surrounding forest. They may migrate up to 400 m. The eggs hatch into larvae, which live in the pools until they metamorphose into the adult form. They depend exclusively upon vernal pools for breeding habitat, and an individual will return year after year to the same pool to breed.

The vernal pools at this site typically have patches of herbaceous emergent vegetation, and the larger pools also have shrub growth in their centers. Herbaceous species include the northeastern bulrush, regal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*Osmunda claytonii*), sphagnum and polytrichum mosses, northern awned sedge (*Carex gynandra*), prickly dewberry (*Rubus hispidus*), and woolgrass (*Scirpus cyperinus*). The dominant shrub species is winterberry (*Ilex verticillata*), although southern arrowwood (*Viburnum dentatum* var. *lucidum*) is also present. Forest canopy throughout the pool and wetland area is patchy, interrupted by wetlands and also sparse due to past logging and road construction. The more diffuse wetland areas have variable degrees of tree canopy, and a mixture of upland and wetland herbaceous species—cinnamon fern, lowbush blueberry (*Vaccinium angustifolium*), needle-and-thread grass (*Brachyelytrum erectum*), New York fern (*Thelypteris noveboracensis*), sphagnum moss, hay scented fern (*Dennstaedtia punctilobula*), and northern awned sedge—were dominant.

*Supporting Natural Landscape:* No Supporting Natural Landscape area was designated, given that all of the watershed of the wetland is captured within the Core Habitat Area.

### Threats and Stresses

The lack of amphibian eggs in an early spring survey raises concern about the condition of the habitat. It is possible for vernal pools in this setting to become highly acidic from buildup of acid rain and decomposition products, because the surrounding bedrock is acidic and offers no mineral buffering capacity against acid inputs. Many species of amphibian cannot breed successfully in highly acidic water.

The northeastern bulrush appears to depend upon seasonal fluctuations in water level. Removal of timber, or other earth disturbances that alter the natural hydrological regime, may alter the habitat such that the bulrush cannot survive.

### Recommendations

The acidity of the pools should be investigated. In order to preserve natural hydrological conditions, timbering and earth disturbances such as road construction and other construction projects should be avoided within 400 meters of the ponds and wetland areas.

## **Tubb Run Headwaters Wetland BDA**

### Description

*Core Habitat Area:* This site is an extensive wetland complex in the broad, flat area at the headwaters of Tubb Run, high on the Allegheny Front. The wetland has active beaver dams, which have impounded part of the area in open water. Adjacent to the ponded areas are zones of emergent vegetation and wet

meadow. Most of the wetland area, however, is an herbaceous mosaic dominated by sphagnum and sedge species, with ~10-20% shrub cover. The shrubs include winterberry (*Ilex verticillata*), chokeberry (*Photinia* sp.), a willow species (*Salix* sp.), lowbush blueberry (*Vaccinium angustifolium*), southern arrowwood (*Viburnum dentatum* var. *lucidum*), and withe-rod (*Viburnum nudum* var. *cassinoides*). This area also shows evidence of recent transition from a less saturated condition, with scattered upland trees still persisting on occasional high hummocks. Surrounding the open wetland is a zone of palustrine forest that contains both upland and wetland species, and that is likely seasonally flooded early in the year. The Core Habitat Area includes the open wetland as well as a forested buffer surrounding the wetland that may be utilized by amphibian species breeding in the wetland.

Herbaceous species of the wetland include: bristly dewberry (*Rubus hispidus*), nodding sedge (*Carex gynandra*), rice cutgrass (*Leersia oryzoides*), northern long sedge (*Carex folliculata*), bearded shorthusk (*Brachyelytrum erectum*), polytrichum moss (*Polytrichum* sp.), arrowleaf tearthumb (*Polygonum sagittatum*), common rush (*Juncus effusus*), flat-top goldentop (*Euthamia graminifolia*), woolgrass (*Scirpus cyperinus*), brownish sedge (*Carex brunnescens*), a bentgrass species (*Agrostis* sp.), wrinkle-leaf goldenrod (*Solidago rugosa*), black huckleberry (*Gaylussacia baccata*), sensitive fern (*Onoclea sensibilis*), tawny cottongrass (*Eriophorum virginicum*), bog fern (*Thelypteris simulata*), northern bugleweed (*Lycopus uniflorus*), quaking aspen (*Populus tremuloides*), needle spikerush (*Eleocharis acicularis*), leafy bulrush (*Scirpus polyphyllus*), northern red oak (*Quercus rubra*), parasol whitetop (*Doellingeria umbellata*), cucumber-tree (*Magnolia acuminata*), bear oak (*Quercus ilicifolia*), Blue Ridge blueberry (*Vaccinium pallidum*), yellow birch (*Betula alleghaniensis*), small green wood orchid (*Platanthera clavellata*), yellow screwstem (*Bartonia virginica*), whorled wood aster (*Oclemena acuminata*), and broadleaf cattail (*Typha latifolia*).

*Supporting Natural Landscape:* no Supporting Natural Landscape area was designated, given that all of the watershed of the wetland is captured within the Core Habitat Area.

### Threats and Stresses

The amphibian species for which this wetland may provide appropriate breeding habitat can 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 and other direct disturbances to the structure of the forest floor may also degrade the habitat for amphibians.

Release of chemical pollutants in the watershed of the wetland will likely result in pollution of the wetland. Chemical pollutants that are harmful to aquatic life and ecological health include petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc..

### 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 surrounding the wetland that amphibians may occupy, it is recommended that a full forest canopy be maintained and disturbances to the forest floor avoided within 290 meters of the wetland edges in order to prevent degradation of amphibian habitat.

Water quality impacts should be considered for any activities taking place in the watershed of this wetland: any use of ecologically detrimental pollutants (pesticides, herbicides, automotive chemicals, solvents, fertilizer or other nutrient sources) should be carefully controlled to avoid release into the environment, 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 their 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.

## **ASHVILLE BOROUGH**

The landscape of Ashville Borough is mainly residential and urban. No Natural Heritage Areas have been identified within its boundaries. Good conservation objectives for the borough would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of Clearfield Creek.

*Clearfield Creek Pools BDA*



*Above, right:* Vernal pool (mostly dry in summer) with northeastern bulrush (center).

*Above:* fruiting stalk of northeastern bulrush, with characteristic droopy branches.

*Below, left:* Northeastern bulrush growing in vernal pool



*Above:* Spotted salamander, an obligate vernal pool breeder, peers out from a pond in early spring.

*Below:* spotted salamander eggs, left, and Jefferson salamander eggs, right, laid in a vernal pool. These salamanders are two species that may be found in vernal pools, and cannot survive without this habitat.



*Salamander photos courtesy of the Upper Susquehanna Coalition*

# East Carroll Township & Carrolltown Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

*NATURAL HERITAGE AREAS:*

| Chest Creek at Eckenrode Mills BDA |    | <i>High Significance</i> |  |           |   |
|------------------------------------|----|--------------------------|--|-----------|---|
| hemlock palustrine forest          | -- | S3                       |  | 7/17/2003 | E |
| wet meadow                         | -- | S5                       |  | 7/17/2003 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# East Carroll Township & Carrolltown Borough

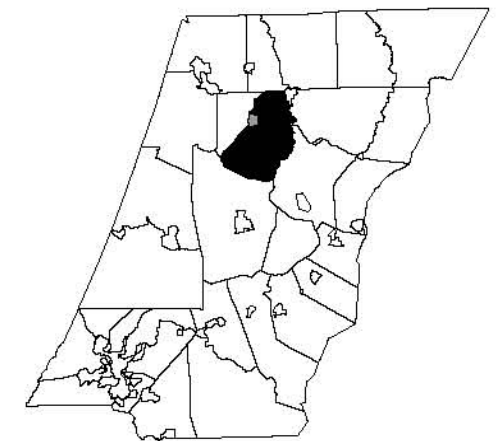
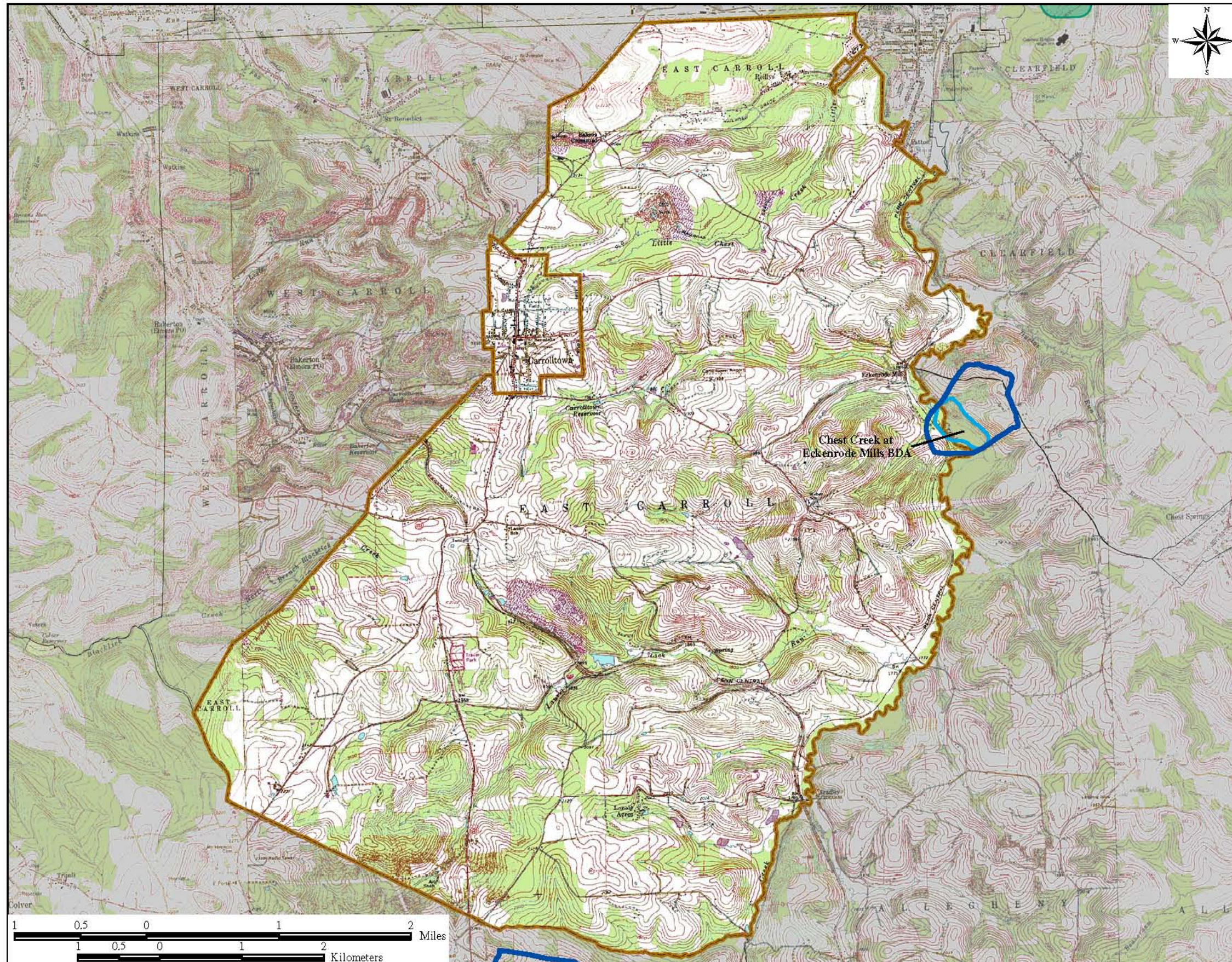
## Cambria County Natural Heritage Inventory

### East Carroll Township & Carrolltown Borough

**Biological Diversity Areas:**  
Chest Creek at Eckenrode Mills

**Landscape Conservation Areas:**  
None

**Public Lands:**  
None



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## **EAST CARROLL TOWNSHIP**

The landscape of East Carroll Township is primarily a mosaic of forest (~60%) and agricultural land (~40%), although it also includes some areas of residential development and strip mined land (~3%). Due to the scattered pattern of forest in the county, intermingled with other land uses, there are only very small areas of interior forest habitat, which most species that require such habitat cannot successfully utilize. The forested areas are most suitable for generalist species and edge species.

Most of the township's waterways are tributaries that flow east into Chest Creek, which forms the eastern boundary of the township. Chest Creek and its tributaries within the township have been evaluated by the DEP as suitable for aquatic life (PA-DEP 2006). The Eastern Continental Divide, between the Ohio River basin and the Susquehanna River basin, crosses the western-most edge of the township, with its tip draining into the North Branch Blacklick Creek. **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

No Natural Heritage Areas are within the boundaries of the township, although one Biological Diversity Area falls along its border. Good conservation priorities for East Carroll Township would be the establishment of a network of riparian buffers along the township's streams. Riparian buffers filter out pollutants to improve stream water quality, and also offer habitat to many wildlife species and plants. In many areas, some riparian buffer already exists. Establishing buffers in gaps between existing forest corridors, and widening buffers where necessary to at least 110 m, will enhance the ecological health, scenic beauty, and water quality of the township's streams (Harding et al. 1998, Maryland DNR 2005, Palone and Todd 1998).

### **Chest Creek at Eckenrode Mills BDA**

See description under Allegheny Township, pg. 45.

## **CARROLLTOWN BOROUGH**

The landscape of Carrolltown Borough is mainly residential and urban. The borough is situated along the watershed divide between Chest Creek and the West Branch Susquehanna River, although most of the borough land drains into tributaries to Chest Creek. No Natural Heritage Areas have been identified within its boundaries. There is a stormwater management problem in the borough; the Conservation District interim report for stormwater problem assessment provides more information.

Good conservation objectives for the borough would be the management of runoff from roads, sewage systems, and stormwater drainage to minimize chemical, sediment, and nutrient pollution of the streams downslope to the east and west.

# Elder Township & Hastings Borough

---

---

|                                  | <u>PNDI Rank</u> |       | <u>Legal Status</u> |       | Last Seen | Quality |
|----------------------------------|------------------|-------|---------------------|-------|-----------|---------|
|                                  | Global           | State | Federal             | State |           |         |
| <i>NATURAL HERITAGE AREAS:</i>   |                  |       |                     |       |           | none    |
| <i>OTHER CONSERVATION AREAS:</i> |                  |       |                     |       |           | none    |
| <i>GEOLOGIC FEATURES:</i>        |                  |       |                     |       |           | none    |

# Elder Township & Hastings Borough

## Cambria County Natural Heritage Inventory

### Elder Township & Hastings Borough

#### Biological Diversity Areas:

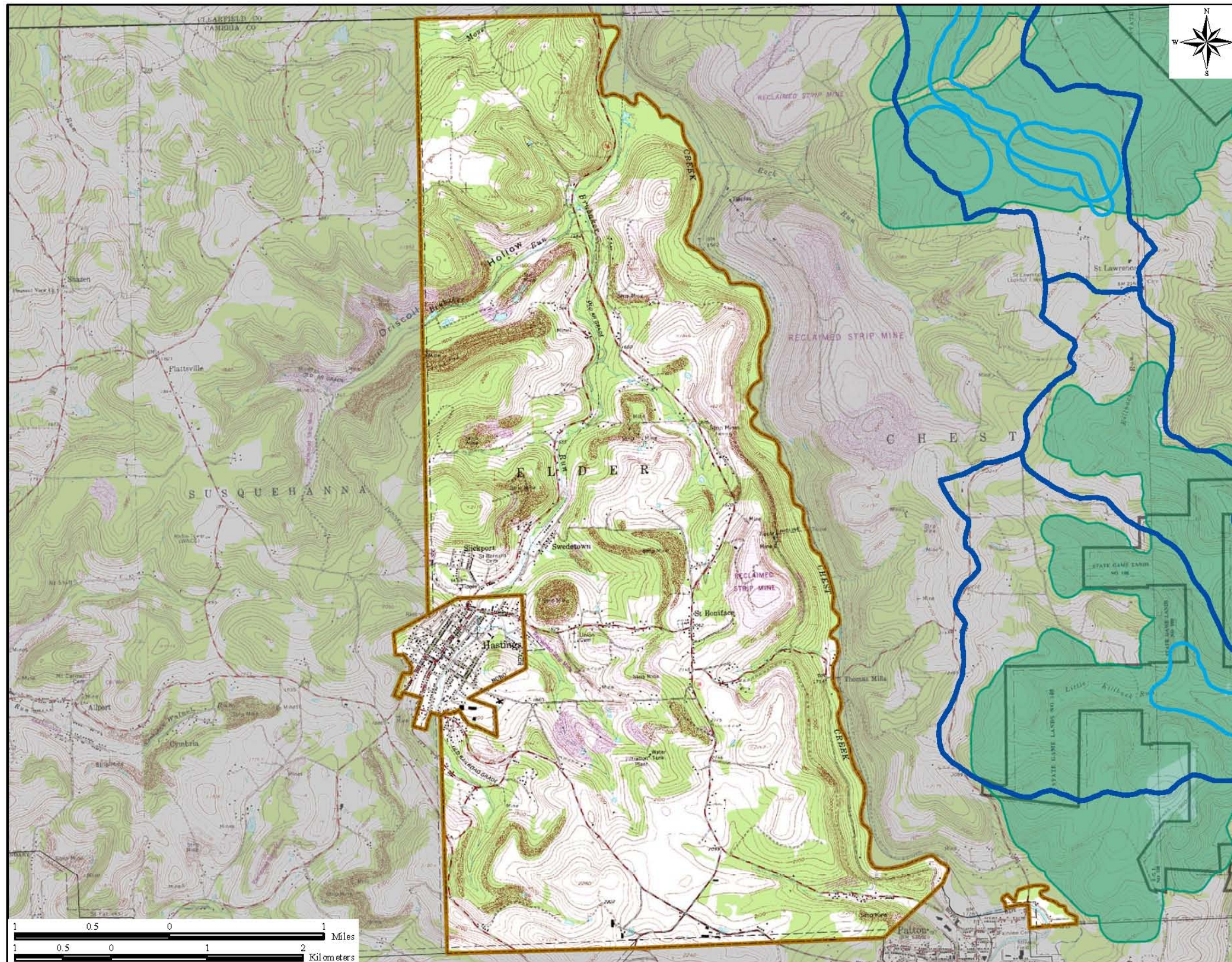
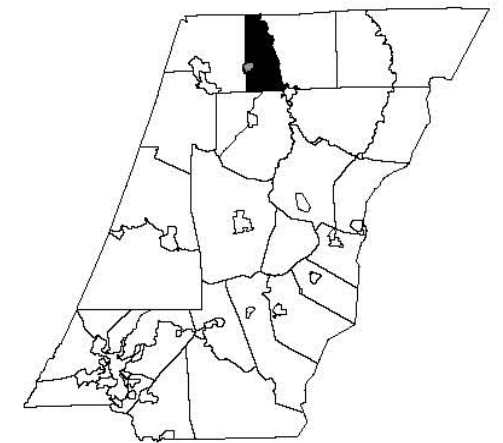
None

#### Landscape Conservation Areas:

None








#### Public Lands:

None



#### Legend



-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## **ELDER TOWNSHIP**

Elder Township falls within the watershed of Chest Creek, which forms its eastern boundary. The township does not currently have any extensive areas of intact natural landscape. Over 20% of the township's land area has been strip mined, while ~45% is forested, and ~30% is in agricultural or residential use. The most contiguous forest area is a narrow band of forest along the slope on the west bank of Chest Creek. The two streams within the township, Little Brubaker Run and Brubaker Run, are classified as impaired for aquatic life due to acid mine drainage pollution, according to the PA-DEP (PA-DEP 2006). Chest Creek, which forms the eastern border of the township, is not classified as impaired, although below the confluences with Brubaker Run and Rock Run it receives the pollution load of those impaired streams. **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

No Natural Heritage Areas were identified within the township boundaries. Good conservation priorities for the ecological health of the township would be remediation of acid mine drainage pollution to improve the water quality and ecological health of the township's streams, and restoration of mined areas to support agriculture or native forests.

## **HASTINGS BOROUGH**

The landscape of Hastings Borough is predominantly urban and residential; no Natural Heritage Areas were identified within the borough boundaries. The primary issue related to ecological health for the borough is appropriate management of stormwater and sewage to minimize impacts to area waterways.

# Gallitzin Township, Gallitzin Borough, & Tunnelhill Borough

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

*NATURAL HERITAGE AREAS:*

| Clearfield Creek at Amsbry BDA                          | <i>Notable Significance</i> |    |           |   |
|---|-----------------------------|----|-----------|---|
| Appalachian blue violet ( <i>Viola appalachiensis</i> ) | G3                          | S2 | 5/21/1987 | E |

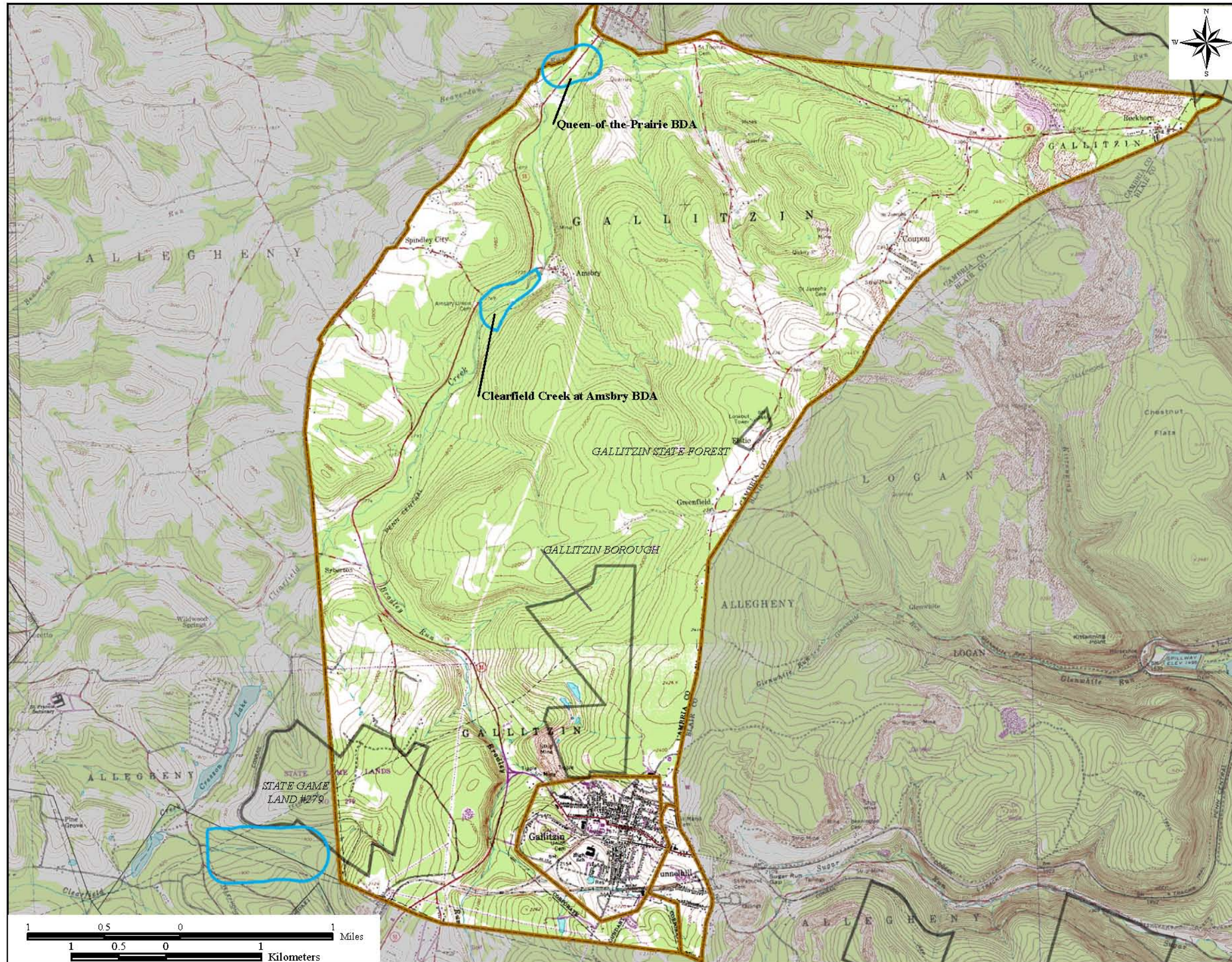
| Queen-of-the-Prairie BDA                          | <i>Notable Significance</i> |      |           |   |
|---|-----------------------------|------|-----------|---|
| queen-of-the-prairie ( <i>Filipendula rubra</i> ) | G4G5                        | S1S2 | 7/10/1996 | C |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Gallitzin Township, Gallitzin Borough, & Tunnelhill Borough

## Cambria County Natural Heritage Inventory Gallitzin Township & Borough, & Tunnelhill Borough



### Biological Diversity Areas:

- Clearfield Creek at Amsbry
- Queen-of-the-Prairie

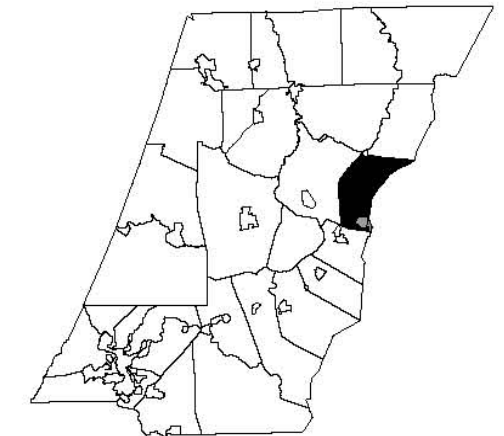
### Landscape Conservation Areas:

None

### Public Lands:

- Gallitzin State Forest
- State Game Land #279
- Gallitzin Borough\*

\*Note: water authority boundaries are approximate, intended for visual reference only



### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## GALLITZIN TOWNSHIP

Gallitzin Township is situated along the western slope of the Allegheny Front. A large extent (~90%) of the township is forested. Much of this forest is highly contiguous, as developments and other uses are situated around the edges of the township, leaving large blocks of forest intact in the center of the township. Two large blocks of contiguous forest, one of ~900 acres and one of ~2,400 acres, are separated by a utility right-of-way. These areas are ecologically important because they provide interior forest habitat that may be suitable for forest-dependent species, which include many of the neotropical migrant songbirds. While much forest cover remains in Pennsylvania, interior forest habitat of significant size is unusual because most of the forested areas are fragmented by roads, right-of-ways, and other land uses (Goodrich et al. 2003).

