UPPER BRODHEAD/ PARADISE CREEKS

GREENWAY PLAN

NOVEMBER 2010

McLane Associates
Landscape Architects

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PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

And By:

THE MONROE COUNTY OPEN SPACE PROGRAM

Cooperating Municipalities

Barrett Township
Paradise Township
Mount Pocono Borough
Price Township

Monroe County Commissioners

Chairperson Suzanne McCool
Vice-chairperson Theresa Merli
Commissioner Janet Weidensaul

Study Committee Members

(and their affiliations)

Barrett Representatives

Patrick Dougherty * (Previous Committee Chair)

(Formerly of the: Barrett, Mount Pocono, Paradise Regional Open Space Committee, P.H.L.T)

Judy Stillinger

(Former member of Barrett Open Space Committee)

Sally Duffy

(Barrett, Mount Pocono, Paradise Regional Open Space Committee, Barrett Open Space Committee, Barrett EAC)

Mount Pocono Representatives

Dan McDavitt

(Barrett, Mount Pocono, Paradise Regional Open Space Committee, Mount Pocono Council, Mount Pocono Mayor)

John Scalamandre

(Barrett, Mount Pocono, Paradise Regional Open Space Committee, Mount Pocono Council)

Paradise Representatives

Reda Briglia

(Paradise Supervisor, P.A.R.C, Paradise EAC)

Don Miller

(P.H.L.T. *Barrett, Mount Pocono, Paradise Regional Open Space Committee, Paradise EAC, Monroe County Open Space Advisory Board)*

Cheryl Phillips

(Concerned Paradise Resident)

Price Representatives

Rick Mosher

(Delaware Water Gap, Middle Smithfield, Price Smithfield Regional Open Space Committee, Price Township Supervisor)

Adam Mosher (Current Committee Chair)

(Price Township Supervisor, Delaware Water Gap, Middle Smithfield, Price Smithfield Regional Open Space Committee, Monroe County Open Space Committee)

Alberta Deiter

(Concerned Price Township Citizen)

Additional Committee Participants:

Dawn Gorham
(P.H.L.T.)

Edie Stevens
(Paradise EAC, Brodhead Watershed Association)

Pattie O'Keefe
(Barrett, Mount Pocono, Paradise Regional Open Space Committee, Barrett EAC)

Frank May
(Buck Hill Conservation Foundation)

Theresa Merli
(Brodhead Watershed Association)

Bill Barry
(Barrett EAC)

Carol Hillestad
(Paradise EAC)

Paul Reisch

Sean Anlauf
(Monroe County Planning Commission)

Key Organizations and Individuals

Municipal Government Entities - Municipal Boards, Commissions, and Authorities will have a strong influence on the planning and implementation of the Greenway Plan on a local level.

- Barrett Township EAC
- Mount Pocono Sewer Authority
- Paradise Township EAC

Regional Government Entities - The following governmental entities will influence and facilitate regional connections of the Greenway and implementation on a larger scale.

- Brodhead Creek Regional Water Authority
- Monroe County Conservation District
- Monroe County Planning Commission
- Monroe County Open Space Advisory Board
- Pennsylvania Department of Conservation & Natural Resources (DCNR)
- Pennsylvania Department of Environmental Protection (DEP)

Non-Profit Entities - Important parties associated with the integration of the greenway into the existing infrastructure and open space are:

- Brodhead Watershed Association
- Buck Hill Falls Conservation Foundation
- Henryville Conservation Club
- The Nature Conservancy
- Natural Lands Trust
- Pocono Area Recreation Commission (P.A.R.C)
- Pocono Heritage Land Trust (P.H.L.T.)
- Stroudsburg Greenway Committee

Individual Property Owners - Owners who have a significant interest in land conservation and water quality preservation within the watershed and are potentially interested in conservation easements.

- Dr. Balaban
- Alice Makla
- Paul Nauman
- Howard Phillips
- David Price
- Leonard Reinhart
- Richard Shoesmith
- Doc Weiss
- William Barry
- Mary Ann Miller
- Russel Nauman
- Alice Price
- Edward Price
- Tighe Scott
- George Stone

Private Clubs (Hunting, Fishing, Residential Communities) - Large land owners within the watershed that will have a crucial role in connecting the Greenway through lands which are not publicly owned are:

- Brodhead Fly-Fishers LCC
- Brodhead Hunt and Fishing Club
- Bright Creek Hunt Club
- Deer Run Hunt Club
- Eagle Claw Club
- Easton Anglers Association
- Hiawatha Hunt & Fish Club
- Manzanedo Rod & Gun Club
- Mt Allen Hunt Club
- Oak Springs Sportsmen Association
- Paradise Falls Lutheran Association
- Parkside Angling Association
- Pine Lodge Hunt Club
- Pleasant Ridge Hunting Club
- Spruce Mountain Hunt Club
- Turkey Knoll Hunting Club
- Brodhead Forest and Stream Association

Private Businesses (Resorts, Inns, Camps) - These are entities who have an interest in how the Greenway will affect the local economy. They may also be large land owners who restrict full public access.

- Blakeslee Inn and Restaurant
- Brookview Country Cottage
- Buck Hill Falls
- Camp Canadensis
- Chestnut Grove Resort
- Cranberry Run Campground
- Crescent Lodge and Inn
- Daniels Top Of The Poconos
- Garden Motel
- Mount Airy Casino
- Mount Pocono Campground
- Otter Lake Camp Resort
- Outdoor World Scotrun Resort
- Paradise Stream Resort
- Pocono Fountain Motel
- Pocono Gardens
- Pocono Manor
- Pine Hill Lodge
- Skytop Lodge

Executive Summary

E Executive Summary

Introduction

The Upper Brodhead / Paradise Creeks Greenway Plan addresses local and regional conditions and concerns while embracing statewide conservation initiatives. The plan suggests trail layouts and linkages to locations of significant cultural and natural importance. With urban sprawl continuing to compromise the identity of the traditional Pocono landscape, the greenway plan focuses its efforts on three over-arching goals to preserve this region's integrity.

Watershed Protection - *It is important to protect the already high quality streams, the area's clean drinking water, and tourist based economy that depends on clean water as a natural resource.*

Land Conservation - *The watershed contains large parcels of undeveloped land that are important to conserve for both watershed protection as well as the local enterprises that depend on green open space.*

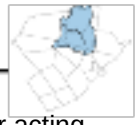
Community Connections - *Trail networks, scenic byways, and bikeways will pass through the natural scenic landscape while connecting town centers within the watershed. The plan also looks outside the watershed area to make regional connections to other areas throughout the Pocono region.*

There are a total of four municipalities which are directly involved in this greenway project. These municipalities are Barrett Township, Mount Pocono Borough, Paradise Township and Price Township. Since a major goal of this greenway plan is to protect water quality, planning efforts must focus on the watershed. Within the Brodhead Creek watershed (which encompasses most of Monroe County) seven sub-watersheds can be found, two of which are the Upper Brodhead Creek watershed and the Paradise Creek watershed. These two watersheds are the primary study area for this greenway plan. Together these watersheds drain approximately 110 square miles or about 71,000 acres.

Data Collection and Analysis

The report begins by giving a detailed inventory and analysis of the study area. This information was key in deciphering how the plan would take shape. Several highlights of data collection and analysis are:

- The two watersheds possess extremely clean water especially when compared to the rest of Pennsylvania. All streams within the watershed garner at least a 'High Quality' designation while sections of nine streams have received an 'Exceptional Value' designation.
- Much of the land within the watershed is still undeveloped. However; most of the undeveloped land is held by private hunting and fishing clubs, resorts/lodges and camps. These entities are under constant pressure to develop their land thus these large tracts of forest might become developed if left unprotected.
- An active rail line twists its way approximately seventeen miles throughout the watershed. The rail line would be an ideal location for a multi-use and handicap accessible trail due to its wide corridors and gentle slope.
- The watershed contains many scenic roads that could produce exceptional bikeway and byways routes. The many restaurants, inns, and historic structures along their paths further justify the implementation of bikeways and byways along these routes.



- Monroe County is the one of the fastest growing counties in Pennsylvania. Rapid growth will continue over the next two decades, adding another estimated 80,000 people. With pressure to develop being intense there remains only a short window of opportunity to protect land and resources that are so important to the county.

The Need For A Greenway Within the Upper Brodhead / Paradise Creek Watersheds

Much of the local economy is dependent on clean water and land conservation. Summer camps, resorts, fishing and hunting clubs, destination resorts and tourism related and dependent businesses all rely on clean air, water and a healthy natural environment for their continued success. In fact, state lands, resorts, clubs and camps all benefit ecologically and economically from the "critical mass" created by each other's forested conservation land.

Tourism is the economic engine that powers the Northeastern Poconos and much of Monroe County. The Pocono region welcomes approximately twenty four million tourists each year. Tourists spend 2.1 billion dollars annually on lodging, restaurant food and beverages and recreational activities. These tourists are twice as likely to participate in outdoor activities when compared to the national norm.

While it is quite apparent that this region is dependent on clean water and healthy forests for financial stability, there is also overwhelming evidence that visitors to the area would enjoy an expansive trail network. In December 2009, a 'Trails Roundtable' was held were local citizens discussed and mapped out trails throughout Monroe County. Over sixty people attended the meeting which attests to Monroe County citizens' desire for a strong trail network.

The Monroe County Open Space plan, approved by the voters, also indicates the public's demand for greenways and other outdoor activities. In a survey sent to Monroe County citizens concerning open space, nine out of every ten respondents supported the "Godfrey Ridge" Greenway (another greenway within Monroe County). Also, in that same survey about seven out of ten respondents would like to see additional greenways developed throughout the county.

Public Participation

In order to guide the planning process, input was gathered from the public. A "Study Committee" was selected by the four municipalities to facilitate the planning process. The committee was composed of three representatives from each of the four municipalities and a cross section of nine community members and stakeholders. Members of the study committee were responsible for acting as liaisons to the municipalities' elected officials, park and recreation boards and planning commissions. The study committee served in an advisory role throughout the development of the proposed greenway. In addition to eight committee meetings there were three public meetings and seventeen key person interviews that aided the planning process.

Issues, Opportunities, and Threats

The next step in the greenway planning process is to identify opportunities and constraints relating to the three goals.

Watershed Protection – As stated earlier, the high level of water quality is a major economic asset to this region and one reason for its remarkable population increase. With that said, urban sprawl and population growth have the greatest impact on water quality and stream health. If people continually rework the landscape, water quality will quickly deteriorate. While population increase is inevitable, growing the population

in an environmentally conscious manner is the best way to protect the existing clean water from degradation.

In addition to eco-friendly growth, forest cover can be directly related to water quality. Bernard Sweeney, a director of the Stroud Water Research Center, stated, "If you have a stream with very little forest cover, the water quality is very low." Land conservation plays a major role in protecting water quality.

Land Conservation – When viewing a map of the Upper Brodhead & Paradise Creek region, one may get the impression that the two watersheds contain ample forest. While this is currently the case, it is important to understand that fishing clubs, hunting clubs, resorts, and camps own a large percentage of forested space and stream frontage. This land is not protected and there is no assurance that these land owners will continue to serve in this stewardship role. These large tracts of land are constantly under development pressure because of the ever-growing population and recent economic downturns. It is important that each township have safeguards (i.e. zoning ordinances, SALDO's, etc.) in place to prevent any degrading development practices that could occur on these parcels if they were to be sold to developers. Recognizing greenway opportunities in the early planning of these projects can help build a greenway system, protect stream resources and provide positive results for both the local citizens and the developer.

Community Connections – Threats to trails and regional connections include urban sprawl, fragmenting recreational areas, the dismantling of historic infrastructure, and the development of large tracts of forested land. Opportunities exist in the form of historic preservation and the creation of new trails and bikeways that connect both town centers and rural areas.

A very important trail opportunity that cannot be overlooked is the rail line which travels approximately seventeen miles throughout the two watersheds. The Rails-to-Trails Conservancy is a key resource that should be utilized when trying to create a trail system along the rail line. Rails-with-trails enhances local transportation networks by providing non-motorized local connections that are sometimes preferable to on-road bike lanes or sidewalks located on congested, dangerous roadways. Rails-with-trails benefit railroads, too. In most cases the trail manager purchases a use easement or license from the railroad, providing financial compensation and in some cases reducing liability responsibility and cost to the railroad.

Bikeways along major roads also provide the benefit of being used as an alternative means of transportation. Bikeways will facilitate regional connections ensuring not to isolate the Brodhead Greenway while allowing access for more users outside the limits of the Brodhead Greenway.

There are several roadways within the watersheds that have the potential to become scenic byways. These include: Routes 196, 611, 314, 191, 447, 940, and 390. Scenic byways are most useful when thought of in terms of the journey and destinations. Varied trip lengths, scenery and destination points offer the broadest appeal. Designated byways within the county will foster business and boost the local economy, usually through tourism. Restaurants, hotels, resorts and other businesses along the byways can benefit significantly from an increase in tourism due to the byway designation. It is also crucial for the Upper Brodhead / Paradise Creeks watersheds to create an identity for itself within the Poconos. Having signage control throughout the watersheds along major roads will in turn lead to a more scenic road. Not only will uniform signage make for a more scenic drive for motorists, it will also help to create an identity and consistent datum throughout the area.

A footpath loop has been proposed to cross through Price Township, Paradise Township, and Barrett Township. The proposed footpath is anchored by two very large parcels the Pennsylvania State Gamelands 221 to the west and the Delaware State Forest to the east. There is a great deal of work to be done before the entire trail network can be connected, but the potential for an expansive public trail system throughout the watershed is evident. To expand this trail network beyond the two watershed boundaries, several regional trail connections have been identified in the report that would allow access to a larger regional trail network.

The Greenway Plan

The Greenway plan focuses on making recommendations to achieve the three initial goals of the project. Described below is a brief overview of these recommendations.

Watershed Protection Recommendations:	
Recommendation:	**Explanation:**
Redesignate Streams to Exceptional Value	Even though all streams within the watersheds have a high level of protection at High Quality designation, redesignating streams as Exceptional Value will provide even more protection. Upgrading to Exceptional Value designation would prevent the possibility of stream degradation whereas keeping the status quo of HQ designation would allow for them to possibly be degraded if socially or economically justified.
Enact the Model Flood Plain Ordinance proposed by the Monroe County Planning Commission	Vegetated buffers along watercourses will provide a source of cleansing before the contaminants can enter into the stream. The greenway plan proposes that each municipality adopt through public process the model floodplain ordinance brought forth by the Monroe County Planning Commission. Not only does this ordinance place strict regulations upon activities within a floodplain, but it also places buffers on all water sensitive resources.
Educate through the Brodhead Water Authority	Stream redesignation, the model floodplain ordinance and many of the land conservation recommendations, will in all likelihood be met with much resistance from the general public. One of the best ways to make the public more accepting of these and other proposed changes is thoroughly educating them on the importance of preserving water quality.
Protection from the Potential Impacts of Marcellus Shale Drilling	Marcellus Shale drilling could have a profound affect on water quality if left minimally regulated by the commonwealth. Municipal or county officials need to understand the needs of their citizens within their jurisdiction, and those local citizens need to show support and interest in protection against the drilling.

Land Conservation Recommendations:

Recommendation:	Explanation:
Create Official Maps	The Official Map enables municipalities to designate specific properties and areas important for community needs. All four municipalities should create Official Maps to identify all land conservation opportunities.
Joint Zoning Ordinances Between Municipalities	Floodplain and buffer management will greatly benefit from joint zoning and SALDO's. Combining municipal regulations will allow for regulation at more of a watershed level as opposed to the municipality level at which it currently operates.
Creative Conservation Easements	A large percentage of lands within the watershed are owned by hunting and fishing clubs who are willing to place their land into a conservation easement, but are unwilling to allow full public access to their lands. An alternative to this problem is finding ways to allow for 'partial' public access to these parcels which would require only a percentage of funds needed to purchase the land.
Smart Growth Principles and Village Revitalization	One of the most adverse affects of urban sprawl is traffic congestion and the resulting air pollution. Concentrating future commercial and service related development in or adjacent to traditional town centers can make public transportation more efficient and foster more alternative transportation options.

Community Connections Recommendations:

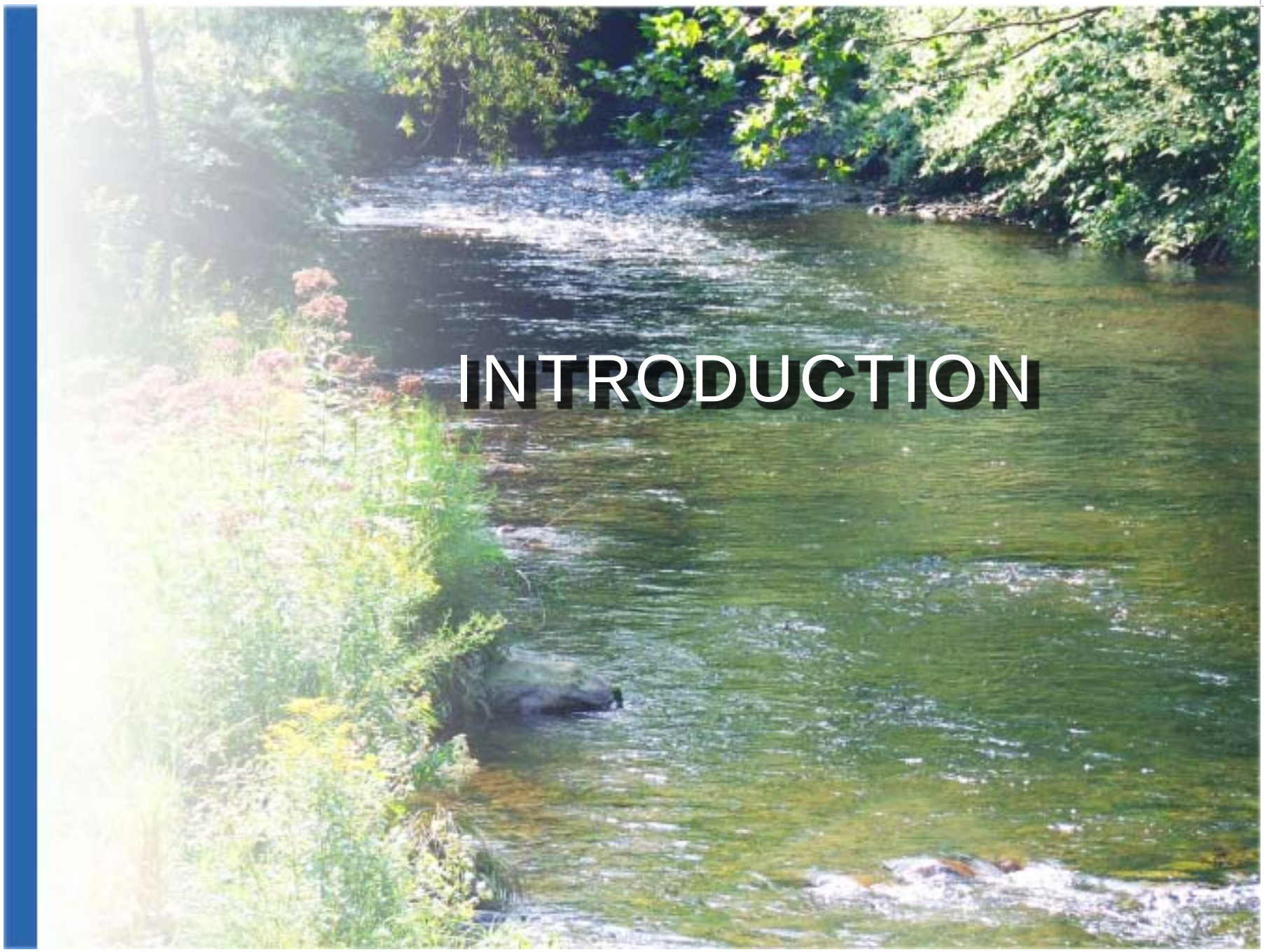
Recommendation:	Explanation:
Acquire Key Parcels Necessary To Implement Proposed Trails	The Land Conservation Opportunities map (a 24 x 36" print can be found at the end of the book) illustrates a potential trail loop anchored by Gamelands 221 and the Delaware State Forest. A list of these key parcels can be found on page 5-13.
Additional "Trail Roundtable" Meetings	In December of 2009 a "Trails Roundtable" meeting was held to discuss and map out trails throughout Monroe County. This meeting was very well attended but there is still much work to be done.
Inn to Inn Trail System	An inn to inn trail system is a program that would allow people to travel between two inns via foot trails or bike paths while their luggage would be delivered to the destination by vehicle. This program could potentially increase revenue for those inns/resorts participating in the program and any other business along the trail route.
Develop Byways and Bikeways Along Potential Routes	This plan is proposing that the following routes be considered for both scenic byways and bikeways: - Routes 447, 611, 390, 191, 196, 940 and 314.
Multi-use Trail Along Rail Line	A trail along the rail line would not only provide a multi-use trail with minimal land acquisition but since rail lines are gently sloped they can meet ADA requirements for a handicapped accessible trail.
Enact a Sign Ordinance	Because billboards often detract from the general aesthetics of roads a sign ordinance needs to be enacted to control billboards along potential scenic byways.

Greenway Plan Implementation

It is our recommendation that the current Brodhead and Paradise Creeks Greenway Study Committee continue as a transitional organization to assist in the creation and establishment of a permanent operational entity.

The most expedient route to the establishment of a permanent greenway management entity would be to incorporate the required functional capabilities into an existing government or non-government organization (NGO). This organization would obviously have to have compatible goals and operational responsibilities, adequate qualified staff and/or additional staffing capabilities, the legitimate authority to take on the additional responsibilities, and be capable of fully implementing the strategies for achieving the greenway plan goals.

Whatever the final administrative vehicle selected to manage and implement the greenway plan, it will most definitely require the full cooperation and support of many allied organizations.



INTRODUCTION

Introduction

What is a Greenway?

A greenway is a corridor of undeveloped land or open space that can be used for a variety of recreational activities. They are often used for recreation, transportation, conservation and to connect amenities. A greenway may be narrow or wide, and suburban or urban. Generally, there is a focus either on land preservation, water quality protection, or community linkages.

Prevalent fragmentation of land and urban sprawl lead to a decrease in water quality and an increase in public health concerns. This creates a demand for preservation of open space, woodlands, and water and air quality.

Usually greenways are the result of a public need for conservation and or connections through a perceived natural asset rather than a venture taken by the public or private investor. While they do not generate capital directly, in certain cases they can indirectly aid in accretion of capital through tourism by serving as a marketing tool for local economies.

Benefits of a Greenway

- Create a Plan for Conservation
- Preservation of Natural Resources
- Educational Opportunities
- Alternative Forms of Transportation
- Local Economic Stimulation
- Foster a Sense of Community Through Connections
- Opportunities for Recreation, Health and Fitness
- Protection of Water Resources
- Historic and Scenic Preservation
- Pollution Mitigation

Create a Plan for Conservation - Greenway plans are used for future growth of an area and can define specific areas or corridors for conservation. They aim to conserve land and cultural identity without compromising new development.

Preservation of Natural Resources - There are many environmental benefits associated with greenways including the preservation of wildlife habitats and plant and animal species as well as buffering the negative effects of development.

Educational Opportunities - Greenways can be used as a means of educating students as well as the general public. Education about water quality within the local watershed as well as the importance of community connections and ecological preservation can be provided by occasional signage and/or seminars.

Alternative Forms of Transportation - Greenways can provide alternative travel choices, connecting neighborhoods to transit, schools, workplaces and shopping areas by walking trails, biking trails, byways, or light-rail lines.

Local Economic Stimulation - The outdoor activities that are usually provided by greenways contribute to an expansion in the tourism market of local economies. Land values around greenways have also been known to increase.

Foster a Sense of Community - Greenways define patterns of development in order to protect rural landscapes. Networks of trails, bikeways, and byways proposed by greenways link communities and amenities.

Opportunities for Recreation, Health and Fitness - Since greenways are generally linear corridors of land, trails within the greenways provide a great opportunity for exercise. Parks and other open spaces allow for many other forms of recreation as well.

Protection of Water Resources - Many greenway plans focus on the protection of water resources in limiting areas of development around waterways. Their aim is to create buffers around bodies of water to preserve water quality.

Historic and Scenic Preservation - Our best link to our future is through our past. Greenways serve to promote the unique history and culture of

towns, cities and villages. Greenways can highlight historic buildings or assets of a region through trail connections or roadway signage.

Pollution Mitigation - Pollution caused by surface runoff, contaminants from factories and fertilizers can be mitigated through more sustainable land practices. Greenways target these sources of pollution that degrade the natural environment and threaten public health and safety.

Pennsylvania Department of Conservation and Natural Resources

"Greenways connect neighborhoods and communities, wildlife with habitat corridors, protect open space, provide opportunities for outdoor recreation, increase economic development opportunities and serve to increase environmental awareness. Greenways also provide important value to the health, well being and aesthetic needs of human communities and are vital to the functions of ecosystems.

As a result of the substantial direct and indirect values provided by open space corridors, greenways are influencing how we plan and develop our communities. Increasingly, individuals, families, organizations and governments are focusing their efforts on the continued development of greenways as tools for planning sustainable communities that offer an enhanced quality of life for residents.[1]"

Purpose of the Upper Brodhead & Paradise Creeks Greenway Plan

The Greenway Plan presents mechanisms to promote natural resource conservation and enhancements in Barrett Township, Mount Pocono Borough, Paradise Township and Price Township. The Greenway Plan addresses local and regional conditions and concerns while embracing statewide conservation initiatives. The Greenway Plan suggests trail layouts and linkages throughout the four municipalities to locations of significant cultural and natural importance.

As urban sprawl continues to encroach upon the traditional legacy of the Poconos, open space/ greenways and planning efforts are of critical importance in Monroe County. The creation of the Upper Brodhead/Paradise Creek Greenway Plan is essential in providing for the long term preservation and conservation needs of the County such as: protecting some of the finest water quality in the Commonwealth with nine exceptional value tributaries; preserving historic trout fishing waters; safeguarding the largest concentration of parcels over 100 acres in the county; buffering State Forest and State Gamelands; and the creation of many miles of potential greenway corridors.

This study is being conducted in order to compliment the Stroud Region Greenway, which focused on creating connections to and from the Stroudsburg region. Recommendations from the Barrett, Mt. Pocono, Paradise Open Space and Recreation Plan (OSRP) and the Eastern Monroe Regional OSRP have indicated that greenway development within these municipalities is essential to the communities' continued success.

The plan will benefit a variety of organizations and citizens including local resorts and inns, camps, all outdoor clubs, property owners, users of recreation facilities, local businesses, and visitors to the area through preservation of the scenic beauty.

Development of the Plan

A Study Committee comprised of three representatives from each of the four municipalities associated with this greenway project and additional representatives were selected to help guide the planning process. The Committee provided overall direction, reviewed draft analyses and recommendations, and acted as a liaison to the region's communities and interest groups. Substantial amounts of public input was collected from individuals and community groups facilitated through public and committee meetings.

Three over-arching goals were derived from this process:

Watershed Protection - It is important to protect the already high quality streams, the area's clean drinking water, and the tourist based economy that depends on clean water as a natural resource.

Land Conservation - The watershed contains large parcels of undeveloped land that are important to conserve for both water quality preservation and local enterprises that depend on green open space.

Community Connections - Trail networks, scenic roadways, and bikeways will pass through the scenic landscape while connecting town centers within the watershed and enabling other regional connections such as to the Stroud Region Greenway.

Project Funding

The Upper Brodhead / Paradise Creeks Greenway Plan was produced with financial assistance from the Department of Conservation and Natural Resources (DCNR) and the Monroe County Open Space Program.

The project was also partially funded by the Keystone Recreation, Park and Conservation Fund Grant Program, administered by the Department of Conservation and Natural Resources and the Bureau of Recreation and Conservation.

Frequently Asked Questions about Greenway Conservation Plans

Some residents who are not familiar with Greenway Plans, especially those geared towards conservation and the planning process, may have concerns about the implications of having a plan put into action. Three common questions about conservation greenways are:

1. How will this project impact private property?

The plan itself will not encroach upon private property and will not dictate what landowners can and cannot do. The plan is an opportunity to work towards a vision for the future of the watershed; it is not focused on specific property owners. Recommendations may be made within the plan for general care of lands adjacent to waterways; however, it will be up to local landowners and municipalities to follow these recommendations or not. Property owners are encouraged to participate in terms of developing the greater vision for the area.

2. Are you proposing land use restrictions within each of the four municipalities?

A plan may encourage updating municipal plans and ordinances to include things like natural resource protection zoning and transfer of development rights. Such zoning often affects new development only and such actions would then need to be adopted by each municipality. The plan in itself cannot require land use restrictions – only local governments can carry out such actions. If local governments pursue such zoning amendments or changes, it is required by the Municipalities Planning Code to be a public process.

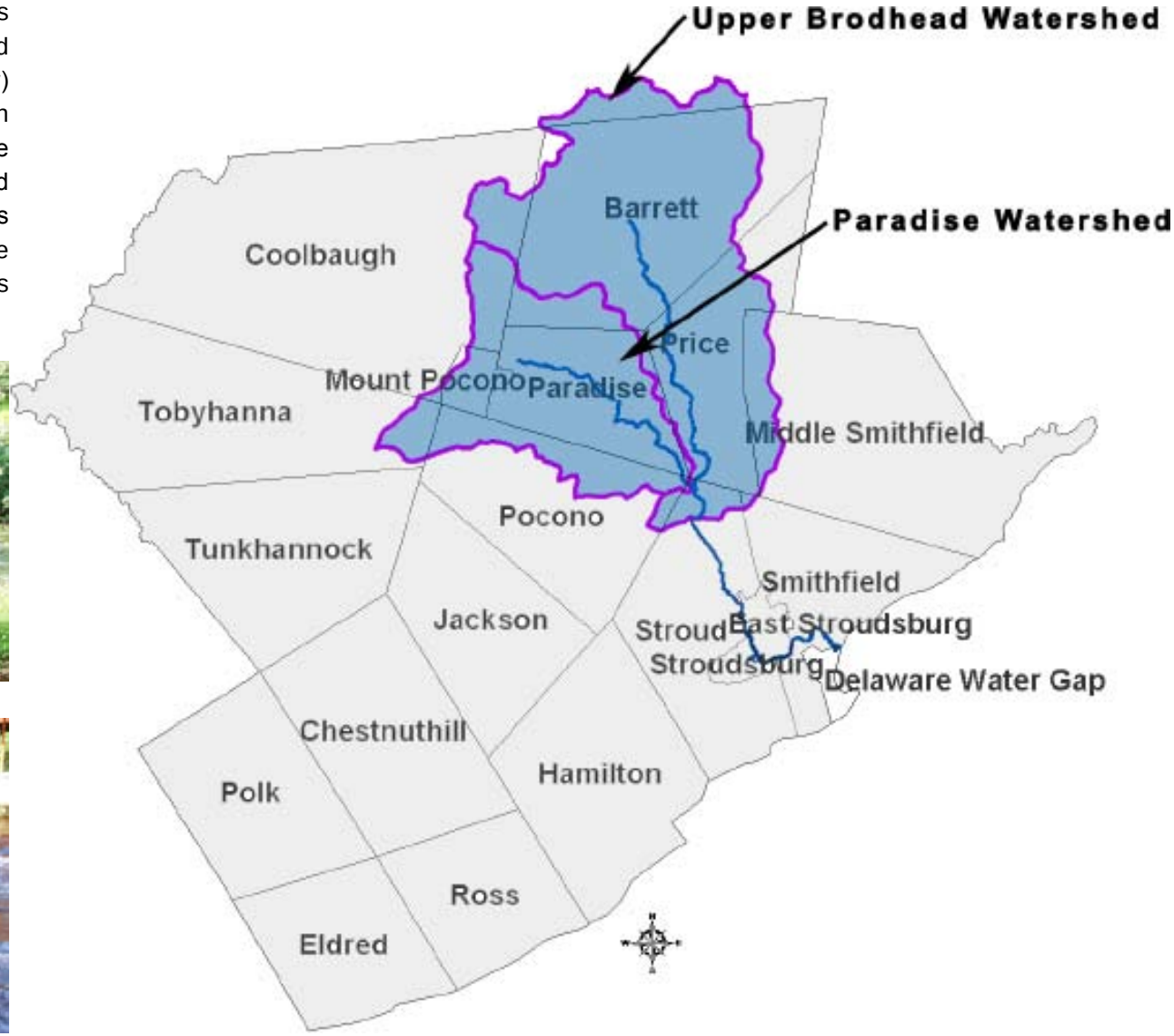
3. Can the Plan enable new environmental regulations that could affect stream front property owners?

