

Northumberland County Greenways and Open Space Plan

Northumberland County Commissioners

Frank J. Sawicki, Chairman

Vinny Clausi

Merle H. Phillips

Northumberland County Planning Department

Pat Mack, Director

Kathy Jeremiah, Project Coordinator

Consultants

Urban Research and Development
Corporation

Bethlehem, PA

in association with

Mid-Penn Engineering
Lewisburg, PA

This plan was financed in part by a grant from the Community Conservation Partnerships Program, Keystone Recreation, Park and Conservation Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation.

This plan was financed in part by a grant from the Land Use Planning and Technical Assistance Program of the Pennsylvania Department of Community and Economic Development.

INTRODUCTION

Greenway. . . The word is almost a self-description, evoking images of meadows, forests, streams, and wildlife. The word “greenway” is a combination of England’s “greenbelt” and famed New York City architect Frederick Law Olmsted’s “parkway” and is defined as:

“1. A linear open space established along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, scenic road, or other route. 2. Any natural or landscaped course for pedestrian or bicycle passage. 3. An open-space connector linking parks, natural reserves, cultural features, or historic sites with each other and with populated areas. 4. Locally, certain strip or linear parks designated as a parkway or greenbelt.”¹

As the importance of land conservation increased throughout the United States, the greenway concept grew in popularity. In Northumberland County, the Susquehanna River and Mahanoy Creek expand the concept to include the conservation of waterways.

Greenways also provide an important resource in the county’s park and recreation system. Parks are key activity centers, or “nodes”, that are often connected within a greenway system.

Open spaces are also critical elements of the Northumberland County landscape. Open space allows many natural and environmental functions to occur unimpeded by the encroachment of development and also provides visual relief from the built environment.

The *Northumberland County Greenways and Open Space Plan* performs several related functions. The plan:

- Reviews background conditions in the county that affect greenways and open space.
- Defines greenway types within the county.
- Proposes a network of greenways.
- Proposes a network of open space.
- Proposes specific actions to implement the study recommendations.
- Provides information on resources to help with implementation.

¹ Little, Charles, *Greenways for America*, The Johns Hopkins University Press, Baltimore and London, 1995, p. 1

CONTENTS

PAGE

Contents i

Executive Summary vii

Introduction 1-1

 Greenway Types and Functions 1-2

 Greenway Benefits 1-5

 Study Purposes 1-8

 Study Organization 1-8

 Study Development 1-9

 How to Use the Study 1-10

Current Conditions 2-1

 Planning Framework 2-1

Pennsylvania Greenways—An Action Plan for Creating Connections (June 2001) 2-1

Pennsylvania Outdoors; The Keystone for Health Living (September 2009) 2-2

Northumberland County Comprehensive Plan (June 2005) 2-3

Susquehanna River Water Trail—West Branch, Stewardship and Conservation Plan (August 2009) ... 2-4

Central Susquehanna Valley Thruway Interchange Study (July 2005) 2-4

Central Susquehanna Valley Thruway Gateway Project (March 2007) 2-4

Northumberland County Greenways and Open Space Plan

	<u>PAGE</u>
<i>Susquehanna Greenway Strategic Action Plan; A Call to Action</i> (June 2006)	2-5
<i>Warrior Run Pathways Partnership</i> (July 2006)	2-5
<i>Northumberland County Natural Heritage Inventory Update</i> (April 2008)	2-7
<i>Valley Vision 2020—A Plan for Pennsylvania's Heartland</i> (June 2008)	2-7
<i>Comprehensive Plan for the Water Resources of the Susquehanna River Basin</i> (December 2008)	2-8
<i>Revitalizing River Towns of the Middle Susquehanna Region</i> (June 2009)	2-9
<i>Lycoming County Comprehensive Recreation, Parks, & Open Space/Greenway Plan</i> (April 2008)	2-10
<i>Columbia County Comprehensive Recreation, Parks, Greenways and Open Space Plan</i> (2007)	2-10
<i>Schuylkill County Open Space and Greenway Plan</i> (2006)	2-10
<i>Dauphin County Parks, Recreation, Open Space, and Greenways Plan</i> (approved 15 April 2009)	2-10
Regional Location	2-10
Population and Development	2-11
Natural Resources	2-11
Waterways and Watersheds	2-11
Floodplains and Wetlands	2-13
Steep Slopes	2-15
Natural Areas	2-15
Physiography and Bedrock Geology	2-17
Prime Agricultural Land	2-17
Recreation Sites	2-18
State Sites	2-18
Local Parks	2-20
Trails	2-20
Golf Courses	2-21
Campgrounds	2-21
Knoebels Amusement Resort	2-21
Preserved Private Lands	2-22

Northumberland County Greenways and Open Space Plan

	<u>PAGE</u>
Public Schools, Public Libraries, and Large Commercial / Industrial Areas	2-22
Public Educational Facilities	2-22
Public Libraries	2-23
Large Commercial / Industrial Centers	2-23
Historic Features	2-24
Existing and Proposed Land Use	2-25
Man-Made Features	2-25
Greenways and Open Space Plan	3-1
Goal and Objectives	3-2
Plan Map	3-3
Action Program	3-10
Recommendations	3-11
Land Preservation Tools	3-11
Stakeholders and Roles	3-19
Costs and Potential Funding Sources	3-26
Pilot Project	3-30
Management Considerations	3-37
Appendices	
A Public Meetings	A-1
B Trail Design Guidelines	B-1
C Preserving Greenways Through Development Regulations	C-1

Tables

2.1	Municipal Population, 1990–2008	2–12
2.2	Projected Population, 2000–2030	2–12
2.3	Stream Water Quality Designations, 2010	2–14
2.4	Species and Natural Sites of Concern, 2010	2–16
2.5	Recreation Sites, 2010	2–19
3.1	Summary of Proposed Greenways	3–5
3.2	Recommended Actions	3–12
3.3	Capital Area Greenbelt Budget, 2005	3–28
3.4	Potential Funding Sources	3–31
B1	Standard Trail Width Recommendations	B–2
B2	Trail Surface Synopsis	B–4

Maps

2.1	Regional Location, Northumberland County	2–11
2.2	Waterways and Watersheds	following 2–14
2.3	Floodplains and Wetlands	following 2–14
2.4	Steep Slopes	following 2–16
2.5	Natural Areas	following 2–16
2.6	Bedrock Geology	following 2–18
2.7	Prime Agricultural Land	following 2–18
2.8	Recreation Sites and County Lands	following 2–18
2.9	Preserved Private Land	following 2–22
2.10	Public Schools, Public Libraries, and Large Commercial / Industrial Areas	following 2–22
2.11	Historic Sites & Museums	following 2–24
2.12	Generalized Existing Land Use	following 2–26
2.13	Generalized Proposed Land Use	following 2–26
2.14	Man-Made Features	following 2–26

		<u>PAGE</u>
3.1	Northumberland County Greenways and Open Space Concept	following 3-4
3.2	Northumberland County Greenways and Open Space Concept, Northern Section . . .	following 3-4
3.3	Northumberland County Greenways and Open Space Concept, Central Section	following 3-4
3.4	Northumberland County Greenways and Open Space Concept, Southwest Section . .	following 3-4
3.5	Northumberland County Greenways and Open Space Concept, Southeast Section . .	following 3-4

Figures

1.1	Greenway Types	1-2
2.1	Streams and their land components	2-15
2.2	Large forested areas	2-17
2.3	The Whaleback Anticline	2-18
2.4	State parks in Northumberland County	2-20
2.5	Equestrians on trail	2-21
2.6	The Phoenix	2-22
2.7	Fort Freeland and Joseph Priestly House	2-24
3.1	City of Shamokin	3-4
3.2	The Susquehanna River	3-9
3.3	Land Preservation Techniques	3-15
B1	"Share the Road" Signage	B-12

This page intentionally blank.

Executive Summary

The *Northumberland County Greenways and Open Space Plan* is a guide for the county to identify and preserve key lands within the county and to begin to develop a system of linear pathways connecting key sites and activity centers. The plan includes 4 primary sections:

1. Introduction
2. Current Conditions
3. Greenways and Open Space Plan
4. Appendices

Introduction

Chapter 1 provides a general framework for the plan. The text includes general information on the various types, functions, and benefits of greenways as well as more specific information about the:

- Purposes for the study.
- Goals and objectives for the study.
- Organization of the study.
- Process used to develop the study, including information on the public meetings held to gather input for and to publicize the study.
- Guidelines on how to use the study.

Current Conditions

Chapter 2 is an examination of current conditions, which is extremely important to any planning effort. Planning is never conducted in a vacuum. The plan must start with the conditions that already shape the community. The following current conditions were examined in the *Northumberland County Greenways and Open Space Plan*, including both text, analysis, and maps.

- **Planning Framework** — Surprisingly many previous plans have either included the greenway concept as part of the plan substance or provided complementary information to the Northumberland County effort. Examples include the Pennsylvania statewide greenways plan, the county comprehensive plan, the statewide comprehensive outdoor recreation plan (SCORP), the greenway plans prepared in neighboring counties, the Valley Vision 2020 plan prepared by SEDA-COG, and others.
- **Regional Location** — The discussion of the regional location puts Northumberland County in context (Map 2.1, p. 2–11). Large-scale, multi-state or multi-region greenways are being planned and developed. Knowing the county’s relationship to the larger context of greenways helps to define the role of the county’s greenway system
- **Population and Development** — The Northumberland County greenway system is designed to connect residents and workers to destinations within the county in a “hub and

spoke” configuration. The population information shows how the county has grown within the past 10–20 years and how the county is projected to grow in the future. The location of possible destinations shows the points to which the population will travel.

- **Natural Resources** — Many natural resources should be protected from development. The *Northumberland County Greenways and Open Space Plan* identifies eight natural resources:
 - Waterways and Watersheds (Map 2.2, following p. 2–14)
 - Floodplains and Wetlands (Map 2.3, following Map 2–2)
 - Steep Slopes (Map 2.4, following p. 2–16)
 - Natural Areas (Map 2.5, following Map 2.4)
 - Bedrock Geology (Map 2.6, following p. 2–18)
 - Prime Agricultural Land (Map 2.7, following Map 2.6)
 - Generalized Existing Land Use (Map 2.12, following p. 2–26)
 - Generalized Proposed Land Use (Map 2.13, following Map 2.12)
 - Man-Made Features (Map 2.14, following p. 2–28)

Identifying the resources in the plan illustrates a focal point for land preservation efforts. Some of the resource areas, such as ridgelines and waterways, provide pathways and trails that serve as linear connections—the “spokes” of the system. Other resources—such as floodplains, wetlands, steep slopes, natural areas, physiography, and prime agricultural land—should simply be preserved as open space.

- **Recreation Areas** — Parks and other recreation sites (Map 2.8, following p. 2–18)— including municipal and state parks, existing trails, golf courses, and private sites, such as campgrounds and Knoebels Amusement Resort—offer many destinations, or “hubs”, for the county greenway system. Connections between recreation areas and the developed areas within and around the Sunbury and the boroughs—more “hubs” connected by the “spokes”—are often the most heavily used within a greenway system.
- **Preserved Private Lands** — The greenways and open space plan also identifies private lands that are preserved (Map 2.9, following p. 2–22). Preserved private lands include farms with conservation easements, mostly in Delaware, Lewis, Turbot, and Upper Mahanoy townships. In addition, the Montandon marshland off of PA 45 in West Chillisquaque Township is preserved under a conservation easement.
- **Public Schools, Public Libraries, and Large Commercial/Industrial Areas** — Other destination hubs that attract people include public buildings, large commercial areas, and large industrial areas (Map 2.10, following Map 2.9). Greenways with pathways offer the opportunity for residents to walk or bicycle between destinations in a pleasant environment that promotes health and welfare.
- **Historic Features** — Historic sites (Map 2.11, following p. 2–24), from the Joseph Priestly House in Northumberland to the three covered bridges along the Northumberland/Columbia County border in Ralpho Township to the Sunbury Historic District to the Zion Stone Church, attract visitors from all over the county, the region, and beyond. Northumberland is rife with history. Connecting historic sites within a green-

way system allows residents and visitors to enhance the experience of Northumberland County.

- **Existing and Proposed Land Use** — The current and proposed land use patterns (Maps 2.12 and 2.13, respectively, following p. 2–26), taken from the county comprehensive plan, provide a broad view of likely greenway hubs. Proposed locations for residential, commercial, and industrial development show the likely locations for future hubs within the greenway system.
- **Man-Made Features** — Within the context of a greenways and open space plan, man-made features in Northumberland County (Map 2.14, following p. 2–28) include both mines and railroads. Mining operations are prevalent throughout the county. Industrial mineral mining is slightly more prominent the northern section of the county than the southern area, but the southern portion of the county is dominated by coal mines. Mines are actually part of the background studies to illustrate areas to avoid when developing greenways.

Railroads, on the other hand, can be valuable links in the system. Abandoned railroads should be considered first as potential spokes in the Northumberland County system. However, a growing movement throughout the country involves providing trails along active rail lines. Active rail lines should be considered with great caution to ensure the safety of trail users.

Greenways and Open Space Plan

Chapter 3 uses the information from chapters 1 and 2 to create a greenways and open space plan for Northumberland County. The plan includes three specific elements (goals/objectives, plan map, and action program) and several items within some of the elements.

- The **goals and objectives** provide direction for the plan. Goals are statements of the desired end for the system. Objectives are more specific steps designed to achieve each goal. Specifically, the goals and objectives for the *Northumberland County Greenways and Open Space Plan* are:

Goal 1: Develop a greenway system that includes both recreation and conservation greenways.

Objective 1a: Connect activity centers, as identified in the background studies, using linear, natural corridors wherever possible.

Objective 1b: Protect and expand existing open space as part of the Northumberland County greenways network.

Goal 2: Expand the county’s existing trail and open space system.

Objective 2a: Work with stakeholders—including land owners, government agencies, conservation and recreation organizations, developers, volunteers, and others—to develop trail segments and preserve open space.

Northumberland County Greenways and Open Space Plan

Objective 2b: Build upon existing trail and pathway efforts, such as the Warrior Run Pathways Partnership and the Anthracite Outdoor Adventure Area (AOAA), to develop and support the greenway system.

- North (Map 3.2, following Map 3.1)
- Central (Map 3.3, following Map 3.2)
- Southwest (Map 3.4, following Map 3.3)
- Southeast (Map 3.5, following Map 3.4)

Objective 2c: Encourage municipalities to require—through local zoning and subdivision ordinances—that developers include trails and open space in all new developments.

The plan map(s) illustrate existing and planned elements in addition to proposing new elements. The map(s) include:

Objective 2d: Explore the use of utility corridors and railroad rights-of-way as part of the county trail network.

- *Major Hubs* – the larger developed concentrations, including Northumbeland, Shamokin, and Sunbury, among others.
- *Minor Hubs* – the smaller developed areas, including Riverside, Turbotville, and Watsontown, among others.

Goal 3: Protect natural features, cultural, scenic, and historic areas of Northumberland County.

- *Natural Features and Natural Areas* – taken from the background studies.

Objective 3a: Identify conservation greenways as a means of preserving lands for a variety of reasons throughout the county.

- *Lands Suitable for Open Space Preservation* – including lands cited for preservation in other county plans as well as those noted in the interview and public meeting processes.

Objective 3b: Use the boroughs and other activity centers as hubs within the greenways network.

- *State lands* – including state parks and state forests.

- The **plan map** (Map 3.1, following p. x and p. 3.4) illustrates the specific concepts included in the greenways plan. For the sake of clarity, in addition to the plan map for the entire county, the plan map is also divided into four sections to illustrate the plan concepts at a larger scale:

- *Recreation areas* – including municipal parks, school parks, county land, state parks, existing trails, campgrounds, golf courses, and Knoebels Amusement Resort.
- *Anthracite Outdoor Adventure Area (proposed)*
- *Scenic Overlooks* – to identify lands that might be suitable for preservation efforts.

Northumberland County Greenways and Open Space Plan

- *Greenways/Trails* – including existing and proposed conservation and recreation greenways plus the Warrior Run Pathways that are located in Northumberland County.
- *Historic Points of Interest* – including covered bridges, the Sodom School, and the Whaleback Anticline.

The system is composed of approximately 360.0 miles of existing and proposed greenways, including:

- 81.9 miles of water-based recreation greenways.
- 175.4 miles of land-based recreation greenways.
- 102.7 miles of conservation greenways.

Specifically, the plan identifies the following existing or proposed greenways:

- Chillisquaque Creek Greenway
- Delaware Run Greenway
- Lake Augusta Greenway
- Limestone Run Greenway
- Little Shamokin Creek Greenway
- Mahanoy Creek Greenway
- Mahantango Creek Greenway
- Roadways: US 11 PA 405 PA 642 PA 254
PA 44 PA 61 PA 225 PA 890
PA 147
- Schwaben Creek Greenway
- Shamokin Creek Greenway
- Snow Creek Greenway
- Sunbury Riverfront
- Susquehanna River Greenway

- Warrior Run/Beaver Creek Greenway
- Warrior Run Pathways (Northumberland County only), which includes all or portions of:
 - Warrior Run Trail.
 - West Branch Trail Concept.
 - Limestone Valley Ramble.
 - Muncy Hills Challenge I.
 - Muncy Hills Challenge II.
 - Watsontown to Dewart Sunset Loop

- The **Action Program** provides guidance and tools necessary for the county to implement the greenways and open space plan. The action program is composed of six parts:
 - Recommendations
 - Land Preservation Tools
 - Stakeholders and Roles
 - Costs and Potential Funding Sources
 - Pilot Project
 - Management Considerations

Recommendations

The plan includes the following 24 specific recommendations. Each recommendation includes a priority in terms of a suggested time frame and suggestions for the lead entity(ies) for each recommendation.

1. Develop the Anthracite Outdoor Adventure Area (AOAA).
2. Work with SEDA-COG and PennDOT to plan and develop the Lake Augusta Gateway Project.

Northumberland County Greenways and Open Space Plan

3. Develop the Lower Anthracite Heritage Trail.
4. Prepare local greenways plans that further the state's greenways vision, support/supplement the *Northumberland County Greenways and Open Space Plan*, and specifically identify potential greenway corridors and alignments.
5. Adopt official maps as a tool to help preserve land.
6. Establish a greenways, open space, and recreation advisory council as a pilot project to begin implementation of the *Northumberland County Greenways and Open Space Plan*.
7. Work with Sunbury Revitalization, Inc. and other organizations to increase the economic benefit of nearby greenways/trails for local businesses.
8. Work closely with the Northumberland County Conservation District (NCCD) to further the county greenway system. Potential tasks might include:
 - Discuss alternatives and establish a management structure for the greenway system.
 - Establish priorities for greenway development, recognizing that priorities can and will change quickly as resources for specific greenways become available.
 - Provide connections to educational institutions, corporations, and other organizations that may be able and willing to offer resources for the greenway system.
9. Establish a register or online database of all conservation easements or leases in the county.
10. Work with PennDOT and SEDA-COG in the design of the proposed Central Susquehanna Valley Thruway Project to address greenway issues, such as pedestrian movement within the corridor and automobile/buggy interaction north of Interstate 80.
11. Establish/stabilize riparian buffers with support from grants and volunteer efforts by local landowners and conservation groups.
12. Promote the concept of land preservation by educating landowners about the benefits of "conservation development" (or "cluster development"), Best Management Practices for agriculture, and the benefits of local volunteerism.
13. Expand programs for educating local farmers regarding best management practices with support from grants and volunteer efforts by local landowners and conservation groups.
14. Prepare a river conservation plan for every water-based greenway in the *Northumberland County Greenways and Open Space Plan* to identify the unique characteristics and threats posed to each waterway as well as appropriate protection measures and key parcels for preservation.
15. Provide educational and technical assistance to municipalities and landowners regarding the benefits and methods of land conservation with a specific focus on the value of conservation easements.

16. Provide clear signage to assist trail users in locating existing and future trails and amenities along trails, such as nearby business districts.
17. Work with the Brush Valley Preservation Association and other interested groups to encourage land preservation in the Brush Valley area.
18. Work with the PA Bureau of State Parks and appropriate municipalities to incorporate trails within Milton and Shikellamy State Parks into the county's proposed trail/greenway system.
19. Provide support to the Warrior Run Community Corporation and others in developing the trail system presented in the Warrior Run Pathways Partnership document.
20. Protect natural features through education/information programs, local ordinances, and a focus on priority natural areas.
21. Encourage recreational activity, such as boating and fishing, along the Susquehanna River.
22. Work with municipalities to provide for trails in local zoning and subdivision/land development ordinances.
23. Encourage agricultural preservation (particularly in the northern part of the county) by educating farmers about the value of land preservation and by modifying local ordinances

to allow accessory uses that offer farmers alternative sources of income (such as machinery repair) during times of poor harvests.

24. Encourage volunteers to develop "Friends of..." groups for each greenway to help establish and maintain the greenway.

Land Preservation Tools

The plan includes a discussion of various tools that can be used for land preservation. Every landowner's circumstances are different, so a tool that is appropriate for one situation or transaction or in one section of the county may not be appropriate in other circumstances. The tools discussed in chapter 3 are:

- Fee Simple Acquisition (p. 3–11)
- Conservation Easements (p. 3–11)
- Other Easements (p. 3–11)
- Purchase and Leaseback or Resale (p. 3–15)
- Donations (p. 3–15)
- Land Exchange (p. 3–16)
- Municipal Ordinances (p. 3–16)
- Public Dedication (p. 3–17)
- Open Space Development (p. 3–17)
- Transfer of Development Rights (p. 3–18)
- Purchase of Development Rights (p. 3–18)
- Official Map (p. 3–18)
- Map of Potential Conservation Lands (p. 3–19)

Stakeholders and Roles

Many groups have a stake in greenway development and land preservation. The *Northumberland County Greenways and Open*

Space Plan identifies the following stakeholders and discusses the role of each.

- Municipalities (p. 3–19)
- Northumberland County (p.3–20)
 - Northumberland County Conservation District (p. 3–21)
 - Northumberland County Agricultural Land Preservation Board (p. 3–21)
 - Northumberland County Planning Department (p. 3–22)
- Conservation and recreation groups (p. 3–22)
- Landowners (p. 3–22)
- SEDA-COG (p. 3–22)
- State agencies (p. 3–23)
 - PA Dept. of Conservation and Natural Resources (DCNR — p. 3–23)
 - PA Game Commission (PGC — p. 3–23)
 - PA Fish and Boat Commission (PFBC — p. 3–23)
 - PA Dept. of Environmental Protection (DEP — p. 3–24)
 - PA Dept. of Transportation (PennDOT — p. 3–24)
 - PA Dept. of Community and Economic Development (DCED — p. 3–24)
 - PA Historical and Museum Commission (PHMC — p. 3–24)
- Federal agencies (p. 3–24)
 - Susquehanna River Basin Commission (SRBC — p. 3–24)
 - Environmental Protection Agency (EPA — p. 3–25)
- Other key organizations/individuals (p. 3–25)
 - Local businesses and corporations (p. 3–25)
 - Chambers of Commerce and tourism bureaus (p. 3–25)
 - Volunteer organizations (p. 3–26)
 - Land developers (p. 3–26)

Costs and Potential Funding Sources

The plan includes a discussion of greenway trail development costs and presents three sample projects from nearby counties:

- Conewago Trail, Elizabethtown, PA — \$102,000 per mile
- Lebanon Valley Rail Trail, Phase 4, Lebanon County, PA — \$230,000 per mile
- Heritage Rail Trail County Park, York, PA — \$260,500 per mile

Costs vary widely depending on the trail length, surface, and amenities. The plan includes an appendix on trail design considerations.

The plan also emphasizes the importance of volunteers in developing and maintaining greenways. As an example, the Capital Area Greenbelt, a greenway around the City of Harrisburg, obtained 62.5 percent of its 2005 budget from volunteers.

Funding assistance for greenways (land acquisition) and trail development costs can come from a variety of federal and state sources. The plan (Table 3.4) identifies 53 sources of funding that may be applied to greenways, although greenways may an unconventional use in some of the programs. The funding sources include six Northumberland area foundations for which greenways may be a reasonable use. Unfortunately, many of the state and federal programs have little or no funding available, even if the program is still in existence. Currently, the most widely used sources of greenway funding come from DCNR and DCED.

Pilot Project

The plan includes a recommended pilot project to provide a “kick start” to implementation. Northumberland County is a large

county with a wide variety of land use environments. Issues in the southern part of the county—which includes the larger developed areas of Northumberland/Sunbury and Shamokin and includes the majority of the county’s mining operations—are significantly different from issues in the northern part of the county, which is more oriented to small towns and farming.

Therefore, the plan recommends that the pilot project be the formation of a countywide advisory council to discuss both local and countywide issues and serve as a unifying organization for Northumberland County. Members from one area of the county may have solutions to a situation being experienced in another section of the county, and the council can be a forum for passing information and solutions among different segments of the county. The plan further recommends that the advisory council work through the Northumberland County Conservation District, since the conservation district has a strong, established structure which will be helpful in forming and guiding the advisory council.

Management Considerations

Managing greenways within local borders will ultimately be the responsibility of the municipality, since local governments in Pennsylvania have control over land use, policing, and other local services. Therefore, the plan proposes that municipalities work together in creating, maintaining, and managing multimunicipal greenways. Discussing and resolving multimunicipal issues will be one of the most important functions of the proposed advisory council, which will be formed on a countywide basis. In addition to having members representing specific causes or local assets (e.g., Susquehanna River, Shamokin Creek, Warrior Run), the advisory council, in a management capacity, should also have members who represent different areas of the county. Greenway issues in the northern part of the county may be quite different

than greenways issues in the southern part of the county, and the advisory council should be a forum for addressing considerations on a geographic basis as well as a topical basis.

Appendices

The *Northumberland County Greenways and Open Space Plan* includes three appendices:

- A Public Meetings — a summary of the notice, content, and results of the public meetings held during the course of the project.
- B Trail Design Guidelines — a discussion of considerations relevant to designing and building trails within greenways.
- C Preserving Greenways Through Development Regulations — a discussion of the usefulness of local ordinances in preserving land from development. Appendix C also includes:
 - information from current local ordinances and suggestions for changes to ordinances in each municipality to strengthen land preservation.
 - model zoning and subdivision and land development ordinance (SALDO) provisions to enhance land preservation.

This page intentionally blank.

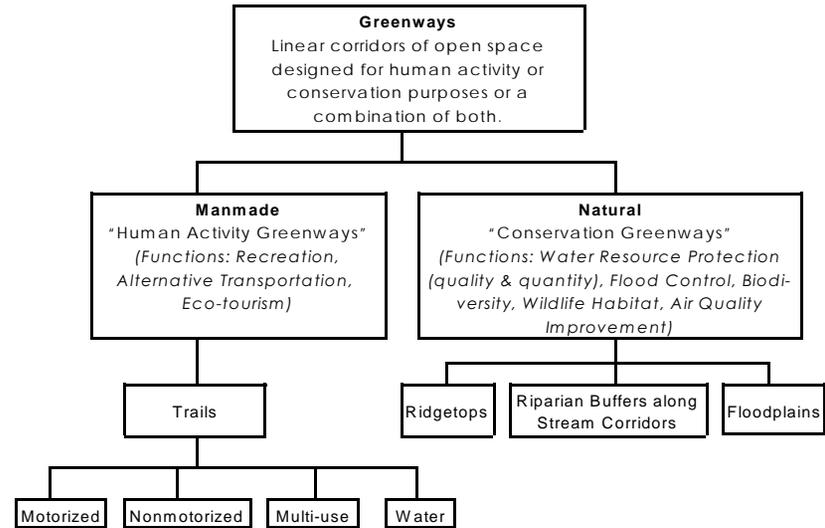
GREENWAY TYPES AND FUNCTIONS

Greenways perform many different functions, as identified by the Pennsylvania Department of Conservation and Natural Resources (Figure 1.1). The geography, natural features, and settlement patterns of Northumberland County suggest the need for various types of greenways in different parts of the county.

Greenways also differ by general setting. Five broad categories of settings illustrate different greenway environments:

- “Supergreenways” — Large-scale greenways that span long distances and often present a common theme; The East Coast Greenway currently under development from Calais, ME to Key West, FL is a prime example of a supergreenway.
- Mega-greenway — The term “mega-greenway” has been created by DCNR to denote large landscapes with a cohesive preservation effort and many partners in a multicounty region. Examples of mega-greenways include the Susquehanna Greenway and the Lehigh Valley Greenway Initiative.
- Rural — Rural greenways often help preserve natural features, such as open meadows, agricultural land, forests, or riparian corridors. Land for rural greenways is often available through Best Management Practices and other land preservation techniques.

Figure 1.1
Greenway Types



Source: PA Department of Conservation and Natural Resources (DCNR), available at:
<http://www.pagreenways.org/greenwaysnetworks-types.htm>

- Suburban — Greenways in a suburban environment often connect residential developments to activity centers, such as schools, parks and recreation areas, employment centers, and downtowns. Suburban greenways can also encourage nonmotorized trips between neighborhoods and provide a pleasant recreational amenity within larger developments.

Northumberland County Greenways and Open Space Plan

- Urban — Urban greenways provide pedestrian connections throughout a downtown or heavily developed area. Urban greenways also encompass streetscape improvements (such as trees, plantings, sidewalk widening, and cultural and historical markers) to provide pleasant and educational pedestrian paths for residents and visitors. The Cities of Sunbury and Shamokin, the boroughs, and some villages in the county are appropriate locations for urban greenways.

Charles Little, one of the most knowledgeable and strongest proponents of the greenway concept, observed “...five major project types:

1. *Urban riverside greenways, usually created as part of (or instead of) a redevelopment program along neglected, often run-down city waterfronts.*
2. *Recreational greenways, featuring paths and trails of various kinds, often of relatively long distance, based on natural corridors as well as canals, abandoned railbeds...and other public rights-of-way.*
3. *Ecologically significant natural corridors, usually along rivers and streams and (less often) ridgelines, to provide for wildlife migration and “species interchange,” nature study, and hiking.*
4. *Scenic and historic routes, usually along a road or highway (or, less often, a waterway), the most representative of them making an effort to provide pedestrian access along the route or at least places to alight from the car.*
5. *Comprehensive greenway systems or networks, usually based on natural landforms such as valleys and ridges but sometimes*

simply an opportunistic assemblage of greenways and open spaces of various kinds to create an alternative municipal or regional green infrastructure.”²

In addition to the different magnitudes of greenways and different environments that greenways create as noted above, differences in land ownership (public vs. private) and other elements can help to define various types of greenways.

The *Northumberland County Greenways and Open Space Plan* endorses the following definitions:³

Greenway — A greenway is a corridor of open space. Greenways vary greatly in scale, from narrow ribbons of green that run through urban, suburban, and rural areas to wide corridors that incorporate diverse natural, cultural, and scenic features. Greenways can be land- or water-based, running along stream corridors, shorelines or wetlands. Some greenways follow old railways, canals, ridge tops, or other features. Greenways can incorporate both public and private property. Greenways differ in location and function, but overall, a greenway network will protect natural, cultural, and scenic resources, provide recreational benefits, enhance the natural beauty and the quality of life in neighborhoods and communities, and stimulate economic development opportunities.

² Ibid., pp. 4–5

³ Most of the definitions are taken or adapted from the statewide greenways plan, *Pennsylvania Greenways — An Action Plan for Creating Connections*”

Conservation Greenway — The primary use of a conservation greenway is to preserve ecological functions. Public access to conservation greenways is often prohibited or very limited. Conservation greenways provide habitat for wildlife, such as a stream corridor that provides food, shelter, and cover to various species. The recently completed parks, recreation, open space, and greenways plan for neighboring Dauphin County identifies the areas along many of the county creeks—including the Mahantango Creek that borders Northumberland County—as conservation greenways.

Recreational Greenways — Recreational greenways are created primarily for informal, low-impact recreation. Recreational use by residents and tourists may take place over the land or along a river, such as the Susquehanna River, enclosed in a riparian buffer greenway. Most recreational use of greenways occurs on trails, but hunting, fishing, wildlife watching, and enjoyment of cultural and historic sites in greenways are additional examples of such use.

Riparian Buffers — A riparian buffer is a conservation greenway along a river or creek that traps sediment and nutrients, shades and cools the water, protects the banks from erosion, and provides for wildlife movement and habitat.

Natural Areas — Natural areas are green spaces or greenways with nature observation or environmental education functions. Natural resources make greenways useful as outdoor learning sites. A greenway with access and parking is very likely to be used by school groups and environmental/civic organizations. Groups with stewardship responsibility for greenways often

conduct interpretive programming and consider the corridor a nature area or an outdoor learning center.

Open Space — Open space is land or water that is predominantly undeveloped and permanently reserved for public or private enjoyment. Open space includes stream valleys, ridge tops, lakes, woodlands, parks, agricultural land, and more. Open space serves many purposes, including:

- Providing recreation areas for a wide range of activities such as baseball, skiing, picnicking, soccer, wildlife observation, hiking, and biking.
- Conserving biodiversity and natural resources.
- Providing habitat for plants and animals.
- Helping to purify air and recharge water by removing pollutants that originate in developed areas.
- Preserving historic landscapes, scenic quality, community character, and agricultural land.
- Enhancing economic value, since property values are generally higher when located close to clean water, attractive landscapes, recreational areas, and parks. Businesses are also attracted to areas that provide a high quality of life, part of which includes convenient access to natural settings and recreational and cultural opportunities.

- Benefiting the travel and tourism industries with the increasing popularity of natural and cultural recreational activities.
- Minimizing the cost of public services such as water, sewer, trash collection and roads by reducing sprawl development.

GREENWAY BENEFITS

Interviews, meetings, and other information-gathering activities for the *Northumberland County Greenways and Open Space Plan* identified the following benefits related to greenways in the county, some of which also illustrate the need for greenways as both a recreation element in the county and a vehicle for land preservation.

- *Quality of Life* — The environmental, health, recreational, biodiversity, and other benefits of greenways increase the quality of life in the community. Virtually every greenway can provide some benefit to the community, and most greenways provide several benefits.⁴
- *Increased and diversified tourism* — Public-access greenways can be a tourist attraction that can draw visitors from a wide area, depending on the type of greenway and the extent of recreational amenities, such as fish and boat access points, trails, scenic roadway designations, or cultural/historic markers within urban greenways. For example:

— The Appalachian Trail draws hikers from all over the United States. The trail runs from Maine to Georgia, through the middle of neighboring Dauphin County.

— The Pine Creek Trail (www.visittiogapa.com/railtrail.html) is a 60.5-mile trail through the Pine Creek Gorge, commonly referred to as the Grand Canyon of Pennsylvania. The hiking/biking trail also has a section for equestrians. The trail connects Ansonia (Tioga County) to Waterville (Lycoming County). The rail trail has been voted one of the “10 great places to take a bike tour” by USA Today. In 1968, the Pine Creek Gorge was designated a National Natural Landmark by the National Park Service. The recent *Pine Creek Rail Trail 2006 User Survey and Economic Impact Analysis* shows that trail users spend an average of \$30 per visit on soft goods and \$355 on hard goods, generating annual revenue of \$3–\$5 million for the local economy.

— In York County, the Heritage Rail Trail County Park is a 21.1-mile trail stretching southward from the First Continental Courthouse in York through several boroughs connecting to Maryland’s Northern Central Railroad Trail, which extends for 20 miles into the Hunt Valley area near Ashland, MD.

The trail is being extended by approximately 5.0 miles northward from York to John Rudy County Park. The first section of the extension was opened to the public in summer 2007. The York County Rail Trail Authority estimated that 300,000 people use the Heritage Rail Trail County Park in 2004, and usage has reportedly increased

⁴ For more information, the reader is referred to www.pagreenways.org.

from 2004 to the present. Furthermore, a 2007 study found a significant economic impact by trail users.⁵

- The Great Allegheny Passage (www.atatrail.org) is a planned 150-mile system of biking and hiking trails of which 132 miles is completed and continuous from McKeesport, PA to Cumberland, MD. The 150-mile system will connect to the C & O Canal Towpath in Cumberland, creating a continuous, nonmotorized, 318-mile system linking Pittsburgh to Washington, D.C. In July 2007, the Great Allegheny Passage was named the first inductee into the Rails to Trails Conservancy's Trail Hall of Fame.
- The East Coast Greenway (ECG, www.greenway.org) is a planned, 2,950-mile trail that is approximately 21 percent complete and will eventually connect all major cities along the East Coast from Calais, ME to Key West, FL.

In some cases, the greenway itself can be a destination—without an extensive trail network and with limited, well-defined public access points—offering opportunities for bird-watching and wildlife-viewing. Greenways might also be the thread used to tie together historic and/or cultural stories in Northumberland County, such as:

- The development of roads from Indian trade routes to bridle paths to canals and railroads to highways.
- The story of the Pennsylvania Canal, of which the Susquehanna Division through Northumberland County has two branches: the North Branch from Sunbury to Nanticoke (Luzerne County) and the West Branch from Sunbury to Muncy (Lycoming County).
- The stories of anthracite coal and the railroads, which are inextricably linked.

- *Recreation-related spending* — Active greenways can also increase recreation-related spending, which can provide a significant boost to the local economy. The *Western Maryland Rail Trail Economic Impact Study* indicated that the mean spending for a WMRT user in 2002 was approximately \$13 per visit. The corresponding mean spending per user in 2006 was approximately \$16 per visit.⁶ Closer to Northumberland County, the *2007 User Survey and Economic Impact Analysis* (Interactive Marketing Solutions, 2007) for the Heritage Rail Trail County Park in York County estimates that the average purchase of “soft goods” (e.g., drinks, snacks, lunches) by trail users increased from \$8.33 per trip in 2001 to \$12.86 per trip in 2007.
- *Reduced future flooding potential* — Many greenways are located adjacent to waterways and provide natural areas for

⁵ According to *Heritage Rail Trail County Park 2007 User Survey and Economic Impact Analysis* (November 2007), 89.6% of trail users cited trail use as influencing a purchase of hard goods (average cost: \$367.77), and 79.1% of trail users cited trail use as influencing a purchase of soft goods (average cost: \$12.86).

⁶ Urban Research and Development Corporation (URDC), September 2002 (revised December 2002), p. 13, updated 2006

overflow in times of flooding, which helps to minimize flood damage. Greenways are a valuable tool that developers and local officials can use to reduce the potential for future flood damage.

- *Health benefits* — Public-access greenways provide an environment for people to walk, hike, jog, or bicycle while enjoying the experience of nature or simply a time of solitude and meditative contemplation, all of which contribute to physical and emotional health. Selected greenway segments include fitness equipment along the trail to incorporate into trail use. Studies have shown a direct link between increased use of nonmotorized trails (hiking/biking/walking) and decreased public health expenditures.⁷ Other evidence suggests that nature contact enhances emotional, cognitive and values-related development in children.⁸
- *Preservation of natural, historic, or scenic features* — Most greenways contain natural, historic, or scenic features that add to the visual character of the community or are a part of the area's history. As development pressure increases, greenways become an attractive use for the land that provides many benefits for current and future residents and helps to preserve

valuable community resources on both public and private land.

- *Protection of water resources* — Greenways also help to preserve water resources by providing a vegetation buffer between streams and developed areas. Together with Best Management Practices, greenways help to control and purify stormwater runoff and to reduce soil erosion. Greenways can also help to conserve water supply and enhance water quality. Greenways and associated open spaces also provide recharge areas for groundwater aquifers, which are critical to drinking water supplies, especially in times of drought.
- *Environmental education* — Access to nature through greenways can inspire school classes, nonprofit organizations, and the general public to learn about and care for the environment. Greenways can also provide both basic and advanced research opportunities for plant and wildlife research.
- *Alternative transportation* — In view of the rising cost of gasoline and other fuels, greenways with trails can also provide an alternative form of transportation between activity centers. In areas where greenways and trails have become an established part of the community, bicyclists, walkers, and runners /joggers often use greenway trails to travel between home, work, school, shops, parks, and other destinations, rather than relying on roads and cars.
- *Potential increased property value* — Studies have documented the increased property value that comes from being located near or adjacent to parks, open space, and

⁷ See, for instance, Wang PhD, Guijing, Macera PhD, Caroline A., Scudder-Soucie MEd, Barbara, Schmid PhD, Tom, Pratt MD, MPH, Michael, and Buchner, MD MPH, David; *Cost-Benefit Analysis of Physical Activity Using Bike / Pedestrian Trails*; Journal; Health Promotion Practice; April 2005 Vol. 6, No. 2, 174–179

⁸ Frumkin, Howard (2003). *Healthy Places: Exploring the Evidence*. American Journal of Public Health, 93 (9).

greenways.⁹ Greenways provide nearby recreation facilities and a knowledge that land preservation is an important value in the community. No studies have found a negative economic effect of greenways on adjacent property. In the vast majority of cases, proximity to a greenway has a positive economic effect on property value.

STUDY PURPOSES

The *Northumberland County Greenways and Open Space Plan* has several important purposes. The study process will result in several tangible products for the county's future use. The study provides a vision for greenways and open space in Northumberland County.