The major waterway that flows through Gallitzin Township is Clearfield Creek. Clearfield Creek and its tributary Bradley Run are both classified as impaired for aquatic life by the PA-DEP due to acid mine drainage pollution (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for the township would be stewardship of the two Biological Diversity Areas; ecological forest management to maintain and improve the health and contiguity of the forested areas in the center of the township; and improvement of water quality in the township's streams through remediation of acid mine drainage and establishment of riparian buffers where they do not already exist.

### Queen-of-the-Prairie BDA

#### Description

This site is designated around a population of queen-of-the-prairie (*Filipendula rubra*), a plant species of special concern in PA. Queen-of-the-prairie is a tall plant (5–8 ft) with large sprays of small pink flowers in July and August. It is believed that this species' native range extends from the Midwest to include Pennsylvania. However, it has occasionally been distributed as a garden cultivar. Cultivated populations of plant species of special concern are not considered conservation priorities by the Pennsylvania Natural Heritage Program, because cultivars may be genetically distinct from native stock due to distant geographic origin or to selective breeding for ornamental value. Often, populations which developed from garden cultivation can be distinguished from naturally occurring populations by determining whether the habitat where the plants occur is similar to the natural habitat. However, in Pennsylvania the queen-of-the-prairie may naturally occupy disturbed areas, which complicates this assessment. The native habitat in Pennsylvania has not been rigorously assessed, but in other states the species occupies wet prairie sites, sometimes calcareous. In Pennsylvania, the analogous habitat may be wet patches in disturbed areas. Thus, it is difficult to determine whether this population may have naturally colonized this right-of-way because it offers open, wet conditions, or whether it escaped from cultivation in a nearby garden.

#### Threats and Stresses

The species likely favors high light levels, and may be threatened by regrowth of woody vegetation creating shade over it. It can likely tolerate some disturbance, but herbicide application, total vegetation removal, or complete mowing of the area would damage and possibly eliminate the population.

### Recommendations

Some mowing or trimming at this site to prevent woody species from developing a canopy above the queen-of-the-prairie may help maintain this population. Total vegetation removal (mowing, herbicides, clearing) should be avoided.

## **Clearfield Creek at Amsbry BDA**

### Description

This site is a forested floodplain along Clearfield Creek where the Appalachian violet (*Viola appalachiensis*) has been observed to grow. The Appalachian violet is a species of global concern because its geographic distribution is limited to the southern Appalachian mountains. See fact sheet on page 170 for more information on this species.

### Threats and Stresses

This species may be somewhat tolerant of disturbance in its habitat, as it has been observed growing along edges and in disturbed settings. However, disturbances directly impacting the plants would still pose a threat.

### Recommendations

Some activity in the area, such as low-impact timber removal, or non-motorized recreational use, may be possible without harm to the Appalachian violet population. However, if vegetation will be disturbed or removed extensively, surveys for Appalachian violet plants should be incorporated into planning so that the specific locations for disturbance activities do not coincide with plant populations.

## **GALLITZIN BOROUGH & TUNNELHILL BOROUGH**

The landscape of Gallitzin and Tunnelhill Boroughs is predominantly urban and residential. No Natural Heritage Areas were identified within the borough boundaries. All of the borough land drains into Bradley Run, a tributary to Clearfield Creek. The primary issue related to ecological health for the boroughs is appropriate management of runoff from stormwater, sewage, and roads to minimize release of chemical, sediment, and nutrient pollution into waterways.



Queen-of-the-prairie (*Filipendula rubra*) in bloom



Appalachian violet (*Viola appalachiensis*)

# Jackson Township & Vintondale Borough

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

*NATURAL HERITAGE AREAS:*

|  |    |    |                             |  |           |   |
|--|----|----|-----------------------------|--|-----------|---|
| <b>Laurel Run BDA</b>                                |    |    | <i>Notable Significance</i> |  |           |   |
| tuliptree - beech - maple forest                     | -- | S4 |                             |  | 7/21/2004 | E |
| <b>South Branch Blacklick Creek Slope Forest BDA</b> |    |    | <i>Notable Significance</i> |  |           |   |
| hemlock (white pine) - northern hardwood forest      | -- | S5 |                             |  | 9/30/2004 | E |
| <b>Vintondale Bog BDA</b>                            |    |    | <i>County Significance</i>  |  |           |   |
| acidic shrub-herb wetland (unclassified)             | -- | -- |                             |  | 2004      | E |
| <b>Laurel Ridge LCA #1</b>                           |    |    | <i>High Significance</i>    |  |           |   |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Jackson Township & Vintondale Borough

## Cambria County Natural Heritage Inventory

### Jackson Township & Vintondale Borough

#### Biological Diversity Areas:

- Laurel Run
- South Branch Blacklick Creek Slope Forest
- Vintondale Bog

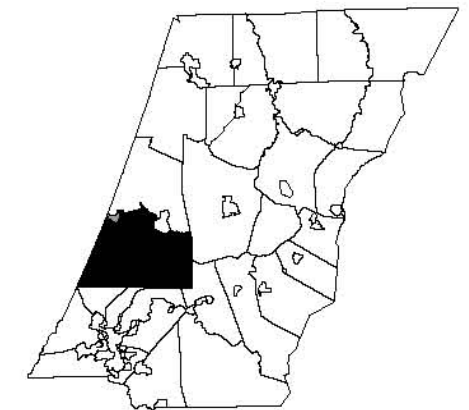
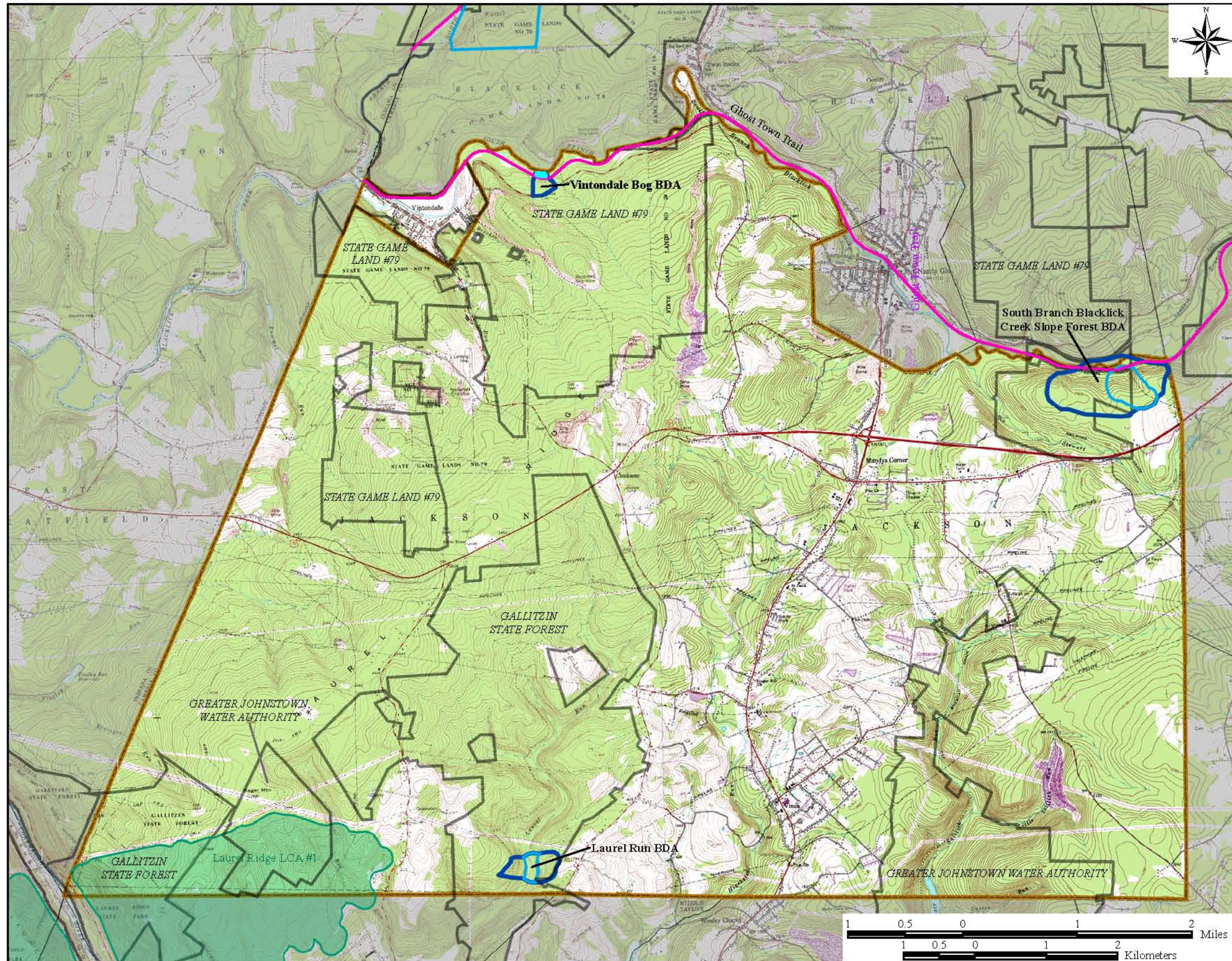
#### Landscape Conservation Areas:

- Laurel Ridge #1

#### Public Lands:

- Gallitzin State Forest
- State Game Land #79
- Greater Johnstown Water Authority:\*
- Saltlick Run & Rager Mountain

\* Note: water authority property boundaries are approximate, intended for visual reference only



#### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## JACKSON TOWNSHIP

Jackson Township is situated at the northern end of Laurel Ridge, part of the Allegheny Mountain range. The ridge is a distinct topographic feature of the township. The southern edge of the township is part of an extensive area of contiguous forest along the ridge, recognized as Laurel Ridge LCA # 1 (see pg. 32 for more information). Above this LCA, however, the forests of the ridge are fragmented by many utility right-of-ways, and do not offer interior forest habitat. About half of the township drains into the South Branch Blacklick Creek, which flows across the township in the north, while half drains into the Little Conemaugh River via several tributaries that flow south through deeply cut valleys. These are Laurel Run, Hinckston Run, and Saltlick Run, all of which are dammed at the base to create reservoirs used for drinking water. **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams. The Hinckston Run Valley is heavily developed for residential use. The Laurel Run and Saltlick Run Valleys are still largely forested, but fragmented by many utility right-of-ways. The ecological value of these stream valleys could be enhanced by minimizing the impacts of these fragmenting features, through consolidation of the right-of-ways into a single corridor, ideally coinciding with an existing transportation corridor; and through maximization of forest canopy and native vegetation along the right-of-ways. Many invasive plant species, including tree-of-heaven (*Ailanthus altissima*) and Japanese knotweed (*Polygonum sachalinense*), are establishing in these watersheds. Japanese knotweed is pervasive in this region, and has overwhelmed native vegetation in many areas. The spread of these invasives is greatly facilitated by the fragmenting features, which provide corridors of introduction and increase the area of habitat highly suitable for invasives by increasing forest edge. Stewarding the ecological health of the forests along these valleys will enhance their scenic value, as well help to safeguard the drinking water supplies they provide.

Good conservation priorities for the township would be remediation of acid mine drainage problems; remediation of mine waste areas; and enhancement of forest contiguity along Laurel Ridge, Laurel Run, and Salt Lick Run.

### Laurel Run BDA

#### Description

*Core Habitat Area:* This is a steep ravine and floodplain area that hosts a plant species of special concern, the mountain bugbane (*Cimicifuga americana*), in a small but high quality example of a mature tuliptree - beech - maple forest community. For more information about the mountain bugbane, see species fact sheet on pg. 169. Tree species of the forest community include: sugar maple (*Acer saccharum*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), tuliptree (*Liriodendron tulipifera*), cucumber-tree (*Magnolia acuminata*), black cherry (*Prunus serotina*), American basswood (*Tilia americana*), and eastern hemlock (*Tsuga canadensis*). Herbaceous species included: bearded shorthusk (*Brachyelytrum erectum*), a sedge species (*Carex* sp.), intermediate woodfern (*Dryopteris intermedia*), fan clubmoss (*Lycopodium digitatum*), clubmoss (*Lycopodium obscurum*), Canada mayflower (*Maianthemum canadense*), Indian cucumber (*Medeola virginiana*), mountain woodsorrel (*Oxalis montana*), mayapple (*Podophyllum peltatum*), New York fern (*Thelypteris noveboracensis*), and roundleaf yellow violet (*Viola rotundifolia*).

*Supporting Natural Landscape:* These areas are steep slopes above the mountain bugbane habitat areas. The condition of the slopes above the habitat areas is important to the support of the habitat and the plants.

## Threats and Stresses

*Core Habitat Area:* The mountain bugbane may be threatened by collecting because it very closely resembles black cohosh (*Cimicifuga racemosa*), which is valued medicinally. It may also have particular microclimate requirements for temperature and moisture of soil and air.

*Supporting Natural Landscape:* Due to the steep slope, any earth excavation, substantial tree canopy removal, or other soil disturbances resulting in erosion will likely destabilize the slope and threaten the structure of the habitat beneath. Earth disturbance or canopy removal may also alter hydrological patterns that create the temperature and soil moisture conditions for the plant population.

## Recommendations

*Core Habitat Area.* To maintain the mountain bugbane and the habitat that supports it, the core area should receive no greater disturbance than occasional foot traffic.

*Supporting Natural Landscape:* Timbering, other forest canopy removal, and earth disturbances should be avoided in this area to maintain the stability and the microclimate conditions of the plant's habitat.



*Mountain bugbane population along Laurel Run*

## **South Branch Blacklick Creek Slope Forest BDA**

### Description

This site includes a small fragment of forest with very mature eastern hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*), and sugar maple (*Acer saccharum*) trees. The slope is very rocky; in many areas the substrate is organic matter and leaf litter that has formed a layer over large sandstone rocks. Water can be heard running under the rocks. The surrounding areas are forested, but have been more heavily timbered, and thus the remaining trees are not as large. The largest trees are extremely tall

and straight; smaller individuals are intermixed as well. The herbaceous layer is very sparse and has only a few species of vascular plants, although bryophyte (mosses and liverworts) diversity has not been assessed. The stand is an interesting example of very mature forest. It may offer some of the habitat values of old-growth forest, such as tree cavities, but many species that depend on old-growth conditions require a much larger area to support a viable population.

### Threats and Stresses

Logging would remove the unique feature of this site: its large trees. The two dominant species, eastern hemlock and American beech, are both vulnerable. The hemlock woolly adelgid is an insect pest that has decimated mature hemlocks further south; it is spreading north and has been documented in southern Pennsylvania. Beech is vulnerable to beech bark disease, a cankerous fungal infection that is spread by scale insects. Both the scale insect and the fungus are introduced species native to Europe. Some individuals are killed by the disease, while others (1 – 5%) are partially or fully resistant (Ohio DNR 2006).

### Recommendations

Logging should be avoided in this area. Enhancing the contiguity and health of surrounding forested areas will create a larger matrix of forest, increasing the habitat value of this stand to forest specialists. The beech and hemlock trees should be monitored for signs of woolly adelgid or beech bark disease. The beech scale excretes a white waxy covering while feeding on beech bark, which is quite visible during the spring and summer. The fungus produces reddish spores on the bark, which can be best seen in the autumn.

## **Vintondale Bog**

### Description

This BDA is a small wetland area that was likely created when the installation of a rail line impounded a low-lying area in the floodplain. It now hosts an assemblage of shrub and herb species typical of an acidic wetland. Shrubs include: steplebush (*Spiraea tomentosa*), southern arrowwood (*Viburnum recognitum*), common elderberry (*Sambucus nigra* ssp. *canadensis*), staghorn sumac (*Rhus typhina*), Allegheny blackberry (*Rubus allegheniensis*), and gray alder (*Alnus incana*), with saplings of cucumber-tree (*Magnolia acuminata*) and black cherry (*Prunus serotina*). Herbs include broadleaf cattail (*Typha latifolia*), field horsetail (*Equisetum arvense*), wrinkle-leaf goldenrod (*Solidago rugosa*), skunk cabbage (*Symplocarpus foetidus*), trumpetweed (*Eupatoriadelphus fistulosus*), cranberry (*Vaccinium macrocarpon*), nodding sedge (*Carex gynandra*), narrowpanicle rush (*Juncus brevicaudatus*), prickly bog sedge (*Carex atlantica*), common rush (*Juncus effusus*), New York ironweed (*Vernonia noveboracensis*), and shallow sedge (*Carex lurida*).

### Threats and Stresses

Forest canopy removal in the area surrounding the wetland will likely result in soil erosion and sediment pollution accumulating in the wetland. Any release of chemical pollutants in the watershed will likely drain into the wetland. Chemical pollutants harmful to aquatic life include: petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc.. There is some potential for trail maintenance activities or trail users to impact the wetland.

## Recommendations

Forest canopy removal should be avoided in the area surrounding the wetland, in order to preserve a natural buffer that filters pollutants. All activities in the area should be conducted with consideration of potential water quality impacts; release of chemical pollutants into the environment should be avoided. Trail and park maintenance should leave a buffer of natural vegetation intact surrounding the wetland, and should avoid chemical use within the watershed. The area should be monitored for signs of excessive foot traffic damaging vegetation so that if foot trails develop in the wetland area or close to it, they can be closed and re-routed elsewhere.

## **VINTONDALE BOROUGH**

The landscape of Vintondale Borough is primarily residential or urban, and also includes formerly mined areas. No Natural Heritage Areas have been identified within the borough. Good conservation priorities for the township are remediation of mine waste sites and mine drainage pollution.

*South Branch Blacklick Creek Slope Forest BDA*



*hemlock and beech trunks*



*beech tree framed by hemlocks*

## Johnstown Area

|  | PNDI Rank |       | Legal Status |       | Last Seen | Quality |
|--|-----------|-------|--------------|-------|-----------|---------|
|  | Global    | State | Federal      | State |           |         |

### NATURAL HERITAGE AREAS:

|                          |    |    |                          |  |      |   |
|--------------------------|----|----|--------------------------|--|------|---|
| Allwine Creek BDA        |    |    | <i>High Significance</i> |  |      |   |
| Exceptional Value stream | -- | -- |                          |  | 1997 | E |

|                          |    |    |                          |  |      |   |
|--------------------------|----|----|--------------------------|--|------|---|
| Ben's Creek BDA          |    |    | <i>High Significance</i> |  |      |   |
| Exceptional Value stream | -- | -- |                          |  | 1997 | E |

|                               |    |    |                            |  |           |   |
|-------------------------------|----|----|----------------------------|--|-----------|---|
| Sam's Run Slope BDA           |    |    | <i>County Significance</i> |  |           |   |
| sugar maple - basswood forest | -- | S4 |                            |  | 6/10/2004 | E |

|                                  |    |    |                          |  |      |   |
|----------------------------------|----|----|--------------------------|--|------|---|
| Mill Creek/Little Mill Creek BDA |    |    | <i>High Significance</i> |  |      |   |
| Exceptional Value stream         | -- | -- |                          |  | 1997 | E |

|   |    |         |                             |  |          |   |
|---|----|---------|-----------------------------|--|----------|---|
| Staple Bend BDA                                   |    |         | <i>Notable Significance</i> |  |          |   |
| northern myotis ( <i>Myotis septentrionalis</i> ) | G4 | S3B-S3N |                             |  | 2/3/1997 | E |

|                     |  |  |                          |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|
| Laurel Ridge LCA #1 |  |  | <i>High Significance</i> |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|

|                     |  |  |                          |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|
| Laurel Ridge LCA #2 |  |  | <i>High Significance</i> |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|

|                     |  |  |                          |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|
| Laurel Ridge LCA #3 |  |  | <i>High Significance</i> |  |  |  |
|---------------------|--|--|--------------------------|--|--|--|

|                     |  |  |                                 |  |  |  |
|---------------------|--|--|---------------------------------|--|--|--|
| Laurel Ridge LCA #4 |  |  | <i>Exceptional Significance</i> |  |  |  |
|---------------------|--|--|---------------------------------|--|--|--|

|                         |  |  |                                 |  |  |  |
|-------------------------|--|--|---------------------------------|--|--|--|
| State Game Land #42 LCA |  |  | <i>Exceptional Significance</i> |  |  |  |
|-------------------------|--|--|---------------------------------|--|--|--|

OTHER CONSERVATION AREAS: none

GEOLOGIC FEATURES: none

# Johnstown Area

## Cambria County Natural Heritage Inventory

### Johnstown Area

#### Biological Diversity Areas:

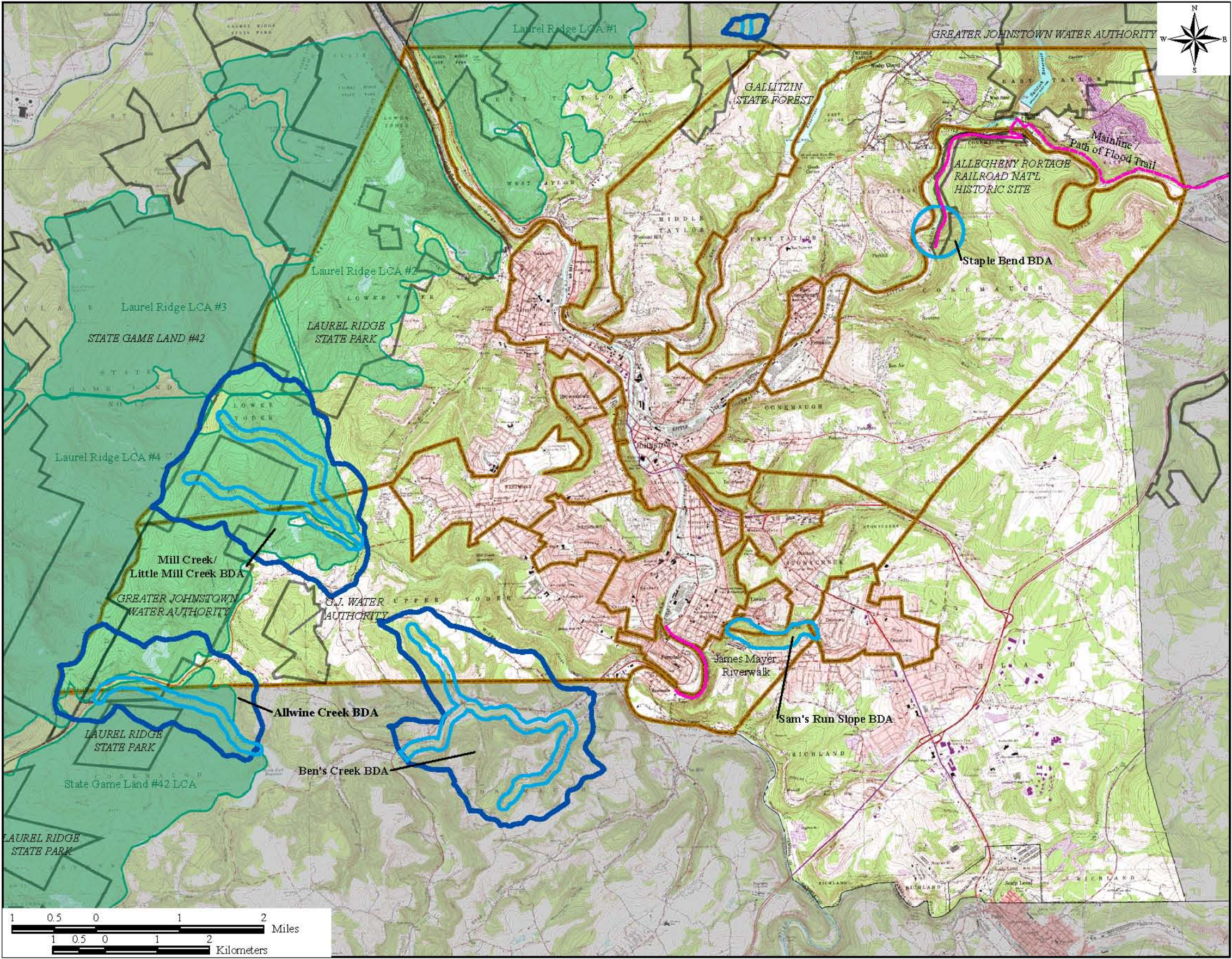
- Allwine Creek
- Ben's Creek
- Mill Creek/Little Mill Creek
- Sam's Run Slope
- Staple Bend


#### Landscape Conservation Areas:








- Laurel Ridge #2
- Laurel Ridge #3
- Laurel Ridge #4
- State Game Land #42 LCA

#### Public Lands:

- Allegheny Portage Railroad
- Gallitzin State Forest
- Laurel Ridge State Park
- State Game Land #42
- Greater Johnstown Water Authority



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
-  Complete
-  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
-  Supporting Landscape
-  Core Habitat

## JOHNSTOWN AREA

The Johnstown area contains many municipal divisions which are treated together here due to their individually small land areas. The westernmost townships fall across the eastern slope of Laurel Ridge, part of the Allegheny Mountain range. This area is largely forested and undeveloped, and includes several streams designated as Exceptional Value by the PA-DEP (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams. There are several large, contiguous blocks of forest along the ridge that fall across western Cambria County in the greater Johnstown area and also extend into Westmoreland and Somerset Counties; these are recognized as Laurel Ridge LCA #1, #2, #3, and #4 (see pg. 32 for more information).