The plan itself cannot enable or force any government agency to enact new legislation. What it can do is provide information and public comments about the stream front that could be used as a guide in creating or amending legislation. Those types of actions generally would require a public process.

Study Area

As stated earlier the four municipalities which are directly involved in this greenway project are: Barrett Township, Mount Pocono Borough, Paradise Township and Price Township.

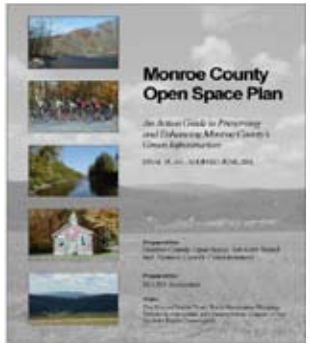
Since a major goal of this greenway plan is to protect water quality, our planning efforts must focus on the watershed. Within the Brodhead watershed (which encompasses most of Monroe County) seven sub-watersheds can be found, two of which are the Upper Brodhead Creek watershed and the Paradise Creek watershed. The Upper Brodhead watershed and the Paradise Creek watersheds make up the primary study area. Together these watersheds drain approximately 110 square miles or about 71,000 acres.



Related Studies

Below is a brief description of previous plans that influenced the Upper Brodhead & Paradise Creeks Greenway Plan

Monroe County Open Space Plan



The Monroe County Open Space Plan provided a starting point for preserving open space and creating greenways throughout the county. The Open Space Plan mentions nine conceptional greenway corridors two of which are along the Brodhead Creek and Paradise Creek. The overall goal or recommendation of this plan is a concept called "Forever Green" - a county featuring an open space system linked by a network of preserved land and trails.

The Open Space Plan also provided much of the background information needed to implement a greenway including a county wide user survey regarding open space, trails, parks, byways, bikeways, and greenways. Committee members working on the Open Space Plan also conducted many key person interviews that corresponded very well with the support greenways received. Thus the Upper Brodhead and Paradise Creeks Greenway Plan references the Monroe County Open Space Plan on several occasions.

Brodhead Watershed Conservation Plan

The Brodhead Watershed Conservation Plan intends to "*guide and prioritize conservation actions on a watershed-wide basis*." The plan identified "*unplanned growth, dirtier stream water, polluted stormwater runoff, development on wetlands, and municipal regulations not protective enough of watershed resources*" as the major threats to the Brodhead Creek's water quality.

Several implementation recommendations made by the Watershed Conservation Plan are:

- Municipalities need to strengthen land use ordinances to better protect floodplains and groundwater recharge areas and to minimize the amount and impact of impervious surfaces.
- Riparian landowners should be encouraged to create and maintain forested stream buffers. Partnerships should be organized to restore impacted and eroding streambanks using bioengineering and natural stream design approaches.
- Educational programs must be developed to encourage landowners and citizens to plant native species, plant or maintain riparian buffers, and improve stream habitat. Programs should also be developed to educate citizens about protecting sources of drinking water in the watershed.

Eastern Monroe Regional Open Space and Recreation Plan

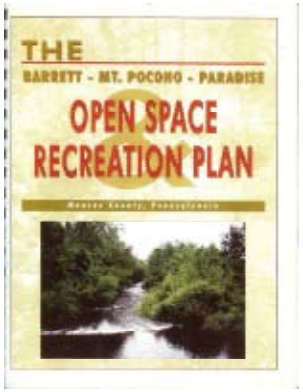
(Delaware Water Gap Borough, Middle Smithfield Township, Price Township, Smithfield Township)

The Eastern Monroe Regional Open Space and Recreation Plan is a continuation of the Monroe County Open Space Plan. The Plan's purpose is to illustrate the priorities in each municipality on which they spend bond funds, DCNR grants and private sector contributions to assist in preserving land.

The Plan identifies unique natural areas of significance, unique geological features, open space/preservation opportunities, potential active recreational sites, and proposed conservation corridors to be protected. Several recommendations of this plan that correspond with our plan are:

- Establish a greenway system which includes some areas open to the public and other areas remaining in private ownership with no public access.
- Work with the private hunting and fishing clubs in Price Township to establish conservation easements.
- Make greater use of zoning and subdivision regulations to enhance environmental protection and land preservation. (Including steep slopes, wetland buffer zones, stream corridor buffers and open space subdivision.)

The Barrett, Mount Pocono, Paradise Open Space Recreation Plan



The Barrett, Mount Pocono, Paradise Open Space and Recreation Plan is also a follow-up to the Monroe County Open Space Plan which envisions a linked system of parks and greenways and the preservation of open space throughout the county. This plan identifies the region's remarkably clean water ways, large contiguous tracts of forest land, and natural features such as waterfalls, swamps, bogs, and marshes as important natural features that need protection. This plan also makes several recommendations to protect these features including:

- Preserve the large concentrations of undeveloped land in Barrett Township and Paradise Township.
- Make greater use of zoning and subdivision regulations to enhance environmental protection.
- Adopt zoning regulations to protect scenic roads.
- Adopt zoning regulations to protect scenic villages
- Evaluate the feasibility of transfer of development rights (TDR).

Brodhead, McMichael and Pocono Creeks Greenways Plan

The Brodhead, McMichael, Pocono Creeks Greenways Plan connects many recreation areas within the Stroud Region, such as the Levee Loop Trail, The New Stroud Regional Park, Pinebrook Park and the McMichael Conservation Area.

The goals and vision of the plan includes incorporation of green infrastructure which would "guide future development" and secondly the creation of trail ways along riparian areas which would encourage "health, educational, and transformational benefits".

Implementation of the plan includes acquisition of key properties, stream restoration, cooperation of local officials and organizations, administration of the plan's recommendations, construction, education and publicity, and future planning.

Implementation depends on public support which can be achieved through education and increasing use of current green spaces. Creation of a formal advocacy group, the former Study Committee of the plan, is also recommended. The group would be responsible for continuing maintenance and implementation of the greenway plan and keeping the public informed.

It is also important that public elected officials are involved in the process and updated regularly as well as other conserved parties. Lastly, it is important for the success of the plan that open space projects remain a commitment to the region and continually funded.

DATA COLLECTION AND ANALYSIS

1.1 - Historic Sites
1.2 - Land Cover
1.3 - Natural Areas Inventory
1.4 - Streams, Wetlands, and Floodplains
1.5 - Topography
1.6 - Steep Slopes
1.7 - Stream Designations
1.8 - Geology
1.9 - Vegetative Analysis
1.10 - Wildlife Analysis
1.11 - Land Ownership

1.1 Historic Sites

There are approximately forty private and pubic historical structures located within the Upper Brodhead Creek and Paradise Creek watersheds. Many of these sites are located along the traditional transportation corridors; in historic town centers and destination resorts that proliferated in the late 19th century. These sites could provide scenic destination points for footpaths, bike paths and byways. Three of these sites are recognized by *National Registry of Historic Places.* They are: Buck Hill Inn, Swiftwater Inn, and Pocono Manor.

Buck Hill Inn

The Inn at Buck Hill Falls originally opened in 1901 as an 18-room inn and was expanded over the years to become a 400+ room resort and conference center. The Inn at Buck Hill Falls ceased operations in 1991.

The Swiftwater Inn

The Swiftwater Inn originated as a place of fortification circa 1750-1799 serving as a fort for the U.S. Army. The fort was then converted into a hotel and remained that way for 200+ years until its doors closed in 2007. Unfortunately, this structure was demolished in 2009.

Pocono Manor Inn

Built in 1902 Pocono Manor Inn has been inviting guests to enjoy its luxurious rooms and invigorating golf course throughout the years.

Other sites that are not listed on the national registry but are worth noting are:

Northrup House- The Northrup family founded a tannery in Barrett Township in 1847 and built one of the most “modern” buildings in the county in 1850 just south of Canadensis. The house is presently in ruinous condition, but one can imagine the charm of this house in its heyday.

Cresco Train Station - During the end of the 19th century and the beginning of the 20th century, thousands of people each weekend visited the Pocono Mountain Region of northeastern Pennsylvania. Many traveled by train through breathtaking landscapes of the mountains and forest until they reached their destination. Their they enjoyed the fresh mountain air and clean water.

Skytop Lodge - Renowned as a Member of the National Trust Historic Hotels of America, Skytop Lodge Resort and Spa has been delighting guests since 1928. Rising from the splendor of an ancient mountain setting, Skytop’s signature natural stonework is at home with the vistas that surround it.

UPPER BRODHEAD PARADISE CREEK
HISTORIC PLACES

Key

1 - Hensel-Frankel House
2 - Kirk-in-the-Woods
3 - Madden-Morelli House
4 - Parkside Chapel
5 - Metzgar-stevenson House
6 - Hilgert Homestead
8 - Wooddale Methodist Church
9 - Parkside Chapel
10 - St. Paul's Church
11 - Lesoine School
12 - Paradise Valley School
13 - Keoke Chapel
14 - Old Lutheran Church Site
15 - Trinity Church
16 - Price Twp Election House
17 - McComas Chapel Site & Cem
18 - Sprag Shed
19 - n/a
20 - Mountainhome United Meth
21 - n/a
22 - Canadensis Meth Ch
23 - St.Bernadette's Church
24 - Swiftwater Inn
25 - Monanesqua Villa
26 - Stites Mountain House
27 - Henryville House
28 - Paradise Inn
29 - Farm on the Hill
30 - The Antlers
31 - Maple Lawn Inn/Wildflower Inn
32 - Pocono Mountain Inn
33 - Pine Knob Inn
34 - The Cliff View Tavern
35 - Rockledge Manor
36 - Onwaw Lodge
37 - Monomonock Inn
38 - Brookview Manor
39 - Solar Way/Pinehurst
40 - Buck Hill Falls and Cottages
41 - Villa Caprioli
42 - The Pines
43 - Buck Hill Inn
44 - n/a
45 - Hotel Canadensis
46 - Laurel Grove Inn
47 - Solar Way/Pinehurst
48 - The Overlook
49 - Pocono Manor Inn

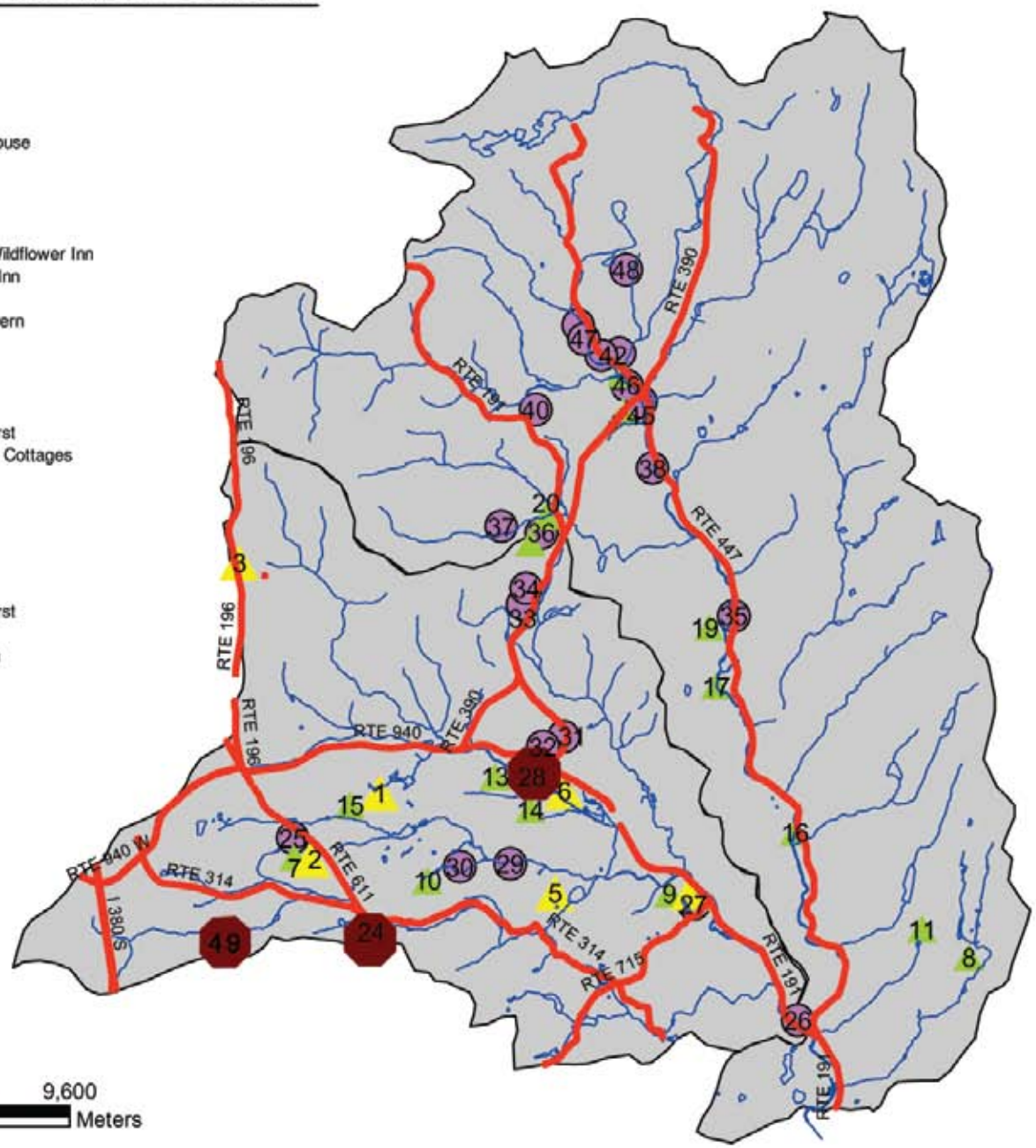
Legend

National Registry Sites - 3

Private Historic Structures - 6

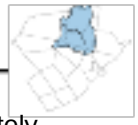
Public Historic Structures - 17

Resorts - 25



N W E

0 1,200 2,400 4,800 7,200 9,600 Meters



1.2 Land Cover

Land cover is distinct from land use despite the two terms often being used interchangeably. Land cover is the physical material at the surface of the earth, including forest, residential development, vacant parcels etc. Land use is a description of how people utilize the land including socio-economic activity - urban and agricultural land uses. The following map on page 1-5 illustrates the land cover of our study area

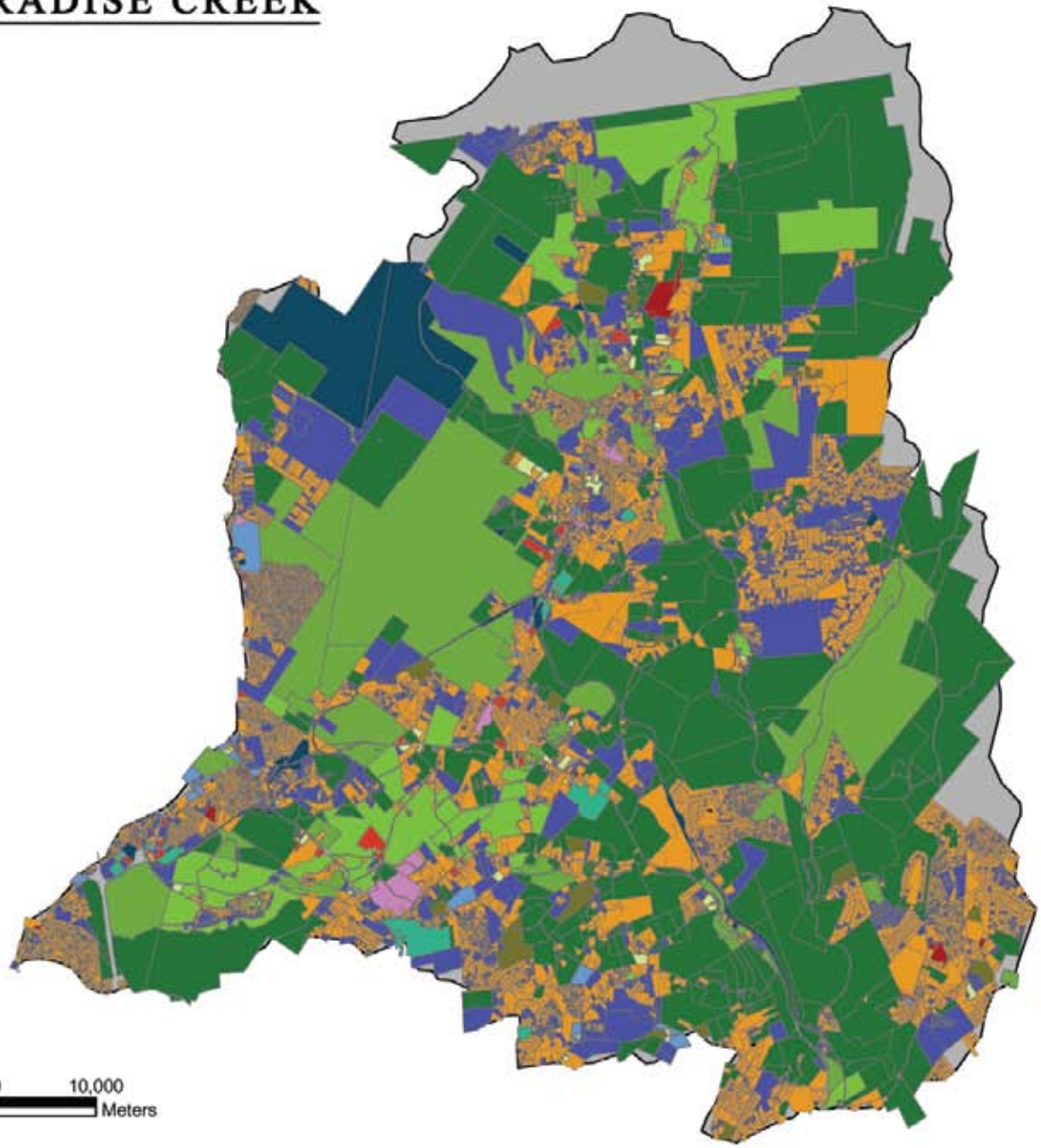
There are approximately 71,000 acres of land within the Upper Brodhead Creek and Paradise Creek watershed. Spatially, the largest land cover within the watersheds is forest, which encompasses 26,000 acres or about 37% of the watershed. Even though 37% of forest cover seems very high, one must understand that much of this area is privately owned by hunting/fishing clubs, summer camps, and resorts. These facilities are often under economic pressure to abandon their current (ecologically beneficial) land use in favor of higher density residential and commercial development. Thus there is some sense of urgency in protecting these fragile ecological resources.

The second largest land use, residential development, accounts for almost 15,000 acres or about 21% of the total land use. This percentage will certainly increase in the future due to the high population growth rate expected throughout the region. Growth is inevitable, however employing Smart Growth Land-use Principals and Water Conservation Best Management Practices can allow municipalities to minimize the negative impacts of residential development.

The third largest land cover and possibly the most important as far as this plan is concerned is "Vacant". Vacant parcels account for approximately 10,200 acres of land or about 14% of the total watershed. Several reasons why these parcels remain "vacant" are: the landowners may live out of state, intend to pass down the land as an inheritance, use the land just for hunting or fishing or intend to develop the parcel in the future. Whatever the case may be, these parcels may be available for municipal or county acquisition due to their idle condition.

The watershed currently possess ample open green space, as illustrated by the large percentages of forest, parks and recreation, agricultural, and vacant land cover. Together these land cover units account for almost 70% of the watershed area and obviously have a very significant impact on air and water quality within the Upper Brodhead and Paradise Creeks region.

UPPER BRODHEAD PARADISE CREEK
LANDCOVER



Legend

- Agriculture
- Communication/Trans/Utilities
- Parks & Recreation
- Educational Services
- Forest
- Government Services
- Hotels
- Industrial
- Residential
- Resorts & Group Camps
- Retail Trade
- Services & F.I.R.E.
- Vacant
- Wholesale Trade & Scrap Yards

N W E S

0 1,250 2,500 5,000 7,500 10,000 Meters

1.3 Natural Areas Inventory

Monroe County has a wealth of natural areas that support many diverse and often rare plant and animal species. These sites are found throughout the county, in forested, agricultural, and the less urbanized areas. In 1991 Monroe County created a Natural Areas Inventory (NAI) to locate these sites in order to better protect them.

Sites are ranked from 1 to 5 with 1 being the highest priority sites for protection based on state or national significance, and 5 indicating the lowest priority for protection. Rankings take into account potential threats, management needs, and existing protection. Additionally, there have been many sites added to the list since 1991 including an update in 1999 which have not been ranked and currently have a zero (0) rating.

While the majority of the (NAI) sites located within the Upper Brodhead and Paradise Creeks Greenway received a rank of 3 or lower they are still crucial to the regions overall ecological health and thus necessary precautions should be put in place to ensure their protection.

Some of the more important (NAI) areas within or adjacent to the Upper Brodhead and Paradise Creeks Greenway are:

Tannersville Cranberry Bog (Mt. Pocono, E. Stroudsburg) Pocono/ Stroud Townships. (County Rank 2)

This world-renowned wetland system supports excellent examples of three natural communities: boreal conifer swamp (primarily spruce and tamarack) acidic broadleaf swamp, and glacial bog. Three plant species of concern and a PA-Endangered butterfly species, are also found here. While about 800 acres have been protected by The Nature Conservancy and Pocono Township, an additional 300 acres are in need of protection.

(SP530) (County Rank 3)

A small population of a Pennsylvania endangered species (SP530) was observed in a cliff area along Buck Hill Creek in June of 1991. Because this site is a tourist attraction that is kept in a natural state, the only potential threats to the plants appear to be trampling and picking by tourists, and scouring from the creek during high water.

Cresco Heights (County Rank 3)

Monroe County's NAI revisited this particular site in June of 1991. Four plant species of concern were once again located. The plants were growing with normal vigor in the Acidic Rocky Summit Natural Community.

West Mountain Monroe (County Rank 4)

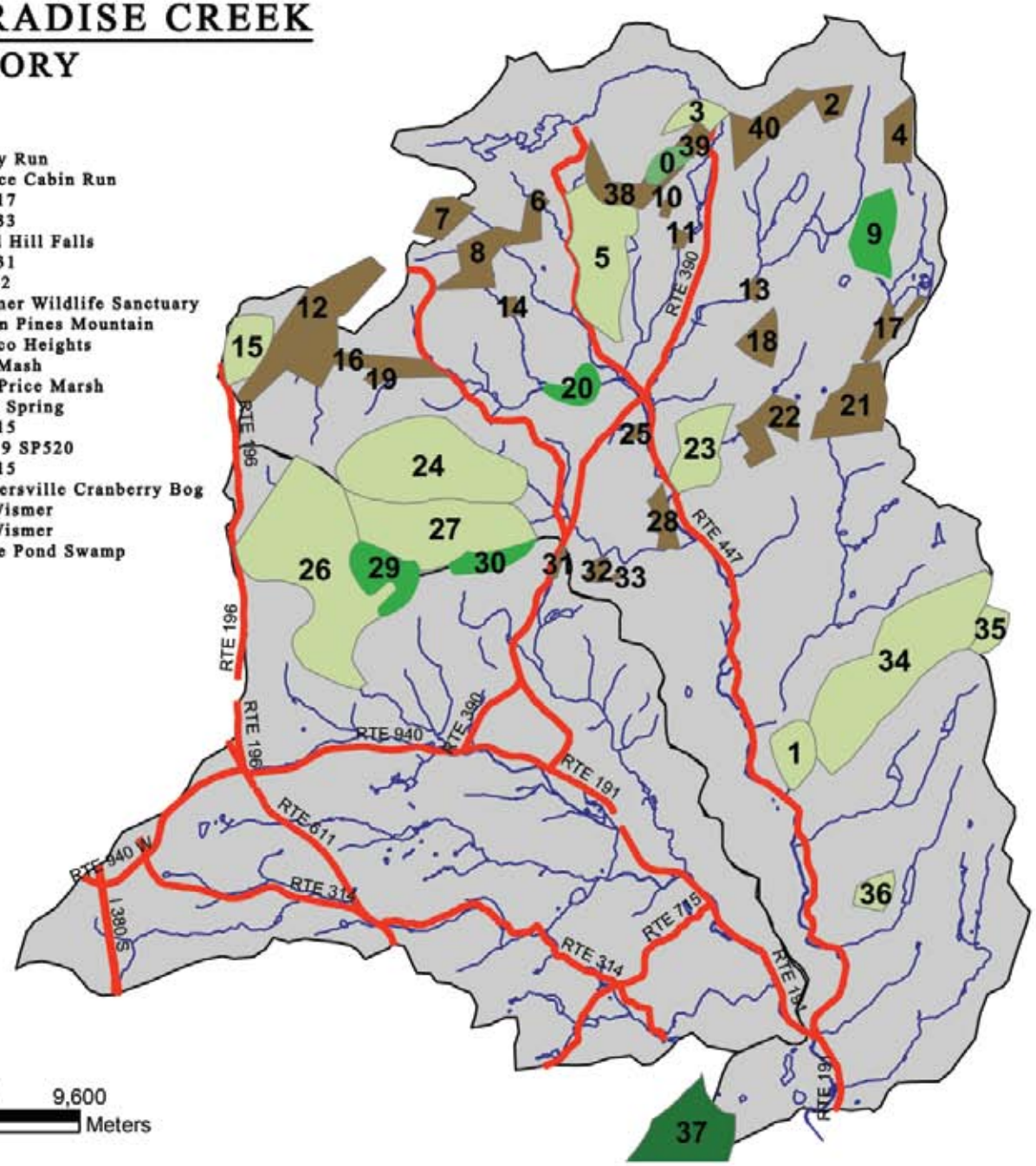
An excellent population of a Pennsylvania Threatened plant (SP507) was recorded within the Skytop Resort area in June of 1991. No apparent threats to the population were identified. A management agreement with the Skytop Resort ensures protection of this area.

Dutch Hill (County Rank 5)

An individual male of an animal species of concern (SP538) was photographed in the Dutch Hill area during 1992. This species is known to den nearby. Because the home range of this animal varies (e.g., ½ to 20 square miles), habitat development is a threat.

UPPER BRODHEAD PARADISE CREEK
NATURAL AREAS INVENTORY

0 - West Mountain Monroe
1 - Laurel Run Road Site
2 - Goose Pond Swamp
3 - GE511
4 - Kintz Swamp
5 - Dutch Hill - William Price Nursery
6 - Spruce Mountain Run Falls
7 - Pocono Plateau Lake Wetlands
8 - Spruce Mountain
9 - Bloomer Swamp
10 - H. Bender Falls
11 - Leavitt Falls
12 - Mud Swamp / Sipos Swamp Area
13 - Goose Pond Run Falls
14 - Voght Farm Wetland
15 - NC534
16 - Upper Buck Hill Creek
17 - Stony Run Pond
18 - Spruce Cabin Pond
19 - Big Spring
20 - GE520 NC526 SP530 (Buck Hill Falls)
21 - Stony Run
22 - Spruce Cabin Run
23 - NC517
24 - NC533
25 - Bond Hill Falls
26 - NC531
27 -NC532
28 - Zimmer Wildlife Sanctuary
29 - Seven Pines Mountain
30 - Cresco Heights
31 - The Mash
32 - Lon Price Marsh
33 - Sand Spring
34 - NC515
35 - SP519 SP520
36 - NC515
37 - Tannersville Cranberry Bog
38 - Mt Wismer
39 - Mt Wismer
40 - Little Pond Swamp



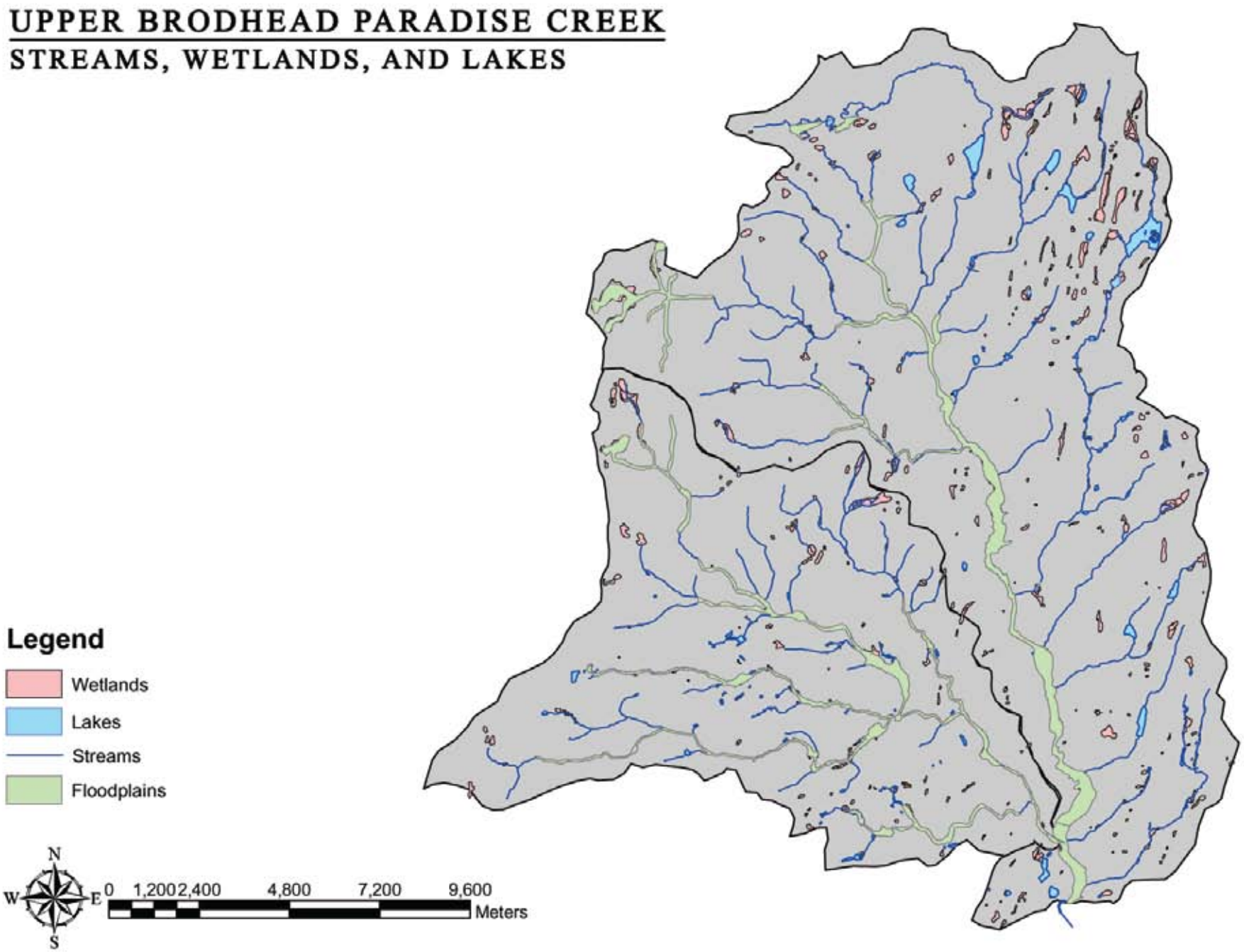
Legend
1 = Highest Priority
5 = Lowest Priority
1
2
3
4
5
Not Rated

N W E S
0 1,200 2,400 4,800 7,200 9,600 Meters

1.4 Stream Wetlands and Floodplain Areas

The following map illustrates the streams, wetlands and floodplains within the Upper Brodhead and Paradise Creeks watershed. The sensitive areas comprise approximately 750 acres of lakes, 2,500 acres of wetlands, 2,800 acres of floodplains totalling nearly 8.5 % of the watershed area. (See Streams, Wetlands, and Lakes Map page 1-9) The 100-year floodplain are areas that on average flood once every one hundred years according to the Federal Emergency Management Agency. Floodplain areas not only provide a natural habitat to many plant and animal species, they also help moderate flood heights downstream. It is crucial that these areas remain as undisturbed as possible to ensure the continued naturally occurring flood management process. FEMA is in the process of updating the floodplain zones for Monroe County, consequently the floodplain zone maps may soon be outdated.