⁹ See, for example:

- U.S. Department of the Interior, National Park Service, *Economic Impacts of Protecting Rivers, Trails, and Greenway (cont'd. pg. 1-9) Corridors*, 1995, 4th edition (revised), available at:
<http://www.nps.gov/pwro/rtca/econindx.htm>
- Nicholls, Sarah, and Crompton, John L., "The Impact of Greenways on Property Values: Evidence from Austin, Texas", *Journal of Leisure Research*, 3rd Quarter, 2005, available at:
http://www.findarticles.com/p/articles/mi_qa3702/is_200507/ai_n14799204
- Nicholls, PhD, Sarah, "Measuring the Impact of Parks on Property Values", *National Recreation and Park Association*, March 2004, available at:
<http://www.nrpa.org/content/default.aspx?documentId=1013>

Complementing the county comprehensive plan, the greenway study is a tool for planning activities regarding greenways and open space. The study is an advisory document, as opposed to zoning and subdivision ordinances, which carry the force of law. The plan lays the foundation for a network of preserved land throughout the county that will provide scenic, aesthetic, recreational, and, in some areas, transportation benefits for county residents. The plan also serves as Northumberland County's response to the goal of establishing a physical network of greenways throughout the commonwealth, as identified in the state greenway plan.¹⁰

STUDY ORGANIZATION

The *Northumberland County Greenways and Open Space Plan* is composed of four sections:

- **Introduction** — The introduction lays the foundation for the plan by explaining the concept of greenways, including the types, functions, and benefits of greenways. The introduction also includes information on the organization of the plan as a guide for the reader. The chapter describes the purpose and information included in each section of the plan. The introduction also includes information on the process of developing the plan.

¹⁰ *Pennsylvania Greenways: An Action Plan for Creating Connections*, available at: www.dcnr.state.pa.us/brc/greenways/.

- **Current Conditions** — The second chapter presents background information on the following topics regarding Northumberland County:

- Planning Framework
- Regional Location
- Population/Development
- Natural Resources
- Recreation Sites
- Preserved Private Lands
- Historic Features
- Existing/Proposed Land Use
- Man-Made Features

- **Northumberland County Greenways System** — The proposed greenway system is presented in chapter 3. The system is composed of various types of greenways presented on a series of maps and described in the chapter.

- **Implementation** — The implementation chapter includes recommendations for actions to fulfill the plan vision presented in the previous chapter. The final chapter of the study also includes information on the following topics to assist in implementation:

- Recommended actions, including priorities and lead entity(ies)
- Land preservation techniques
- Cost estimates for high priority projects
- Potential funding sources
- Ongoing management of the greenway system
- Potential pilot projects
- Trail design issues
- Gaps and inconsistencies in current local land use regulations

STUDY DEVELOPMENT

The *Northumberland County Greenways and Open Space Plan* was developed by the Northumberland County Commissioners through the Northumberland County Planning Department. The county retained Urban Research and Development Corporation of Bethlehem, PA as a consultant on the project.

The county and consultant met regularly to exchange and discuss ideas, monitor progress, and help advise during the planning process. The county staff provided valuable input throughout the study process, including:

- Resources and research for background information.
- Review of the consultant’s findings and documentation.
- Ideas and direction for questions posed by the consultant.
- A forum for discussion throughout the planning process.

The plan also offered a set of public meetings for the general public to help guide and respond to the planning process. Northumberland County is large, and issues vary in different parts of the county. Therefore, each meeting was held in a different part of the county:

The county and consultant held the first set of public meetings after the background studies had been completed. The first meetings gave residents an opportunity to learn about the planning process, view the results of the background analyses, and provide input for the planning stage of the program. Meetings were held in two locations:

Northumberland County Greenways and Open Space Plan

Milton Borough Hall
Wednesday, 21 July 10
6:30 p.m.

Career Center (Shamokin)
Thursday, 22 July 10
6:30 p.m.

The second set of public meetings occurred after the initial draft plan was prepared. The meetings provided an opportunity for the public to see the results of the planning process and comment on the final draft plan. Meetings were held in the same two locations as the first set of public meetings:

Milton Borough Hall
Monday, 17 October 11
6:00 p.m.

Career Center (Shamokin)
Wednesday, 19 October 11
6:00 p.m.

A summary of information from the public meetings is provided in Appendix A.

HOW TO USE THE STUDY

The *Northumberland County Greenways and Open Space Plan* is useful for elected officials and others interested in identifying and developing specific greenways, preserving open space, and conserving natural resources. Examples of possible uses for the study and subsequent actions by elected and appointed officials include the following:

- Keep abreast of funding programs (Table 3.6) and aggressively apply for funding for park and recreation improvements, easement acquisition, and other conservation-oriented activities.

- Consider adopting provisions to municipal subdivision and land development ordinances (SALDO) that require developers to set aside usable land for recreation purposes within land developments.
- Review the open space and greenway priority information in chapter 3. Use every available opportunity to preserve open space from development in both rural and urban settings. Identify open space as part of landscape greenways to preserve valuable viewsheds.
- Consider adopting provisions to the municipal zoning and subdivision and land development ordinances (SALDO) that preserve open space within proposed developments. Promote the Open Space Development Concept.
- Work with landowners, conservancies, the county, and others knowledgeable about the value of open space to consider all options regarding the question of preservation vs. development, including a complete review of the financial and nonfinancial benefits to the landowner. Consider the land preservation techniques discussed in chapter 3.

This page intentionally blank.

CURRENT CONDITIONS

Before providing a vision of future greenways in Northumberland County, one of the important tasks is to examine the circumstances within which the county must work to develop greenways. The following chapter examines current conditions in the county in the following areas:

- Planning framework
- Regional location
- Population and development
- Natural resources
- Recreation
- Preserved lands
- Cultural and historic features
- Existing and proposed land use

Some of the information—such as previous planning activities, regional location, and population—provides context for greenways in the county. Other information—such as natural resources, man-made features, historic features, and recreation sites—identifies either sites that can serve as activity nodes within a greenway network or sites that should be preserved as part of the county open space system.

PLANNING FRAMEWORK

Other plans that have been prepared in Northumberland County provide a foundation upon which to build the county's greenway and open space plan. In addition, the PA Department of Conservation and Natural Resources (DCNR) encourages each of the 67 counties in the state to prepare greenways plans to help implement the statewide plan. According to the DCNR website¹, the countywide greenway plans are either completed or in progress in all counties except four (Montour, Snyder, Union, and Wayne)—three of which are adjacent to Northumberland County. The following section identifies relevant previous planning efforts, discusses the importance and some of the relevant findings of each plan, and presents the recommended connections to Northumberland from the other surrounding counties of Lycoming, Columbia, Schuylkill, and Dauphin.

Pennsylvania Greenways—An Action Plan for Creating Connections (June 2001)

The recommendation to preserve and protect greenways goes back to the early 1990s. In 2001, the statewide greenways plan² provided specific coordination and strategic planning processes

¹ <http://www.pagreenways.org/greenwaysnetworks-planning.htm>

² <http://www.dcnr.state.pa.us/brc/greenways/actionplan.aspx>

Northumberland County Greenways and Open Space Plan

to incorporate Pennsylvania's counties into a statewide greenways network. The plan defines greenways, networks of hubs and spokes, and green infrastructure. The plan also provides 12 strategies for implementation and statewide and local context for each strategy:

- Use **hubs and spokes** to develop the greenway network.
- Prepare **local greenway plans** at the county and municipal levels.
- Increase **opportunities for diverse populations** to enjoy greenways.
- Use greenways to **promote physical and mental wellness**.
- Develop **trails to offer transportation alternatives** to the automobile.
- **Protect natural resources and environmental quality** with greenways.
- Develop a greenways **organizational structure**.
- Assemble **public and private funding** to support greenways.
- Develop a **greenways toolbox** including technical resources, "best practices", and guidance on important issues, such as design standards and liability.
- **Incorporate greenways into training programs**, such as environmental and ecological coursework.
- **Showcase greenways** in promotional and marketing campaigns.
- Establish a **corps of volunteers** to help maintain and promote greenways.

Pennsylvania Outdoors; The Keystone for Health Living
(September 2009)

States are required to produce a State Comprehensive Outdoor Recreation Plan (SCORP) every five years in order to receive federal Land and Water Conservation Funds (LWCF). Pennsylvania released the latest update of the state plan in late 2009.³

The plan includes research, public input, findings, policies, goals, and recommendations regarding outdoor recreation throughout the state. The document illustrates the inextricable link between greenways and outdoor recreation with the following references:

- Recommendation 1.2, Action Step A: Update the [state greenways plan] to a web-based series of fact sheets.
- Recommendation 1.6, Action Step C: Support the implementation of county greenway plans by developing grant guidelines and ranking criteria that give priority funding to projects that encourage development of walkable communities and that strengthen local land use policies encouraging protection of open space.
- Recommendation 2.5, Action Step C: Work with state agencies and other partners to assess which current cultural or historic features like parks, monuments, natural features, or historic districts could add recreational assets like trails and greenways.

³ <http://www.paoutdoorrecplan.com/>

Northumberland County Greenways and Open Space Plan

- Goal 3: Develop a Statewide Land and Water Trail Network to Facilitate Recreation, Transportation, and Healthy Lifestyles.
- Recommendation 3.1, Action Step D: Update the 2001 Pennsylvania Greenway Plan and evaluate state progress in meeting its goal of establishing close-to-home greenways/trails within 1,000 Pennsylvania municipalities.

The SCORP has extensive appendices, one of which identifies trail gaps in major greenways throughout the state, two of which are in Northumberland County:

- Sunbury Riverfront Trail in the City of Sunbury
- Warrior Run Pathways Project through Delaware Township and Watsonstown Borough (continuing into Allenwood and White Deer Townships in Union County)

Northumberland County Comprehensive Plan (June 2005)

The *Northumberland County Comprehensive Plan* provides background information, goals, and policies for the county in the areas of land use, housing, transportation, economic development, historic preservation, and community facilities (including libraries; hospitals; schools; police, fire, and ambulance services; recreation; and sewer and water services). For each major topic, the plan includes background information, goals and objectives, and a plan element that discusses issues, policies, and implementation strategies.

Greenways are relevant to many areas discussed in the comprehensive plan:

- *Land use/land preservation*, since greenways are a key method of preserving land from development
- *Natural resources*, which greenways help to preserve
- *Recreation sites, historic sites and areas, schools, commercial and employment centers*, all of which are important nodes/destinations within a greenway system

The county comprehensive plan includes many specific recommendations that are relevant to the *Northumberland County Greenways and Open Space Plan*. Some of the relevant recommendations include:

- Definitions for the following land use categories, specifically for conservation (p. 56):
 - Mine and quarry areas
 - Permanent open space
 - Environmentally sensitive areas
 - Agricultural preservation areas
- “Promote the preservation and creation of a permanent network of adequate and diverse open space, park and recreation resources for the use and enjoyment by present and future County residents.” (p. 61)
- “Advocate a County-wide greenbelt system interconnecting Northumberland County’s parks, recreation and open space resources through a network of open space corridors and linear parks and trails.” (p. 62)

Northumberland County Greenways and Open Space Plan

- “Provide incentives for recreation and open space preservation and dedication through the development process.” (p. 63)
- “Municipalities should provide aggressive, but reasonable, recreation and open space provisions in their various land use ordinances to meet the local recreation needs of their residents.” (p. 64)
- “Maintain the quality of the natural environment and protect the Environmentally Sensitive Areas of Northumberland County.” (p. 78)
- “...Northumberland County will develop and actively promote strategies to manage transportation demand including...the use of pedestrian and bicycle networks.” (p. 180)
- “Abandoned rail rights-of-way should be acquired, where feasible, for their reuse as transportation corridors (highway or rail) or multi-use recreational trails.” (p. 188)

Susquehanna River Water Trail-West Branch Stewardship and Conservation Plan (August 2009)

Prepared by the Northcentral Pennsylvania Conservancy under a grants from DCNR and the Chesapeake Bay Gateways Network, the plan was designed to meet the requirements of DCNR’s Rivers Conservation Program. The plan, which includes an executive summary, is posted on the conservancy’s website: www.npcweb.org.

The plan covers the entire west branch: from Northumberland to mile marker 227 at Cherry Tree (Indiana County). The plan furthers the development and sustainability of the west branch water trail by creating a maintenance plan, identifying needs at existing access sites, and determining the need for additional access points.

The plan provides 41 detailed recommendations to meet the following goals:

- Develop a volunteer stewardship network.
- Secure reasonable, and safe access.
- Sustain and enhance environmental integrity.
- Provide safe, pleasurable, and diverse experiences.
- Adopt a functional organizational structure for trail management.

On 2 June 2011, the federal Department of the Interior designated the West Branch as a National Recreation Trail (NRT). (The main branch of the Susquehanna had previously been designated as a NRT.) Pennsylvania now has 67 NRTs totaling more than 2,300 miles.

Central Susquehanna Valley Thruway Interchange Study (July 2005)

Central Susquehanna Valley Thruway Gateway Project (March 2007)

SEDA-COG is working with PennDOT and central Susquehanna counties to develop the Central Susquehanna Valley Thruway (CSVT)—a 12–13 mile, limited-access highway connecting the

Northumberland County Greenways and Open Space Plan

Selinsgrove Bypass (US 11/15 in Monroe Township, Snyder County) to PA 147 in West Chillisquaque Township, Northumberland County. The two reports cited above are part of extensive public participation activities dealing with specific elements of the project. As the CSVT develops, the transportation landscape in the area will change dramatically. Greenway issues—such as pedestrian movement within the corridor and automobile/buggy interaction north of Interstate 80—should be a part of the design considerations.

Susquehanna Greenway Strategic Action Plan; A Call to Action (June 2006)

The Susquehanna Greenway Partnership (SGP) prepared the action plan in June 2006. The plan includes recommendations for a new organizational framework, a method for implementing greenway components, and a communications and outreach strategy. The three-year plan calls for creating four regional committees empowered along with local partners to implement the plan.

The Susquehanna Greenway design is modeled after and consistent with the “hubs and spokes” framework defined in the 2001 state greenways plan, *Pennsylvania Greenways: An Action Plan for Creating Connections*. The plan for the Susquehanna Greenway has five implementation goals:

1. **Special Place:** The Susquehanna Greenway will be a specially recognized place – a destination consisting of diverse and interconnected landscapes and communities.

2. **Conservation:** The Susquehanna Greenway Partnership will conserve, protect and restore the natural environment for future generations, creating healthy and sustainable communities.
3. **Benefits:** The Susquehanna Greenway will bring multiple benefits to the region, including:
 - Conservation education
 - Community revitalization
 - Economic development
 - Enhanced recreation
 - Environmental stewardship
 - Healthy living opportunities
4. **Awareness:** The Susquehanna Greenway Partnership will increase public understanding and awareness of the Susquehanna River and its enduring story.
5. **Partnership:** The Susquehanna Greenway Partnership, in cooperation with local partners, will champion and implement the vision of the Susquehanna Greenway.

Warrior Run Pathways Partnership (July 2006)

The *Warrior Run Pathways Partnership* report was prepared by the Susquehanna Economic Development Association Council of Governments (SEDA-COG) under the sponsorship of the Warrior Run Community Corporation (WRCC). The WRCC is an organization dedicated to the economic, recreational, educational, and community advancement of the Warrior Run area, based in

Northumberland County Greenways and Open Space Plan

the Warrior Run School District which is comprised of eight municipalities in four counties:

- Anthony Township, Lycoming County
- Delaware Township, Northumberland County
- Gregg Township, Union County
- Lewis Township, Northumberland County
- Limestone Township, Montour County
- McEwensville Borough, Northumberland County
- Turbotville Borough, Northumberland County
- Watsontown Borough, Northumberland County

The pathways project envisions a system of trails and natural areas connecting and preserving the area’s scenic, cultural, and environmental assets, much like the concept of a greenway system for Northumberland County. The report discusses the use of conservation tools for rivers, valleys, ridges, the Muncy Hills area, and villages.

Specifically, the report proposes five pathway concepts:

- *West Branch River Trail*—features a trail aligned with the West Shore of the Susquehanna River which would create a loop when combined with the Watsontown-Dewart Canal Walk on the eastern shore of the river.
- *Warrior Run Trail*—connects Turbotville and McEwensville using the Warrior Run school complex as a social and geographic focal point of the community.

- *Muncy Hills Trail*—links substantial areas of open space, such as the Montour Preserve and lands owned by PPL Corporation, across the entire width of the Warrior Run area.
- *Warrior Run Touring Routes*—include a series of low-volume roadways suitable for hiking/jogging and biking. The touring routes are:
 - Allenwood River Ride; 4.0 mi.; 30 min.
 - Limestone Valley Ramble (Fireman’s Breakfast Loop); 15.0 mi.; 2.0 hrs.
 - Montour Preserve Wanderer’s Loop; 13.5 mi.; 1.5 hrs.
 - Muncy Hills Challenge I; 14.6 mi.; 2.5 hrs.
 - Muncy Hills Challenge II; 21.0 mi.; 3.5–4.0 hrs.
 - Watsontown to Dewart Sunset Loop; 8.3 mi.; 1 hr.

For each pathway, the report includes a concept map and a discussion of land use, land ownership, opportunities, challenges, regulatory issues, phasing, and funding sources. The report closes with a six-year action program that stresses three critical implementation elements:

- Leadership (WRCC, citizens, partnerships, and early implementation projects)
- Warrior Run Touring Routes (route concepts, validation, definition, and signage; map development and publication; healthy living program development and implementation)
- Prioritized Trail Concepts (refinements, landowner agreements, trail design, funding, construction)

Northumberland County Natural Heritage Inventory Update
(April 2008)

The Western Pennsylvania Conservancy prepared the *Northumberland County Natural Areas Inventory* in 2002 and updated the document as the *Northumberland County Natural Heritage Inventory* (NHI) in 2008. The inventory contains information on the locations of rare, threatened, and endangered species and of the highest quality natural areas in the county. Each site description includes general management recommendations from the Pennsylvania Natural Heritage Program to help protect the identified species.

The NHI identifies 27 animal species of concern, 11 plant species of concern, 3 exemplary natural communities, and 2 geologic features in Northumberland County. In addition, the inventory recognizes 38 sites of statewide significance and six sites of local significance for the protection of biological diversity.

The NHI also includes the following recommendations:

- Consider conservation initiatives for natural areas on private land, including:
 - Conservation easements.
 - Lease and management agreements.
 - Land acquisition by a conservation organization.
 - Fee simple acquisition.
 - Unrestricted donations of land.
 - Local zoning.

- Prepare management plans that address species of special concern and natural communities.
- Protect bodies of water.
- Provide for buffers around natural heritage areas (NHAs).
- Reduce fragmentation of the landscape surrounding NHAs.
- Encourage the formation of grassroots organizations.
- Manage for invasive species.
- Incorporate information from the NHI into planning efforts.

Valley Vision 2020—A Plan for Pennsylvania’s Heartland (June 2008)

SEDA-COG prepared the plan to help manage change in eleven central Pennsylvania counties, including Northumberland. The plan is one of ten regional plans covering the entire state.

The plan identifies five regional “neighborhoods” in central Pennsylvania region (Anthracite, Central Valleys, Juniata Valleys, Middle Susquehanna Valley, Mountain Top), two of which include parts of Northumberland County: Middle Susquehanna Valley and Anthracite.

Middle Susquehanna Valley — The Middle Susquehanna Valley had a 2000 population of 310,720. Population is projected to increase through 2050. Top employment sectors are education,

Northumberland County Greenways and Open Space Plan

health care & social assistance, and manufacturing. The 17 Northumberland County municipalities in the Middle Susquehanna Valley are:

- Delaware Twp.
- E. Chillisquaque Twp.
- Lewis Twp.
- Lower Augusta Twp.
- McEwensville Boro.
- Milton Boro.
- Northumberland Boro.
- Point Twp.
- Riverside Boro.
- Rockefeller Twp.
- Rush Twp.
- Turbot Twp.
- Turbotville Boro.
- Sunbury City
- Upper Augusta Twp.
- Watsontown Boro.
- W. Chillisquaque Twp.

Anthracite Region — The Anthracite region had a 2000 population of 39,926. Population is projected to decrease through 2050. Top employment sectors are manufacturing, health care & social assistance, and education. The 19 Northumberland County municipalities in the Anthracite Region are:

- Coal Twp.
- E. Cameron Twp.
- Herndon Boro.
- Jackson Twp.
- Jordan Twp.
- Kulpmont Boro.
- Little Mahanoy Twp.
- Lower Mahanoy Twp.
- Marion Hts. Boro.
- Mount Carmel Boro.
- Mount Carmel Twp.
- Ralpho Twp.
- Shamokin City
- Shamokin Twp.
- Snyderstown Boro
- Upper Mahanoy Twp.
- Washington Twp.
- W. Cameron Twp.
- Zerbe Twp.

The greenway concept is strongly endorsed in the *Valley Vision 2020* report. The report includes 15 goals for Central Pennsylvania in the following six (6) areas. Each goal includes a series of specific actions with appropriate time frames.

- Community Revitalization and Community Development
- Energy Conservation and Development
- Environmental Conservation and Recreation
- Public Infrastructure and Services
- Regional Planning and Community Education
- Transportation and Land Use

Comprehensive Plan for the Water Resources of the Susquehanna River Basin (December 2008)

The plan was prepared by the Susquehanna River Basin Commission. The plan:

- Provides a framework for the commission to manage and develop the water resources of the Susquehanna River Basin.
- Serves as a guide for all commission programs and activities, which helps fulfill the mission to enhance public welfare through comprehensive planning, water supply allocation, and management of the basin’s water resources.
- Offers a useful resource for the commission’s member jurisdictions (including Northumberland County), water resource managers in the basis, private sector interests, and others.

Northumberland County Greenways and Open Space Plan

- Serves as a guide for water resource planning done by local interests and the states.

The plan includes goals for each of the following priority management topics:

- Water Supply
- Water Quality
- Flooding
- Ecosystems
- Chesapeake Bay
- Coordination, Cooperation and Public Information

The plan also includes specific ongoing activities and needed actions for achieving all of the above goals. The entire report is available on the commission's website at:

www.srbc.net/planning/compplanfiles.asp

Revitalizing River Towns of the Middle Susquehanna Region
(June 2009)

SEDA-COG followed the *Valley Vision 2020* report with a strategic plan focused on revitalizing the ten river towns of the Middle Susquehanna Region, four of which are located in Northumberland County: Northumberland, Milton, Sunbury, and Watsontown. The plan includes background information on the Middle Susquehanna Region, a vision for the river towns, strategies for river town enhancement, and a brief assessment of each of the 10 towns. (The six towns outside of Northumberland County are Berwick, Bloomsburg, Catawissa, Danville, Lewisburg, and Selinsgrove.)

The plan includes goals for revitalization and strategies to achieve each goal. Each strategy includes a time frame, examples, and potential partners. Goals of the plan are:

- Promote a compelling regional identity.
- Encourage strong interconnections between municipalities and organizations working together to provide regionwide benefits.
- Preserve and strengthen the look and feel of the regional landscape.
- Provide diverse opportunities for people to connect to the river.
- Improve and protect environmental and scenic quality along the river and throughout its countryside.
- Celebrate the significance of the Susquehanna River.
- Build vital downtowns and neighborhoods.
- Capitalize upon the unique qualities of each individual River Town.
- Foster public engagement and civic pride.

Northumberland County Greenways and Open Space Plan

Lycoming County Comprehensive Recreation, Parks, & Open Space/Greenway Plan (adopted April 10, 2008)

Lycoming County shares a small border with Delaware and Lewis Townships in Northumberland County. Map 23 of the Lycoming County plan identifies the West Branch of the Susquehanna River as a high priority greenway.

Columbia County Comprehensive Recreation, Parks, Greenways and Open Space Plan (2007)

Columbia County lies east of Northumberland County, sharing a border with Ralpho, Coal, and Mount Carmel Townships. The entire border with Coal Township and a large portion of the border with Mount Carmel Township are within the Weiser State Forest. The only element of the “Greenways and Trails Map” in the Columbia County plan relevant to Northumberland County is the Weiser State Forest along Roaring Creek.

Schuylkill County Open Space and Greenway Plan (2006)

Schuylkill County forms a portion of the southern border of Northumberland County adjoining the townships of East Cameron, Upper Mahanoy, and a portion of Jordan. The only item in the Schuylkill County plan relevant to Northumberland County is the continued stewardship of the state game lands that extend into Schuylkill County from East Cameron Township.

Dauphin County Parks, Recreation, Open Space, and Greenways Plan (approved 15 April 2009)

Dauphin County adjoins Northumberland County to the south along the Mahantango Creek. The border is also the southern border of Lower Mahanoy Township and a portion of Jordan Township. The Dauphin County plan identifies the Susquehanna River as a multiuse greenway, which includes elements of both conservation and recreational use. The plan also identifies the Mahantango Creek as a conservation greenway along the entire length of the Northumberland County border.

REGIONAL LOCATION

Northumberland County is located in central Pennsylvania along the east bank of the Susquehanna River north of the state capital of Harrisburg (Map 2.1). The county is within a 2½-hour drive of Philadelphia, and a 4-hour drive of Pittsburgh. Surrounding counties include:

- Lycoming to the north.
- Montour and Columbia to the east.
- Schuylkill and Dauphin to the south.
- Snyder and Union across the Susquehanna River to the west.

Map 2.1

Regional Location, Northumberland County



Source: URDC

POPULATION AND DEVELOPMENT

The U. S. Census estimates the 2008 population of Northumberland County to be 91,091 (Table 2.1), a 3.7 percent decrease from the 2000 census. Northumberland is a member of the 11-county SEDA-COG.

Municipalities that increased in population from 2000 to 2008 are the townships of Jordan, Lower Mahanoy, Point, Ralpho, Rockefeller, Rush, Shamokin, Washington, and Zerbe. All other municipalities in Northumberland County decreased in population from 2000 to 2008.

Municipalities that increased in population from 2000 to 2008 are the townships of Jordan, Lower Mahanoy, Point, Ralpho,

Rockefeller, Rush, Shamokin, Washington, and Zerbe. All other municipalities in Northumberland County decreased in population from 2000 to 2008.

According to data published by the Pennsylvania State Data Center (PSDC), the estimated 2008 population for Northumberland County is lower than the projected county population for 2030 (Table 2.2). The PSDC data projects a population decrease between 2000 and 2030 in three of the nine counties surrounding Northumberland: Lycoming, Montour, and Schuylkill. Individual municipal changes ranged from + 7.1 percent in Zerbe Township to – 8.0 percent in Shamokin City. Overall, the total county population decreased by 3.7 percent during the period.

NATURAL RESOURCES

Natural resources provide the basis for any land preservation effort, and land preservation is one of the primary benefits of a greenway system. Natural resources discussed below include:

- Waterways / Watersheds
- Floodplains / Wetlands
- Steep Slopes
- Physiography / Geology
- Prime Agricultural Land
- Natural Areas

Waterways and Watersheds

A watershed is the natural dispersion of runoff to a central location, such as a stream or river, from higher topographical areas. The Pennsylvania Department of Environmental Protection (DEP) defines a watershed as “land area from which water drains

Northumberland County Greenways and Open Space Plan

**Table 2.1
Municipal Population, 1990–2008
Northumberland County**

	Year			Change, 2000-2008	
	2008	2000	1990	Number	Percent
Northumberland Co.	91,091	94,556	96,771	-3,465	-3.7%
Coal Township	10,235	10,628	9,922	-393	-3.7%
Delaware Township	4,333	4,341	4,018	-8	-0.2%
East Cameron Twp.	636	686	646	-50	-7.3%
E. Chillisquaque Twp.	634	664	679	-30	-4.5%
Herndon Borough	354	383	422	-29	-7.6%
Jackson Township	925	928	845	-3	-0.3%
Jordan Township	783	761	847	22	2.9%
Kulpmont Borough	2,763	2,985	3,233	-222	-7.4%
Lewis Township	1,809	1,862	1,881	-53	-2.8%
Little Mahanoy Twp.	430	435	432	-5	-1.1%
Lower Augusta Twp.	1,069	1,079	1,024	-10	-0.9%
Lower Mahanoy Twp.	1,662	1,586	1,669	76	4.8%
McEwensville Borough	298	314	273	-16	-5.1%
Marion Heights Boro.	684	735	837	-51	-6.9%
Milton Borough	6,359	6,650	6,746	-291	-4.4%
Mount Carmel Borough	5,888	6,390	7,196	-502	-7.9%
Mount Carmel Twp.	2,581	2,701	2,679	-120	-4.4%
Northumberland Bo.	3,512	3,714	3,860	-202	-5.4%
Point Township	3,869	3,722	3,466	147	3.9%
Ralpho Township	3,874	3,764	3,625	110	2.9%
Riverside Borough	1,853	1,861	1,991	-8	-0.4%
Rockefeller Twp.	2,260	2,221	2,029	39	1.8%
Rush Township	1,236	1,189	1,097	47	4.0%
Shamokin City	7,367	8,009	9,184	-642	-8.0%
Shamokin Township	2,244	2,159	1,697	85	3.9%
Snydertown Borough	331	357	416	-26	-7.3%
Sunbury City	9,819	10,610	11,591	-791	-7.5%

	Year			Change, 2000-2008	
	2008	2000	1990	Number	Percent
Turbot Township	1,663	1,677	1,846	-14	-0.8%
Turbotville Borough	645	691	675	-46	-6.7%
Upper Augusta Twp.	2,514	2,556	2,681	-42	-1.6%
Upper Mahanoy Twp.	596	599	621	-3	-0.5%
Washington Township	685	660	620	25	3.8%
Watsonstown Borough	2,102	2,255	2,310	-153	-6.8%
West Cameron Twp.	482	517	527	-35	-6.8%
W.Chillisquaque Twp.	2,718	2,846	3,119	-128	-4.5%
Zerbe Township	1,878	2,021	2,067	143	7.1%

Source: U. S. Census

**Table 2.2
Projected Population, 2000–2030
Northumberland and Surrounding Counties**

County	Population		Change, 2000–2030	
	2030	2000	Number	Percent
Northumberland	92,182	94,556	(2,374)	-2.5%
Columbia	69,765	64,151	5,614	8.8%
Dauphin	269,855	251,798	18,057	7.2%
Juniata	25,696	22,821	2,875	12.6%
Lycoming	109,969	120,044	(10,075)	-8.4%
Montour	17,038	18,236	(1,198)	-6.6%
Perry	45,638	43,602	2,036	4.7%
Schuylkill	146,078	150,336	(4,258)	-2.8%
Snyder	38,955	37,546	1,409	3.8%
Union	52,280	41,624	10,656	25.6%

Source: PSDC

toward a common watercourse in a natural basin.” Since the activities occurring within a watershed are geographically dispersed and affect a multitude of natural resources, environmental regulations are usually created for entire watersheds.

The Susquehanna River is the primary waterway in Northumberland County (Map 2.2). The main branch of the river forms the western boundary of the county south of Northumberland Borough, at which point the river crosses the county to the east, connecting the boroughs of Northumberland and Riverside. The west branch of the river forms the western county boundary north of Northumberland Borough. The Susquehanna River watershed is the largest watershed on the American east coast: more than 49,000 miles of waterways draining 27,510 square miles (an area nearly the size of Massachusetts, Vermont, Delaware, and New Jersey combined) spread over parts of New York, Pennsylvania, and Maryland.

Northumberland County is part of the Lower Susquehanna Subbasin, one of six subbasins defined by the Susquehanna River Basin Commission. Smaller creeks in the county that are part of the Lower Susquehanna subbasin include:

- Chillisquaque Creek
- Mahanoy Creek
- Mahantango Creek
- Roaring Creek
- Shamokin Creek

Conditions and components of streams generally are the major components behind preparing greenway plans. The floodplains, hydric soils, wetlands, woodlands and steep slopes that surround streams offer continuous natural green pathways ideal for greenway designation.

Pennsylvania’s water quality standards (Pennsylvania Code, Chapter 93) designate protection categories for streams throughout the commonwealth. Waterways in Northumberland County (Table 2.3) are identified in one or more of four categories:

- *Migratory Fishes* — Streams with an “MF” label support the passage, maintenance, and propagation of anadromous and catadromous fishes and other fishes which move to or from flowing waters to complete their life cycle in other waters.
- *Warm Water Fishes* — Streams labeled “WWF” should be protected as habitat for warm water fish and other flora and fauna which are indigenous to warm water habitats.
- *Cold Water Fishes* — Streams identified as “CWF” should be protected as habitat for cold water fish and other fauna and flora indigenous to cold water.
- *Trout Stocking* — Streams noted as “TSF” qualify for trout stocking by the state.

Floodplains and Wetlands

Floodplains (Map 2.3) are areas that are inundated in a storm. The Federal Emergency Management Agency (FEMA) identifies floodplains by the theoretical timing of a storm event necessary to inundate the land. The two most common measures are a 100-year floodplain (i.e., the area to be flooded in a storm the strength of which has a one in 100 chance of occurring in the current year) and a 500-year floodplain. Acting as a natural barrier, floodplains have environmentally sensitive riparian buffers full of vegetation. Floodplains occur naturally along waterways, such as the Susque-

Northumberland County Greenways and Open Space Plan

**Table 2.3
Stream Water Quality Designations
Northumberland County, 2010**

Stream	Zone	Uses Protected
West Branch, Susquehanna River	Main stem	WWF, MF
Unnamed tributaries to West Branch, Susquehanna River	Loyalsock Creek to mouth	WWF, MF
Unnamed tributaries to Susquehanna River	West Branch, Susquehanna River to Juniata River	WWF, MF
Unnamed tributaries to Susquehanna River	Lackawanna River to West Branch, Susquehanna River	CWF, MF
Shamokin Creek	Main stem	WWF, MF
Unnamed tributaries to Shamokin Creek	Basins	CWF, MF
North Branch	Basin	CWF, MF
Locust Creek	Basin	CWF, MF
Quaker Run	Basin	CWF, MF
Buck Run	Basin	CWF, MF
Coal Run	Basin	CWF, MF
Carbon Run	Basin	CWF, MF
Furnace Run	Basin	CWF, MF
Trout Run	Basin	CWF, MF
Bennys Run	Basin	CWF, MF
Millers Run	Basin	CWF, MF
Lick Creek	Basin	CWF, MF
Sealholtz Run	Basin	WWF, MF

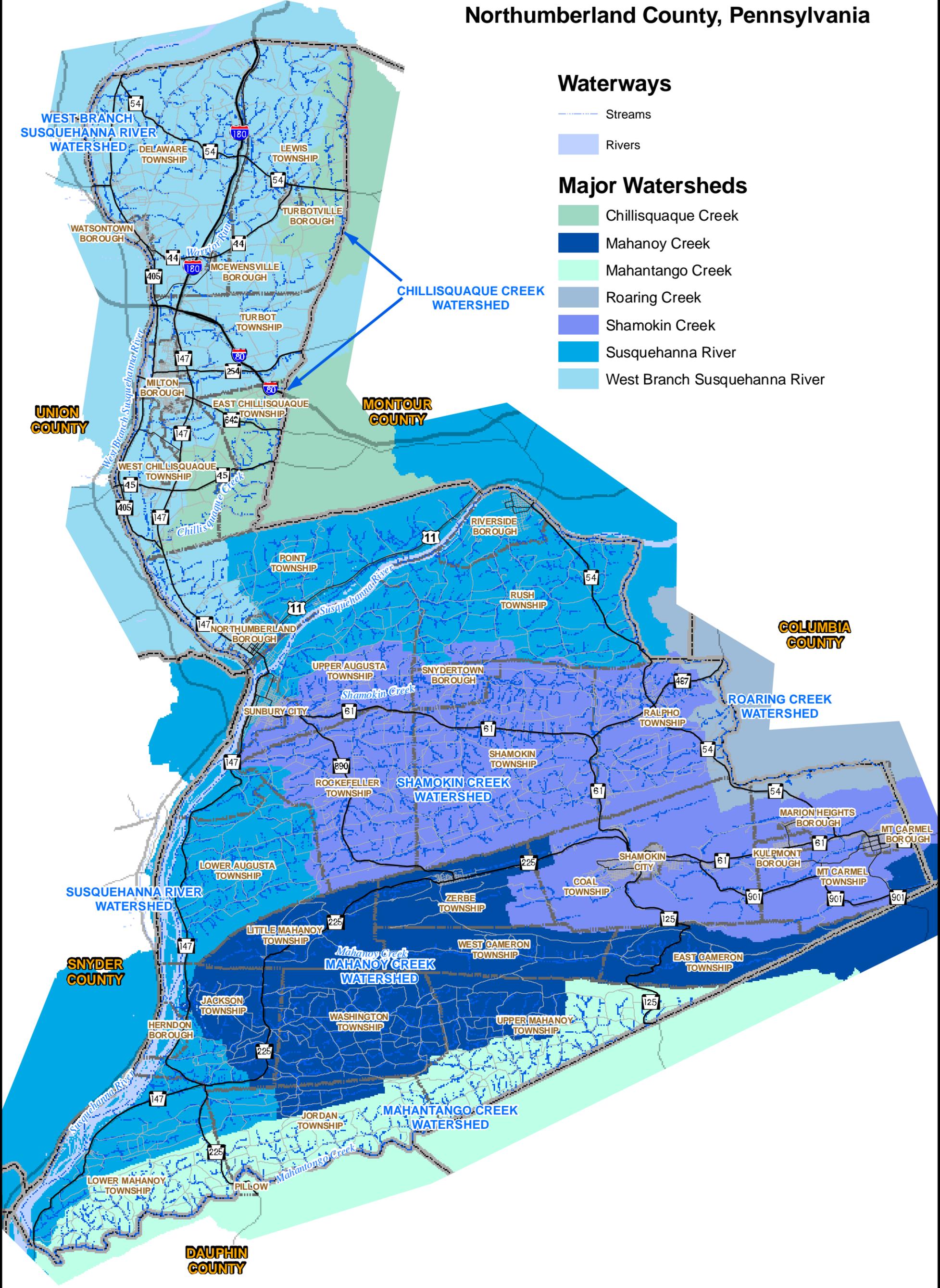
Stream	Zone	Uses Protected
Boile Run	Basin	WWF, MF
Mahanoy Creek	Main stem	WWF, MF
Unnamed tributaries to Mahanoy Creek	Basins	CWF, MF
Schwaben Creek	Basin	TSF, MF
Fidlers Run	Basin	WWF, MF
Dalmatia Creek	Basin	WWF, MF
Mahantango Creek (East)	Source to Pine Creek	CWF, MF
Mahantango Creek (East)	Pine Creek to Mouth	WWF, MF
Little Roaring Creek	Basin	CWF, MF
Logan Run	Basin	CWF, MF
Wilson Run	Basin	CWF, MF
Gravel Run	Basin	CWF, MF
Lithia Spring Creek	Basin	CWF, MF
Delaware Run	Basin	WWF, MF
Dry Run	Basin	WWF, MF
Spring Run	Basin	WWF, MF
Warrior Run	Basin	WWF, MF
Muddy Run	Basin	WWF, MF
Limestone Run	Basin	WWF, MF
Chillisquaque Creek	Basin	WWF, MF

MF Migratory Fishes CWF Cold Water Fishes
 WWF Warm Water Fishes TSF Trout Stocking Fishes

Source: PA Dept. of Environmental Protection regulations, chap. 93

2.2: Waterways and Watersheds

Northumberland County, Pennsylvania

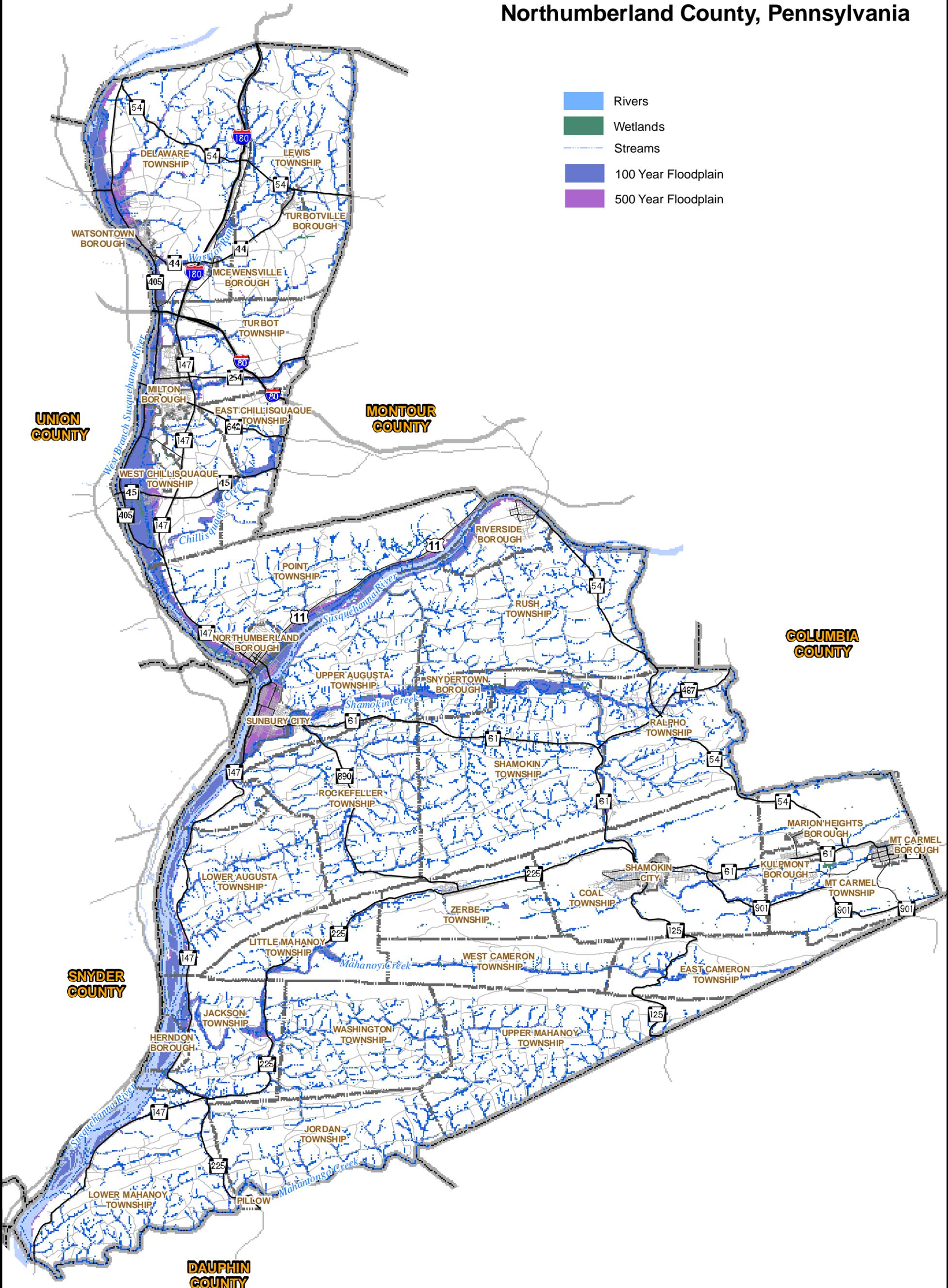


DATA SOURCE: Union County GIS Department.