Johnstown is centered on the junction of the Little Conemaugh River and the Conemaugh River. The floodplains of the rivers, and the steep slopes and valleys surrounding them, are urban and industrial. The outlying areas to the north and east are a mosaic of residential areas, industrial waste dump sites, and forests.

Conservation priorities for this area include ecological forest management along Laurel Ridge to maintain the forests' health and contiguity; conservation stewardship of Biological Diversity Areas; remediation of water pollution impacts from industrial discharge, waste dumps, and mining; management of stormwater and sewage runoff to minimize water pollution; monitoring and control of the spread of invasive species; and clean-up of dump sites.

### Municipalities of the Johnstown Area, with Natural Heritage Areas

| <i>Municipality</i>    | <i>BDAs</i>  | <i>LCAs</i>                                     |
|------------------------|--|---|
| Conemaugh Township     | Staple Bend BDA  |   |
| Dale Borough           |  |   |
| East Taylor Township   |  |   |
| Ferndale Borough       |  |   |
| Geistown Borough       |  |   |
| Johnstown City         |  |   |
| Lower Yoder Township   | Mill Creek/Little Mill Creek BDA   | Laurel Ridge LCAs<br>#2, #3, #4                 |
| Middle Taylor Township |  |   |
| Richland Township      |  |   |
| Scalp Level Borough    |  |   |
| Southmont Borough      |  |   |
| Stonycreek Township    | Sam's Run Slope BDA  |   |
| Upper Yoder Township   | Mill Creek/Little Mill Creek BDA<br>Allwine Creek BDA<br>Ben's Creek BDA | Laurel Ridge LCA #4,<br>State Game Land #42 LCA |
| West Taylor Township   |  | Laurel Ridge LCA #1                             |
| Westmont Borough       |  |   |

## **Mill Creek/Little Mill Creek BDA, Ben's Creek BDA, Allwine Creek BDA**

### Description

These BDAs are designated to recognize several exceptional streams along Laurel Ridge, as well as the land important in supporting these waterways. The reaches of Allwine Creek, Ben's Creek, Mill Creek, and its tributary Little Mill Creek mapped within Biological Diversity Areas are those that have been designated as Exceptional Value by the PA-DEP (PA-DEP 2006).

*Core Habitat Area:* The Core Habitat area includes perennially flowing reaches of the streams plus a buffer of 110 meters from the streams' 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 2005, Palone and Todd 1998).

*Supporting Natural Landscape:* The Supporting Natural Landscape includes the watersheds of the EV streams. 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 these areas would likely result in physical degradation of the stream channels, erosion and sediment pollution in the streams, increased water temperatures, and disruption of natural nutrient cycles involving the streams.

*Supporting Natural Landscape:* If forest cover is substantially reduced in the watersheds of these streams, 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:* These areas 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 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 streams and the ecological integrity of the aquatic ecosystems. A good step for landowners in the watershed is to develop an ecologically informed Forest Management Plan to guide future uses while stewarding the land's health. Plans should consider individual parcels in the context of the larger forested region and the watershed of which they are a part.

Water quality impacts should be considered for any activities taking place within these BDAs: ecologically detrimental pollutants should not be released, and any earth disturbing activities should employ appropriate erosion control measures and avoid steep slopes. Ecologically detrimental pollutants include pesticides and herbicides; excessive fertilizer, compost, manure, and other nutrient sources; acidic

discharge; automotive and industrial chemicals, solvents, cleaners, and de-icers; and sediments. 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 streams.

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

## **Sam's Run Slope BDA (Stonycreek Township)**

### Description

This BDA highlights a forested slope between developed areas in Johnstown. Given its small size and surrounding landscape context, it does not have the regional ecological significance of other sites identified in the report. However, it is identified as a small natural fragment in relatively good condition in a heavily developed area. Compared to many other slopes in the area, which are heavily dominated by invasive trees, shrubs, and herbs, and often have evidence of significant soil disturbance, this forest community is in good condition. The trees are very mature second-growth black cherry (*Prunus serotina*) and sugar maple (*Acer saccharum*). The herbaceous layer is sparse to moderate. This slope is also notable for the relative lack of invasive exotic species, which are very prevalent in other areas. Although invasive species are present at moderate densities in the outer areas of this forest, below the power line that runs across the slope two-thirds of the way up the herbaceous layer is free of invasives except one patch of Japanese knotweed (*Polygonum cuspidatum*).

### Threats and Stresses

The knotweed patch that has established on the lower slope may spread to crowd out native species, as it has done on many other forested hillsides in the area.

### Recommendations

It may still be possible to remove the knotweed, as it has not spread extensively, to preserve the native character of the slope forest. When evaluating control methods for invasive species, consider the long-term consequences for the site, such as physical disturbance or chemical pollution, as well as the effectiveness of the method in eradicating the invasive species in question.

## **Staple Bend BDA (Conemaugh Township)**

### Description

Core Habitat Area: The ecologically unique feature of this BDA is the old railroad tunnel at Staple Bend, which is now used as a winter hibernation site by bats, including the northern myotis (*Myotis septentrionalis*), a species of conservation concern in Pennsylvania. Included within the Core Habitat Area is the area surrounding the cave within which bedrock disturbances may affect the cave.

During the summer, the bats that hibernate in the tunnel require habitat for roosting and foraging. However, little is known about the habits of bat species during their active phase (Best and Jennings 1997), so summer habitat areas cannot be identified without telemetry studies tracking the animals' movements. In general, many bat species roost under the bark of trees, and forage along streams and forest edges. The suitable physical structures for roosting are most often found in mature trees or dead snags.

### Threats and Stresses

*Core Habitat Area:* The winter hibernation site can be threatened by disturbance in the tunnel during the months of November through April. The most common form of disturbance is human traffic. If bats are disturbed from hibernation, they can use up the stored energy reserves that are needed when they emerge in the spring, causing them to die of starvation. Blasting or other activities that disrupt bedrock within the Core Habitat Area may damage the structure of the cave, potentially making it unusable by the bats.

Reduction of forest cover, especially along riparian corridors, may reduce roosting and feeding habitat for the bats.

### Recommendations

*Core Habitat Area:* Blasting and other activities that will affect the bedrock should be avoided within this area so as not to damage the cave being used as a hibernation site. During the months of November through April, foot traffic and other disturbances in the tunnel or near its mouth should be avoided, to prevent disturbances to the hibernating bats. The Pennsylvania Game Commission's bat experts are monitoring this site and helping to develop appropriate management strategies to ensure the health and safety of the bat colonies.

Further assessment of what areas are being used as summer habitat by bats hibernating in the tunnel will be useful in guiding conservation of this population. Generally, maintaining and cultivating forest cover in surrounding regions will increase the amount of available habitat for bats.



*Above:* A stand of knotweed has established in forest along Laurel Run.

Japanese knotweed is an invasive exotic plant species that has spread pervasively along the floodplains of the Conemaugh River. In many places in the Johnstown area, it is also spreading into upland forested areas. The tall, dense growth form of knotweed can completely shade out native vegetation

*Below:* Knotweed beginning to establish along the floodplain of Laurel Run. Knotweed stands (center, right) loom large in comparison with native vegetation (left, foreground).



# Munster Township

---

---

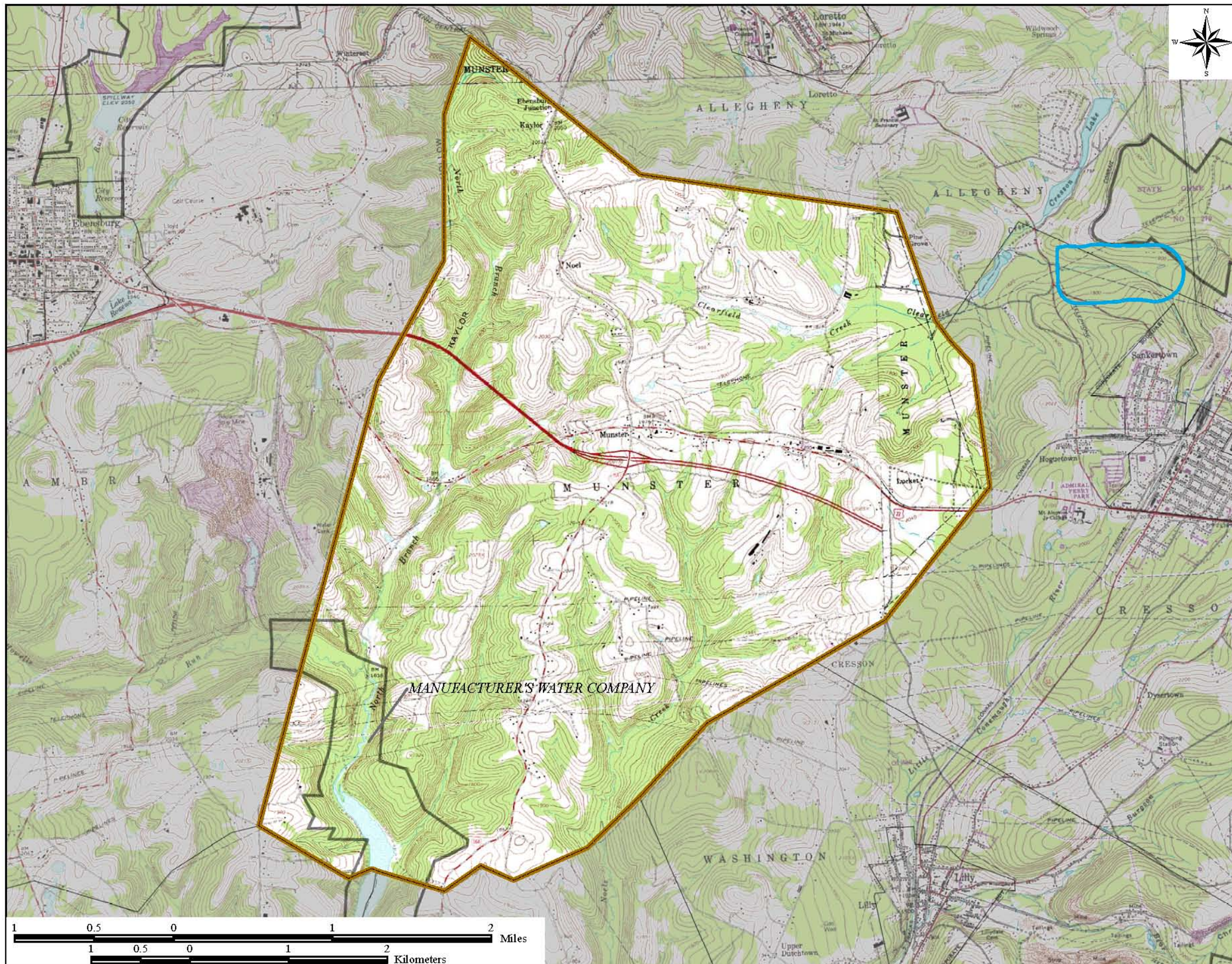
|                                  | <u>PNDI Rank</u> |       | <u>Legal Status</u> |       | Last Seen | Quality |
|----------------------------------|------------------|-------|---------------------|-------|-----------|---------|
|                                  | Global           | State | Federal             | State |           |         |
| <i>NATURAL HERITAGE AREAS:</i>   |                  |       |                     |       |           | none    |
| <i>OTHER CONSERVATION AREAS:</i> |                  |       |                     |       |           | none    |
| <i>GEOLOGIC FEATURES:</i>        |                  |       |                     |       |           | none    |

---

---

# Munster Township

## Cambria County Natural Heritage Inventory Munster Township

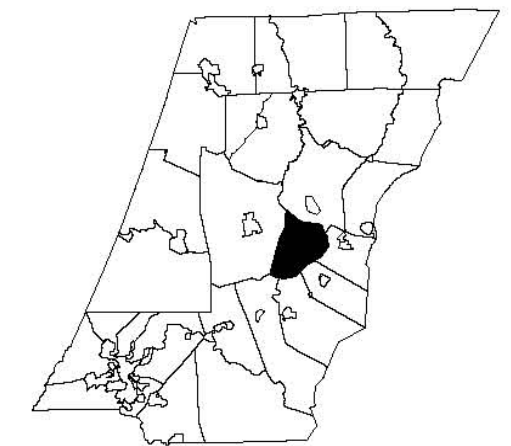


**Biological Diversity Areas:**  
None

**Landscape Conservation Areas:**  
None

**Public Lands:**  
Manufacturer's Water Company\*

\*Note: water authority boundaries are approximate, intended for visual reference only



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## MUNSTER TOWNSHIP

Munster Township lies west of the Allegheny Front in landscape of gently rolling hills and stream valleys. It is primarily a mosaic of forested land and agriculture. The forests are mainly in corridors along stream valleys, fragmented by roads and other land uses, and thus do not offer any extensive areas of interior forest habitat. However, they do offer riparian habitat, protect water quality in the streams, and improve the habitat value of the streams for terrestrial and aquatic life. The northeastern tip of the township forms the headwaters of Clearfield Creek, while the remainder of the township drains into the North Branch Conemaugh River and Noels Creek, a tributary to the Little Conemaugh River. Both of these streams are assessed as suitable for aquatic life by the PA-DEP (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for Munster Township would be the establishment of a network of riparian buffers along the streams and the remediation of mine drainage pollution. Riparian buffers help protect water quality in streams by stabilizing the banks and filtering runoff. Native riparian forests already exist along many of the township's streams; establishing forest in any gaps and widening buffers to extend at least 110 meters from the stream banks will provide suitable habitat for many wildlife species (Harding et al. 1998, Maryland DNR 2005, Palone and Todd 1998). Riparian areas and forests should also be assessed for invasive species and control programs developed where necessary. Control efforts should avoid harmful chemicals and minimize habitat damage while promoting dominance of native vegetation.

# Portage Township & Portage Borough

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

*NATURAL HERITAGE AREAS:*

|                        |  |  |  |  |  |                             |
|------------------------|--|--|--|--|--|-----------------------------|
| Allegheny Front #5 LCA |  |  |  |  |  | <i>Notable Significance</i> |
|------------------------|--|--|--|--|--|-----------------------------|

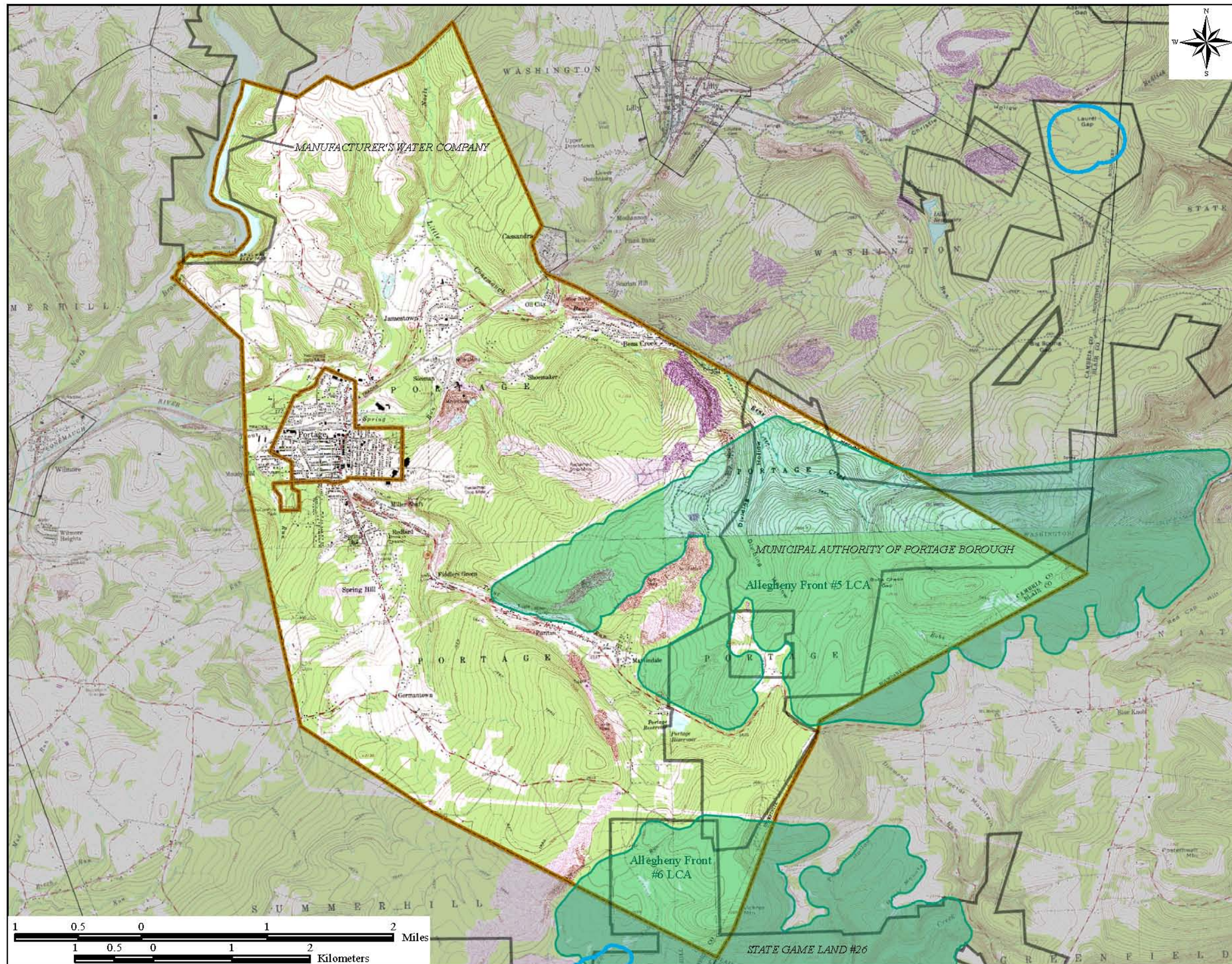
|                        |  |  |  |  |  |                             |
|------------------------|--|--|--|--|--|-----------------------------|
| Allegheny Front #6 LCA |  |  |  |  |  | <i>Notable Significance</i> |
|------------------------|--|--|--|--|--|-----------------------------|

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Portage Township & Portage Borough

## Cambria County Natural Heritage Inventory Portage Township & Borough



**Biological Diversity Areas:**  
None

**Landscape Conservation Areas:**  
Allegheny Front #5  
Allegheny Front #6

**Public Lands:**  
State Game Land #26  
Municipal Authority of Portage Borough\*  
Manufacturer's Water Company\*

\*Note: water authority boundaries are approximate, intended for visual reference only



### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## **PORTAGE TOWNSHIP**

Portage Township is situated on the western slope of the Allegheny Front. The eastern half of the township along the slope is largely forested, although it also contains some extensive strip-mined areas as well. The forested areas form part of two large, contiguous forest blocks that extend to the east and south; these are recognized as Allegheny Front LCA #5 and #6 (see pg. 31 for more information). The northern half of the township is a mosaic of forest, residential areas, and agriculture.

The township is in the watershed of the North Branch Little Conemaugh River, which is classified by the PA-DEP as impaired for aquatic life due to acid mine drainage pollution (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Conservation priorities for the township include ecological management of the LCAs to conserve the health and contiguity of the forests, and remediation of acid mine drainage water pollution problems.

## **PORTAGE BOROUGH**

The landscape of Portage Borough is predominantly urban and residential. No Natural Heritage Areas were identified within the borough boundaries. The borough is situated at the juncture of the Little Conemaugh River and Trout Run. The primary issue related to ecological health for the borough is appropriate management of runoff from stormwater, sewage, and roads to minimize release of chemical, sediment, and nutrient pollution into these waterways.

# Reade Township

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

*NATURAL HERITAGE AREAS:*

| Bell's Gap Run BDA                                  |      |    |  |  |           |   |
|---|------|----|--|--|-----------|---|
| <i>Exceptional Significance</i>                     |      |    |  |  |           |   |
| slender rock-brake ( <i>Cryptogramma stelleri</i> ) | G5   | S1 |  |  | 8/26/2001 | B |
| Allegheny woodrat ( <i>Neotoma magister</i> )       | G3G4 | S3 |  |  | 1996      | E |
| calcareous opening/cliff                            | --   | S2 |  |  | 2003      | E |
| hemlock - northern hardwood forest                  | --   | S5 |  |  | 2003      | E |

| Clearfield Creek Floodplain BDA  |    |    |  |  |      |   |
|----------------------------------|----|----|--|--|------|---|
| <i>County Significance</i>       |    |    |  |  |      |   |
| floodplain forest (unclassified) | -- | -- |  |  | 2003 | E |

| Clearfield Creek Floodplain at Fallentimber BDA |    |      |  |  |      |   |
|---|----|------|--|--|------|---|
| <i>County Significance</i>                      |    |      |  |  |      |   |
| floodplain forest (unclassified)                | -- | --   |  |  | 2003 | E |
| red maple – black ash palustrine forest         | -- | S2S3 |  |  | 2003 | E |

| Allegheny Front #3 LCA          |  |  |  |  |  |  |
|---------------------------------|--|--|--|--|--|--|
| <i>Exceptional Significance</i> |  |  |  |  |  |  |

| Allegheny Front #4 LCA          |  |  |  |  |  |  |
|---------------------------------|--|--|--|--|--|--|
| <i>Exceptional Significance</i> |  |  |  |  |  |  |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Reade Township

## Cambria County Natural Heritage Inventory

### Reade Township

#### Biological Diversity Areas:

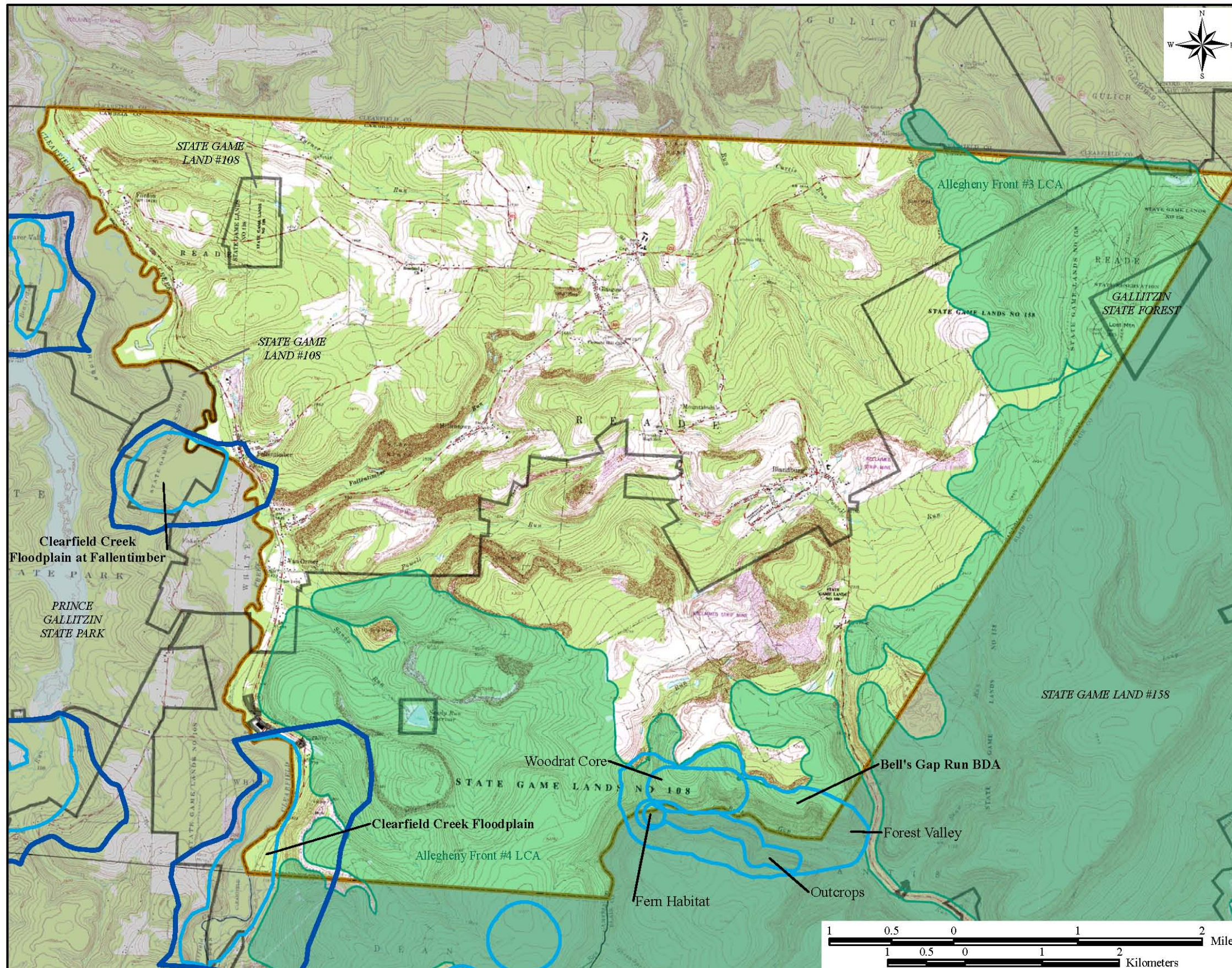
- Bell's Gap Run
- Clearfield Creek Floodplain
- Clearfield Creek Floodplain at Fallentimber

#### Landscape Conservation Areas:

- Allegheny Front #3
- Allegheny Front #4

#### Public Lands:

- Gallitzin State Forest
- State Game Land #108
- State Game Land #158



**Legend** 

-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## READE TOWNSHIP

Reade Township is situated along the western slope of the Allegheny Front and extends west to Clearfield Creek. The landscape is largely forest and strip mined areas, with settled areas scattered and a network of roads connecting them. Nearly 20% of the land in the township has been strip mined. The southern and eastern portions of the township form part of two large blocks of contiguous forest, the Allegheny Front LCAs #3 and #4. See pg. 30 for LCA descriptions and management recommendations. The forested areas in the central and western portions of the township are fragmented by roads and mines, and do not offer large areas of contiguous interior forest habitat.