Wetlands are areas that have vegetation and soil characteristics of a permanently and/or a frequently saturated environment. They include swamps, springs, vernal pools, marshes, bogs, highwater table soils, and similar areas. It has been well documented that wetlands are important groundwater recharge areas that support wildlife, fish and other aquatic life. Wetlands reduce flooding by detaining storm water discharge and help filter impurities that contribute to surface water and groundwater pollution. Lakes and streams, like wetlands, serve a similar function. Streams provide essential habitat for fish, reptiles and amphibians and play an important role in the life cycles of many insects, mammals and birds. Streams filter pollutants that have been washed off developed land, preventing the degradation of downstream rivers and lakes. Streams also provide many high quality recreational opportunities for boaters, anglers and other outdoor enthusiasts which is very evident in the study area.


UPPER BRODHEAD PARADISE CREEK
STREAMS, WETLANDS, AND LAKES
Legend
Wetlands
Lakes
Streams
Floodplains
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1,200
2,400
4,800
7,200
9,600
Meters

1.5 Topography

The USGS topography map (Figure 1-10) illustrates the contour of the land within the Upper Brodhead and Paradise Creek watersheds. The high point within the greenways study area is at an elevation of 2,100' located to the northwest of Lake Jamie, while the low point is at an elevation of 600' located near the intersection of Routes 191 and 447. The most prominent topographic feature of the watershed is the Pocono Escarpment.

Pennsylvania's Department of Conservation and Natural Resources has done an in-depth study of the plateau. In their *Pennsylvania Geography Survey (Map 13)* report they describe the Pocono Escarpment as "underlain mainly by tough, erosion resistant sandstones that are relatively flat lying. Relief on the upland is generally less than 200 feet, but can be as much as 600 feet where small hills rise above the general level of the upland. Elevations on the upland (escarpment) range from 1,200 to 2,320 feet. Weather in this area can be severe. The upland is drained by several small streams that flow from the upland interior to and away from the margins. The low relief and relative smoothness of the upland surface results from both the flatness of the underlying rock and the scouring of the surface by glacial ice. The area was glaciated at least three different times in the past million years. In addition to erosion, the most recent glacier also left behind a variety of glacial deposits that occur on the surface of the upland. Particularly notable is the abundance of sandstone boulders that litter the surface in many places."

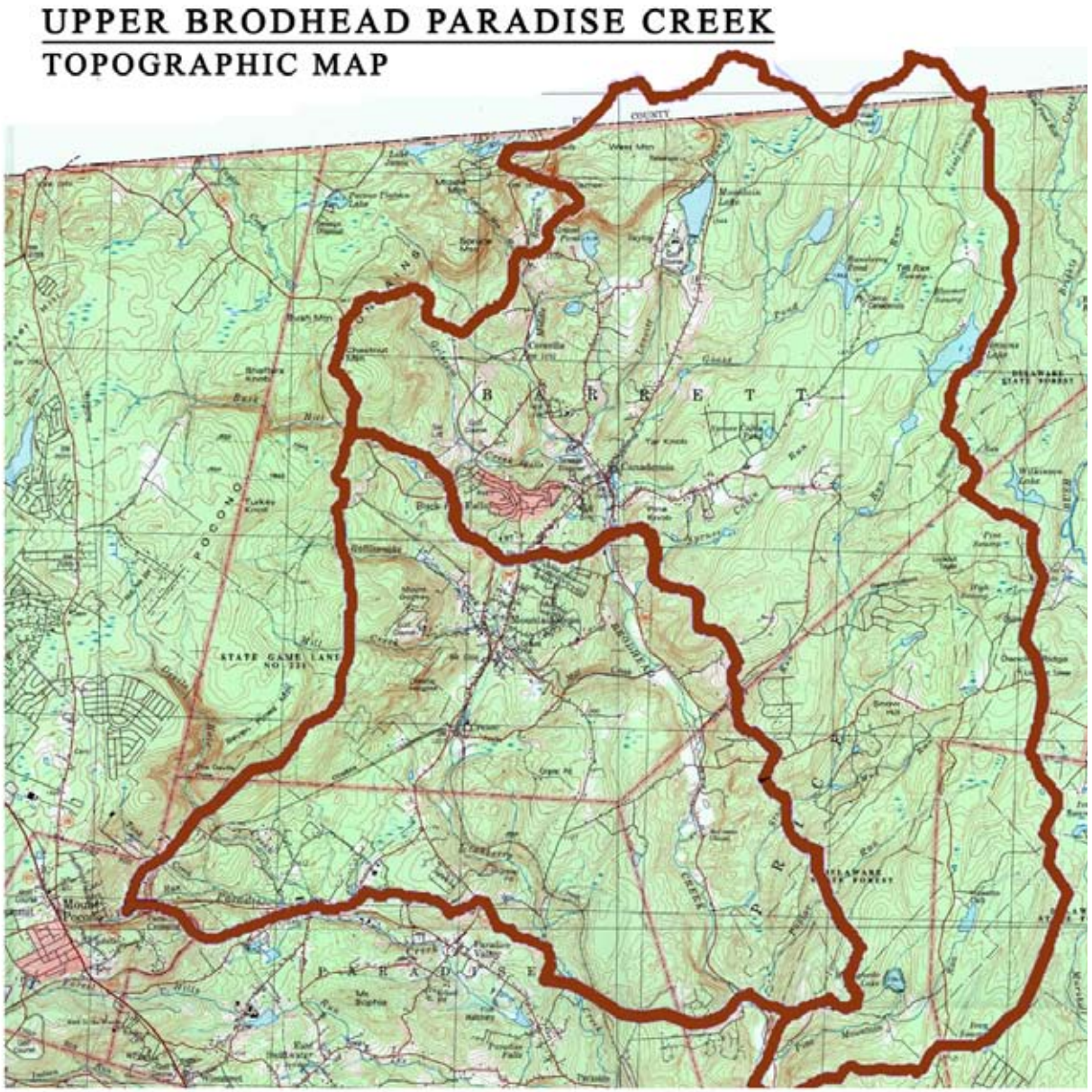


Figure 1-10

1.6 Steep Slopes

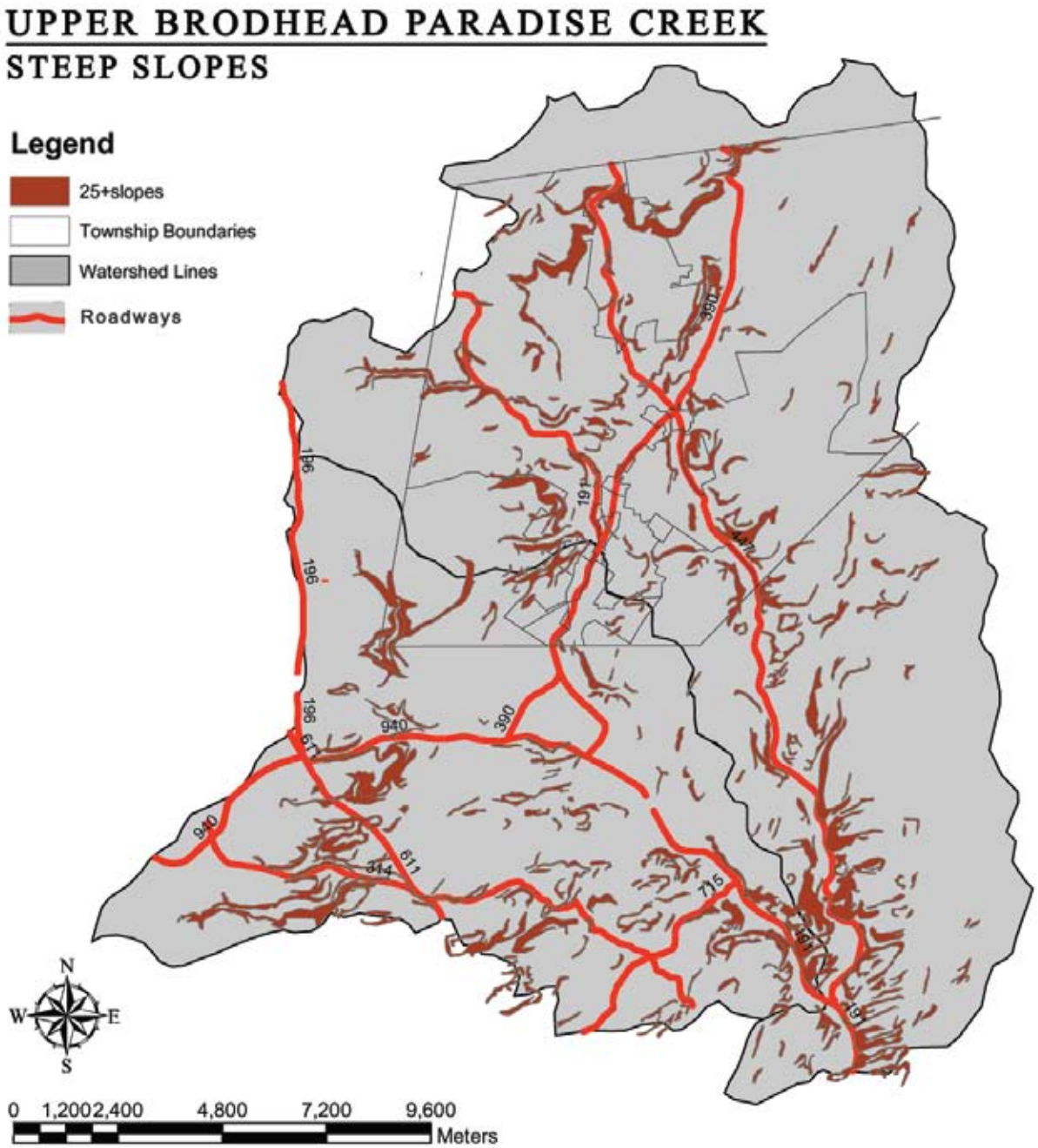
Supplemental to the USGS topographic map, the steep slope map indicates slopes greater than 25%. Slopes greater than 25% account for roughly 7,326 acres or about 10.3% of the total land mass of the greenway study area. The identification of these slopes is very important because they are extremely susceptible to erosion when their soil and vegetation are disturbed. Challenging topography can add significantly to the construction and maintenance cost of roads and buildings. Steep terrain also limits where people can locate on–site sewage systems. There are several reasons for steep slope protection including:

1. Prevent soil erosion and protect the municipality from undue expense caused by erosion.

2. Protect property from increases in the velocity of storm water runoff caused by improper or excessive construction on steep slopes.

3. Protect surface waters from sedimentation, turbidity and effluent from improperly sited sewage disposal systems.

4. Preserve scenic views and protect unique and unusual natural areas.



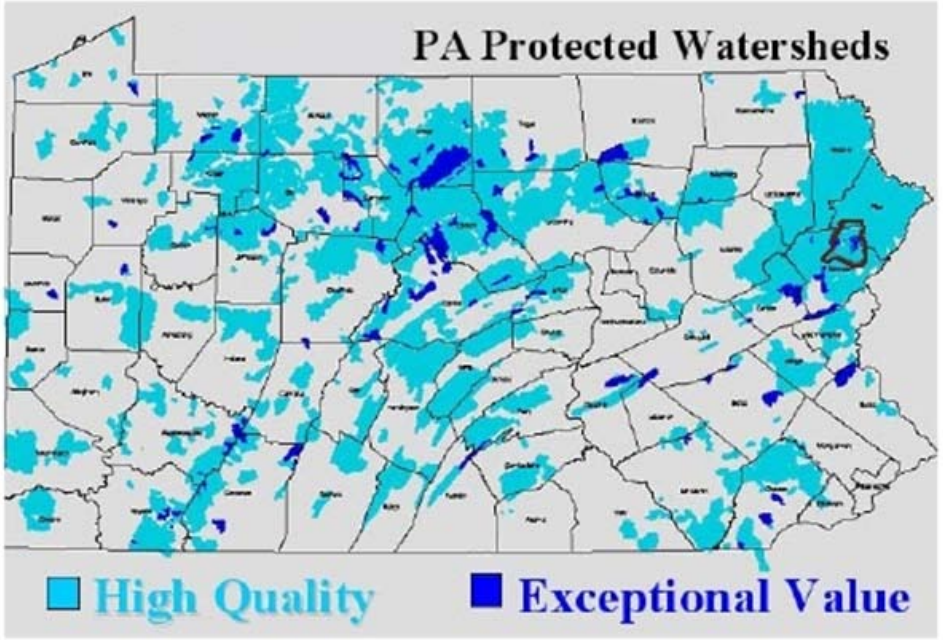
1.7 Stream Designations

The Pennsylvania Department of Environmental Protection (DEP) classifies or "designates" water quality of streams based in part on biological integrity. The two highest designations a stream can receive are High Quality (HQ) and Exceptional Value (EV). Since these are relatively rare and important water resources, Special Protection is granted by Pennsylvania to protect all existing uses of the stream (i.e. by aquatic life and humans) to safeguard the quality of its water.

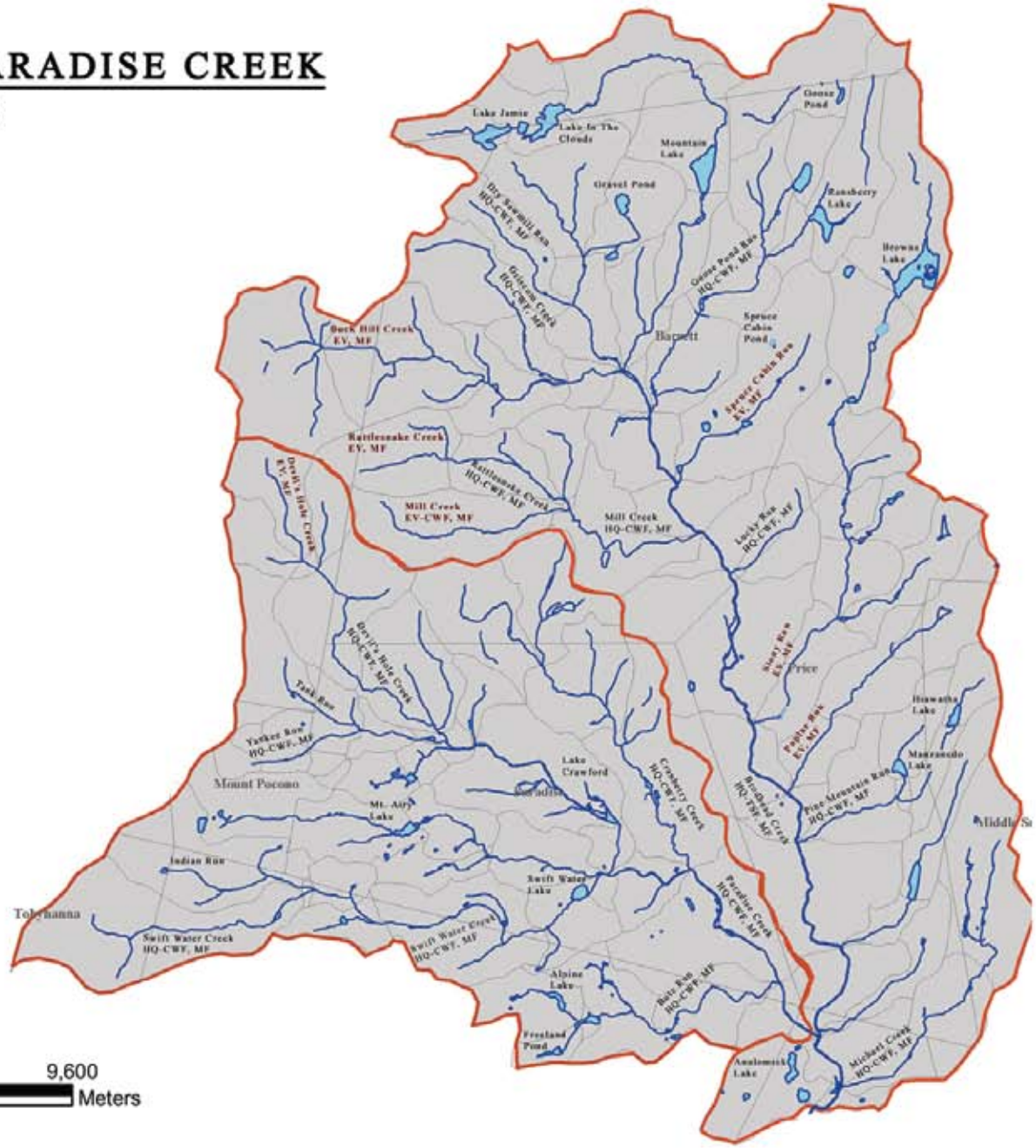
The Upper Brodhead and Paradise Creek watersheds possess extremely high water quality streams when compared to most other areas of the state. (Figure 1-12.) Of the twenty-four classified streams within the greenway study area, portions of nine streams were designated as Exceptional Value (EV) while all other remaining stream sections received a High Quality (HQ) designation. In contrast Pennsylvania as a whole has approximately 80,000 miles of streams of which

- 3,076 miles (or about 4%) are designated EV
- 22,563 miles (or about 27%) are designated HQ
- 54,361 miles (or about 69%) are lower designations

It must be noted that several streams deemed High Quality (HQ) may likely be eligible for redesignation to Exceptional Value. *Note: A larger version of the map on the following page (Figure 1-13) can be found at the end of this report*



UPPER BRODHEAD PARADISE CREEK
STREAM DESIGNATIONS



EV Streams
- Buck Hill Creek
- Rattlesnake Creek
- Devil's Hole Creek
- Mill Creek
- Spruce Cabin Run
- Stony Run
- Poplar Run
- Indian Run
- Swiftwater Creek

HQ Streams
- Dry Sawmill Run
- Griscom Creek
- Rattlesnake Creek
- Devil's Hole Creek

HQ Streams
- Tank Run
- Yankee Run
- Goose Pond Run
- Mill Creek
- Lucky Run
- Brodhead Creek
- Paradise Creek
- Pine Mountain Run
- Michael Creek
- Cranberry Creek
- Butz Run

1.8 Geology

The northern half of the watershed falls within the Appalachian Plateaus Province, a broad area of hilly to low mountainous terrain that extends north and east into New York State and west across the northern tier counties of Pennsylvania. Topography is characterized by high, flat plateaus with elevations between 900-1,800 feet.[3]

The watershed is mainly underlain by sedimentary rocks of the Devonian (360 to 408 million years ago) and Silurian (408 to 436 million years ago) ages. The Devonian Period is sometimes called the "Age of Fishes" because fish became abundant and diverse during this time.[4]

Approximately seventy-five percent of the land within Upper Brodhead / Paradise Creek watershed lies within the Long Run Member of Catskill Formation. The soil make-up consists of gray and grayish-red sandstone and grayish-red siltstone and mudstone in fining-upward cycles.[5]

The Packerton member of the Catskill Formaiton is the next biggest formation covering about 9%. These deposits are a greenish-gray to gray sandstone with some siltstone and some laterally persistent conglomerate beds in lower parts. The primary rock type is sandstone, the secondary rock type is siltstone, and the tertiary rock type is conglomerate.[6]

Poplar Gap member is the next largest at 8 % also of the Catskill Formation. It is a medium gray sandstone conglomerate with minor red shale and siltstone and rare calcareous lenses. The primary rock type is sandstone, the secondary rock type conglomerate, and the tertiary rock type is siltstone.[7]

The Walcksville Member, Beaverdam Run Member, Towanensing Member, and Trimmers Rock Member are the only other deposits found within our watersheds, and are found in very small portions.[8]

Rock formations in Barrett Township

Rock formations in Paradise Township

UPPER BRODHEAD PARADISE CREEK
GEOLOGY

LONG RUN MEMBER

Alternating gray sandstone and red siltstone and shale.
One-hour specific capacity is 0.19 gpm/ft; 24-hour potential yield is 40 gpm; water level below land surface is 46 feet; water is low in solutes, soft, and potentially corrosive. Specific conductance is 160 micromhos; hardness is 2 gpg.

PACKERTON MEMBER

Greenish-gray to gray sandstone and conglomerate and rare calcareous lenses. Cliff former at the Pocono Plateau escarpment.
Information for one well is available. One-hour specific capacity is 0.11 gpm/ft; water level below land surface is 100 feet. No water-quality data.

POPLAR GAP MEMBER

Medium-gray sandstone and conglomerate, minor red shale and siltstone, and rare calcareous lenses.
One-hour specific capacity is 0.67 gpm/ft; 24-hour potential yield is 215 gpm; water level below land surface is 26 feet; water is low in solutes, soft to moderately hard, and potentially corrosive. Specific conductance is 134 micromhos; hardness is 4 gpg; excessive concentrations of iron and manganese occur locally.

BEAVERDAM RUN MEMBER

Greenish-gray sandstone and lesser amounts of siltstone and shale.
Hydrologic information is from two wells. Average one-hour specific capacity is 0.18 gpm/ft; 24-hour potential well yield, probably the same as in the Long Run Member, is 45 gpm; average water level below land surface is 34 feet. No water-quality data.

WALCKSVILLE MEMBER

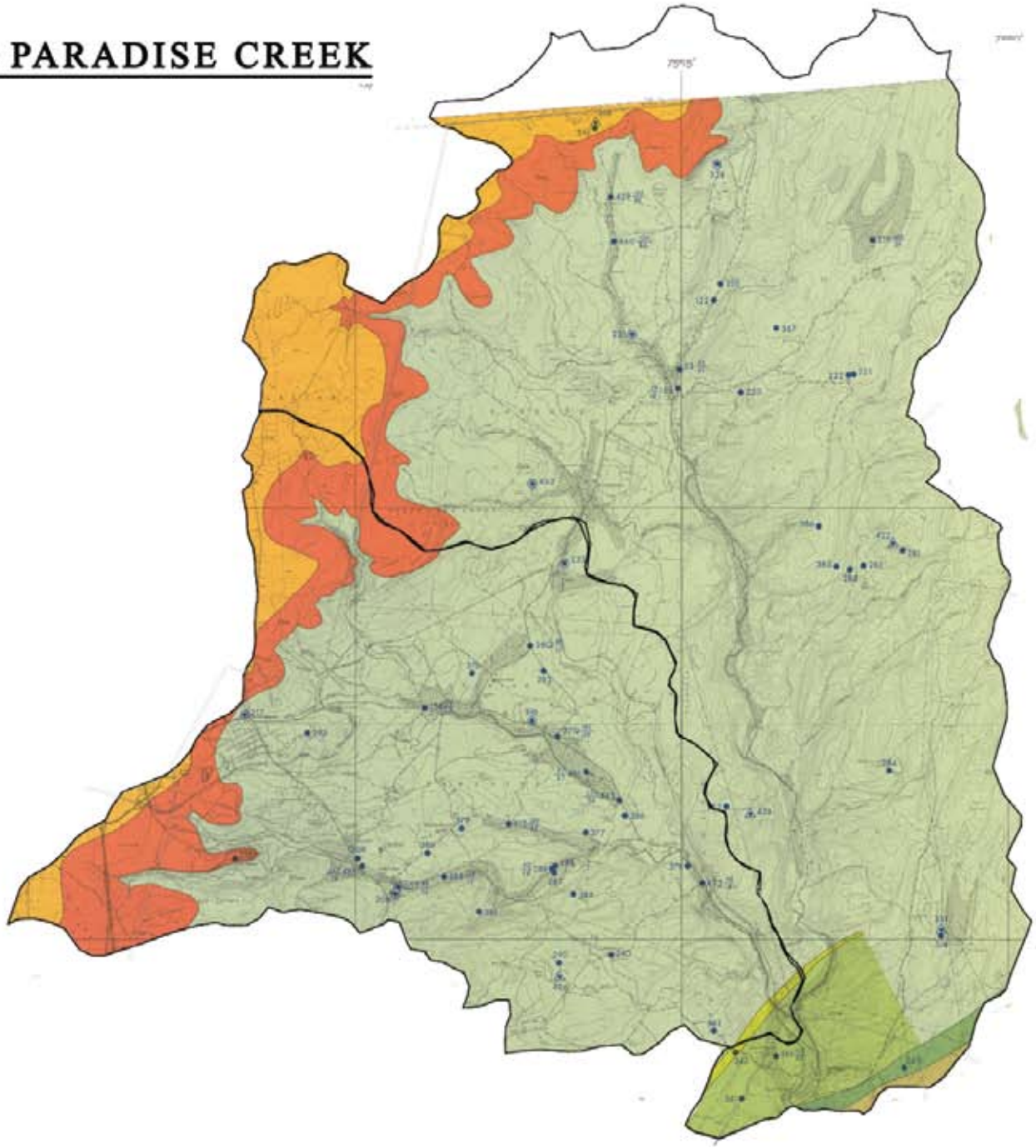
Alternating greenish-gray sandstones and red shales.
One-hour specific capacity is 0.12 gpm/ft; 24-hour potential yield is 35 gpm; water level below land surface is 50 feet; no water-quality data.

TOWAMENSING MEMBER

Medium-gray sandstone containing interbedded silty shale and siltstone.
One-hour specific capacity is 0.10 gpm/ft; 24-hour potential yield is 30 gpm; water level below land surface is 60 feet; no water-quality data.

TRIMMERS ROCK FORMATION

Gray and olive-gray, massive and fissile siltstone and minor shale.
One-hour specific capacity is 0.18 gpm/ft; 24-hour potential yield is 90 gpm; water level below land surface is 32 feet; water is low in solutes, soft, and potentially corrosive. Specific conductance is 168 micromhos; hardness is 3.5 gpg.



1.9 Vegetative Analysis

As with all areas across the state there are specific wildlife problems that face this region. One of these problems brought to attention by the Bureau of Forestry (Delaware District) during the key person interviews was the over abundance of deer. They commented that deer, specifically their overwhelming feeding needs, have had a profound impact on the Delaware State Forest's health. The understory of the forest has been severely eaten by the deer, leaving little or no ground level vegetation. The Bureau of Forestry has two ways to deal with the problem: 1) Deer Management Assistance Program (DMAP) a program that allows landowners to purchase extra deer tags, 2) construct deer exclusion fence meant to keep deer out of a particular area.

Also, large landowners of the greenway region have suffered hardwood loss due to the gypsy moth. One citizen remarked that he had seen almost all the white oaks on his 100+ acre parcel destroyed by the gypsy moths.

Another plant disease that has gained prominence in the Pocono region over the past fifteen plus years is the Hemlock Wooly Adelgid. This disease has been killing hemlocks on the eastern coast of the U.S. for many years. Hemlock trees play an important role in stream health because of their cooling affect on the stream and the shade they provide for fish. Hemlocks are also a prime habitat for a variety of birds including the Black Burnian and Acadian Flycatcher.

Several other diseases mentioned through key person interviews are the Emerald Ash Borer

Gypsy Moth

Hemlock Woolly Adelgid

and the Asian Longhorn Beetle. These diseases are currently less severe threats to the forest, but could become major problems in the future.

While pests such as the gypsy moth and Hemlock Woolly Adelgid have a negative impact on this region's healthy forest; invasive plant species pose another threat. Invasive, non-native plants crowd out the natives that indigenous creatures rely on for food, breeding and nesting, shelter, shade and more. The main stem of the Brodhead Creek has been particully hard hit by invasives. Some of the most prevalent invasives found are: Japanese Knotweed, Multiflora Rose, Japanese Barberry and Purple Loosestrife. These species reproduce quickly and can completely dominate a stream within just a few seasons.

Above: Multiflora Rose

Below: Japanese Knotweed

Purple Loosestrife

1.10 Wildlife Analysis

According to Brodhead Watershed Conservation plan "*the U.S Environmental Protection Agency has identified Monroe County as an area of high biodiversity within the Middle Atlantic Region of the United States.*"[3]

Up until 1972, the farming chemical DDT had a devastating effect on the osprey, bald eagle and other raptor species in Monroe County. After the DDT ban, the Poconos became a site for reintroduction programs for the bald eagle and the osprey. Over the years these reintroduction programs were very successful and as of 2003, approximately a dozen bald eagle nesting sites were identified within the Poconos. Similar to the bald eagle, the osprey and the peregrine falcon have made similar comebacks in the Pocono Region.[13]

While the bird population of the county has gone through several changes the mammal population has remained strong. A 1995 study of Monroe County found a total of forty-four species can be found within the county. However, by some estimates, the watershed may support as many as fifty-six species of mammals. Some of the more prevalent mammals within Monroe County are: White Tailed Deer, Black Bear, Cottontail Rabbit, and Foxes. [3]

Along with a diverse array of mammal life, this region possess a very healthy and varied aquatic life population. Brook Trout were historically very prevalent within Monroe County but their population has slightly diminished due to the degredation of streams and competition with exotic species. Brown trout, which are not native to the area, have become the most abundant species of trout found throughout the Brodhead watershed. Some headwater streams have fish populations limited to trout alone or trout and sculpins but fish diversity increases in a downstream progression to include dace, darters, fallfish, suckers and American eels. [3]

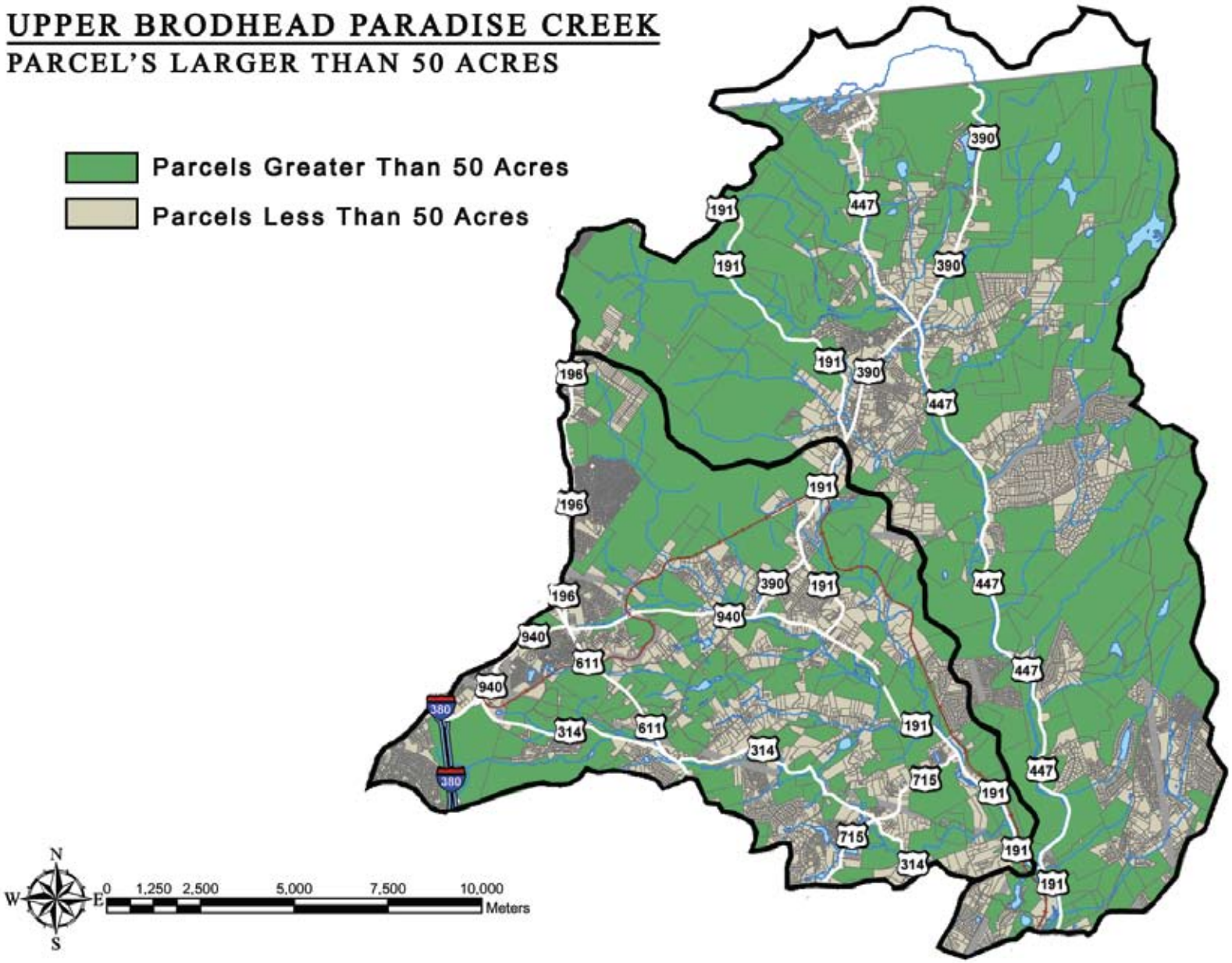
Through water preservation and land conservation the Upper Brodhead / Paradise Creek Greenway plan will aid in protection this unique healthy wildlife population.