2.3: Floodplains & Wetlands

Northumberland County, Pennsylvania



- Rivers
- Wetlands
- Streams
- 100 Year Floodplain
- 500 Year Floodplain



DATA SOURCE: Federal Emergency Management Agency and Union County GIS Department.





Figure 2.1 — Streams and their land components offer significant opportunities for providing greenways and saving sensitive lands.

hanna River, Shamokin Creek, Mahanoy Creek, Chilisquaque Creek, Warrior Run, and others. Some of the developed areas along waterways, including much of Sunbury and Watsonstown, are located within the 500-year floodplain.

Wetlands (Map 2.3)—the areas that have water present and also exhibit vegetation and soil types that show the characteristics of a permanently or frequently saturated environment—are often found within floodplains. As with floodplains, wetlands help control flooding by storing or detaining stormwater. Wetlands also provide a diverse ecosystem that is common habitat for endangered species. Wetlands in Northumberland County occur on some of the islands in the Susquehanna River and in isolated places throughout the county, including areas in Zerbe, Mount Carmel, Point, and Lewis Townships.

Steep Slopes

Vegetation on steep slopes is crucial in controlling erosion, slowing storm water runoff, and preserving viewsheds. Steep slopes are frequently unsuited for either agriculture or development. Boroughs in the northern part of the county, such as McEwensville and Turbotville, evolved in flatter, more accessible stretches of land. Other communities, particularly in the eastern part of the county, (e.g., Kulpmont, Marion Heights, Mount Carmel, and Shamokin), evolved near coal deposits in spite of steep slopes (Map 2.4).

Natural Areas

Natural areas are specifically identified for special characteristics, such as a unique plant or animal habitat or an important waterway or mountain. Some natural areas can add to the enjoyment of the greenway experience while others should be avoided to preserve potentially endangered species.

Natural areas in Northumberland County include key forested areas, an Important Mammal Area (IMA), and sites identified in the *Northumberland County Natural Heritage Inventory Update, 2008* (prepared by the Western Pennsylvania Conservancy).⁴ The sites of concern from the county natural heritage inventory include (Table 2.4):

⁴ Important Bird Areas (IBAs), identified by the Audubon Society, are also significant natural areas. According to the Audubon website, Northumberland County contains no IBAs.

⁷⁷<http://iba.audubon.org/iba/siteSearch.do>

**Table 2.4
Species and Natural Sites of Concern
Northumberland County, 2010**

Birds:	<ul style="list-style-type: none"> • Long-eared owl • Upland sandpiper • American bittern • Marsh wren • Peregrine falcon 	<ul style="list-style-type: none"> • Common moorhen • Bald eagle • Least bittern • Sora • Virginia rail
Mammals:	<ul style="list-style-type: none"> • Long-tailed or rock shrew 	<ul style="list-style-type: none"> • Eastern small-footed myotis • Northern myotis (bat)
Herptiles:	<ul style="list-style-type: none"> • Timber rattlesnake 	<ul style="list-style-type: none"> • Eastern spadefoot toad
Insects:	<ul style="list-style-type: none"> • Pine devil moth • A noctuid moth • November moth • Black dash butterfly 	<ul style="list-style-type: none"> • Esther moth • Bronze copper butterfly • A zale moth • Southern variable dart moth
Freshwater Mussels:	<ul style="list-style-type: none"> • Elktoe • Triangle floater 	<ul style="list-style-type: none"> • Yellow lampmussel • Green floater
Plants:	<ul style="list-style-type: none"> • Screw-stem • Bull sedge • Long's sedge • False hop sedge • Jeweled shooting star 	<ul style="list-style-type: none"> • Scirpus-like rush • Downy lettuce • Tooth-cup • River bulrush • False loosestrife seedbox • Yellow-fringed orchid
Natural Communities:	<ul style="list-style-type: none"> • Ephemeral/fluctuating natural pool • Northern Appalachian shale cliff • Graminoid marsh 	
Geologic Features:	<ul style="list-style-type: none"> • Sand dunes 	<ul style="list-style-type: none"> • Anticlines

- 10 bird species.
- three mammal species.
- eight insect species.
- two geologic features.
- three exemplary natural communities.
- 11 plant species.
- two herptile species.
- four fresh water mussel species.

Large forest areas are located throughout the county (Map 2.5). Identified natural areas contain plants or animals of concern for preservation on a local, state, or national level. Each of the natural areas contains a “core habitat”, where the plant/animal is primarily located, and a “supporting landscape” surrounding the core habitat. Both the core habitats and the surrounding landscapes are purposefully generalized to protect the species from potential harm from humans.

Furthermore, the Pennsylvania Biological Survey has identified the Susquehanna River Valley as an IMA from Sunbury south to Duncannon, including the southwest corner of Northumberland County along with adjacent portions of Snyder and Dauphin Counties. The Susquehanna River Valley IMA contains critical habitat for:

- Beaver.
- Mink.
- Raccoon.
- Least weasel.
- Several species of bats.
- Northern river otter.
- Muskrat.
- Gray squirrel.
- Southern flying squirrel.

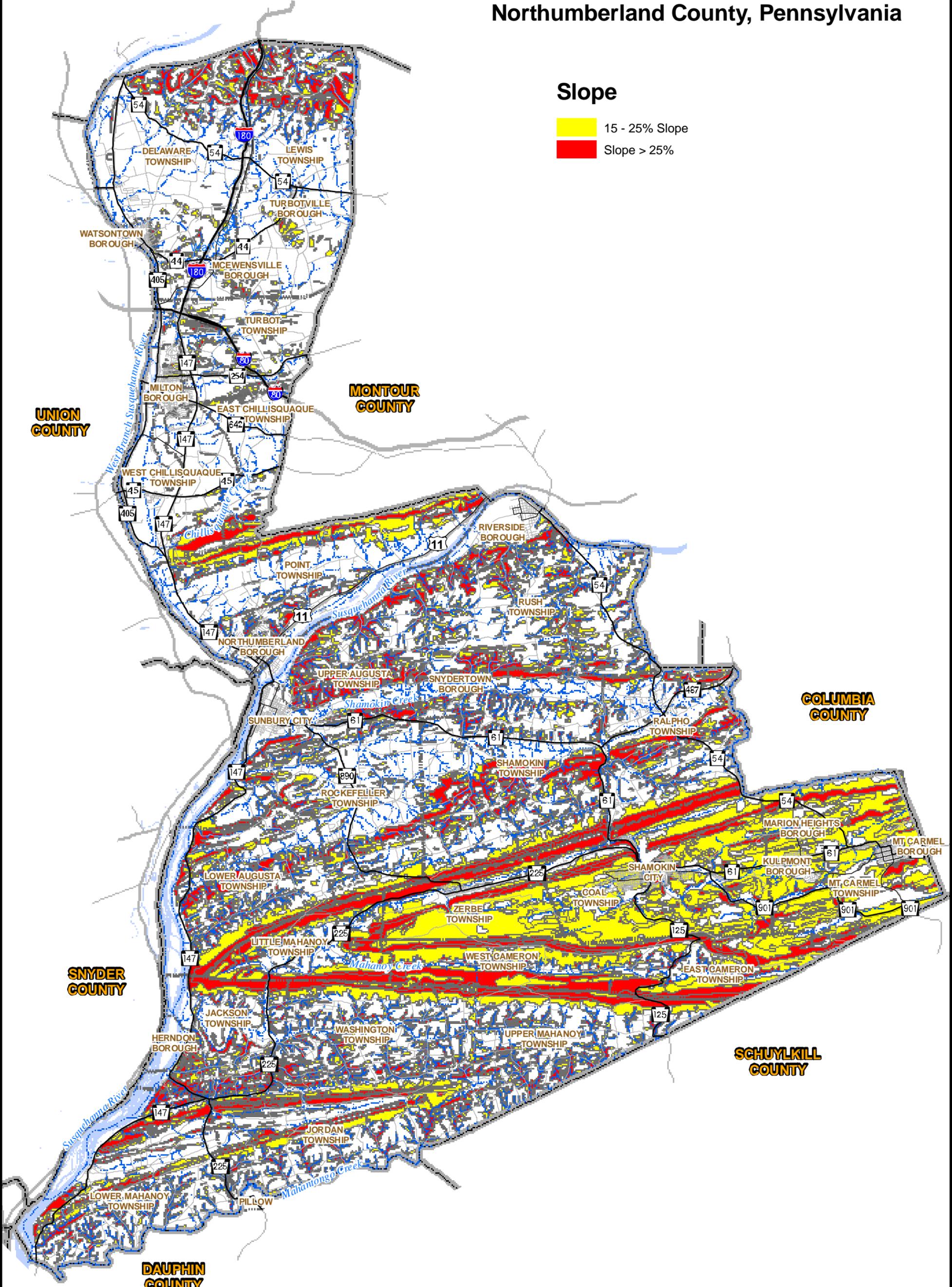
Source: *Northumberland County Natural Heritage Inventory Update, 2008*, Western Pennsylvania Conservancy, Table 2, p. 20

2.4: Steep Slopes

Northumberland County, Pennsylvania

Slope

- 15 - 25% Slope
- Slope > 25%

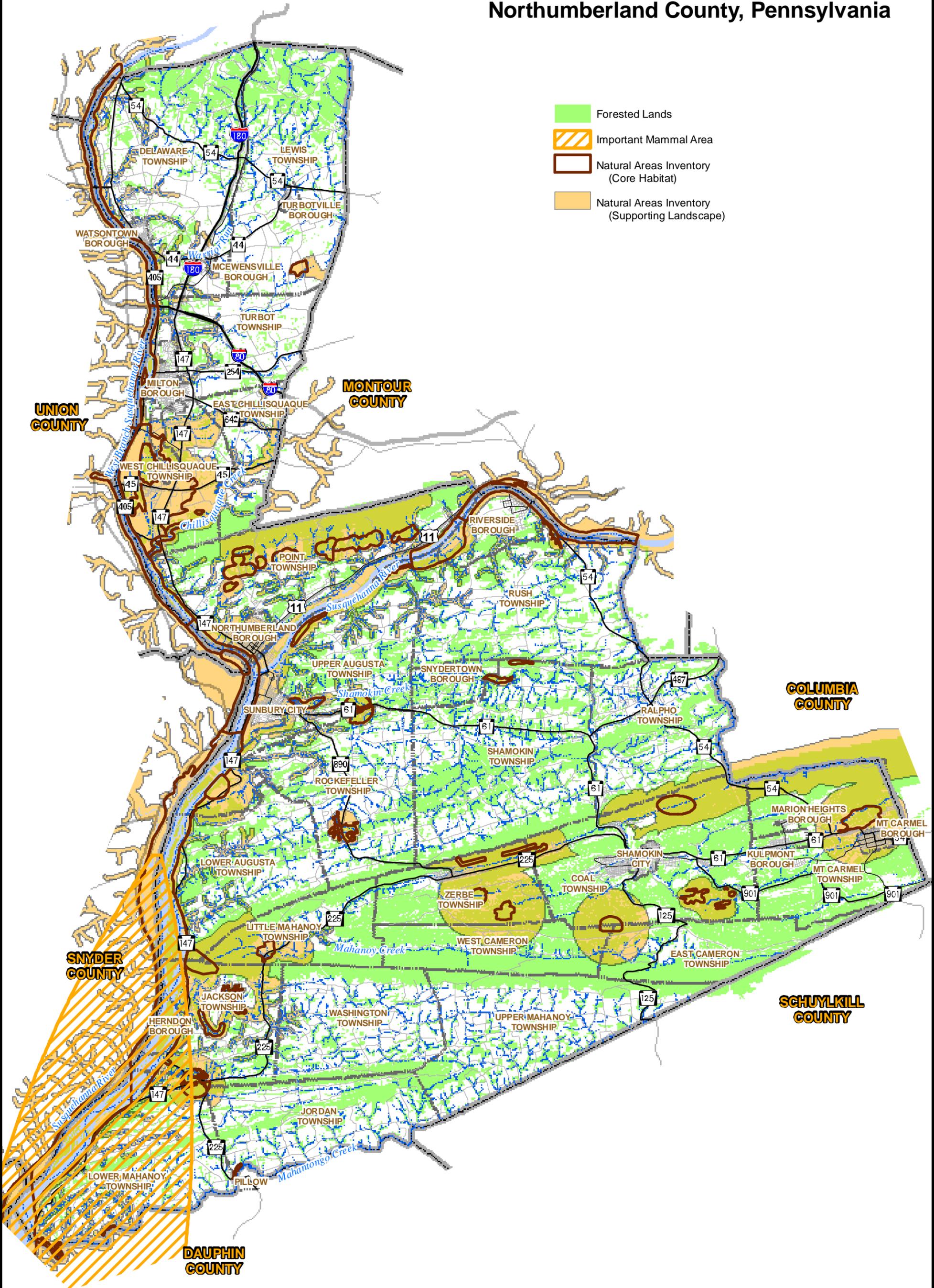


DATA SOURCE: Northumberland County Soil Survey and Union County GIS Department.



2.5: Natural Areas

Northumberland County, Pennsylvania



- Forested Lands
- Important Mammal Area
- Natural Areas Inventory (Core Habitat)
- Natural Areas Inventory (Supporting Landscape)



DATA SOURCE: Northumberland County Natural Heritage Inventory Update 2008 and Union County GIS Department.



More information on IMAs can be found on the Pennsylvania Wildlife Federation website.⁵

Physiography and Bedrock Geology

Physiographic provinces are large regions, typically including multiple states, that exhibit similar physical properties and geology. Physiography and bedrock geology (Map 2.6) have a significant effect on soil development, hydrology, and land use patterns. Northumberland County lies within the Ridge and Valley Province. Within the county, the province is divided into two sections: the Susquehanna Lowland Section and the Anthracite Upland Section.⁶ The Anthracite Upland Section lies between Big Mountain and Little Mahanoy Mountain, which converge near the Susquehanna River in Zerbe and West Cameron Townships.

Northumberland County is one of the most unique Pennsylvania counties for the large deposits of anthracite coal in the southern part of the county. Natural resources from the ground have always been an important part of Northumberland's history. Land preservation activities can not only help to develop greenways but can also preserve natural resources for future use and economic development.



Figure 2.2 — Large forested areas, such as the coal lands in the southern part of the county, offer many opportunities for hiking, hunting, environmental education, and other outdoor recreational pursuits as well as providing habitat for many animal species, some of which are listed in the county's natural heritage inventory.

Prime Agricultural Land

Prime agricultural land is land that has the best combination of conditions for farming and is available for farming.⁷ In addition to identifying prime agricultural land, the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture identifies soils of statewide importance for each state.

⁵<http://www.pawildlife.org/imas.html>

⁶Northumberland County Natural Heritage Inventory Update, 2008, Western Pennsylvania Conservancy, p. 3

⁷*National Soil Survey Handbook*, section 622.04, U.S. Department of Agriculture, Natural Resources Conservation Service, available at <http://soils.usda.gov/technical/handbook/contents/part622.html>

The NRCS divides soils into several classes, based on characteristics suitable for farming. In general, “prime” agricultural land is considered those soils in Classes I, II, and III. Much of Northumberland County contains prime agricultural land, with the striking exception of the Anthracite Upland Section from Mount Carmel Borough west to the Susquehanna River (Map 2.7). The history of coal mining in the area has made the Anthracite Upland area relatively unsuitable for agriculture.

Farmland is a critical component of a greenway system. In some cases, a “working farm” can be an educational destination along a greenway. An easement across the land can provide a key connection in a greenway network. Farms can also be part of a conservation greenway, providing vistas for the enjoyment and contemplation of county residents.



Figure 2.3 — The Whaleback Anticline is a unique geologic feature in Northumberland County.

RECREATION SITES

Recreation sites are a major component of a greenway system. Greenways—particularly those with trails—are often used to link recreation sites, providing a cohesive network of recreation opportunities throughout the municipality or county. The 60 recreation sites in Northumberland County (Table 2.5, Map 2.8) include:

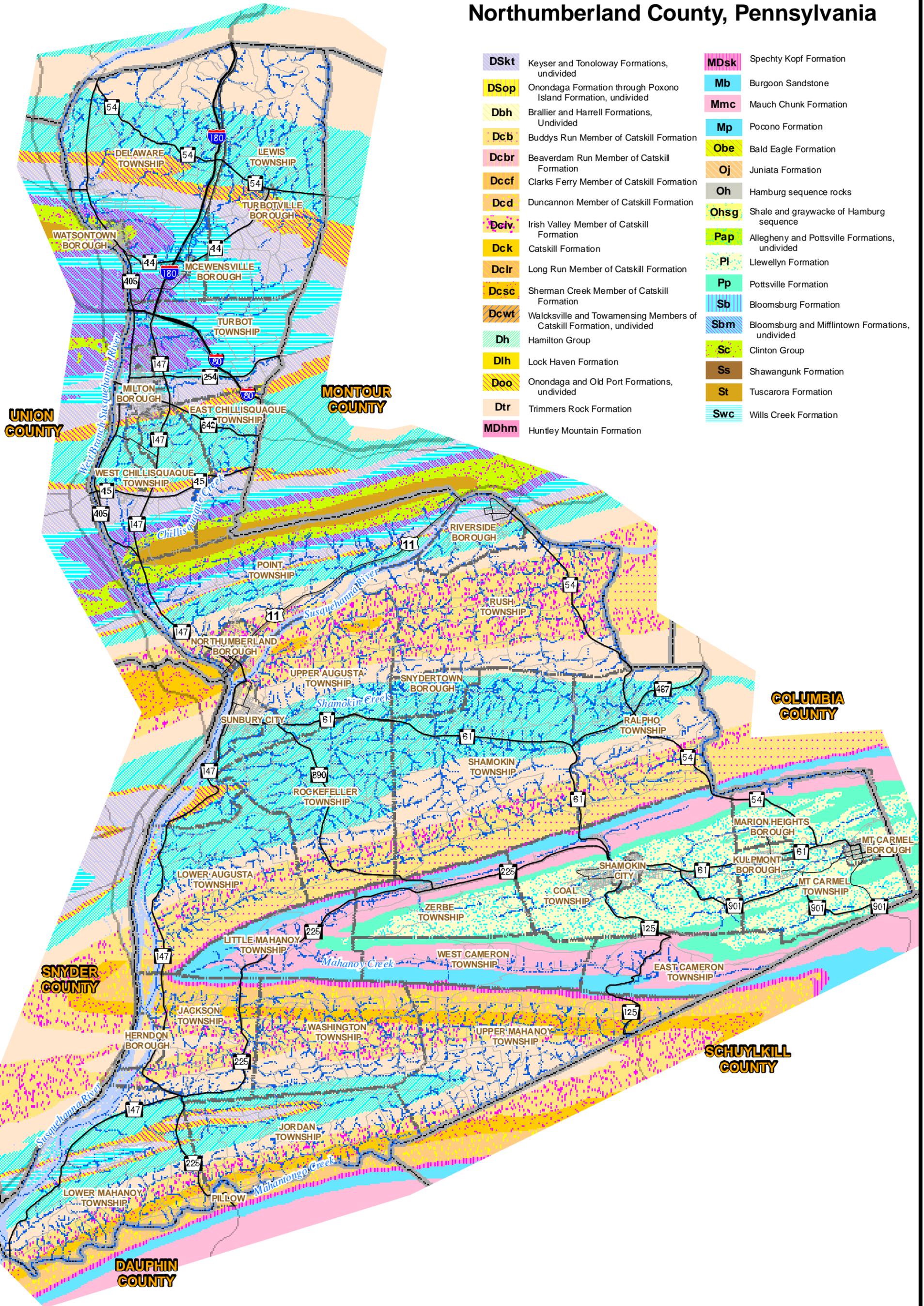
- State parks and forests.
- Local parks.
- Trails.
- Golf courses.
- Campgrounds.
- Knobels Amusement Resort.

State sites

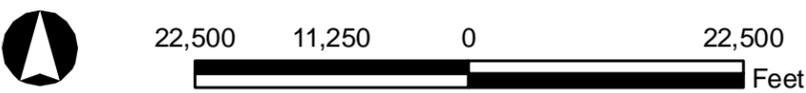
State game lands are state-designated areas for wildlife management and protection and wildlife habitat protection. The lands are controlled by the Pennsylvania Game Commission, created in the late 1800s due to over-hunting, deforestation, and pollution of the natural environment. Used mainly for hunting and trapping purposes, the state game lands also offer sources of fuel in oil and natural gas fields. Northumberland County includes parts of game lands # 84, 115, 325, and 329.

2.6: Bedrock Geology

Northumberland County, Pennsylvania



DSkt	Keyser and Tonoloway Formations, undivided	MDsk	Spechtly Kopf Formation
DSop	Onondaga Formation through Poxono Island Formation, undivided	Mb	Burgoon Sandstone
Dbh	Brallier and Harrell Formations, Undivided	Mmc	Mauch Chunk Formation
Dcb	Buddys Run Member of Catskill Formation	Mp	Pocono Formation
Dcbr	Beaverdam Run Member of Catskill Formation	Obe	Bald Eagle Formation
Dccf	Clarks Ferry Member of Catskill Formation	Oj	Juniata Formation
Dcd	Duncannon Member of Catskill Formation	Oh	Hamburg sequence rocks
Dciv	Irish Valley Member of Catskill Formation	Ohsg	Shale and graywacke of Hamburg sequence
Dck	Catskill Formation	Pap	Allegheny and Pottsville Formations, undivided
Dclr	Long Run Member of Catskill Formation	Pl	Llewellyn Formation
Dcsc	Sherman Creek Member of Catskill Formation	Pp	Pottsville Formation
Dcwt	Walcksville and Towamensing Members of Catskill Formation, undivided	Sb	Bloomsburg Formation
Dh	Hamilton Group	Sbm	Bloomsburg and Mifflintown Formations, undivided
Dlh	Lock Haven Formation	Sc	Clinton Group
Doo	Onondaga and Old Port Formations, undivided	Ss	Shawangunk Formation
Dtr	Trimmers Rock Formation	St	Tuscarora Formation
MDhm	Huntley Mountain Formation	Swc	Wills Creek Formation



DATA SOURCE: PASDA and Union County GIS Department.

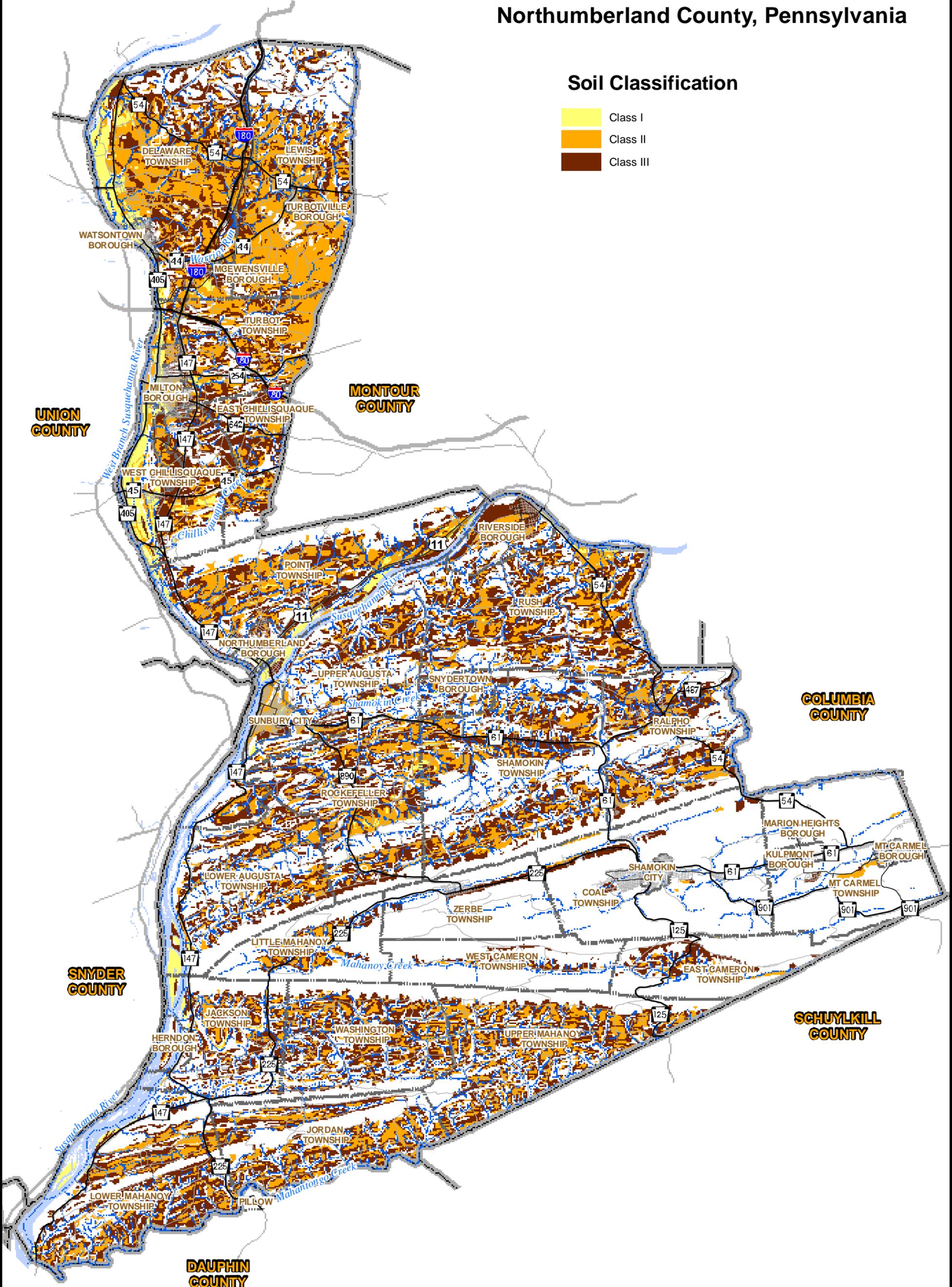


2.7: Prime Agricultural Land

Northumberland County, Pennsylvania

Soil Classification

- Class I
- Class II
- Class III



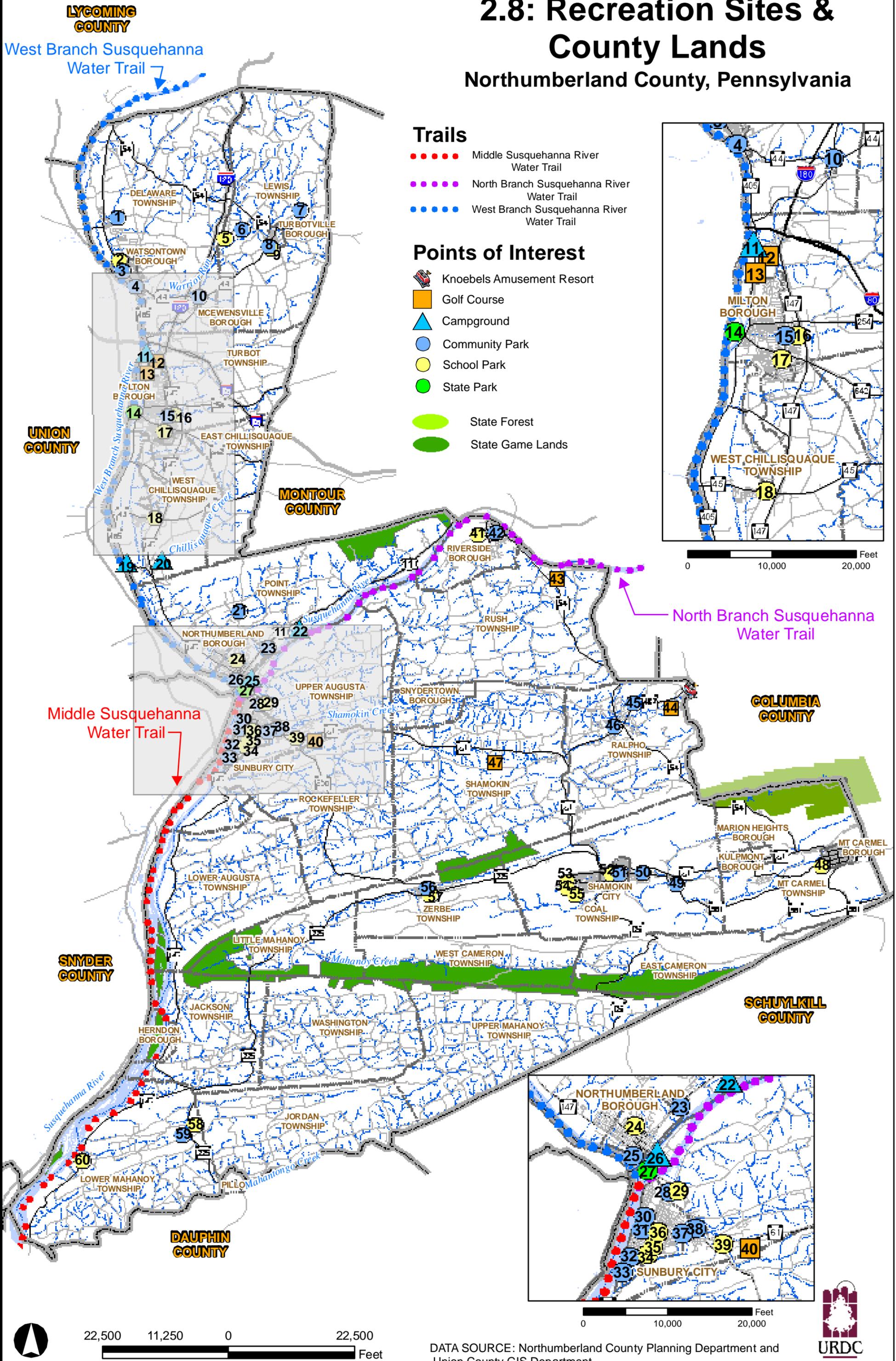
22,500 11,250 0 22,500 Feet

DATA SOURCE: Northumberland County Soil Survey and Union County GIS Department.



2.8: Recreation Sites & County Lands

Northumberland County, Pennsylvania



Trails

- Middle Susquehanna River Water Trail
- North Branch Susquehanna River Water Trail
- West Branch Susquehanna River Water Trail

Points of Interest

- Knobel's Amusement Resort
- Golf Course
- Campground
- Community Park
- School Park
- State Park
- State Forest
- State Game Lands

0 10,000 20,000 Feet

North Branch Susquehanna Water Trail

Middle Susquehanna Water Trail

0 10,000 20,000 Feet

22,500 11,250 0 22,500 Feet

DATA SOURCE: Northumberland County Planning Department and Union County GIS Department.



Northumberland County Greenways and Open Space Plan

**Table 2.5
Recreation Sites — Northumberland County, 2010**

Map No.	Recreation Site
1	Delaware Grange Park
2	Watsonstown Elementary School
3	8 th Street Park
4	Watsonstown Park
5	Warrior Run High School
6	AYSO Fields
7	Moser Fields
8	Turbotville Park
9	Turbotville Elementary School
10	McEwensville Park
11	Fort Boon Campground
12	Turbot Hills Golf Course
13	Rt 405 Driving Range
14	Milton State Park
15	Milton Community Park
16	Milton Elementary School
17	Milton High School
18	Montandon Elementary School
19	Libby's Shoreside Campground
20	Yogi Bear's Shangri-La by the Creek Campground
21	Point Township Recreation Area
22	Splash Magic Campground
23	Northumberland AYSO Soccer Fields
24	C W Rice Middle School
25	Fantasy Island Campground
26	Pincknotter Park
27	Shikellamy State Park
28	Memorial Drive Recreational Complex
29	Shikellamy Elementary School
30	Oppenheimer Pleasure Grounds
31	Cameron Park

Map No.	Recreation Site
32	Rice Playground
33	Keithan Bluebird Park
34	Shikellamy High School
35	Shikellamy Middle School
36	Beck Elementary School
37	Kiwanis Playground
38	Community Park
39	Oaklynn Elementary School
40	Sunny Hill Golf Course
41	Riverside Elementary School
42	Riverside Park
43	Cherokee Golf Course
44	Three Ponds Golf Course
45	Ralpho Community Park
46	Ralpho Township Recreational Complex
47	Indian Hills Golf Course
48	Marion Heights Municipal Park
49	Mount Carmel Area School
50	Coal Township Park
51	East End Civic Association
52	Shroyer Memorial Pool
53	Shamokin Elementary School
54	Lower Anthracite Regional Recreation Fields
55	Shamokin High / Middle School
56	Northumberland County Vocational School
57	Trevorton Community Park
58	Trevorton Elementary School
59	Line Mountain High School
60	Line Mountain Recreation Area
61	Dalmatia Elementary School

Note: Some recreation sites less than one acre in size may not be listed in Table 2.5

Sources: Union County GIS Department, URDC



Figure 2.4 — State parks and forests in Northumberland County include many pathways, such as the path in Weiser State Forest pictured above.

State forests offer large tracts of pristine forest to both residents and tourists. Scenic vistas and old growth forests allow for natural beauty within the areas, while recreational sports, such as all-terrain vehicles, snow-mobles, and mountain biking have become more popular in recent years. Northumberland County includes a small portion of Conrad Weiser State Forest north of the Mount Carmel / Kulpmont / Marion Heights area.

State parks provide opportunities for healthful outdoor recreation and serve as outdoor classrooms for environmental education. State parks conserve the natural, scenic, aesthetic, and historical values of the state and protect the natural outdoor experience for both current and future generations. Northumberland County has two state parks:

- Milton State Park is an 82-acre island on the West Branch Susquehanna River, between the Boroughs of Milton and West Milton. The northern half of the park has day use facilities with a seasonal restroom, and the southern half remains in a wooded state for hiking and nature study. Facilities include hiking trails, picnicking areas, recreation fields, boating ramps, fishing areas, and areas for wildlife watching.
- Shikellamy State Park is a 132-acre park located in Union and Northumberland Counties on both sides of the Susquehanna River. The 54-acre Shikellamy Marina section is in Northumberland County, between the Borough of Northumberland and the City of Sunbury on the southern tip of Packer’s Island, at the confluence of the West Branch and North Branch of the Susquehanna River. The marina section offers trails for walking and bicycling, picnic facilities, scenic views of nearby Lake Augusta, fishing opportunities in Lake Augusta, boat docks, slips, and launching facilities.

Local parks

Municipal parks provide recreation facilities for local residents. Many schools also offer facilities for residents, although most schools have priorities for the use of school recreational facilities in which school groups and other users may take precedence over use by the general public.

Trails

The Susquehanna River Water Trail is the predominant trail within Northumberland County. The river has been recently recognized as a National Recreation Trail. The state parks also have various trails within park boundaries.

Two other significant trail-oriented locations are proposed in the county. Since the facilities are proposed, both sites are shown on the plan map in chapter 3 rather than on Map 2.8. The two facilities are:

- The Anthracite Outdoor Adventure Area (AOAA) Park proposed in Coal Township and four adjacent municipalities — The county’s consultant is finalizing a feasibility study for the recreation area, anticipated to be one of the largest off-highway vehicle areas in the eastern United States.
- The Lower Anthracite Heritage Regional Trail is planned to traverse Schuylkill, Columbia, and Northumberland Counties. The region has prepared a feasibility study identifying five alignment options.

Golf courses

Table 2.5 lists five golf courses in Northumberland County:

- Turbot Hills (public) — Three Ponds (public)
- Sunny Hill (public) — Indian Hills (private membership)
- Cherokee (public)

Campgrounds

The six campground areas in Northumberland County provide opportunities for outdoor camping with a variety of recreation facilities.

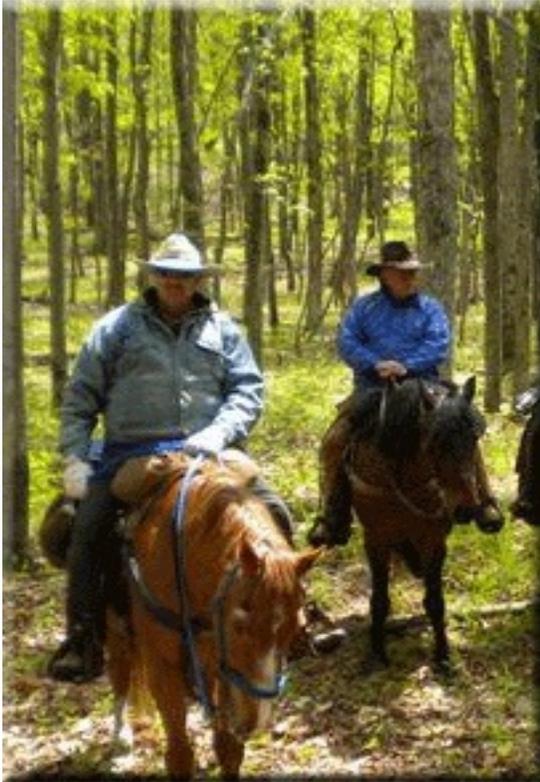


Figure 2.5 — In addition to hiking, many county trails and woodlands offer opportunities for horse-back riding.

Knoebels Amusement Resort

Knoebels is well-known throughout Pennsylvania and surrounding states as a family fun destination. The resort includes many rides, several food locations (including a full-service family restaurant), swimming, camping, and the Three Ponds Golf Course (on-site).



Figure 2.6 — The Phoenix is just one of the many popular attractions at Knoebels Grove Resort. The old-fashioned wooden roller coaster was brought to Knoebels in 1985 from San Antonio, TX.

PRESERVED PRIVATE LANDS

Privately owned land can be preserved from development in many ways. The *Northumberland County Greenways and Open Space Plan* includes a discussion of various land preservation methods as tools for plan implementation. One of the most common methods involves the use of permanent easements, either for agricultural use or for general conservation.

Few easements are currently in place on private land in Northumberland County (Map 2.9). Agricultural easements are found in Delaware Township, Lewis Township, and Turbot Township in the northern part of the county. In the southern part

of the county, some farmlands in Jordan, Lower Mahanoy, and Upper Mahanoy Townships are under easement.

PUBLIC SCHOOLS, PUBLIC LIBRARIES, AND LARGE COMMERCIAL / INDUSTRIAL AREAS

Schools and libraries are facilities that are often destinations in a greenway system, particularly for pedestrians and bicycle users. Large commercial and industrial areas are frequently destinations for shoppers and workers that travel on foot or by bicycle. Together, schools, libraries, and commercial/industrial centers (Map 2.10) can account for a significant portion of nonrecreational greenway usage.

Public Educational Facilities

Public schools and colleges are major destinations for students. Greenways that connect residential concentrations to schools and colleges can be used for transportation to and from the educational facilities. Northumberland County is served by the Northumberland County Career and Technology Center in Coal Township outside of the City of Shamokin, the Susq-Cyber Charter School (based in Bloomsburg, Columbia County), and all or part of eight public school districts (municipalities in parentheses):

- Danville Area (Riverside, Rush)
- Line Mountain (Herndon, Jackson, Jordan, Little Mahanoy, Lower Augusta, Lower Mahanoy, Upper Mahanoy, Washington, West Cameron, Zerbe)

2.9: Preserved Land

Northumberland County, Pennsylvania



22,500 11,250 0 22,500
Feet

DATA SOURCE: Northumberland County Conservation District and Union County GIS Department.