The northern part of the township drains into Little Muddy Run and the southeastern portion drains into Bell's Gap Run, a tributary of the Juniata River, while the remainder of the township drains into Clearfield Creek. Little Muddy Run, the tributaries to Bell's Gap Run, Clearfield Creek, and most of its tributary Powell Run are classified as impaired for aquatic life by the PA-DEP due to acid mine drainage pollution (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for Reade Township would be remediation of acid mine drainage pollution in township waterways; ecological management of LCAs to maintain the health and contiguity of the forests; restoration of abandoned mine sites to support native forests; and improvement of the contiguity of forested areas outside of the LCAs.

### Bell's Gap Run BDA

#### Description

This BDA includes several important ecological features, which the four Core Habitat Areas focus on: calcareous opening/cliff communities; a population of the slender rock-brake (*Cryptogramma stelleri*), a plant species of special concern in Pennsylvania; a population of the Allegheny woodrat (*Neotoma magister*); and an exceptionally intact and mature forested stream valley.

*Outcrops Core Habita Area:* Along the slope south of Bell's Gap Run there is a line of calcareous sandstone outcrops that formed where a particular geological layer (termed the "Loyalhanna limestone" even though it is calcareous sandstone) meets the surface. These outcrops host a variety of calcium-loving plant species. They are also inaccessible to deer, and thus host a number of species that could be found along the forested slopes but have been reduced or eliminated by deer browsing pressure. The flora of the outcrops includes white baneberry (*Actaea pachypoda*), northern maidenhair fern (*Adiantum pedatum*), garlic mustard (*Alliaria petiolata*), red columbine (*Aquilegia canadensis*), Jack-in-the-pulpit (*Arisaema triphyllum*), Canadian wild ginger (*Asarum canadense*), walking fern (*Asplenium rhizophyllum*), maidenhair spleenwort (*Asplenium trichomanes*), whorled wood aster (*Oclemena acuminata*), crinkleroot (*Cardamine diphylla*), small enchanter's nightshade (*Circaea alpina*), bulblet bladderfern (*Cystopteris bulbifera*), a fern species (*Cystopteris* sp.), marginal woodfern (*Dryopteris marginalis*), a bedstraw species (*Galium* sp.), jewelweed (*Impatiens* sp.), Canadian woodnettle (*Laportea canadensis*), twoleaf miterwort (*Mitella diphylla*), smooth Solomon's seal (*Polygonatum biflorum*), early saxifrage (*Saxifraga virginensis*), zigzag goldenrod (*Solidago flexicaulis*), twistedstalk (*Streptopus lanceolatus*), heartleaf foamflower (*Tiarella cordifolia*), red trillium (*Trillium erectum*), Canadian white violet (*Viola canadensis*), a violet species (*Viola* sp.), wild hydrangea (*Hydrangea arborescens*), a gooseberry species (*Ribes* sp.), striped maple (*Acer pensylvanicum*), mountain maple (*Acer spicatum*), and common elderberry (*Sambucus nigra* ssp. *canadensis*).

*Fern Core Habitat Area:* An outcrop face where a small tributary drains into Bell's Gap Run hosts a population of the slender rock-brake, a fern that is only known from two other locations in Pennsylvania. The center of this species' distribution is further north; Pennsylvania is at the southern edge of its range, and this location is the southernmost known in Pennsylvania. The topography at this site, as well as its north-facing aspect, create a cold-air drainage in which the microclimatic conditions are cooler than the surrounding areas. The outcrops are surrounded by forest dominated by sugar maple (*Acer saccharum*), black birch (*Betula lenta*), and striped maple (*Acer pensylvanicum*), with white ash (*Fraxinus americana*), beech (*Fagus grandifolia*), hemlock (*Tsuga canadensis*), hickory (*Carya* sp.), and basswood (*Tilia americana*) interspersed occasionally.

*Woodrat Core Habitat Area:* This area hosts a population of the Allegheny woodrat. The woodrat (which is unrelated to the Norway rat) is an animal of global concern because its range is limited and its populations are declining due to disease and loss of habitat. It lives in forested settings, nests in rock outcroppings, and eats a variety of plants and nuts. See species fact sheet on pg. 167 for more information. This Core Habitat Area is currently fairly intact forest, and this condition is important to the woodrat because it survives best in large areas of intact forest. Fragmented forests, edge habitat, and non-forest land uses favor predators and raccoons, which carry a parasite that is fatal to woodrats.

*Forest Valley Core Habitat Area:* The stream valley along Bell's Gap Run has exceptionally intact and mature forest along the steep slopes of the valley and the floodplain of the stream. The floor of the valley is hemlock dominated in some areas and contains mixed hardwoods in others. Sugar maple, beech, basswood, and tuliptree (*Liriodendron tulipifera*) are prominent. In some areas the canopy appears very mature, including trees of 40-60 cm and greater dbh. The sides of the valley are steep and there is little floodplain along most of the stream's length. Rhododendron (*Rhododendron maximum*) is prevalent in lower slope areas.

### Threats and Stresses

*Outcrops Core Habitat Area:* The outcrops are a fragile habitat and any direct disturbance may damage them. Outcrops can be attractive to human foot traffic because of the appeal of climbing, but the natural communities here are not able to sustain foot traffic without damage. Removal of the tree canopy in areas surrounding and adjacent to the outcrops could change the microclimate of the outcrops to increase temperatures and evaporate moisture more quickly. Disturbances to the tree canopy, soil, or bedrock on the steep slope above the outcrops could result in sediment erosion onto the outcrops. They may also be especially susceptible to invasive species because of their circumneutral pH (Frappier & Eckert 2003; Silveri et al. 2001; Anderson & Kelly 1995), and disturbance can create opportunity for invasive species to colonize (Hobbs 2001).

*Fern Core Habitat Area:* The same considerations apply here as in the Outcrops Core Habitat Area. Additionally, the fern species may be especially sensitive to temperature changes, because it is growing in a cold air drainage and usually occurs in more northern climates. Tree canopy removal in this vicinity will likely raise temperatures in the fern's habitat.

*Woodrat Core Habitat Area:* If this forested area is fragmented, or if non-forest land uses are introduced, the woodrat population may be threatened by an increase in predators and by increased exposure to raccoons, which carry a parasite fatal to the woodrats, the raccoon roundworm (*Balyisascaris procyonis*). The parasite is believed to be a substantial cause of the woodrat's decline across its range.

*Forest Valley Core Habitat Area:* Because of the steep slopes of this valley, timber removal would likely result in soil erosion and damage to the valley. Several old logging roads exist along the slopes; in their

current state they are mainly used for foot traffic, and a closed canopy is regrowing above them. However, if the roads were expanded, they would fragment the contiguity of the forest. If the roads were opened to motorized vehicle traffic, it might provide greater opportunity for the introduction of invasive species, and also cause structural damage to the soil and slope.

### Recommendations

*Outcrops Core Habitat Area:* The outcrops are not currently near any foot trails, and so should be relatively sheltered from foot traffic. If further trails are developed in the area, care should be taken not to route them near the outcrops. Timber removal should be avoided within the core area and 100 meters surrounding the area. Disturbances to the bedrock, soil, and tree canopy upslope of the outcrops should also be avoided.

*Fern Core Habitat Area:* The above recommendations apply here as well, with special emphasis on the preservation of tree canopy in order to avoid raising the temperature at this site.

*Woodrat Core Habitat Area:* This area should be managed as a mature, contiguous forest tract, in order to protect the woodrat population.

*Forest Valley Core Habitat Area:* Timbering should be avoided along the steep slopes of the valley because of the likelihood that erosion problems will develop. The ecological health of this uniquely mature area can be enhanced by allowing the many old logging roads to revert to forest, and by continuing to prohibit motorized vehicle traffic.

### **Clearfield Creek Floodplain BDA**

Please see description under White Township, pg. 124.

### **Clearfield Creek Floodplain at Fallentimber BDA**

Please see description under White Township, pg. 124.

# Summerhill Township & Wilmore Borough

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

*NATURAL HERITAGE AREAS:*

|   |    |    |                            |  |           |   |
|---|----|----|----------------------------|--|-----------|---|
| Big Cedar Run BDA                       |    |    | <i>County Significance</i> |  |           |   |
| black cherry - northern hardwood forest | -- | S4 |                            |  | 7/27/2004 | E |

|                                |    |    |                          |  |      |   |
|--------------------------------|----|----|--------------------------|--|------|---|
| South Fork Conemaugh River BDA |    |    | <i>High Significance</i> |  |      |   |
| Exceptional Value stream       | -- | -- |                          |  | 1997 | E |

|                        |  |  |                             |  |  |  |
|------------------------|--|--|-----------------------------|--|--|--|
| Allegheny Front #6 LCA |  |  | <i>Notable Significance</i> |  |  |  |
|------------------------|--|--|-----------------------------|--|--|--|

|                        |  |  |                          |  |  |  |
|------------------------|--|--|--------------------------|--|--|--|
| Allegheny Front #7 LCA |  |  | <i>High Significance</i> |  |  |  |
|------------------------|--|--|--------------------------|--|--|--|

|                        |  |  |                                 |  |  |  |
|------------------------|--|--|---------------------------------|--|--|--|
| Allegheny Front #8 LCA |  |  | <i>Exceptional Significance</i> |  |  |  |
|------------------------|--|--|---------------------------------|--|--|--|

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Summerhill Township & Wilmore Borough

## Cambria County Natural Heritage Inventory

### Summerhill Township & Wilmore Borough

#### Biological Diversity Areas:

- Big Cedar Run
- South Fork Conemaugh River

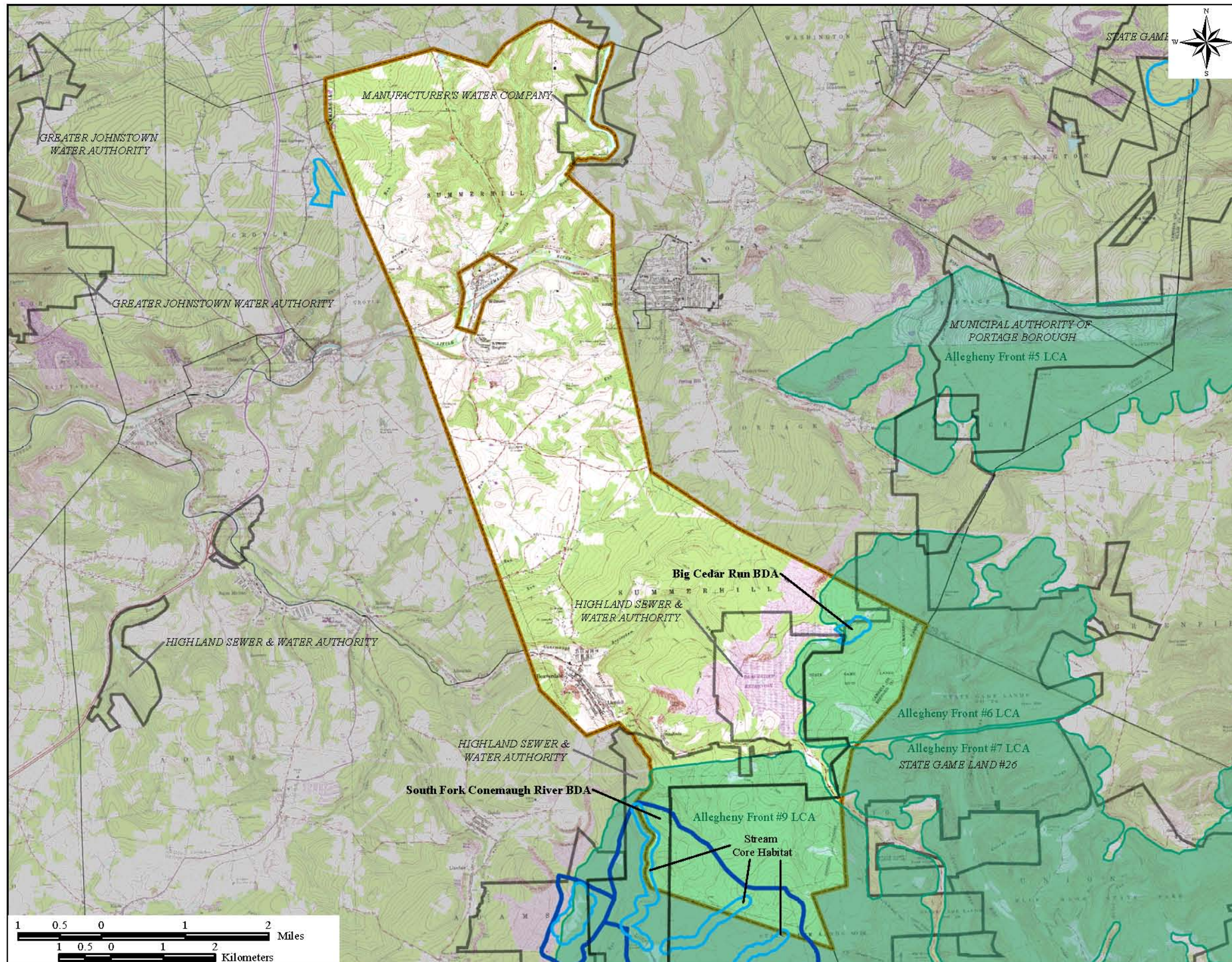
#### Landscape Conservation Areas:

- Allegheny Front #7
- Allegheny Front #8
- Allegheny Front #9

#### Public Lands:

- State Game Lands #26
- Highland Sewer & Water Authority\*
- Manufacturer's Water Company\*

\*Note: water authority boundaries are approximate, intended for visual reference only



#### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## SUMMERHILL TOWNSHIP

Summerhill Township extends from the summit of the Allegheny Front west and north to cross the Little Conemaugh River. The township is ~75% forested and ~17% agricultural. The forests are most contiguous and offer the best habitat value to those species requiring interior forest conditions in the portion of the township that falls along the western slope of the Allegheny Front. This area contributes to three large, contiguous blocks of forest, recognized as the Allegheny Front LCAs #6, #7, and #8 (see pg. 31 for more information). In the northern end of the township, forest patches are small and fragmented by roads and non-forest land uses.

The northern half of the township drains into the North Branch Little Conemaugh River and the Little Conemaugh River, which merge within the township. The southern half of the township drains into the South Fork Little Conemaugh River. The North Branch Little Conemaugh River and part of the South Fork Little Conemaugh River are classified as impaired for aquatic life by the PA-DEP due to acid mine drainage pollution (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Conservation priorities for the township include ecological management of the LCAs to preserve the health and contiguity of the forests and remediation of water pollution problems.

### Big Cedar Run BDA

#### Description

This site highlights the wetland and forest communities around the mouth of Big Cedar Run where it meets the Beaverdale Reservoir. Immediately above the reservoir's edge there is a small area of emergent shrub and herbaceous wetland, which is dominated by sphagnum moss but also includes shrubs such as steplebush (*Spiraea tomentosa*), meadowsweet (*Spiraea alba*) and southern arrowwood (*Viburnum dentatum* var. *lucidum*) and herbaceous species such as cattails (*Typha latifolia*), rattlesnake manna grass (*Glyceria canadensis*), and sedges (*Carex canescens*, *Carex folliculata*, *Carex gynandra*). Above this zone the forest begins, with hemlock dominant in the lower reach of the stream ravine. The hemlock area generally has a sparse herbaceous layer except in areas where seepages emerge, where there are palustrine species, including sphagnum moss (*Sphagnum* sp.), bearded shorthusk (*Brachyelytrum erectum*), greater bladder sedge (*Carex intumescens*), eastern rough sedge (*Carex scabrata*), three-seeded sedge (*Carex trisperma*), melic manna grass (*Glyceria melicaria*), whorled wood aster (*Oclemena acuminata*), cinnamon or interrupted fern (*Osmunda* sp.), and rhododendron (*Rhododendron maximum*).

#### Threats and Stresses

Timber removal in the area of the seepages would dramatically alter this habitat by exposing it to more light and higher temperatures. Earth-moving in this area could potentially disrupt the groundwater flows that result in the seepages. Release of any ecologically detrimental pollutants in the area— including pesticides, herbicides, automotive chemicals, mining discharges, and excessive sediments or nutrients— could also harm the water quality of the seeps and the reservoir.

### Recommendations

Timber removal and earth-moving activities should be avoided in the areas surrounding the seepages. The use of any ecologically detrimental pollutants should be carefully controlled to prevent release into the watershed.

### **South Fork Conemaugh River BDA**

See description under Adams Township, pg. 41.

## **WILMORE BOROUGH**

The landscape of Wilmore Borough is predominantly urban and residential. No Natural Heritage Areas were identified within the borough boundaries. The borough is situated at the juncture of the Little Conemaugh River and the North Branch Little Conemaugh River. The primary issue related to ecological health for the borough is appropriate management of runoff from stormwater, sewage, and roads to minimize release of chemical, sediment, and nutrient pollution into these waterways.



Graminoid (foreground) and shrub (purple-flowering steeplebush, *Spiraea tomentosa*) wetland along Big Cedar Run, Summerhill Township.

# Susquehanna Township & Northern Cambria Borough

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

*NATURAL HERITAGE AREAS:*

| West Branch Susquehanna BDA      | <i>County Significance</i> |    |      |   |
|----------------------------------|----------------------------|----|------|---|
| floodplain forest (unclassified) | --                         | -- | 2003 | E |

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Susquehanna Township & Northern Cambria Borough

## Cambria County Natural Heritage Inventory

### Susquehanna Township & Northern Cambria Borough

#### Biological Diversity Areas:

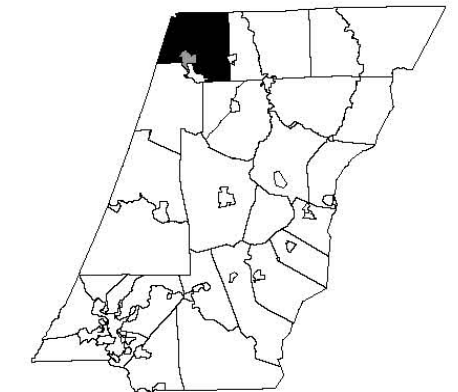
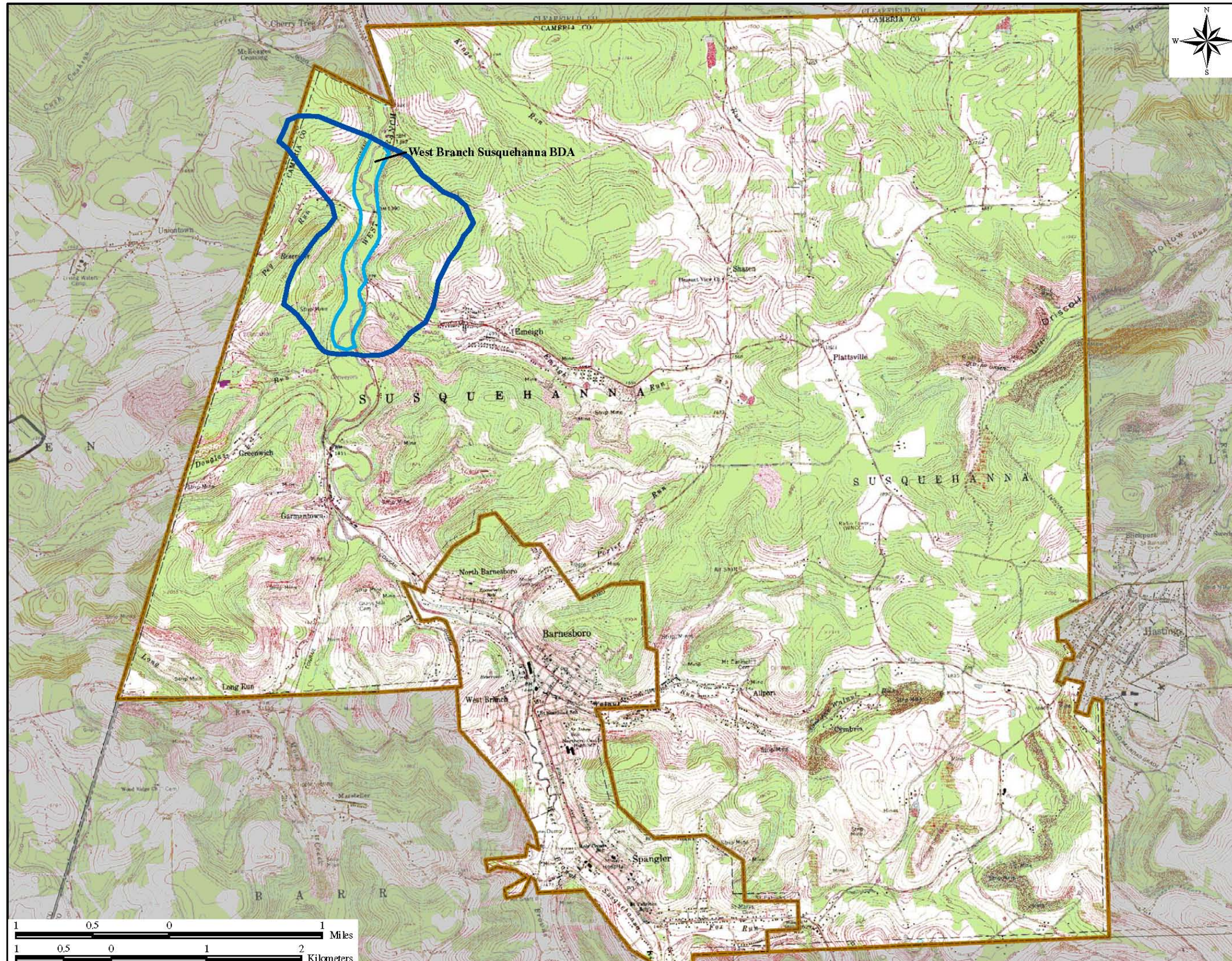
West Branch Susquehanna

#### Landscape Conservation Areas:

None








#### Public Lands:

None



#### Legend



-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## SUSQUEHANNA TOWNSHIP

Susquehanna Township is a landscape of rolling hills and stream valleys. It contains a large portion of the headwaters of the West Branch Susquehanna River, although the origin of the river is slightly further southeast in West Carroll township. Strip mining has been extensive, covering ~10% of the township's total land area. Around 75% of the township is forested, although this forest is fragmented by roads and other land uses such that only very small areas of interior forest habitat remain. The forests of the township may be suitable habitat for generalist species and edge species, but do not offer sufficient area for many interior forest species to live and breed.

Most of the township drains into the main stem of the West Branch Susquehanna River or one of its small tributaries, although the western edge the township drains into Little Brubaker Run, a tributary to Brubaker Run and then Chest Creek. The West Branch and Brubaker Run are both classified as impaired for aquatic life by the PA-DEP due to pollution from abandoned mine drainage (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for the township would be remediation of water pollution from abandoned mine drainage, restoration of formerly mined areas to native forests, improvement in the contiguity of the township's forested areas, and conservation stewardship of the township's BDA.

### West Branch Susquehanna BDA

#### Description

*Core Habitat Area:* This area is highlighted as a BDA because it is the most extensive and intact area of natural floodplain along the West Branch Susquehanna River in Cambria County. The floodplain along this stretch of the river contains some semi-palustrine areas, but no signs of frequent flooding, and no extensive seepage wetlands. The semi-palustrine areas may be the result of past construction or excavation. Today, due to the many micro-habitats along the floodplain, the area hosts a great diversity of plant and animal species.

Several invasive exotic plant species are present, and moderately prevalent in places. The river banks are almost vertical in some places, and frequently unvegetated. In most areas, forest extends to the bank. A few small grassy terraces are infrequently scattered; these are dominated by the invasive species Japanese knotweed (*Polygonum cuspidatum*), reed canarygrass (*Phalaris arundinacea*), and multiflora rose (*Rosa multiflora*).