> *"Before population was greatly advanced in this part of Pennsylvania, game of all description found within that range was extremely abundant. The Elk itself did not disdain to browse on the shoulders of the mountains near the Lehigh."*
>
> -John James Audubon, Episodes,

1.11 Land Ownership

One thing that sets these two watersheds apart from most others are the overwhelming number of large land owners. The map on the next page illustrates all parcels (green) that are fifty acres or larger, which account for almost seventy percent of the watershed.

Many of these large parcels are owned by private hunting and fishing clubs, summer camps, and resorts meaning they are dependent on each others open/forest areas for survival. For instances, there are several hunting and fishing clubs which are almost entirely encompassed by Skytop Lodge a 5,000+ acre resort. The 5,100 acres of undeveloped land held by Skytop Lodge, provides a healthy habitat for wildlife within the region which in turn allows the hunting and fishing clubs to thrive. In contrast, while Skytop Lodge is a large resort; the numerous hunting and fishing clubs surrounding the resort add to the “green/outdoor” atmosphere Skytop markets to its patrons.


UPPER BRODHEAD PARADISE CREEK
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Endnotes:

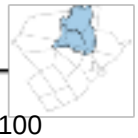
1. www.fema.gov/hazard/flood/index.shtm
2. www.epa.gov/wetlands/
3. Brodhead Conservation Plan
5. http://tin.er.usgs.gov/geology/state/sgmc-unit
6. http://tin.er.usgs.gov/geology/state/sgmc-unit
7. http://tin.er.usgs.gov/geology/state/sgmc-unit
8. http://tin.er.usgs.gov/geology/state/sgmc-unit
9. Brodhead Conservation Plan p145-146
10. Brodhead Conservation Plan p145-146
11. Brodhead Conservation Plan p145-146
12. http://www.dcnr.state.pa.us/topogeo/map13/13gpoc.aspx
13. Oplinger, Carl The Poconos: *An Illustrated Natural History Guide* 2006 The Rutgers State University

Demand and Potential Use of the Greenway

2.1 - Community Profiles

2.2 - Potential Greenway Use

2.3 - Profile of Greenway Users

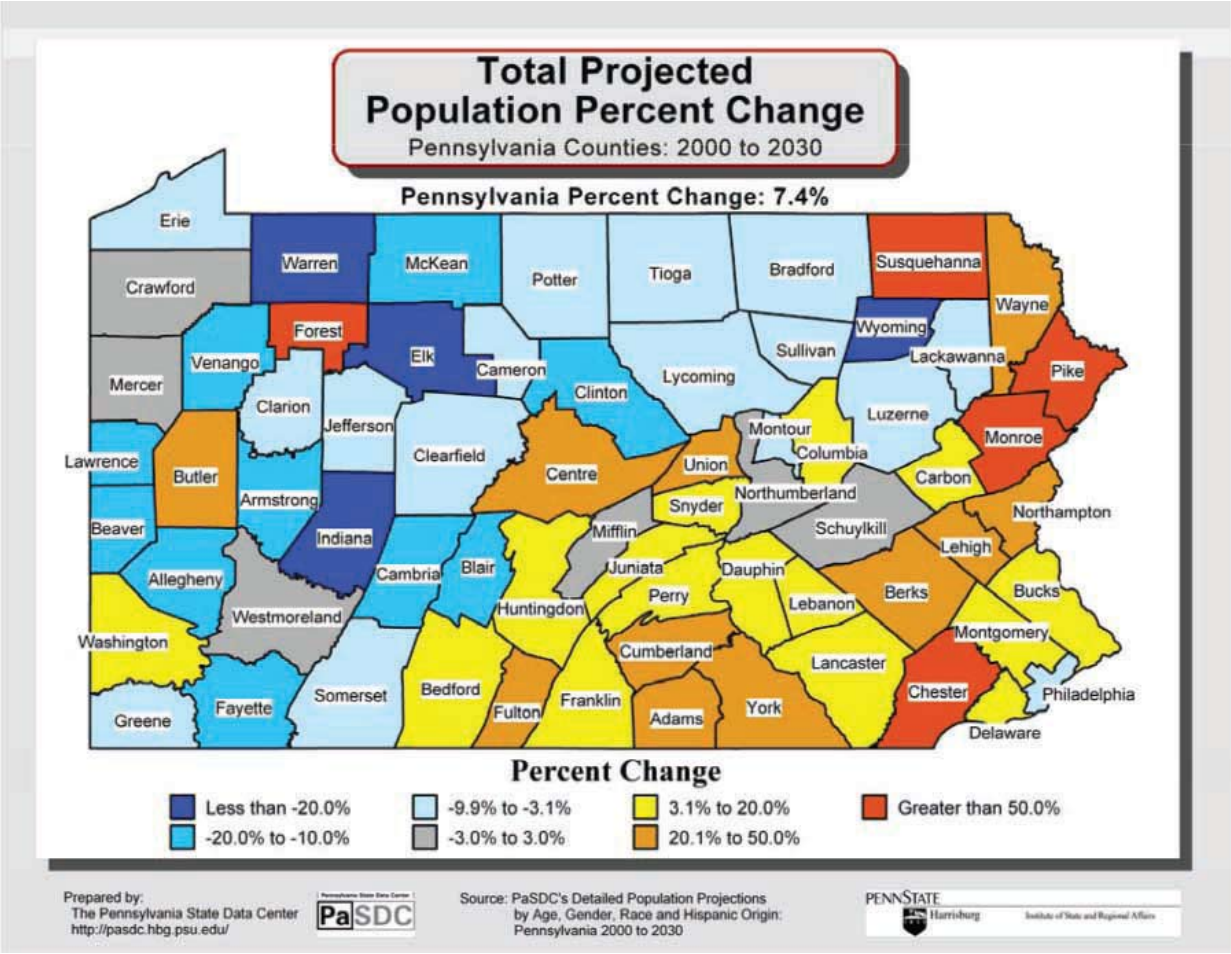


2.1 Community Profiles

Monroe County

Monroe County, is located in northeast Pennsylvania along the Pennsylvania and New Jersey border. According to the U.S. Census Bureau, the county has a total area of 617 square miles that includes 608 square miles of land and nine square miles of water (1.44%).

The U.S. Census Bureau estimated the population of Monroe County at 165,058 people in 2008. The county is one of the fastest growing counties in Pennsylvania with a growth rate of 44.9% between the years of 1990 – 2000. In the 2000 U.S. Census, Monroe County's population was divided as follows: 26.80% under the age of 18; 8.60% from 18 to 24; 28.80% from 25 to 44; 23.50% from 45 to 64; and 12.30% who were 65 years of age or older. The median age for county residents was 37 years old. Lastly, for every 100 females in the county there were 97.60 males.



The main reason for the steadily increasing population within Monroe County over the past several decades is its close proximity to the New York Metropolitan Area. Another key factor that contributes to the population explosion, which includes permanent residents, part-time residents, and tourists, is the natural environment. Portions of two nationally protected areas are located within the county, the Delaware Water Gap National Recreation Area and the Middle Delaware National Scenic River. The Delaware State Forest, state game lands, local parks, greenways and open spaces are also attractive features.

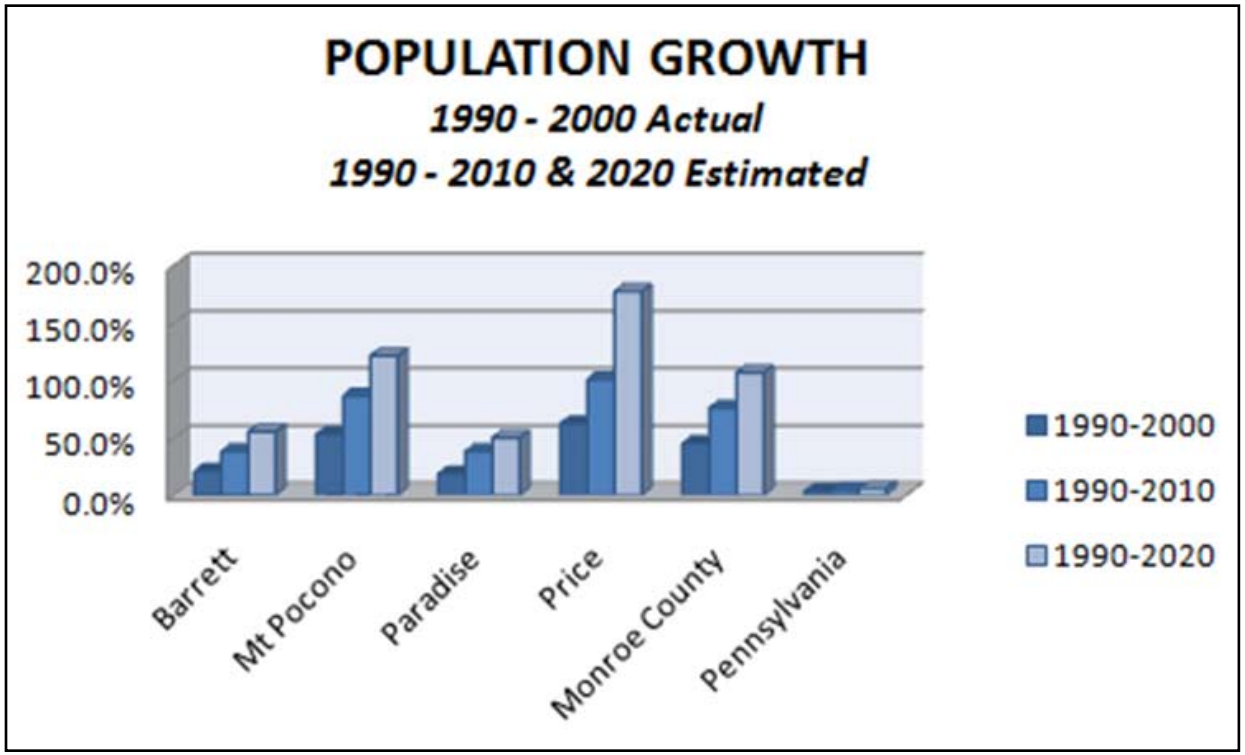
The demographic shifts are not limited to Monroe County. Current growth rates for the counties adjacent to Monroe County are among the highest in New Jersey and Pennsylvania as well. Pike and Monroe Counties are presently two of the fastest-growing counties in Pennsylvania and Sussex County is one of New Jersey's fastest-growing counties. These changes and the regional influences of these changes were succinctly described in "Inventory and Analysis of Adjacent Land Uses" report published by the National Park Service in 1991. It studied those areas adjacent to the Delaware Water Gap National Recreation Area and stated the following:

"In the 1970's a wave of development began moving westward into the Poconos along the Interstate 80 transportation corridor. Commuters and retirees were attracted to the area by its close proximity to metropolitan New York/New Jersey, affordable housing, lower taxes, and rural amenities. Current growth rates for the

counties adjacent to the National Recreation Area are among the highest in New Jersey and Pennsylvania. Pike and Monroe Counties are presently the two fastest-growing counties in Pennsylvania ... and Sussex County is one of New Jersey's fastest-growing counties ...This growth trend is rapidly changing the region's rural character. Many vacation and seasonal homes are now being converted to year round residences, permanent residential and commercial developments have rapidly expanded, and land has been changing hands at record levels. In addition, the increasing proliferation of time-share units - officially listed as seasonal dwellings - are actually occupied throughout the year."

The Poconos have always offered a place for New York City residents to own a home outside the city with a more traditional "small town feel" while still being close enough to commute to the city for work. The Poconos are, indeed, unlike the rest of Pennsylvania. It is not only a vacation area with beautiful natural resources and quaint towns; but it represents the ever-expanding edge of the New York metropolitan area and it is a living example of the impacts of urban sprawl.

The dramatic increase in population growth is not expected to diminish anytime soon. The estimated population for the county in 2010 is 181,740 people, which would be a 31.0% increase, from 2000. This is a dramatic change especially when compared to the rest of the state which is expected to see an increase of only 1.4% during the same time period. The growth rate is expected to continue into the upcoming decade (2010 – 2020) Many population projections put the total number of residents at 224,341in 2020 which would be a 30.8% increase between 2010 –2020.[1] which is much faster rate than the rest of the state at 3.4%.



Barrett Township

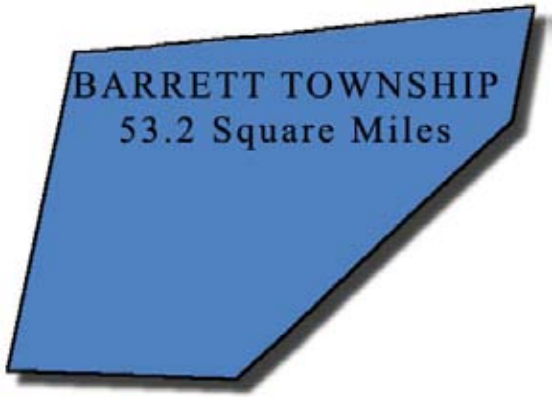
Barrett Township has a total area of 53.2 square miles, which is comprised of 52.6 square miles of land and 0.6 square miles of water. The township lacks many high-density areas, which creates a "small town feel". The township is comprised of five small villages; Cresco, Mountainhome, Canadensis, Buck Hill Falls, and Skytop, (which have potential to become even greater destination points if enhancements are completed.)

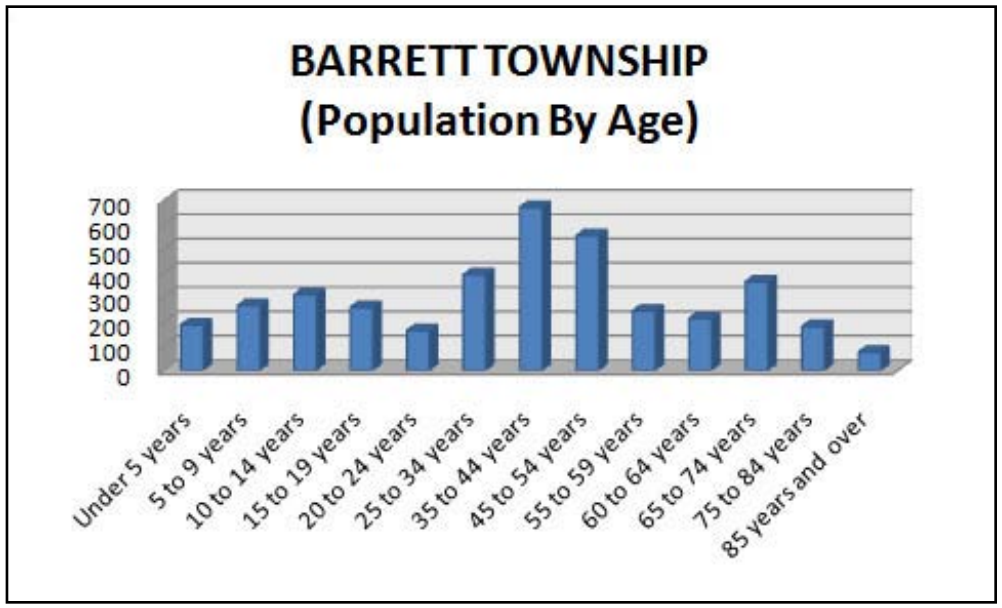
Barrett Township was once a thriving resort destination within the Pocono Mountains region because of prominent getaway resorts like Skytop Lodge and Buck Hill Inn. While today tourism is not as profitable as it once was, it still remains a leading industry for the township and a large reason for the township's continued growth.

Over the last census period (1990 – 2000), Barrett Township has grown over 17.3% to a population of 3,380. This is slow compared to some of the surrounding communities such as Coolbaugh Township and Greene Township that increased by 125% and 50% respectively. Even Monroe County as a whole grew by about 45% over the same time period. Nevertheless the township still grew at a much faster rate than the rest of the state (3.4%).

The majority of Barrett Township's population is between the ages of 35 to 54 years old. Additionally, the 18 years or younger population has shown a marked increase, whereas, the elderly population (65 years old and older) has shown only a slight increase.

Barrett is expected to receive a substantial population increase in the next 10 years. The estimated population for Barrett Township in 2010 is roughly 4,550, which would be an increase of 17.3% for the decade. The population for the municipality is expected to grow to 5,225 by the year 2020 which would be an additional increase of 17.4%.





Mt. Pocono Borough

The Borough of Mount Pocono, once called Forks, was incorporated in 1927. It has a total landmass of 3.5 square miles with no water bodies within its limits. Mount Pocono differs from Barrett Township, Paradise Township and Price Township in that it has a higher population density and development density. Mount Pocono hosts 783.4 people per square mile as compared to the three other municipalities which range from 75 – 125 people per square mile.

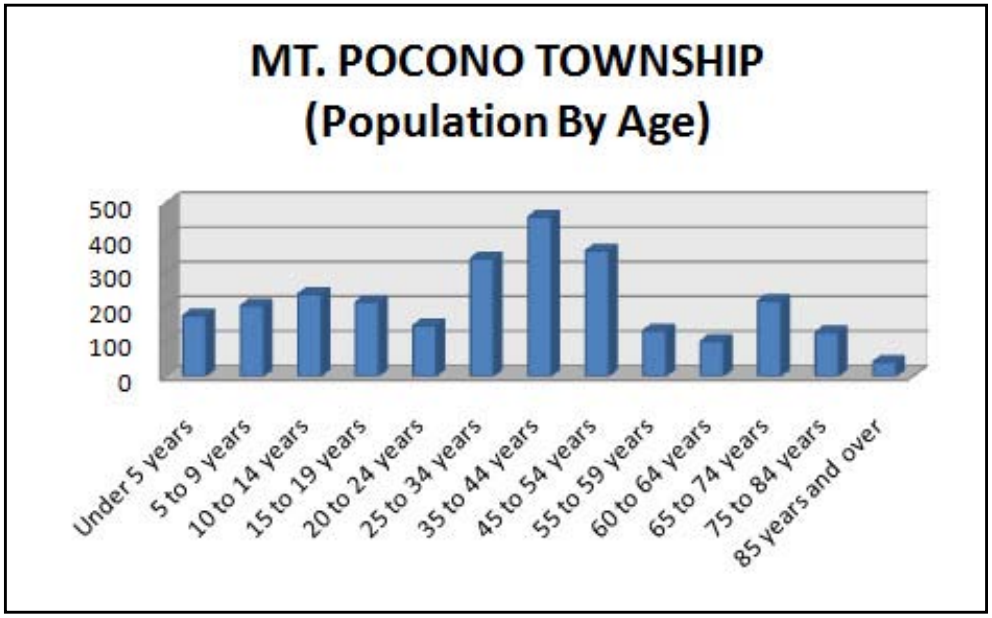
Mount Pocono Borough lies at the junction of several roads, which have historically served as the primary travel routes for the region. Route 611 runs south to Stroudsburg and East Stroudsburg and north to Scranton. Also, Route 940 and Route 380 are two additional highways that run through the borough creating easy access for tourists visiting the borough.

The borough of Mount Pocono was significantly affected during the second housing boom between the years of 1970-1990. The increase in commercial activity and the number of housing units built since 1970 has been dramatic. The number of housing units increased from 478 to 1,119 during this time period. Even though the commercial district of the borough grew during this time period a significant portion of workers still commuted outside the borough limits to get to their jobs.

The largest percent of the population within the borough are college-educated professionals ranging in age from 25 to 54 years old. Another interesting fact is that while Mount Pocono increased population 52.8% from 1990 – 2000, the borough saw a much larger increase in housing units (85.5%.) This means that while the local economy is in a very healthy state, open space is being rapidly developed as a result.

Of the four municipalities working on this greenway plan, Mount Pocono is second to Price in terms of population increase. The estimated population in 2010 is 3,675, which would be equivalent to 34% growth from the years of 2000 – 2010. In 2020 the population could be as high as 4,625, which would be an additional 34.7% growth in the upcoming decade.

Water quality is especially important in Mount Pocono Borough where a concentration of users are supplied through a central ground water system. Recharge areas need to be protected from contamination and diminution.[1]

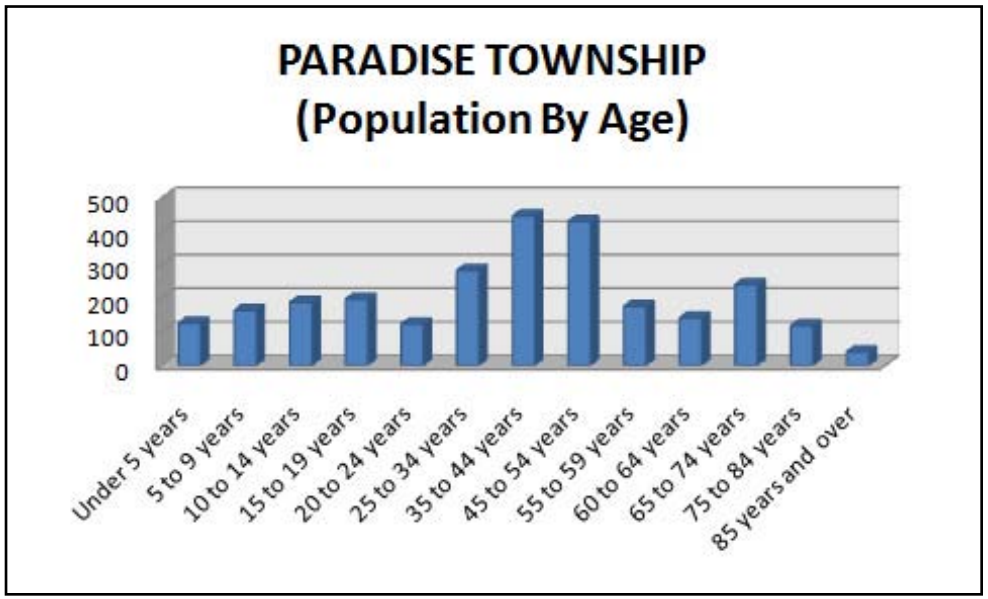


Paradise Township

Paradise Township was established in 1848. It has a total landmass of 21.5 square miles with 21.4 square miles of land, and 0.1 square miles of water. Like Monroe County, Paradise Township has also seen a dramatic increase in population since 1990. A majority of this growth can be attributed to the ever-expanding New York City metropolitan area.

The population of Paradise Township increased 15.7% between 1990 and 2000 but the housing units increased at a much slower pace (8.9%) for the same time period. Overall the township has a much older population compared to the surrounding municipalities and Monroe County as a whole. The largest percentage of citizens ranged between 35 – 54 years of age but the percentage of senior citizens (65+) 14.9% is much higher compared to the rest county at 12.3 %. As expected the percentage of school age children in Paradise Township is lower, 22.7% compared to Monroe County at 26.8% of school age children.

Paradise Township is expected to grow at considerably lower rates than Price and Mount Pocono but still increase in population at a faster rate than the state of Pennsylvania. The estimated population in 2010 is 3190, a 19.4% increase between the years of 2000 – 2010. With the population expected to climb to 3,510 in 2020, an additional 320 people would be looking for homes throughout Paradise Township.



Price Township

Price Township was established in 1798 and has a total area of 25.2 square miles. Of the 25.2 miles, 25.0 square miles are land and only 0.2 square miles are water.

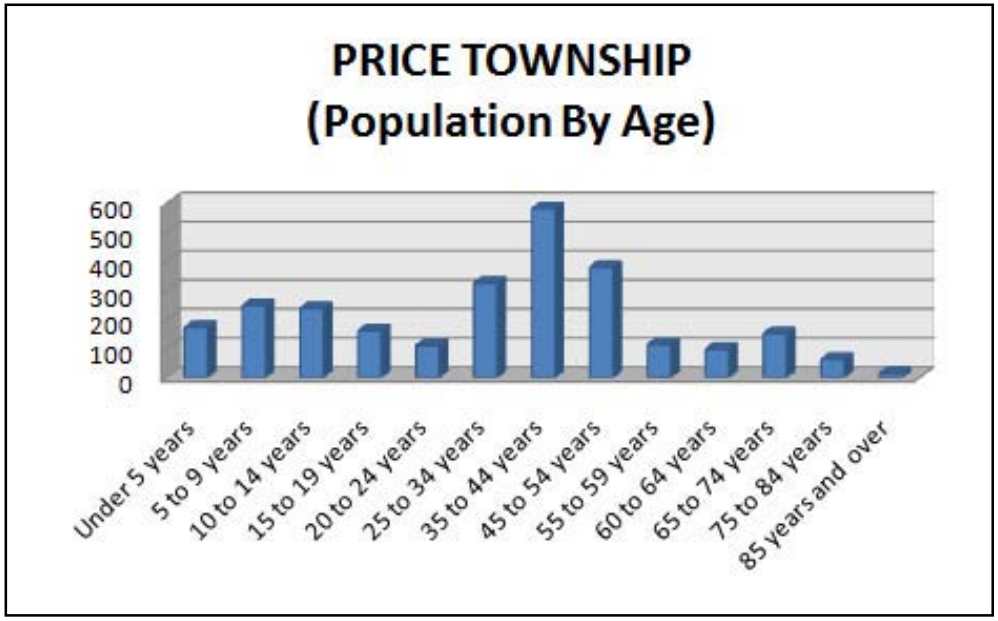
Like its neighbors, Price Township is experiencing population growth and rather remarkable visitation due to its proximity to the New York City Metropolitan area. It now has a population density exceeding the national average after years of having only a handful of persons per square mile. These changes and regional influences were succinctly described in a 1991 "Inventory and Analysis of Adjacent Land Uses" report published by the National Park Service. It studied those areas adjacent to the Delaware Water Gap National Recreation Area, stating the following: "In the 1970's a wave of development began moving westward into the Poconos along the Interstate 80 transportation corridor. Commuters and retirees were attracted to the area by its close proximity to metropolitan New York/New Jersey, affordable housing, lower taxes, and rural amenities.

The 2000 U.S. Census data showed 2,649 people lived in Price Township in 2000, an increase of 62.2% from 1990. This was a much smaller rate than the 138.7% increase the township experienced between 1980 and 1990, but of course, the base was small a decade earlier.

Given this history and the recent rebound in the economies of adjacent New Jersey and New York State from which Price derives its growth, it is reasonable to expect the current trend to continue at about the same level.

Price Township is somewhat similar to Monroe County as a whole insofar as age of the population is concerned, with 35.0% of the people under 25 years of age. The over 65 years age group, however, represented only 8.6% of all Price Township residents compared with 12.3% for the County, giving the Township a lower median age of 36.1 years compared to 37.2 years for the County. This reflects the large number of young families moving into the Township at the present time. There are also more school age children with 18.3% of children between the ages of 5 – 14, where as the state's percentage of population for the same age group is only 16.2% [2].

Of the four municipalities studied Price Township is the fastest growing municipality and is expected to remain that way through the year 2020. The population for Price Township is expected to come in at roughly 3,650 people in 2010, which would be a 37.8% increase over the last decade. The population increase is expected to accelerate during the next decade with an estimated population increase of 38.7% during these years.



2.2 Potential Greenway Use

A large amount of work concerning the demand and potential use of a greenway has already been completed by Monroe County in their Open Space Plan and thus it is quoted frequently in this section. A county wide survey was conducted in 1998 to determine the citizens preferences and opinions about parks, recreation, and greenways. The survey focused on five areas, one of which was greenways. Below are the survey findings on greenways taken from the Monroe County Open Space Plan:

- Nine out of every ten respondents support the "Godfrey Ridge" Greenway (the specific greenway segment examined in the Greenway Project Feasibility Study);
- About seven out of ten respondents would like to see greenways developed throughout the County. Over half would like to see them developed with multi-purpose trails and for environmental protection.

It is clear from the survey that Monroe County citizens want to expand their outdoor recreation opportunities. Of the five areas surveyed, greenways received the greatest response. Here is a quote from the Open Space Plan that summarizes their findings; *"Clearly, greenways are important in Monroe County. People support them whether they would use them or not. The survey findings also have important implications for planning and service delivery. People appear to want facilities developed as soon as possible. Proximity to the areas where people live is important. Protecting natural resources is extremely important. There is a great interest in leisure services, especially those geared toward year-round residents. Promoting the service and getting the word out about programs and facilities should be high on the County's parks and recreation priority list."*

In conjunction with the survey, key person interviews were conducted in order to gain more specific opportunities and concerns about Monroe County's open space. Results of the key person interviews mirrored the public survey in its findings. Some of the results pertinent to this greenway research are listed below:

Opportunities:

- The beauty and natural resources of Monroe County need to be protected;
- There is urgency about preserving open space before it is lost to development;
- While people acknowledge that open space is expensive, it is cheaper now than it will be in the future, therefore it is important to acquire it now;
- Keep as much open space as possible; Create trails and pathways for people to walk, run, and bike safely;
- Develop passive recreation facilities such as trails and picnic facilities.

Constraints:

- Open space is being lost too quickly;
- It is important to secure large parcels before they vanish;
- Monroe County's scenic beauty and charm is being tainted by development;
- There are not enough trails for people to walk, bike, and cross-country ski;
- Since there is no provision for motorized recreation vehicles outside of state forests, people ride where they can, often illegally;
- We need to provide for the year-round residents;

Upon completion of this countywide research initiative, four distinct conclusions were drawn that correlate very well with Upper Brodhead / Paradise Creeks Greenway plan.

1. Monroe County is one of the fastest growing county in Pennsylvania. Rapid growth will continue over the next two decades, adding another 80,000 people. Development pressure is intense. There is only a short window of opportunity to protect land and resources in the County.
2. Open space and natural resource protection is the top priority.
3. There is overall support for the development of greenways throughout Monroe County.
4. There is consensus on the need for parks that achieve a balance of recreation opportunities for people of all ages, interests, and abilities in all areas of the County. There was emphasis on the need to serve year round residents. [3]

Pocono Mountain's Visitor Bureau Research

At the beginning of this section, county and municipal demographics were discussed in great detail. It is important that this greenway plan best meet the needs of these residents but one thing that cannot be overlooked is the large amount of visitors this area receives yearly. Tourism is a strong industry in this region and this greenway plan could help or hinder the tourism industry.