2.10 - Educational Facilities, Libraries & Large Commercial/Industrial Areas

Northumberland County, Pennsylvania

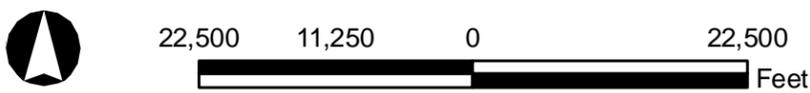
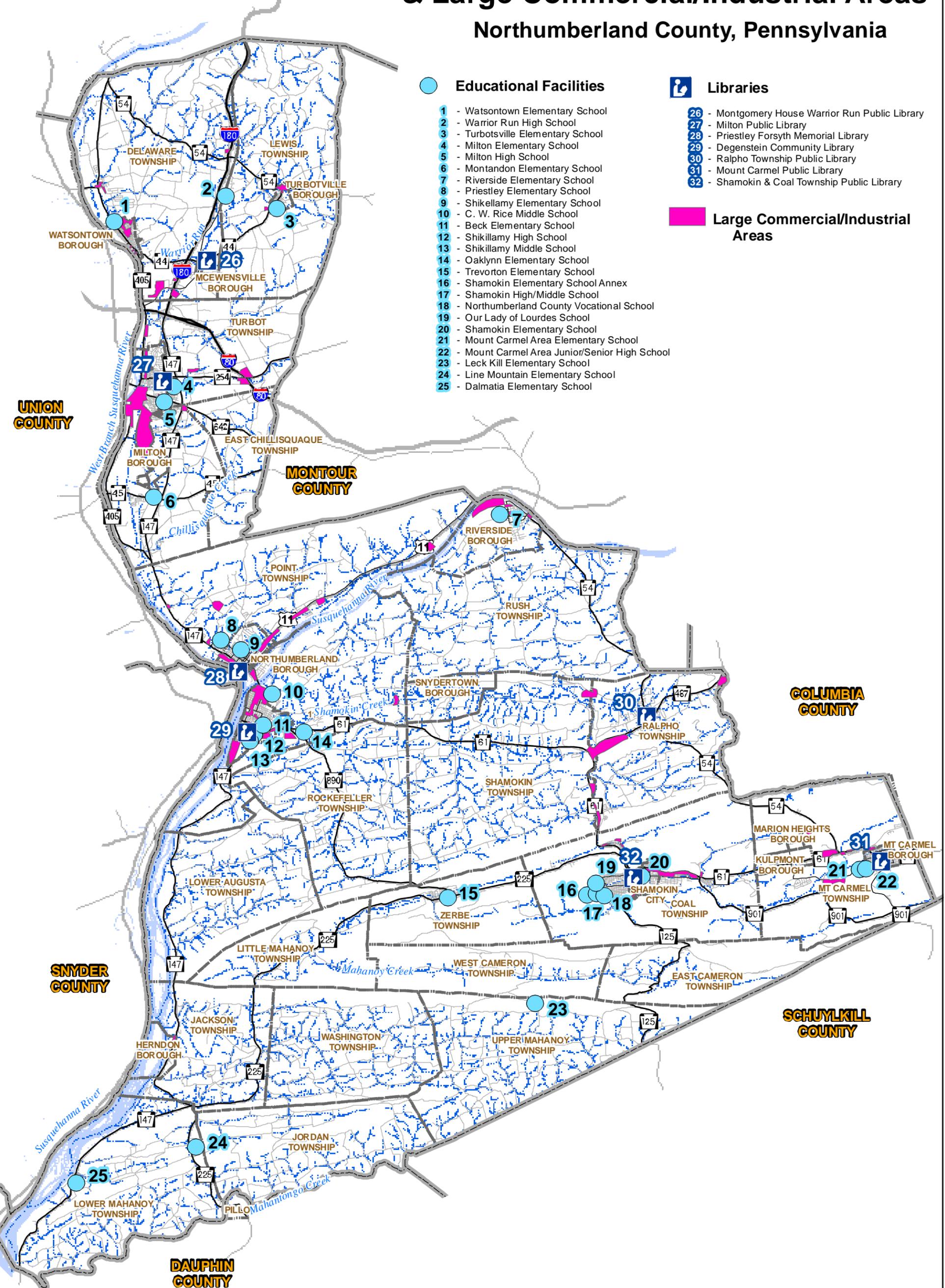
Educational Facilities

- 1 - Watsontown Elementary School
- 2 - Warrior Run High School
- 3 - Turbotville Elementary School
- 4 - Milton Elementary School
- 5 - Milton High School
- 6 - Montandon Elementary School
- 7 - Riverside Elementary School
- 8 - Priestley Elementary School
- 9 - Shikellamy Elementary School
- 10 - C. W. Rice Middle School
- 11 - Beck Elementary School
- 12 - Shikillamy High School
- 13 - Shikillamy Middle School
- 14 - Oaklynn Elementary School
- 15 - Trevorton Elementary School
- 16 - Shamokin Elementary School Annex
- 17 - Shamokin High/Middle School
- 18 - Northumberland County Vocational School
- 19 - Our Lady of Lourdes School
- 20 - Shamokin Elementary School
- 21 - Mount Carmel Area Elementary School
- 22 - Mount Carmel Area Junior/Senior High School
- 23 - Leck Kill Elementary School
- 24 - Line Mountain Elementary School
- 25 - Dalmatia Elementary School

Libraries

- 26 - Montgomery House Warrior Run Public Library
- 27 - Milton Public Library
- 28 - Priestley Forsyth Memorial Library
- 29 - Degenstein Community Library
- 30 - Ralpho Township Public Library
- 31 - Mount Carmel Public Library
- 32 - Shamokin & Coal Township Public Library

Large Commercial/Industrial Areas



- Milton Area (East Chillisquaque, Milton, Turbot, West Chillisquaque)
- Mount Carmel Area (Kulpmont, Marion Heights, Mount Carmel Borough, Mt. Carmel Township)
- Shamokin Area (Coal, East Cameron, Shamokin, Shamokin Township)
- Shikellamy (Northumberland, Point, Rockefeller, Snyderstown, Sunbury, Upper Augusta)
- Southern Columbia Area (Ralpho)
- Warrior Run (Delaware, Lewis, McEwensville, Turbotville, Watsontown)

The only post-secondary educational institution in Northumberland County is the for-profit McCann School of Business in Sunbury. Union County, directly across the Susquehanna River from Sunbury, is the home of Bucknell University. In addition:

- Luzerne County Community College maintains a post secondary division in Shamokin.
- Susquehanna University is located in neighboring Snyder County.
- Bloomsburg University is located in neighboring Columbia County.

Public Libraries

Public libraries are activity centers for public use and are often centrally located within neighborhoods. In addition to the benefits of providing information resources to the general public, libraries also strengthen a community identity and frequently offer a sense of historical pride. Northumberland County is served by seven public libraries (Map 2.10):

- Degenstein Community Library — Sunbury
- Milton Public Library — Milton
- Montgomery House Warrior Run Area Public Library — McEwensville
- Mount Carmel Public Library — Mount Carmel
- Priestly Forsyth Memorial Library — Northumberland
- Ralpho Township Public Library — Elysburg
- Shamokin and Coal Township Public Library — Shamokin

Large Commercial/Industrial Centers

Large commercial and industrial centers are activity centers where people gather to work or shop. The centers are often hubs or destinations within a greenway system. Focuses of commercial activity in Northumberland County include:

- Portions of the boroughs and the City of Sunbury.
- The Milton Area Industrial Development Association (MAIDA) Business Park and the adjacent Tanner Addition Business Park.
- The I-80 corridor.
- Areas along other key roads, such as U.S. 11, PA 61, and PA 487 (Map 2.10).
- The Seedco Industrial Park along PA 901, the home of Reinhart Food Service.

HISTORIC FEATURES

Historic features include sites and areas of historic significance and museums that highlight historical events. Greenways can be used to develop tours of historic features that tell specific stories about portions of the county. Clusters of historic sites can also form nodes within a greenway system. The National Register of Historic Places includes 27 sites in Northumberland County (Map 2.11).

Museums can also serve as nodes in a greenway system, particularly if the museum is related to the story told by a specific greenway/trail. In addition to the historic sites, Northumberland County has five additional museums, also noted on Map 2.11:

- Northumberland County Historical Society and Hunter House Museum in Sunbury
- A Long House Native American Museum in Sunbury
- Lower Anthracite Model Railroad in Shamokin
- Milton Historical Society in Milton
- Turbotville Auto Museum in Turbotville

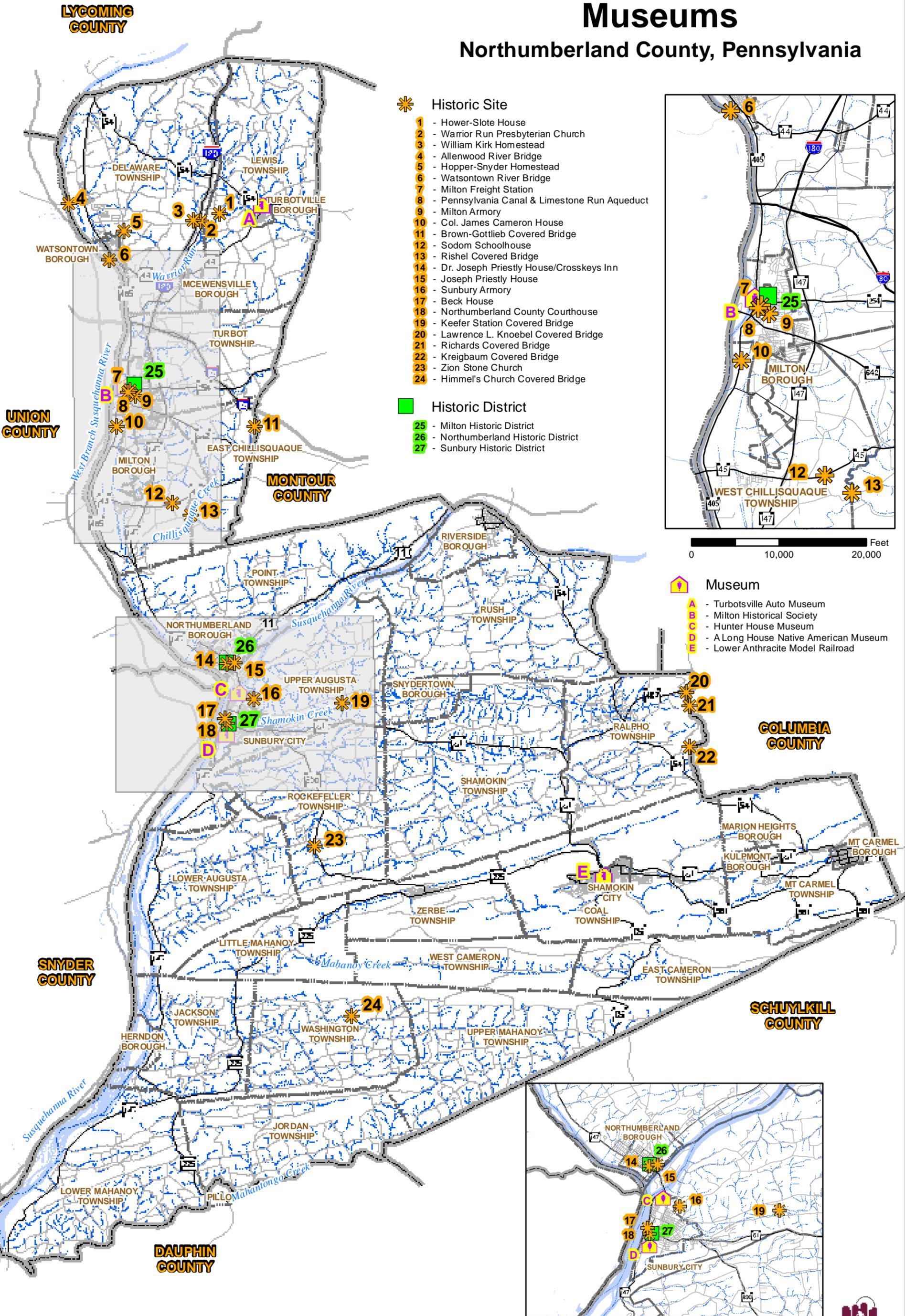


Figure 2.7 — Fort Freeland (above), near Watsontown and Turbotville, and the Joseph Priestly House (below) in Northumberland Borough are two of the many historic sites in Northumberland County.



2.11: Historic Sites & Museums

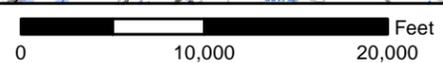
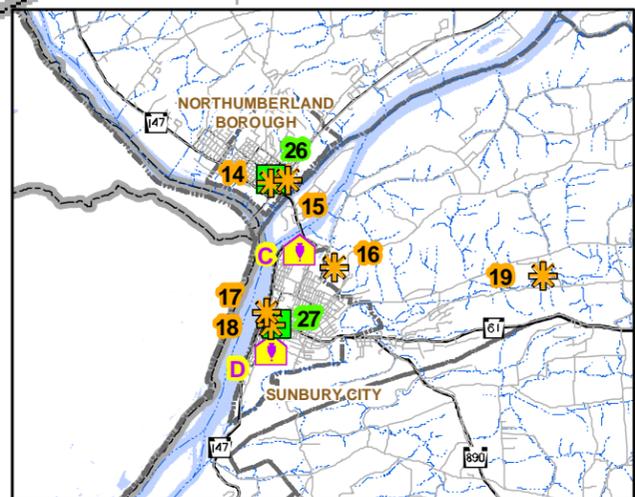
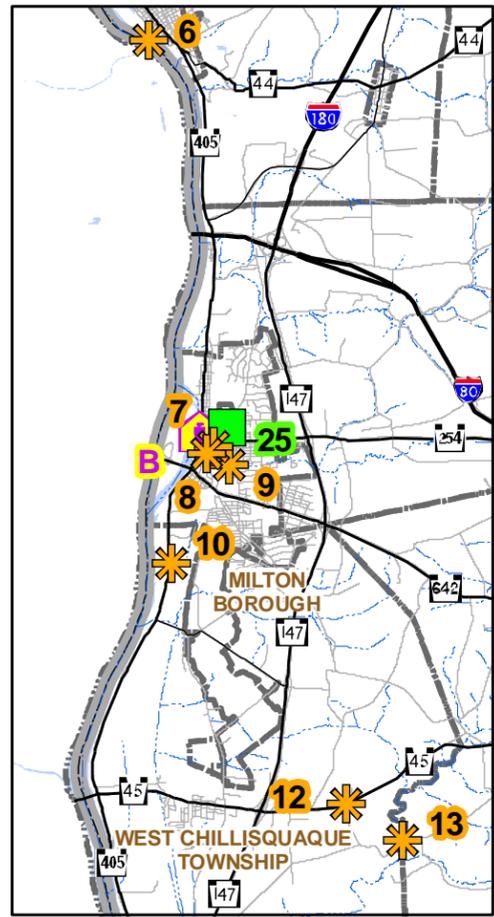
Northumberland County, Pennsylvania



- Historic Site**
- 1 - Hower-Slote House
 - 2 - Warrior Run Presbyterian Church
 - 3 - William Kirk Homestead
 - 4 - Allenwood River Bridge
 - 5 - Hopper-Snyder Homestead
 - 6 - Watsontown River Bridge
 - 7 - Milton Freight Station
 - 8 - Pennsylvania Canal & Limestone Run Aqueduct
 - 9 - Milton Armory
 - 10 - Col. James Cameron House
 - 11 - Brown-Gottlieb Covered Bridge
 - 12 - Sodom Schoolhouse
 - 13 - Rishel Covered Bridge
 - 14 - Dr. Joseph Priestly House/Crosskeys Inn
 - 15 - Joseph Priestly House
 - 16 - Sunbury Armory
 - 17 - Beck House
 - 18 - Northumberland County Courthouse
 - 19 - Keefer Station Covered Bridge
 - 20 - Lawrence L. Knoebel Covered Bridge
 - 21 - Richards Covered Bridge
 - 22 - Kreigbaum Covered Bridge
 - 23 - Zion Stone Church
 - 24 - Himmel's Church Covered Bridge

- Historic District**
- 25 - Milton Historic District
 - 26 - Northumberland Historic District
 - 27 - Sunbury Historic District

- Museum**
- A - Turbotville Auto Museum
 - B - Milton Historical Society
 - C - Hunter House Museum
 - D - A Long House Native American Museum
 - E - Lower Anthracite Model Railroad



DATA SOURCE: Northumberland County Planning Department and Union County GIS Department.



EXISTING AND PROPOSED LAND USE

Land use in Pennsylvania is controlled at the municipal level of government. County policy can help guide municipalities to ensure cohesion in development patterns and public services. The *Northumberland County Comprehensive Plan* (adopted 28 June 2005) illustrates both existing land use (Map 2.12) and proposed land use (Map 2.13). The plan identifies two types of areas for proposed development (p. 57):

- “Limited Development Areas” — rural areas containing some development but only limited or non-existent infrastructure

The Generalized Proposed Land Use Map includes four areas identified for limited development:

- small area on the north side of Comley Road west of Gold Road in Lewis Township
- south side of Warrior Run School Road between Pleasant View Estates Road and Trent Road in Lewis Township
- an L-shaped area along Mountain Road and Grove Road in Point Township
- area in the southwest quadrant of Dairy Road and PA 2215 in Lower Mahanoy Township

- “Future Growth Areas” — areas suitable for future growth based on proximity to existing development, sewer availability, and transportation capacity

The Generalized Proposed Land Use Map includes five areas identified for future growth:

- area along the north side of Ridge Road from PA PA 147 east to Yocum Lane in Point Township
- area south of Snyderstown Road and west of Bottle Drive in Shamokin Township
- area south of Snyderstown Road and east of Bottle Drive in Ralpho Township
- area south of the Ferndale and Fairview sections of Coal Township
- large area south of Kulpmont from the village of Shady Acres south to PA 901 and from Kulpmont west to PA 901

Areas proposed for new development might also be planned to contain new greenways and trails that serve residents, students, and workers with new recreation and transportation opportunities.

MAN-MADE FEATURES

Man-made features, as well as natural features, can also be significant parts of a greenway network. In Northumberland County, the linear corridors that may become part of the greenway system include roads, active and/or abandoned rail corridors and major utility rights-of-way, including pipelines and electric transmission lines (Map 2.14).

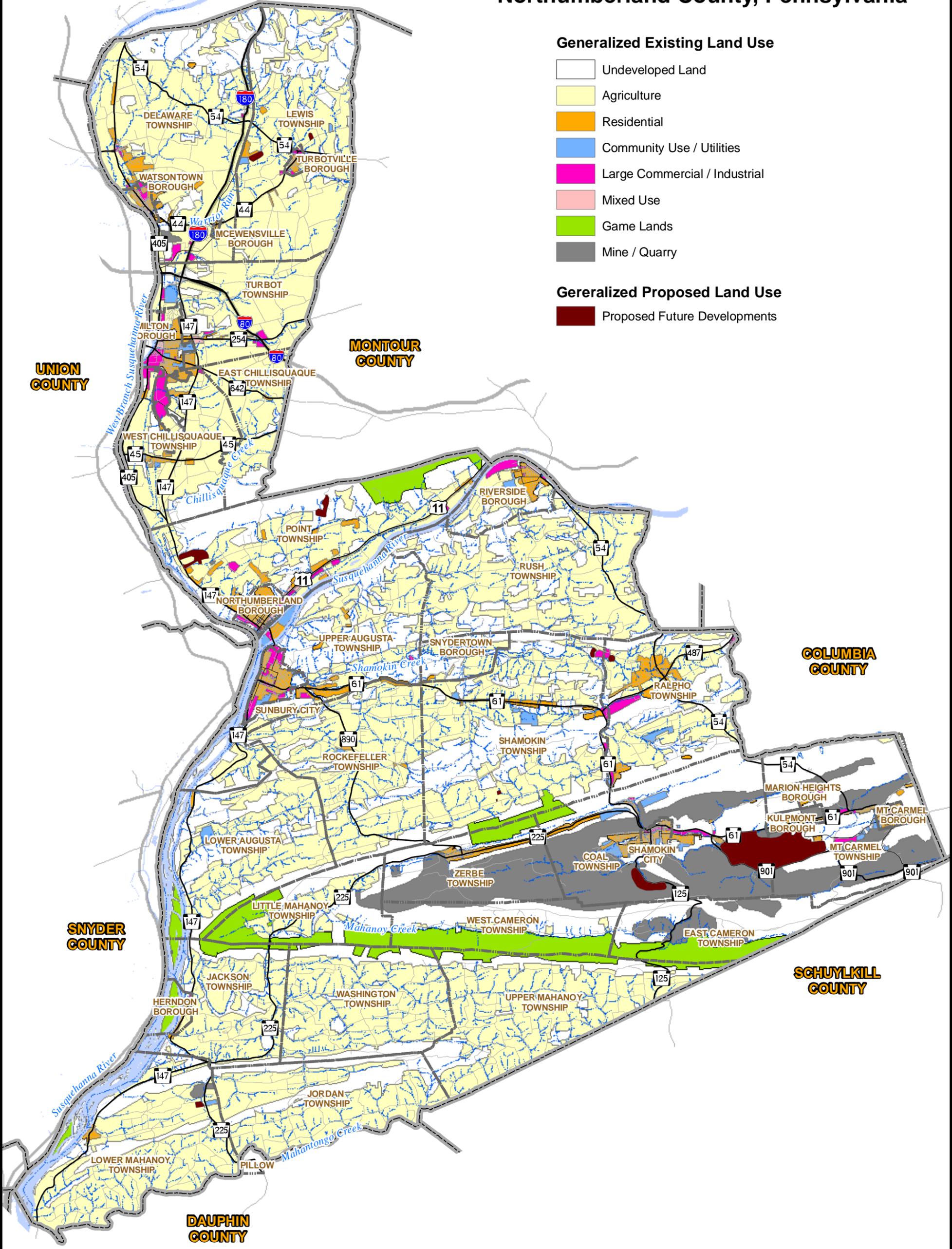
Mining operations are a major part of the Northumberland County landscape. Industrial mineral mining operations are found in the northern and southwestern parts of the county. Coal mining operations—particularly anthracite coal, for which the area is known nationwide—are clustered in the townships of Little Mahanoy, Zerbe, West Cameron, Coal, East Cameron, and Mount Carmel. As noted earlier, land preservation activities in Northumberland County should be flexible enough to develop a greenway system and to provide for the future extraction of important minerals that can create jobs and increase economic development in the county.

A greenway network can include a trail system that provides transportation connections. Bicycle and walking connections can augment public transportation systems when the network integrates public transportation stops and hubs. The Lower Anthracite Transportation System (LATS) provides fixed-route, fixed-schedule service in the southern portion of the county. The system serves Shamokin, Mount Carmel, and nearby areas.

The Northumberland County Transportation Department operates door-to-door shared-ride services for the disabled with 24-hour notice. Door-to-door service is personalized by time and location and has no hub to integrate into a greenway system.

2.13: Generalized Proposed Land Use

Northumberland County, Pennsylvania



UNION COUNTY

MONTOUR COUNTY

COLUMBIA COUNTY

SCHUYLKILL COUNTY

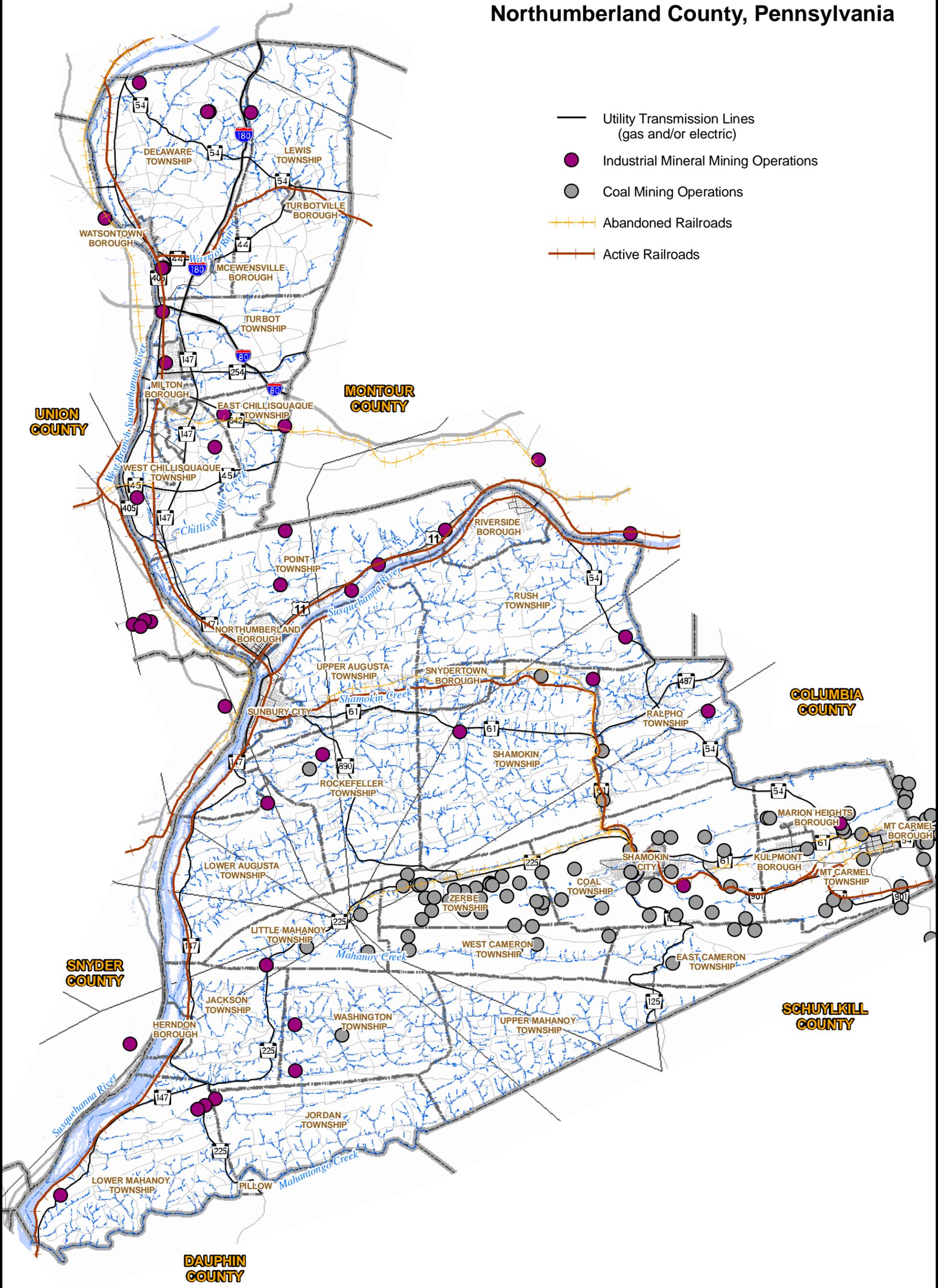
SNYDER COUNTY

DAUPHIN COUNTY



2.14: Man-Made Features

Northumberland County, Pennsylvania



DATA SOURCE: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



GREENWAYS AND OPEN SPACE PLAN

The *Northumberland County Greenways and Open Space Plan* is based on the background information presented and analyzed in the previous chapter. The plan is composed of several elements:

- **Goals and Objectives** — The goals and objectives provide direction for the plan. Goals identify desired ends toward which the plan should reach. Objectives are more specific steps that should be taken to achieve the goals.
- **Plan Map** — The Greenways and Open Space Concept Plan (Map 3.1) includes both recreation and conservation greenways (Table 3.1). The Susquehanna River serves as the backbone for the entire county greenway system. The concept also identifies three major activity hubs (Milton, Northumberland/Sunbury, and Shamokin) and six minor activity hubs (Watsontown, Turbotville, Riverside, Snyderstown, Mount Carmel, and Herndon).
- **Action Program** — The action program provides tools for implementing the *Northumberland County Greenways and Open Space Plan*. The action program consists of the following elements:

- **RECOMMENDATIONS** — The recommendations present policies, programs, and projects to implement the plan. Each recommendation includes a broad time frame/priority for the action and a suggestion for the lead entity(ies) responsible for the action.¹
- **LAND PRESERVATION TOOLS** — The action program includes a discussion of various methods that can be used to conserve land. Each opportunity for land preservation is unique due to owner circumstances and available public resources. Furthermore, priorities for land acquisition may change quickly as land becomes available or may become unavailable.
- **STAKEHOLDERS** — Many different groups have an interest in greenways. Each group is identified and roles discussed within the action program.

¹ The general time frame for the plan is approximately 10 years, to conform with the requirement of the PA Municipalities Planning Code (MPC) that county comprehensive plans be updated at least every 10 years. Northumberland County may wish to update the greenways and open space plan at the same time the county comprehensive plan is next updated, in order to coordinate the two planning efforts.

- **MANAGEMENT** — The action program provides guidance for addressing management issues for the Northumberland County greenway system. The suggested management approach involves the county advisory council (discussed as a pilot project) working closely with the Northumberland County Conservation District, which is already established as a strong entity for land conservation in the county.
- **COSTS AND POTENTIAL FUNDING SOURCES** — The action program includes both a discussion of costs (with examples from recent successful greenways in south central Pennsylvania) and an extensive list of sources for potential financing of projects directly or indirectly related to the greenways system.
- **PILOT PROJECT** — Pilot projects are relatively easy to implement because of low cost, available resources, owner circumstances, and other considerations. Pilot projects show tangible evidence and success of the county greenway effort. The action program identifies a pilot project(s) that the county may wish to undertake that shows early success and generates enthusiasm within the community for other greenway/land preservation projects.

GOALS AND OBJECTIVES

The goals of the *Northumberland County Greenways and Open Space Plan* provide a broad policy-oriented direction for the county in establishing greenways and preserving open space. Objectives are more specific actions that help further each goal.

Goal 1: *Develop a greenway system that includes both recreation and conservation greenways.*

Objective 1a:

Connect activity centers, as identified in the background studies, using linear, natural corridors wherever possible.

Objective 1b:

Protect and expand existing open space as part of the Northumberland County greenways network.

Goal 2: *Expand the county's existing trail and open space system.*

Objective 2a:

Work with stakeholders—including land owners, government agencies, conservation and recreation organizations, developers, volunteers, and others—to develop trail segments and preserve open space.

Objective 2b:

Build upon existing trail and pathway efforts, such as the Warrior Run Pathways Partnership and the Anthracite Outdoor Adventure Area (AOAA), to develop and support the greenway system.

Objective 2c:

Encourage municipalities to require— through local zoning and subdivision ordinances—that developers incorporate trails and open space into all new developments.

Objective 2d:

Explore the use of utility corridors and railroad rights-of-way as part of the county trail network.

Goal 3: *Protect natural features, cultural, scenic, and historic areas of Northumberland County.*

Objective 3a:

Identify conservation greenways as a means of preserving lands for a variety of reasons throughout the county.

Objective 3b:

Use the boroughs and other activity centers as hubs within the greenways network.

PLAN MAP

The *Northumberland County Greenways and Open Space Plan* map (Map 3.1) illustrates important concepts for the plan. The proposed Northumberland County greenways system is based on a system of hubs and spokes. The hubs are activity centers connected by linkages, which are the spokes of the system.

Several information items from the background studies are very important to the plan itself and have been pulled through to the plan map. In addition to proposals, the plan map also illustrates the following information:

- *Natural features and Natural Areas*, which include:
 - Agricultural Easements
 - Conservation Easements
 - Floodplains
 - Natural Areas²
 - Slopes greater than 25 percent
 - Wetlands
- *State Lands*, which include:
 - Milton State Park
 - Shikellamy State Park
 - State game lands
 - Weiser State Forest
- *Recreation Areas*, including both county and municipal sites

² as identified in the *Northumberland County Natural Heritage Inventory*

Northumberland County Greenways and Open Space Plan



Figure 3.1 — The City of Shamokin, pictured at left, is one of the major hubs in the Northumberland County greenway system.

The cities and larger boroughs in the county have the most activity centers, as identified in the background studies. Therefore, the three major hubs of the proposed greenway system in Northumberland County are the areas around Milton, Northumberland/Sunbury, and Shamokin.

The plan also recognizes the areas around the Boroughs of Herndon, Mount Carmel, Riverside, Snyderstown, Watsonstown, and Turbotville, as minor, or secondary hubs.

The spokes of the greenway system serve two significant functions:

- Preserving sensitive, linear corridors of land
- Connecting the system hubs, wherever possible

The system includes both recreation greenways and conservation greenways. Recreation greenways include all types of trails and/or shared roadways and allow for pedestrians, bicyclists, boaters, and, perhaps, equestrians, to name a few. Conservation greenways do not include trails or active recreation facilities. In fact, many conservation greenways will not provide for public access. Many of the conservation greenways identified in the greenway plan concept are focused on waterways. Both sides of

each waterway should be preserved, if at all possible, to protect the quality and quantity of water supplies.

Some of the greenways recommended as part of the *Northumberland County Greenway and Open Space Plan* are oriented to recreation, some to conservation, and some have segments of both recreation and conservation. In total, the plan designates approximately 360.0 miles of greenways throughout the county (Table 3.1), including:

- 81.9 miles of water-based recreation greenways
- 175.4 miles of land-based recreation greenways
- 102.7 miles of conservation and other related greenways

Each greenway is further described below.

- The *Chillisquaque Creek Greenway* is one of several east-west greenways that pass through the entirety of Northumberland County between the West Branch of the Susquehanna River and Montour County. The recreational greenway winds 8.5 miles from a point along the Northumberland/Montour border about ½-mile south of Interstate 80 to the West Branch of the Susquehanna River at the village of Chillisquaque in West Chillisquaque Township.
- The *Delaware Run Greenway* is a 5.8-mile conservation greenway along the entire length of Delaware Run, from the source (north of PA 54 near Interstate 180) to the mouth (at the West Branch of the Susquehanna River). The Delaware Run Greenway is located entirely in Delaware Township.

LYCOMING COUNTY

3.1 Greenways & Open Space Concept Plan - 2011

Northumberland County, Pennsylvania

UNION COUNTY

MONTOUR COUNTY

COLUMBIA COUNTY

SNYDER COUNTY

SCHUYLKILL COUNTY

DAUPHIN COUNTY

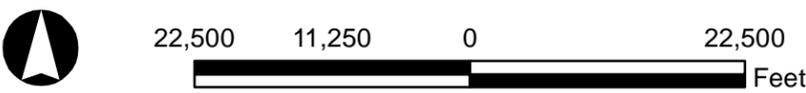
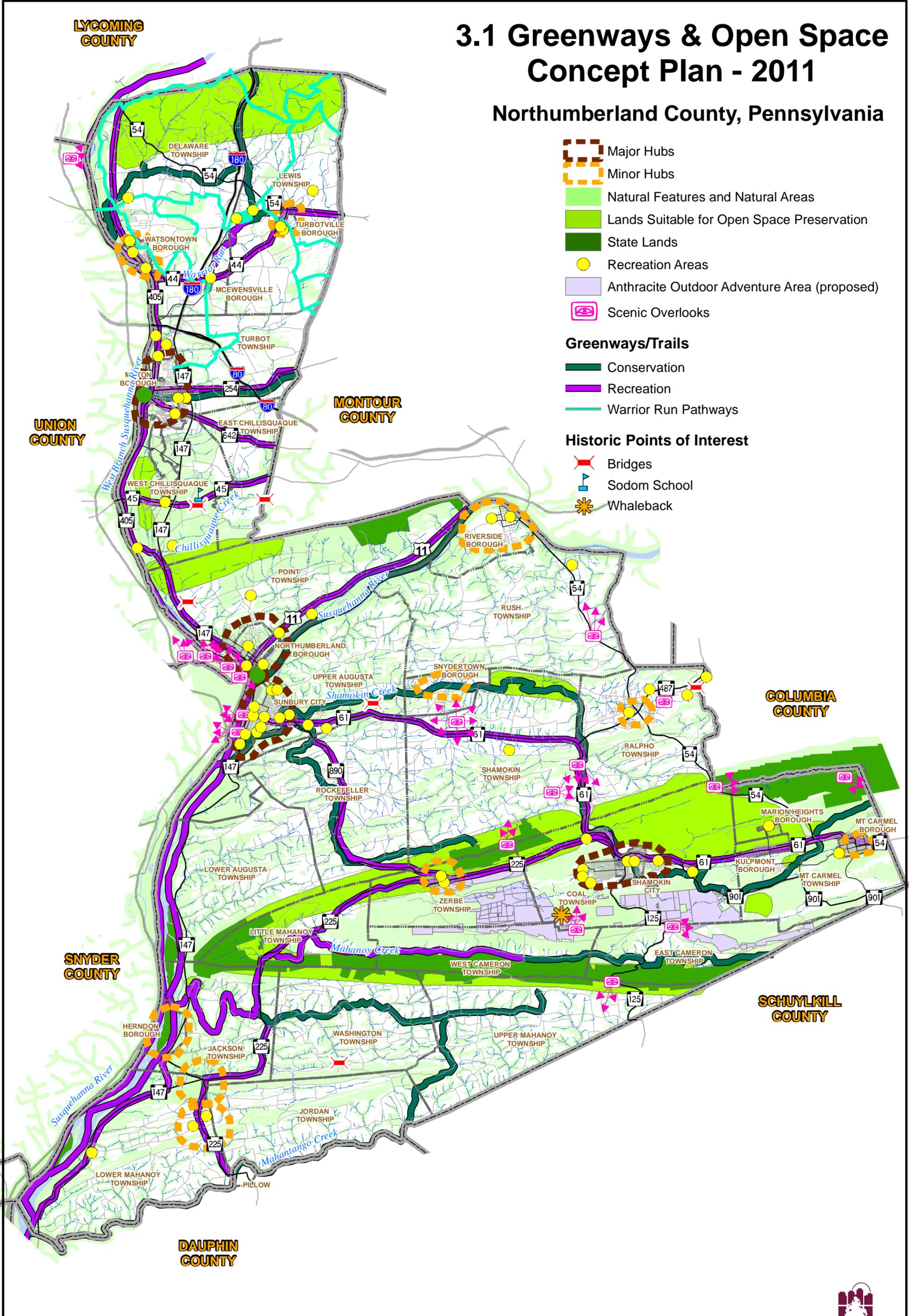
-  Major Hubs
-  Minor Hubs
-  Natural Features and Natural Areas
-  Lands Suitable for Open Space Preservation
-  State Lands
-  Recreation Areas
-  Anthracite Outdoor Adventure Area (proposed)
-  Scenic Overlooks

Greenways/Trails

-  Conservation
-  Recreation
-  Warrior Run Pathways

Historic Points of Interest

-  Bridges
-  Sodom School
-  Whaleback



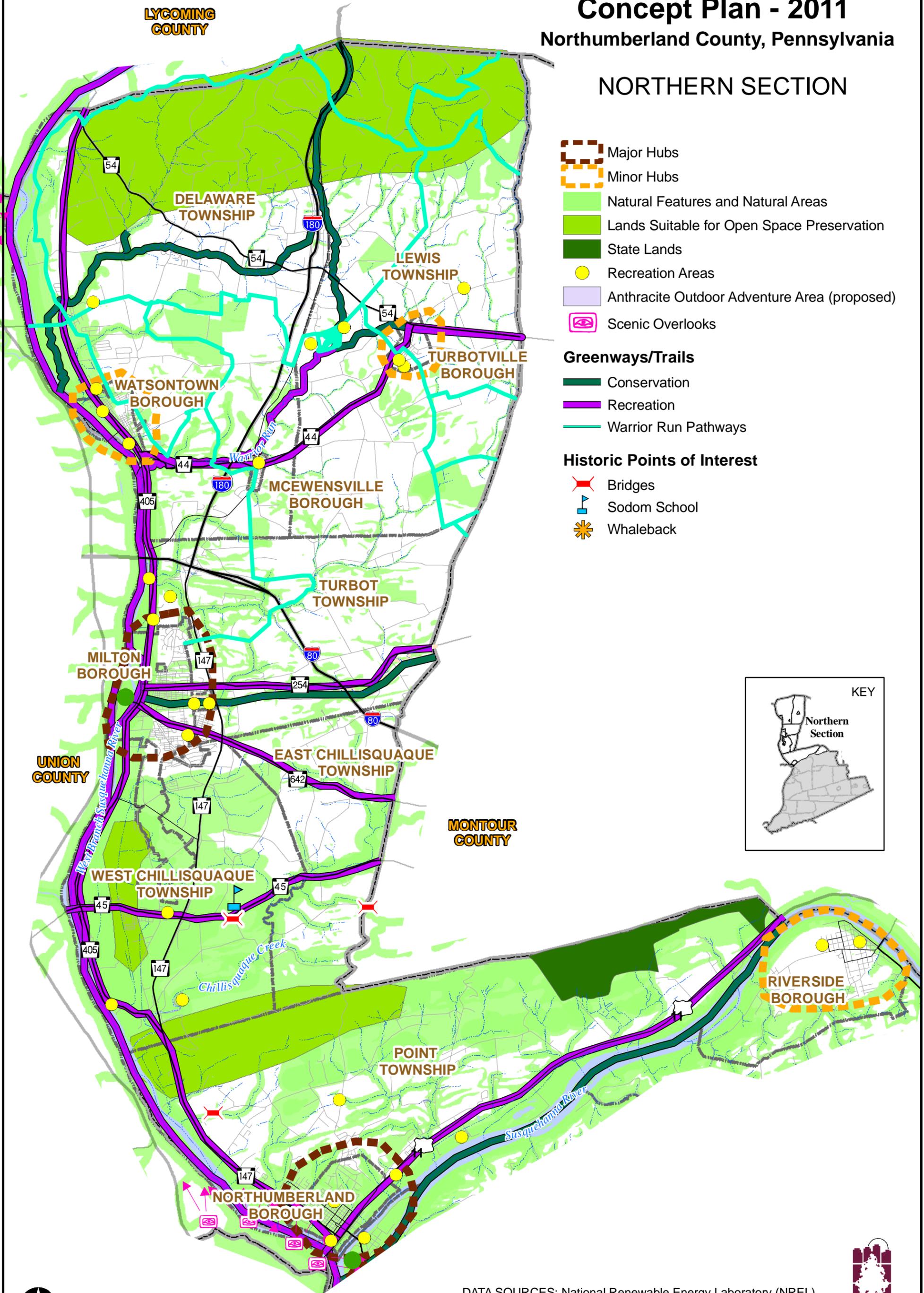
DATA SOURCES: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