The forest canopy is a mesic mix of broadleaf species, including red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), muscle beech (*Carpinus caroliniana*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*), an ash species (*Fraxinus* sp.), black walnut (*Juglans nigra*), tuliptree (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), chokecherry (*Prunus virginiana*), white oak (*Quercus alba*), red oak (*Quercus rubra*), and a willow species (*Salix* sp.).

The northwest floodplain section is forested, but open due to recent cutting, and almost exclusively dominated by black cherry (*Prunus serotina*). A diverse mixture of disturbance-adapted and wetland-adapted species are present, as well as typical forest understory components. A fairly dense understory of tall herbaceous, shrubs and saplings has developed.

The northeast section of floodplain has fewer signs of cutting, and the understory is more open. Just south of the Baker sawmill, two shrub wetlands are present, with silky dogwood (*Cornus amomum*), white meadowsweet (*Spiraea alba*), willow (*Salix* sp.), and dense herbaceous growth dominated by false nettle (*Boehmeria cylindrica*), jewelweed (*Impatiens* sp.), virgin's bower (*Clematis virginiana*), and wrinkle-leaf goldenrod (*Solidago rugosa*).

The southwesternmost section of floodplain is hemlock-dominated, and contains some very large trees, including scattered American beech (*Fagus grandifolia*) and American basswood (*Tilia americana*).

South of State Route 240 where a small tributary converges with the river from the west, a large beaver pond has developed, with open water, some standing dead trees, and some remaining living trees. It is surrounded by herbaceous growth, dominated by American bur-reed (*Sparganium americanum*), American mannagrass (*Glyceria grandis*), rice cutgrass (*Leersia oryzoides*), and softstem bulrush (*Schoenoplectus tabernaemontani*). Great Blue Herons and Green Herons were observed. Above this tributary, the forest resembles the previously described areas north of Route 240, with recent cutting in some areas.

Detailed Species List (\* = exotic species):

Shrubs included: hazel alder (*Alnus serrulata*), \*Japanese barberry (*Berberis thunbergii*), northern spicebush (*Lindera benzoin*), common ninebark (*Physocarpus opulifolius*), \*multiflora rose (*Rosa multiflora*), bristly dewberry (*Rubus hispida*), American red raspberry (*Rubus idaeus*), white meadowsweet (*Spiraea alba*), and southern arrowwood (*Viburnum dentatum* var. *lucidum*).

Herbaceous species included an agrimony species (*Agrimonia* sp.), a bentgrass species (*Agrostis* sp.), groundnut (*Amphicarpaea bracteata*), wild sarsaparilla (*Aralia nudicaulis*), Jack-in-the-pulpit (*Arisaema triphyllum*), swamp milkweed (*Asclepias incarnata*), white wood aster (*Eurybia divaricata*), smallspike false nettle (*Boehmeria cylindrica*), bearded shorthusk (*Brachyelytrum erectum*), a bindweed species (*Calystegia* sp.), Pennsylvania bittercress (*Cardamine pensylvanica*), graceful sedge (*Carex gracillima*), greater bladder sedge (*Carex intumescens*), hop sedge (*Carex lupulina*), shallow sedge (*Carex lurida*), drooping sedge (*Carex prasina*), Swan's sedge (*Carex swanii*), twisted sedge (*Carex torta*), broadleaf enchanter's nightshade (*Circaea lutetiana*), fan clubmoss (*Lycopodium digitatum*), crested woodfern (*Dryopteris cristata*), intermediate woodfern (*Dryopteris intermedia*), common boneset (*Eupatorium perfoliatum*), flat-top goldentop (*Euthamia graminifolia*), a bedstraw species (*Galium* sp.), fragrant bedstraw (*Galium triflorum*), avens (*Geum* sp.), \*ground ivy (*Glechoma hederacea*), American mannagrass (*Glyceria grandis*), fowl mannagrass (*Glyceria striata*), \*dames rocket (*Hesperis matronalis*), American marshpennywort (*Hydrocotyle americana*), jewelweed (*Impatiens capensis*), \*paleyellow iris (*Iris pseudacorus*), an iris species (*Iris* sp.), rice cutgrass (*Leersia oryzoides*), marsh seedbox (*Ludwigia palustris*), hairy woodrush (*Luzula acuminata*), clubmoss (*Lycopodium obscurum*), northern bugleweed (*Lycopus uniflorus*), fringed loosestrife (*Lysimachia ciliata*), a loosestrife species (*Lysimachia* sp.), Canada mayflower (*Maianthemum canadense*), \*Japanese stilt-grass (*Microstegium vimineum*), partridgeberry (*Mitchella repens*), scarlet beebalm (*Monarda didyma*), yellow pond-lily (*Nuphar lutea*), sensitive fern (*Onoclea sensibilis*), interrupted fern (*Osmunda claytoniana*), a wood sorrel species (*Oxalis* sp.), deertongue (*Dichanthelium clandestinum*), mayapple (*Podophyllum peltatum*), \*Japanese knotweed (*Polygonum cuspidatum*), jumpseed (*Polygonum virginianum*), Christmas fern (*Polystichum acrostichoides*), common selfheal (*Prunella vulgaris*), \*wild basil (*Clinopodium vulgare*), softstem bulrush (*Schoenoplectus tabernaemontani*), leafy bulrush (*Scirpus polyphyllus*), golden ragwort (*Packera aurea*), American bur-reed (*Sparganium americanum*), skunk cabbage (*Symplocarpus foetidus*), king of the meadow (*Thalictrum pubescens*), rue anemone (*Thalictrum thalictroides*), New York fern (*Thelypteris noveboracensis*), heartleaf foamflower (*Tiarella cordifolia*), eastern poison ivy

(*Toxicodendron radicans*), sessileleaf bellwort (*Uvularia sessilifolia*), white vervain (*Verbena urticifolia*), common gypsyweed (*Veronica officinalis*), a speedwell species (*Veronica* sp.), and a violet species (*Viola* sp.).

*Supporting Natural Landscape:* This includes the immediate watershed upslope of the floodplain Core Habitat, as this area influences the hydrological patterns that feed the wetland and the quality of the water reaching the floodplain. The entire upstream watershed of the West Branch influences water quality at the site.

### Threats and Stresses

*Core Habitat Area:* Several invasive exotic species are present at this site, including multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), dames' rocket (*Hesperis matronalis*), and reed canarygrass (*Phalaris arundinacea*). Two species present at this site that are especially devastating to floodplains are Japanese knotweed (*Polygonum cuspidatum*) and Japanese stiltgrass (*Microstegium vimineum*).

Floodplain habitats naturally undergo some disturbance, so minor disruptions to the forest canopy can likely be withstood. However, large-scale canopy removal or earth-moving activities would be detrimental. Removal of vegetation along streambanks would destabilize the bank and degrade habitat value.

*Supporting Natural Landscape:* Although the hydrology at a floodplain site is mainly influenced by the adjacent stream, it also receives water from the upslope watershed. Release of chemical pollutants into the watershed will result in their eventual accumulation in downslope landscapes and in the stream. Chemical pollutants harmful to aquatic life include: petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc. Activities that require earth-moving or expose bare soil may cause erosion and sedimentation of the stream. Bedrock disturbance may disrupt hydrological flows feeding the stream and result in drainage of toxic leachates into the stream.

### Recommendations

*Core Habitat Area:* Invasive species should be monitored at this site, and control measures considered. When evaluating control measures, consider long term consequences for the site, including chemical pollution and physical disturbance, as well as the effectiveness of the measure in removing the species in questions.

Activities resulting in forest canopy removal, removal of vegetation along streambanks, or earth-moving should be avoided at this site to preserve its natural communities.

*Supporting Natural Landscape:* All activities in the vicinity of this site should consider potential water quality impacts; use of chemical pollutants should be carefully controlled to avoid releasing these substances into the environment. Best management practices should be employed to minimize and control erosion for any activities that require earth-moving or expose bare soil. Any activities resulting in bedrock disturbance should be carefully evaluated, and avoided if they will disrupt hydrological patterns or result in toxic leachates reaching the stream.

## **NORTHERN CAMBRIA BOROUGH**

Northern Cambria Borough borders the West Branch Susquehanna River in its headwaters reaches. Even high in its headwaters, however, the river is impacted by acid mine drainage pollution. It is classified as an impaired stream by the PA-DEP (PA-DEP 2006). Most of the landscape of Northern Cambria Borough is residential and urban; no Natural Heritage Areas were identified within its borders. The primary issue related to ecological health for the borough is appropriate management of runoff from stormwater, sewage, and roads to minimize release of chemical, sediment, and nutrient pollution into the river.

*(Washington Township, Cassandra Borough, & Lilly Borough begin next page)*

# Washington Township, Cassandra Borough, & Lilly Borough

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

*NATURAL HERITAGE AREAS:*

|                        |  |  |  |  |                             |
|------------------------|--|--|--|--|-----------------------------|
| Allegheny Front #5 LCA |  |  |  |  | <i>Notable Significance</i> |
|------------------------|--|--|--|--|-----------------------------|

*OTHER CONSERVATION AREAS:* none

*GEOLOGIC FEATURES:* none

# Washington Township, Cassandra Borough, & Lilly Borough

## Cambria County Natural Heritage Inventory

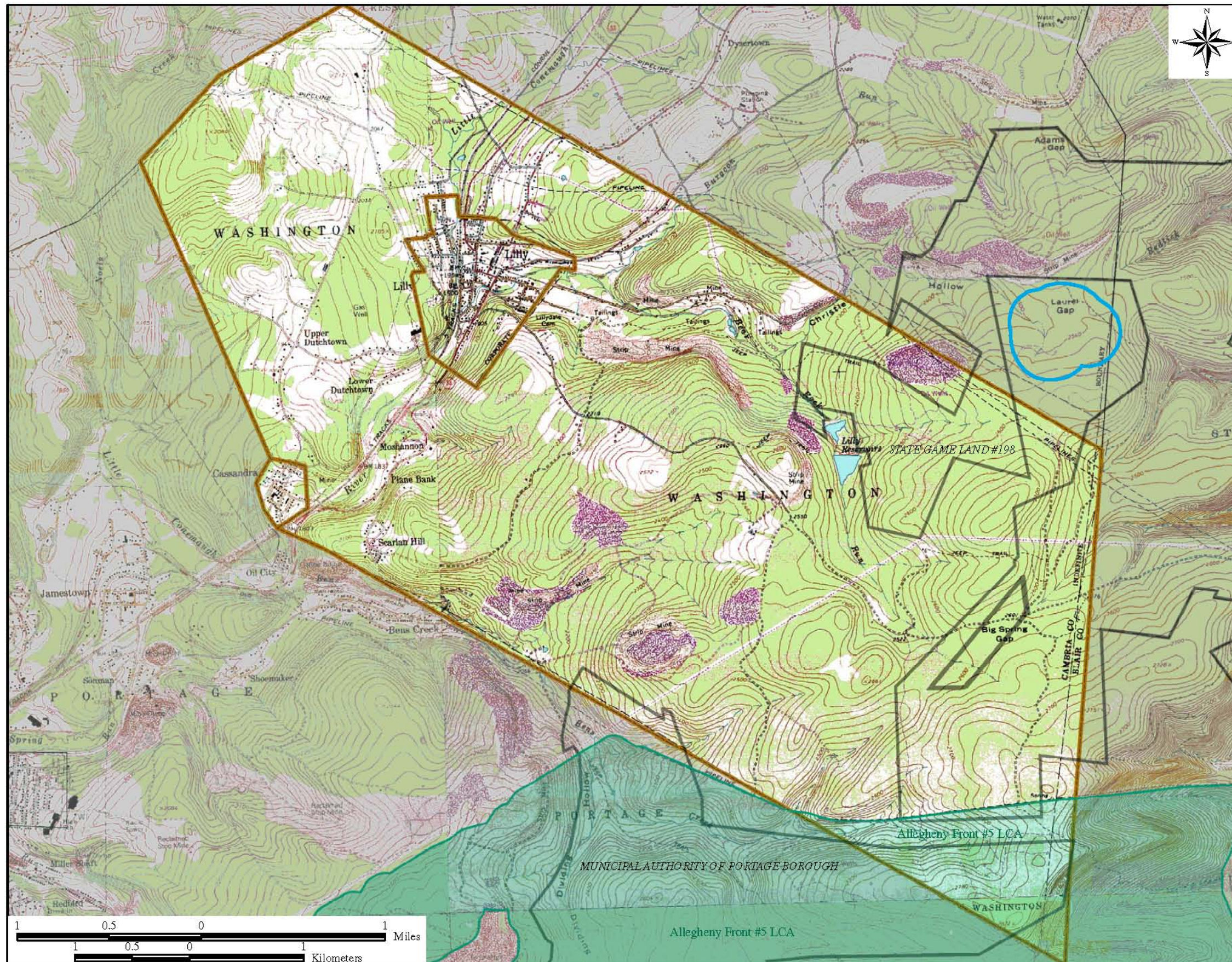
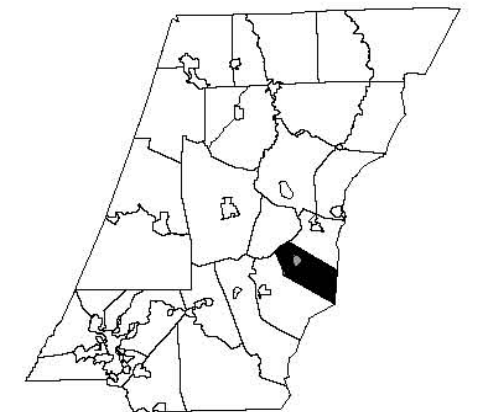
### Washington Township, Cassandra Borough, & Lilly Borough

**Biological Diversity Areas:**  
None

**Landscape Conservation Areas:**  
Allegheny Front #5








**Public Lands:**  
State Game Land #198  
Municipal Authority of Portage Borough\*

\* Note: water authority property boundaries are approximate, intended for visual reference only



#### Legend



-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## **WASHINGTON TOWNSHIP**

Washington Township is situated along the western slope of the Allegheny Front. Its eastern border is near the summit of the front, and the township extends west to cross the Little Conemaugh River. Although almost 90% of the township is forested, the forest is somewhat fragmented by roads and strip-mined areas. There are several areas of contiguous forest at least several hundred acres in size in the eastern half of the township, including one Landscape Conservation Area, Allegheny Front LCA #5 (see pg. 30 for description and recommendations). The habitat value of these areas, individually of marginal size for the success of many species requiring interior forest conditions, could be improved by developing forested corridors at least several hundred meters wide to create contiguity between the blocks, and by minimizing the impact of the fragmenting features (see pg. 25 for more information).

All of the township drains into the Little Conemaugh River. All of the township's stream reaches have been assessed by the PA-DEP as suitable for aquatic life, although the Little Conemaugh River is impaired upstream of Washington Township, in Cresson Township (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) DEP water quality designations for county streams.

## **CASSANDRA BOROUGH & LILLY BOROUGH**

The landscapes of Cassandra Borough and Lilly Borough are predominantly urban and residential. No Natural Heritage Areas were identified within the boroughs' boundaries. Both boroughs are situated along the Little Conemaugh River. Lilly Borough is at the juncture of the Little Conemaugh River, Burgoon Run, and Bear Rock Run. The primary issue related to ecological health for both boroughs is appropriate management of runoff from stormwater, sewage, and roads to minimize release of chemical, sediment, and nutrient pollution into the nearby waterways.

# West Carroll Township

---

---

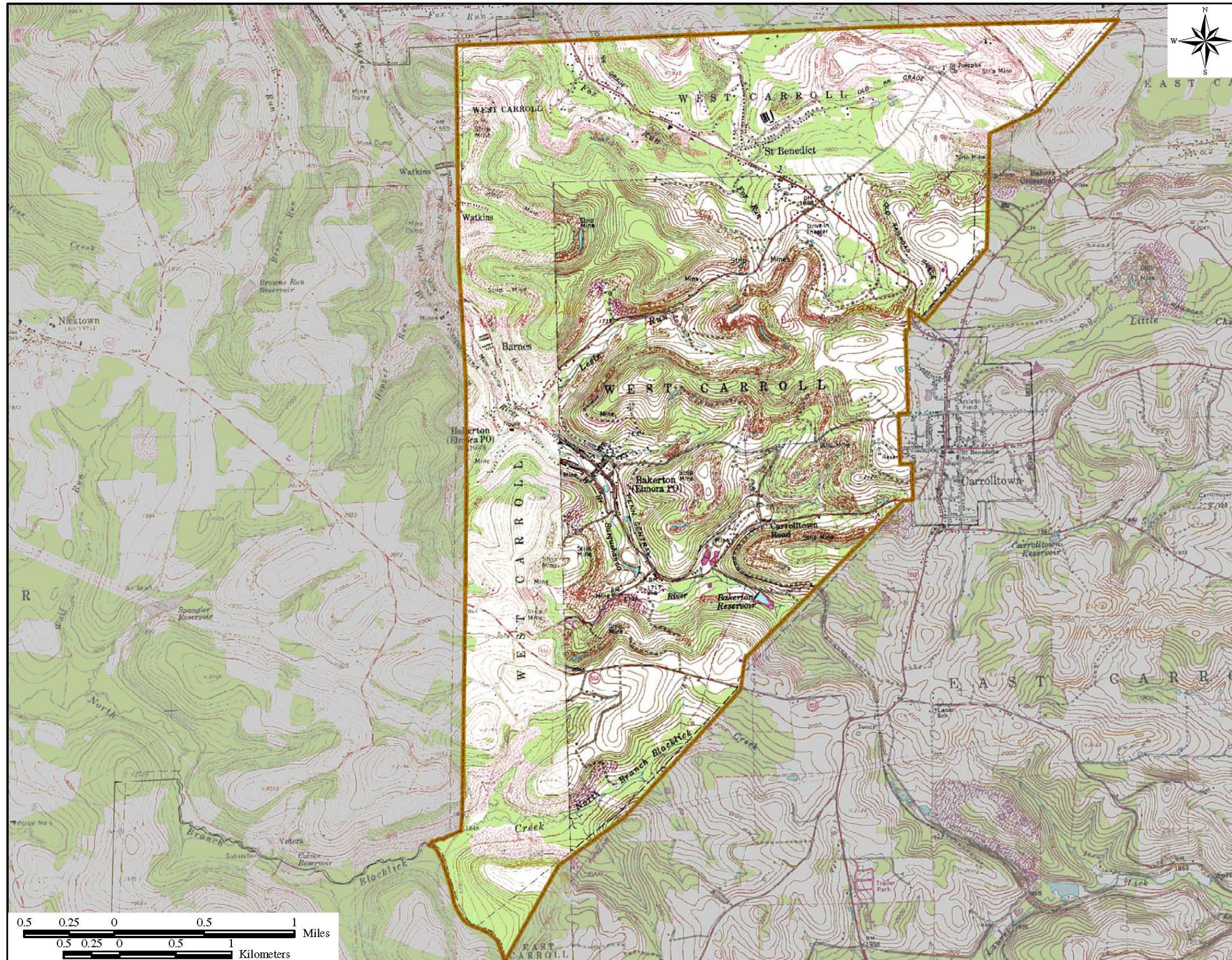
|                                  |      | <u>PNDI Rank</u> |       | <u>Legal Status</u> |       | Last Seen | Quality |
|----------------------------------|------|------------------|-------|---------------------|-------|-----------|---------|
|                                  |      | Global           | State | Federal             | State |           |         |
| <i>NATURAL HERITAGE AREAS:</i>   | none |                  |       |                     |       |           |         |
| <i>OTHER CONSERVATION AREAS:</i> | none |                  |       |                     |       |           |         |
| <i>GEOLOGIC FEATURES:</i>        | none |                  |       |                     |       |           |         |

---

---

# West Carroll Township

## Cambria County Natural Heritage Inventory West Carroll Township



### Biological Diversity Areas:

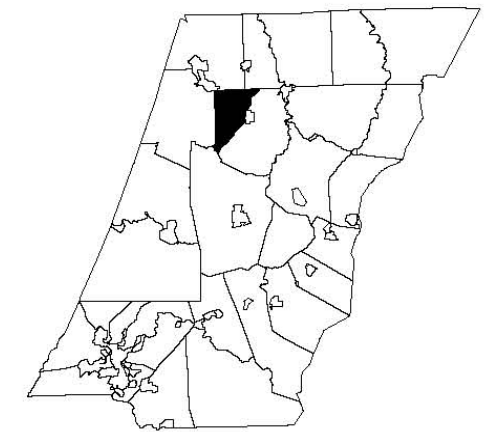
None

### Landscape Conservation Areas:

None








### Public Lands:

None



### Legend



-  Municipality Boundary
-  PUBLIC LAND
- Trail**
  -  Complete
  -  Under Construction
-  Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  -  Supporting Landscape
  -  Core Habitat

## WEST CARROLL TOWNSHIP

West Carroll Township is situated in the Pittsburgh Low Plateau physiographic province and contains the origin of the West Branch Susquehanna River. Strip mining has been extensive in the township, over more than 20% of the township's land area. Because of the extensive mining as well as the development of roads and settlements there are no remaining natural areas of any significant size in the township.

West Carroll Township spans the Eastern Continental Divide. Its southern tip drains into the North Branch Blacklick Creek, in the Ohio River basin, while the northern portion of the township drains into the West Branch Susquehanna River. The West Branch and its tributaries Leslie Run and Fox Run are classified as impaired for aquatic life by the PA-DEP due to acid mine drainage pollution, while the headwaters of the North Branch Blacklick Creek that fall within the township are classified as suitable for aquatic life (PA-DEP 2006). **Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

No Natural Heritage Areas were identified within the township. Good conservation priorities for the township would be the remediation of acid mine drainage pollution into area waterways, and restoration of formerly mined areas to host native forests.