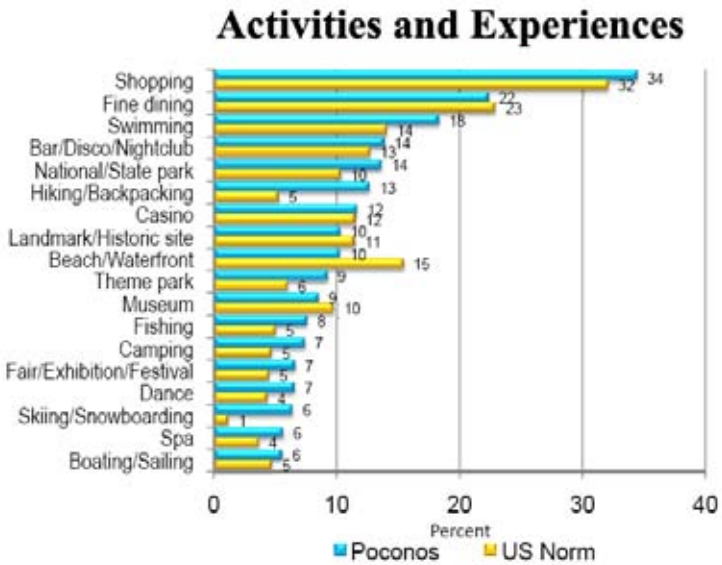
The Pocono Mountain's Visitor's Bureau did an in depth study concerning tourism in the Pocono Region. "According to the Bureau, overnight leisure travelers visiting the Poconos tend to be younger, college-educated couples who are employed in professional occupations and have annual household incomes averaging $55,000. They most often travel for getaway weekends by car from New York, New Jersey, and Pennsylvania, stay in hotels or motels, and participate in outdoor activities. On average, the travelers spend $83 per person per day." [4]

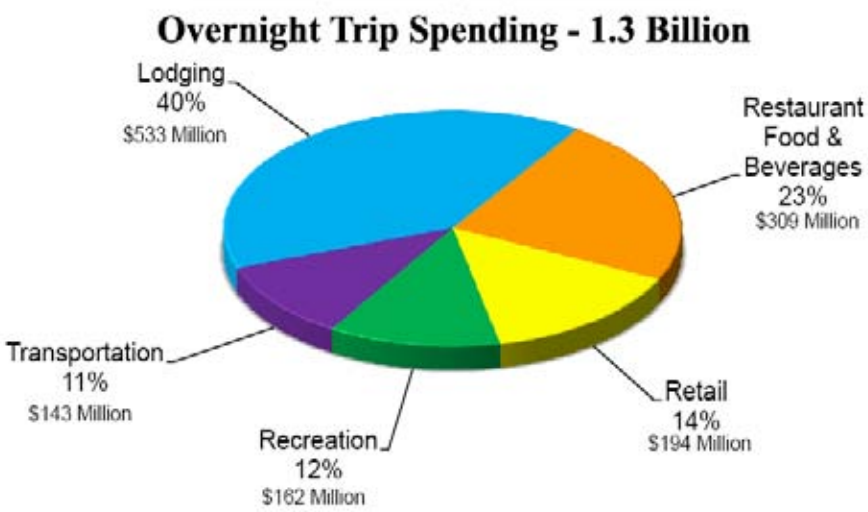
In 2008, Longwoods Travel USA also conducted a Visitor's Report detailing the tourism industry in the Pocono Region. The Pocono Region sees approximately twenty-four million visitors a year with eight million being overnight trips while the remaining sixteen million were day trips.

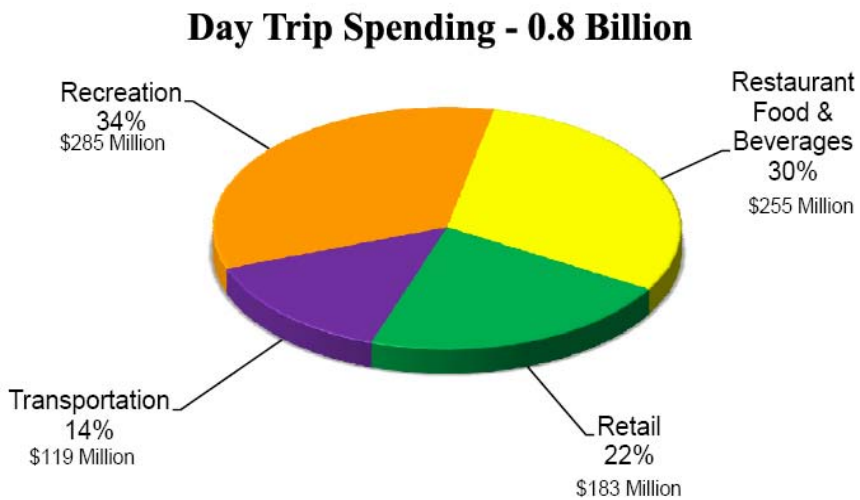
Those visitors participating in overnight visits spent 1.3 billion dollars while vacationing. Forty percent of those monies were spent on lodging with another twenty-three percent spent on restaurant foods and beverages.

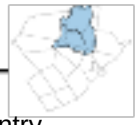
Those visitors participating in day visits spent 0.8 billion dollars while vacationing. Thirty-four percent of those monies were spent on recreation activities and another thirty percent on restaurant foods and beverages.

Further proof of the importance of how the scenic beauty of the Pocono region affects tourism is to look at activities participated in by both overnight visitors and day visitors. These visitors are almost twice as likely to participate in outdoor activities such as national/state park visits, skiing/snowboarding, hiking/backpacking, camping, etc. when compared to the US norm.









2.3 Profile of Greenway Users

Before one begins to establish design requirements for a trail it is important to have a good understanding of who will be using the greenway system. The purpose of this section is to provide background on the various types of trail users and to identify the desired experience of each. The following profiles are common assumptions made for each type of greenway user.

Handicapped - A number of small accommodations must be made to the foot and multiuse trails in order to ensure those with disabilities are able to enjoy the greenway. Such amenities as proper handicap parking and signage, necessary ramps, and proper trail surfaces should be incorporated throughout the greenway wherever possible. According to ADA standards a handicap accessible trail should not exceed a 5% slope. The best location to meet this maximum slope requirement is along the rail line where the slopes are kept very gentile for the trains. Another physically challenged demographic that can easily be accommodated within this greenway would be the blind. Guidelines (ropes are used to direct the blind on a trail) and educational braille signage can be inexpensively implemented along foot trails to accommodate the visually impaired. Trails for the visually impaired need not meet the maximum slope of 5% meaning that these trails can be located in areas of the greenway other than the rail line.

Pedestrians - Hiking and walking appeal to a wide array of people. Whether the pedestrian is looking to enjoy vistas and scenery, keep in shape, or look for an escape from the man-made world, trails provide ample opportunities to do this.

Fitness Walkers - Fitness walkers tend to look for short outdoor experiences where they can get their exercise in a pleasant environment and move on with the rest of their day. These walkers tend to look for short mile marked trail segments that either lead from one destination to another or loop back to their starting position. Fitness walkers tend to enjoy more commercial destinations such as coffee shops, art exhibits, and other small business

Hikers - Hikers use trails to enjoy the sites and sounds of the outdoors rather than obtaining cardiovascular benefits from walking. Hikers are generally more willing to travel along more difficult terrain and steep slopes in order to experience nature on their way to their destination or point of interest. Targets of hikers also tend to vary from those of fitness walkers. Hikers are usually looking for vista's, waterfalls, and historic sites as destinations rather than commercial areas.

Rock Climbers - Rock climbers also use trails but primarily to access climbing areas. Climbers prefer trails that provide quick, direct access to their climbing location.

Cross Country Skiers - Cross country skiers will tend to utilize a variety of trail types during the winter months. Like hikers, skiers enjoy the natural scenic vistas and overlooks that can be viewed while traversing the landscape. Cross country skiers also have the advantage of being able to view the landscape during the winter months.

Environmental Educators - Those in the education field will also benefit from added path systems that would be created through this greenway plan. Whether a corridor runs immediately adjacent to a school or is a few blocks or miles away, greenways offer opportunities for environmental education. These opportunities are facilitated by the development of a greenway trail system, which provides access to natural areas. Trails and interpretive signs provide the necessary facilities for educators to successfully run environmental programs.

Campers - Like hikers, campers seek the more natural points of interest such as waterfalls and vistas. While hikers intend to spend several hours in the outdoors, campers will spend several days in the outdoors. Due to the great distances campers travel, accurate directional signage is a must for these greenway patrons. Also, water sources and rest rooms should be regularly spaced along the trail system to ensure the camper ample hydration and comfort facilities.

Cross Country Athletes - While fitness walkers tend to be those individuals who exercise to maintain their general health, cross country athletes will use a trail system to increase their athletic performance. These greenway users look for various loop lengths (up to 100 miles or more) to constantly challenge their bodies. The cross country athlete is less interested in destination points, but enjoys grade and vegetation changes throughout their training experience.

Equestrians - Due to the heavy weight of horses careful consideration of trail construction must be taken into account. Horses and their riders require wider and taller trail corridors when compared to hikers and bikers. Also, horses require certain surface materials in order to prevent erosion from the forceful horse hoof prints. Also careful consideration must be paid to the placement of obstacles on the course. Obstacles should be placed to give the rider an appealing ride but not so difficult that any handicapped equestrian would have to dismount to complete the course. In all design elements, the safety of the horse and rider is paramount.

Boaters - Paradise Creek and Brodhead Creek present opportunities for kayaking and canoeing. Motorized boats will be off limits due to the pollution they can cause to the water. Point to point routes are preferred with ample boat launch sites and parking areas along the stream. Access to certain sections of streams may be an issue due to the private fishing clubs.

Fishermen - Fishermen tend to be men ranging in age from their forties to post-retirement age, but the sport is often participated in by all ages and both genders. Due to its popularity, designation of fishing areas is a very important aspect throughout the watersheds. Public fishing areas should be well marked, contain necessary parking, and trash disposal areas. Private fishing clubs should be aware that trespassing onto their lands may occur if their land is not properly posted.

Hunters - Like fishermen, hunters tend to be men ranging in age from their forties to post retirement age but hunting is often participated in by all ages and both genders. Hunting is also another important industry to this region with several large hunting clubs in the area. Also, the public hunting lands, State Game Lands 221 and the Delaware State Forest provide opportunities for those not belonging to hunting clubs. Unlike many other outdoor activities hunting is very limited to specific times of the year, most notably late fall and late spring.

Inn and Resort Users - These greenway users are similar to camp users in that they may travel from great distances and lodge at these inns and resorts. But unlike camp users these people will tend to sight-see via a vehicle instead of by bike or foot. In general, inn and resort users are often interested in the cultural and historical destinations as well as natural features. These type of users are often affluent and usually visit the natural amenities that their specific inn or resort offers.

Mountain Bikers - Mountain bikers tend to be in their late teens to thirties who are looking to enjoy the outdoors while improve their overall health. The classic mountain bike trail is the “single track,” which is a narrow pathway with many hills and sharp turns. Mountain bike trails can range from beginner trails with slight grade changes, wide riding corridors and smooth riding surfaces to advanced courses with constant grade changes, narrow riding corridors, challenging surfaces and hairpin turns. Signage is important along the trial to provide direction, indicate points of interest, and provide a measurement for distance traveled. It is best to provide a variety of trail types to accommodate as many mountain bikers as possible.

Biking classifications include:

Beginner Cross-Country Riders - Casual cyclists like gentle, relatively short trails with points of interest along the way to provide a place to rest. These riders prefer tracks with a stable smooth surface, wide trail corridors that are obstruction free, slight grade changes and gentle turns.

Avid Cross-Country Riders - These riders are experienced cyclists who are comfortable in the backcountry and typically carry tools, water, food, clothing and sometimes a first aid kit. Avid riders seek medium-to-long distance rides covering from 10 to 100 miles in a day and are prepared to take care of themselves. Solitude, nature and challenge are key elements of the allure. Several miles of

connecting loops with exciting natural obstacles are desirable.

Downhillers - These riders are technically advanced riders with very sophisticated equipment who desire steep, very difficult downhill trails. Downhill bikes are function specific and are geared mostly for going down hills. Rocky contour trails with many grade reversals are the most sustainable for this segment of the sport. Downhill riders will seek trails that have vehicle shuttle access from the top and bottom. Ski areas that provide summer lift service and amenities are popular with this user group.

Technical/Trails Riders - This group seeks very technical trails, incorporating features such as rock face drops, log rides, elevated bridges, stone ledges, dirt jumps, and seesaws. Some riders prefer to incorporate technical features into longer cross-country rides, while others look for these challenges as a stand alone experience. One compromise is special use technical areas, similar to snowboard parks at ski resorts that focus use. On backcountry trails, these technical features should be well built, blend with nature and flow with the trail.

On-Road Bicyclists - The Federal Highway Administration categorizes On-road bicyclists as follows: [5]

Advanced or Experienced Riders - Advanced or experienced riders are generally using their bicycles as they would a motor vehicle. They are riding for convenience and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with motor vehicle traffic; however, they need sufficient operating space on the shoulder to eliminate the need for themselves or motor vehicles to shift positions.[5]

Beginner Adult Riders - Basic or less confident adult riders who may use their bicycles for transportation purposes, for example, to get to the store or visit with friends, but prefer to avoid roads with fast or busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by the faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and multi-use paths and prefer designated facilities such as bike lanes or wide shoulders on busier streets.[5]

Children - Children, riding on their own or with parents, may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores and recreation facilities. Residential streets with low motor vehicle speeds, like those with multiuse paths, and busier streets with well defined pavement markings between bicycles and motor vehicles can accommodate children without encouraging them to ride in the travel lane of major arterial roads.

There is extensive literature relating to guidelines for on-road bicycle facilities. AASHTO and FHWA, as well as many states, offer a wide range of guidelines for various types of bicycle accommodations. There are essentially three types of on-road bicycle facilities: paved shoulders, shared roadways (including wide curb lanes), and bicycle lanes. All on-road bicycle facilities should be designed so bicyclists travel in the same direction as motorists.

Safety is of great concern in the design of on-road bicycle facilities. Conflicts with pedestrians, automobiles, or other bicyclists can lead to serious injury. Poorly maintained pavement, snow build-up and debris can also lead to safety problems.[5]

Endnotes

1. Mount Pocono Comprehensive Plan
2. Price Township Comprehensive Plan
3. Monroe County Open Space Plan
4. Source: D.K. Shifflet & Associates, LTD for the Pocono Mountains Vacation Bureau ch2 pg28

5http://www.fhwa.dot.gov/publications/research/safety/04103/03.cfm

Public Participation

3.1 - Committee Meetings
3.2 - Public Meetings
3.3 - Key Person Interviews

3.1 Committee Meetings

Introduction

A "Study Committee" was selected by the four municipalities to guide the greenway planning process. The committee was composed of three representatives of each of the four municipalities and a cross section of nine community members and stakeholders. Members of the Study Committee were responsible for guiding the greenway design process and acting as liaisons to the municipalities' elected officials, park and recreation boards and planning commissions. The Study Committee served in an advisory role throughout the development of the proposed greenway plan.

There were eight greenway study committee meetings held at the Barrett Township municipal building. These meetings were generally well attended and helped guide key person interviews and public meeting advertising, as well as providing general knowledge about the township/borough in which they lived.

The following section is a brief overview of the committee meetings; the full minutes for each committee meeting can be found in Appendix A.

Start-Up Meeting *April 23, 2009*

During the startup meeting the consultant explained the greenway planning process, and discussed the key goals of this Greenway Plan, which included Watershed Protection, Land Conservation and Preservation, Greenway Trails, Linkages and Connections, and the Creation and Expansion of Scenic Byways.

Committee Meeting #1 *May 28, 2009*

The major topic of discussion at the first committee meeting was how to assess the overall environmental health of the study area. McLane Associates suggested using water quality as a barometer, such as stream status, and identify land use and how it impacts water quality. The public survey was also briefly discussed. The study committee provided several topics of questioning for the survey and also suggested means for distributing them. It was agreed that a draft of the public survey would be ready for the next committee meeting.

Committee Meeting #2 *June 25, 2009*

A discussion of the "public survey" dominated the agenda of the second committee meeting. Committee members had many concerns about the survey, some of which included the survey being too academic and technical, too long, and how best to distribute them. Also, many committee members felt that the Monroe County Open Space Plan Survey provided an accurate assessment of the public's interests. After much discussion, it was decided that the survey would be put on hold and that an informational brochure may be more useful as a public education tool.

The committee also decided that key person interviews should take priority over the user survey in seeking public input. A list of potential key perons interviews was developed and included; watershed groups, hunting clubs, fishing clubs, associations, and large public and private landowners.

Committee Meeting #3 *July 23, 2009*

The third committee meeting focused on developing a strategy for soliciting the input and support of the numerous fishing and hunting clubs within the watershed. As large land owners, the committee deemed it important to include these clubs early in the planning process. It was decided that a meeting should be held with the clubs to inform them of the greenway planning process and solicit their questions and comments. Finally, the consultant was directed by the committee to prepare a draft informational brochure.

Committee Meeting #4 *August 27 2009*

The first draft of the greenway informational brochure was reviewed and several members of the committee thought the brochure narrative was "too technical" for people unfamiliar with the concept of greenways and watersheds. The Committee reviewed the brochure narrative line-by-line and removed jargon and simplified terminology.

The committee briefly discussed the upcoming meeting with fishing and hunting clubs within the study area. Because of the extent of their land holding, clubs were deemed extremely important to the success of the greenway plan. Committee members generally agreed that most sportsmen's clubs historically have fostered sound environmental stewardship of their lands.

Committee Meeting #5 *October 22, 2009*

The first order of business was getting the informative brochure printed and distributed. It was determined that the brochure would be printed by a local printing business and distributed at public

buildings throughout the study area on election day.

The next order of business was preparing the final agenda for the first public meeting to be held on November 19. The committee requested that the presentation be kept under twenty minutes in order to allow for plenty of time for questions and answers.

Committee Meeting #6 *January 28, 2010*

A model floodplain ordinance (proposed by the Monroe County Planning Commission) was brought up as an initial discussion point. A committee member commented that several years ago the county attempted to enact a model floodplain ordinance of a 100' buffer around all bodies of water. This ordinance was met with much resistance and never passed.

Potential scenic byways and hiker/biker trails routes were discussed at length. Also, the idea for an "Inn to Inn" trail was proposed, where tourists can make a vacation of hiking from inn to inn while their luggage is transported via vehicle.

The final topic of the meeting was how to "market" this Greenway Plan. It was agreed that water quality relating to health and recreation should be made the key "selling point" when presenting this plan to the general public.

Committee Meeting #7 *March 26, 2010*

The committee was briefed on the numerous key person interviews that were recently conducted. The committee members were pleased to hear that those interviewed were in support of the Greenway Planning efforts.

A presentation, meant for the next public meeting, was then presented to the committee for their review. Once again the committee commented that the presentation was "a little technical" for the general public and asked that the presentation be simplified before the public meeting. The consultant agreed to simplify the presentation.

Committee Meeting #8 *April 29, 2010*

The committee was first updated on the key person interviews that were completed to this date followed by the revised Power Point presentation for the second public meeting.

Land easements were the next topic of the meeting, where it was mentioned that there were many opportunities for easements on large parcels, but the land owners were primarily hunting and fishing clubs who, for the most part are opposed to public access on their parcels. Currently no clubs are willing to donate land for conservation easements. The final point was that there needs to be more of an emphasis on regional connections when discussing potential trail linkages within the two watersheds.

3.2 Public Meetings

Two public meetings were held in order to inform the local citizens about the greenway planning process and seek their input and support. The first public meeting was held in the Paradise Township municipal building on November 19, 2009 while the second meeting was held in the Price Township municipal building on May 28, 2010. The full notes for each public meeting can be found in Appendix A.

Public Meeting #1 *November 19, 2009*

The meeting began by providing an introduction to the project, then identifying the state, county and municipal involvement and funding commitments. The consultants also briefly described the make-up and responsibilities of the greenway study committee and provided an overview of the planning process (Scope of Work), and the PA DCNR's public participation, study documentation, and reporting requirements.

After introducing the planning process, a powerpoint presentation was given on the results of the greenway data collection and analysis.

The presentation was followed by a time of question and answer. Those in attendance raised several questions about High Quality and Exceptional Value Designations and the pros and cons of upgrading stream status. One man commented that scenic byways are a good way to help preserve the scenic lands that already exist within the watershed. The consultants stated that there are several opportunities within the watershed for scenic byways to enhance the arrival experience of tourists and visitors and that this could greatly benefit existing resorts and summer camps. Also, bike lanes in conjunction with scenic byways can enhance the recreational opportunities within the greenway.

Public Meeting #2 *May 28, 2010*

The meeting began with a brief introduction to the project and an overview of the greenway planning process. The preliminary draft of the Brodhead Creek / Paradise Creek Greenway Plan was presented in a powerpoint presentation.

The meeting was not well attended, but several questions where raised about the width of the proposed bikeways/byways and their affect on land adjacent to the roadway and there was some specific questions about signage and a "branding" an "image" or "identity" for the greenway.

There was some discussion on trails which included Mount Airy's recently approved eight mile trail system, which is located on private property and is expected to be open for public access. Other issues included the unauthorized use of ATVs, littering, and trespassing on private property

3.3 Key Person Interviews

Key person interviews were conducted in person by the consultant with people belonging to relevant organizations, major stakeholders and primary property owners within the greenway. The purpose of these interviews was to gather information and develop support in getting the plan implemented. Below is a brief overview of the key person interviews the entire interview can be found in appendix B. The company or organization interviewed is highlighted in **bold** text while the interviewee(s) names shown in *italic.*

Brodhead Creek Regional Authority

Ken Brown - Authority Manager

The Brodhead Creek Regional Authority is responsible for supplying water to much of Stroudsburg and the surrounding region. The Brodhead Creek Regional Authority's water sources consist of two wells located adjacent to the Brodhead Creek and a surface water intake located in the Brodhead Creek. Ken Brown noted that because of a glacial till valley area along the Brodhead Creek most of the Brodhead Creek Regional Authority's source water comes from a large land mass located at the top of their watershed (Barrett Township, Paradise Township, and Coolbaugh Township).

Ken also noted that because of the expansive watershed that provides the water, (the Upper Brodhead Creek watershed and the Paradise Creek watershed) it is not feasible for the authority to purchase lands to help protect water quality. Instead the water authority is looking to educate the public and persuade municipalities to enact strict laws aimed at protecting the existing water quality. Ken listed several means of water quality protection that the water authority is pursuing:

a) Persuade all municipalities that affect water quality to enact the model floodplain ordinance put forth by the Monroe County Planning Commission (Act 167).

b) Enact more regulations on septic tank maintenance. Ken pointed out that currently Pocono Township has a regulation that requires all septic tanks to be cleaned every four years. Ken says that this inspection helps maintain septic health and address any potential concerns before they become problems.

c) Ken would also like to see zoning be more stringent along stream corridors. For instance, a house right next to a buffer is not a large threat to water quality but a gas station located adjacent to the buffer is a much larger threat.

EAC Network

Carol Hillestad

Carol is part of the Environmental Advisory Council (EAC) for Paradise Township. This is a board appointed by the Supervisors to make recommendations on environmental issues that affect the township. Relevant issues may include open space acquisition, trails and historic preservation. Carol has a broad knowledge about land ownership within the township.

While Carol commended our effort to map out all possible conservation opportunities, she noted that this type of mapping had already been done by way of the yet to be adopted Paradise Township Official Map. (Carol later supplied Paradise Township's official map for the greenway plan)

Carol did point out several priorities on the official map:

1. Echo Farm a former 700+ acre hunting and fishing club.

2. The Heidt property that contains many wetlands but which the owners are still looking to develop.

3. The Vanskiver property as a possible trail easement that would link Skywood Park and Paradise Township municipal buildings together.

DCNR Bureau of Forestry

Nick Lylo – District Forester
Tim Ladner – Assistant District Forester
Tim Balch – Assistant District Forester

The forestry bureau was excited to hear about our greenway plan and offered several ways to link the State Forest Land with other public and private trail systems. Within the State Forest Lands there are several snowmobile/ pedestrian trails that could be used in conjunction with our proposed trail layout. Most likely the best way to connect the two western parcels of state forest land is via Schoolhouse Road. While other routes might be possible (along state owned roads), Schoolhouse Road is the most feasible.

The forestry bureau stressed that deer continue to be a large problem within the Delaware State Forest Land. The Bureau of Forestry has two ways to deal with the problem: 1) Deer Management Assistance Program (DMAP), a program that allows landowners to purchase extra deer tags, 2) construct deer exclusion fence meant to keep deer out of a particular area.

Brodhead Watershed Association

Don Baylor

Don Baylor, ab aquatic biologist, has sampled many streams within our area, and is also a member of the Brodhead Watershed Association. He answered several questions that were brought to the forefront by the committee regarding water quality.

Don mentioned that designating a stream as EV does not automatically qualify all streams that flow into it as EV. Only in the absence of data (ie. the streams are not tested) will tributaries automatically receive an EV designation.

Currently the HQ stream, Forest Hills Run, is listed as “impaired” because the water does not measure up to HQ standards. The largest reason for its decline is two large point sources, Mount Pocono’s and Mount Airy’s sewage treatment plants. The western most portion of Yankee Run until it reaches Tank Run is also in a poor state but has not yet received an “impaired” label

Don listed six sections of streams that he considered priorities for stream re-designation:

- The remaining HQ section of Devils Hole Creek
- Paradise Creek to Lake Crawford
- The remaining section of Mill Creek
- Cranberry Creek to Paradise Creek
- Yankee Run
- Tank Creek

Don did not have data on the Middle and Leavitt branches but he said they would be worth looking at because they already have a good fish population which is always a good indicator of stream health.

Skytop Lodge Naturalist

John Serrao

John Serrao is a local naturalist who works for several resorts within the two watersheds. John was interviewed in order to give us insight into the local forest’s health. John Serrao mentioned two major threats to watershed’s forest health.

The first is the Hemlock Wooly Adelgid which has been killing many hemlocks on the east coast for years. Hemlock trees play an important role in stream health because of their cooling affect on the stream and the shade they provide for fish. Hemlocks are also prime habitat for a variety of birds including the Blackburnian warbler and Acadian Flycatcher. The second major threat to forest health is the fragmentation of large forest lands. John noted that several animal species depend on large contiguous forest land for such things as mating and food supply. John said that severing these large tracts of forest with just a road can have a dramatic impact on certain species’ health. John also added that the Emerald Ash Borer and the Asian Longhorn Beetle are two less severe threats to the forest, but could become major problems in the near future.

Buck Hill Falls

John Styk

John Styk is the forest manager at Buck Hill Falls and a Barrett Township resident. John was able to provide us with information regarding Buck Hill Falls and property owners in Barrett Township

John commented that Buck Hill Falls was once very conservation minded but due to the economic downturn they are looking into developing portions of their 4,000+ acre parcel.

John was also very familiar with many residents in Barrett Township and their stance on land conservation. John was able to identify many large landowners throughout the township who may be interested in conservation easements and/or outright purchases.

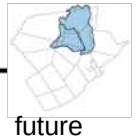
Monroe County Conservation District

Craig Todd - District Manager
Orianna Richards - Head Resource Conservationist

The conservation district noted that while many streams in our study area qualify for EV re-designation, HQ streams already bear strict ordinances and upgrading HQ streams to EV status would do little in terms of protection. A better means of stream protection may be requesting that each municipality place the Floodplain Ordinance, proposed by the Monroe County Conservation District, into their respective zoning ordinances.

The topic of conversation then turned to agriculture programs. Craig Todd stated that several parcels within our study area may qualify for agriculture protection programs but these landowners must take the initiative to get their land into these programs. It was suggest that we identify parcels that would be eligible for the agriculture program and approach them in our key person interviews.

Oil drilling also came up in the key person interview. Oil drilling could be a threat to the land and water quality within our study area. Currently neither the Township nor the County has any ordinances in place to regulate this industry.



Monroe County Planning Commission

Christine Dettore - Open Space Coordinator
George Basila - GIS Analyst
Sean Anlauf - Planner
Amy Seidel - Environmental Planner
Christine Meinhart - Senior Planner
Steven Rinker - GIS Coordinator/Manager

The planning commission noted that all four municipalities are in compliance with the minimum floodplain ordinance requirements, but once the new FEMA maps are released (probably some time in the summer of 2010) township ordinances will need to be updated. In regards to updating township ordinances, the planning commission also recommended that each township enact the proposed floodplain ordinance model. It was also suggested that the ordinance be "stand alone" as compared to it being lumped in with the zoning, SALDO, etc. because a "stand alone" ordinance generates the most influence.

Official maps, created on a township by township basis, is another very useful land management tool brought to our attention during this meeting. The Official maps indicate, along with a variety of other things, potential conservation opportunities.

The last topic of conservation during this key person interview discussed the over abundance of billboards located throughout the study area. In order to act upon sign ordinances, an inventory of all signs must be taken throughout the Townships. Only Barrett Township and Paradise Township have done so up to this point.

Paradise Fish Hatchery

Beth Martin - Sales & Marketing

Beth said the 120 acre farm allows some public access but several areas are off limits to the public for liability reasons. She also commented that the hatchery was once owned by her father and herself. They sold it on February 6, 2009 to Charley Conklin. Charley owns another hatchery in the western part of the state and plans to continue to operate the hatchery in much the same way Beth and her father did.

In regards to stream health, Beth stated that trout are a good indicator of high oxygen levels and the overall health of the stream. She said that the local fish clubs are the hatchery's biggest clients and without healthy streams throughout the region their business would greatly suffer.

Pike County Planning Commission

Sally Corrigan County Planning Director
Scott Boyce Community & Natural Resources Planner

A meeting was set up with the Pike County Planning Commission to locate possible byway and bikeway connections and to get their thoughts on land management tools.

The planning committee members identified Route 390 and 507 as potential byways high on their priority list to get state certified as scenic byways.

Along the lines of land conservation Sally & Scott pointed out that "conserved lands" in conservation subdivisions and "sending parcels" from TDR's must have conservation easements on them in order to protect them from future development. They also remarked that while both TDRs and Conservation Easements are good tools to preserve land, proper incentive programs must be in place in order to encourage developers to use these tools (e.g. septic systems, increased density etc.) They also recommended that joint zoning should be enacted to increase the effectiveness for TDRs. (To create more opportunity for "sending" and "receiving" parcels.)

Pocono Mountains Visitor's Bureau

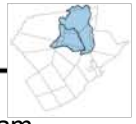
Carl G. Wilgus - Executive Director

A meeting was arranged with the Pocono Mountains Visitors Bureau to gather information about our greenway users. Carl was able to provide us with a study from Longwood Travels USA. This study gives detailed information about visitors to the Pocono Region such as length of travel and visit purpose.

Carl also feels that the patrons of Mount Airy Casino rarely interact with the rest of the community. One of the main reasons for this is that the Casieno provides all their lodging, dining and entertainment needs.

Several other pertinent facts gleaned from Carl G. Wilgus about the Pocono Region are:

- The Pocono Region hosts approximately twenty four million visitors a year.
- Visitors to this region are twice as likely to participate in outdoor activities when compared to the rest of the United States
- Visitors to this region are about 15% more likely to stay at a resort hotel when compared to the US average.



- Carl believes that Monroe county is not growing as fast as projected, but it's still growing at a faster rate when compared to the rest of Pennsylvania.
- Carl commented that Great Wolf Lodge /Water Park and Camelback Mountain Resort are the biggest draws to this area as opposed to the Mount Airy Casino.

Price Township Large Landowners

Paul E Nauman
Paul Dano
Don Cramer

A meeting was initiated with several large landowners in Price Township to get their reaction to the greenway plan

The initial reaction of those interviewed determined that they felt this plan would include a trail system through private property. The citizens interviewed were adamantly against cutting through their private property and believe many other landowners would also be against having trails through their parcels. Once we explained that this greenway would not cut through private property without permission of the residents where much more receptive to the greenway plan.

There was a mixed review on scenic byways and bike routes along 447 & 191. The two biggest concerns voiced by the key persons were the speed limits need to be lowered and that a bike trail would only increase the litter problem along these roads. But those interviewed were in favor of scenic byways to help enhance the countryside.

One citizen noted that gypsy moths have destroyed many white oaks on his property and throughout the region. It was suggested that our plan include some element of forest protection and invasive species control.

Skytop Lodge

Robert A Baldassari - Director of Sales and Marketing

Robert A. Baldassari was very receptive to our plan and said that a priority of Skytop Lodge has always been land preservation. So our greenway plan compliments their business ethics.

Robert noted that Skytop Lodge owns approximately 5,500 acres of which 400 are developed while the remaining 5,100 are undeveloped. He said that although the hiking trails on Skytop Lodge property are open to the public, those representing Skytop Lodge did not want to see the resort used as a park. Robert did express interest in a inn-to-inn trail system and thought this idea could be a good marketing tool.

Brodhead Forest and Stream

Doug Swift - member
Anonymous Consultant who was working with the club to improve fish habitat

Doug Swift is a member of the 1,300 acre Brodhead Forest and Stream hunting and fishing club. He was encouraged about the overall health of his club stating that the club's membership has remained fairly constant as long as he has been a member. He also remarked that many of the clubs throughout the region remain in good financial shape and have little or no plans of selling their land.