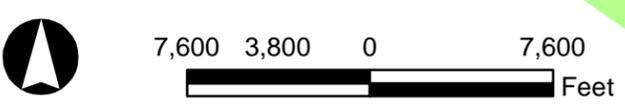
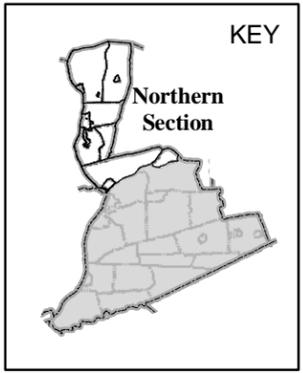
3.2 Greenways & Open Space Concept Plan - 2011

Northumberland County, Pennsylvania

NORTHERN SECTION



- Major Hubs
 - Minor Hubs
 - Natural Features and Natural Areas
 - Lands Suitable for Open Space Preservation
 - State Lands
 - Recreation Areas
 - Anthracite Outdoor Adventure Area (proposed)
 - Scenic Overlooks
- Greenways/Trails**
- Conservation
 - Recreation
 - Warrior Run Pathways
- Historic Points of Interest**
- Bridges
 - Sodom School
 - Whaleback



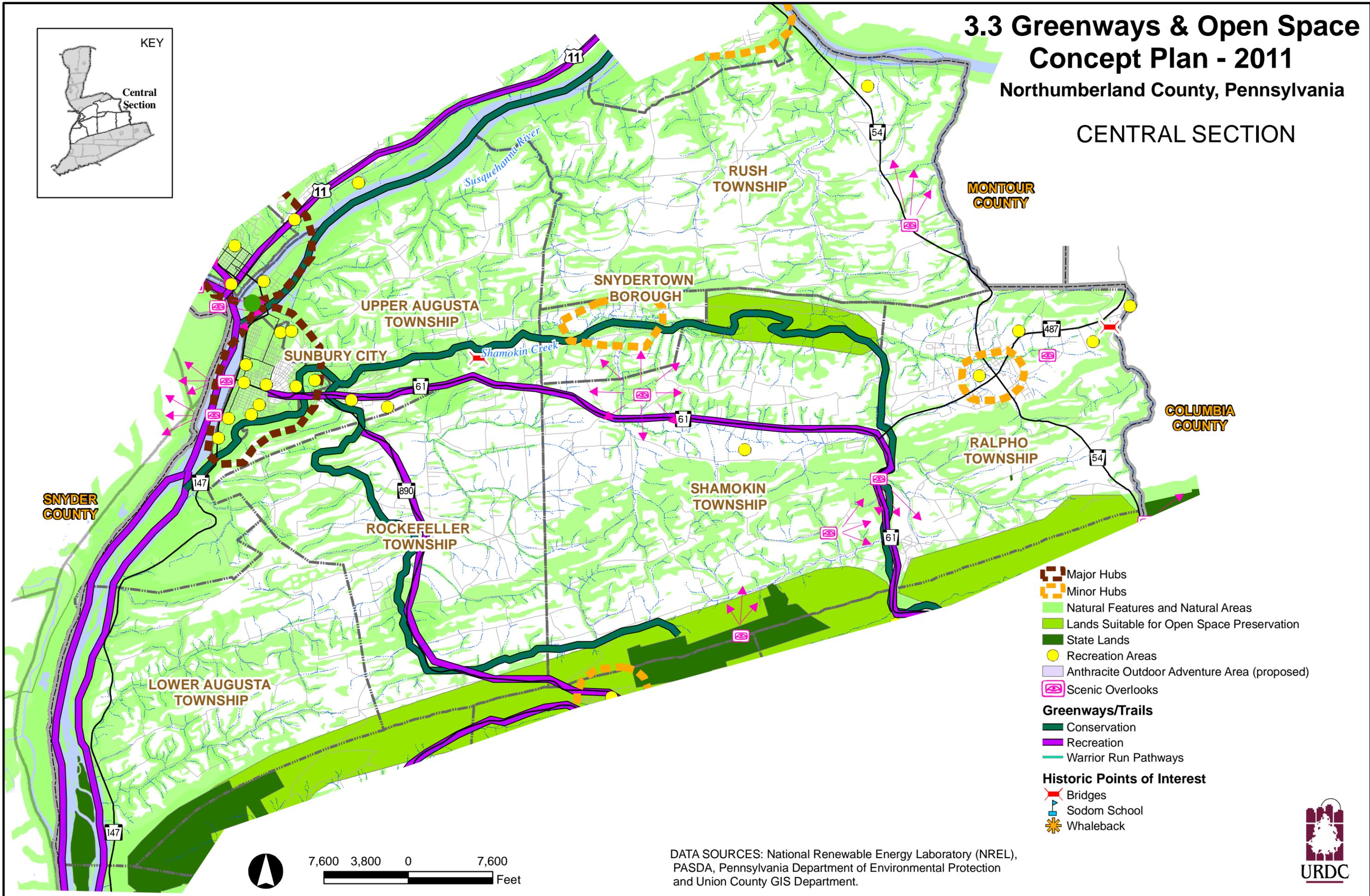
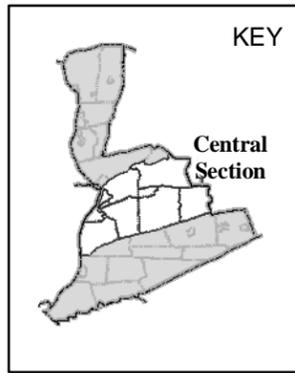
DATA SOURCES: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



3.3 Greenways & Open Space Concept Plan - 2011

Northumberland County, Pennsylvania

CENTRAL SECTION



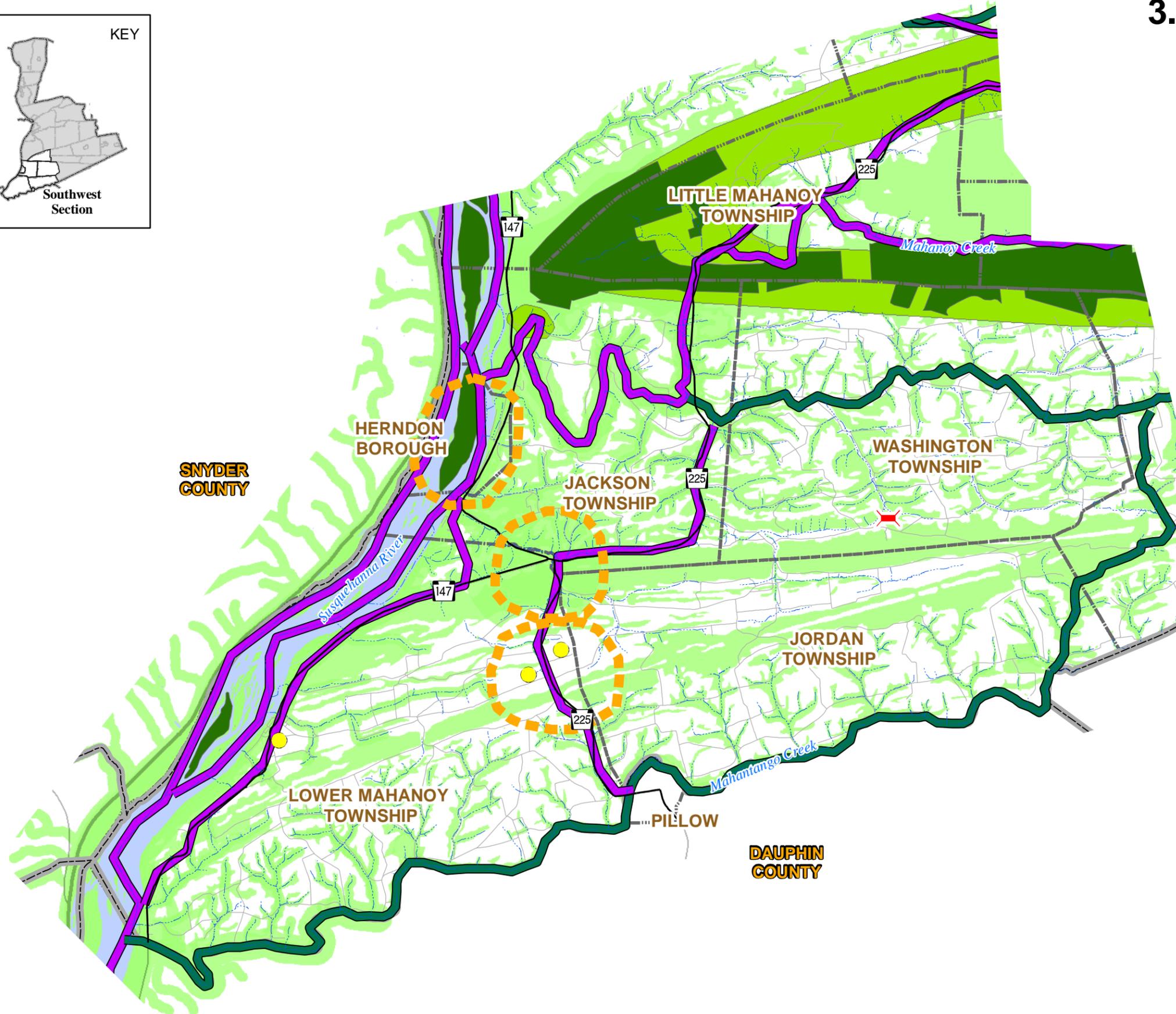
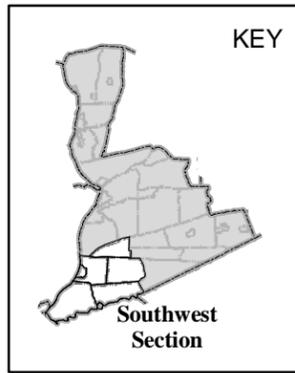
DATA SOURCES: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



3.4 Greenways & Open Space Concept Plan - 2011

Northumberland County, Pennsylvania

SOUTHWEST SECTION



- Major Hubs
- Minor Hubs
- Natural Features and Natural Areas
- Lands Suitable for Open Space Preservation
- State Lands
- Recreation Areas
- Anthracite Outdoor Adventure Area (proposed)
- Scenic Overlooks
- Greenways/Trails**
 - Conservation
 - Recreation
 - Warrior Run Pathways
- Historic Points of Interest**
 - Bridges
 - Sodom School
 - Whaleback



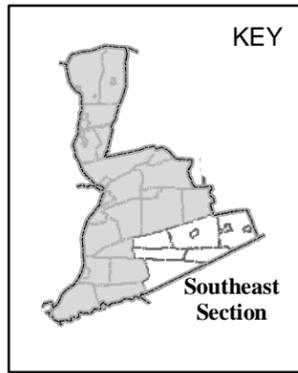
DATA SOURCES: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



3.5 Greenways & Open Space Concept Plan - 2011

Northumberland County, Pennsylvania

SOUTHEAST SECTION



- Major Hubs
- Minor Hubs
- Natural Features and Natural Areas
- Lands Suitable for Open Space Preservation
- State Lands
- Recreation Areas
- Anthracite Outdoor Adventure Area (proposed)
- Scenic Overlooks
- Greenways/Trails**
- Conservation
- Recreation
- Warrior Run Pathways
- Historic Points of Interest**
- Bridges
- Sodom School
- Whaleback



DATA SOURCES: National Renewable Energy Laboratory (NREL), PASDA, Pennsylvania Department of Environmental Protection and Union County GIS Department.



Northumberland County Greenways and Open Space Plan

**Table 3.1
Summary of Proposed Greenways**

Greenway	Mileage			
	Recreation		Conservation	Total
	Water-Based	Land-Based		
Chillisquaque Creek	8.5			8.5
Delaware Run			5.8	5.8
Lake Augusta Gateway	(see US 11, PA 147, PA 61, and Sunbury Riverfront Park)			
Limestone Run			5.1	5.1
Little Shamokin Creek			12.1	12.1
Mahanoy Creek	14.3		10.3	24.6
Mahantango Creek			14.4	14.4
Roadways				
US 11		9.6		9.6
PA 405		10.3		10.3
PA 642		4.6		4.6
PA 254		5.0		5.0
PA 44		7.9		7.9
PA 61		25.6		25.6
PA 225		8.2		8.2
PA 890		8.6		8.6
PA 147		30.2		30.2
Schwaben Creek			11.6	11.6
Shamokin Creek			28.9	28.9
Snow Creek			6.4	6.4
Sunbury Riverfront		(see PA 147)		
Susquehanna River	54.6			54.6
Warrior Run/Beaver Creek	4.5		8.1	12.6
Warrior Run Pathways (Northumberland County only)				
Warrior Run Trail	included in Warrior Run/Beaver Creek above			
West Branch Trail Concept		4.5		4.5
Warrior Run Touring Routes (Northumberland Co. only)		52.6		52.6

Northumberland County Greenways and Open Space Plan

Greenway	Mileage			
	Recreation		Conservation	Total
	Water-Based	Land-Based		
Limestone Valley Ramble	included in Warrior Run Touring Routes			
Muncy Hills Challenge I	included in Warrior Run Touring Routes			
Muncy Hills Challenge II	included in Warrior Run Touring Routes			
Watsonstown to Dewart Sunset Loop	included in Warrior Run Touring Routes			
TOTALS	81.9	175.4	102.7	360

Source: URDC

- The *Lake Augusta Gateway Corridor* is currently in the planning stages through SEDA-COG. The plan includes a series of river access points on the east bank, scenic views on the west bank, several general improvement areas, and six specific improvements:

- Sunbury Riverfront Park
- Packer Island Gateway
- Old Town Northumberland Enhancements
- Susquehanna Water Sports Park
- Fish Passage Park

The Lake Augusta Gateway provides opportunities for connections between linear parks and the downtowns of Sunbury and Northumberland. Trail/walkway users can provide a significant boost to downtown businesses. Old Town is a neighborhood organization in Sunbury that works with businesses and residents to enhance the neighborhood, which is accessible to the Susquehanna River. Sunbury Revitalization, Inc. (SRI) works closely with downtown businesses and recently received a \$60,000 grant from the city's

Community Development Block Grant (CDBG) funds to help provide facade improvements in the downtown. The *Northumberland County Greenways and Open Space Plan* strongly supports connections between greenways/trails and downtowns/commercial areas.

- The *Limestone Run Greenway* is a conservation greenway composed of the entire length of Limestone Run in Northumberland County. The headwaters of Limestone Run are in Montour County near the village of California. Limestone Run crosses into Northumberland County near PA 254 and flows into the West Branch of the Susquehanna River at Milton, a distance of approximately 5.5 miles.
- The *Little Shamokin Creek Greenway* is designated a conservation greenway, from the headwaters south of Elm Road in Shamokin Township to the Shamokin Creek in the village of Hamilton east of Sunbury (12.1 mi.).
- *Mahanoy Creek* meanders the entire width of Northumberland County, from the West Branch of the Susquehanna

Northumberland County Greenways and Open Space Plan

River to the Schuylkill County line, a total of 24.6 miles. The plan designates the western 14–15 miles as a recreation greenway, since the western portion is navigable. Clean-up efforts are underway along the eastern 10–11 miles, designated as a conservation greenway.

- The ***Mahantango Creek Greenway*** is a 14.4-mile greenway along the southern border of Northumberland County from the West Branch of the Susquehanna River to the Schuylkill County line. The Mahantango is designated a conservation greenway to coordinate with the parks, recreation, open space, and greenways plan in neighboring Dauphin County.
- Several ***roadways*** are included as part of the greenway system to provide connections for bicyclists, pedestrians, and runners. All roadways in the system are considered recreational greenways and are identified as follows:
 - *U.S. 11*, between PA 405 in Northumberland and the Montour County line (9.6 mi.)
 - *PA 44*, from PA 405 in Watsontown, through McEwensville and Turbotville, to the Montour County line (7.9 mi.)
 - *PA 61*, from PA 147 in Sunbury, through Shamokin and Mount Carmel, to the Columbia County line (25.6 mi.)
 - *PA 147*, between PA 405 in the village of Chillisquaque (West Chillisquaque Township) and the Dauphin County line (30.2 mi., which includes the Sunbury Riverfront Greenway).
- *PA 225*, between PA 61 in Shamokin Township and the Dauphin County line in Lower Mahanoy Township (8.2 mi.)
- *PA 254*, from PA 405 in Milton to the Montour County line (5.0 mi.)
- *PA 405*, between PA 642 in Milton and the Lycoming County line (10.3 mi.)
- *PA 642*, between PA 405 in Milton and the Montour County line (4.6 mi.)
- *PA 890*, from the village of Hamilton (east of Sunbury in Upper Augusta Township) to PA 225 in the village of Trevorton, Zerbe Township (8.6 mi.)
- The ***Schwaben Creek Greenway*** is a conservation greenway from the headwaters near state game lands #84 in Upper Mahanoy Township to the mouth at the Mahanoy Creek in Jackson Township, a distance of 11.6 miles.
- The *Shamokin Creek* flows from the Montour County line (at a point northeast of the Borough of Mount Carmel) to the West Branch of the Susquehanna River—a total of approximately 28.9 miles. The ***Shamokin Creek Greenway*** is designated in the plan as a conservation greenway because of the poor condition of the creek. Decades of acid mine drainage have rendered the creek unsafe for recreation. Continued

conservation efforts should gradually improve water conditions with the hope of restoring the water quality at some point in the future.

- The *Snow Creek Greenway* is a short (6.4 miles) conservation greenway connecting the Mahantango Creek to the Schwaben Creek in Jordan, Upper Mahanoy, and Washington Townships.
- Approximately 1.1 miles of the *Sunbury Riverfront*³ is currently being restored as a pathway/greenway. The plan recognizes the riverfront restoration as part of the PA 147 greenway in the county system. According to the site master plan for the project, the riverfront will include:
 - Riverbank stabilization.
 - An amphitheater with a gently tiered hard surface and lawn seating areas for approximately 1,000 persons on the river side, and another 500 on the land side of the flood wall.
 - A 30-slip marina.
 - A continuous, 10-foot wide greenway path extending the entire length of the project area primarily along the river side of the flood wall.
 - Open space with trails, benches, trash receptacles, accent lighting, and other amenities.
 - An overlook at Bainbridge Street using the former PA 61 bridge structure to provide panoramic vistas of the river.
 - Landscape enhancements at the Veteran’s Memorial Bridge.
 - Five (5) flood wall openings to provide at-grade universal access to the river side of the flood wall.

³ The Sunbury Riverfront Trail addresses one of the “major gaps” (#23) identified in the *Pennsylvania Statewide Comprehensive Outdoor Recreation Plan (SCORP)*.

Northumberland County Greenways and Open Space Plan

— Other amenities, including a restroom/concession building, historical interpretive signage, event concession areas, Front Street streetscape improvements, and landscape plantings.

- The **Susquehanna Greenway** is the primary focus of the Northumberland County system and is a recreation greenway with both a water-based and a land-based component. The water-based component includes all three segments of the river in the county, all of which emanate from the Sunbury-Northumberland hub:

- Main stem to Dauphin County (19.5 mi.⁴)
- West Branch to Lycoming County (21.1 mi.)
- North Branch to Montour County (14.0 mi.)

The land-based component of the Susquehanna in Northumberland County includes three segments of roads, each of which roughly parallels a water-based segment:

- PA 147 along the main stem
- PA 405 along the West Branch
- US 11 along the North Branch⁵

⁴ All greenway distances are approximate.

⁵ The North Branch continues into Montour County. The North Branch Trail, which is in Montour County, stops at the Montour/Northumberland county line. Connections into Northumberland County using the North Branch Trail would address one of the “major gaps” (#26) identified in the *PA Statewide Comprehensive Outdoor Recreation Plan* (SCORP).

The entire Susquehanna River Water Trail is part of the National Recreation Trail (NRT) system.⁶ The main stem of the water trail was designated in July 2008. The North Branch of the water trail was recognized in July 2009, and the West Branch was designated in June 2011.

- The **Warrior Run/Beaver Run Greenway** passes through northern Northumberland County connecting the West Branch of the Susquehanna River to Lycoming County via Warrior Run and Montour County via Warrior Run and Beaver Run. The greenway is a recreation greenway between the Susquehanna River and the point west of Turbotville where Warrior Run turns northward (4.5 mi.). The remainder of the greenway is designated a conservation greenway and includes:

- Warrior Run from the recreation greenway to the Lycoming County line (4.9 mi.).
- A connection between Warrior Run and Beaver Run through the Borough of Turbotville (2.0 mi.).
- Beaver Run, from the connection leading into Turbotville to the Montour County line (1.2 mi.).

- All of the **Warrior Run Pathways** are part of the Northumberland County greenway system. The report, prepared by the Warrior Run Pathways Partnership, identified nine pathway concepts in the region, each with several alternative

⁶ www.americantrails.org/nationalrecreationtrails



Figure 3.2 — The Susquehanna River, seen here from Shikellamy State Park, is a National Recreation Trail and forms the backbone of the Northumberland County greenway system.

alignments. The proposed principal alignment of each pathway is described below.

- The **West Branch Trail Concept** is a 4.5-mile loop trail between Watsonstown Borough and the village of Dewart in Northumberland County and between the villages of White Deer and Allenwood in Union County. The loop includes two bridges across the West Branch of the Susquehanna River: the 2nd Street Bridge in Watsonstown and the PA 45 bridge. Approximately half of the trail is in each of the two counties.
- The concept for the **Warrior Run Trail** is to connect the Boroughs of McEwensville and Turbotville along Warrior

Run. The 3.1-mile portion of Warrior Run is part of the 4.5-mile recreational section of the Warrior Run/Beaver Creek Greenway described above.

- The **Muncy Hills Trail Concept**⁷ is a network of trails through the Muncy Hills area in the extreme northern portion of Northumberland County (Delaware and Lewis Townships). The proposed Muncy Hills trails network connects the West Branch of the Susquehanna River through state game lands #325 and through Montour County to state game lands #226 in Columbia County.
- The **Warrior Run Touring Routes**⁸ network is composed of lesser traveled roads that provide opportunities for shared routes for pedestrians, runners, and bicyclists. The network includes approximately 77.3 miles of routes through northern Northumberland County and parts of Union, Montour, and Lycoming Counties. The routes provide varied environments and levels of difficulty—from easy to strenuous—and are composed of six loops:

⁷ multiple alignments proposed; mileage depends on alignment

⁸ multiple alignments proposed; mileage depends on alignment

- *Allenwood River Ride* (4.0 mi.; Union Co.; easy)⁹
- *Watsonstown to Dewart Sunset Loop* (8.3 mi.; Northumberland Co.; easy)¹⁰
- *Limestone Valley Ramble (Fireman’s Breakfast Loop)* (Northumberland and Montour Cos.; 15.9 mi.; moderate)
- *Montour Preserve Wanderer’s Loop* (13.5 mi.; Montour Co.; moderate)
- *Muncy Hills Challenge I* (14.6 mi.; Northumberland and Montour Cos.; strenuous)
- *Muncy Hills Challenge II* (21.0 mi.; Northumberland and Lycoming Cos.; strenuous)

ACTION PROGRAM

The action program will help Northumberland County to implement the *Northumberland County Greenways and Open*

⁹ The Dewart–Watsonstown and Allenwood–White Deer Twp. segments address one of the “major gaps” (#22) identified in the SCORP.

¹⁰ The Dewart–Watsonstown and Allenwood–White Deer Twp. segments address one of the “major gaps” (#22) identified in the SCORP.

Space Plan. The action program consists of the following elements, each of which is discussed below:

- Recommendations
- Land preservation tools
- Stakeholders
- Costs and potential funding sources
- Pilot project
- Management considerations

Recommendations

Recommendations for the *Northumberland County Greenways and Open Space Plan* (Table 3.2) include policies, programs, and projects to further the county greenway concept. The recommendations include a priority in the form of a time frame. Each recommendation also includes a suggested lead entity(ies) for implementation.

Land Preservation Tools

One of the most important purposes of greenways, as noted throughout the *Northumberland County Greenways and Open Space Plan*, is preserving land. The techniques used to preserve the land must be available to and feasible for the landowner. Since landowners have many different financial needs and circumstances, techniques that are appropriate for some owners will not be useful to others. Available funding is another variable that will make one tool appropriate over others for a specific transaction. The following section describes many of the tools that can be effective in preserving land in Northumberland County, depending on the location, size, and other characteristics

of the land as well as the financial, familial, and other circumstances of the landowner.

- **Fee Simple Acquisition** — The most effective means of preserving land is through fee simple purchase. Fee simple purchase gives the owner complete control of the land, including all public access and conservation practice decisions. In most situations, fee simple acquisition is also the most expensive method of land control. Therefore, many entities interested in land preservation, particularly public agencies or land conservancies with limited budgets, will explore other, less expensive options for land control.
- **Conservation Easements** — Conservation easements place restrictions or an outright prohibition on development at a lower cost than fee simple acquisition. Under a conservation easement, land could (and usually does) remain in current ownership, but the property owner voluntarily agrees to donate or sell the right to develop the land. The landowner agrees to place a restriction in the deed of the property, which becomes binding on all future owners of the land. The easement is held by the municipality, county, or a private, non-profit conservancy, such as the Merrill Linn Conservancy. Conservation easements often provide the property owner with federal income tax and estate tax benefits.
- **Other Easements** — Conservation easements may be used to preserve many types of resources. For example, easements may be placed on historic lands or buildings, open space, forests, or farmland. Conservation easements are frequently used for environmental preservation without providing for public use of the land. However, a conservation easement can

also be combined with a *pedestrian easement* or *right of public access easement* to allow public access for walking, hiking, horseback riding, bicycling, and other activities with

Northumberland County Greenways and Open Space Plan

**Table 3.2
Recommended Actions**

Recommended Action *	Priority **	Lead Entity(ies)***
1. Develop the Anthracite Outdoor Adventure Area (AOAA).	I	Northumberland Co. NCPD Coal Twp.
2. Work with SEDA-COG and PennDOT to plan and develop the Lake Augusta Gateway Project.	S	NCPD SGP SEDA-COG
3. Develop the Lower Anthracite Heritage Trail.	L	landowners NCPD Mt. Carmel Shamokin
4. Prepare local greenways plans that further the state’s greeways vision, support/supplement the <i>Northumberland County Greenways and Open Space Plan</i> , and specifically identify potential greenway corridors and alignments.	O	municipalities NCPD SGP
5. Adopt official maps as a tool to help preserve land.	O	municipalities
6. Establish a greenways, open space, and recreation advisory council as a pilot project to begin implementation of the <i>Northumberland County Greenways and Open Space Plan</i> .	S	NC potential members
7. Work with Sunbury Revitalization, Inc. and other organizations to increase the economic benefit of nearby greenways/trails for local businesses.	I	SRI NCPD local governments SEDA-COG
8. Work closely with the Northumberland County Conservation District (NCCD) to further the county greenway system. Potential tasks might include: <ul style="list-style-type: none"> • Discuss alternatives and establish a management structure for the greenway system. • Establish priorities for greeway development, recognizing that priorities can and will change quickly as resources for specific greenways become available. • Provide connections to educational institutions, corporations, and other organizations that may be able and willing to offer resources for the greenway system. 	I	NCCD advisory council NCPD stakeholders
9. Establish a register or online database of all conservation easements or leases in the county.	S	NCCD local recreation orgs. affected landowners
10. Work with PennDOT and SEDA-COG in the design of the proposed Central Susquehanna Valley Thruway Project to address greenway issues, such as pedestrian movement within the corridor and automobile/buggy interaction north of Interstate 80.	L	NCPD SGP SEDA-COG

Northumberland County Greenways and Open Space Plan

Recommended Action *	Priority **	Lead Entity(ies) ***
11. Establish/stabilize riparian buffers with support from grants and volunteer efforts by local landowners and conservation groups.	O	landowners SGP MLC TNC NPC
12. Promote the concept of land preservation by educating landowners about the benefits of “conservation development” (or “cluster development”), Best Management Practices for agriculture, and the benefits of local volunteerism.	O	NCPD SGP NCCD
13. Expand programs for educating local farmers regarding best management practices with support from grants and volunteer efforts by local landowners and conservation groups.	O	MLC SGP NCPD NPC NCCD TNC
14. Prepare a river conservation plan for every water-based greenway in the <i>Northumberland County Greenways and Open Space Plan</i> to identify the unique characteristics and threats posed to each waterway as well as appropriate protection measures and key parcels for preservation.	L	MLC NCPD NPC SGP NCCD
15. Provide educational and technical assistance to municipalities and landowners regarding the benefits and methods of land conservation with a specific focus on the value of conservation easements.	O	MLC NCCD SGP NPC NCPD TNC
16. Provide clear signage to assist trail users in locating existing and future trails and amenities along trails, such as nearby business districts.	O	municipalities PennDOT SGP
17. Work with the Brush Valley Preservation Association and other interested groups to encourage land preservation in the Brush Valley area.	O	BVPA NCPD landowners municipalities
18. Work with the PA Bureau of State Parks and appropriate municipalities to incorporate trails within Milton and Shikellamy State Parks into the county’s proposed trail/greenway system.	L	BSP SGP NCPD municipalities
19. Provide support to the Warrior Run Community Corporation and others in developing the trail system presented in the Warrior Run Pathways Partnership document.	S	landowners NCPD WRCC
20. Protect natural features through education/information programs, local ordinances, and a focus on priority natural areas.	O	municipalities NCPD MLC TNC NPC SGP
21. Encourage recreational activity, such as boating and fishing, along the Susquehanna River.	S	PFBC NCPD SGP landowners
22. Work with municipalities to provide for trails in local zoning and subdivision/land development ordinances.	O	NCCD MLC SGP NCPD NPC
23. Encourage agricultural preservation (particularly in the northern part of the county) by educating farmers about the value of land preservation and by modifying local ordinances to allow accessory uses that offer farmers alternative sources of income (such as machinery repair) during times of poor harvests.	O	MLC NPC NCCD TNC NCPD

Northumberland County Greenways and Open Space Plan

Recommended Action *	Priority **	Lead Entity(ies) ***
24. Encourage volunteers to develop “Friends of...” groups for each greenway to help establish and maintain the greenway.	O	NCPD volunteers

* Recommendation numbers are for reference only and do not reflect priority.

** Priorities/time frames:

I Immediate (2011–2012) L Long (2015–2020)

S Short (2012–2015) O Ongoing Recommended policies, as opposed to programs and projects, should be implemented as soon as possible and should continue until the policy is no longer useful. Therefore, no time frame is provided.

*** Lead entities:

NCCD Northumberland Co. Conservation Dist.	SEDA–COG
BSP PA Bureau of State Parks	SGP Susquehanna Greenway Partnership
BVPA Brush Valley Preservation Assoc.	NCPD Northumberland Co. Planning Dept.
MLC Merrill Linn Conservancy	NPC Northcentral Pennsylvania Conservancy
NC Northumberland County	PFBC PA Fish and Boat Commission
	PGC Pennsylvania Game Commission
	TNC The Nature Conservancy
	WRCC Warrior Run Community Corp.

Source: URDC

established rules and restrictions. With such an easement, the landowner is not held liable for any injuries, crimes, or death associated with public use of the land.

Another easement type—the *joint-use easement*—accommodates multiple uses under one easement. Joint-use easements are particularly appropriate for public utility corridors and access roads. Electric transmission lines, sanitary sewer lines, petroleum or gas pipelines, and other such corridors may be ideal for trail connections, often containing a cleared pathway. Access roads around ponds or other recreation areas or through housing developments can also make excellent joint-use easements to facilitate connections. Joint-use easements are advantageous in that landowners will know the exact purposes of the singular easement, rather than dealing with multiple easements.

Agricultural conservation easements may be appropriate in areas with prime farmland adjacent to greenways. The action preserves additional contiguous land and helps to maintain the scenic character of both the greenway and the area as a whole. Local, county, or state governments may purchase easements from owners of prime farmland if the owner agrees to keep the land in agricultural use. The land must meet certain acreage, soil, and production criteria to qualify for the program.¹¹

The Pennsylvania Land Trust Association (PALTA) is the statewide organization of nonprofit, land conservation groups.

¹¹ Additional information about agricultural conservation easements is available from the Northumberland County Conservation District.

PALTA has developed model easements that are available on the association website (<http://www.conserveland.org>) and include:

- Fishing Access Agreement
 - Pennsylvania Conservation Easement
 - Riparian Forest Buffer Protection Agreement
 - Trail Easement Agreement
 - Water Quality Improvement Easement
- ***Purchase and Leaseback or Resale*** — An entity interested in preservation, such as a local government or conservancy, can purchase land in fee simple, place restrictions on the deed prohibiting certain uses (e.g., residential development), and sell or lease the land to interested parties. The original buyer gains the potential for future use at the current price and may recover some or all of the purchase price through leasing. The land is maintained in open space and may be developed as a park if and when future demand warrants. Resale of some or all of the land with deed restrictions may maintain open space, relieve the municipality of maintenance obligations, and return the land to the tax rolls.

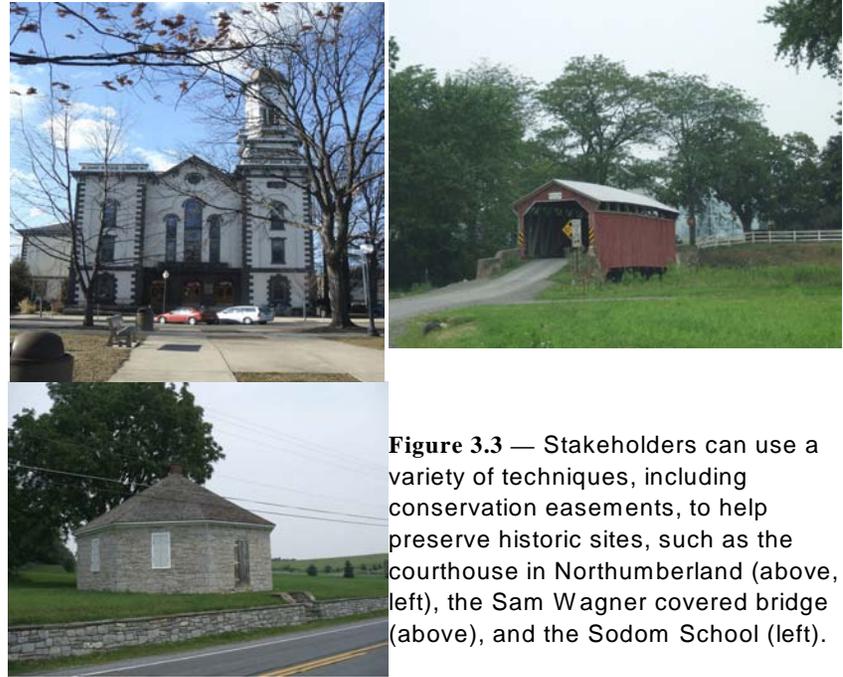


Figure 3.3 — Stakeholders can use a variety of techniques, including conservation easements, to help preserve historic sites, such as the courthouse in Northumberland (above, left), the Sam Wagner covered bridge (above), and the Sodom School (left).

- ***Donations*** — Frequently, land can be acquired through donations from private owners, organizations, and corporations. Local governments should encourage land donations by pointing out benefits of such actions, such as federal income and estate tax benefits and the public relations value. Prior to accepting a donation, a municipality should

consider the location of the parcel and the anticipated development and maintenance costs. If the location is poor and/or projected costs will be excessive, the municipality should strongly consider accepting a fee rather than the land. If the municipality accepts the land donation, the landowner may wish to establish an endowment fund along with the land to assist with development and/or maintenance costs. In addition to land, corporations and other private parties also frequently provide cash donations for worthy causes, including land preservation.

- **Land Exchange** — A land exchange, or land swap, is useful when a development interest and a conservation interest both own a piece of land more appropriate to the mission of the other. For example, a residential developer may own a wetland area next to a park while a local government owns a vacant tract near an existing developed area. With the land exchange, the wetland would be preserved by the municipality,

and the developer builds houses in an appropriate location. Any mismatches in land value can be negotiated.

- **Municipal Ordinances** — Municipal zoning ordinances and subdivision and land development ordinances (SALDOs) offer one of the least expensive methods to protect natural features. Local ordinances contain provisions that prohibit or limit activities on or near natural features. The following provisions are most important with regard to greenways.
 - *Riparian buffers* are the areas within a specified distance (or “setback”) of a waterway within which development or other activities is prohibited or restricted. Most township ordinances establish riparian buffers between 50 and 100 feet, while many borough and city ordinances do not contain any riparian buffer provisions. The most appropriate buffer size depends on the size of the stream and the existing natural and human features along the stream. A two-tiered buffer can set different standards for two different setbacks (e.g. no development within 100 feet, and no mowing within 50 feet).
 - *Floodplain regulations* prohibit development and certain other activities within the 100-year floodplain, frequently in a separate floodplain ordinance. The 100-year floodplain corridor is composed of a *floodway* and *flood fringe* area. State floodplain regulations form a bare minimum of floodplain protection. All floodplains should be kept in open space. Activities such as tree-cutting, clearing of vegetation, storage of hazardous materials, and landfill operations would have a negative effect during flood events and should be prohibited. In places where

existing structures are located within the floodplain, regulation options include establishing a lowest floor level for buildings, requiring floodproofing, and prohibiting further development or improvements.

- *Wetlands, high water table soils, and hydric soils* are areas containing permanently or frequently saturated soil conditions or standing water. The three features often coincide. Most zoning ordinances take a site-by-site approach to wetlands regulation, requiring a zoning officer or engineer to determine if wetland indicators are present on a parcel being developed. If the site contains wetland indicators, the applicant must have a qualified wetland specialist delineate wetlands, on which development must be prohibited. Alternatively, a municipality may have a complete wetlands map database prepared for the jurisdiction by a wetlands specialist.
- *Steep slopes* are usually divided into two categories: 15–25% and greater than 25%. Development densities and buildings sites are typically restricted in slopes between 15 and 25%, and restricted or prohibited on slopes greater than 25%. Keeping steep slopes in open space is a benefit to ridge-based greenways as well as stream-based greenways, where the riparian zone is surrounded by slopes.
- *Woodlands* — Most SALDOs contain tree-cutting provisions, permitting unlimited tree-cutting in areas necessary to accommodate home sites and road rights-of-way, and providing a maximum tree extraction number or rate for other areas. As an alternative, declaring a

maximum percentage of tree removal per lot is a more protective option. To protect woodlands along stream corridors and ridges, cutting restrictions can be placed on floodplain forests and upland forests, respectively.

- *Agricultural zoning* — “Effective agricultural zoning” limits the amount of development on key prime farmland tracts so that most of the land remains in large lots that can still be viable for farming. Agricultural zoning must consider soils, physical features, current land use patterns, and other matters. Limiting water and sewer extensions, transfer of development rights, and other techniques may also help to conserve farmland.
- **Public Dedication** — The Pennsylvania Municipalities Planning Code (Act 247, as amended) enables municipalities to require that residential developers dedicate land, or fees in lieu of land, for public recreation. Municipalities must have an adopted recreation plan¹² and adopted SALDO regulations relating to public dedication before land or fees can be accepted. The requirement should be oriented toward land dedication with the provision that, by mutual consent of both parties, the landowner may pay a fee to the municipality in lieu of land. The amount of land required must be related to the demand for recreation land typically created by new development. The required land dedication should be in

¹² The recreation “plan” can be a complete document or a simple two-page resolution explaining the results desired from the dedication, as long as the “plan” is formally adopted by resolution of the municipality’s governing body.

addition to the preservation of natural features on the land, such as floodplains, wetlands, steep slopes, and woodlands. Further information is available on the Pennsylvania Land Trust Association website at:

<http://conserveland.org>.

- **Open Space Development** — Open space development, similar in some respects to “cluster development”, is very useful in areas where greenways pass through land that is zoned for development. When a tract is developed in the open space scheme, increased development densities are allowed in exchange for mandatory open space. As an example, under standard suburban development schemes, a 100-acre lot adjacent to a stream might be subdivided into 100 one-acre lots. Under an open space development concept:
 - The natural features of the site are identified and preserved first (10 acres, for example).
 - Open space is then set aside near the stream (40 acres, for example).
 - The remaining area is subdivided into the 100 lots originally allowed under conventional zoning, which means that the lots are only 0.5 acres each.

Open space development can be facilitated with provisions in the zoning ordinance and SALDO. Open space development provisions are often amendments to existing lot size requirements in each zoning district (e.g. “Low Density Residential District: 1.0 acre minimum lot size, or 0.60 acre with 40% open space.”).