# White Township

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

## NATURAL HERITAGE AREAS:

| Beaver Valley Wetlands BDA                   |    | <i>High Significance</i> |  |           |   |
|--|----|--------------------------|--|-----------|---|
| green ash – mixed hardwood floodplain forest | -- | S2                       |  | 9/16/2004 | E |

| Burgoon Run Tributary Wetland BDA           |    | <i>County Significance</i> |  |            |   |
|---|----|----------------------------|--|------------|---|
| palustrine forested seepages (unclassified) | -- | --                         |  | 6/--/ 2006 | E |

| Clearfield Creek Floodplain BDA  |    | <i>County Significance</i> |  |      |   |
|----------------------------------|----|----------------------------|--|------|---|
| floodplain forest (unclassified) | -- | --                         |  | 2003 | E |

| Clearfield Creek Floodplain at Fallentimber BDA |    | <i>County Significance</i> |  |      |   |
|---|----|----------------------------|--|------|---|
| floodplain forest (unclassified)                | -- | --                         |  | 2003 | E |
| red maple – black ash palustrine forest         | -- | S2S3                       |  | 2003 | E |

| Killbuck Run BDA                                       |    | <i>County Significance</i> |  |           |   |
|--|----|----------------------------|--|-----------|---|
| black cherry – northern hardwood forest                | -- | S4                         |  | 9/23/2004 | E |
| sugar maple – basswood forest                          | -- | S4                         |  | 9/23/2004 | E |
| hemlock (white pine) – red oak – mixed hardwood forest | -- | S4                         |  | 9/23/2004 | E |
| hemlock palustrine forest                              | -- | S3                         |  | 8/28/2003 | E |

| Slate Lick Run Wetlands BDA               |    | <i>County Significance</i> |  |      |   |
|---|----|----------------------------|--|------|---|
| unique wetland communities (unclassified) | -- | --                         |  | 2003 | E |

| Rogue's Harbor Run LCA |  | <i>High Significance</i> |  |  |  |
|------------------------|--|--------------------------|--|--|--|
|------------------------|--|--------------------------|--|--|--|

OTHER CONSERVATION AREAS: none

GEOLOGIC FEATURES: none

# White Township

## Cambria County Natural Heritage Inventory

### White Township

#### Biological Diversity Areas:

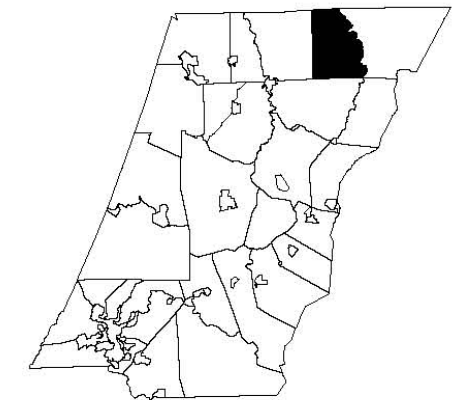
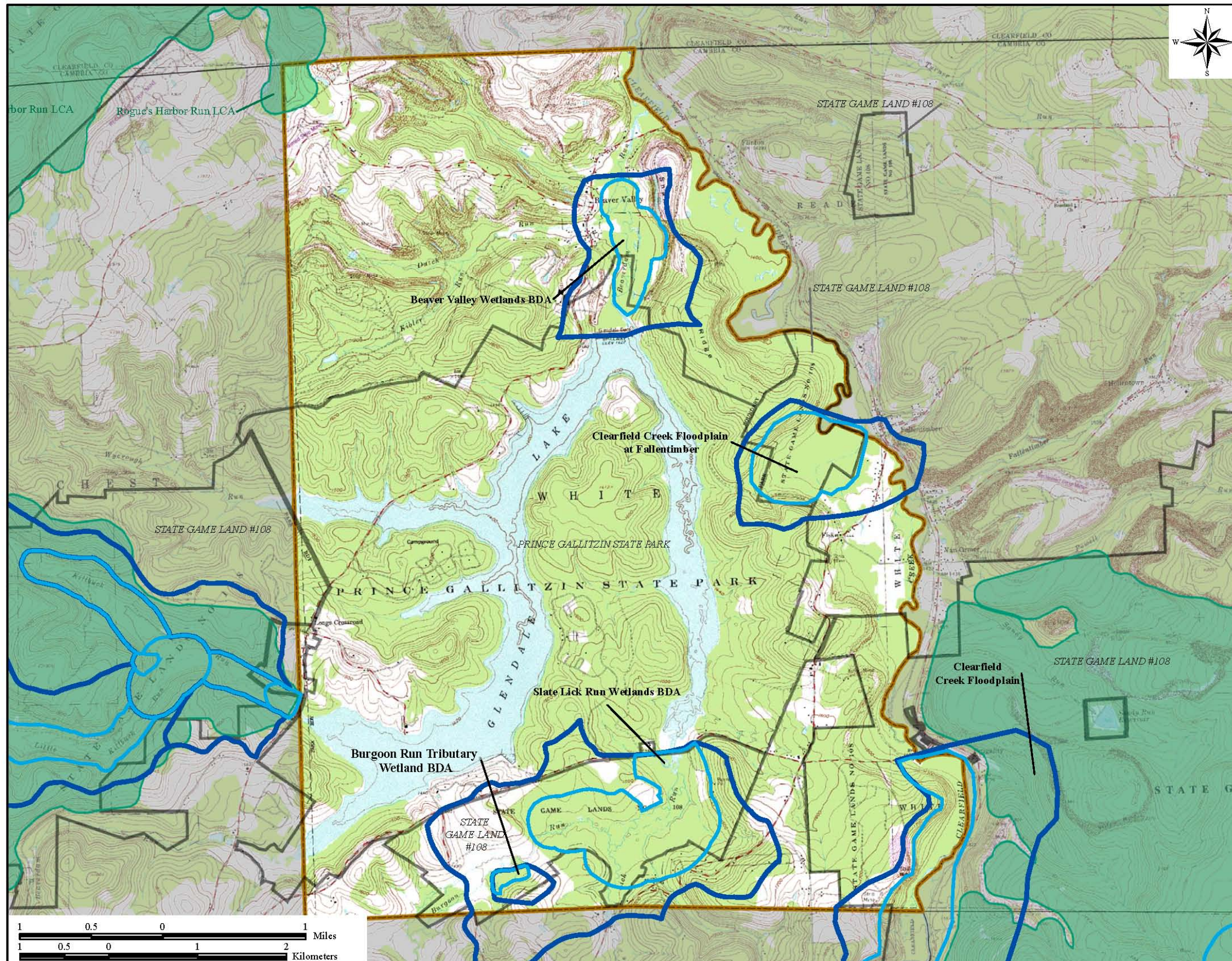
- Beaver Valley Wetlands
- Burgoon Run Tributary Wetland
- Clearfield Creek Floodplain
- Clearfield Creek Floodplain at Fallentimber
- Slate Lick Run Wetlands

#### Landscape Conservation Areas:

- Rogue's Harbor Run

#### Public Lands:

- Prince Gallitzin State Park
- State Game Land #108



#### Legend



- Municipality Boundary
- PUBLIC LAND
- Trail**
  - Complete
  - Under Construction
- Landscape Conservation Area (LCA)
- Biological Diversity Area (BDA)**
  - Supporting Landscape
  - Core Habitat

## WHITE TOWNSHIP

White Township is bounded to the east by Clearfield Creek and extends west to encompass most of Glendale Lake, which was created by the installation of the Glendale Dam on Beaverdam Run. Much of the northern end of the township above the lake has been strip-mined, while the landscape surrounding the lake is forested or developed for recreational facilities. Several Biological Diversity Areas have been identified around unique ecological features surrounding the lake and its tributaries. The forested area surrounding the Exceptional Value watershed Rogue's Harbor Run has been designated as the Rogue's Harbor Run LCA; see pg. 33 for description and recommendations.

Most of the township drains into Glendale Lake, except for the eastern edge, which drains into Clearfield Creek. The PA-DEP has assessed most of Glendale Lake's tributaries as suitable for aquatic life, except for Burgoon Run and Slate Lick Run, which are impaired by sediment pollution from agricultural runoff. Clearfield Creek is impaired for aquatic life by acid mine drainage pollution. Dutch Run, a tributary to Beaverdam Run, is classified as impaired for aquatic life due to excessive nutrients (PA-DEP 2006).

**Figures 6 and 7** (pg. 19, 21) map DEP water quality designations for county streams.

Good conservation priorities for the township would be the stewardship of its Biological Diversity Areas, improvement and maintenance of water quality through erosion control, and preservation of the contiguity and health of the township's forests.

### Beaver Valley Wetlands BDA

#### Description

*Core Habitat Area:* This site is notable for the diverse floodplain forest community found in the floodplain of Beaverdam Run just downstream of the Glendale Dam. It is one of the few examples of a relatively intact floodplain forest community remaining in the county. It has few invasive species, in contrast to many other floodplain areas in the county that have been overrun with Japanese knotweed and other exotic invasive plant species. Substantial portions of the area have saturated soil. The forest canopy is relatively mature and intact. It is of mixed species composition, with bitternut hickory (*Carya cordiformis*) and shagbark hickory (*Carya ovata*) as important dominants. Conifers are scattered, including hemlocks (*Tsuga canadensis*) and a few emergent white pines (*Pinus strobus*). The community roughly matches the green ash – mixed hardwood floodplain forest type (WPC & TNC 2002).

Trees include (\* = exotic species): red maple (*Acer rubrum*), bitternut hickory (*Carya cordiformis*), shagbark hickory (*Carya ovata*), a hawthorn species (*Crataegus* sp.), American beech (*Fagus grandifolia*), an ash species (*Fraxinus americana* or *pensylvanica*), eastern white pine (*Pinus strobus*), black cherry (*Prunus serotina*), northern red oak (*Quercus rubra*), black willow (*Salix nigra*), eastern hemlock (*Tsuga canadensis*), and American elm (*Ulmus americana*).

Shrubs include gray alder (*Alnus incana*), \*Japanese barberry (*Berberis thunbergii*), silky dogwood (*Cornus amomum*), northern spicebush (*Lindera benzoin*), and \*multiflora rose (*Rosa multiflora*).

Herbs include an agrimony species (*Agrimonia* sp.), common ladyfern (*Athyrium filix-femina*), smallspike false nettle (*Boehmeria cylindrica*), a brome-grass species (*Bromus* sp.), graceful sedge (*Carex gracillima*), Gray's sedge (*Carex grayi*), greater bladder sedge (*Carex intumescens*), hop sedge (*Carex lupulina*), a sedge species (*Carex* sp.), a woodreed species (*Cinna* sp.), devil's darning needles (*Clematis*

*virginiana*), deertongue (*Dichanthelium clandestinum*), a ryegrass species (*Elymus* sp.), beechdrops (*Epifagus virginiana*), white wood aster (*Eurybia divaricata*), a bedstraw species (*Galium* sp.), fragrant bedstraw (*Galium triflorum*), avens (*Geum* sp.), jewelweed (*Impatiens capensis*), hairy woodrush (*Luzula acuminata*), a bugleweed species (*Lycopus* sp.), partridgeberry (*Mitchella repens*), sensitive fern (*Onoclea sensibilis*), cinnamon or interrupted fern (*Osmunda* sp.), golden ragwort (*Packera aurea*), Virginia creeper (*Parthenocissus quinquefolia*), creeping phlox (*Phlox stolonifera*), arrowleaf tearthumb (*Polygonum sagittatum*), jumpseed (*Polygonum virginianum*), Christmas fern (*Polystichum acrostichoides*), eastern swamp saxifrage (*Saxifraga pensylvanica*), roundleaf goldenrod (*Solidago patula*), calico aster (*Symphotrichum lateriflorum*), crookedstem aster (*Symphotrichum prenanthoides*), skunk cabbage (*Symplocarpus foetidus*), king of the meadow (*Thalictrum pubescens*), New York fern (*Thelypteris noveboracensis*), eastern poison ivy (*Toxicodendron radicans*), and common gypsyweed (*Veronica officinalis*).

*Supporting Natural Landscape:* This area is the immediate watershed above the wetland area. It is highlighted as especially important to the Core Habitat Area because its condition has a strong influence on water quality, and any activities that take place here may influence the natural communities of the floodplain that are directly downslope. However, water quality is also influenced by the tributary that joins Burgoon Run within the site, Dutch Run, and by Glendale Lake. The watersheds of these streams determine their water quality.

### Threats and Stresses

*Core Habitat Area:* Floodplain communities naturally experience disturbance, so can tolerate some vegetation disruption. However, large-scale forest canopy removal and earth-moving activities, would damage the unique natural communities at this site. Removal of vegetation along streambanks would destabilize the banks, resulting in soil erosion and sediment pollution, and would also degrade the habitat value for terrestrial and aquatic species.

The previously strip-mined area immediately east of the floodplain may be a seed source for invasive species, as many of these species prefer open, disturbed habitats.

*Supporting Natural Landscape:* Although the hydrology of a floodplain site is mainly influenced by the adjacent stream, it also receives water from the upslope watershed. Release of chemical pollutants into the watershed will result in their eventual accumulation in downslope landscapes and in the stream. Chemical pollutants harmful to aquatic life include: petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc. Activities that require earth-moving or that expose bare soil may cause erosion and sedimentation of the stream. Bedrock disturbance may disrupt hydrological flows feeding the stream and result in drainage of toxic leachates into the stream.

### Recommendations

*Core Habitat Area:* Restoration of native forest to the strip-mined area to the east of the floodplain may help buffer the unique floodplain community against entry of invasive species. The BDA should also be monitored to detect any invasive species, especially Japanese knotweed (*Polygonum cuspidatum*) and Japanese stiltgrass (*Microstegium vimineum*), and they should be removed while they are small and few. Activities that result in large-scale forest canopy removal, removal of streambank vegetation, or earth disturbance should be avoided at this site.

*Supporting Natural Landscape:* All activities in the vicinity of this site should consider potential water quality impacts; use of chemical pollutants should be carefully controlled to avoid releasing these substances into the environment. Best management practices should be employed to minimize and control erosion for any activities that require earth-moving or that expose bare soil. Any activities resulting in bedrock disturbance should be carefully evaluated and should be avoided if they will disrupt hydrological patterns or result in toxic leachates reaching the stream.

## **Burgoon Run Tributary Wetland BDA**

### Description

*Core Habitat Area:* This BDA highlights a forested seepage area at the base of a gentle slope. The forest community is similar to the hemlock (white pine) – northern hardwood type, with relatively tall and mature trees. The area was referenced in a letter from Maurice Goddard dated from the 1970s in the files of the Pennsylvania Game Commission as containing exceptionally mature trees. The surrounding areas are less mature; to the east are food plot areas and to the west is a broad saturated area with shrubs and low trees, which likely developed with the impoundment of the lake. As a natural forested wetland community with relatively mature canopy, the area provides important habitat and is ecologically significant in the county. However, it was not rated as a state-significant area due to its small size, location within a disturbed landscape, and the somewhat low diversity of its flora in comparison to other examples of the type.

The dominant species of the forest canopy are eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), shagbark hickory (*Carya ovata*), and American beech (*Fagus grandifolia*), with occasional emergent eastern white pines (*Pinus strobus*). The subcanopy layer is dominated with hemlock, with occasional American hornbeam (*Carpinus caroliniana*). The shrub layer has northern spicebush (*Lindera benzoin*) and Allegheny blackberry (*Rubus allegheniensis*).

The seeps are intermingled with slightly higher, less saturated areas, and thus the herb layer is a mixture of typical herbs of mesic areas in northern hardwood forests— including intermediate woodfern (*Dryopteris intermedia*), mayapple (*Podophyllum peltatum*), common ladyfern (*Athyrium filix-femina*), eastern poison ivy (*Toxicodendron radicans*), hepatica (*Hepatica nobilis*), Christmas fern (*Polystichum acrostichoides*), mountain woodsorrel (*Oxalis montana*), Canada mayflower (*Maianthemum canadense*), American hogpeanut (*Amphicarpaea bracteata*)—and typical species of seeps and low wet areas, including sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), skunk cabbage (*Symplocarpus foetidus*), Jack-in-the-pulpit (*Arisaema triphyllum*), hairy sedge (*Carex lacustris*), Canadian woodnettle (*Laportea canadensis*), jumpseed (*Polygonum virginianum*), small enchanter's nightshade (*Circaea alpina*), drooping sedge (*Carex prasina*), and Virginia cutgrass (*Leersia virginica*).

*Supporting Natural Landscape:* This includes the immediate watershed upslope of the wetland, as this area influences the hydrological patterns that feed the wetland and the quality of the water reaching the wetland.

### Threats and Stresses

*Core Habitat Area:* Invasive species are present in the surrounding areas, including autumn olive (*Elaeagnus umbellata*), exotic bush honeysuckles (*Lonicera* sp.), and multiflora rose (*Rosa multiflora*). These species may invade the forest, crowding out native plants and diminishing habitat value for native

animals. Timber removal within this community would raise light levels, cause wider fluctuations in temperature and moisture levels, and change hydrological patterns. These changes would likely facilitate invasion by exotic shrubs and alter the plant community composition.

*Supporting Natural Landscape:* Any activities that require bedrock disturbance, earth-moving, or forest canopy removal upslope would likely change the hydrological patterns that feed the seepages. Release of ecologically detrimental pollutants—including pesticides, herbicides, excessive sediments, excessive nutrients, solvents, automotive chemicals, etc.—would degrade water quality and harm aquatic life. Amphibians, some species of which may breed in the seeps, are particularly vulnerable to chemical pollutants.

### Recommendations

*Core Habitat Area:* This area should be monitored for invasive species, and control programs should be initiated if necessary. Control of exotic shrubs is most effective if colonizing individuals are identified and removed before they reach maturity to produce seeds, and if seed sources in surrounding areas are removed. Manual methods are recommended to avoid introduction of toxins into the wetland, and care should be taken to minimize damage to soil structure and surrounding vegetation.

Timber removal would be detrimental to the health of this community and is not recommended as a compatible use.

*Supporting Natural Landscape:* Bedrock disturbance, earth-moving, and removal of more than 15% of the timber in this area are not recommended, in order to preserve the hydrological flows feeding the seepages. The use of ecologically detrimental pollutants should be carefully controlled to avoid releasing these substances into the watershed, where they may contaminate the wetland.

## **Clearfield Creek Floodplain BDA**

### Description

*Core Habitat Area:* This site is designated because it is one of the few floodplain areas in the county with relatively intact natural communities. Along Clearfield Creek there is a corridor of forest adjacent to the stream in most areas. Where the floodplain is wide, floodplain forest communities have developed. This site includes several areas of relatively broad floodplain. These floodplains do not appear to regularly experience flooding, as they are slightly elevated above the stream level. Perhaps due to the infrequency of flooding, the community type is intermediate between the red oak – mixed hardwood terrestrial forest type and the green ash – mixed hardwood floodplain forest type. The forest canopy is a diverse mix of mesic hardwood species, including red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), common serviceberry (*Amelanchier arborea*), American hornbeam (*Carpinus caroliniana*), shagbark hickory (*Carya ovata*), American chestnut (*Castanea dentata*), American beech (*Fagus grandifolia*), cucumber magnolia (*Magnolia acuminata*), American sycamore (*Platanus occidentalis*), black cherry (*Prunus serotina*), red oak (*Quercus rubra*), American basswood (*Tilia americana*), eastern hemlock, and slippery elm (*Ulmus rubra*). Hemlocks (*Tsuga canadensis*) and white pines (*Pinus strobus*) are also scattered occasionally.

The herbaceous and shrub layers are more distinctively typical of floodplains in their species composition. Northern spicebush (*Lindera benzoin*) and ninebark (*Physocarpus opulifolius*) are prevalent, while silky dogwood (*Cornus amomum*) and gray alder (*Alnus incana*) occur in low wet areas

and along the shoreline. Also present in the shrub layer is the typical forest species American witchhazel (*Hamamelis virginiana*).

The herbaceous layer is extremely diverse because it includes floodplain species, wetland species, and typical mesic forest species. These include: northern maidenhair (*Adiantum pedatum*), a bentgrass species (*Agrostis* sp.), wild leek (*Allium tricoccum*), sweet vernalgrass (*Anthoxanthum odoratum*), wild sarsaparilla (*Aralia nudicaulis*), Jack-in-the-pulpit (*Arisaema triphyllum*), common ladyfern (*Athyrium filix-femina*), smallspike false nettle (*Boehmeria cylindrica*), bearded shorthusk (*Brachyelytrum erectum*), crinkleroot (*Cardamine diphylla*), thicket sedge (*Carex abscondita*), fringed sedge (*Carex crinita* var. *crinita*), shallow sedge (*Carex lurida*), twisted sedge (*Carex torta*), blue cohosh (*Caulophyllum thalictroides*), small enchanter's nightshade (*Circaea alpina*), devil's darning needles (*Clematis virginiana*), deertongue (*Dichanthelium clandestinum*), eastern bottlebrush grass (*Elymus hystrix*), a ryegrass species (*Elymus* sp.), a fleabane species (*Erigeron* sp.), trumpetweed (*Eupatorium fistulosum*), common boneset (*Eupatorium perfoliatum*), sweetscented joepeyweed (*Eupatorium purpureum*), white wood aster (*Eurybia divaricata*), bigleaf aster (*Eurybia macrophylla*), flat-top goldentop (*Euthamia graminifolia*), stiff marsh bedstraw (*Galium tinctorium*), fragrant bedstraw (*Galium triflorum*), creeping mannagrass (*Glyceria acutiflora*), fowl mannagrass (*Glyceria striata*), dames' rocket (*Hesperis matronalis*), wild hydrangea (*Hydrangea arborescens*), American marshpennywort (*Hydrocotyle americana*), jewelweed (*Impatiens capensis*), a rush species (*Juncus* sp.), Virginia cutgrass (*Leersia virginica*), turk's-cap lily (*Lilium superbum*), brown widelip orchid (*Liparis liliifolia*), stiff clubmoss (*Lycopodium annotinum*), northern bugleweed (*Lycopus uniflorus*), fringed loosestrife (*Lysimachia ciliata*), wild mint (*Mentha arvensis*), Japanese stilt-grass (*Microstegium vimineum*), Allegheny monkeyflower (*Mimulus ringens*), true forget-me-not (*Myosotis scorpioides*), sensitive fern (*Onoclea sensibilis*), a wood-sorrel species (*Oxalis* sp.), Canadian lousewort (*Pedicularis canadensis*), common arrowleaf tearthumb (*Polygonum sagittatum*), Christmas fern (*Polystichum acrostichoides*), common selfheal (*Prunella vulgaris*), multiflora rose (*Rosa multiflora*), bristly dewberry (*Rubus hispidus*), leafy bulrush (*Scirpus polyphyllus*), smooth carrionflower (*Smilax herbacea*), bristly greenbrier (*Smilax tamnoides*), wreath goldenrod (*Solidago caesia*), wrinkle-leaf goldenrod (*Solidago rugosa*), twistedstalk (*Streptopus lanceolatus* var. *roseus*), crookedstem aster (*Symphyotrichum prenanthoides*), skunk cabbage (*Symplocarpus foetidus*), king of the meadow (*Thalictrum pubescens*), New York fern (*Thelypteris noveboracensis*), heartleaf foamflower (*Tiarella cordifolia*), swamp verbena (*Verbena hastata*), and a violet species (*Viola* sp.).

*Supporting Natural Landscape:* This area includes the immediate watershed upslope of the wetland, as this area influences the hydrological patterns that feed the wetland and the quality of the water reaching the wetland.

### Threats and Stresses

*Core Habitat Area:* While these floodplain areas are notable for the prevalence of native, rather than exotic, plant species, some exotic invasive species have established in low numbers. Japanese knotweed (*Polygonum sachalinense*) is a highly aggressive species common in other areas of the county that often grows to dominate floodplain areas to the almost complete exclusion of natives. It has established a few stands along the shoreline. Japanese stiltgrass (*Microstegium vimineum*, also known as Nepalese brown-top), is rapidly expanding into Pennsylvania from the south, where it is very prevalent and aggressive. Its growth may be somewhat limited by the cooler season here, but its expansion has been rapid. It is present in the herb layer, but scattered in relatively low density. Morrow's honeysuckle (*Lonicera morrowii*) is a shrub that commonly invades old fields and forests, and is present at low density at this site.

Floodplain habitats naturally undergo some disturbance, so minor disruptions to the forest canopy can likely be withstood. However, large-scale canopy removal or earth-moving activities will be detrimental. Removal of vegetation along streambanks will destabilize the bank and degrade habitat value.

*Supporting Natural Landscape:* Although the hydrology of a floodplain site is mainly influenced by the adjacent stream, it also receives water from the upslope watershed. Any release of chemical pollutants into the watershed will result in their eventual accumulation in downslope landscapes and in the stream. Chemical pollutants harmful to aquatic life include petroleum products, pesticides and herbicides, automotive and home improvement chemicals, solvents and cleaners, etc. Activities that require earth-moving or expose bare soil may cause erosion and sedimentation of the stream. Bedrock disturbance may disrupt hydrological flows feeding the stream and result in drainage of toxic leachates into the stream.

### Recommendations

*Core Habitat Area:* It may be possible to control the invasive species through early removal at this site because they have not established extensively. However, plans for removal should balance effectiveness against the target species with the long-term impacts to the site, including physical disturbance and chemical contamination. Extensive physical disturbance can actually improve the habitat for invasive species.

Activities resulting in large-scale canopy removal, removal of vegetation along streambanks, or earth-moving should be avoided at this site to preserve its natural communities.

*Supporting Natural Landscape:* All activities in the vicinity of this site should consider potential water quality impacts; use of chemical pollutants should be carefully controlled to avoid releasing these substances into the environment. Best management practices should be employed to minimize and control erosion for any activities that require earth-moving or that expose bare soil. Any activities resulting in bedrock disturbance should be carefully evaluated and should be avoided if they will disrupt hydrological patterns or result in toxic leachates reaching the stream.

## **Clearfield Creek Floodplain at Fallentimber BDA**

This site is also a relatively intact floodplain area, part of which is a low-lying black ash swamp community. The floodplain area here is very broad, and the topography somewhat lower and wetter than the previously described site. Along most of the floodplain the forest appears to be periodically inundated, as the dominant herbaceous species is skunk cabbage (*Symplocarpus foetidus*). The forest canopy does not fall within any of the types delineated in the Fike 1999 community classification or its supplemental reports addressing floodplains (WPC & TNC 2002). It is perhaps intermediate between the red oak – mixed hardwood type and the green ash – mixed hardwood floodplain forest type. The canopy includes red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), American hornbeam (*Carpinus caroliniana*), bitternut hickory (*Carya cordiformis*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), an ash species (*Fraxinus* sp.), cucumber-tree (*Magnolia acuminata*), American sycamore (*Platanus occidentalis*), black cherry (*Prunus serotina*), and eastern hemlock (*Tsuga canadensis*). Other herbaceous species include wild leek (*Allium tricoccum*), Jack-in-the-pulpit (*Arisaema triphyllum*), smallspike false nettle (*Boehmeria cylindrica*), white edge sedge (*Carex debilis*), blue cohosh (*Caulophyllum thalictroides*), silver false spleenwort (*Deparia acrostichoides*), deertongue (*Dichantheium clandestinum*), eastern bottlebrush grass (*Elymus hystrix*), white wood aster (*Eurybia divaricata*), and fragrant bedstraw (*Galium triflorum*).

There is also a low-lying backwater swamp area dominated by black ash (*Fraxinus nigra*) and red elm (*Ulmus rubra*). This community is classified as a red maple – black ash palustrine forest, a type considered of special concern in Pennsylvania due to its scarcity. Winterberry (*Ilex verticillata*) and northern spicebush (*Lindera benzoin*) are prevalent in the shrub layer. The herbaceous layer includes shade-tolerant wetland species such as nodding sedge (*Carex gynandra*), greater bladder sedge (*Carex intumescens*), smooth-sheath sedge (*Carex laevivaginata*), hop sedge (*Carex lupulina*), shallow sedge (*Carex lurida*), white turtlehead (*Chelone glabra*), American mannagrass (*Glyceria grandis*), melic mannagrass (*Glyceria melicaria*), dames' rocket (*Hesperis matronalis*), jewelweed (*Impatiens* sp.), Virginia cutgrass (*Leersia virginica*), a lily species (*Lilium* sp.), marsh seedbox (*Ludwigia palustris*), Allegheny monkeyflower (*Mimulus ringens*), true forget-me-not (*Myosotis scorpioides*), sensitive fern (*Onoclea sensibilis*), cinnamon or interrupted fern (*Osmunda* sp.), clearweed (*Pilea* sp.), halberdleaf tearthumb (*Polygonum arifolium*), jumpseed (*Polygonum virginianum*), water-plantain spearwort (*Ranunculus ambigens*), blue skullcap (*Scutellaria lateriflora*), wrinkle-leaf goldenrod (*Solidago rugosa*), American bur-reed (*Sparganium americanum*), and crookedstem aster (*Symphotrichum prenanthoides*).