A consultant for Brodhead Forest and Stream, who wished to remain anonymous, identified sewer treatment facilities along with development as major threats to water quality. The consultant is working with the club to improve fish habitat using several techniques such as placing large granite boulders in the stream and planting stronger riparian buffers.

Doug mentioned that the hunting and fishing club is considering enrolling in PA's Clean and Green Program (Act 319). Doug was intrigued by the idea of a conservation easement and suggested his club might be open to a conservation easement as long as it did not require public access. He believes that many other hunting and fishing clubs might be open to easements if they were better educated on conservation easements. Doug was also in favor of stream re-designation because he says "it will not affect the activities of the Brodhead Forest and Stream club and would only improve their fish habitat."

The consultant was able to offer some insight into the history of both the Brodhead Creek and Paradise Creek. He said in 1955 much of Paradise Creek and Brodhead Creek were dredged and widened to prevent flooding. This activity has had several affects on the stream: 1) The widening of streams has created a shallow water depth which leads to warmer water and less habitat for essential macro invertebrates 2) The stream is still consistently trying to find a new path with stable soils for its banks thus erosion is a constant problem.

ISSUES AND OPPORTUNITIES

4.1 - Watershed Protection
4.2 - Land Conservation
4.3 - Bikeways
4.4 - Scenic Byways
4.5 - Multi-use Trail
4.6 - Footpaths

4.1 Water Quality Issues and Threats

People: The Greatest Threat To Water Quality

As stated earlier the high level of water quality is a major economic asset for this region and one factor that draws both permanent and temporary residents to the Poconos. Consequently, urban sprawl and rapid population growth have severe negative impacts on water quality and stream health. If people continually rework the landscape, the quality of water will deteriorate quickly. While population increase is often inevitable, growing the population in a way with the least impact is the only workable solution for protecting water quality.

Issue 1: Deforestation

Large areas of healthy forest cover, particularly on steep slopes and along floodplains, is often directly associated with areas of high water quality. Bernard Sweeney, a director of the Stroud Water Research Center stated, "*If you have a stream with very little forest cover, the water quality is very low.*" As presented in maps 4-2.1 and 4-2.2, the areas within the state with the highest water quality also have the most dense forest cover. For decades technology, to some extent, has replaced the filtering services provided by forests, but at a very high price. Literally billions of dollars are invested each year in construction and operation of water treatment plants to purify water that has been contaminated as a result of industrialization and urban development. In fact, water utilities spend nineteen times more on water treatment chemicals every year than the federal government invests in protecting lakes and rivers from pollution while using techniques such as conservation of forest land.[1]

The Forest Service estimates that nearly one million acres of forest were converted to developed uses each year in the 1990s. The Forest Service also estimates that by 2050, an additional twenty-three million acres of forests may be lost due to urban sprawl. Areas experiencing the largest loss of forested lands are often suburban and urban communities where municipal staff struggle to keep pace with the rapid growth and often have inadequate tools to manage it.

Several studies have been undertaken to assess the true costs of providing potable water in urbanized watersheds. A survey of twenty-seven water suppliers was conducted in 2002 by the Trust for Public Land and the American Water Works Association that found for every 10% increase in forest cover in the source watershed, treatment and chemical costs decreased by approximately 20%, up to about 60% forest cover.[2,3]

The relationship between protected forest areas and drinking water is discussed in *Running Pure,* a research report by the World Bank / World Wildlife Fund Alliance for Forest Conservation and Sustainable Use. Research found that approximately 1/3 of the world's 105 largest cities obtain a significant portion of their drinking water from protected areas and that well-managed natural forests benefit urban populations with high quality drinking water.

% of Watershed Forested	Treatment and Chemical Costs *per mil gal*	% Change in Costs	Average Treatment Costs *per day at 22 mil gal*
10%	$115	19%	$2,530
20%	$93	20%	$2,046
30%	$73	21%	$1,606
40%	$58	21%	$1,276
50%	$46	21%	$1,012
60%	$37	19%	$814

Figure 4-2.1

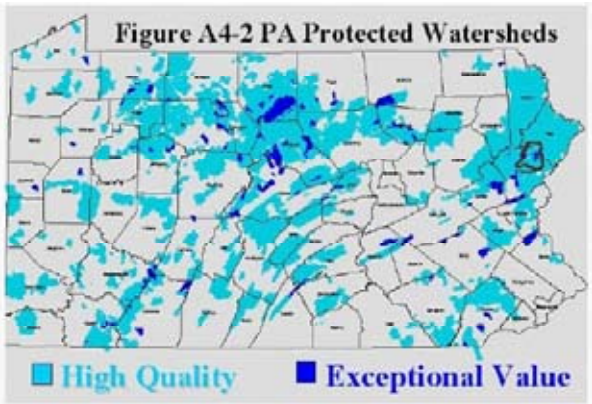
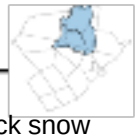


Figure 4-2.2



Issue 2: Human Development

With development comes numerous threats to water quality. One good example of how humans can impact water quality is the recent expansion of the nearby Pocono Jackson Joint Water Authority. Jackson Township's relative location to the Brodhead and Paradise watershed can be seen below. The water authority was awarded a $145,000 grant to help pay for new drinking water lines to serve the Village of Reeders in Monroe County, Pa.

The drinking water lines were needed because of seepage from a nearby Superfund site that contaminated groundwater. Prior to the contamination, citizens of this region obtained their drinking water from private wells. Due to the Superfund site's leak, the well water is no longer drinkable, forcing these citizens to buy their water from the water authority.

The $145,000 grant only paid for approximately 55% of the total cost to rebuild the new water lines required to serve the additional customers. The water authority had to cover the rest of the cost.[5]

In order to prevent a situation similar to this, careful attention must be given to activities that are permitted within the watersheds. Below is a description of potential sources of contamination resulting from urbanization in the Upper Brodhead/ Paradise Creeks watershed. The information below is taken directly from Stroudsburg Municipal Authority Source Water Assessment Report.

Auto Repair: Auto repair, storage and salvage facilities store and use a wide range of toxic substances such as gasoline, diesel fuel, motor oil, power steering fluid, brake fluid, antifreeze, refrigerants, battery acid, cleaning solvents, and contaminated water. Paint, paint thinners and other body repair material often contain metals such as arsenic, chromium, copper, lead, and mercury that are also considered toxic pollutants.

Golf Courses: Poorly designed or constructed golf courses, and/or inadequate operation and maintenance practices disrupt and degrade wetlands, floodplains, riparian zones, and forest cover that protect water quality. Golf courses may also use large quantities of fertilizer, pesticides, fungicides, along with other chemicals that are required to maintain fairways and greens. In some cases, chemical application rates can rival or exceed those used in intensive agriculture. Golf courses are typically built near streams and/ or lakes so rainfall events may result in carrying a large amount of pollutants directly into these waterways.

Salt Storage: Salt is generally stored close to the area where it is applied. The application of road salt is necessary to slow the accumulation of snow and prevent the formation of ice or hard pack snow on walks and roadways. However, salt, or sodium chloride, is so soluble in water that excess sodium and chloride is easily transported into surface waters. Sodium is a drinking water concern for individuals restricted to low-sodium diets due to hypertension (high blood pressure). While the use of salt to deice roads is necessary, certain practices can greatly decrease the possible contamination of water supplies. Facilities should be located on flat sites away from surface water and on impervious surfaces that are easily protected from overland runoff. The salt itself should be stored under cover to prevent loss due to runoff.

Boating: Boaters can have a negative impact on the environment due to the cumulative impact of small quantities of fuel being released directly into the lake. Should large quantities of fuel be released, the effect on raw water quality would be more serious and likely to cause respiratory, allergic and neurological illnesses.

Transportation Corridors/Bridges

Numerous roads traverse the Brodhead and

Paradise Creeks Greenway. Routes 380, 611, and 191 are among some of the most heavily traveled roads in that area. Road deicing practices and the potential for discharge of pollutants from auto accidents are real concerns along these transportation corridors. An accident on a bridge or along a stream would be the most serious, allowing a variety of petroleum products to contaminate the raw water. The persistence of petroleum products in the environment, the potential for discharge of large quantities of pollutants, and the variety of different locations throughout the watershed where accidents could occur are the main reason for roads being so detrimental to water quality. Likewise, bridges are also given an "A" ranking because a spill on a bridge or salt runoff from deicing may directly enter waterways.

Residential Developments: The Stroudsburg Water Authority has designated all residential developments within a 1/4 mile on either side of the Brodhead Creek or Paradise Creeks as potential places for contamination. Pollution from a residential development includes potential contaminant sources such as on-lot waste disposal, swimming pools, and lawn care practices. Wastewater, amonia, chlorine, and fertilizers can significantly affect human and environmental health if found in water supplies.

Wastewater Treatment: Removing contaminants to protect the environment is mandated by various federal and state laws, and generally keeps discharged contaminants within safe levels. However, situations can occur that release dangerous contaminants into the source water. Since treatment facilities are often adjacent to rivers, safety measures for accidental spills and flood control are critical. The upkeep of the collection and treatment system is also crucial. Excess inflow from manholes (stormwater) or infiltration (groundwater) may cause the treatment plant to exceed capacity, resulting in overflow into the receiving waters.

Quarries: Quarrying operations remove surface vegetation that increase siltation in streams and lakes. Turbidity is the result of suspended solids in the water. Turbid conditions may increase the possibility of waterborne disease, bacteria, viruses, and protozoans. Best management practices can greatly reduce turbidity in raw water caused by quarry operations. These practices include sediment basins, rock dams, silt fence, and vegetated filter strips.

Dry Cleaners: Chemicals used in the dry

cleaning process are denser than water and tend to sink quickly through media until they reach a water source. Contamination of source waters are usually the result of improper storage and disposal of liquid and solid wastes containing by products or pollutants from the dry cleaning processes.

Wood Treatment: Over time, chemical preservatives may leach from the wood (especially arsenic) and enter soil, subsurface and waterways. These chemicals are potentially damaging if consumed in high levels in drinking water. Copper, chromium and arsenic have the largest potential to cause problems that tend to be very serious. They may cause bladder, lung, kidney, liver and skin cancer.

Stables: Feedlots and grazing areas can be a source of drinking water contamination if wastes are not properly managed. The various types of microorganisms present in fecal waste cause severe illness and diseases if ingested through drinking water. Best Management Practices (BMP's) should be used to divert runoff from these areas away from streams, lakes and other waterways.

Issue 3: Natural Enemies of the Forest

While development and urbanization of the watersheds is the biggest threat to forest cover there are other biological forces not directly related to development. John Serrao, a Monroe County naturalist, pointed out several biological threats to the local forest.

Wooly Adelgid: The first threat comes from the Hemlock Wooly Adelgid which has been killing many Hemlocks on the east coast for years. Hemlock trees play an important role in stream health because of their cooling affect on the stream and the shade they provide for fish. As discussed earlier in this section, forest cover and stream quality are directly correlated. Since Hemlocks tend to grow near streams, the shade that they provide regulates stream temperature providing for a more bio-diverse fish habitat. Hemlocks also help to stabilize stream banks and increase aquatic biodiversity. Hemlocks are a prime habitat for a variety of birds including the Black Burnian and Acadian Flycatcher.[4]

Fragmentation - A second threat to forest health is the fragmentation of large forestlands. John noted that several animal species depend on large contiguous forestland for such things as mating and food supply. John said that severing these large tracts of forest with just a road can have a dramatic impact on certain species' health. It also should be noted that the disturbance is not isolated to the width of the new road. Rather, the road promotes invasive species colonization, and new light availability changes the species composition to several hundred feet from the road edge.

John added that the Emerald Ash Borer and the Asian Longhorn Beetle are two less severe threats to the forest, but could become major problems in the near future if there would be a sudden population increase.

Gypsy Moth: In certain years an overabundance of gypsy moths may reek havoc on the forest. These caterpillars can destroy hundreds of acres of forest in particular years of over-population. Oak stands of forest are most susceptible to gypsy moth, therefore the Pocono Region has seen an extensive decline in overall forest health.

Invasive Species: Japanese Knotweed is very prevalent along Brodhead Creek from the Route 390/447 intersection southward. John also mentioned Japanese Stilt Grass and several Barberry species as problematic plants invading forest land. The abundance of non-native plants compromises biodiversity which negatively affects both plant and animal habitats.

Overall, a healthy and intact forest and watershed will be more resilient to invasive species and more able to counteract any unavoidable anthropogenic pollution. It is necessary that our natural systems remain healthy so as to maintain their functional services.

Issue 4: Marcellus Shale Drilling

Marcellus shale drilling could potentially come to the Pocono region in the near future. It is important that the general public as well as the local governments are aware of the potential dangers that are associated with the natural gas drilling.

What is Marcellus Shale?

The Marcellus Shale is a black shale formation extending deep underground from Ohio and West Virginia northeast into Pennsylvania and southern New York. Although the Marcellus Shale is exposed at the ground surface in some locations in the northern Finger Lakes area, it is as deep as 7,000 feet or more below the ground surface along the Pennsylvania border in the Delaware River valley. Drilling activity is expected to focus on areas where the Marcellus shale is deeper than 2,000 feet.

Geologists estimate that the entire Marcellus Shale formation contains between 168 trillion to 516 trillion cubic feet of natural gas throughout its entire extent. To put this into context, New York State uses about 1.1 trillion cubic feet of natural gas a year. It is not yet known how much gas will be commercially recoverable from the Marcellus shale drilling.

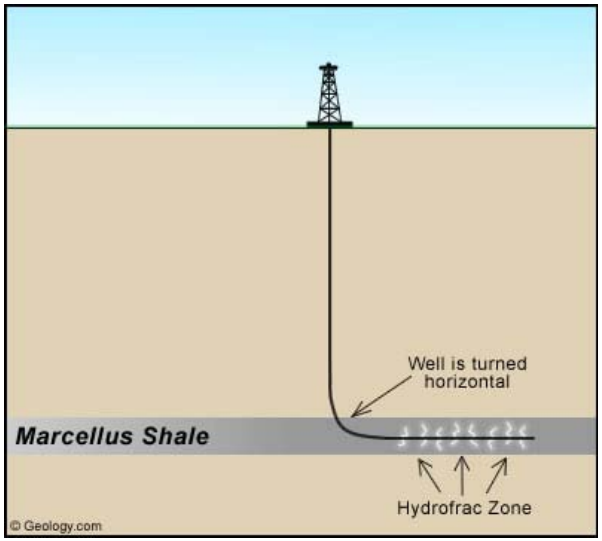
There are two types of drilling used to extract the natural gas, horizontal drilling and hydraulic fracturing. Both types of drilling are legal in Pennsylvania but the majority of miners use the hydraulic fracturing technique.

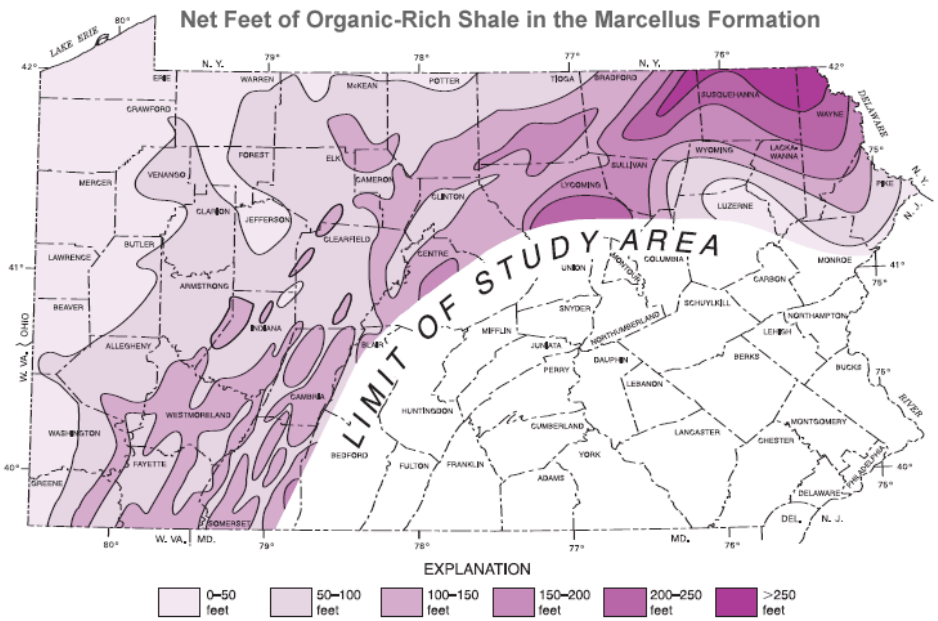
Horizontal drilling has been used since the 1980s. A "horizontal well" is first drilled down vertically to a depth above the target gas-bearing rock formation. Special tools are then used to curve the well so that the hole is drilled horizontally within the gas-bearing rock for up to several thousand feet. Approximately ten percent of all Marcellus shale drilling permits are for directional and horizontal wells. Except for special tools used underground, horizontal drilling is performed using the same equipment and technology as vertical drilling, with the same protocols in place for aquifer protection, fluid containment and waste handling.

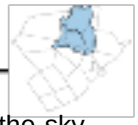
Benefits of horizontal drilling:

- There is maximum contact with the gas-bearing rock formation, so that more gas can be produced from a single well.
- Multiple horizontal wells can be drilled laterally from the same surface location, so that less of the ground surface is disturbed compared to using vertical wells to produce the same amount of gas.

Hydraulic fracturing consists of pumping water and frac material (a proprietary blend unique to each drilling company) down the well under high pressure to create fractures in the gas-bearing rock. The frac material (sometimes referred to as a "proppant") holds the fractures open, allowing more gas to flow into the well than would naturally. No blast or explosion is created by the hydraulic fracturing process, which has been used since at least the 1950s. Hydraulic fracturing technology is especially helpful for "tight" rocks like shale.







Environmental Problems with Drilling

Of course, nothing we do is environmentally neutral. Natural gas is a relatively clean fuel that promotes energy independence for a nation. However, gas extraction will have a significant impact on our water resources. First, billions of gallons of water will be taken from streams as part of this process. Some of this water is used for drilling with a resulting sludge composed of cuttings and drilling slurry. Also at each site millions of gallons of water will be converted to hydraulic fracturing fluid by mixing the clean water taken from streams with the frac material.

Environmentalists predict severe problems created by these chemicals that affect air quality, as well as aquifer and surface water pollution. It is not mandatory for drilling companies to disclose the chemicals in their fracking fluid, and therefore water treatment plants have little way of dealing with contamination. Open plastic-lined pits that store residual fluids may provide potential contamination from spills and leaks. Once emptied, the residue, along with the plastic liners, are generally left in place and covered with soil. Large impervious drilling pads can degrade the land, groundwater, and nearby streams. Additional environmental concerns involve pipelines, compression stations, drilling pads and wastewater storage pits that alter the landscape and disrupt wildlife habitats. Heavy drilling rigs and tank trucks severely damage roadways ill designed for such loads.

Drilling Regulation

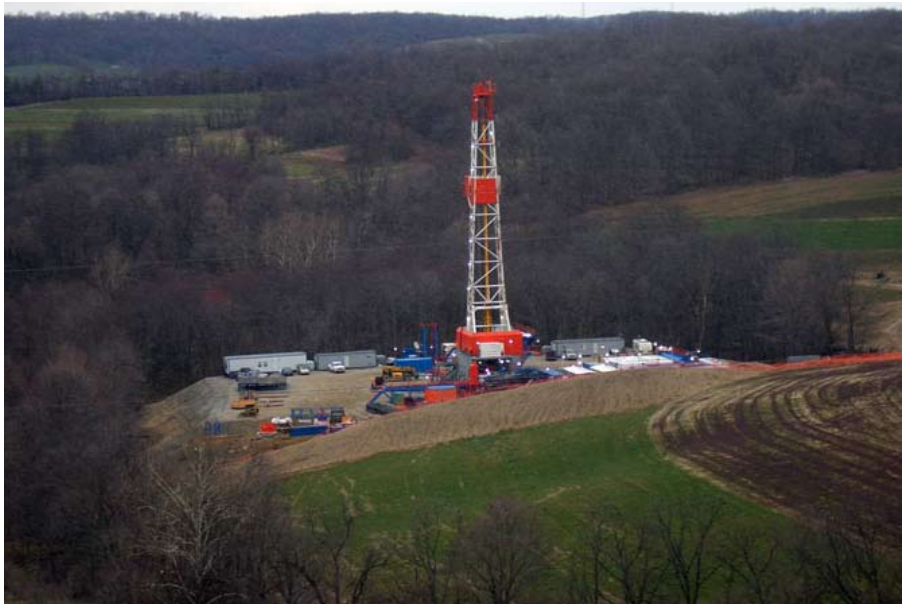
It has been said that all decisions are political ones. Marcellus Shale is the subject of legislation, litigation, and regulation. Currently anyone wishing to drill a well requires a permit under the Pennsylvania Oil and Gas Act. The state also requires environmental impact statements (EIS) for such activities and provides public input through its EIS process. Citizens can keep up-to-date with permit requests via e-alerts by contacting the PA Department of Environmental Protection (DEP). Although many agencies, commissions and departments have a limited regulatory role, the DEP is the most responsible for regulatory oversight.

Recent Drilling Problems

On June 4, 2010 DEP released a document saying that they were about to investigate a well blowout in Lawrence Township, Clearfield County.

At approximately 8 p.m. on Thursday June 3, 2010 the operators of the well, which is owned by EOG Resources, Inc., lost control of it while preparing to extract gas after hydrofracturing the shale. As a result the well released natural gas and flowback frack fluid onto the ground and 75 feet into the air. The well was eventually capped around noon on June 4.

DEP secretary John Hanger said "This was not a minor accident, but a serious incident that will be fully investigated by this agency with the appropriate and necessary actions taken quickly. When we arrived on scene, natural gas and frack fluid was flowing off the well pad and heading toward tributaries to Little Laurel Run and gas was shooting into the sky, creating a significant fire hazard.[15]



Another incident of Marcellus Shale drilling having a profound effect on the environment occurred in Dimrock. PADEP officials were forced to clean up as much as 8,000 gallons of dangerous drilling fluids after a series of spills at a natural gas production site in September of 2009.

The spills, which occurred at a well site run by Cabot Oil and Gas, involved frack fluid that was described as a "potential carcinogen" by several DEP investigators. The contaminants had seeped into a nearby creek, where a fish kill was reported by the state Department of Environmental Protection. The DEP also reported fish "swimming erratically."

The incident is the latest in a series of environmental problems connected to Cabot's drilling in the Dimock area. During the winter of 2008-2009 drinking water in several area homes was found to contain metals and methane gas that state officials

determined leaked underground from Cabot wells. And in the spring, the company was fined for several other spills, including an 800-gallon diesel spill from a truck that overturned.[16]

These two stories are just a small representation of the myriad of problems that come along with Marcellus Shale drilling. Of course, natural gas drilling does have its advantages such as a cleaner source of fuel, and the many jobs that come along with the drilling, but its extraction needs to be tightly monitored to prevent any more ecological disasters.

Delaware River Basin Commission

The DRBC provides protection to much of the Delaware Watershed (including our study area) through additional regulation and oversight. The DRBC has designated the Delaware River Basin from its headwater to Trenton as "special protection waters" to protect the quality and quantity of the region's water. All test wells and other gas drilling must only be done with review and permits issued by the DRBC, a regional body comprised of the governors of Pennsylvania, New York, New Jersey, and Delaware, and the Commander of the U.S. Army Corps of Engineers. DRBC has received many gas drilling permit applications, several for surface water and three for gas wells. The DRBC must refuse to issue all permits to facilitate gas drilling until a thorough regional Programmatic Environmental Impact Study is completed.[17]

The reason for the extra regulation is due to the fact that the Upper Delaware has been named America's Most Endangered River by American River. Each year since 1986, American Rivers has released its "America's Most Endangered Rivers" report to spotlight the nation's ten most imperiled rivers. The Delaware River tops this years list because of the Marcellus Shale drilling that is expected to come to the watershed. The Upper Delaware River, the drinking water source for 17 million people across New York, New Jersey and Pennsylvania is at risk from shale fracking for natural gas, a process that poisons groundwater and creates toxic pollution.[18]

"Unless we stop the threat of rampant shale fracking, the drinking water for 17 million people across the Northeast will be threatened by toxic pollution," said Rebecca Wodder, president of American Rivers. "We can't let natural gas companies fatten their profits by putting our precious clean water at risk."

American Rivers called on the Delaware River Basin Commission to ban any shale fracking in the Upper Delaware watershed until a thorough study of impacts is completed and the pollution potential of shale fracking is fully documented and assessed. American Rivers also urged Congress to pass the Fracturing Responsibility and Awareness of Chemicals Act of 2009 and to resist special interest pressures aimed at inclusion of federal subsidies of shale fracking for natural gas in upcoming energy legislation.[19]

Opportunity 1: General Land Preservation The first opportunity to protect water quality is through land preservation. It must be noted that land preservation directly affects water quality in the corresponding watershed. Most of the issues and problems mentioned in this section that threaten water quality can be avoided by practicing land conservation. Preserving land from development and maintaining its natural functions promotes infiltration, reduces channelized runoff and contamination, promotes natural drainage, and facilitates natural recharge to streams. In the next section (4.3), land preservation issues will be discussed in more detail, including both potential impedances and goals for preservation.

Opportunity 2: Model Flood Plain Ordinance One tool that each municipality can utilize is a model flood plain ordinance proposed by the Monroe County Planning Commission and supported by the Monroe County Conservation District. Not only does this ordinance provide more strict regulations regarding floodplains, but also places buffers on all streams, wetlands, and ponds.

All four municipalities have some type of buffer requirements throughout their individual zoning and SALDO plans. While these ordinances do provide some level of protection they are sometimes difficult to enforce because they are scattered throughout each municipality's planning documents.

It has been suggested by the Monroe County Planning Commission that the model ordinance be enacted as a "stand alone" ordinance given that a stand alone ordinance has the most power. Below is an excerpt taken from the Model Flood Plain Ordinance explaining/justifying the ordinance.

"There is a growing body of knowledge that has established the scientific basis for buffers around wetlands, vernal ponds, and lakes and along streams, to offset the impacts of development on water quality. The utility of buffers as a non-structural BMP has been well-documented and in every case the retention of vegetated buffers has demonstrated positive water quality benefits. Non-structural BMP's, like vegetated buffers, have several advantages over structural controls. Chief among these are allowing natural processes to renovate non-point source pollution. Non-structural controls require little or no maintenance, while structural controls require routine maintenance. An analysis of existing stormwater management structures, conducted as part of the Paradise Creek Watershed Assessment and Protection Plan project, found that 80% of them were either constructed improperly or are failing due to lack of maintenance. In addition, the use of buffers as non-structural stormwater management tools will also allow for the implementation of green infrastructure identified in all of the Regional Open Space plans developed in the last five years. The purpose is to establish buffer requirements for new development which will ensure that anti-degradation standards are met in the special protection waters of the Brodhead Creek and McMichaels Creek watersheds.[6]"

Last year (2009), forested buffers and their relation to high water quality were discussed at the Pennsylvania State Capitol. The House Majority Policy Committee hosted the meeting where they discussed whether or not the state should require minimum buffers along waterways. No resolution was attained therefore Pennsylvania still has no required vegetative buffers. Maryland and Virginia already have minimum buffer requirements enacted which means Pennsylvania is behind the curve.

In March of 2010 Pennsylvania Department of Environmental Protection proposed changes to existing regulations which would potentially require 150-foot buffers for exceptional value waters. One legislator, Barbara McIlvaine Smith (D-156), is

considering legislation requiring 100 foot minimum buffers on all streams and waterways regardless of status. McIlvaine Smith also said the DEP's proposed regulation does not go far enough because of the large number of impaired streams in the state.[7]

By enacting the model flood plain ordinance, it is clear that each municipality would be well ahead of the norm when compared to the rest of the state in terms of buffers.

Opportunity 3: Stream Status Upgrade From CWF-HQ to CWF-EV Status: A second tool that could be implemented to protect water quality would be redesignating several streams from CWF-HQ (Cold Water Fishery – High Quality) to CWF-EV (Cold Water Fishery – Exceptional Value.) As seen on the "Stream Designation Map" (24 x 36" map at the end of the report) all streams within our watersheds are listed as either HQ or EV.

Pennsylvania has two Special Protection categories (Exceptional Value and High Quality) that are based, at least in part, on biological integrity. Exceptional Value streams are considered the best Cold Water Fisheries and have the most strict levels of protection on them, whereas High Quality streams have slightly less strict levels of protection. Since these are relatively rare and important water resources, Special Protection is granted by Pennsylvania to protect all existing uses of the stream (i.e. by aquatic life and humans) and to safeguard the quality of its water.

There are more than 80,000 miles of streams and rivers in Pennsylvania, more than in any state except Alaska. An estimated 4% of the state's streams have been awarded additional protection as Exceptional Value streams, while about 27% have been classified High Quality.[9] This further showcases how unique these two watersheds that comprise the study area really are and why there is such a need to protect them.

Upgrading from HQ to EV: Even though all streams within the watersheds have a high level of protection at HQ designation, redesignating streams as Exceptional Value will provide even more protection. In High Quality streams, water quality can not be lowered except in the event that a stream discharge is the result of "necessary social or economic development". Upgrading to EV status would prevent the possibility of stream degradation whereas keeping the status quo of HQ status would still allow for the possibility of stream degradation. When waters are designated as EV or HQ, existing activities are "grandfathered" and can continue in their current form.[10]

Of course, upgrading to EV status will have a significant impact on several area assets including:

Farming: In EV watersheds, existing farming operations are not affected. Existing permits for larger operations, such as Concentrated Animal Feeding Operations (CAFO's) would be grandfathered and no changes would be needed as the result of the EV classification. For new or expanded CAFO's, permit requirements are designed to prevent stream degradation, but CAFO's could still be built.[11]

Development: EV designation will not bar development, but will ensure that associated activities are subject to more stringent requirements. Developers will have to examine siting alternatives, minimize the extent of earth disturbance, and maintain or install riparian buffers when working along an EV stream. In addition, developers must utilize the best available management practices and demonstrate that any stream discharge will not degrade the water. As an alternative to direct sewage discharges into an EV water, proponents must consider land application of wastewater or other alternatives that avoid stream degradation. Developers will also be required to minimize direct stormwater discharges to the maximum extent possible through the use of infiltration and other techniques that will maintain

clean water. Furthermore, many activities proposed in EV watersheds are subject to more stringent individual permit requirements rather than general permits. The state has issued many permits for residential, commercial, and industrial activity in EV watersheds, but proposals for these developments had to demonstrate that they would not adversely affect the stream.[12]

Wetlands: Under an EV designation, only those wetlands located in or along the floodplain of an EV watercourse are protected. These wetlands will be given greater protection, and the permits required for filling or otherwise impacting them are more difficult to obtain. Other wetlands in the watershed will be protected at the current level.

Opportunity 4: Protect Against Potential Impacts of Marcellus Shale Drilling

Several methods to protect the Pocono region against Marcellus Shale drilling are presented in this plan. This is not an all inclusive list, it is just a starting point. The rules, regulations, and research concerning the drilling is being updated on a continual basis. Local officials must keep themselves up to date in order to make the most informed decisions possible.

Propose A Ban On Marcellus Shale Drilling Near Water Sensitive Areas

On August 6, 2008 New York City officials demanded a ban on natural gas drilling near upstate reservoirs because they feared the drilling could contaminate the city's drinking water. They've asked the state Department of Environmental Protection to establish a one-mile protective perimeter around each of the city's six major Catskill reservoirs and connecting infrastructure -- a buffer that would put at least half a million acres off-limits to drilling. New York is one of just four major cities in the United States with a special permit allowing its drinking water to go unfiltered, and that pristine water comes from a network of reservoirs and rivers in five upstate counties. If the special permit was revoked, the city would have to build a treatment facility that could cost nearly $10 billion, said Walter Mugden, a senior official at the U.S. Environmental Protection Agency. That's roughly what the state estimated it would earn from gas development over the next decade.[20]

Of course the Pocono region is a far less dense area than New York City, but such entities as the Brodhead Water Authority rely on the healthy water supply they receive from the Brodhead / Paradise Creek watersheds to meet the drinking needs of the Pocono population. If the watershed were to ever get contaminated from the gas drilling they, like New York City, would be forced to build additional treatment facilities to handle the water. Those within the Poconos could petition PADEP to enact gas drilling buffers similar to those around the Catskills to ensure their water remains untainted.