- **Transfer of Development Rights** — Transfer of development rights (TDR) is often a voluntary option in a zoning ordinance that provides incentives for private developers to pay for preserving natural features. Under a typical TDR system, a developer pays a private landowner to permanently preserve the land in return for being able to add the potential development from the preserved parcel to a parcel in another area of the municipality that is more suitable for development. Therefore, the developer receives approval to build on the development parcel at a higher density than would be allowed without the additional development rights from the preserved parcel. The developer and the owner of the sensitive land privately negotiate a price. The municipality approves the higher density development, and, simultaneously, a conservation easement is placed on the targeted land, eliminating development options on the land in perpetuity.
- **Purchase of Development Rights (PDR)** — Under a PDR arrangement, a farmland owner voluntarily sells the development rights to a government agency or private land trust and receives compensation in return for the restrictions placed on the land. The farmer retains title to the land and can sell or pass along the farm, but the land can only be used for farming and open space. An easement is placed on the landowner's deed and “runs with the land”, either in perpetuity or for a period of time specified in the easement document. The easement typically prohibits residential development except for the owner, the owner's children, or farm labor. Public access is not normally allowed, nor is the dumping of garbage or the removal of soil. Normal agricultural practices and structures are permitted as long as they comply with state and federal statutes.

- **Official Map** — An official map formally identifies existing and proposed public lands.¹³ The official map can be used to reserve rights-of-way for a period of one year, which can be very useful to a municipality for trail development, easement acquisition, or other negotiations with developers. When a greenway plan is adopted by the county and/or municipalities, the proposed greenways should be put on an official map, which should also be adopted. If a development is proposed on a parcel where a greenway is also proposed, the municipality has one year to acquire control of all or a portion of the parcel or negotiate other arrangements in accordance with local policies prior to development of the parcel.
- **Map of Potential Conservation Lands** — Municipalities should be encouraged to prepare a "Map of Proposed Conservation Lands" in order to identify lands that should be preserved as future development occurs. The map cannot hold the force of law and should not be prepared as an ordinance. Nevertheless, the map would help guide discussions during the development review process and provide a clear indication to the developer of the municipality's wishes for land preservation. Preparation of the map should start with information contained in the community's existing planning documents. The sensitive areas should be divided into two categories:

- Primary Conservation Areas would include the most constrained lands, such as wetlands, floodplains, and slopes exceeding 25%.
- Secondary Conservation Areas include locally noteworthy or significant features of the natural landscape, such as mature woodlands, wildlife habitats and travel corridors, prime farmland, groundwater recharge areas, greenways and trails, river and stream corridors, historic sites and buildings, and scenic viewsheds. Local residents should be most familiar with the secondary areas and would be a part of the identification process.

Usually the secondary areas, unlike the primary areas, are not protected by any laws. Therefore, the municipality should carefully examine the local ordinances (e.g., zoning and subdivision/land development) to be as specific as possible about the types of lands to be preserved.

Stakeholders and Roles

Greenway implementation requires cooperation from many diverse interests, including groups in both the private and public sectors. Many successful greenway efforts start at the "grassroots" level. Interested groups and citizens work together and focus local efforts developing ideas to present to government officials, businesses, and others with the resources to assist in implementation. Successful greenways in Northumberland County will be developed with the support and assistance of local government, both municipal and county. Most often, at the local level, one person, or a small group of people, have identified greenways as a personal passion and take a leading role in the organizing effort. Throughout the pursuit of the greenway system,

¹³ Authority for an official map is provided in Article IV of the Pennsylvania Municipalities Planning Code (Act 247 as reenacted and amended).

numerous stakeholders should be involved, categories of which are discussed below and include:

1. Municipalities
2. Northumberland County
3. Conservation/recreation groups
4. Landowners
5. SEDA-COG
6. State agencies
7. Federal agencies
8. Other key organizations and individuals

MUNICIPALITIES

Municipalities—city and borough councils, township supervisors, park and recreation departments, and other local agencies—will be the focus of support for the Northumberland County greenway system. Successful greenway systems depend on a strong base of support, which should begin building at the local level.

One of a municipality’s first tasks with regard to greenways will be to review and, where necessary, adopt or update local planning and zoning documents to strengthen provisions for environmental protection. Through zoning ordinances, SALDOs, comprehensive plans, open space plans, and official maps, municipalities can maintain conservation greenways by regulation rather than acquisition. For example, a borough or township can require in the zoning ordinance and SALDO that all 100-year floodplains, 50-foot stream buffers, wetlands, steep slopes, and riparian woodlands remain as open space. The documents can also include provisions on historic preservation.

Municipalities will also be the focus of land acquisition for publicly accessible greenways. In Pennsylvania, municipalities have local jurisdiction over land within municipal borders and are responsible for providing local services, such as police protection, local road maintenance, recreation, and trash collection.

Municipalities can also help with education and outreach efforts to promote land conservation. Local newsletters, posters, and pamphlets can help landowners and residents understand land preservation issues and environmental preservation practices.

Some municipalities create Environmental Advisory Councils (EACs) to advise the governing body regarding conservation, regulation, and development. An EAC is typically a volunteer group with environmental professionals and other residents that lend knowledge and experience to better guide the actions of the municipal government. A municipality can receive up to \$5,000 in grant money from the Pennsylvania Environmental Council to establish an EAC.

NORTHUMBERLAND COUNTY

Northumberland County government is an important partner in preserving land and providing leisure services. The *Northumberland County Greenways and Open Space Plan* generally recommends that the county continue the current roles, as discussed below.

Northumberland County operates no county parks or recreation programs. The Northumberland County Recreation Committee holds fundraising events each year to give scholarships to high school student-athletes and funding to local youth groups, such as

Little Leagues. The county is developing the Anthracite Outdoor Adventure Area (AOAA) on several thousand acres of county-owned land located roughly from PA 54 in Mount Carmel Township just outside of Excelsior to Burnside and from Burnside to SR 2044 in Zerbe Township. The site is projected to be one of the largest off-highway vehicle activity areas in the eastern part of the county. The *Northumberland County Greenways and Open Space Plan* recognizes the potential for the AOAA.

- **Open Space** — Northumberland County can be an important partner in preserving open space in the county. The county should provide technical assistance to municipalities regarding land preservation, including aid with ordinance provisions. The county should work with the Merrill Linn Conservancy, the Northcentral Pennsylvania Conservancy, the Susquehanna Greenway Partnership, and other conservation organizations to help landowners make the decision to preserve valuable land in the county. Municipalities and other eligible entities may also wish to consider a bond issue for acquiring permanent open space.
- **Greenways** — The county has prepared the *Northumberland County Greenways and Open Space Plan* to provide a framework for further, more detailed studies at the local level. In addition, county staff can provide guidance to local officials in obtaining and preserving land as part of the county greenway system.

The Northumberland County government will also be an important partner in conserving contiguous greenways through the work of the following agencies:

- **Northumberland County Conservation District** — The Northumberland County Conservation District (NCCD) plays an important role in the environmental conservation and land preservation aspects of greenways. In general, conservation districts promote the conservation of natural resources, particularly soil and water. Staff professionals:
 - Review development plans to check for threats to soil stability and water quality.
 - Educate interested persons on best management practices.
 - Actively work with other agencies to enhance environmental quality countywide.

The conservation districts are important partners in the management of private land holdings along the conservation greenways, particularly in agricultural areas, recommending and monitoring riparian buffers, streambank restoration, and other management practices that result in better water quality and enhanced greenways along streams. The conservation districts are also the primary link between agencies for enrolling in federal conservation programs such as CRP, CREP, and P.L. 566, which will be discussed later under potential funding.

The *Northumberland County Greenways and Open Space Plan* envisions another, strong, special role for the

NCCD. The NCCD and the recommended countywide advisory council should work closely on many issues involving the greenway system. The NCCD already has a strong meeting structure from which the advisory council could benefit. Furthermore, both the NCCD and the advisory council are composed of county stakeholders that can perform important functions for the greenway system, such as developing specific priorities for greenway development, establishing a greenway management structure, and resolving various greenway issues.

— ***Northumberland County Agricultural Land Preservation Board***

The Northumberland County Agricultural Land Preservation Board is appointed to oversee the selection and purchase of agricultural conservation easements in the county. The board, which cooperates closely with the county conservation district, can help farmers apply for an easement and see how individual farms will rate against other applicants. As the facilitator of farmland preservation, the board has an important role in preserving contiguous belts of farmland throughout the county.

— ***Northumberland County Planning Department***

The Northumberland County Planning Department (NCPD) will be an important partner in developing the county greenway system. Planning professionals craft countywide plans, such as the *Northumberland County*

Comprehensive Plan, that provide the framework for further, more detailed studies at the local level. In addition, NCPD staff can provide guidance to local officials in obtaining and preserving land as part of the county greenway system.

CONSERVATION AND RECREATION GROUPS

Conservancies and recreation organizations often provide the hands-on activism and volunteers needed to realize the greenway vision. Conservancies are focused on the issue of land preservation and can solicit support and organize resources targeted to the specific cause. Recreation groups provide an invaluable pool of volunteer effort and typically have goals compatible with those of land conservation efforts. Both types of groups will be instrumental in establishing greenways by:

- Advocating conservation on private land.
- Raising funds.
- Writing grant applications.
- Increasing public awareness of conservation through events and publications.
- Providing volunteer resources for trail and other conservation projects.
- Coordinating local and governmental entities.

Some of the groups that may become involved at some point during implementation include (but are not limited to) the following:

- Brush Valley Preservation Association
- Little Shamokin Creek Watershed Association

Northumberland County Greenways and Open Space Plan

- Mahanoy Creek Watershed Association
- Merrill Linn Conservancy
- Northcentral Pennsylvania Conservancy (NPC)
- Northumberland County Conservation District
- PA Environmental Council (PEC)
- Shamokin Creek Restoration Alliance
- Sierra Club, Pennsylvania Chapter
- Warrior Run Community Corporation

LANDOWNERS

Effective greenway planning and implementation must involve all affected landowners. Any proposed action (e.g., riparian restoration, conservation easements, hiking trails, water trails, bike routes) can have an impact on a landowner's well-being and interests. Landowners should be encouraged to support any greenway effort—especially at the conceptual stage—through public surveys, public meetings, and inclusion in steering committees.

SEDA-COG

The Susquehanna Economic Development Association– Council of Governments (SEDA-COG) is composed of a large base of support: 11 member counties in central and northcentral Pennsylvania. The organization has a professional and support staff of 93 and a central office in Lewisburg (Union County). The sheer size and scope of SEDA-COG allows the agency to offer a unique perspective in working with both state and local officials to preserve land as part of a larger economic development strategy for the region.

STATE AGENCIES

Many agencies of the Commonwealth of Pennsylvania can be involved in implementing the *Northumberland County Greenways and Open Space Plan*. The following agencies have funding programs available and/or land holdings in the county which can become part of a greenway network.

- ***PA Dept. of Conservation & Natural Resources (DCNR)*** — DCNR is the lead agency responsible for implementing the *Pennsylvania Greenways Action Plan*. Initiated by a governor's executive order in 1998, DCNR's greenway effort aims to significantly enhance conservation, recreation, and quality of life in Pennsylvania by conserving and enhancing a statewide network of linear open space and trails. The greenways proposed in the *Northumberland County Greenways and Open Space Plan* have the potential to become part of a larger network of statewide greenways that includes the Susquehanna Greenway. Therefore, DCNR and the county and local entities have mutually supportive goals and should look for any and all opportunities to work together in planning, funding, and implementing the greenway network proposed for Northumberland County.
- ***PA Game Commission (PGC)*** — The PGC oversees all hunting regulations statewide and manages all state game lands. Northumberland County includes three sections of state game lands:
 - #84, across the southern portion of the county

- #115, across Montour Ridge north of the North Branch of the Susquehanna River
- #325, in the northeast corner of the county

The PGC will be an important partner when pursuing recommended greenways near or on game lands. In addition, the PGC will be responsible for enforcing hunting regulations on any open space, public or private, where hunting is permitted.

- **PA Fish & Boat Commission (PFBC)** — The PFBC regulates recreational fishing and boating on all Pennsylvania streams and lakes and provides access points with parking. The PFBC will be an important partner for helping establish a limited number of access points that may be desired along riparian greenways, such as the conservation greenways noted in Table 3.1 and listed below:

- Delaware Run
- Mahanoy Creek
- Mahantango Creek
- Limestone Run
- Little Shamokin Creek
- Schwaben Creek
- Shamokin Creek
- Snow Creek
- Warrior Run/
Beaver Creek

- **PA Dept. of Environmental Protection (DEP)** — DEP will have a passive but necessary role in the implementation of Northumberland County greenways. DEP establishes and enforces environmental regulations that involve storm water and wastewater management, mineral extraction, smokestack venting, vehicle emissions, and development near wetlands and floodplains. Many DEP regulations are either modeled or referenced in municipal zoning and land development ordinances. Also, in the event of major environmental challenges

or disagreements, DEP officials may become involved locally.

- **PA Dept. of Transportation (PennDOT)** — PennDOT is the construction and maintenance entity for all state-owned roads and will be a major stakeholder when pursuing trails, auto and bicycle touring routes, and parking areas. PennDOT approval is necessary when considering trail crossings or bike lanes in state road rights-of-way. The agency also oversees the distribution of certain grant monies for trail and path construction, including TEA-21 (Table 3.4).
- **PA Dept. of Community & Economic Development (DCED)** — The DCED can provide guidance and funding for community revitalization and redevelopment projects in the county as well as historic rehabilitation and interpretation efforts. Grants from DCED can also be used for establishing auto touring routes or any other tourism-related project. DCED would also be an important partner and funding source for pursuing the redevelopment of brownfield sites.
- **PA Historical & Museum Commission (PHMC)** — Created in 1945 as the official history agency of the commonwealth, PHMC is responsible for the collection, conservation, and interpretation of Pennsylvania’s heritage—a charge met through the Bureau for Historic Preservation, the PA State Archives, the State Museum of PA, and the PA Trail of History. The agency also maintains a comprehensive database of historic resources statewide and will be an important contact when seeking additional recognition and protection of any historic resources in the county.

FEDERAL AGENCIES

Depending on circumstances, two federal agencies may become involved in the implementation of the *Northumberland County Greenways and Open Space Plan*. Both agencies are described below.

- ***Susquehanna River Basin Commission (SRBC)*** — The SRBC was created on 24 December 1970 when President Nixon and the governors of Maryland, New York, and Pennsylvania signed the Susquehanna River Basin Compact creating the regional body with the force of law to oversee a unified approach to coordinate the water resource efforts of the federal government and the three states through which the Susquehanna River flows. The commission meets periodically to act on applications for projects using water, adopt regulations, and direct planning and management activities affecting the basin's water resources.

The Susquehanna River is 444 miles in length—the largest river located entirely within the United States that flows into the Atlantic Ocean. The basin includes the river and hundreds of tributaries extending from Otsego Lake near Cooperstown, NY to the Chesapeake Bay in Havre de Grace, MD.

- ***Environmental Protection Agency (EPA)*** — The EPA is an appropriate contact in the event of environmental challenges and undertakings. As an example, the EPA is remediating the Susquehanna Steel Plant in the Borough of Milton. Although the *Northumberland County Greenways and Open Space Plan* envisions no future environmental difficulties, environ-

mental problems that are currently unforeseen could have a negative impact on the sites in the county and may involve future EPA coordination.

OTHER KEY ORGANIZATIONS / INDIVIDUALS

Many other organizations and individuals will play key roles in supporting the *Northumberland County Greenways and Open Space Plan* and the proposed countywide greenway system. The following examples illustrate the breadth of interests that greenways can attract.

- ***Local Businesses and Corporations*** — Local businesses are often a good source of cash donations and volunteer efforts. Many local businesses are also important members of the community, and the approval of local businesses is often just as important to successful greenway efforts as the support of individual landowners. Local businesses are very attuned to the quality of life in Northumberland County, which the greenway system can enhance significantly. The potential benefits of a successful greenway system include an increase in the county's quality of life, which can generate new business through increased tourism and new residents.
- ***Chambers of Commerce and Tourism Bureaus*** — Northumberland County is served by three Chambers of Commerce:
 - *Brush Valley Regional Chamber of Commerce*, located in Shamokin, serving the City of Shamokin, the Boroughs of Kulpmont and Mount Carmel, Coal Township, the villages of Elysburg, Paxinos, and Trevorton, and the surrounding area

- *Central Pennsylvania Chamber of Commerce*, with offices in Milton, representing the business interests of Columbia, Lycoming, Montour, Northumberland, Snyder, and Union Counties
- *Greater Susquehanna Valley Chamber of Commerce*, which has an office in the Borough of Shamokin Dam (Snyder County), serves the counties of Montour, Northumberland, Snyder, and Union
- *Susquehanna River Valley Visitors Bureau*, based in Lewisburg, provides visitors with information on lodging, eating, events, and other information in the three-county area of Northumberland, Snyder, and Union.

All four organizations should promote the greenway effort for the potential to increase both tourism and quality of life in the county. Increased quality of life helps to maintain and attract citizens of all ages, and also attracts potential employers to the area.

- ***Volunteer Organizations*** — During and after the development of greenways in the county, volunteer efforts will be critical to help build and maintain trails and assist with interpretive materials and events. Many groups can be enlisted for supporting projects, including the conservation and recreation groups listed above as well as youth organizations, such as the Boy Scouts, Girl Scouts, church groups, and extracurricular school groups.

- ***Land Developers*** — Throughout the development review process, municipal officials, conservation groups, and the general public should meet with developers to assure that new developments:

- Respect natural features.
- Allow for connectivity of open space.
- Leave ample buffers along streams.
- Facilitate the building of any proposed recreation trails.
- Adequately control storm water and erosion.

The Northumberland County Planning Department and other agencies should also help to educate developers on innovative, environmentally-conscious practices, such as open space development and traditional neighborhood developments.

Costs and Potential Funding Sources

Costs for greenways can vary widely depending on ownership circumstances (and, therefore, the price of acquisition/site control, if any), development proposed, such as trails, and maintenance required, if any. Conceivably, a greenway could involve no public cost at all (if the owner voluntarily places a permanent conservation easement on the land, and the land remains in private ownership).

If access is granted and trails are developed, costs will vary depending on the trail length, surface, and amenities. Trail design considerations are the subject of Appendix B. The following information comes from several recently constructed trails in Pennsylvania. The three examples illustrate the wide range of construction cost, depending on trail design, surface, and circumstances: from approximately \$102,000 per mile for crushed stone in Elizabethtown to \$230,000 per mile for paved surface (Lebanon Valley Rail Trail) to \$260,500 per mile for the York County Heritage Rail Trail.

- **Conewago Trail, 5.2 miles, approximately \$530,000 (includes engineering)**
Elizabethtown, PA — Spring 2007

The Conewago Trail connects PA 230 in Elizabethtown to the Lebanon Valley Rail Trail at the Lancaster-Lebanon county line. The renovation project included a new, crushed stone surface approximately eight feet wide, clearing/grubbing, pipes, signs, and a 5-car parking lot.

- **Lebanon Valley Rail Trail, Phase 4, 2.5 miles, 10' wide, \$575,000 (includes engineering)**
Lebanon County, PA — 2007

The Lebanon Valley Rail Trail is a 12.5-mile trail connecting the Lancaster-Lebanon county line to Whitman Road in Cornwall. Phase 4 of the trail, now under construction, will extend the trail 2.5 miles into the City of Lebanon. The extension will be a 10-foot wide, paved surface.

- **Heritage Rail Trail County Park, 1.0 miles, 10' wide, \$260,500 (excludes engineering)**
York, PA — 2007

The northern extension of an existing rail-trail, an approximate one-mile route in an area that is not on existing rail corridor; total construction cost estimates include everything required to complete the trail with crushed stone (drainage, reseeding, curbing & one gate) and ranged from a low of \$260,500 to a high over \$500,000. Engineering costs may be ball-parked at approximately 20%, bringing total cost to approximately \$312,600.

Maintenance costs will also vary significantly depending on the type of trail and the level of volunteer involvement. Carefully planned design and construction will have a significant effect on long-term maintenance costs.¹⁴

¹⁴ Many free assistance services are available from web sites managed by Rails-to-Trails Conservancy (www.railstotrails.org) and American Trails

Public-private partnerships can be an ideal way to address maintenance issues on a trail. A commonly seen partnership is one where the trail is owned by a municipality but maintained largely by volunteers with assistance from the county or municipality. Involving the local citizens and service groups in the planning of a trail from the very beginning of a project is a good step toward developing a friends group.

The Capital Area Greenbelt in Harrisburg is one local example of a successful partnership. The greenbelt is a 20-mile trail that loops around and through the city and parallels the Susquehanna River. Primarily constructed with asphalt tread, the greenbelt also includes sections of dirt 'single track' as well as boardwalk. The friends group built and maintains a community Five-Senses garden. The greenbelt includes only two miles of actual rail-trail, with the remainder using existing shoulders, miscellaneous rights-of-way, and shared roadways. The greenbelt maintenance budget (Table 3.3) is a good example of a successful partnership maintaining a trail. In the case of the Capital Area Greenbelt, the 2005 example is worth noting for the fact that the value of donated equipment, materials, and services (\$86,600) amounted to more than 62 percent of the organization's annual budget.

Northumberland County Greenways and Open Space Plan

**Table 3.3
Capital Area Greenbelt Budget, 2005**

Maintenance Activity	Labor cost	Donated services	Equipment/ material cost	Donated equipment/ materials	Approximate annual cost for activity
Resurface non-asphalt trail		\$2,000	\$2,000	\$3,500	\$7,500
Grade non-asphalt trail					\$0
Pothole repair and other patches on non-asphalt trail		\$1,000	\$500	\$1,500	\$3,000
Snow removal from non-asphalt trail					\$0
Surface cleaning of non-asphalt trail					\$0
Keep trailside land clear of trash and debris		\$1,000	\$1,000		\$2,000
Mowing		\$2,000	\$1,000	\$2,000	\$5,000
Leaf removal					\$0
Tree pruning					\$0
Tree removal	\$500	\$800	\$200	\$1,000	\$2,500
Invasive species removal		\$1,000	\$500	\$800	\$2,300
Planting new vegetation		\$3,000	\$2,000	\$3,000	\$8,000
Application of herbicides or pesticides		\$1,000	\$300	\$1,000	\$2,300
Clearing of drainage channels and culverts		\$500	\$200	\$500	\$1,200
Surface maintenance of parking areas	\$2,000	\$1,000	\$300	\$1,000	\$4,300
General maintenance of trailheads (litter clean-up, etc.)		\$200	\$100	\$500	\$800
Landscaping / gardening at trailheads		\$3,000	\$2,000	\$3,000	\$8,000
Empty trash cans at trailheads	\$1,500		\$2,000	\$2,000	\$5,500
Maintenance of stationary toilets at trailheads (clean, empty, etc.)					\$0
Maintenance of portable toilets at trailheads (clean, empty, etc.)					\$0
Empty trash cans along trail					\$0

Northumberland County Greenways and Open Space Plan

Maintenance Activity	Labor cost	Donated services	Equipment/material cost	Donated equipment/materials	Approximate annual cost for activity
Maintenance of stationary toilets along trail (clean, empty, etc.)					\$0
Maintenance of portable toilets along trail (clean, empty, etc.)					\$0
Maintenance of informational kiosks (repairs, etc.)					\$0
Maintenance of picnic tables, benches, etc.					\$0
Updating information in informational kiosks		\$300	\$100	\$200	\$600
Installation of signs		\$200	\$300	\$500	\$1,000
Repair/maintenance of signs		\$200	\$300	\$500	\$1,000
Installation of pavement markings					\$0
Maintenance of pavement markings					\$0
Patrols by police agency	\$30,000				\$30,000
Patrols by non-police agency (e.g. trail watch)					\$0
Recovery from illegal acts such as dumping and vandalism					\$0
Installation of lighting	\$100		\$100		\$200
Maintenance of lighting	\$200		\$500		\$700
Installation of emergency call boxes					\$0
Maintenance of emergency call boxes					\$0
Installation of gates, bollards and fencing	\$1,000	\$200	\$100	\$20,000	\$21,300
Maintenance of gates, bollards and fencing	\$300	\$10,000	\$200	\$15,000	\$25,500
Bridge, tunnel, underpass and crossing inspection	\$50	\$50	\$50	\$50	\$200
Bridge redecking					\$0
Paint/stain/treat bridge deck or structure	\$300	\$600	\$300	\$1,000	\$2,200
General bridge maintenance	\$100	\$500	\$1,000	\$1,000	\$2,600
Tunnel lighting maintenance					\$0
Tunnel open/closed status					\$0

Northumberland County Greenways and Open Space Plan

Maintenance Activity	Labor cost	Donated services	Equipment/material cost	Donated equipment/materials	Approximate annual cost for activity
Paint tunnel/underpass walls and ceiling					\$0
General tunnel/underpass maintenance					\$0
Railroad grade crossing maintenance					\$0
Road grade crossing maintenance					\$0
Totals	\$36,550	\$28,550	\$16,050	\$58,050	\$139,200

Source: Rails-to-Trails Conservancy, *Rail-Trail Maintenance & Operation*. Rails-to-Trails Conservancy, Camp Hill, PA, July 2005

The federal government, state government, county government, private organizations, and foundations provide various opportunities to fund open space and greenway efforts (Table 3.4). Funding sources are always changing. New programs are added, and older programs are revised or deleted. Currently, the C2P2 program from DCNR is still funded, while most programs from DCED have no funding in current budgets. In general, most programs still exist but have no funding in current budgets. Therefore, any potential applicant should contact the administering agency to determine the available funding and exact requirements in effect at the time of application.

Pilot Project

The plan recommends the formation of a countywide advisory council to focus on greenway, open space, and recreation issues (Table 3.2, #6). Typically, an issue dealing with a greenway, open space in a particular area, or local recreation is championed by a group of local volunteers focused on a single issue. For instance, one local recreation organization may be focused on providing

and maintaining baseball fields in a specific part of the county. Another group may be devoted to the preservation and maintenance of a specific waterway. Yet another group may concentrate on land preservation in a specific area. Still other groups may be able to provide small financial incentives for specific purposes. A countywide advisory council would help causes and issues by:

- Sharing constructive ideas about issues one group may face, based on the experience of other group(s).
- Providing a forum for residents or groups wishing to develop an idea or voice a compliment or complaint.

Northumberland County Greenways and Open Space Plan

**Table 3.4
Potential Funding Sources¹⁵**

Program Name	General Description of Program	Administering Agency
Act 68 Snowmobile & ATV Trails Fund	see C2P2	
Agricultural Conservation Easement Purchase Program	The Agricultural Conservation Easement Purchase Program provides funds for the purchase of development rights on farmland. The perpetual easement ensures the farmland will be available for agricultural use indefinitely. Funding comes from federal, state, and county sources.	Northumberland Co. Conservation District & PA Bureau of Farmland Preservation
Community Conservation Partnerships Program (C2P2)	<p>Provides matching grants to eligible entities for projects in the following areas:</p> <ul style="list-style-type: none"> • Planning <ul style="list-style-type: none"> – Comprehensive Recreation, Park, & Open Space Plan – Conservation Plan – Feasibility Study – County/Mun. Greenway/Open Space Network Plan – Specific Greenway, Trail, or Rails-to-Trails Plan – Snowmobile/All-Terrain Vehicle Plan – Master Site Plan – Rivers Conservation Plan • Technical Assistance <ul style="list-style-type: none"> – Education, Training, Implementation – Peer-to-Peer Technical Assistance – Circuit Rider <p>The C2P2 program funds grants by using several different funding sources:</p> <ul style="list-style-type: none"> • Keystone Recreation, Park, and Conservation Fund (Key 93) • Environmental Stewardship Fund (Growing Greener 1) • Growing Greener Bond Fund (Growing Greener 2) • Act 68 Snowmobile and ATV Trails Fund • Federal Land and Water Conservation Fund (LWCF) • Fed. Recreational Trails component of the Transportation Equity Act for the 21st Century (TEA-21) 	<p style="text-align: center;">PA DCNR</p> <ul style="list-style-type: none"> • Pennsylvania Recreational Trails • Acquisition <ul style="list-style-type: none"> – Park and Recreation Areas – Greenways/Trails/Rivers Conservation – Rails-to-Trails – Snowmobile/All-Terrain Vehicle – Natural and Critical Habitat Areas • Development <ul style="list-style-type: none"> – Park and Recreation Areas – Greenways and Trails – Rails-to-Trails – Snowmobile/All-Terrain Vehicle – Rivers Conservation

¹⁵The information in Table 3.4 may be slightly outdated. Funding programs are constantly changing. In general, all of the programs in Table 3.4 still exist, but, due to current, severe budget constraints, some of the programs may have limited or no funding for the current year. Therefore, any potential applicant should contact the administering agency to determine the exact requirements in effect at the time of application.

Northumberland County Greenways and Open Space Plan

Program Name	General Description of Program	Administering Agency
Community Development Block Grant (CDBG)	Offers grants for a wide variety of activities, provided the applicant proves by survey or census that either 1) at least 51% of the project beneficiaries are low and moderate income persons or disabled persons or 2) the project eliminates "blighted" conditions in officially designated areas. For example, funds can be used for water and sewage improvements, storm drainage, handicapped accessibility, parks/recreation/greenways, street and sidewalk improvements, planning, and historic rehabilitation.	SEDA-COG & PA DCED
PA Conservation Corps	Provides funding for work crews for community projects, such as trail improvements.	PA Dept. of Labor/ Industry
Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)	The U.S. Department of Agriculture, through its Farm Service Agency, provides payments to farm operators to plant long-term, stabilizing and filtering vegetation on highly erodible or other sensitive landscapes, such as riparian areas. Contract duration is between 10 and 15 years. The participant, in return for annual payments during this period, agrees to implement a conservation plan approved by the local conservation district. Eligible land must be in cropland or pasture land, have an erosion index of 8 or higher, and may include field margins.	Natural Resource Conservation Service–NRCS (U.S. Department of Agriculture); NCCD
Environmental Protection Agency (EPA) Watershed Initiative	The Environmental Protection Agency (EPA) provides large Watershed Initiative grants ranging in size from approximately \$300,000 to \$1.3 million. Twenty grants are given out each year. The program is very competitive and requires state endorsement of the proposed project(s).	U.S. EPA (Philadelphia)
EPA — Water Quality	Grants for improving water quality are available for the U.S. EPA.	U.S. EPA (Philadelphia)
EPA — Brownfields Program	Grants for a very limited number of pilot demonstration projects for cleanup of contaminated underused industrial sites.	U.S. EPA (Philadelphia)
Flood Control - Army Corps of Engineers (CoE)	Various types of projects to manage flooding. Typically, the CoE is involved in larger watersheds, while NRCS has primary responsibility for smaller watersheds (see Small Watershed Program).	U.S. Army CoE
Flood Hazard Mitigation Grant Program	Provides 75% funding to relieve imminent hazards from flooding, such as voluntary buy-outs and demolitions of highly flood-prone properties.	Federal Emergency Management Agency
Flood Protection Program, PA	Offers design and construction of flood protection projects. The project must be deemed economically justifiable under the state capital budget process.	PA DEP — Bureau of Waterways Engineering
Forest Legacy Program	The Forest Legacy Program (FLP), a federal program in partnership with the state, supports state efforts to protect forest lands. The FLP directly supports property acquisition and also supports efforts to acquire donated conservation easements. Participation in the FLP is limited to private forest landowners.	USDA Forest Service in cooperation with state foresters
Growing Greener Program	As part of Pennsylvania's Growing Greener Program, PA DEP offers various grants that can be used for greenway related projects. The grants include: Watershed Grants, Technical Assistance Grants, and New or Innovative Technology Grants. Parts of the Growing Greener program are also administered by DCNR. (See C2P2)	PA DEP
Home Town Streets and Safe Routes to School	The Home Town Streets Program provides funding for a variety of streetscape improvements that are aimed at reestablishing downtown and commercial centers. The Safe Routes to School Program provides grants and is designed to work with both school districts and pedestrian/bicycle safety advocates to make physical improvements that promote safe walking and biking passages to schools. Both programs require a 20% local match.	PennDOT
Historic Preservation Tax Credits	Offers federal income tax credits for a percentage of the qualified capital costs to rehabilitate a certified historic building. The program is generally limited to income-producing properties.	PA Historical and Museum Commission (PHMC)

Northumberland County Greenways and Open Space Plan

Program Name	General Description of Program	Administering Agency
Historic Preservation – Certified Local Government Grants	Provides modest-sized matching grants to provide technical assistance to municipalities that have official historic districts and meet other criteria to be “certified.”	Federal, administered by PHMC
Historic Preservation Survey and Planning Grants	Matching grants for historic surveys, historic preservation planning and National Register nominations. Available to municipalities and nonprofit organizations. Cannot be used for construction.	Federal, administered by PHMC
Heritage Parks Program	Provides grants up to 75% of costs for projects within state-designated “Heritage Parks” to preserve and interpret the significant contribution that certain areas made upon the industrial heritage of the state and nation. Funds four types of projects: feasibility studies, special purpose studies, management action plans, and implementation projects. Projects are intended to conserve natural, historic and recreational resources relating to industrial heritage to stimulate regional tourism. At present, there are no heritage parks in Northumberland County. Neighboring Lycoming County is part of the Lumber Heritage Region of Pennsylvania, and neighboring Schuylkill County is part of the Schuylkill River National and State Heritage Area.	PA DCNR
Industrial Sites Reuse Program, PA ("Brownfields")	Provides grants of up to 75% and low-interest loans for assessment of environmental contamination and remediation work at former industrial sites. Available to private companies, nonprofit economic development agencies, or authorities that own the land. Mainly targeted toward cities. Financing is not available to the company that caused the contamination.	PA DCED in cooperation with PA DEP
Intermunicipal Projects Grants	Promotes cooperation between neighboring municipalities so as to foster increased efficiency and effectiveness in the delivery of municipal services at the local level. (part of MAP program)	PA DCED
Keystone Recreation, Park, and Conservation Fund (Key 93)	see C2P2	
Keystone Historic Preservation Funds	Provides 50% matching grants to fund analysis, acquisition, or rehabilitation of historic sites. The site must be on the National Register of Historic Places or officially determined to be eligible for listing. The site must be accessible to the public after funding. Grants can be made to public agencies or nonprofit organizations.	PHMC
Land & Water Conservation Fund	see C2P2	
Local Government Capital Projects Loan Program	Provides low-interest loans to municipalities with populations of 12,000 or less for the purchase of equipment and the purchase, construction, renovation or rehabilitation of municipal facilities. Priorities are given to projects that are necessary for public health and safety or involve intergovernmental cooperation.	PA DCED
Municipal Assistance Program (MAP)	The former Land Use Planning and Technical Assistance Program (LUPTAP) and Shared Municipal Services (SMS) programs have been combined into one program. The program guidelines and other information are available at: http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/municipal-assistance-program	PA DCED
National Recreational Trails Funding (Symms NRTA)	Provides grants for the acquisition and development of recreation trails (which may include trails for motorized vehicles). A 20% local match is required. Applications may be made by federal, state or local government agencies, and some for-profit entities. (also see C2P2)	Federal, administered by PA DCNR

Northumberland County Greenways and Open Space Plan

Program Name	General Description of Program	Administering Agency
Nutrient Management Plan Development Incentive Program	Grants of \$4 per acre are available to farmers to cover up to 75% of the cost of preparing nutrient management plans. Low-interest loans are also available through the state to help implement nutrient management-related best management practices.	Northumberland County Conservation District
On-Lot Septic System Program	Offers low-interest loans to limited income households to repair failing on-lot septic systems.	PennVest, PHFA
PA Infrastructure Investment Authority (PennVest)	Offers low-interest loans for construction and improvement of drinking water and wastewater systems. 100% grants may be available for highly-distressed communities. Mainly intended for public systems, but some private systems may be approved. Water projects are funded through the Drinking Water Revolving Loan Fund. Sewage projects are funded through the Clean Water Revolving Fund. PennVest is also authorized to provide loans for projects to control existing stormwater problems, such as separating stormwater from sanitary sewage. The "Advance Funding Program" provides low-interest loans for feasibility studies and engineering of systems if the utility itself cannot fund the work.	PennVest PA DEP (Bureau of Water Supply Management) — Involves both U.S. EPA and state funds
PA Recreational Trails	Provides matching funds (80/20) to federal state, and local agencies and private organizations to develop and maintain recreational trails and facilities for motorized and nonmotorized use (see C2P2).	PA DCNR
Rails to Trails (Key 93)	Provides grants for feasibility studies, master site plans, acquisition, and improvement of former railroad lines for recreation trails. A 50% local match is required. Open to municipalities, authorities, and nonprofit agencies. (see C2P2)	PA DCNR
Recycling Grants (Act 101 of 1988)	Grants for up to 90% of municipal costs to develop and implement recycling programs, such as the purchase of recycling bins and composting equipment. Grants are also available to counties for a recycling coordinator, waste management plans, and pollution prevention education.	PA DEP, Bureau of Land Recycling and Waste Management
Recycling Market Development Loan Fund	Provides low-interest loans to businesses to purchase recycling source-separating equipment.	PA DEP Bureau of Land Recycling and Waste Management
Rivers Conservation Program, PA	Offers 50% grants to conserve and enhance river resources. Typically, funding is first provided for a conservation plan for a waterway. Grants are available to implement an approved plan. Available to municipalities, authorities, and nonprofit organizations. (See C2P2)	PA DCNR
Rivers, Trails, and Conservation Assistance Program	The National Parks Service operates a program aimed at conserving land and water resources for communities. Eligible projects include conservation plans for protecting land and water resources, trail development, and greenway development.	National Park Service
Rural Utilities Service Financing	Offers low-interest loans for drinking water and sewage projects for rural areas and small towns. The "Water and Water Disposal Loan Program" provides loans for water supply, wastewater disposal, solid waste disposal, and stormwater management systems for rural areas and towns with a population less than 10,000 persons. Available to municipalities, authorities, and nonprofit corporations. Grants up to 75% of project costs may be available for highly distressed areas. Also guarantee loans by private lenders. • Provides grants to nonprofit organizations to provide technical assistance to rural communities or for a circuit rider to serve several rural water systems. • Offers emergency grants to communities that have experienced a significant decline in quantity or quality of drinking water.	U.S. Dept. of Agriculture, Rural Utilities Service
Sewage Facility Planning Grants	Grants to pay up to 50% of the costs to prepare a new sewage facilities plan or update an existing plan, under State Act 537 of 1966.	PA DEP

Northumberland County Greenways and Open Space Plan

Program Name	General Description of Program	Administering Agency
Small Watershed Program (Public Law 566)	Provides technical and financial assistance in carrying out projects which aim to protect water resources, provide water-related recreation, or protect against flooding. Eligible watersheds must be smaller than 250,000 acres (390 square miles). The program provides up to 100% funding for flood prevention projects, and up to 50% matching for agricultural water management, public recreation, and fish/wildlife purposes. Each year, a state will receive an average of \$650,000 for allocation under P.L. 566.	Natural Resource Conservation Service (U.S. Department of Agriculture)
Stormwater Management Grants (PA Act 167 of 1978)	Grants for cooperative efforts at the watershed level among municipalities for stormwater planning and ordinances. Grants are typically made to counties, but may be made to municipalities.	PA DEP, Bureau of Watershed Conservation
Stream Improvement Program	Provides design and construction assistance to eliminate imminent threats to flooding and streambank erosion.	PA DEP, Bureau of Waterways Engineering
SAFETEA-LU (part of federal Transportation Equity Act)	Provides grants of up to 80% for: pedestrian and bicycle facilities (including trails), acquisition of scenic easements at scenic or historic sites, development of scenic or historic route programs, landscaping and other scenic beautification along highways, restoration of historic transportation facilities (such as canals), preservation of rail corridors (particularly for multiple-use trails), control and removal of outdoor advertising, archeological research, and mitigation of water pollution due to highway runoff. All projects must have a direct correlation with transportation.	U.S. DOT funds, administered by PennDOT
Urban Forestry Grants	Provides grants for tree planting projects. Program is also a federal "America the Beautiful" grant program for tree planting.	PA DCNR
Water Supply Plan & Well-head Protection Grants	Provides grants to counties to plan for water supplies at the county level and to implement programs to protect the wellheads of public wells.	PA DEP, Bureau of Water Supply
Wetlands Reserve Program	The U.S. Department of Agriculture also provides direct payments to private landowners who agree to place wetlands under permanent easements. The program can be used to fund the protection of open space and greenways within riparian corridors.	U.S. Department of Agriculture (USDA)
Foundations		
Anselmo (Joseph J.), Sr. Charitable Trust	Grants restricted to organizations serving youth in Northumberland Borough and Point Twp. Most grants for general support, special projects, or building funds. Forms available at bank. Grants can range from about \$850 to more than \$15,000. One of the trusts major interests is "conservation and ecology".	Northumberland National Bank 570-473-3531 (phone)
The Degenstein Foundation	Grants mostly within 75 miles of Sunbury.— grants for general purposes — information and forms available on website: www.deg-fdn.org — One major interest is "local government projects", which may include greenways.	Apfelbaum, Apfelbaum, and Apfelbaum (Sunbury) 570-286-1582 (phone)
Guyer (G. Scott and Bessie K.) Foundation	Eligibility restricted to organizations or municipal agencies within 10 miles of Shamokin Dam, in Snyder, Union, or Northumberland Counties — forms and information on eligible applicants and projects available at www.guyer-fdn.org — One major interest is "local government projects", which may include greenways.	Apfelbaum, Apfelbaum, and Apfelbaum (Sunbury) 570-286-1582 (phone)
Long (Andrew C.) Foundation	All giving for unrestricted support primarily to/for the Shamokin area; High grants of \$5,000; no grants to individuals; some primary interests include youth, disabled/handicapped, and community service clubs, all of which might become involved in greenway projects	c/o John Woytowich & Co. 101 W. Independence St. Shamokin, PA 17872
Moyer Memorial Foundation	Giving restricted to organizations serving children age 18 and under in Snyder and Northumberland Cos.; sample recipients include libraries, universities, historical societies, and local governments; more info. at www.moyer-fdn.org ;	Apfelbaum, Apfelbaum, and Apfelbaum (Sunbury) 570-286-1582 (phone)

Northumberland County Greenways and Open Space Plan

Program Name	General Description of Program	Administering Agency
Whipple Sunbury Foundation	Giving restricted to Sunbury area; only Sunbury area organizations are eligible to apply; areas of interest include youth and disabled/handicapped; sample previous recipients include YMCA, Boy Scouts, Kauffman Public Library, and Special Olympics	Susquehanna Trust & Investment Co. 400 Market St., Sunbury 570-863-6251 (phone)

Sources: Publications and internet sites of various agencies; *Pennsylvanian* magazine; PA DCED *Resource Directory*
PA DCNR and PA Growing Greener websites, *Directory of Pennsylvania Foundations (7th Edition)*, URDC

Examples of groups that should be represented on a countywide advisory council include:

- Brush Valley Preservation Association
- Lewis Township Recreation Complex Committee
- Line Mountain Recreation Area
- Little Shamokin Creek Watershed Association
- Lower Anthracite Regional Recreation Commission
- Mahanoy Creek Watershed Association
- Northumberland County Recreation Committee
- Shamokin Creek Restoration Alliance
- Sunbury Revitalization, Inc.
- Susquehanna Greenway Partnership
- Warrior Run Community Corporation

The advisory council should work diligently to forge a strong working relationship with the Northumberland County Conservation District (NCCD). More specifically, the Northumberland County Greeways & Open Space Advisory Council should take the following actions:

1. Approach the NCCD to offer an advisory role, including, but not limited to:
 - a. Establishing an ongoing dialogue with conservation district management.