*Skunk cabbage under forest canopy at  
Clearfield Creek Floodplain at Fallentimber BDA*

### Threats and Stresses

Threats and stresses described above for the Clearfield Creek Floodplain BDA also apply here, to both the Core Habitat Area and Supporting Natural Landscape. However, invasive species are not yet established at this site.

### Recommendations

Recommendations provided above for the Clearfield Creek Floodplain BDA also apply here, to both the Core Habitat Area and Supporting Natural Landscape. However, as invasive species are not yet established, monitoring for the presence of these species is recommended rather than eradication efforts.

## Slate Lick Run Wetlands BDA

### Description

*Core Habitat Area:* This BDA highlights wetland and forest communities in the backwater areas upstream of Glendale Lake along Slate Lick Run and Burgoon Run. These communities have an exceptionally diverse flora. The hydrological regime is obviously influenced by the dam, as the water in the streams flows at a much slower than normal rate. The topography is a mixture of upland areas, semi-saturated palustrine forest, and hydric wet woodlands with openings. The species composition of the herbaceous layer in the relatively dry areas is typical of a rich mesic site. The wetland areas have an exceptionally diverse mixture of species with very mixed dominance. In some areas, hairy sedge (*Carex lacustris*) is dominant; in other areas, upright sedge (*Carex stricta*), gray alder (*Alnus incana*), or black ash (*Fraxinus nigra*) is dominant.

Tree species include: red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), eastern white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*).

Shrub species include: gray alder (*Alnus incana*), American witchhazel (*Hamamelis virginiana*), winterberry (*Ilex verticillata*), chokeberry (*Photinia* sp.), pussy willow (*Salix discolor*), silky willow (*Salix sericea*), common elderberry (*Sambucus nigra* ssp. *canadensis*), white meadowsweet (*Spiraea alba* var. *latifolia*), and southern arrowwood (*Viburnum dentatum* var. *lucidum*).

Herbaceous species include: northern water plantain (*Alisma triviale*), Jack-in-the-pulpit (*Arisaema triphyllum*), purplestem beggarticks (*Bidens connata*), devil's beggarticks (*Bidens frondosa*), smallspike false nettle (*Boehmeria cylindrica*), brownish sedge (*Carex brunnescens*), fringed sedge (*Carex crinita*), northern long sedge (*Carex folliculata*), greater bladder sedge (*Carex intumescens*), hairy sedge (*Carex lacustris*), hop sedge (*Carex lupulina*), shallow sedge (*Carex lurida*), upright sedge (*Carex stricta*), white turtlehead (*Chelone glabra*), American golden saxifrage (*Chrysosplenium americanum*), a woodreed species (*Cinna* sp.), a dodder species (*Cuscuta* sp.), woodland horsetail (*Equisetum sylvaticum*), melic mannagrass (*Glyceria melicaria*), floating mannagrass (*Glyceria septentrionalis*), a mannagrass species (*Glyceria* sp.), fowl mannagrass (*Glyceria striata*), jewelweed (*Impatiens* sp.), a forget-me-not species (*Myosotis* sp.), cinnamon fern (*Osmunda cinnamomea*), Greek valerian (*Polemonium reptans*), halberdleaf tearthumb (*Polygonum arifolium*), arrowleaf tearthumb (*Polygonum sagittatum*), smooth rock skullcap (*Scutellaria saxatilis*), hemlock waterparsnip (*Sium suave*), roundleaf goldenrod (*Solidago patula*), wrinkle-leaf goldenrod (*Solidago rugosa*), a bur-reed species (*Sparganium* sp.), skunk cabbage (*Symplocarpus foetidus*), and king of the meadow (*Thalictrum pubescens*).

*Supporting Natural Landscape:* This area includes the immediate watershed upslope of the wetland, as this area influences the hydrological patterns that feed the wetland and the quality of the water reaching the wetland.

### Threats and Stresses

*Core Habitat Area:* Some invasive species are present, especially at the outer edges of the forest near the lake and the road. Species include bush honeysuckle (*Lonicera morrowii*) and multiflora rose (*Rosa multiflora*). These may spread to the interior and outcompete native vegetation. Timber removal would likely damage these communities, as the wetland soil and vegetation structure is fragile and increased light levels favor invasive species.

*Supporting Natural Landscape:* Release of ecologically detrimental pollutants—including pesticides, herbicides, excessive sediments, excessive nutrients, solvents, automotive chemicals, etc.— would degrade water quality and harm aquatic life. Amphibians, several species of which are likely utilizing the wetlands, are particularly vulnerable to chemical pollutants. Additionally, any activities that require substantial bedrock disturbance, earth-moving, or forest canopy removal upslope may change the hydrological patterns that feed the wetland.

### Recommendations

*Core Habitat Area:* Invasive species should be monitored, and if they are found to be increasing, control measures may need to be considered. When evaluating methods of controlling invasive species, consider the long-term consequences for the site, such as chemical pollution or physical disturbance, as well as the effectiveness of the method in controlling the species in question. The Nature Conservancy publishes species abstracts for many invasive species that summarize the species' ecology and growth characteristics, and provide information about control. These abstracts are available online at: <http://tncweeds.ucdavis.edu/esadocs.html>. Timber removal should be avoided in this area due to the sensitive wetland vegetation and soils.

*Supporting Natural Landscape:* All activities in this area should be considered in relation to their impact on water quality; release of chemical pollutants should be avoided. Substantial bedrock disturbances or earth-moving projects should be evaluated for hydrological impacts, and should not take place if they will alter the hydrological patterns feeding the wetland. Best management practices to control erosion should be used within the watershed for roads or any situation where bare soil is exposed. As forested areas help to filter pollutants and moderate hydrological patterns, preventing flash flooding, forest cover within the watershed should be maintained and increased where possible.

### **Killbuck Run BDA**

See description under Chest Township, pg. 61.



## GENERAL 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 available tools and resources 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 PNHP staff and 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 he or she wants 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 and animal habitat, high quality waters, forest land, and agricultural land. The land trust can often furnish technical expertise as a reference in developing plans.

Land acquisition by a conservation organization can be at fair market value or as a bargain sale in which a purchase price below fair market value is negotiated, with tax benefits that reduce or eliminate the disparity. Some NHAs that are scenic and do not contain highly sensitive species 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 an 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 overlaying 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 more detailed and ecologically specific management plans to ensure the continued existence of the associated natural elements. Site-specific recommendations from the NHI report should be incorporated into existing management plans or new plans should be prepared. Recommendations may include: removing 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, and 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.

Stewardship of Supporting Natural Landscape areas is also important in maintaining the long-term health of NHAs. For forest sites, an ecologically informed Forest Management Plan can be a good tool for long-term planning. 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.

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 critical are those that host high biodiversity or unique biological resources, supply drinking water, or are attractive recreational resources. Many rare species, unique natural communities, and locally significant habitats occur in wetlands and water bodies, and these resources are directly dependent on natural hydrological patterns and water quality for their continued existence. Ecosystem processes that operate when the watershed surrounding a body of water has a high degree of natural cover 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. Development proposals should be scrutinized for their impact on entire watersheds, not just on 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 disturbance of large pieces of land. County and township officials can encourage landowners to maintain buffer zones of natural native vegetation within riparian areas. Vegetated buffers (preferably of native plant species native to Pennsylvania) help reduce erosion and

sedimentation and provide cooling shade over the water. These conditions benefit 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) and natural resources agencies can provide further guidance regarding buffer considerations appropriate for various kinds of natural resources within NHAs, e.g., a shale barren community, wetland, water body, or forest.

Watersheds and 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 as sensitive as the portion directly occupied by the resource of concern. NHA maps provide “Supporting Natural Landscape” designation to highlight the importance of surrounding watersheds, while the occupied habitat areas are mapped as “Core Habitat Areas.” Recommendations tailored to the sensitivity of both categories are provided. 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.**

Any new developments should be sited within areas that have already seen past disturbances, and that can utilize existing infrastructure. Care should be taken to ensure that protected natural areas do not become "islands" surrounded by development. In these situations, the site is effectively isolated and its value for wildlife is reduced. Careful planning can maintain natural environments and the plants and animals associated with them. A balance between growth and the conservation of natural and scenic resources can be achieved by guiding development away from the most environmentally sensitive areas.

The reclamation of previously disturbed areas, or brownfield 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 right-of-ways), large pieces of the landscape can be maintained intact. If possible, networks or corridors of woodlands or greenspace linking sensitive natural areas to each other should be preserved.

**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 well-established populations might present difficult management challenges. Below is a list of sources for invasive species information.

- The Mid-Atlantic Exotic Plant Pest Council (MA-EPPC) is a non-profit 501(c)(3) organization 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>.
- The Natural Biodiversity Conservation Strategy is a local resource for addressing invasive species problems in Cambria County. The mission of NBCS is to conserve the native diversity of plants and animals within the ecosystem of south-central and southwestern Pennsylvania by nurturing harmonious interactions between natural populations and communities. The NBCS office is located in Johnstown. More information is available at the NBCS webpage: <http://www.naturalbiodiversity.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, and geographic distribution, as well as an evaluation of possible control techniques.
  - The Nature Conservancy's "Weeds on the Web" at <http://tncweeds.ucdavis.edu> provides links to excellent fact sheets on invasive biology and control.
  - 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/index.cfm>.
  - The following site is a national invasive species information clearinghouse listing numerous other resources on a variety of related topics: <http://www.invasivespecies.gov/>
  - Weeds Gone Wild: Alien Plant Invaders of Natural Areas is a project of the Plant Conservation Alliance. The website provides a compiled national list of invasive plants infesting natural areas throughout the U.S., background information on the problem of invasive species, illustrated fact sheets, management options, and suggested alternative native plants. [www.nps.gov/plants/alien](http://www.nps.gov/plants/alien).
  - <http://www.issg.org/database/welcome/> is the Global Invasives Species Database managed by the Invasive Species Specialist Group (ISSG) of the IUCN Species Survival Commission. It was developed as part of the global initiative on invasive species led by the Global Invasive Species Programme (GISP) and is supported through partnerships with the National Biological Information Infrastructure, Manaaki Whenua-Landcare Research and the University of Auckland.

**8. Incorporate County Natural Heritage Inventory information into planning efforts.** Through internal planning, decision-making related to land-use development, and participation in regional planning initiatives, counties and municipalities can profoundly shape the land and landscapes of Pennsylvania. Natural Heritage Areas can be readily included in comprehensive plans, greenway and open space plans, parks and recreation plans, and regional planning initiatives. DCNR-funded greenway and open space plans, Heritage Region plans, and River Conservation Plans are good examples of planning efforts that reach beyond county boundaries.

## 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 semi aquatic New World salamander. Ambystomid 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 calcium carbonate rocks.

**Calciophilic:** 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 molt (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 mycorrhizae 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.

## LITERATURE CITED

- Anderson, M.G., and B. Vickeray. In press. Scaling the coarse filter: determining the adequate size of ecosystem-based reserves. *Conservation Biology*.
- Anderson, R.C., and T. M. Kelley. 1995. Growth of garlic mustard (*Alliaria petiolata*) in native soils of different acidity. *Transactions of the Illinois State Academy of Science* 88: 91-96.
- Anonymous. 1985. A preliminary inventory of natural areas of the Hoosier National Forest. Indiana Department of Natural Resources, Indianapolis, Indiana. Unpublished report. 197 p.
- Appalachia Working Group of the Forest Stewardship Council – US. 2005. Appalachia (USA) Regional Forest Stewardship Standard Version 4.2 – Final. 67p.
- Arkansas Forestry Commission. Best Management Practices Guidelines: Roads. Available online at: <http://www.forestry.state.ar.us/bmp/roads.html> Accessed: May 2004.
- Best, T.L., and J.B. Jennings. 1997. *Myotis leibii*. *Mammalian Species* 547:1-6.
- Blaustein, A. R., D. B. Wake, and W. P. Sousa. 1994. Amphibian declines: judging stability, persistence, and susceptibility of populations to local and global extinctions. *Conservation Biology* 8:60-71.
- Brody, A. J., and M. R. Pelton. 1989. Effects of roads on black bear movements in western North Carolina. *Wildlife Society Bulletin* 17:5-10.
- Ciszek, D. 2002. "Lynx rufus" Animal Diversity Web. Accessed March 19, 2005 at [http://animaldiversity.ummz.umich.edu/site/accounts/information/Lynx\\_rufus.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Lynx_rufus.html)
- Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. <http://www.npwrc.usgs.gov/resource/othrdata/wetloss/wetloss.htm> (Version 16JUL97).
- 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.
- Fike, J. 1999. Terrestrial and palustrine plant communities of Pennsylvania. Pennsylvania Natural Diversity Inventory. 86 p.
- Forman, R. T., and L. E. Alexander. 1998. Roads and their major ecological effects. *Annual Review of Ecology and Systematics* 29:207-231.
- Forman, R. T., and D. R. Deblinger. 2000. The ecological road-effect zone of a Massachusetts (U.S.A.) suburban highway. *Conservation Biology* 14:36-46.
- Frappier, B., and R.T. Eckert. 2003. Utilizing the USDA PLANTS database to predict exotic woody plant invasiveness in New Hampshire. *Forest Ecology and Management* 185:207-215.
- Getz, L.L., L. Verner, and M. Prather. 1977. Lead concentrations in small mammals living near highways. *Environmental Pollution* 13:151-157.

- Goodrich, L. J., M. Brittingham, J.A. Bishop, and P. Barber. 2003. Wildlife habitat in Pennsylvania: past, present, and future. Pennsylvania Department of Conservation and Natural Resources.
- Hairston-Strang, A. 2005. Riparian Forest Buffer Design and Maintenance. Maryland Department of Natural Resources, Forest Service. Annapolis, MD.
- Greenberg, C.H., S.H. Crownover, and D.R. Gordon. 1997. Roadside soils: a corridor for invasion of xeric scrub by nonindigenous plants. *Natural Areas Journal* 17:99-109.
- 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. Harrisburg, PA. <http://www.dcnr.state.pa.us/wlhabitat/>
- Haskell, D. G. 2000. Effects of forest roads on macroinvertebrate soil fauna of the southern Appalachian Mountains. *Conservation Biology* 14:57-63.
- Hobbs, R.J. 2001. Land-use changes and invasions. In: Mooney, H.A., Hobbs, R.J. (Eds.), *Invasive Species in a Changing World*. Island Press, Washington, DC, pp. 55-64.
- Hudy, M., T.M. Thieling, N. Gillespie, and E.P. Smith. 2005(?). Distribution, status and threats to brook trout within the eastern United States. Eastern Brook Trout Joint Venture. 76p. Available at: [http://saindev.seris.info/gis\\_apps/proj/brooktrout/doc/Assessment2.pdf](http://saindev.seris.info/gis_apps/proj/brooktrout/doc/Assessment2.pdf)
- Lynch, J. F., and D. F. Whigham. 1984. Effects of forest fragmentation on breeding bird communities in Maryland, USA. *Biological Conservation* 28:287-324.
- Matlack, G. R. 1993. Microenvironment variation within and among forest edge sites in the eastern United States. *Biological Conservation* 66:185-194.
- Massachusetts Executive Office of Environmental Affairs. 2001. BioMap: Guiding Land Conservation for Biodiversity in Massachusetts. Boston, MA.
- Mazur, K. M., and P. C. James. 2000. Barred Owl (*Strix varia*). In *The Birds of North America*, No. 508 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Murcia, C. 1995. Edge effects in fragmented forests: implications for conservation. *Trends in Ecology & Evolution* 10:58-62.
- Myers, W., J. Bishop, R. Brooks, T. O'Connell, D. Argent, G. Storm, J. Stauffer, and R. Carline. 2000. The Pennsylvania Gap Analysis Project Final Report. The Pennsylvania State University and U.S. Geological Survey, University Park, PA. 142 p.
- 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.
- Nash, B.L., D.D. Davis and J.M. Skelly. 1992. Forest health along a wet sulfate/pH deposition gradient in north-central Pennsylvania. *Environmental Toxicology and Chemistry* 11: 1095-1104.
- NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.3. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>

- Ohio Department of Natural Resources. 2006. Beech Bark Disease. <http://www.ohiodnr.com/forestry/health/beechnbark.htm>
- Opler, P.A., H. Pavulaan, and R.E. Stanford (coordinators). 1995. Butterflies of North America. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm> (Version 12DEC2003).
- Ostroumov, S.A. 2002. New definitions of the concepts and terms ecosystem and biogeocenosis. *Doklady Biological Sciences* 383:141-143(3).
- Oxley, D. J., M. B. Fenton, and G. R. Carmody. 1974. The effects of roads on populations of small mammals. *Journal of Applied Ecology* 11:51-59.
- PA-DEP. 2006. "Pennsylvania Integrated Water Quality Monitoring and Assessment Report." PA Department of Environmental Protection, Bureau of Watershed Conservation. Harrisburg, PA
- Palone, R.S., and A.H. Todd, eds. 1998. Chesapeake Bay Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers. Chesapeake Bay Program & Northeastern Area, USDA Forest Service. Annapolis, MD & Morgantown, WV. Available online at: <http://www.chesapeakebay.net/pubs/subcommittee/nsc/forest/handbook.htm>
- Parendes, L.A., and J.A. Jones. 2000. Role of light availability and dispersal in exotic plant invasion along roads and streams in the H. J. Andrews Experimental Forest, Oregon. *Conservation Biology* 14:64-75.
- Pennsylvania 21st Century Environment Commission. 1998. Report of the 21st Century Environment Commission. Available at: <http://www.21stcentury.state.pa.us/2001/final.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.
- Robbins, C.S., J.R. Sauer, R. Greenberg and S. Droege. 1989. Habitat area requirements of breeding birds of the middle Atlantic states. *Wildlife Monograph* 103:1-34.
- Robbins, C.S. 1980. Effects of forest fragmentation on breeding bird populations in the piedmont of the Mid-Atlantic Region. *Atlantic Naturalist* 33: 31-36.
- Robinson, W. D. 1995. Louisiana Waterthrush (*Seiurus motacilla*). In A. Poole and F. Gill, editors. *The Birds of North America*, No. 151. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.
- Schmidt, W. 1998. Plant dispersal by motor cars. *Vegetatio* 80: 147-152.

- Seiler, A. 2001. Ecological effects of roads: a review. Introductory Research Essay No. 9, Swedish University of Agricultural Sciences, Upsala, Sweden.
- Semlitch, R.D. and J.R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. *Conservation Biology* 17: 1219–1228
- Silveri, A., Dunwiddie, P.W., and H.J. Michaels. 2001. Logging and edaphic factors in the invasion of an Asian woody vine in a mesic North American forest. *Biological Invasions* 3:379-389.
- Smith, T.L. 1991. *Natural ecological communities of Pennsylvania*. Pennsylvania Natural Diversity Inventory. Department of Environmental Resources. 112 p.
- Squires, J. R., and R. T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*). In *The Birds of North America*, No. 298 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Thorne, S. G., K. C. Kim and K. C. Steiner, Eds. (1996). *A Heritage for the 21st Century: Conserving Pennsylvania's Native Biological Diversity*. Pennsylvania Fish and Boat Commission. Harrisburg, PA. 60 p.
- Trombulak, S. C., and C. A. Frissell. 2000. Review of the ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology* 14:18-30.
- Upper St. Clair Township, Department of Deer Management. 2005. Deer Management Updates. Available at: <http://www.twpusc.org/admin/deer/updates.htm>
- USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- Watkins, R. Z., J. Chen, J. Pickens, and K. D. Brosofske. 2003. Effects of forest roads on understory plants in a managed hardwood landscape. *Conservation Biology* 17:411-419.
- Western Pennsylvania Conservancy and The Nature Conservancy. 2002. Classification, Assessment and Protection of Floodplain Wetlands of the Susquehanna Drainage. Report to U.S. EPA and Pennsylvania DCNR; U.S. EPA Wetlands Protection State Development Grant n. CD-993731.
- Williams, C. E. 1995. Effects of powerline corridors on forest ecosystem integrity. Pages 76-86 in S. K. Majumdar, E. W. Miller, and F. J. Brenner, editors. *Environmental Contaminants, Ecosystems and Human Health*. Pennsylvania Academy of Science, Easton, PA.
- Yahner, R. H. 1995. *Eastern deciduous forest: ecology and wildlife conservation*. University of Minnesota Press, Minneapolis, MN. 220 p.

## 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 Cambria 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 is of a good size and extent and is 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. In 2006 the Pennsylvania Science Office of TNC dissolved, and its heritage program staff moved under the administration of the Western Pennsylvania Conservancy. Today the PNHP is a partnership between the WPC-administered science staff and the state agencies charged with managing natural resources: the Pennsylvania Department of Conservation and Natural Resources, the Pennsylvania Fish Commission, and the Pennsylvania Game Commission.

The PNHP is part of a network of natural heritage programs and conservation data centers 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, Latin America, and the Caribbean.

PNHP collects and stores geographical 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 9,000 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 800 plant and animal species, and about 1100 managed areas. As part of its function, PNHP provides reviews of projects that require permits issued by the Pennsylvania Department of Environmental Protection. 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 PNHP to identify the areas of highest natural integrity and significance in Cambria County.





## 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<br>RANK | STATE<br>RANK |
|--|----------------|---------------|
| <b>TERRESTRIAL FORESTS:</b>                            |                |               |
| 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            |
| 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            |

| COMMUNITY NAME   | GLOBAL RANK | STATE RANK |
|--|-------------|------------|
| <i>TERRESTRIAL FORESTS (cont'd.):</i>                  |             |            |
| 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       |
| 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         |

| COMMUNITY NAME  | GLOBAL RANK | STATE RANK |
|---|-------------|------------|
| <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         |
| <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         |

| COMMUNITY NAME | GLOBAL RANK | STATE RANK |
|----------------|-------------|------------|
|----------------|-------------|------------|

*HERBACEOUS WETLANDS (cont'd.):*

|   |      |      |
|---|------|------|
| 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   |

*COMMUNITY COMPLEXES:*

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 |
|----------------|-------------|------------|
|----------------|-------------|------------|

*SUBTERRANEAN COMMUNITIES:*

|                                     |    |      |
|-------------------------------------|----|------|
| Solution Cave Terrestrial Community | G? | S3   |
| Solution Cave Aquatic Community     | G? | S3   |
| Tectonic Cave Community             | G? | S3S4 |
| Talus Cave Community                | G? | S2S4 |

*DISTURBED COMMUNITIES:*

|                            |    |    |
|----------------------------|----|----|
| 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? |

*ESTUARINE COMMUNITIES:*

|                                  |      |    |
|----------------------------------|------|----|
| Deepwater Subtidal Community     | G?   | S1 |
| Shallow-Water Subtidal Community | G?   | S1 |
| Freshwater Intertidal Mudflat    | G3G4 | S1 |
| Freshwater Intertidal Marsh      | G3G4 | S1 |

| COMMUNITY NAME                               | GLOBAL RANK | STATE RANK |
|--|-------------|------------|
| <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       |
| <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<sub>a</sub>: 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 Diversity Inventory for more information.}

## APPENDIX V<sub>b</sub>: 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 populations 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<sub>c</sub>: 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 CAMBRIA COUNTY

*Documented in the Pennsylvania Natural Diversity Inventory database since 1984*

| <b>Scientific Name</b>         | <b>Common Name</b>      | <b>State Rank</b> | <b>Global Rank</b> | <b>Pg. #</b>   |
|--------------------------------|-------------------------|-------------------|--------------------|----------------|
| <u>Plants</u>                  |                         |                   |                    |                |
| <i>Cimicifuga americana</i>    | Mountain bugbane        | S3                | G4                 | 91, 169        |
| <i>Cryptogramma stelleri</i>   | Slender rock-brake fern | S1                | G5                 | 107            |
| <i>Filipendula rubra</i>       | Queen-of-the-prairie    | S1S2              | G4G5               | 88             |
| <i>Scirpus ancistrochaetus</i> | Northeastern bulrush    | S3                | G3                 | 77             |
| <i>Viola appalachiensis</i>    | Appalachian blue violet | S2                | G3                 | 88, 47,<br>170 |
| <u>Animals</u>                 |                         |                   |                    |                |
| <i>Myotis septentrionalis</i>  | Northern myotis         | S3B,S3N           | G4                 | 99             |
| <i>Neotoma magister</i>        | Allegheny woodrat       | S3                | G3G4               | 107            |

## 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:

Forest Stewardship Program  
DCNR - Bureau of Forestry  
Rachel Carson State Office Building  
400 Market Street  
P.O. Box 8552  
Harrisburg, PA 17105-8552  
(717) 787-2106

The *Forest Legacy Program* acts to purchase conservation easements or titles 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  
Rachel Carson State Office Building  
400 Market Street  
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.sfiopa.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](mailto:sfi@penn.com)

*Forest Landowner Associations* provide information and educational programs to help members better manage their forest resources. For more information, contact:

S.W. Pennsylvania Woodland Owners Association  
195 E. High Street  
Waynesburg, PA 15370  
(724) 627-6624

The *Forest Stewards Volunteer Program* has an excellent web site providing general information and links to publications on sustainable forestry.  
<http://vip.cas.psu.edu/index.html> (link to PA Forest Stewards.cas.psu.edu)

## APPENDIX VIII: 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.

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](http://www.epa.gov/wed/pages/ecoregions/na_eco.htm). Accessed: March 2004.

Farley, W.H. 1985. Soil survey of Cambria County, Pennsylvania. United States Department of Agriculture, Soil Conservation Service ; in cooperation with the Pennsylvania State University, College of Agriculture and Pennsylvania Department of Environmental Resources, State Conservation Commission. 128p.