FRAC Act

At the federal level, the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act of 2009 (S.1215/H.R. 2766 was introduced by several senators and state reps from Pennsylvania, New York, and Connecticut. This legislation would repeal the exemption for hydraulic fracturing in the Safe Drinking Water Act and require disclosure of the chemicals used in the hydraulic fracturing fluids. The FRAC Act must be passed by Congress to improve the protection of drinking water throughout the Marcellus Shale region. As of June 27, 2010 the FRAC Act was still in the early stages of deliberating at the committee level. The bill has yet to come before the Senate or the House for a vote.[20]

This bill was actually proposed by Senator Robert Casey on June 9, 2009. Requiring gas companies to reveal what chemicals they use in their hydraulic fracturing fluid would go a long way

in preventing disasters. Pocono citizens will need to continue to push Senator Casey to get the bill to a vote before the drilling comes to the Pocono Region.

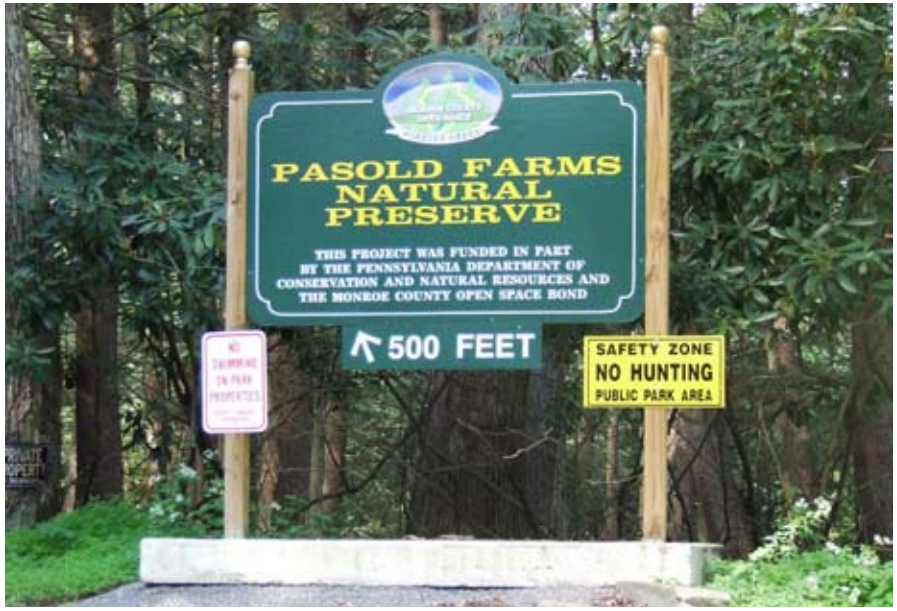
Utilize Damascus Citizens for Sustainability

Damascus Citizens for Sustainability (DCS) is a grassroots nonprofit, 501(c)(3), organization dedicated to protecting the Upper Delaware River Basin and beyond from the ravages of deep-shale gas extraction and the threat posed by the natural gas industry. This organization has done many things to help protect water from the adverse affects of natural gas drilling. In 2010 the Damascus Citizens filed multiple legal actions that challenge the failure of the Delaware River Basin Commission to review ten "exploratory wells" within the "Special Protection Waters" of the Upper Delaware River Basin Watershed. The DCS also facilitates presentations to help inform the general public of the dangers of gas drilling. More than 300 area residents attended a June 2008 public meeting highlighting the timely interest in this topic.

Protection Through Zoning

Municipal regulation of shale gas drilling is extremely limited due to preemption by the Pennsylvania Oil and Gas Act. Aside from road bonding and maintenance agreements, local officials have very little control over the location of wells, on-site safety, water supply protection, permit notification, and well-site bonding. While zoning, subdivision, and/or land development ordinances may be used "to guide growth and development that results from the gas boom and to protect community assets" (Pennsylvania Department of Conservation and Economic Development, n.d.), they cannot be used to regulate gas operations already covered by the Oil and Gas Act. Attempts to clarify their authority, or lack thereof, have left municipalities without recourse except through court action. For example, local officials have gone to court to reconcile their legislative powers as set forth in the state's Municipal Planning Code with the largely preemptive state Oil and Gas Act.[7]

In February 2009, the Pennsylvania Supreme Court handed down decisions in two pivotal cases, Huntley & Huntley v. Borough Council of the Borough of Oakmont and Range Resources-Appalachia, LLC v. Salem Township. Although far from identical, both rulings validate some degree of municipal authority through traditional zoning ordinances that designate particular land uses. Not surprisingly, the rulings also leave room for interpretation. But, Holly M. Fishel of the Pennsylvania State Association of Township Supervisors (PSATS) pointed out, "These are important rulings for local government because oil and gas well drilling is now treated like every other use and subject to reasonable land use regulations" (2009, August 19). Elam Herr, a director of the same association further said, "We are not asking to regulate drilling, which would duplicate state regulations, but to have oversight of well locations, like other uses."



The PSATS has identified several other salient issues. These include: road damage caused by extensive heavy truck use and 30-year-old road bonding limits far below current repair costs; the lack of notification requirements to the appropriate municipalities and counties once DEP has granted a permit; possible contamination of private water wells; insufficient number of treatment facilities for wastewater; limited resources and expertise available to local and volunteer fire departments for handling well fires; and the current exclusion of oil and gas reserves from property tax assessment (coal and other minerals are allowed to be assessed with a property tax).[22]

4.2 Land Preservation Issues and Threats

When viewing a map of the Upper Brodhead and Paradise Creek region, one may get the impression that the watersheds contain ample open/green space with a very large percentage of high quality and exceptional quality streams. While this is currently the case, it is important to understand that fishing clubs, hunting clubs, resorts, and camps own a large percentage of open/green space and stream frontage and there is no assurance that they will continue to serve this stewardship role. These large tracts of land are constantly under development pressure because of the ever-growing population. Thus, it is important that each township have safeguards (i.e. zoning ordinances, SALDO's, etc.) in place to prevent any degrading development practices that could occur on these parcels if they were to be sold to developers. Recognizing greenway opportunities in the early planning of these projects can help build a greenway system, protect stream resources, and provide positive results for local citizens and the developer.

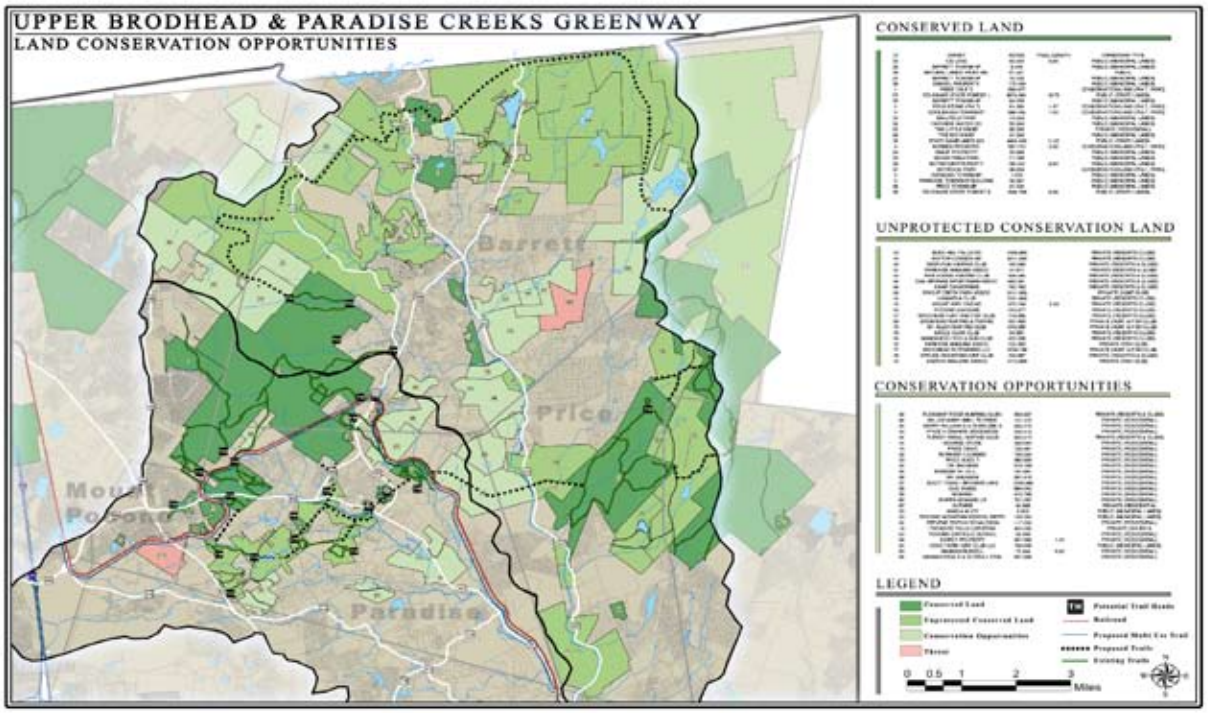
The Land Conservation Opportunities Map to the right is a starting point for identifying key parcels along several conservation and recreation corridors within the Greenway. (please see the 24" x 36" version of this map is provided in the back of the document)

The "Conserved Lands" parcels in dark green are already protected lands. The Delaware State Forest and Game-Lands 221 anchor the undeveloped land map while other parcels such as the Kurmes Preserve and Skywood Park continue to add to the already protected lands.

The "Unprotected Conserved Lands" in medium green are very critical to the green infrastructure of the watersheds. Many fishing clubs, hunting clubs, resorts and camps fall into this category. As stated earlier, while a large percentage of each one of these parcels remains forested, in time they could become developed. For instance, about fifteen years ago Camp Canadensis, a 750+ acre camp in Barrett Township, had development concepts prepared by a local developer. Even though Camp Canadensis has not executed those development options it should be noted that they are willing and ready to sell their land if their business fails to remain profitable. Camp Canadensis owns approximately 750 acres of land, much of which is forested. If this large tract of land were to be developed, the several hundred homes minus the large forested areas would have a profound effect on water quality.

Municipalities and Land Trust Organizations should be mindful of any such development plans. Should any one of the large landowners decide to sell their land, the municipalities and land trust organizations should be prepared to capitalize on these potential conservation opportunities.

The "Conservation Opportunities", in light green, are parcels that have been identified as possible conservation opportunities. These landowners, identified through key person interviews, could be open to such ideas as conservation easements, simple fee purchases, or pubic access for trail use.



Opportunity 1: Official Maps

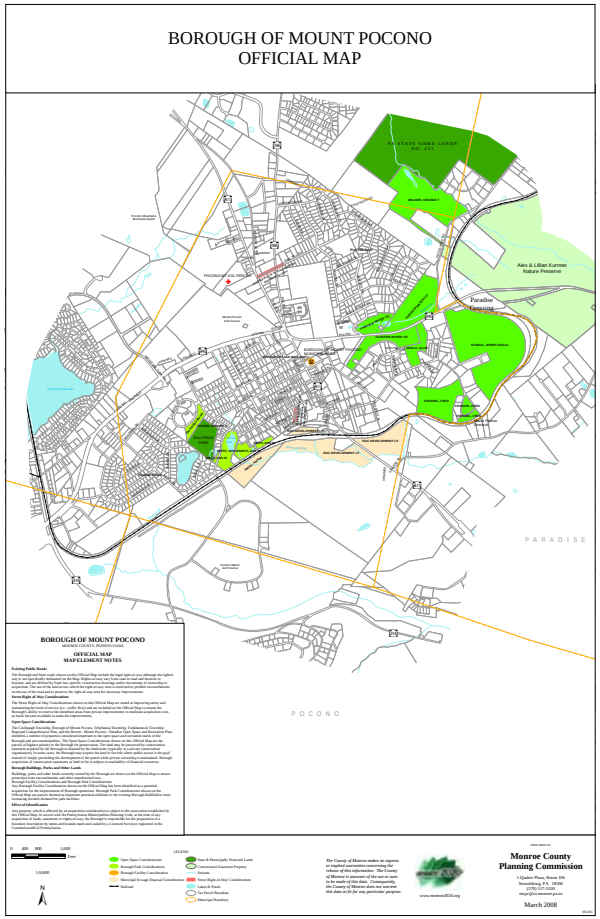
One opportunity that each municipality can utilize to acquire and protect land is an Official Map. Currently only Mount Pocono Borough has an official map while Paradise Township has an official Map in draft form. The Land Conservation Map provides a good starting point for Barrett and Price Township Official Maps.

(The following explanation of official maps was taken from a Official Map Fact Sheet provided by the Monroe County Planning Commission.) Zoning ordinances, subdivisions, and land development ordinances have historically been the primary land use management tools used by Pennsylvania municipalities. However, in addition to these land use management tools, the law provides for the adoption of the Official Map. Specifically authorized by Article IV of the Municipalities Planning Code, the Official Map enables municipalities to designate specific properties and areas important for community needs. Few municipalities in Pennsylvania have adopted an Official Map.

The Official Map is used to further the execution of the comprehensive plan, open space and recreation plan, road improvement plan, greenway plan, and other identified planning goals. The official map does this by identifying both private and public lands for the public which have a current or future need. The property owners are then informed of the planned public improvements and land/easement acquisitions.

A wide variety of elements can be shown on the official map as long as they are consistent with the requirements of the Municipalities Planning Code. The following list includes both features specifically identified in the Planning Code and additional features that are often important to the quality of life in a community.

- Existing and proposed public streets, watercourses, and public grounds, including widening, extensions, openings or closings
- Bikeway routes (both separate trails and those proposed along existing roads)
- Existing and proposed public parks, playground, and open space reservations



- Pedestrian ways and easements
- Railroad and transit right-of-ways and easements (including those that may be vacated or abandoned and have potential use as trials)
- Stream valley corridors and other environmentally critical areas such as unique and scenic areas, or habitats of endangered species
- Flood control basins, floodways, and floodplain, stormwater management areas, and drainage easements
- Potential public well sites or groundwater resources areas
- Significant historical and archaeological areas
- Sites planned for public facilities such as municipal buildings, police and fire stations, libraries, community centers, and schools

Benefits of Official Maps

- Provides for the coordination of public and private goals. Property owners are informed, up front, of long range municipal goals for roads, parks, other public facilities and conservation easements. This allows development plans to be adjusted before detailed and costly plans are prepared.

- Provides an effective method for implementing the Comprehensive Plan, the Open Space Plan and other planning goals. Most municipalities rely primarily on their zoning and subdivision ordinances to advance their future land use goals. The Official Map provides an additional and highly effective tool to ensure that a municipality is developed in accordance with its land

use policies. It is particularly effective for achieving transportation and community facility goals. The implementation of an open space or park and recreation plan can benefit from the designation of existing and proposed parks, related facilities and conservation easements on the Official Map.

- The Township can plan ahead to provide community facilities, parks and open space important to the community. By setting aside funds for the eventual purchase or easement of the identified acres the Township can use limited resources to the best long term advantage. Priorities can be established instead of reacting to unanticipated needs or undertaking uncoordinated acquisitions.

Official Maps help with grant applications. When the Township applies for grants or other funding, the Official Map can provide an advantage, such as specific features on the Official Map indicating a commitment to purchase the land or easement and/or make improvements. For example, mapping future parks or recreation facilities demonstrates that the township has planned ahead for these improvements, and could be considered when grant applications are reviewed.

Common Myths Regarding The Official Map

- The official map is not a zoning map. The official map is often mistaken for the zoning map or the future land use map in the comprehensive plan. In fact, the official map is a separate, legal document adopted in accordance with the requirements of the Pennsylvania Municipalities Planning Code

- The Official Map does not have to be surveyed. Other methods can be used provided the location of the Official Map components are sufficiently described. The metes and bounds survey is not required until an actual purchase of land or easement is proposed.

- The Official Map does not imply municipal responsibility for opening, maintaining or improving mapped roads. The inclusion of proposed streets or land/easements acquisitions on the Official Map does not constitute the opening or establishment of the street, the taking, or acceptance of land. Nor does it obligate the Township to improve or maintain such streets or land until the time of formal acceptance or purchase.

- The Official Map does not constitute a taking of land. Although a property owner cannot build within mapped areas, the owner is free to use any unmapped portions of the land in whatever way the Township ordinances allow. If a property owner intends to subdivide or develop land reserved on the Official Map, he must submit written notices to the municipality of these intentions. Following notification, the Township has time to purchase the land or obtain an easement. If necessary, the Township may use condemnation proceedings to acquire the land.[13]

Opportunity 2: Fee Simple Purchase

Fee Simple Purchase is a form of land purchase or entitlement to land; more specifically it is a form of freehold ownership. It is the most common way real estate is owned in common law countries, and is ordinarily the most complete ownership interest that can be had in real property, short of allodial title, which is often reserved for governments. Fee simple ownership represents absolute ownership of real property but it is limited by the four basic government powers of taxation; eminent domain, police power, and escheat. Fee Simple could also be limited by certain encumbrances or a condition in the deed. How ownership is limited by these government powers often involves the shift from allodial title to fee simple such as when uniting with other property owners acceding to property restrictions or municipal regulation.

There are several examples of fee simple purchases throughout each of the four participating municipalities. These fee simple purchases currently serve as municipal buildings, parks, etc. Several land trusts have also made fee simple purchases such as the Kurmes Preserve and Pasold Farms. Usually a fee simple purchase is not

the most economic way for a land trust organization or municipality to acquire land but it is a powerful tool nevertheless.

Opportunity 3:Transfer of Development Rights

Another tool that each township could utilize is a Transfer of Development Rights program (TDR). Currently, only Price Township has an ordinance allowing for a transfer of development rights.

TDR programs allow landowners to transfer the right to develop one parcel of land to a different parcel of land. Generally, TDR programs are established by local zoning ordinances. In the context of open space protection, a TDR is used to shift development from agricultural areas to designated growth zones closer to municipal services. The parcel of land where the rights originate is called the "sending" parcel. When the rights are transferred from a sending parcel, the land is restricted with a permanent conservation easement. The parcel of land to which the rights are transferred is called the "receiving" parcel. Buying these rights generally allows the owner to build at a higher density than ordinarily permitted by the base zoning.

TDR programs are based on the concept that property owners have a bundle of different rights, including the right to use, lease, sell and bequeath the land, borrow money using it as security, construct buildings on it and mine it, subject to reasonable local land use regulations. Some or all of these rights can be transferred or sold to another person. When a landowner sells property, generally all the rights are transferred to the buyer. TDR programs enable landowners to separate and sell the right to develop land from their other property rights.

TDR programs are most suitable in places where large blocks of land remain in undeveloped states. In communities with a fragmented undeveloped land base, it is difficult to find a viable sending area. Jurisdictions also must be able to identify receiving areas that can accommodate the development to be transferred out of the sending area. The receiving areas must have the physical capacity to absorb new units, and residents of those areas must be willing to accept higher density development. Often, residents of potential receiving areas must be persuaded that the benefits of protecting open space outweigh the costs of living in a more compact neighborhood. Most TDR transactions are between private landowners and developers. Local governments generally do not have to raise taxes or borrow funds to implement TDR. A few jurisdictions have experimented with public purchase and "banking" of development rights. A TDR bank buys development rights with public funds and sells the rights to private landowners. TDR programs can be designed to accomplish multiple goals including open space protection, conservation of environmentally sensitive areas, and preservation of historic landmarks.

Opportunity 4: Conservation Easements

There will be a greater need for Conservation Easement programs if TDR programs are developed, official maps are drafted and approved, and conservation subdivisions become more widely used. Below is a list of the most prevalent land trust organizations used in the Pocono region and a brief description of each (in their own words)

Natural Lands Trust - Natural Lands Trust is the Philadelphia region's largest land conservation organization, saving thousands of acres of forests, fields, streams, and wetlands each year.

Since 1953, they have worked

to protect landscapes in eastern Pennsylvania and southern New Jersey by preserving and caring for natural lands, healthy habitats, and clean watersheds for the benefit of native plants, wildlife, and current and future generations.

They own and manage 42 nature preserves, totaling over 20,000 acres, and hold conservation easements and other restrictions exceeding 18,000 acres.

Nature Conservancy The Nature Conservancy is the leading conservation organization working around the world to protect ecologically important lands and waters for nature and people. This worldwide organization has added over one million members since their founding in 1951. Some of the Nature Conservancy's accolades consist of protecting more than one hundred and nineteen million acres of land and five thousand miles of rivers worldwide. The conservancy operates in all fifty states and more than thirty countries worldwide while working on threats to conservation involving climate change, fresh water, oceans, and conservation lands.

Buckhill Falls - Conservation Foundation - More than a century ago, the founders of the Buck Hill Falls community acquired a large tract of Pocono woodland, both as a place they and their families could enjoy and as a legacy for future generations. Buck Hill Falls residents are the inheritors and stewards of that invaluable legacy that today comprises about 4,600 acres, much of it land that cannot be disposed of without Buck Hill Falls Company shareholder approval.

The land is located between Pennsylvania State Game Lands and other extensive private landholdings, including Skytop. In fast-growing Monroe County, these open spaces provide outdoor recreation for surrounding residents and animal corridors and habitats for black bear, wild turkey, and other woodland animals. As the community's centennial approached, a number of community members saw the need for more active and vigilant efforts to preserve this heritage, and created the Buck Hill Conservation Foundation, a tax-exempt non-profit organization.

Pocono Heritage Lands Trust (PHLT) - Pocono Heritage Land Trust is a locally based conservation group dedicated to protecting important lands waters, open space, agricultural landscapes and the natural heritage of the Pocono Mountains region.

PHLT was founded in 1984 and is an active participant in the 2020 Monroe County Open Space Program. The trust is a non-profit organization funded by grants, donations and the contributions of its corporate and individual members. It is guided by the Land Trust Alliance's Standards and Practices.

PHLT cooperates with willing landowners and local government to preserve land with special scenic, recreational, or environmental value. In some cases, PHLT acquires ownership of the land through donation or purchase. In others, it acquires the development rights through voluntary legal agreements. In all cases, the trust accepts responsibility for managing and protecting the land in perpetuity.

Opportunity 5: Smart Growth Principles and Village Revitalization

Since Monroe County is growing at such a phenomenal rate, population increase/development is inevitable, but if done in a sustainable way the negative impacts can be minimized. Another way to conserve land would be to utilize smart growth principles that would in turn revitalize town centers. Smart Growth is an urban planning and transportation theory that concentrates growth in the center of a city to avoid urban sprawl; and advocates compact, transit-oriented, walkable, bicycle-friendly land use, including neighborhood schools, complete streets, and mixed-use development with a range of housing choices.

There are a total of ten smart growth principles:

1. Create Range of Housing Opportunities and Choices

Providing quality housing for people of all income levels is an integral component in any smart growth strategy.

2. Create Walk-able Neighborhoods

Walk-able communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth.

3. Encourage Community and Stakeholder Collaboration

Growth can create great places to live, work and play -- if it responds to a community's own sense of how and where it wants to grow.

4. Foster Distinctive, Attractive Communities with a Strong Sense of Place

Smart growth encourages communities to craft a vision and set standards for development and construction which respond to community values of architectural beauty and distinctiveness, as well as expanded choices in housing and transportation.

5. Make Development Decisions Predictable, Fair and Cost Effective

For a community to be successful in implementing smart growth, it must be embraced by the private sector.

6. Mix Land Uses

Smart growth supports the integration of mixed land uses into communities as a critical component of achieving better places to live.

7. Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas

Open space preservation supports smart growth goals by bolstering local economies, preserving critical environmental areas, improving our communities quality of life, and guiding new growth into existing communities.

8. Provide a Variety of Transportation Choices

Providing people with more choices in housing, shopping, communities, and transportation is a key aim of smart growth.

9. Strengthen and Direct Development Towards Existing Communities

Smart growth directs development towards existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space and irreplaceable natural resources on the urban fringe.

10. Take Advantage of Compact Building Design

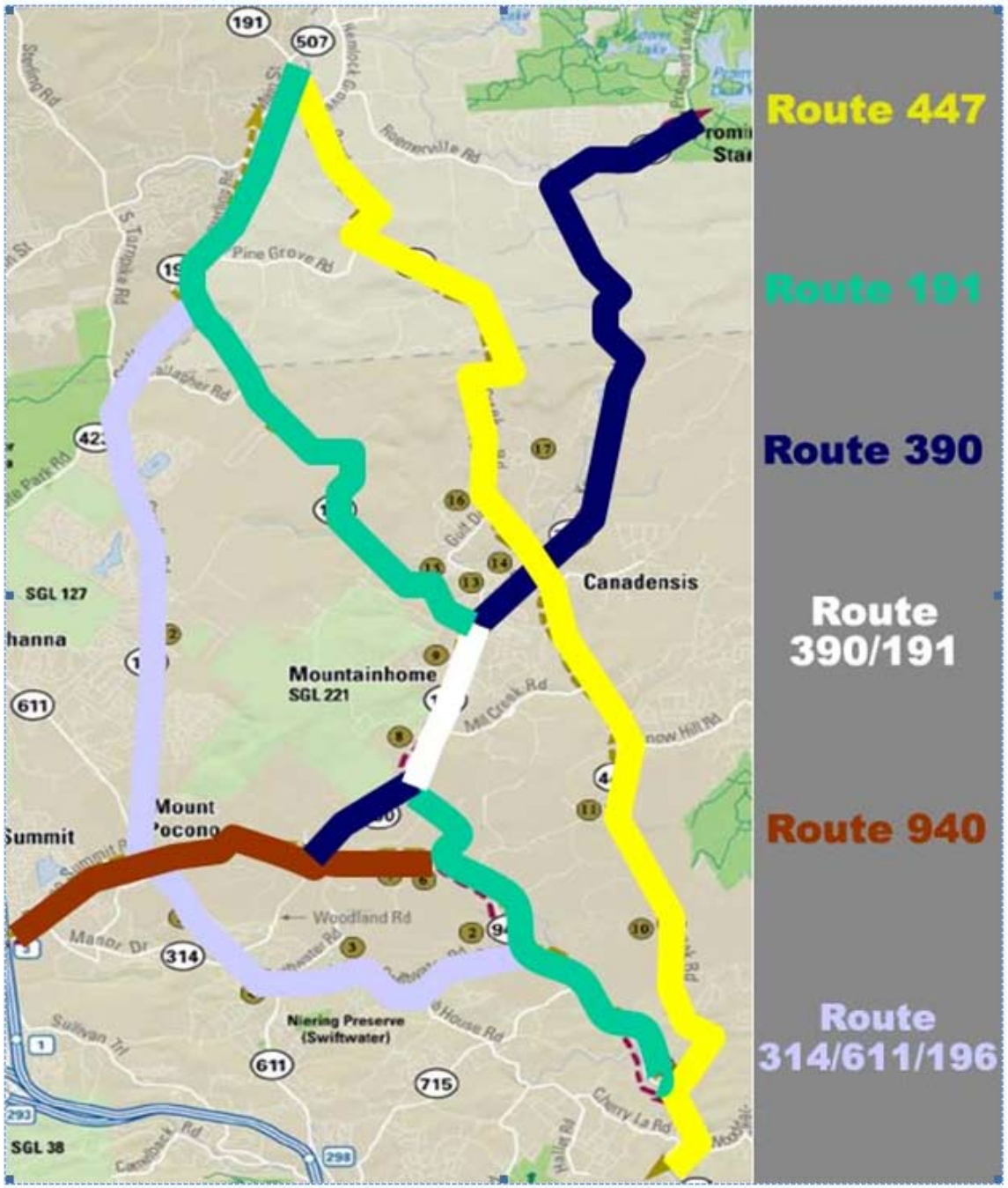
Smart growth provides a means for communities to incorporate more compact building design as an alternative to conventional, land consumptive development.

4.3 Bikeway Issues and Opportunities

Share the road bikeways provide recreation and alternative transportation opportunities, ideal for experienced adult riders. They enhance the area's tourism, recreation, and provide community and regional connections. Tobyhanna State Park, Promised Land State Parks, and the many local municipal parks like Skywood and High Acres, are viable rest stops and destinations points along the bikeways.

Over the next couple of pages, each potential bikeway is mapped out, opportunities and constraints identified, and key points of interest along the road documented.

The next two sub sections detail the potential for a multi-use trail and a footpath loop.

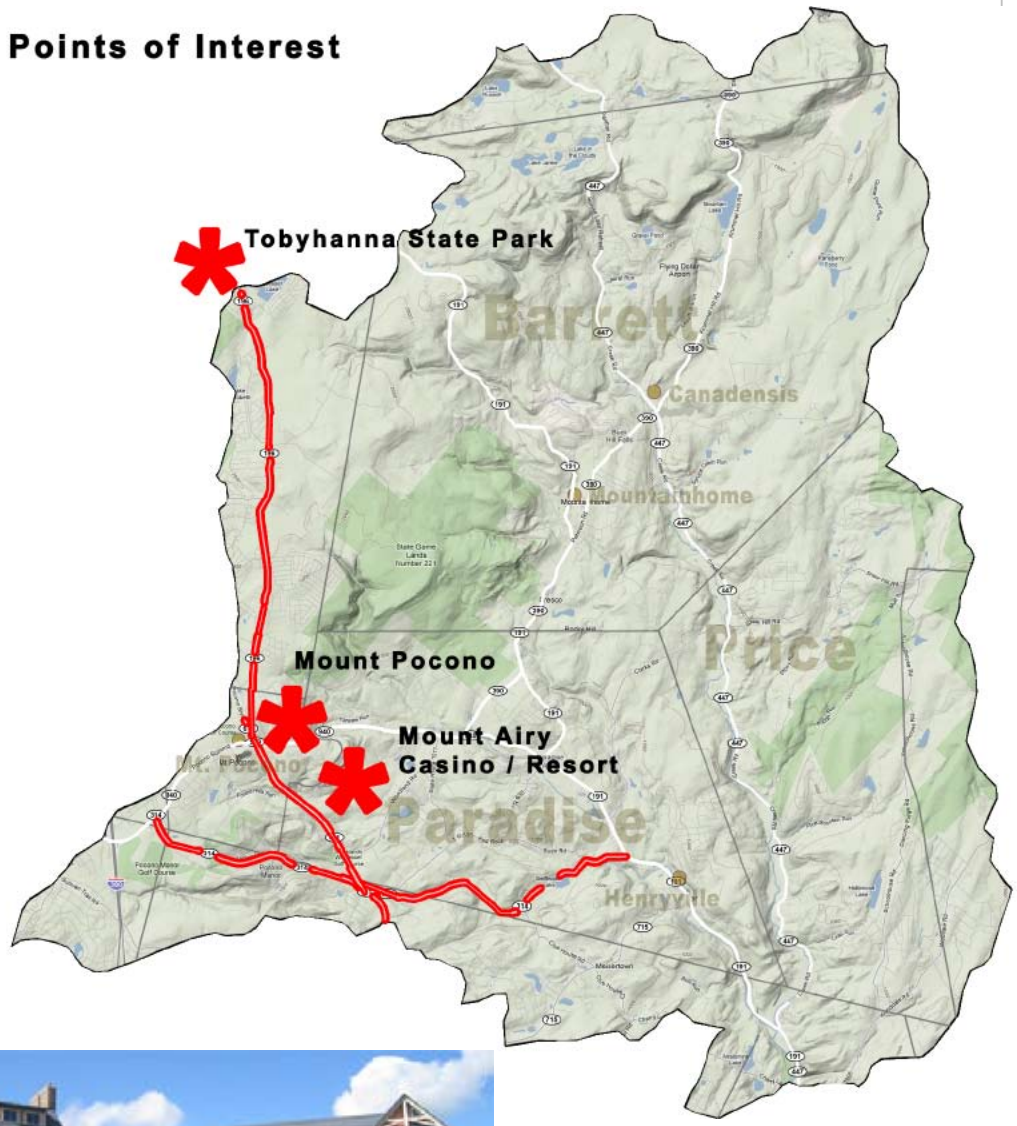


Route 314/611/196

Issues: Traffic Congestion, Pedestrian & Vehicular Conflicts, Noise, Heat, Glare, Auto & Truck Exhaust Fumes, High Traffic Speeds, High Traffic Volumes, Debris on Shoulders

Positives: Smooth Paved Surface, Commercial Center, On-Street Parking, Sidewalks, Lighting, Directness of Route, Commercial District, and Commercial Recreation Activities.