- b. Providing volunteer assistance at workshops and other educational events to help promote district programs and activities.
 - c. Serving as a sounding board/brainstorming group for new ideas and concepts.
 - d. Exploring new or reestablished funding streams that may become available.
 - e. Providing a unified front to other government agencies to strengthen grant applications and other means of funding.
2. Work with the NCCD to establish a set of priorities for current projects within the county. Additionally, establish rating criteria against which to measure each project to equitably determine needs and priorities for future funding.
 3. Offer to serve as a review committee for the NCCD. The NCCD is occasionally approached with requests for support on projects, grants, and other items. The advisory council could work with the NCCD to help determine which projects warrant the highest priority in support, funding, and assistance.

Management Considerations

Managing greenways within local borders will ultimately be the responsibility of the municipality, since local governments in Pennsylvania have control over land use, policing, and other local services. Greenways can be a great opportunity for adjacent municipalities to work together in creating and maintaining a strong community asset. Therefore, one of the most important functions of the proposed advisory council, which is formed on a countywide basis, is to help forge strong working relationships among adjacent municipalities. Municipal representatives to the advisory council should work through the council together to discuss and resolve issues regarding greenway segments within local borders.

Furthermore, the council, in addition to having members representing specific causes or local assets (e.g., Susquehanna River, Shamokin Creek, Warrior Run), should also have members who simply represent different areas of the county. Greenway issues in the northern part of the county may be quite different than greenways issues in the southern part of the county, and the advisory council should be a forum for addressing considerations on a geographic basis as well as a topical basis.

This page intentionally blank.

Appendix A

PUBLIC MEETINGS

Northumberland County is geographically large, and the character and issues are significantly different between the northern and southern parts of the county. The northern part of the county is characterized more by agriculture and forestry and is narrower than the southern part. The southern part of the county includes large mined areas and larger cities (e.g., Sunbury and Shamokin) and boroughs (e.g., Northumberland, Mount Carmel). Therefore, each public meeting for the plan was held twice: one to serve the northern part of the county and one to serve the southern part.

First Set of Public Meetings

The first set of public meetings for the *Northumberland County Greenways and Open Space Plan* occurred as follows:

- 21 July 2010, 6:30 p.m., in Milton Borough Hall
- 22 July 2010, 6:30 p.m. in the Northumberland County Career Center, located in Shamokin

Prior to the meetings, the county placed the following notice in two local newspapers: the News Item and the Milton Daily Standard:

PUBLIC MEETING NOTICE

The Northumberland County Planning Department, along with the project consultants, will hold public meetings for the Greenways and Open Space Master Plan and the Off Highway Vehicle Park Master Plan as follows: 1) Greenways and Open Space July 21, 2010, 6:30 p.m. Milton Borough Council Chambers, 2 Filbert St., Milton and July 22, 2010, 6:30 p.m. Northumberland County Career Center Auditorium, 2 E. Arch St., Shamokin; 2) Off Highway Vehicle Park July 27, 6:30 p.m. Shamokin Area Junior Senior High School Auditorium. All interested parties are invited to attend the public meetings. Persons requiring special accommodations to facilitate participation in the meetings may call the Planning Department at 570-988-4220 to make such arrangements.

**NORTHUMBERLAND COUNTY
BOARD OF COMMISSIONERS**

Frank J. Sawicki, Chairman
Vinny Clausi
Kurt A. Masser

ATTEST: Kimberley Best, Esq.
Chief Clerk

Northumberland County Greenways and Open Space Plan

In order to save publishing costs, the notice advertised three public meetings: two for the greenway and open space plan and one for the proposed off-highway vehicle park. Except for county staff, the consultants, and representatives of the state funding agencies, one person attended the meeting in Milton, and 11 persons attended the meeting in Shamokin.

Key points made during the meetings were:

- Greenways should be used to connect the parks throughout the county.
- Make the plan a part of the county subdivision and land development ordinance and/or comprehensive plan.
- In addition to broad open spaces, open areas should be provided in redeveloped areas.
- The county may wish to consider funding a bond issue to provide open space.
- The Shamokin Creek mine water treatment sites represent an educational opportunity to incorporate into the greenway system.
- The greenway plan should support agricultural preservation techniques.
- Local governments need guidance and technical assistance to provide greenways. The county should offer technical assistance to local municipalities to establish greenways.
- The plan should help to preserve Brush Valley.
- As with other plans, the greenway and open space plan should be used as part of development reviews.
- The county should consider hiring a land preservation specialist.
- Preserved land may increase nearby property values and requires few, if any, public services.
- The Pennsylvania Land Trust Association (www.conservationtools.org) provides valuable information on land preservation techniques and successful preservation projects.
- Biodiversity should be used as one key element in establishing preservation priorities.
- Local preservation groups (such as the Brush Valley Preservation Association, Mahanoy Creek Watershed Association, Shamokin Creek Restoration Alliance, Warrior Run Community Corporation, and others) should be consulted and used frequently for local land preservation efforts.

Second Set of Public Meetings

The first set of public meetings for the *Northumberland County Greenways and Open Space Plan* occurred as follows:

Northumberland County Greenways and Open Space Plan

- 17 October 2011, 6:00 p.m., in Milton Borough Hall
- 19 October 2011, 6:00 p.m. in the Northumberland County Career Center, located in Shamokin

Prior to the meetings, the county placed the following notice in two local newspapers: the News Item and the Milton Daily Standard:

Faxed notification of the meetings was sent to the county’s media fax list, composed of the following newspapers, radio stations, and television stations:

- The Daily Item
- Shamokin News Item
- The Milton Standard
- The Danville News
- The Press Enterprise
- The Citizen Standard
- The Upper Dauphin Sentinel
- Williamsport Sun-Gazette
- The Harrisburg Patriot
- The Reading Eagle
- Associated Press
- WKOK / WQKX
- WMLP / WVLY
- WISL
- WSPI / WAVT / WPPA
- CNN / CATV
- WHLM / WJMW
- WPGM
- WQSU
- WGRC
- WILQ / WLYC
- WYGL / WWBE
- WRAK / WKSP
- WHTO / WZXR
- WNEP-TV
- WYOU-TV
- WBRE-TV

In addition, the county prepared the following press release for distribution:

CONTACT: Mrs. Kathy Jeremiah, Project Coordinator
Northumberland County Planning Department
399 S. Fifth Street
Sunbury, PA 17801
570-988-4295

REGARDING: Northumberland County Greenways and Open Space Plan

Northumberland County will hold a public input session on the Greenways and Open Space Plan. This plan will be used as a tool for planning activities regarding greenways and open space. The process of developing this plan will result in several tangible products for the County’s future use.

The primary goal of the Northumberland County Greenways and Open Space Plan is to enhance the quality of life in the communities throughout Northumberland County by preserving land and, where appropriate, creating various types of greenways. The Plan will present an Action Program and Recommendations.

There will be two public meetings held to accommodate County residents. One meeting will be on Monday, October 17, at 6:00 pm, at the Milton Borough Building located at 2 Filbert Street, Milton, with the other location being the Northumberland County Career and Arts Center, Room 304, at 2 East Arch Street in Shamokin, on Wednesday, October 19 at 6:00 p.m.

Pat Mack, Northumberland County Planning and IDA Director, said “Through this Plan we want to be able to link our communities with natural areas, forested areas, downtown districts, etc. We will connect our population major and minor hubs with the Greenways Plan. I believe our Greenways Plan will note how the connection between walkable greenways and walkable downtowns creates economic benefits to revitalize our region and encourage people into the downtowns for commerce.”

Bob Kriebel of Urban Research and Development Corporation, Bethlehem, PA is the consultant for the County’s Greenways and Open Space Plan. Also assisting with the Plan is Mid-Penn Engineering from Lewisburg. The master plan is being funded with grants from the Pennsylvania Department of Conservation and Natural Resources and the Pennsylvania Department of Community and Economic Development.

Key points made during the meetings were:

- The *Susquehanna River Water Trail-West Branch Stewardship and Conservation Plan* (August 2009) should be added to the list and discussed in chapter 2 of the plan as part of the

framework for the *Northumberland County Greenways and Open Space Plan*.

- Emphasize agricultural land preservation, particularly in the northern part of the county. Local ordinances should not be so restrictive on agricultural uses.
- History should be one emphasis of the plan. Indian trails¹ and places like Fort Augusta, Fort Freeland, and Fort Rice each played a role in the county's history and development.
- The Northcentral Pennsylvania Conservancy should be mentioned along with the Linn Conservancy as potential partners for land preservation in Northumberland County.
- Instead of simply being classified as an "other" stakeholder in the action program, SEDA-COG should be specifically identified. SEDA-COG, which covers a large area composed of 11 counties, putting the agency in a unique position to work with local and state agencies to preserve land as part of a larger economic development strategy.
- Recommendation #16 should be broadened beyond Brush Valley to read: "Work with landowners and interested groups to conserve open space using tools such as conservation easements."

¹ A map of Indian trails can be found at:
http://www.departments.bucknell.edu/environmental_center/sunbury/web site/IndianTrailsMap.shtml

Appendix B

TRAIL DESIGN GUIDELINES

Trails proposed in *Northumberland County Greenways and Open Space Plan* may vary from primitive earthen tracks to paved, graded pathways. Some trails exist in the form of bicycle lanes, bicycle routes, and sidewalks. Trail users will vary from hikers and equestrians to road bicyclists and in-line skaters. When designing a trail, layout, surface, road crossings, signs, landscaping, and other infrastructure are all important considerations.

The following information should serve as a guide for municipalities, which will be spearheading the implementation of the *Northumberland County Greenways and Open Space Plan* and developing greenways within municipal borders and multimunicipal regions.

TRAIL LAYOUT

Trail layout should be sensitive to the environment the greenway intends to preserve. The trail should be compatible with the natural landscape and follow elevation contours where possible. If the trail cannot accommodate the intended user groups without having a negative impact on surroundings, the location and design of the trail should be reevaluated. The trail should also be routed to increase environmental awareness, and be built and maintained in a sustainable, cost-effective, and timely fashion. Improper trail

implementation can lead to long-term maintenance problems, which are often difficult to fix.¹

Trails should also be compliant with design criteria established by the *Americans with Disabilities Act (ADA)*. At this time, trails must meet the following technical provisions in order to be considered accessible:

- Surface - the trail surface shall be firm, stable and slip resistant
- Clear Tread Width - 36" minimum
- Tread Obstacles - 2" high maximum (up to 3" high where running and cross slopes are 5% or less)
- Cross Slope - 5% maximum
- Passing Space - provided at least every 1,000' where the trail width is less than 60" (5'-0")
- Signs - shall be provided indicating the length of accessible trail segment
- Running Slope (trail grade) shall meet one or more of the following:
 - 5% or less for any distance
 - Up to 8.33% for 200' maximum with resting intervals no more than 200' apart

¹Flink, Charles A. and Robert M. Searns. *Greenways, A Guide to Planning, Design and Development*. Island Press, Washington, D.C. 1993. P 198.

- Up to 10% for 30' maximum with resting intervals no more than 30' apart
- Up to 12.5% for 10' maximum with resting intervals no more than 10' apart.
- No more than 30% of the total trail length may exceed a running slope of 8.33%

Trail tread width recommendations have been developed for bicycle trails in urban, suburban and rural settings. Furthermore, the American Association of State Highway Transportation Officials (AASHTO) provides recommendations for trail widths (Table B1).

In certain environments, certain user groups, such as cyclists and equestrians, may require some restrictions to minimize environmental impacts. Trail design details may also be warranted to reduce the impacts caused by specific site characteristics. Boardwalks near wetlands are one example of a restrictive trail option that attempts to minimize environmental impacts.

Trail Construction

A highly-developed trail is made of three components: the sub-grade, the sub-base and the trail surface. The sub-grade is the trail's foundation, which is made up of the native soils that bears the load generated by trail users. The sub-base distributes the weight of the trail surface and users to the sub-grade. The trail surface is the point of contact between the trail and the users. The surface can be either soft or hard, depending on its ability to absorb or repel water.

Table B1
Standard Trail Width Recommendations²

<i>AASHTO Standard Tread Width for Bicycle-only Trails</i>			
<i>AASHTO Standards</i>	<i>Recommended Minimum Width</i>		
One way, single lane	5'		
Two way, dual lanes	10'		
Three lanes of bicycle travel	12.5' minimum		
<i>Recommended Trail Tread Widths for User-Specific Trails</i>			
<i>Trail User Type</i>	<i>Recommended Tread Width</i>		
Bicyclist	10' (2-way travel)		
Hiker/walker/jogger/runner	4' rural; 5' urban		
Cross-country skier	8-10' for 2-track trail		
Equestrian	4' tread; 8' cleared width		
<i>Minimum Recommended Tread Widths for Multiple Use Trails</i>			
<i>Tread Type</i>	<i>Urban</i>	<i>Suburban</i>	<i>Rural</i>
Pedestrian, non-motorized	12'	10'	10'
Pedestrian, equestrian	16'	12'	10'

Source: AASHTO

Sub-grade

The sub-grade provides the foundation for the trail to be developed. Any imperfections in the sub-grade will eventually

²Flink, Charles A. and Robert M. Searns. *Greenways, A Guide to Planning, Design and Development*. Island Press, Washington, D.C. 1993. P 200-201.

become apparent in the final trail surface. The characteristics of the sub-grade that provide a good foundation are susceptibility to freezing, weight bearing, and shrink/swell characteristics. Adequate drainage is a requirement to maintain a sound sub-grade and can be accomplished with surface or sub-surface drainage systems, or a combination of the two.³

Sub-base

The sub-base distributes the load of the trail surface and trail users to the sub-grade and provides drainage. The design load of the trail, or the maximum weight able to be carried by the trail, along with the type of material used for the sub-base and the use of geotextiles, will determine the depth of the sub-base necessary.

Trail Surface

The surface of the trail can be constructed of either soft or hard materials. Soft materials are defined as those that are able to absorb moisture, such as earth and wood chips. Hard materials repel moisture and include crushed stone, bituminous concrete, soil cement, resin-based stabilized material and concrete. The type of trail surface can encourage or discourage different types of use. Trails surfaced with soft materials are preferred by equestrians because horses are less susceptible to injury on soft materials. Hard materials with a smooth finished surface such as bituminous concrete are preferred by inline skaters as more conducive to the sport. The surface of the trail (Table B2) should

be chosen conservatively when first installed and can be upgraded as use and demand increase.

Simple Hiking Trails

More rugged trails developed in Northumberland County need not follow all of the above-mentioned design guidelines. Trails intended for walking (and in some cases, equestrian, mountain bike, and bicycle use) could be kept in a primitive state, with natural surfaces three to four feet wide. The trail surface may be completely unimproved, consisting of native soil, grasses, forest litter, and occasional bedrock. Muddy sections may be treated with wood mulch or small, compacted logs.

Unlike the highly-developed recreation trails, simple hiking trails can be built largely with volunteer labor. Regular maintenance will ensure that the hiking trails are not blocked by fallen trees, overgrown with vegetation, erosion, or flooding.

CROSSINGS⁴

Trails may cross roads or rail lines at-grade, above-grade or below-grade. At-grade crossings are the most common although certain situations may present the opportunity to provide a bridge or tunnel. Crossings are site specific and require careful evaluation and planning.

³Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 62-65.

⁴Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 85-88.

Northumberland County Greenways and Open Space Plan

**Table B2
Trail Surface Synopsis**

<i>Surface Material (longevity)</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Hard Materials</i>		
Soil Cement, medium	Uses natural materials, more durable than native soils, smoother surface, low cost, accommodates multiple use	Surface wears unevenly, not a stable all-weather surface, erodes, difficult to achieve the correct mix
Granular Stone, medium-long (7-10 years)	Soft but firm surface, natural material, moderate cost, smooth surface, accommodates multiple use	Surface can rut or erode with heavy rainfall, regular maintenance needed to keep consistent surface, replenishing stones may be a long-term expense, not for areas prone to flooding or steep slopes
Bituminous Concrete (asphalt), medium-long (7-15 years)	Hard surface, supports most types of use, all-weather, accommodates most users simultaneously, smooth surface to comply with ADA guidelines, low maintenance	High installation cost, costly to repair, not a natural surface, freeze/thaw an crack surface, heavy construction vehicles need access
Concrete, long (20 years plus)	Hardest surface, easy to form to site conditions, supports multiple use, lowest maintenance, resists freeze/thaw, best cold weather surface, most resistant to flooding	High installation cost, costly to repair, not a natural-looking surface, construction vehicles will need access to the trail corridor
Boardwalk, medium-long	Necessary in wet or ecologically sensitive areas, natural-looking surface, low maintenance, supports multiple use	High installation cost, costly to repair, can be slippery when wet
Resin-stabilized, medium-long depending on type of application	Aesthetics, less environmental impact, possible cost savings if soil can be used, can be applied by volunteers	Need to determine site suitability and durability, may be more costly in some cases
<i>Soft Materials</i>		
Native Soil, short to long depending on local use and conditions	Natural material, lowest cost, low maintenance, can be altered for future improvements, easiest for volunteers to build and maintain	Dusty, ruts when wet, not an all-weather surface, can be uneven and bumpy, limited use, possibly not accessible
Wood Chips, short (1-3 years)	Soft, spongy surface good for walking, moderate cost, natural material	Decomposes under high temperature and moisture, requires constant replenishment, not typically accessible, limited availability, not appropriate for flood prone areas
<i>Other</i>		
Recycled Materials, varies	Good use of recyclable materials, surface can vary depending on materials	Design appropriateness and availability varies.

Source: Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 74-75.

At-Grade

The most ideal at-grade road crossing will experience very light traffic or provide a traffic signal that can be activated by trail users to allow for safe passage. A professional should be employed to evaluate the intersection and establish a safe method of crossing. Ideally, the crossing should take place as close to an intersection as possible, preferably in the location of the crosswalk. "Trail Crossing" signs should be installed along the road and, if necessary:

- A painted crosswalk should be installed.
- Curb cuts should be as wide as the trail itself.
- Access to the trail can be controlled if the need arises. The most common method of controlling access is the installation of bollards, which can be removable or hinged to allow access for authorized vehicles, such as emergency and maintenance vehicles, while preventing unauthorized vehicle access to the trail. Another effective vehicle barrier are gates extending completely across the trail. Barriers preventing unauthorized vehicle access must be easily visible under all conditions to avoid becoming a hazard and otherwise conflicting with trail use. Barriers should be placed on straightaways instead of curves in order to maintain satisfactory sight distance. Barriers should meet current ADA guidelines and allow for ease of trail use by users with disabilities.

Alternative methods to alert users of an intersection include warning signs, a change in surface pavement, or a centerline along paved trails. Stop signs should be placed 4–5 feet from the road to allow time for users, especially cyclists, to stop. Site

stopping distances should be evaluated by a professional, and adequate warning should be given to allow cyclists to stop. AASHTO guidelines, which incorporate curves, slopes, and other factors, have been developed to help determine the necessary warning distances needed for cyclists to stop.

Above- or Below-Grade Crossings

Crossing above- or below-grade minimizes conflicts between trail users and vehicles but can also be very costly. When dealing with roadways that have a large volume of high-speed traffic, the only feasible alternative may be an above- or below-grade crossing. Above-grade crossings, such as pedestrian overpasses, are perceived to be less threatening and safer by users than below-grade crossings, or tunnels. Above-grade crossings can be extremely expensive and may require long access ramps in order to meet ADA requirements.

Railroad Crossings

Any proposed railroad crossings must be safe. If an at-grade railroad crossing is necessary, the trail should cross perpendicular to the tracks to prevent the front tire of a bicycle or in-line skate from becoming lodged in the track. If a right angle crossing is not possible, another safety alternative should be used, such as:

- A compressible flangeway filler could be installed to reduce the chance of an accident for a cyclist.
- The trail could be widened, giving cyclists the opportunity to approach the crossing at a right angle to the tracks.

Signs requiring cyclists to dismount when crossing the tracks, which would be used in conjunction with track crossing warning signs, should also be installed. The railroad company must be consulted prior to installing any crossing.

SIGNS FOR GREENWAY TRAILS⁵

Signs portray vital information and play an important role in the success of greenway trails. Signs can serve to regulate, warn, inform, and educate trail users. The Federal Highway Administration (FHWA) has outlined the size, shape and color criteria for signs in the *Manual on Uniform Traffic Control Devices* (MUTCD). Where feasible, and to reduce exposure to liability and promote safe trail use, the standard color and shapes should be followed. Signs need to be designed and placed appropriately within the greenway but done so in a manner that does not lead to cluttering of the landscape. The materials chosen for a sign system should be consistent and take into account budget, aesthetics, durability, and maintenance costs. Some options for materials include plastics, fiberglass, wood, aluminum, steel, brass, bronze, stone, fabric and recycled products. Selected materials should give the sign prominence but still blend well with the surrounding environment.

⁵Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 88-93.

Identification and Directional Signs

Creating a uniform signage system will help define the identity of the trail system. The county, through the Northumberland County Planning Department and SEDA-COG, should help municipalities develop uniform identification signage for the greenway trails within the municipality. Numbers should be used for Northumberland County trails because PennDOT has already established *Bicycle PA*, a statewide network of bicycle routes with letters assigned to the routes. Directional signs should be used in conjunction with route identification signs, providing distances and directional arrows to nearby destinations.⁶

The Susquehanna River shore line, particularly in the Lake Augusta gateway area currently being studied by SEDA-COG, includes access areas that provide ideal locations for orientation signs to the river resource, the Susquehanna River Water Trail, and some of Northumberland County's major recreational assets, as part of the Susquehanna Greenway.

Regulatory Signs

Regulatory signs describe the laws and regulations that apply within the greenway, such as stop signs, speed limit signs, and permitted use signs. Regulatory signs are usually posted where the regulation applies.

⁶ One good example of a plan for consistent signage is the signage manual developed for the Schuylkill River Heritage Area in Montgomery and Berks Counties, Pennsylvania.

Warning Signs

Warning signs inform the users of existing or potentially hazardous conditions along the trail and are mounted prior to the condition to allow time to make the necessary preparations, such as reducing speed. Signs should be used near intersections, bridges and tunnels. Warning signs can also be used to bring attention to changes in the trail's grade or surface.

Educational Signs

Educational signs point out areas of interest that make the trail unique, including natural or cultural features. Interpretive displays for greenways can provide educational information about the significant environmental or historic qualities of the area. Educational signs, often more detailed and ornate than other signs, should be made of weather-proof materials. Sign placement along the trail is important because a poorly located sign may not properly inform the trail user and could become hazardous. Signs located on posts should be at least three feet off the edge of the trail and be raised four to five feet off the ground. Information or education signs that do not contain traffic-oriented material should be placed a minimum of four feet off the edge of the trail, allowing people to view the sign while keeping a clear travel area on the trail.

SUPPORT FACILITIES

Support facilities are the additional amenities in the greenway network to provide users with a pleasant experience. The location and amount of support facilities provided will depend on the trail's popularity, the resources of the managing agency, and the infrastructure that is already in place. Restrooms and large trail-head parking areas should not be initial investments, but may become warranted as trail popularity increases.

Access Points, Trailheads, and Parking Facilities

Access to the greenway trail system can occur from a variety of locations, the most common being road crossings. Access points may contain identification signs, trail maps, and other signs. Road crossings, especially in urban and suburban environments, can provide an easily accessible means for local residents to reach greenway trails. Trailheads can be located near public parks, shopping centers or other prominent sites near the greenway trail system. Access points, trailheads, and parking areas are often the first and last impression of the greenway, so design, appearance, and function are all important. Facilities should be convenient for people to use the trail system.

Virtually all of the greenways proposed in the *Northumberland County Greenways and Open Space Plan* will involve private property. Whenever a private landowner is involved in the process of establishing access points, or any part of a greenway, establishing a positive working relationship by making contact early and often in the process is crucial to the success of the

greenway.⁷ Conversely, the lack of strong communication will make a public/private greenway partnership much more difficult.

Prior to undertaking the construction of additional parking areas, an evaluation of existing facilities should be completed. Existing parking areas should be used wherever possible, which reduces the need to develop new parking areas and promotes a “preserve and conserve” concept of establishing greenways. New parking facilities, when required, should be located at the edge of the greenway, away from environmentally sensitive areas. Providing a small number of parking spaces will minimize initial development impacts and costs and allow for future expansion, if demand increases. Parking areas should be no larger than 10–20 spaces. Parking areas should be constructed using natural materials, such as stone, or from surfaces such as porous asphalt or concrete and grid pavers. Handicap-accessible spaces will be required to have firm, stable, and slip-resistant surfacing. Parking areas should have an obvious connection to the trail. Convenient pedestrian access to the trails is important and can be in the form of an accessible route from the handicap spaces and drop-off area. Obvious access minimizes the desire to create shortcuts to the trail, which can result in negative environmental impacts or trespassing on private property. In parking areas where equestrian use is allowed, larger spaces must be provided for horse trailers.

⁷The importance of communication in public/private greenway projects is almost universal. See, for example, Flink, Charles A. and Robert M. Searns. *Greenways, A Guide to Planning, Design and Development*. Island Press, Washington, D.C. 1993. P 268.

Bicycle Parking

No network of bicycle trails would be complete without safe, secure places to lock bikes. In fact, most people will not consider using the bicycle as a mode of transportation unless some form of bicycle parking is provided at destination points. As bicycle trails become more common throughout Northumberland County, municipalities, either individually or in multimunicipal regions, perhaps coordinated with the help of SEDA-COG, should seek funding and negotiate with landowners to provide bicycle racks at common destinations, such as the following:

- Parks and recreation centers
- Municipal buildings
- Major shopping destinations
- Libraries
- Post offices
- Schools

For maximum security and effectiveness, a *fixed* bicycle rack design should be used, either bolted or embedded in concrete. Where possible, sheltered areas (awnings, breezeways, etc.) can help keep bicycles dry during inclement weather. Many municipalities have incorporated bicycle racks into streetscape designs, and in some cases, employed unique bicycle rack shapes as public art.

Benches, Rest Areas, and Receptacles

Benches and rest areas along the greenway trail system provide a place for users to rest, gather, picnic, or view nature. Benches come in numerous designs and, along with rest areas, should be located at regular intervals along the trail, as well as at trailheads.

Benches, like signs, should be located three feet from the trail's edge.

The issue of receptacles on trails is a matter of policy. Trails that are strongly oriented toward environmental preservation and nature observation should have a strict "carry in-carry out" policy: whatever the user carries in to the trail, the user should also carry out. Therefore, no receptacles should be provided along the trails.

Landscaping⁸

Landscaping helps to beautify the trail, provide visual screening of adjacent land uses, and enhance the ecological value of the greenway corridor. Using native vegetation can help strengthen the environment and restore areas that have been degraded, such as riparian buffers. The type of landscaping implemented along the greenway trail depends on the desired goals and the conditions of the area. An inventory of the environmental features of the area will help to determine if remediation measures are necessary. Site conditions will help to determine the types of plants most suitable, such as wetland or drought-tolerant species. Furthermore, using native plants in designs compatible with site characteristics can help to minimize maintenance costs.

Large trees and shrubs can be used to create shade, define spaces, provide a visual screen for adjacent properties, block wind, and frame views. Smaller shrubs and plants help to reduce maintenance by crowding out weeds and provide additional visual interest for the trail users. Ground cover, in the form of native grasses, vines, and other perennial plants provides food and cover for wildlife. A maintenance schedule should be established in urban, suburban, and rural settings for mowing and trimming to keep the trail corridor free of encroaching plant material. Safety is an important element along any trail and visibility is an important factor regarding safety. A safe sight distance should be maintained along urban and suburban trails.

Fencing

In some instances, a vegetative buffer may not suffice to provide the desired separation or barrier between the greenway trail and adjacent land use. If no satisfactory alternative solution can be reached, a fence may be needed. Fences come in different styles, which perform different functions, and can be constructed from various materials, including wood, metal, and stone. Fences should be constructed to enhance the greenway corridor—not to create barriers to wildlife or be visually unattractive.

Sometimes a landowner perceives a need to have a fence installed because of fear related to trail use near the property. Most of the time, the fear dissipates after the trail has been in place for a few months. If an agreement can be reached at the beginning of a project to forego fence construction for a specified period of time, the landowner may relent. After the allotted time, if the

⁸Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 105-109.

landowner is not persuaded otherwise, the fence may be constructed.⁹

Restrooms

Restrooms require careful consideration prior to installation. Expensive to install and maintain, restrooms are also often the target of vandalism. Access to public, central water and sewer is an important component of the decision to install restroom facilities. If either or neither utility is available, alternatives may include wells, septic systems, portable toilets, or composting toilets, depending on local codes. Restroom facilities can be an opportunity to exercise “green architecture” practices when designing, locating, and constructing the building. As with parking, agreements with adjacent establishments to use existing facilities may be negotiable and may reduce or eliminate the need to create new facilities. Signs should be installed indicating the location of the restroom facilities.¹⁰

Bicycle Routes

Some portions of the Northumberland County greenway system require travel on or along roads, where bicyclists will use the roadway and pedestrians will use shoulders or, where available,

⁹Flink, Charles A. and Robert M. Searns. *Greenways, A Guide to Planning, Design and Development*. Island Press, Washington, D.C. 1993. P 267-268.

¹⁰Flink, Charles A., Kristine Olka and Robert M. Searns. *Trails for the Twenty-First Century*. Island Press, Washington, D.C. 2001. P 96-97.

sidewalks, with a few exceptions. Bicyclists are accommodated in one of three types of facilities, depending on the volume and width of each road segment:¹¹

- Bicycle lanes—dedicated lanes on the same cartway as other vehicles.
- Shared roadways—signage indicating joint use of the same cartway without dedicated lanes.
- Sidepaths—separate pathway parallel to the cartway, similar to a sidewalk.

The plan envisions the possibility of bicycles on some of the greenway trails along the major creeks in the county. However, the primary accommodation for bicycle travel in the greenway system will be shared roadways, which are discussed below. The plan does not propose any separate bicycle lanes on any roadways in the county. Likewise, no separate sidepaths are included in the plan recommendations.

Shared Roadways

In some cases, greenway routes may use low-volume neighborhood streets and rural roads, with volumes less than 2,000 vehicles per day, and speeds of 25 MPH or less. On most shared roadways, a motorist will have to move partially into the adjacent travel lane in order to pass a bicyclist. Due to the low traffic volumes, the movement is generally not a safety problem. Paint

¹¹ Design guidelines for all three types of bicycle accommodations can be developed from the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration in 2003.

stripes and pavement markings are not necessary on shared roadways. The roads are simply used in current condition.

While many of the borough and township streets and roads could be considered “shared roadways”, the ones that compose the greenway trail network should be marked with identification and directional signage. The signs may be unique to the municipality, coordinated with Northumberland County, or compliant with generic signs found in the MUTCD. On shared roadways with unusually high conflict between automobiles and bicycles, “Share the Road” signs may be installed (Figure B1).

Figure B1
“Share the Road” Signage



Source: FHWA, MUTCD, Sections 2C.40 and 2C.51

This page intentionally blank

Appendix C

PRESERVING GREENWAYS THROUGH DEVELOPMENT REGULATIONS

OVERVIEW OF METHODS

A variety of methods can be used in zoning ordinances, subdivision and land development ordinances (SALDOs), and floodplain ordinances to assist in preserving greenways. Appendix C describes a menu of choices which can be combined, as appropriate.

Municipalities with SALDOs should review the Northumberland County SALDO to identify provisions appropriate for inclusion in the municipal SALDO. Municipalities without zoning ordinances should consider adopting zoning provisions to assist in carrying out the *Northumberland County Greenways and Open Space Plan*.

Zoning vs. SALDO Provisions

Some natural feature protection provisions can be placed in either the zoning ordinance or the SALDO. In most cases, the zoning ordinance, which addresses more types of development, is preferable. Also, a developer may attempt to avoid a SALDO requirement by destroying natural features prior to submitting a SALDO plan to the municipality.

Floodplain

The 100-year floodplain is the area expected to be flooded during the worst flood in an average 100-year period. By limiting development in the floodplain, the municipality increases safety by reducing the potential for flood damage and also gains the additional benefits of maintaining open land along waterways.

Most municipal floodplain regulations allow construction to occur within the portions of the floodplain outside of the main flood channel. Typically, new buildings have to be elevated and floodproofed. However, elevated buildings can still displace floodwaters and raise flood levels on other properties.

Townships should consider prohibiting the construction and placement of any new building within the entire 100-year floodplain. Exceptions could be included for small accessory sheds or redevelopment sites.

In addition, most floodplain regulations allow the construction of parking lots in the 100-year floodplain. As a result, the entire floodplain can be paved, which destroys natural vegetation and prevents groundwater recharge. In addition, vehicles can be carried by floodwaters, which creates additional hazards. One alternative is to prohibit new parking lots for three or more motor vehicles on any lot within the floodplain, within a township. Within a borough, less restrictive floodplain regulations regarding parking and new buildings are often appropriate to avoid creating difficulties for redevelopment.

Creek and River Buffers

The natural vegetation along a creek or river is extremely important to filter out pollutants and eroded soil. Thicker vegetation is preferable than thinner in order to filter out more pollutants. Vegetation should ideally include a combination of mature trees and thick, understory shrubs. (Grass has only a limited benefit in protecting water quality.) A municipal zoning ordinance can require that existing vegetation along a creek that is removed as part of a development must be replaced with new

vegetation that will have a similar or better ecological benefit. Free publications that recommend ways to design vegetation buffers along creeks, also known as “riparian buffers,” are available on the Internet from nonprofit and governmental organizations.

Creek and River Setbacks

A minimum setback from any perennial creek can be established for all new buildings, parking lots, and business outdoor storage areas. A perennial creek is a creek that usually has year-round flows, except during droughts. Mapping from the United States Geological Service (USGS) is often used as the source to separate perennial from intermittent creeks. The setback can vary by importance of the creek—a creek with great ecological important should have a wider setback than a creek with less value for recreation and fishing.

Allowed Uses and Densities

Zoning typically involves varying land uses and densities in different zoning districts. Zoning uses incentives and disincentives to encourage development to be placed in certain areas, as opposed to areas where preservation is encouraged. For example, business uses and higher densities of housing are allowed in growth-oriented zoning districts, while only very low density residential, agricultural, and open space-oriented uses are allowed in more conservation-oriented zoning districts. Where greenways are being encouraged, municipalities should consider prohibiting intense commercial uses and reducing the densities of residential development.

A municipality may wish to create a “conservation” zoning district to encompass an area with a concentration of natural features, such as flood-prone land, wetlands, and/or steep slopes. A conservation district could allow a limited number of uses, at a low density, with a strict maximum on the percentage of the lot

that can be covered by buildings, paving, and other surfaces that are impervious to water.

Varying Densities Based Upon Natural Features

In many locations where greenways are desirable, land is often not suitable for development. The total density on a tract of land can be based upon all of the natural features on the tract. In other words:

- The total lot area of the development would be calculated first.
- Areas within wetlands, flood-prone areas, and very steep slopes would be deleted.
- A certain percentage of other natural features would be deleted. For example, 50 percent of areas with moderate slopes could be deleted. Some ordinances delete areas with electric transmission lines.
- The resulting net tract area is divided by a minimum lot area to determine the number of homes allowed on the tract.

A tract with fewer natural constraints would be allowed a higher number of homes than the same-sized tract with many natural constraints. A similar requirement could state that wetlands, flood-prone areas, and very steep slopes would not be considered at all in calculating the minimum lot area. For example, a zoning district may require a minimum *buildable* lot area of one acre. Therefore, a lot of at least one acre might be required *after deleting* all wetlands, flood-prone areas, and very steep slopes.

Forestry and Tree Removal

The Pennsylvania Municipalities Planning Code (MPC) requires that forestry be allowed by right in all zoning districts and that forestry cannot be “unreasonably regulated.” However, municipal regulations have been upheld that regulate forestry. For example,

one township ordinance, upheld in a court decision, prohibited large clearcutting and prohibited forestry close to creeks and on very steep slopes. A municipality can also require that a forest management plan be prepared to demonstrate minimal erosion and to show that the forestry is being conducted to allow long-term productivity on the forested land.

A municipality can also regulate unnecessary removal of mature woodlands as part of a development. Where trees are proposed for preservation, temporary fencing should be placed around the root system to prevent damage to the tree trunks and compaction of the soil during construction.

Steep Slopes

A municipal zoning ordinance can:

- Limit the amount of steep slopes to be disturbed.
- Require that natural vegetation be maintained in place on most steep-sloped areas to minimize erosion.
- Require larger lot sizes and lower impervious coverages if a new principal building is proposed on steep slopes (which encourages a builder to place the home on the less steep portions of a lot). However, the provision also requires that the outer extent of the proposed building location be shown on the subdivision plan.

Wetlands

Municipalities should require a professional wetland delineation and certification whenever a wetland is suspected on-site. Applicants can be required to certify that a site contains no wetlands. A municipality can require that new buildings and new parking areas be set back from wetlands. At a minimum, a 20-foot wide setback is valuable to avoid intrusion into the wetland by construction equipment.

Transfer of Development Rights (TDR)

The optional TDR process can be included in a zoning ordinance. Under a TDR program, specific rural areas are designated as “sending areas” where the goal is to encourage permanent preservation. Other areas are designated as “receiving areas” that are suitable for a higher density of development. The ordinance would allow a developer in a receiving area to buy a conservation easement from an owner of land in a sending area. The developer would privately negotiate a price for the easement with a willing seller in the sending area. The developer then transfers the number of homes that would have been allowed on the sending parcel to achieve a higher density on the receiving parcel. For example, if 10 homes would otherwise be allowed on the receiving parcel, and 8 homes would have been allowed on the sending parcel, the receiving parcel could be developed with 18 homes.

TDR is a valuable land preservation process because:

- The TDR process is voluntary.
- TDR helps preserve land in a way that fairly compensates property owners.
- The TDR process helps to concentrate development in more suitable locations.
- TDR directs development away from important natural areas and farmland.
- The TDR process, as currently structured in Pennsylvania, preserves land without any expenditure of tax dollars.
- TDR does not increase the total number of homes allowed in a municipality.
- TDR greatly minimizes the land consumed by each new home.

TDR can also occur across municipal borders if authorized by both municipalities.

Recreation Land and Fee Requirements

The MPC provides municipalities with the authority to require that new developments include public recreation land. If mutually agreed, the municipality may require a fee from the developer instead of land. The fees can only be used to acquire recreation land or to construct recreation facilities. The municipality must adopt a recreation plan by resolution before land or fees can be required, although the plan is not required to be detailed or elaborate.

When feasible, recreation land should be required at the edge of a new development next to a potential future development site. External placement allows the initial recreation land to be combined with future recreation land when the adjacent site is proposed for development.

Proper standards are vital to make sure that required land is suitable for recreation. A municipality can require that more recreation land be provided if the developer proposes land that is not prime for active recreation. For example, if most of the land proposed by the developer is flood-prone, the municipality could require, for instance, three times the amount of recreation land as would apply if the land were not flood-prone.

Trail Requirements

Some municipalities include requirements in a SALDO for developers to install recreation trails as part of subdivisions. The trail requirement is often in place of a sidewalk requirement. Sometimes, the trail is designed with a more rural setting behind houses. In other cases, the trail may involve an asphalt bicycle path that runs parallel to a road but is separated from the road by a strip of grass or other vegetation. When trails are planned as part of a residential development, trail construction should be required before any adjacent homes are sold. Otherwise, new residents may try to interfere with trail construction.