Local roadways in Cambria County, Pennsylvania. 2003. Pennsylvania Department of Transportation, Bureau of Planning and Research, Geographic Information Division.

Maryland Department of Natural Resources Forest Service. 2005. Riparian Forest Buffer Design and Maintenance. Compiled by A. Hairston-Straing. DNR Publication No. 02-5312005-31. Available online: [http://www.stroudcenter.org/research/rfb\\_designmaintenance.pdf](http://www.stroudcenter.org/research/rfb_designmaintenance.pdf)

National Elevation Dataset for Cambria 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.

USGS 1:24,000 Topographic quadrangles. Pennsylvania Spatial Data Access (PASDA), downloaded 2000. <http://www.pasda.psu.edu/>

## **APPENDIX IX: SPECIES FACT SHEETS**

# Allegheny woodrat

## *Neotoma magister*

### Description:

The Allegheny woodrat is a small mammal in the Muridae family, the group including mice, hamsters, and lemmings. It is similar in appearance to the common brown (or Norway) rat, *Rattus norvegicus*, but it has a blunter snout, larger ears, and a furred tail. The Allegheny woodrat is also more gray in color than brown, and its feet and underside are white. Woodrats grow up to 46.5 centimeters long, and weigh up to 447 grams.

Woodrats live up to live up to three years. Females give birth to up to four litters of two or three young every year, usually in the early spring through late summer. Their diet is varied, including green vegetation, seeds, nuts, fruit and berries, and a few insects.

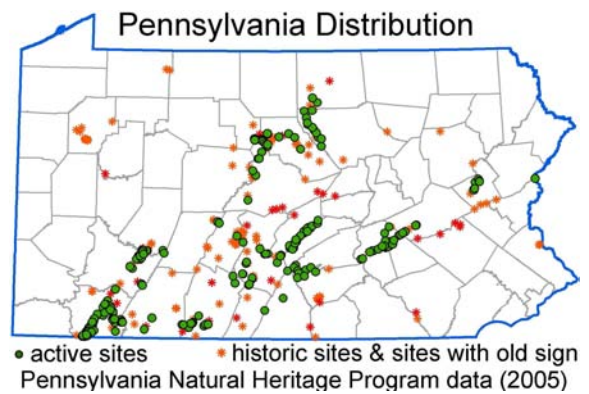
### Where it is found:

Allegheny woodrats nest in caves and crevices between boulders in rocky outcroppings or slopes in mountain woods. They are relatively far-ranging for rodents, moving up to 1000 m in an hour to forage for food. Woodrats prefer den sites in mature forest with thick, diverse undergrowth, which provides them good foraging ground.

Woodrat nests include space for caches which contain food for the winter and a wide variety of found objects such as coins, paper,

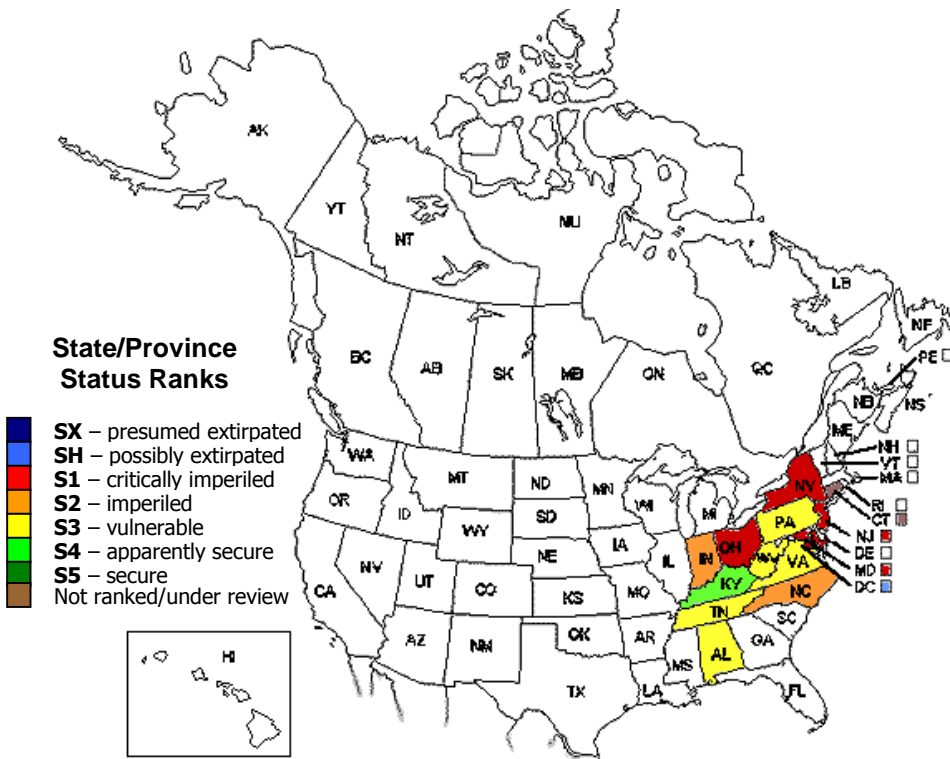


Photo: Dr. Stephen Castleberry



### North American State/Province Conservation Status

Map by NatureServe



bones, rubber bands, feathers, and other debris collected from human and animal leavings, giving the woodrat its other common name, “packrat.” Woodrats also establish latrine areas outside their nests.

### Why it is rare:

Allegheny woodrat population declines were first noticed in the 1970s, and a number of different factors are involved. Woodrats’ food supply has been reduced by loss of chestnut trees to chestnut blight and by gypsy moth destruction of oak trees. Human development can increase woodrat predation by great horned owls, which prefer to hunt in agricultural areas. Because woodrats need specialized habitat for nesting, they may not be able to colonize new areas when the woods around their rocky homes are logged. Surface mining, which may entirely remove the rocky tops of mountain ridges, directly destroys woodrat nest sites, and human spelunkers may disturb woodrat colonies in and around caves.

However, the raccoon parasite *Baylisascaris procyonis* has emerged as a major cause of woodrat declines. *B. procyonis* is a roundworm that lives in raccoons' intestines, which infects woodrats when they forage for undigested seeds in raccoon latrines. Though the parasite is fatal to woodrats, it does not harm raccoons, so raccoon populations serve as reservoirs for *B. procyonis* – and because raccoons are comfortable living around humans, increasing agricultural and residential development in proximity to woodrat habitat brings more raccoons into contact with woodrats. One study (LoGiudice 2003) has showed that the success of re-introduced Allegheny woodrat populations was significantly reduced in areas with heavier contamination by *B. procyonis*.

**NatureServe conservation status ranks:**

**G3G4** – vulnerable to apparently secure

**S3** – vulnerable within Pennsylvania

**Conservation considerations:**

Recovery of Allegheny woodrat populations will require concerted effort on multiple issues. Preservation of large tracts of undisturbed forest around woodrat colonies will be extremely important to their success. Today in Pennsylvania, the largest and most persistent populations of woodrats are also in the most remote and intact forested areas, while few woodrat populations are documented from more fragmented settings. In a landscape where forest is heavily fragmented, raccoons and other predators are far more prevalent than in intact forest settings, greatly increasing the likelihood of woodrat exposure to disease or predation. Construction of boulder piles or slopes as part of mine reclamation projects can help to replace habitat lost to mining, and either planting or managing for fruit and nut-bearing plant species will assure a food supply.



Pennsylvania Natural Heritage Program



Saving the places we care about

**References**

- Balcom, Betsie J. and Richard H. Yahner. 1996. "Microhabitat and landscape characteristics associated with the threatened Allegheny woodrat." *Conservation Biology*, 10(2): 515-25.
- Castleberry, Nikole L., Steven B. Castleberry, W. Mark Ford, Petra Bohall Wood, and Michael T. Mengak. 2002. "Allegheny woodrat (*Neotoma magister*) food habits in the central Appalachians." *American Midland Naturalist*, 147: 80-92.
- Castleberry, Steven B., Petra Bohall Wood, W. Mark Ford, Nikole L. Castleberry, and Michael T. Mengak. 2002. "Summer microhabitat selection by foraging Allegheny woodrats (*Neotoma magister*) in a managed forest." *American Midland Naturalist*, 147: 93-101.
- Chamblin, H. Douglas and Petra Bohall Wood. 2004. "Allegheny woodrat (*Neotoma magister*) use of rock drainage channels on reclaimed mines in southern West Virginia." *American Midland Naturalist*, 151: 346-54.
- Costello, Robert and Alfred Rosenberger. n.d. "North American Mammals [web application]." Washington, DC: United States Museum of Natural History. Available at <http://web6.si.edu/mna/>. Accessed 10 March 2005.
- LoGiudice, Kathleen. 2001. "Latrine foraging strategies of two small mammals: implications for the transmission of *Baylisascaris procyonis*." *American Midland Naturalist*, 146(2): 369-78.
- ——. 2003. "Trophically transmitted parasites and the conservation of small populations: raccoon roundworm and the imperiled Allegheny woodrat." *Conservation Biology*, 17(1): 258-66.
- Mengak, Michael T. 2002. "Reproduction, juvenile growth, and recapture rates of Allegheny woodrats (*Neotoma magister*) in Virginia." *American Midland Naturalist*, 148: 155-62.
- Merritt, Joseph F. 1987. *Guide to the Mammals of Pennsylvania*. Pittsburgh: University of Pittsburgh Press. 186-90.
- NatureServe. 2004. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.1. NatureServe, Arlington, Virginia. Available at <http://www.natureserve.org/explorer>. Accessed 10-11 March 2005.

# Mountain bugbane

## *Cimicifuga americana*

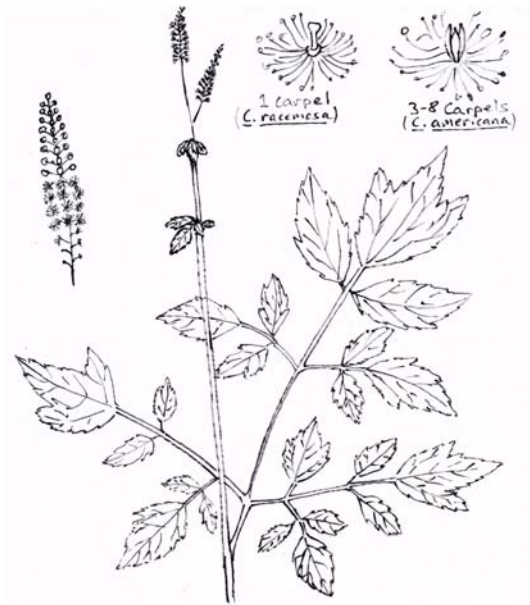
### What it looks like:

Mountain bugbane, *Cimicifuga americana*, is a perennial herb that grows from one to one and a half meters (three to four feet) tall.

**Leaves** are compound, with terminal leaflets large, toothed, and deeply cleft; other leaflets oval to wedge-shaped with sharply defined teeth. All leaflets are less than 10 centimeters (four inches) long.

**Flowers:** a slender raceme (up to 1 ft. tall) of tiny white flowers; no petals; short-lived sepals; most conspicuous feature is the spray of many white stamens; strong foul odor attracts flies for pollination; flowers open from base upward on spike.

Can be distinguished from the very similar looking species black cohosh (*Cimicifuga racemosa*) because it has three or more carpels instead of only one, and its seed pods are stalked.

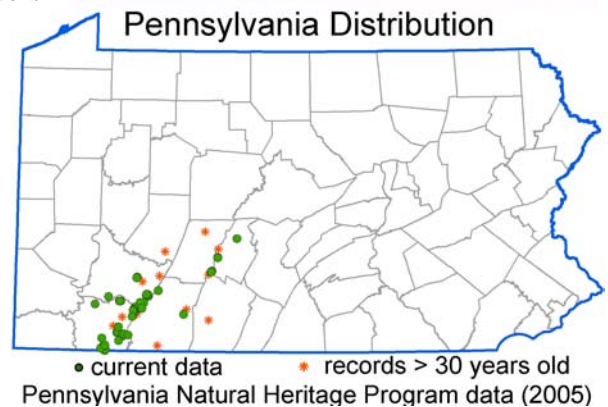


### Where it is found:

Mountain bugbane grows in rich hardwood forests, often in the same habitat as hemlock, on north-facing mountainsides or the wooded corridors that follow mountain streams. It is restricted to the central Appalachians, from Pennsylvania south to Georgia and as far west as Illinois.

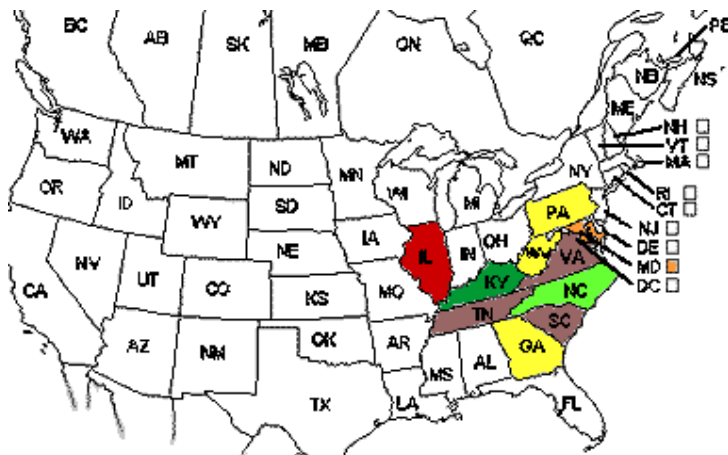
### Why it is rare:

Mountain bugbane is primarily endangered by development and clearcutting of its habitat, but populations have also suffered from harvesting pressure. Although mountain bugbane is not particularly valuable in itself, its similar-looking relative black cohosh is a highly sought-after medicinal herb. Between 300,000 and 500,000 pounds of black bugbane were collected from the wild for sale in 1999, and some of this was almost certainly mountain bugbane.



### North American State/Province Conservation Status

Map by NatureServe



### State/Province Status Ranks

|    |                         |
|----|-------------------------|
| SX | presumed extirpated     |
| SH | possibly extirpated     |
| S1 | critically imperiled    |
| S2 | imperiled               |
| S3 | vulnerable              |
| S4 | apparently secure       |
| S5 | secure                  |
|    | Not ranked/under review |

### NatureServe conservation status ranks:

**G4** – apparently secure worldwide  
**S3** – vulnerable within Pennsylvania

### Conservation considerations:

Much is still unknown about where mountain bugbane grows and how secure its existing populations are. Information about how often it is collected with black bugbane would greatly aid conservation efforts. Given present information, habitat conservation is what this species most requires.

### References

- Gleason, Henry A. and Arthur Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Second ed. New York: The New York Botanical Garden. 49.
- NatureServe. 2004. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed 23 February 2005).
  - United States Department of Agriculture-Natural Resources Conservation Service. 2005. The PLANTS Database [web application]. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. Available at <http://plants.usda.gov>. Accessed 23 February 2005.

# Appalachian blue violet

## *Viola appalachiensis*

### What it looks like:

The Appalachian blue violet is a low-growing herb with perennial stems which first grow upright but eventually lay flat and grow roots, facilitating the plant's spread. Later in the season, the plant often has a distinct mat-forming habit. It is very similar to Walker's violet (*Viola walkeri*) and the American dog-violet (*V. conspersa*), and it was once thought to be a hybrid of these species. However American dog-violet's stems are deciduous, dying away every year; and the leaves of Walker's violet are covered in fine hair, where those of the Appalachian blue violet are almost entirely smooth.

**Flowers** are pale violet with darker stripes, with one petal forming a spur that extends behind the corolla.

**Leaves** are wide and heart-shaped with shallow, rounded teeth.

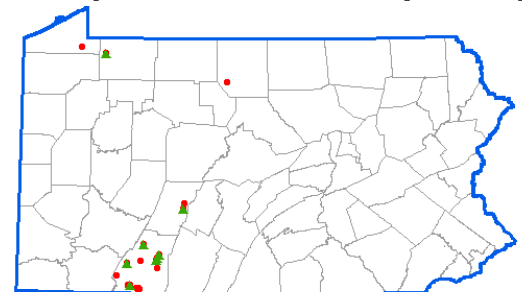


Western Pennsylvania Conservancy 2002

### Where it is found:

Appalachian blue violets grow in serpentine barrens and rich forests in the southern Appalachian mountains. It has only been found in Pennsylvania, West Virginia, Maryland, and North Carolina. They also grow well in disturbed areas, and have been found on ground that is regularly mowed, on dirt roads, and in old fields.

### Pennsylvania Distribution by County



▲ current data • records > 30 years old (1975)  
Pennsylvania Natural Heritage Program data 2005

### North American State/Province Conservation Status

Map by NatureServe



#### State/Province Status Ranks

- SX – presumed extirpated
- SH – possibly extirpated
- S1 – critically imperiled
- S2 – imperiled
- S3 – vulnerable
- S4 – apparently secure
- S5 – secure
- Not ranked/under review

#### NatureServe conservation status ranks:

- G3 – considered vulnerable worldwide
- S2 – imperiled in Pennsylvania

### Why it is rare:

The primary reason for concern with this species is its limited global range. However, it is thought that this species has been frequently overlooked and may be more common than records indicate, and in most of its range most of the documented populations still exist.

**Conservation considerations:** Since the Appalachian blue violet seems to colonize human-disturbed areas, it has strong prospects for recovery. Certainly the species would benefit from measures to control or extirpate invasive exotic competitors; reduction of habitat fragmentation and land-use conversion may also help.

### References

- Ballard, Harvey E and Daniel E. Wujek. 1994. Evidence for the Recognition of *Viola appalachiensis*. *Systematic Botany*. 19(4): 523-38.
- Gleason, Henry A. and Arthur Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. Second ed. New York: The New York Botanical Garden. 162.
- NatureServe. 2004. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.1. NatureServe, Arlington, Virginia. Available at <http://www.natureserve.org/explorer>. Accessed 13 January 2005.
- Weakley, A.S. 2004. *Flora of the Carolinas, Virginia, and Georgia* [working draft of 17 March 2004]. University of North Carolina Herbarium, Chapel Hill, North Carolina. Available online at <http://www.herbarium.unc.edu/flora.htm>. Accessed 13 January 2005.
- United States Department of Agriculture - Natural Resources Conservation Service. 2005. **The PLANTS Database** [web application]. National Plant Data Center, Baton Rouge, Louisiana. Available at <http://plants.usda.gov>. Accessed 13 January 2005.



Pennsylvania Natural Heritage Program



Saving the places we care about

# Northeastern Bulrush

## *Scirpus ancistrochaetus*

### What it looks like:

Northeastern bulrush is a perennial member of the Cyperaceae (sedge) family. It produces flowering stems from woody underground rhizomes. These stems measure between 0.8 and 1.2 m tall.

**Leaves:** the lower leaves measure up to 8 mm wide and are 40-60 times as long as wide, the uppermost leaf measures between 3-5 mm in width and its length is 30-50 times the width

**Flowers:** appearing in June and July, the inflorescence rays are about 6.3 cm long and contain clusters of brown spikelets, a distinguishable characteristic of *S. ancistrochaetus* is that the seedheads droop at the end of arching stalks; in related, similar-looking species, the stalks of the seedheads are straight, and at least some point upward.



### Where it is found:

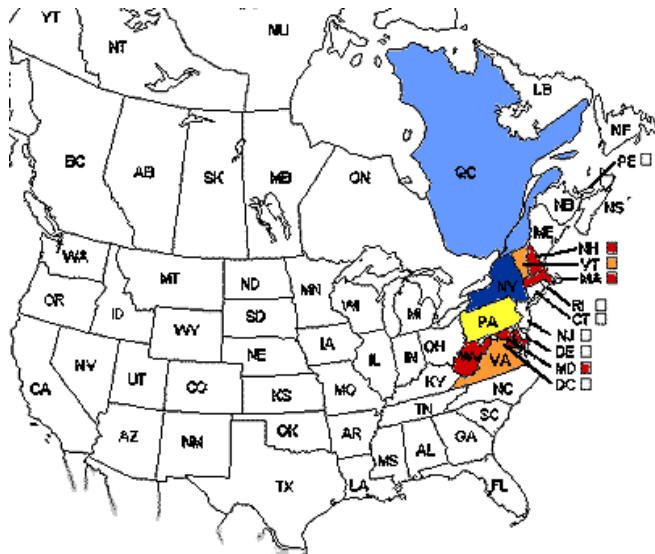


Vernal pond—grasses in center, edged in cinnamon fern

In Pennsylvania, the northeastern bulrush is found almost exclusively in vernal pools where the water level fluctuates seasonally. Related species of bulrush will inhabit a broader range of wetland habitats, and can be found growing in beaver ponds, meadows, or even tire ruts, but the northeastern bulrush appears to be restricted to actual vernal ponds. In other parts of its range, it has been known to inhabit wet depressions, bogs, and other small wetlands where the water level drops through the summer. It is often found at the water's edge or in a few centimeters of water but can also occur in deeper water. It can be found in the Appalachians from southern Vermont and New Hampshire to western Virginia. Although its range is broad, the species is concentrated in Pennsylvania, where 56 of the 85 known populations occur.

### Why it is rare:

The plant is naturally limited to a very specific habitat type, fluctuating vernal pools. Some examples of this habitat have been degraded by human activity. Because slight variations in the natural fluctuation in the water level can harm this plant, activities that impact the water table can make a pond uninhabitable to the bulrush. Other causes of habitat degradation are development, ATV use, agriculture, quarrying, and dredging. Other potential threats to the species include deer browsing, fire, and natural succession; more study is needed to determine whether these factors are significant to the bulrush.



### North American State/Province Conservation Status

Map by NatureServe

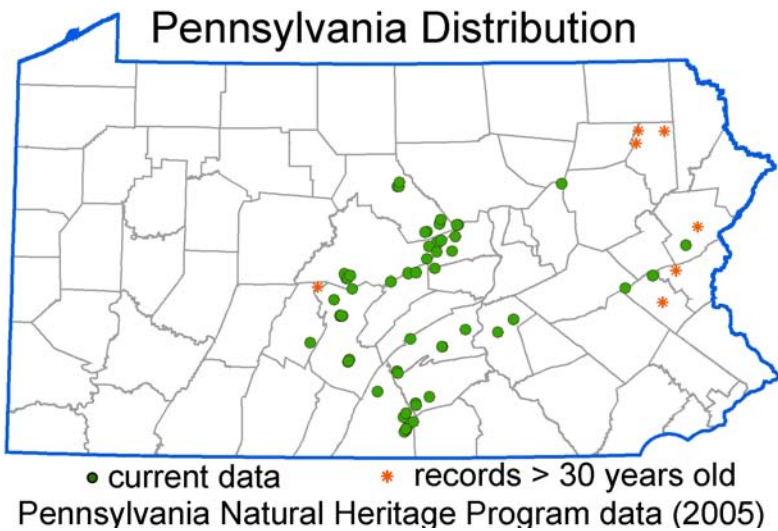
#### State/Province Status Ranks

|   |                                  |
|---|----------------------------------|
| <span style="color: blue;">■</span>       | <b>SX</b> – presumed extirpated  |
| <span style="color: lightblue;">■</span>  | <b>SH</b> – possibly extirpated  |
| <span style="color: red;">■</span>        | <b>S1</b> – critically imperiled |
| <span style="color: orange;">■</span>     | <b>S2</b> – imperiled            |
| <span style="color: yellow;">■</span>     | <b>S3</b> – vulnerable           |
| <span style="color: lightgreen;">■</span> | <b>S4</b> – apparently secure    |
| <span style="color: green;">■</span>      | <b>S5</b> – secure               |
| <span style="color: pink;">■</span>       | Not ranked/under review          |
| <span style="color: purple;">■</span>     | exotic                           |

#### Natureserve Conservation Status Ranks:

**G3:** either very rare and local throughout its range or found locally in a restricted range or because of other factors making it vulnerable to extinction throughout its range

**S3:** rare or uncommon in the state



### Conservation considerations:

The northeastern bulrush became the second plant in Pennsylvania to be listed as a federally endangered species. Because of this special status, activities that pose a direct harm to the species would be subject to regulation by the U.S. Army Corps of Engineers. A five-year plan has been developed to monitor existing populations and conduct research on the biology of the plant in order to determine what conservation measures could adequately protect the species and its habitat. Despite its legal protection, populations of the northeastern bulrush that have not yet been officially documented may be threatened. Conservation of the vernal ponds where there are known populations, and inventory of unsurveyed vernal ponds in the state are the most important needs to ensure this species' health.

| State                      | # of populations |
|----------------------------|------------------|
| New Hampshire              | 8                |
| Vermont                    | 16               |
| New York                   | 0                |
| Massachusetts              | 1                |
| West Virginia              | 3                |
| Maryland                   | 1                |
| <b><u>Pennsylvania</u></b> | <b>56</b>        |



Saving the places we care about

### References

- Gleason, Henry A. and Arthur Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. Second ed. New York: The New York Botanical Garden. 624.
- NatureServe. 2004. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed 2 March 2005.
- Schuyler, Alfred E. 1962. A New Species of *Scirpus* in the Northeastern United States. *Rhodora* 64:43-49.
- Virginia Natural Heritage Program, personal communication
- West Virginia Natural Heritage Program data, personal communication
- New Hampshire Natural Heritage Program data, personal communication
- Vermont Natural Heritage Program, personal communication.