EXISTING DEVELOPMENT REGULATIONS

As of June 2011, 14 municipalities in Northumberland County did not have any zoning provisions in place. Fortunately, most of the municipalities are covered by the county SALDO, which includes a modern set of environmental protections. The level of protection provided by the county SALDO can be increased through the adoption of municipal zoning regulations, because some matters can only be addressed through zoning. (Several boroughs and townships with zoning are also covered by the county SALDO.)

The county SALDO includes the following major provisions that relate to the *Northumberland County Greenways and Open Space Plan*:

- Lot sizes correspond to available utilities. If a lot has a well and on-lot septic system, a minimum lot size of 1.0 acre is required.
- Additional reviews and more detailed plans are required where disturbance of very steeply sloped lands (25 percent or greater) is proposed. The intent of the regulations is to limit the disturbance.
- Developments of 25 or more new dwellings require a natural features analysis.
- The provision of recreation land or the payment of recreation fees is discussed but is not a definitive requirement.
- Studies are required prior to the installation of large wind farms. Visual impacts, among others, must be described.
- Provisions are included for cluster housing developments. Where a municipality does not have a local zoning ordinance, the cluster development can include a minimum tract size of 10 acres, a maximum density of eight homes per acre, and a minimum of 40 percent of the tract preserved in open space.

Some Northumberland County municipalities have outdated zoning ordinances that do little to protect natural features other

than including the minimum regulations for flood-prone areas. For example, some municipalities allow high density manufactured home parks in areas that are intended to be conservation or agriculturally-oriented. Other municipalities have modern zoning ordinances in place.

For review as part of the *Northumberland County Greenways and Open Space Plan*, the county staff provided a sampling of natural feature provisions from the zoning and SALDOs of various municipalities. For example:

- **Delaware Township** has an agricultural preservation zoning district in place that carefully limits the number of homes allowed on prime farmland tracts (such as one home per 20 acres). Delaware Township allows denser developments in commercial and industrial districts through a Planned Residential Development option that requires the preservation of common open space. A cluster housing option is allowed in three zoning districts, in return for preservation of common open space. Delaware Township's SALDO requires that five percent of a tract be set aside for recreation land in developments of 25 or more dwellings.
- **East Chillisquaque Township** has the minimum floodplain regulations in place. In addition, the township allows cluster housing developments in the RR district if 50 percent of the tract is permanently preserved in open space. The township's SALDO requires that 10 percent of the land area of a new development be set aside for recreation use for residents if the development includes more than 20 dwellings. The SALDO was recently updated and includes modern standards to promote the infiltration of runoff and other best management practices in stormwater management.
- **Lewis Township and Turbotville** jointly adopted a modern zoning ordinance. The joint ordinance includes a Woodland Preservation zoning district that requires five acre minimum lots, except that smaller lots are allowed through the

Conservation Subdivision option on tracts of over 50 acres. Lewis Township also has an Agricultural Preservation zoning district that limits the number of homes allowed in prime agricultural areas, such as a maximum of two lots on a tract of less than 30 acres. In addition, the municipalities have tree preservation regulations.

- The **Lewis Township** SALDO requires that five percent of a development of 25 or more dwellings be set aside for recreation. Disturbance of watercourses is limited, and easements are required along watercourses. The SALDO also has standards for cluster housing developments, including requiring 40 percent minimum open space.
- **Lower Augusta Township** has zoning provisions to prohibit most new buildings on very steep slopes of 25 percent or greater. The ordinance includes a process to allow some construction on slopes of 25 percent in the less dense districts with Zoning Hearing Board approval. Lower Augusta goes beyond the minimum regulations to prohibit new buildings in the entire floodplain. For commercial development in a floodplain, only parking that is pervious to runoff is allowed. Lower Augusta's SALDO requires developments of 10 or more dwellings to include recreation areas. Additional reviews and more detailed plans are required for development of land with a slope greater than 15 percent. Developments using wells or septic systems are required to submit a hydrogeological study.
- **McEwensville** and **Milton** Boroughs and **Mount Carmel** and **Ralpho** Townships have most of the required floodplain regulations in place. Milton has an old SALDO that does not address the conservation issues. Ralpho's SALDO discusses "requesting" recreation land and preservation of land along creeks, but does not require it.
- The SALDO for **Northumberland** Borough provides the authority to require an easement along a watercourse or

stream. For a development of 25 or more dwellings, five percent of the land area can be required as a set-aside for recreation.

- **Point Township** has an Open Space zoning district that applies to areas within 100 feet of streams and creeks. The district requires a 2-acre minimum lot size for homes and a 10-acre lot size for other uses, such as recreational uses. Point Township's SALDO provides the township with the authority to require that five percent of a development tract be set aside for recreation use if the development includes 25 or more lots. The SALDO also restricts the disturbance of waterways.
- **Riverside Borough** recently adopted a new zoning ordinance and is preparing to adopt a new SALDO. The zoning ordinance includes restrictions on steep slopes, setbacks from creeks and the river, setbacks from wetlands, and limits upon forestry. The new SALDO will require the provision of recreation land or the payment of recreation fees in new housing developments.
- In **Rockefeller Township**, a modern zoning ordinance includes a Conservation zoning district, an Agricultural zoning district, an Agricultural Holding zoning district, and a Watershed Protection Overlay zoning district. The township also offers a cluster housing option that allows one-acre lots in areas that normally require larger lots, provided that permanent open space is provided.
- **Rush Township** has limits on the removal of topsoil. The township also has an Agricultural District which requires 10-acre minimum lot sizes, in most cases, if a home is proposed on Class I or Class II prime agricultural soils. The lot size is currently the subject of a legal challenge from a developer seeking to build homes on one-acre lots. The Rush Township SALDO also requires that:
 - a) Natural drainage be maintained along a watercourse.
 - b) Street trees be planted.
- c) Recreation land be set aside within developments of 25 or more dwellings.
- **Shamokin** has a Slope zoning district that limits the allowed uses. Shamokin's development regulations are older and do not address most conservation issues.
- **Snydertown** allows a cluster development option in certain districts that allows smaller lots if common open space is provided. The SALDO requires that:
 - Recreation land be provided in new developments of 50 or more dwellings.
 - Street trees be planted.
- **Sunbury** has an Open Space zoning district that does not allow new buildings, other than for allowed recreation uses.
- **Upper Augusta Township** offers a cluster housing development option in three zoning districts. However, the ordinance does not state a minimum amount of open space that must be provided. Upper Augusta's SALDO requires that:
 - a) Street trees be planted.
 - B) Developments of 50 or more dwellings provide recreation land.
- **Watson town** has the authority in its SALDO to require the provision of a recreation area in a new development of 10 or more dwellings or to require the payment of recreation fees in lieu of land.
- The **West Chillisquaque Township** SALDO requires that a Natural Features Analysis be completed for developments of 25 or more lots. The study must address hydrology and woodland conservation, among other topics. The zoning ordinance and SALDO also include standards for cluster housing developments.

- **Zerbe Township** has an older basic zoning ordinance. The ordinance prohibits the construction of a structure within 15 feet of the edge of a stream or an existing natural drainage channel.

MODEL ORDINANCE PROVISIONS

The following examples of model zoning and SALDO provisions should be considered by municipalities to help implement the *Northumberland County Greenways and Open Space Plan* and to protect important natural areas. The rationale for the model provisions is discussed at the beginning of Appendix C.

FLOODPLAINS (Flood-prone areas).

Note: Municipalities have a choice of placing their regulations upon flood-prone areas in the Zoning Ordinance or in a separate ordinance. The PA. Department of Community and Economic Development has a recently updated model ordinance for regulating floodplains, which is available on their website.

If a township wishes to go beyond the minimum provisions, it should consider adding the following provision to its zoning ordinance:

“In no case shall any new principal building be placed, constructed or otherwise located within the one hundred year floodplain.”

AGRICULTURAL PRESERVATION

“Additional Requirements in the AC Agricultural Conservation District:

1. Minimum lot area - 1 acre, except 20 acres for any lot that is beyond the number of lots allowed under Section 307.D.7.

2. Maximum lot area - For a single-family detached dwelling that is not on a principal agricultural lot - 2 acres maximum lot area. The maximum lot area shall not apply if the applicant can demonstrate by credible evidence that the area proposed for the lot: 1) does not include more than 2 acres of Class I, II and/or III soils, as identified in official Federal soils mapping or a more accurate professional study, 2) where additional lot area is needed to improve septic or water supply facilities for the lot, in the determination of the Sewage Enforcement Officer, or 3) where a larger lot size is required because of a State or Federal regulation.
 - a. The largest amount of Class I, II and III agricultural soils that is feasible shall be included on one principal agricultural lot.
3. Minimum lot width - 150 feet.
4. Minimum yards for principal and accessory buildings, except for Raising of Livestock and Poultry, see Section 402:
 - a. Front - 40 feet.
 - b. Each of 2 sides - 15 feet.
 - c. Rear - 30 feet.
 - d. However, an accessory storage building with a maximum floor area of 600 square feet and a maximum height of 15 feet may be located a minimum of 10 feet from the side or rear lot line.
 - e. The minimum lot width may be met at the proposed principal building setback line instead of the minimum building setback line if the applicant proves that such modification would result in a greater amount of preservation of agricultural land than would otherwise occur.
5. Maximum impervious coverage - 15 percent, except sales of farm equipment and places of worship shall be allowed to have a 60 percent maximum impervious coverage.
6. Maximum height - 3 stories or 40 feet, whichever is more restrictive. No maximum height shall apply to agricultural structures.

Northumberland County Greenways and Open Space Plan

7. Limitations on Subdivision and Land Development in the AC District.

- a. To preserve agricultural tracts, the AC District regulations limit the subdivision of lots from farms and establishes a maximum lot size to allow the retention of tracts of sufficient size to be productive for agriculture. This Section is based upon Section 604(3) and other provisions of the Pennsylvania Municipalities Planning Code.
- b. Each tract existing on _____ (*date of enactment*) shall be permitted to subdivide new lots from the tract or establish new principal uses on the tract based upon the lot area of the tract as it existed on such date, as follows:

Lot Area (Acres)		Maximum Number of Total Lots of Less 20 Acres Each Which
At Least	Less Than	Shall be Allowed (including the pre-existing lot)
2	10	2
10	30	3
30	40	4
40	50	5
50 or more		6, plus one lot for every 10 acres over 60

- c. The condition of the tract on _____ (*date of enactment*), or on the date on which the tract was first zoned AC District, shall be the basis from which the maximum development set forth in Section D.7. above shall be calculated.
- d. No subdivision shall be permitted which shall increase the lot size of a lot used for residential purposes in excess of the maximum lot size, except as provided in Section D.2.

- e. A subdivision, the sole purpose of which is to transfer land to increase the size of a tract being used for agricultural purposes, where both the tract from which the land is taken and the tract to which the land is added will be 20 acres or greater after such subdivision, shall not be included when computing the permissible number of lots to be subdivided from a tract as set forth in Section D.
- f. A subdivision to create a lot which will be transferred to the Township, or a municipal authority created by the Township, or that is deed restricted or restricted by a conservation easement so that the lot can never be used for a principal use shall not be included when computing the permissible number of lots to be subdivided from a tract as set forth in Section D. above. For example, if a lot is created solely for the purposes of stormwater management or a water supply well, it shall not be limited by Section D.
- g. Any subdivision or land development plan hereafter filed with the applicable approving body for subdivision or land development of a parent tract shall specify which lot or lots shall carry with it a right of further subdivision or establishment of principal uses, if any such right remains from the quota allocated to the parent tract on _____ (*enactment date*), or on the date when such land was first included within the AC District. The right of further subdivision or establishment of principal uses shall also be included in the deed for the newly-created lot. If the designation of the right of further subdivision or establishment of principal uses was not included on a subdivision or land development plan of a parent tract, it shall be conclusively

Northumberland County Greenways and Open Space Plan

presumed that the largest lot remaining after subdivision shall carry the right of further subdivision or establishment of principal uses.

- i. In the event that a tract which was not classified as part of the AC District on _____ (*enactment date*), or was thereafter classified as part of the AC District, the size and ownership of the tract and the development existing on the tract on the effective date of the change in zoning classification shall determine the number of lots which may be subdivided from, or the number of principal uses which may be established on such tract.
- j. The number of lots which may be created or principal uses which may be established shall be fixed according to the size of the parent tract. This number shall not be increased by the subdivision of such parent tract. Any subsequent owner of a parent tract, land remaining in the parent tract after subdivision or land which was formerly part of a parent tract shall be bound by the actions of his predecessor.
- k. In submitting an application for a subdivision/land development for a dwelling unit within the AC District, the applicant shall demonstrate that measures have been used to:
 - 1) Minimize the loss of valuable farmland;
 - 2) Cluster residential lots on the subject property and, if applicable, with those lots contained on adjoining farms;
 - 3) Minimize the length of property lines shared by all residential lots and adjoining farms;
 - 4) Assure adequate vehicular access to future residences not currently proposed;

5) Assure that the proposed plan can comply with the Township's Subdivision and Land Development Ordinance.

- 1. Agricultural Nuisance Disclaimer - All lands within the AC District are located within an area where land is used for commercial agricultural production. Owners, residents and other users of this property may be subjected to inconvenience, discomfort and the possibility of injury to property and health arising from normal and accepted agricultural practices and operations including but not limited to noise, odors, dust, the operation of machinery of any kind including aircraft, the storage and disposal of manure, the application of fertilizers, soil amendments, herbicides and pesticides. Owners, occupants and users of this property should be prepared to accept such inconveniences, discomfort and possibility of injury from normal agricultural operations, and are hereby put on official notice that Section 4 of the Pennsylvania Act 133 of 1982 "The Right to Farm Law" may bar them from obtaining a legal judgment against such normal agricultural operations."

WETLANDS, LAKES, STEEP SLOPES AND WATERWAY CONSERVATION.

- A. Wetland Studies. It shall be the responsibility of each applicant to determine whether land areas proposed for alteration meet the Federal or State definition of a wetland prior to submittal of development plans to the Municipality. If the Zoning Officer has reason to believe that wetlands may be present on a site proposed for development or subdivision, the Zoning Officer may require that the applicant provide a suitable wetland delineation study prepared by a qualified professional.

Northumberland County Greenways and Open Space Plan

- B. Wetland and Lake Setbacks. A minimum setback of 20 feet shall be required between any new principal building for which a building permit is issued after the effective date of this Ordinance and any "wetland" or natural lake or pond.
- C. Steep Slopes. No principal building shall be constructed or placed on an area with a natural slope of 25 percent or greater. If a new lot will involve a principal building being constructed on slopes of 15 to 25 percent, then the minimum lot size shall be one acre, unless a larger lot size is required by the zoning district. These steep slope provisions shall not apply to slopes that were clearly man-made prior to the adoption of this Section.
- D. Setback from River/Riparian Areas. No new principal building, no new off-street parking space and no new commercial or industrial outdoor storage shall be allowed within 75 feet from the top of the primary bank of the Susquehanna River (main stem, West Branch, and North Branch) and 50 feet from the top of the primary bank of any other perennial creek. Where trees and other natural vegetation is removed within this setback, it shall be replaced with new trees and vegetation that serve the same environmental purposes.”

OPEN SPACE DEVELOPMENT.

- A. Purposes. To allow flexible development of areas with sensitive natural features in such a way as to: a) avoid severe soil erosion and sedimentation, b) avoid severely increased storm water flows and speeds, c) steer development to those areas that are more physically suited for it, d) avoid construction of steep roads that are difficult, time-consuming, and expensive to maintain and snow plow, e) avoid increased use of steep roads and driveways that are dangerous to drive upon in snow and ice, f) to conserve forested areas that are an important part of the ecological cycle, providing for groundwater recharge, air pollution reduction and wildlife habitats and g) reduce construction costs while h) allowing

each property owner a reasonable use of their land, related directly to the natural features and location and accessibility of the land.

- B. Applicability. This article allows an applicant the option to reduce the minimum lot areas on tracts of land if the applicant proves to the satisfaction of the Township that there will be compliance with all of the requirements of this Section.
 - 1. The term "Open Space Development" shall mean a residential development meeting the requirements of this Section and which is approved as provided in Section ____.
 - a. Uses. A Open Space Development shall only include single family detached dwellings, nature preserves, Township-owned recreation, a golf course and their customary permitted accessory uses. A mobile/manufactured home park shall not qualify as a Open Space Development.
 - 2. A tract may be eligible for approval for a Open Space Development if it includes a minimum of 6 acres of land area in common ownership. Such land area shall be contiguous, except that portions of the tract may be separated only by existing or proposed streets or creeks.
 - a. These provisions are intended to allow flexibility in the placement of individual dwelling units, in order to locate homes away from important natural areas and other community assets.
 - b. The amount of common open space shall be based upon the total lot area of all lots within the development, prior to subdivision, and prior to deletion of rights-of-way of future streets and before deleting the area of any environmental features.
 - 1) Areas that were preserved by a conservation or agricultural preservation easement *prior* to the submittal of the subdivision shall not be counted

towards the area of the tract in calculating common open space or allowed density.

- c. Areas used for a principal non-residential use (other than uses approved by the Township to be part of the preserved open space, such as a barn) shall not be included within the land area used to calculate residential density.
 - d. Conservation easements shall be established on lots as necessary to make sure that the maximum density requirement is met over time. Such conservation easements shall prevent the re-subdivision of lots in a manner that would violate this Section.
3. A Open Space Development shall be designed as a unified, coordinated residential development, and shall be approved within a development plan controlled by a single development entity. After final subdivision approval and within an approved development agreement(s), a developer may sell individual lots to different builders or home buyers, provided that the developer or his/her successor remains responsible for ensuring the compliance with the approved development plan.

C. Density, Open Space and Lot Standards.

1. A Yield Plan shall be presented by the applicant. The Yield Plan shall accurately show the maximum number of dwelling units that would be possible under current Township ordinances if the Open Space Development provisions would not be used. This Yield Plan shall be completed to an accurate scale, including accurately showing tract boundaries, steep slopes, 100 year floodplains and wetlands. The Yield Plan shall show potential lots and streets. However, the Yield Plan is not required to meet the detailed engineering requirements of a preliminary subdivision plan. The Board of Supervisors or its designee shall require sufficient septic probes to prove that on-lot septic systems would be possible in

marginal areas. If the probes are not intended to be used for actual construction of septic systems, such probes may be conducted by any State-certified sewage enforcement officer.

2. Such Yield Plan shall be reviewed by the Zoning Officer, with advice by the Township Engineer, to determine whether each represents a reasonably accurate estimate of the number of dwelling units possible on each site, both physically and legally. If such estimates are determined to not be accurate, the applicant shall be required by the Zoning Officer to revise such Yield Plan.
3. The maximum number of dwelling units allowed on the tract through Open Space Development shall be 25 percent greater than the number of dwelling units that is determined by the Township to be possible under the approved Yield Plan.
4. Within a Open Space Development, the only allowed dwelling units shall be single family detached dwellings. The following minimum lot areas shall apply, provided that the total maximum density for the tract is not exceeded:

Note - The minimum lot sizes and minimum amounts of open space will need to vary depending upon the lot sizes that are required under development without open space. The goal is to provide as much open space as is reasonable, while still making sure that open space development is an attractive option to a developer.

- a) Conservation District - The minimum lot area shall be reduced to 1 acre and the minimum lot width shall be reduced to 150 feet. A minimum of 40 percent of the total lot area of the tract (prior to subdivision) shall be preserved as Common Open Space. The majority of the required common open space shall be in one contiguous tract, except that it may be separated by one street. The only allowed dwellings shall be single family detached dwellings.

- b) Rural District - The minimum lot area shall be reduced to 1 acre and the minimum lot width shall be reduced to 150 feet. A minimum of 25 percent of the total lot area of the tract (prior to subdivision) shall be preserved as Common Open Space. The majority of the required common open space shall be in one contiguous tract, except that it may be separated by one street. The only allowed dwellings shall be single family detached dwellings.
 - c) Low Density Residential District - The dwellings shall need both Township-approved central water and central sewage services. The minimum lot area may be reduced to 10,000 square feet and the minimum lot width to 80 feet. A minimum of 35 percent of the total lot area of the tract (prior to subdivision) shall be preserved as Common Open Space. The majority of the required common open space shall be in one contiguous tract, except that it may be separated by one street. The only allowed dwellings shall be single family detached dwellings.
6. Utilities. Any lot of less than one acre shall be served by Township-approved central sanitary sewerage service and central water service.
7. Subdivision of Part of a Tract. This subsection "7" addresses a situation in which only part of a lot is proposed to be subdivided, and the applicant at the present time does not intend to subdivide for the maximum number of dwellings allowed by this Section. In such case, the applicant shall establish a permanent conservation easement covering common open space to comply with this Section. Because only part of the tract is being subdivided, it may not be necessary to meet the common open space requirement based upon the area of the entire tract.
- a) The land under the conservation easement shall be a regular rectangle in shape and shall be located in such a manner as to allow it to adjoin land that could be added under a conservation easement in the future.
 - b) The following hypothetical example assumes a lot includes 50 acres, and the Yield Plan determines that the

applicant for a Conservation Development is allowed a total of 30 new dwellings. In this example, the applicant only wishes to subdivide lots for 10 new dwellings at the present time, which is one-third of the total number of allowed dwellings. If the entire lot would be subdivided to the maximum allowed, a conservation easement would need to be placed on 30 percent of 50 acres, or 15 acres. Because only one-third of the allowed dwelling units are being subdivided, then the conservation easement at this time would only need to apply to 5 acres. The 5 acres under the conservation easement would need to be placed on the tract at a location where it could be joined by the remaining 10 acres of land under a conservation easement if the applicant in the future decided to subdivide lots for the remaining 20 dwelling units that are allowed.

D. Conditions for Approval. In addition to the specific requirements of this Section, a Open Space Development shall only be approved if the applicant proves to the satisfaction of the Board of Supervisors, based upon review by the Planning Commission, that the following conditions will be met:

- 1. That the Open Space Development would clearly serve a valid public purpose that would result in a development that would be superior to what would result if the land would be development as a conventional development. Such valid public purposes include but are not limited to the following:
 - a. The permanent preservation of dense forests, steep slopes, wetlands, creek valleys, highly scenic areas or other sensitive natural features.
 - b. The permanent preservation of a substantial area of land in agricultural uses, in a tract of proper size and configuration that allows for efficient agricultural use and that properly considers the issue of compatibility between the agricultural uses and homes.

- c. The dedication of public parkland at a site deemed appropriate by the Board of Supervisors and that involves land that is clearly suitable for active and/or passive recreation.
 - d. The Open Space of homes in a location that will be substantially buffered from highly-noxious nuisance-generating uses, such as an expressway or major arterial street.
2. The applicant shall prove that the proposed Open Space Development has been designed in full consideration of important natural features, including mature woodlands, creek valleys, steep slopes and wetlands.
- a. At a minimum, the applicant shall prove that areas along perennial creeks shall be preserved in their natural state, except for landscaping, erosion control improvements, public recreation improvements and needed utility, street and driveway crossings.
 - b. The natural features of the site shall be a major factor in determining the siting of dwelling units.

E. Open Space.

1. Open Space. Land within a Open Space Development may be permanently preserved as public, semi-public or private "Common Open Space." See definition in Section ___ of "Open Space, Common or Preserved." The common open space requirements of this Section shall be in place of the common open space land or fee requirements of the Township Subdivision and Land Development Ordinance.
2. Open Space Standards. Any preserved open spaces shall meet all of the following requirements:
- a. Such open space shall be permanently deed-restricted or protected by an appropriate conservation easement to prevent the construction of buildings or the use for any

non-agricultural commercial purposes or the use of the land for clearcut forestry. Land approved as required open space shall only be used for non-commercial active or passive recreation, a Christmas Tree Farm, a golf course, a nature preserve, a wholesale plant nursery and/or Township-approved agricultural uses.

- b. A Open Space Development shall still meet any recreation land dedication or recreation fee requirements that may apply under the Subdivision and Land Development Ordinance. The same area of land may be used to meet the SALDO recreation land and the zoning open space requirements, if the land meets the requirements for each.
- c. The Township may require the use of conservation easements within a Open Space development to limit the disturbance of natural slopes over 15 percent, wetlands, mature forests, creek valleys and other important natural features.
- d. Improvements to Open Spaces. Where open space is proposed to be used for recreation and/or dedicated to the Township, the application shall include a detailed and legally binding (if approved) description of what improvements the applicant will make to any land intended to be publicly dedicated open space to make it suitable for its intended purpose.
 - 1) Examples of such improvements for areas intended for passive recreation include preservation and planting of trees, development of nature, bicycle or jogging trails, the stabilization of creek banks and the removal of undesirable vegetation.
 - 2) Examples of such improvements for areas intended for active recreation include rough grading of land to create land suitable for free-play fields for youth.
 - 3) Type of Maintenance. Where the open space would not be dedicated to a government entity, the

subdivision plan shall state the intended type of maintenance of the open space.

- e. All proposed Preserved Open Space shall be cleared of construction debris, materials from illegal dumping and any rocks that were not naturally on the land, unless those rocks are incorporated into landscaping improvements.
 - f. The applicant shall prove that all required Open Space would be suitable for its intended and Township-approved purposes. The Township may require the provision of a trail easement and/or the construction of a trail through common open space. If a developer is required to install a trail, it shall be completed prior to the final sale of any adjacent residential lots.
 - g. Lots and open spaces shall be located to promote pedestrian and visual access to preserved open spaces whenever possible. A non-motorized recreation trail shall be shown on the plans through common open space and shall be built by the developer prior to the sale or construction of any adjacent homes, unless the Board of Supervisors determine that a trail is not appropriate in the particular situation.
3. Open Space Ownership. The method(s) to be used to own, preserve and maintain any preserved open space shall be acceptable to the Township. The Township shall only approve a Open Space Development if the applicant proves there will be an acceptable method to ensure permanent ownership, preservation and maintenance of land that will not be included in individual home lots.
- a. The method of ownership and use of any required preserved open space shall be determined prior to preliminary subdivision or land development approval. The Township should be given right of first refusal at the time of such review to accept proposed open space as public open space. Required open space shall be

permanently preserved by one or a combination of the following methods:

- 1) Dedication to the Township as public open space, if the Board of Supervisors agree in writing to such dedication.
- 2) Dedication to the County as public open space, if the County Commissioners agree in writing to such dedication.
- 3) Dedication to the School District if such Board of Education agrees in writing to accept such dedication and to use and maintain the land for public school buildings and/or related open space.
- 4) Dedication to a homeowners association as preserved open space, with the homeowners legally bound to pay fees for the maintenance and other expenses of owning such land, and with such homeowners association being incorporated with covenants and bylaws providing for the filing of assessments and/or municipal liens for the non-payment of maintenance costs for preserved open space that is not publicly-owned.
 - (i) Such responsibilities shall be specified as part of each deed prior to sale of each lot or dwelling unit. The Township may delay a dedication of maintenance responsibilities by a developer to a homeowners association until such association is incorporated and able to maintain such land.
- 5) Dedication of the land to an established nature conservation organization acceptable to the Board of Supervisors.
- 6) Dedication of a permanent agricultural preservation easement to the County Agricultural Land Preservation Board, with the land utilized for allowed agricultural uses.
- 7) Dedication to the State Game Commission, State Fish and Boat Commission or similar public agency, if such agency agrees in writing in advance to accept the

Northumberland County Greenways and Open Space Plan

dedication and to maintain the land for public recreation.

- 8) Operation as a bonafide golf course, with a minimum lot area of 50 acres. Areas including buildings or vehicle parking shall not count towards the minimum average lot area.
- 9) Retention as part of one or more private lots, with an appropriate Township-approved conservation easement. This option (9) shall only be available in locations where the applicant proves to the Board of Supervisors that none of the above options are feasible or appropriate. This option (9) is primarily intended for situations where less than 2 acres of common open space would result (which may include a situation where only part of a tract is being subdivided).

b. Legal documents providing for ownership and/or maintenance of required preserved open space shall be reviewed by the Township Solicitor and be subject to approval by the Board of Supervisors prior to recording of the final plan.

c. A legally binding system shall be established to oversee and maintain land that will not be publicly-owned. Any homeowner association should generally follow the provisions of Section 705.f. parts (1) and (2) of the Pennsylvania Municipalities Planning Code, as amended. Proper notations shall be required on the Recorded Plan. For example, if the preserved open space is intended to be owned by a homeowner association as recreation land, a statement should be included that the designated open space "shall not be further subdivided and shall not be used for the construction of any non-recreation buildings."

F. Steep Slopes. Within a Open Space Development, no principal building shall be placed on slopes of over 25 percent.

G. Phasing. The development shall include a phasing system that shall be approved by the Board of Supervisors. Such phases

shall ensure that the requirements of this Article would be met after the completion of any one phase, and that the development could properly function without the construction of additional phases.

H. Landscaping Plan. An application for a Open Space Development involving over 15 acres shall include a landscape planting and preservation plan prepared by a registered landscape architect.

1. Such plan shall show the locations, general species and initial sizes of landscaping to be planted within the preserved open space and throughout the tract.
2. Such plan shall also show that existing substantial healthy trees will be preserved to the maximum extent reasonable. The methods to ensure preservation during construction shall be described.
3. Landscaping shall also be used as appropriate to filter views of denser housing from any adjacent housing that is less dense."

RECREATION AREAS AND FEES.

"A Purposes. To provide adequate open spaces, recreational lands and recreational facilities to serve new inhabitants/occupants of new developments, for both active and passive recreation. To recognize and work to carry out the Recreation Plan for _____, which is hereby adopted by reference as the Recreation Plan for the Municipality, or by a successor document that may be adopted as the Recreation Plan for _____.

B. Applicability. This section shall apply to any subdivision or land development for which a preliminary plan or a combined preliminary/ final plan is submitted after the enactment date of this amendment.

1. This Section shall not apply to plans that the Municipality determines only involve adjustments or corrections to an approved preliminary plan or a

Northumberland County Greenways and Open Space Plan

preliminary plan that was actively before the Municipality for consideration as of the date of the adoption of this Section, provided the adjustments do not increase the number of proposed dwelling units.

C. Limitations on Use of Fees.

1. Any fees collected under this section shall be placed within the Municipality Recreation Escrow Fund, or its successor account.
2. To make sure that the lands and facilities are accessible to the inhabitants of the developments that paid fees towards their cost, such fees should only be used within a 5-mile radius of the boundaries of the subdivision or land development that paid the fees, unless the fees are used within a recreation area open to the public that the Municipality intends to serve the entire Municipality.
3. Such fees shall only be used for the following: acquisition of public open space/recreation land and related debt payments, development of public recreational facilities, landscaping of public open space and necessary engineering and design work.

D. Land to be Preserved. Any subdivision or land development regulated under this Section shall be required to preserve the specified amount of recreation land, unless the Municipality Council and the applicant mutually agree that recreation fees shall be required in-lieu of land.

1. As a general non-binding guideline, it is the intent of this Section that smaller developments (such as 10 or fewer dwelling units) that do not include land that is adjacent to existing publicly-owned land should be required to pay a recreation fee in lieu of dedicating land. However, if the applicant refuses to pay such fees, then recreation land shall be required to be preserved.
2. The land and fee requirements of this section shall be based upon the number of new dwelling units that would

be allowed on the lots of a subdivision or land development after approval.

3. Prime Recreation Land. For the purposes of this section, the term “Prime Recreation Land” shall mean land proposed to be established as recreation land that would meet all of the following standards:
 - a. less than 6 percent slope,
 - b. not a “wetland” under Federal and/or State regulations,
 - c. be part of a contiguous tract of at least 2 acres (which may include existing adjacent recreation land), and
 - d. not be within the “100 Year Floodplain” as defined by official floodplain maps of the Municipality.
4. Amount of Recreation land. If a subdivision or land development is required to include recreation land, the following amounts for each permitted new dwelling unit shall apply:

Percentage of the Total Required Recreation Land that Would Meet the Definition of “Prime Recreation Land”	Minimum Required Recreation Land Per Permitted Dwelling Unit
0% to 25.0%	5,000 square feet
25.1% to 99.9%	2,500 square feet
100%	1,250 square feet

E. Fees. If the Governing Body determines that a proposed subdivision or land development is required to pay fees-in-lieu of dedicating recreation land, this fee shall be \$600 for each new dwelling unit, unless such fee is updated by future action by the Governing Body.

F. Decision on Land vs. Fees. The Governing Body shall determine whether a land dedication would be in the public interest, or whether the payment of fees is required. This initial determination should, but is not required to, be made

at the time of sketch plan review. The Municipality should, at a minimum, consider the following in this decision:

1. Whether the land in that location would serve a valid public purpose.
2. Whether there is potential to make a desirable addition to an existing public or School District recreation area or to create a greenway along a creek.
3. Whether the proposed land would meet the objectives and requirements of this section and any relevant policies of the Comprehensive Plan and any Recreation or Open Space Plan.
4. Whether the area surrounding the proposed development has sufficient existing recreation and open space land, and whether it is possible for pedestrians and bicyclists to reach those lands.
5. Any recommendations that may be received from the Planning Commission, the Municipal Engineer, the local School Board or School District staff and the Municipal Parks and Recreation Board.

G. Recreation Land to be Preserved.

1. Suitability. Recreation land shall be suitable for its intended purpose, in the determination of the Governing Body. The applicant shall state in writing what improvements, if any, he/she will commit to make to the land to make it suitable for its intended purpose, such as grading, landscaping, or development of trails. Such land shall be free of construction debris at the time of dedication. Proposed recreation land shall be suitable to meet the needs of the residents of the development.
2. Ownership. Required recreation land shall be dedicated to the Municipality, unless the Governing Body agree to accept a dedication to any of the following: the School District, the County, a State agency charged with maintaining recreation land, a similar governmental agency, an incorporated property-owner association (such as a homeowner or condominium association) or an established environmental organization acceptable to the

Governing Body. In the case of a rental development, the Municipality may permit the recreation land to be retained by the owner of the adjacent principal buildings.

- a. If recreation land is to be owned by a property-owner association, the developer shall be required to establish such association in a form that requires all property owners within the development to annually contribute to the maintenance of the recreation land.
 - 1) Any property-owner association agreements regarding required recreation land shall be subject to acceptance by the Governing Body, based upon review by the Municipal Solicitor.
 - 2) Prior to the sale of any dwelling unit or lot, all deeds shall require each property-owner to pay fees on a regular basis for the maintenance and other expenses of owning such land. The property-owners shall be incorporated with covenants and bylaws providing for the filing of assessments. After providing notice to affected owners, the Municipality shall have the authority to establish municipal liens upon all properties in the association to fund maintenance of the land and Municipal legal costs if the property-owners association does not fulfill its responsibilities.
 - 3) An orderly process shall be established for the transfer of the land to the association. The dedication of maintenance responsibilities by a developer to a property-owners association shall not occur until such association is incorporated and able to maintain such land.
 - 4) The property-owners association shall be established in full compliance with applicable State law, including the Uniform Planned Community Act.
- b. Transfer to another Entity. If the approved plan states that ownership of and/or responsibilities to maintain the recreation land are given to a particular entity, then any transfer of ownership or responsibilities to another entity shall require pre-approval by the Governing Body. Where land is to be owned by a conservation organization, a process shall be established for the land to transfer to a

different organization if the first organization is not able to fulfill its obligations.

- c. The Governing Body shall have the authority to refuse to accept an offer of dedication of recreation land to the Municipality, and/or to determine that an offer does not meet Municipal requirements.

3. Easements. Any required recreation land dedication shall include a conservation easement to permanently prevent its development for buildings, except buildings for approved types of non-commercial recreation or to support maintenance of the land. Such conservation easements shall, at a minimum, be enforceable by the Governing Body. The Governing Body may require that the easements also authorize their enforcement by a suitable third party.

4. Priorities. Priority shall be given to dedication of land that would be suitable for a) additions to existing public schools and public parks, or b) preservation of woods, steep slopes or other important natural features or land along a creek, or c) for centralized active recreation.

5. Suitability. Land that is not suitable for active or passive recreation shall not be permitted to meet the requirements of this section. Any land area used to meet the requirements of this Section shall meet the definition of "Recreation Land." Portions intended for active recreation shall be well-drained, of less than 6 percent average slope and not require filling in of a wetland for use.

6. Access and Contiguosness. Recreation land within a subdivision or land development shall be contiguous, except as may be specifically exempted by the Governing Body, if necessary considering the unique features of the site, and shall have a minimum of 20 feet of road frontage at a location that allows access for maintenance and by pedestrians.

7. Other Ordinances. Any required land dedication or fees under this Section shall be in addition to any land dedication or improvement requirements of any other Municipal ordinance.

- a. However, the Governing Body may allow common open space provided under a zoning ordinance provision to also count towards the recreation land requirement if the land will be improved for recreation, capable of meeting all of the requirements of this Section, and be available without charge on a daily basis to the public.

8. Residual Lands. If only a portion of a larger tract of land is currently proposed to be subdivided, or the applicant owns one or more adjacent tracts that are not currently proposed to be subdivided, the applicant shall provide a sketch of a possible future land dedication on these adjacent lands. The intent is to coordinate current plans with any future development, even in the long-term.

9. Coordination With Future Adjacent Dedication. The Governing Body may require that a required land dedication within a property currently being subdivided be placed along an edge of the property so that it may, in the future, be combined with a recreation land/ open space dedication on the edge of an adjoining property when that adjoining property is subdivided or developed.

H. Combination of Land and Fees. Upon mutual agreement of the Governing Body and the applicant, the Municipality may accept a combination of recreation land and fees-in-lieu of land to meet the requirements of this section for a subdivision or land development. This combination shall be based upon the recreation land requirement applying for a certain number of dwelling units and the fee-in-lieu of land requirement applying for the remaining development.

1. For example, if a development included 25 dwelling units, recreation land could be required for 15 dwelling units and fees could be required for 10 dwelling units.

I. Timing of Residential Fees. Fees required by this Section for all of the dwelling units shall be paid prior to the recording of the final plan, except as follows:

1. If the required fee would be greater than \$4,000, and the applicant and the Municipality mutually agree to provisions in a binding development agreement to require the payment of all applicable recreation fees prior to the issuance of any building permits within each clearly defined phase or sub-phase of the development, then fees are not required to be paid prior to recording of the final plan but may instead be paid within the requirements of that development agreement.
2. If the applicant agrees to pay such fees in installments, then all such fees shall not be considered to be “paid” for the purposes of any applicable time limitations for utilization under the Municipalities Planning Code until all such fees are paid in full, including all installments and phases.

J. Facilities in Place of Land or Fees. An applicant may submit a written request for a modification of the requirements of this section by offering to construct substantial permanent recreation facilities within the proposed subdivision or land development or on public parkland. Such modification shall only be approved if the applicant clearly proves to the satisfaction of the Governing Body that the facilities will serve a valid public purpose, will be designed following modern standards in a durable manner and will have a higher market value than the land or fees that would otherwise be required.

1. A modification of these requirements may also be approved by the Governing Body if the applicant donates or sells appropriate public recreation land to the Municipality or the School District. In such case, the applicant shall provide a written appraisal from a qualified professional that the market value of the donation or price reduction is greater than the value of the

fee or land requirement that is waived. In such case, the land shall be determined to be suitable for public recreation by the Governing Body.

SIDEWALKS, PATHWAYS AND DRIVEWAY APRONS.

A. Sidewalks built to Municipality specifications shall be required where the average residential density exceeds 3 dwelling units per acre or where the Governing Body determine they are necessary for safe pedestrian movement, such as near a school.

1. As a modification under Section ----, an applicant may propose an alternate system of pathways, such as a crushed stone or bituminous pathway, that serve the same purposes as sidewalks and which guarantee public access, but which are not necessarily within a street right-of-way, if approved by the Municipal Engineer.

B. Pathway or Bikeway.

1. If deemed necessary for the convenient and safe circulation of bicycles and pedestrians, the Governing Body, upon the recommendation of the Planning Commission, may require that a major subdivision or land development include the construction of a pathway or bikeway.
2. A bikeway/pathway shall have a minimum width of 6 feet and a maximum width of 12 feet. It may be required to be placed within a street right-of-way in place of a sidewalk, or may be placed elsewhere on a lot within an easement or other right-of-way.

C. Location and Width of Sidewalks.

1. Sidewalks, where required or provided, shall be located within the street right-of-way. Any area between the sidewalk and curb shall be planted in an attractive vegetative ground cover, such as grass. This strip shall only be paved at driveway entrances.
2. Any required sidewalks shall have a minimum width of:
 - a) 5 feet along arterial streets or along routes used to

access primary or secondary schools and b) 4 feet along collector or local streets in other locations.

D. Construction.

1. Sidewalks shall meet construction specifications in PennDOT Publication 408.
2. Bikeways/pathways shall be constructed of a one inch bituminous surface course, a 1.5 inch bituminous binder course, and 6 inches of compacted gravel or crushed stone, unless an alternative standard is pre-approved by the Municipality. To the maximum extent feasible considering topography, pathways should be accessible to persons in wheelchairs. Stop signs should be posted along bikeways where they meet streets.
3. ADA Ramps. Ramps shall meet the requirements of the Americans With Disabilities Act and accompanying Federal regulations. Note - Additional PennDOT regulations apply along a State road.

E. Maintenance. It shall be the responsibility of the adjacent landowner to maintain, plow snow and remove ice off of and repair sidewalks.