Several points of interest along this proposed byway are: Tobyhanna State Park which exists outside the watershed but Route 196 leads to its entrance, Mount Pocono town center which provides several dinning and shopping opportunities and the Mount Airy Casino.



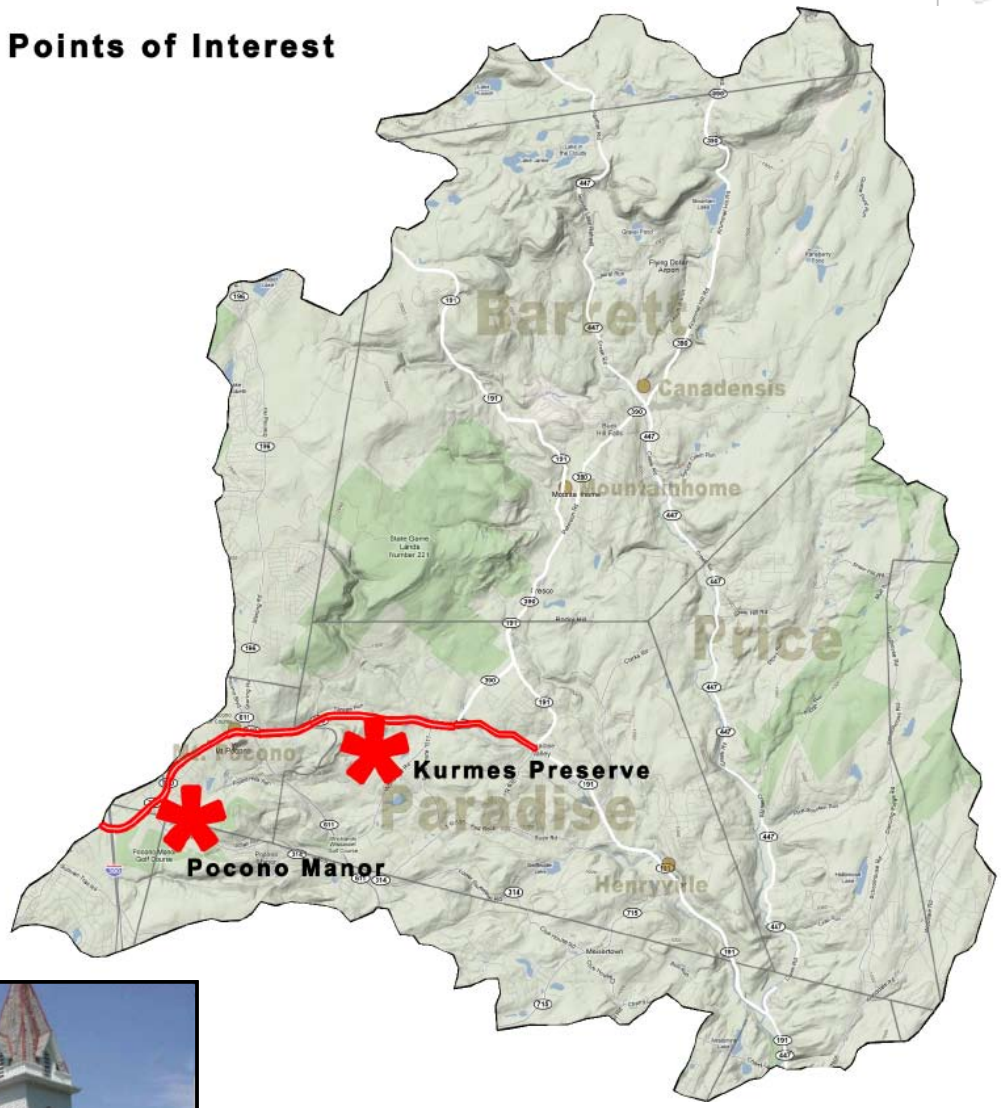
Mount Pocono

Mount Airy Casino/ Resort

Route 940

Issues: Negative aspects which need to be addressed: Steep Slopes, High Traffic Speeds, High Traffic Volumes, Variable Shoulder Widths, Noise, Heat, Glare, Commercial Truck Traffic.

Positives: Wide Shoulders, Good Paved Surface, Directness of Route, Access to Points of Interest Route 940 passes by Pocono Manor and the Kurmes Preserve. This route might be used by both experienced bikers as well as beginners.

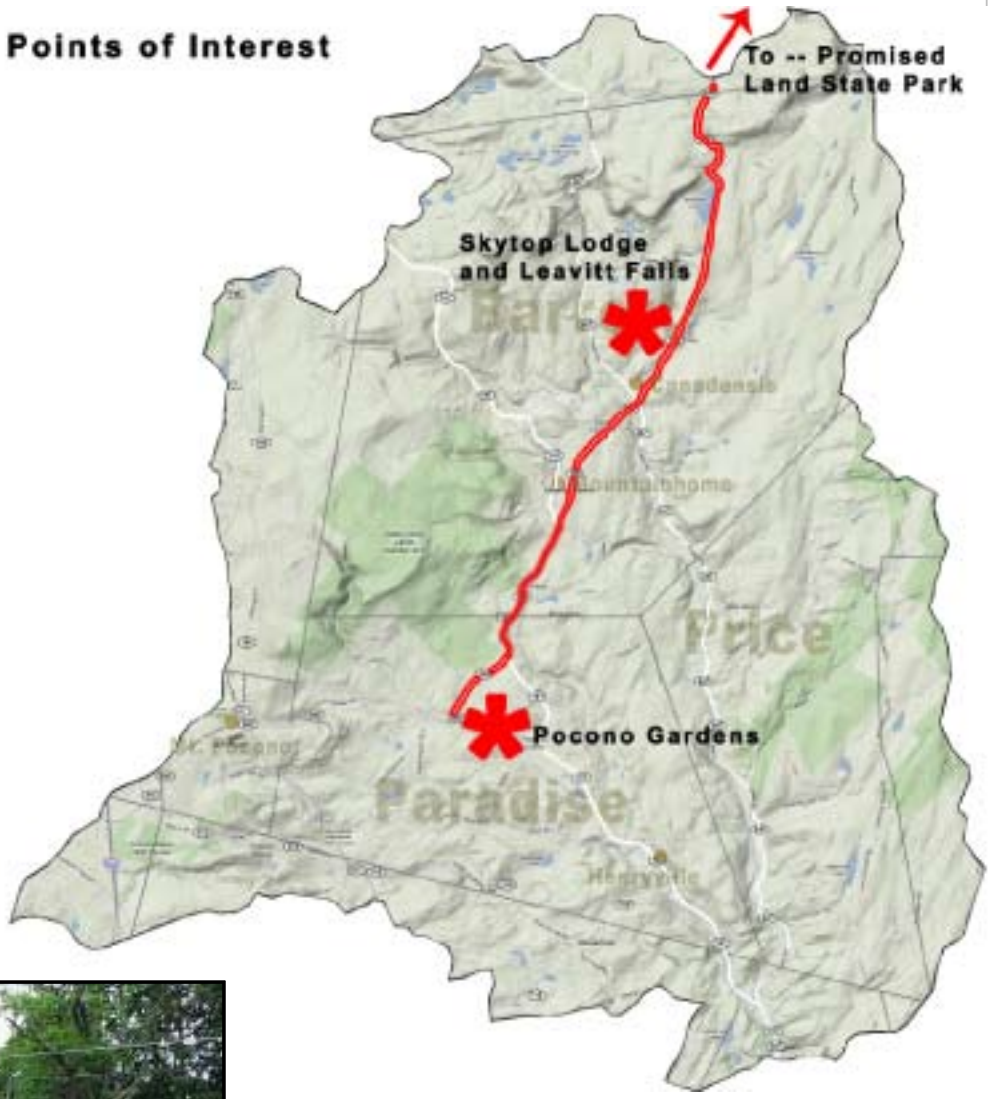


Route 390

Issues: Many Billboards, Shoulder Not Paved, Short Site Distances around Curves

Positives: Wide Shoulders, Low Traffic Volume, Low Noise & Pollution

North of the watershed, Route 390 connects to Promised Land State Park and runs south passing Skytop Lodge and Leavitt Falls. Pocono Gardens lies at the southern most part of this route. This bikeway would be mostly used by experienced bikers because of its steep slopes.



Promised Land State Park

Skytop Lodge

Along Route 390

Route 447

Issues: Negative aspects which need to be addressed: Many Billboards, Small Shoulders, Limited Site Distances,

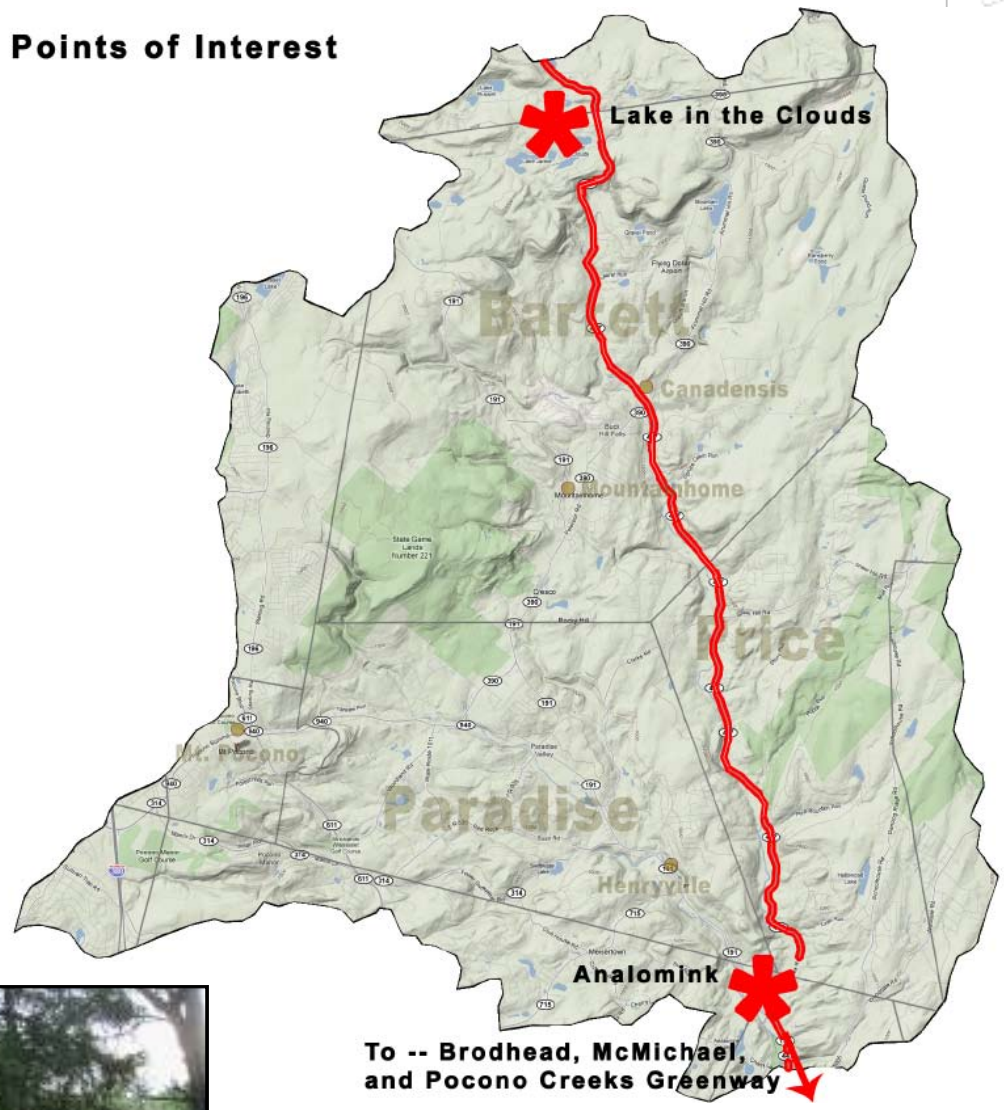
Opportunities: Positive aspects to remain: tranquil wooded scenery, low traffic volume and low speeds

Route 447 runs north to south across the entire watershed, provides connection to the Brodhead, McMichael, and Pocono Creeks Greenway to the south near Stroudsburg. This route would most likely be used by experienced bikers.

Along Route 447

Along Route 447

Along Route 447

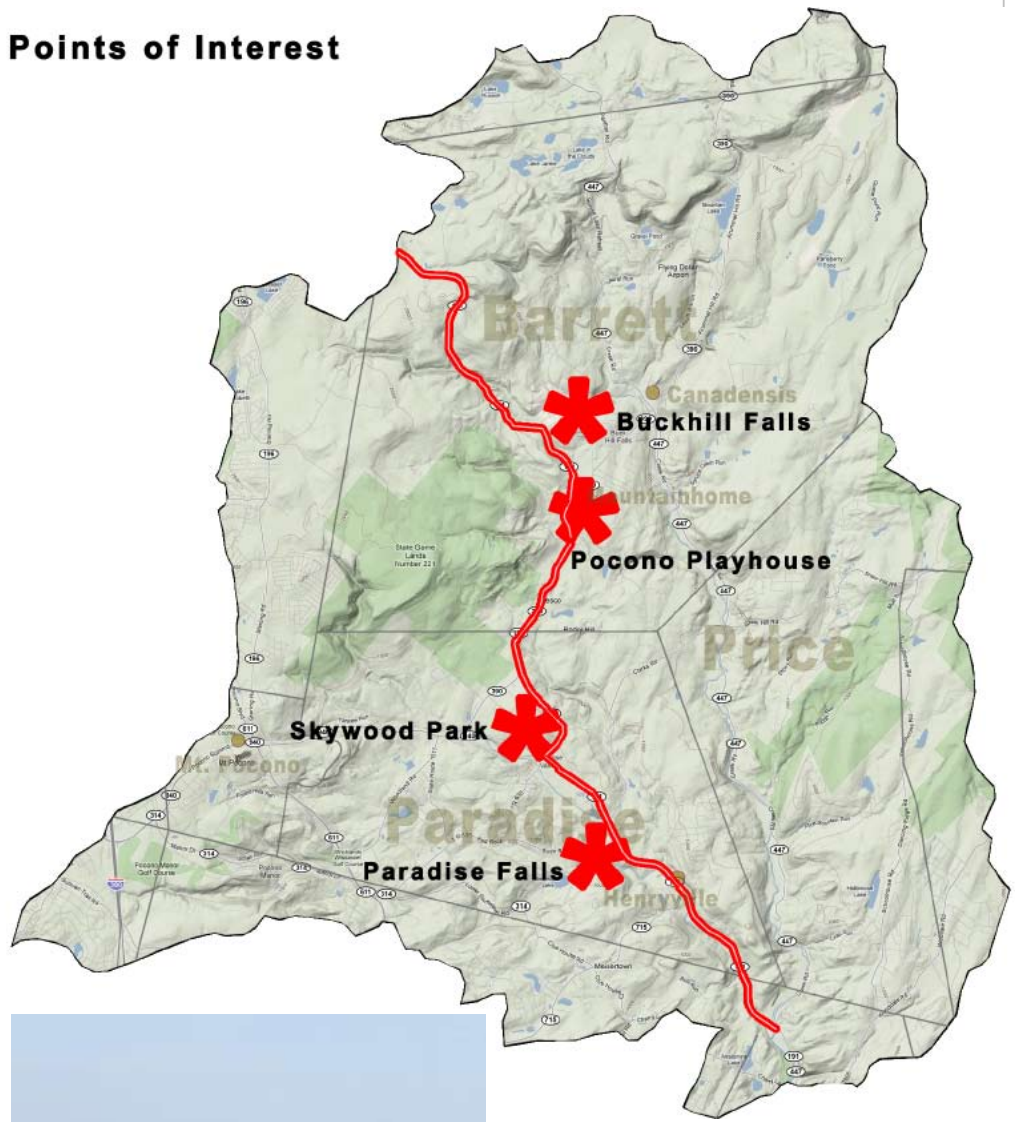


Route 191

Issues: Negative aspects which need to be addressed: Many Billboards, High Traffic Speed

Opportunities: Positive aspects to remain: Nice Paved Surface, Direct Route

Route 191 has many points of interest including Buck Hill Falls, Pocono Playhouse, Skywood Park, and Paradise Falls. This route would be primarily used by experienced bikers.



Pocono Playhouse

Buck Hill Falls

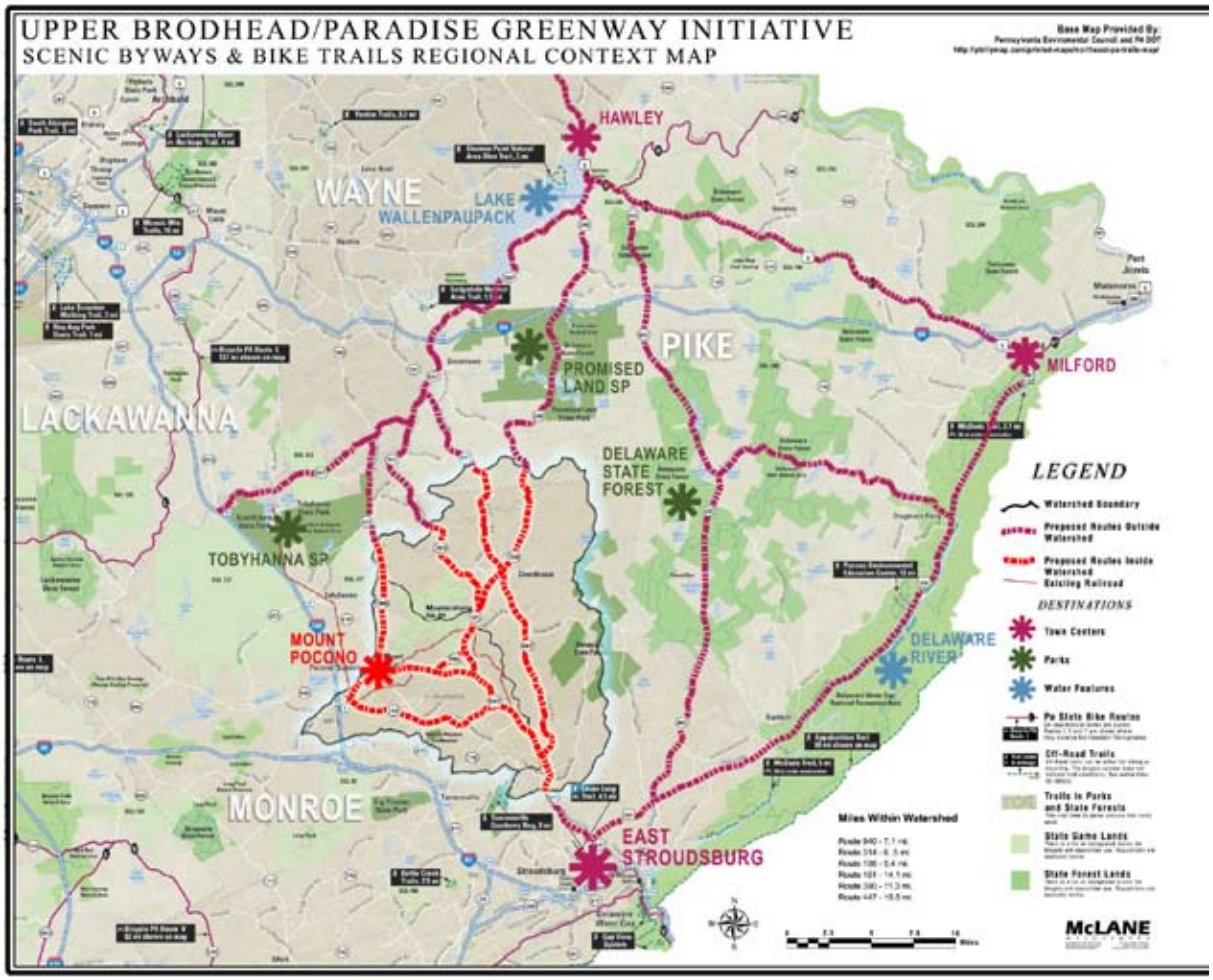
Along Route 191

Skywood Park

Major Access Points and Regional Connections

The proposed bikeways will connect to surrounding bikeways (or greenways) within Northeast Pennsylvania including the Brodhead, McMichael, and Pocono Creeks Greenway. Connection to the McMichael greenway will occur along Route 447 in the southern tier of the watershed. This provides access to Downtown East Stroudsburg and East Stroudsburg University. Route 447 also has a high potential of becoming a major bikeway because of its proximity to Brodhead Creek. There are multiple connections on the north end of the watershed which lead to Delaware River, Delaware State Forest, Promised Land State Park, Lake Wallenpaupack and Hawley.

Figure 5-8 (A larger version of this map can be found at the end of this report)



Branding

Branding of the watershed is critical to the success of the proposed bikeways by creating an identity. If the greenway has a logo or symbol that is recognizable when entering or exiting the watershed, people will be able to associate the area with certain intrinsic qualities of the Greenway. Upon entering the watershed, bikers will see uniformity in billboards and road signs and feel welcomed in this bike friendly area.

Ample signage and consistency along each bikeway route in the greenway will unify the system of bikeways allowing simple navigation. A strong identity will lure more cyclists to the area to use the bikeways, making them a destination rather than through routes.

4.4 Scenic Byways and Issues and Opportunities

Regional Scenic Byways Connections

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program is a grass-roots collaborative effort established to help recognize, preserve and enhance selected roads throughout the United States. The mission is to provide resources to the byway community in creating a unique travel experience and enhanced local quality of life through efforts to preserve, protect, interpret, and promote the intrinsic qualities of designated byways.[1] The U.S. Secretary of Transportation recognizes certain roads as All-American Roads or National Scenic Byways based on one or more archeological, cultural, historic, natural, recreational and scenic qualities.

Roadways in the Brodhead Greenway study area that are seen as having potential to become or attempt to become a scenic byway are routes 196, 611, 314, 191, 447, 940, and 390.

Scenic byways become most effective when thought of in terms of the journey and destinations. Varied trip lengths, scenery, and end points offer a variety of appeal. Town centers such as Mount Pocono, East Stroudsburg, Hawley, and Milford, which contain historic sites, unique restaurants, and distinctive shops, will tend to be the key destinations of Monroe County's scenic byways. Having designated byways within the county will foster business and boost the local economy, usually through tourism. Restaurants, hotels, resorts, and other businesses along the byways can benefit significantly from this increase in tourism.

Branding

"Branding" of the watershed is also important for scenic byways. It is crucial for this Greenway to show its uniqueness within the Poconos. Branding the area through signage on major roads and highways leading into the watershed will give the region a strong identity in the geographic area that people will remember. Having an identify within the Poconos will create a sense of place for the region and bring more people into the area, thus stimulating the local economy. Upon entering the Greenway it should be clear to motorists that this area places priority on keeping the roadways as aesthetically pleasing as possible.

Billboard Control

Having billboard control throughout the watershed along major roads will lead to a more scenic road (scenic byway). Mandating the location, size, and format of marketing signs will aim to solve the current problem of the many billboards littering the roads. Not only will uniformity make for a more scenic drive for motorists, it will help to create an identity and consistent datum throughout the watershed. Billboard control is directly linked to branding of the watershed and helping to designate roads as scenic byways. Since billboard control goes hand-in-hand with branding and scenic byways, it makes sense to implement this strategy.

Many of the major roadways within the watershed are littered with advertisement posters and billboards that have no uniformity or consistency. An integral part of a successful greenway plan is linkage and consistency along corridors that make connections between destinations and provide visual interest along the corridor.

Each township would need to inventory and make an assessment of their existing signage/ billboards. The inventory linked with a location will be the initial step in beginning to consolidate and unify the county's billboards. Regulations can then be made on roadside advertising, mandating certain aspects of advertisements such as size and location along roads.

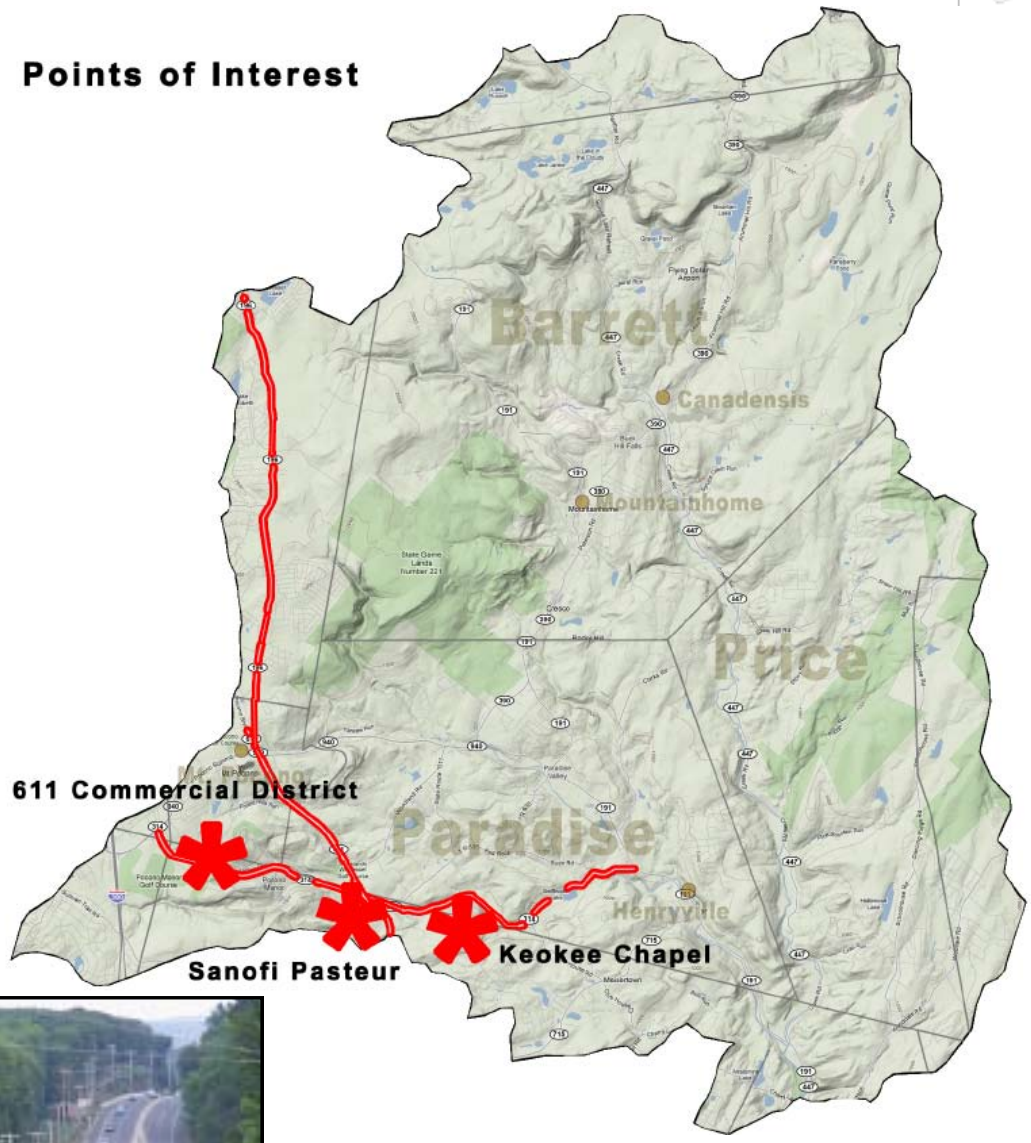
Zoning for Byways

In order to attain a national scenic byway designation, land use zoning adjacent to potential scenic byway roads must be adjusted to prohibit strip development. Restrictions will curtail sporadic urban sprawl and unplanned development and enable these roads to be classified as scenic, by preserving the wilderness of the Poconos which surrounds them.

Route 314/611/196

Issues: Litter & Development along 196
Opportunities: Scenic Views & Buffers along upper 196 & 314

Traffic Volumes (Cars per Day)
Rt. 314: from SR 715 to SR 611 -- 600
Rt. 611: from SR 314 to SR 196 -- 16,000
Rt. 196: from SR 611 to Pike Co. -- 12000



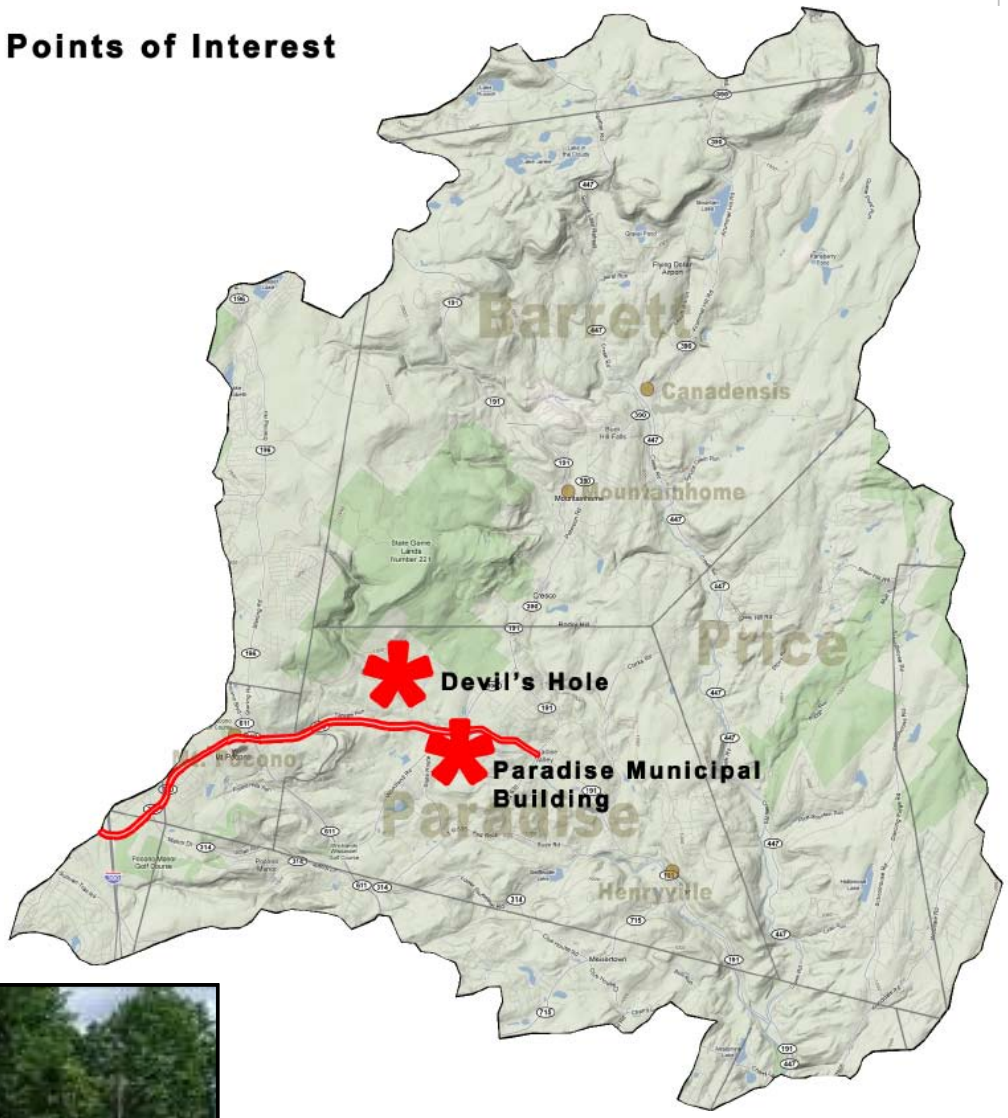
Route 940

Issues: Steep Slopes, High Traffic Volume, High Traffic Speed, and many billboards

Positives

Wide Shoulders, Good Paved Surface,

Traffic Volumes (Cars per Day)
- from SR 191 to SR 390 -- 3800
- from SR 390 to SR 611 --7800



Devil's Hole

Along Route 940

Along Route 940

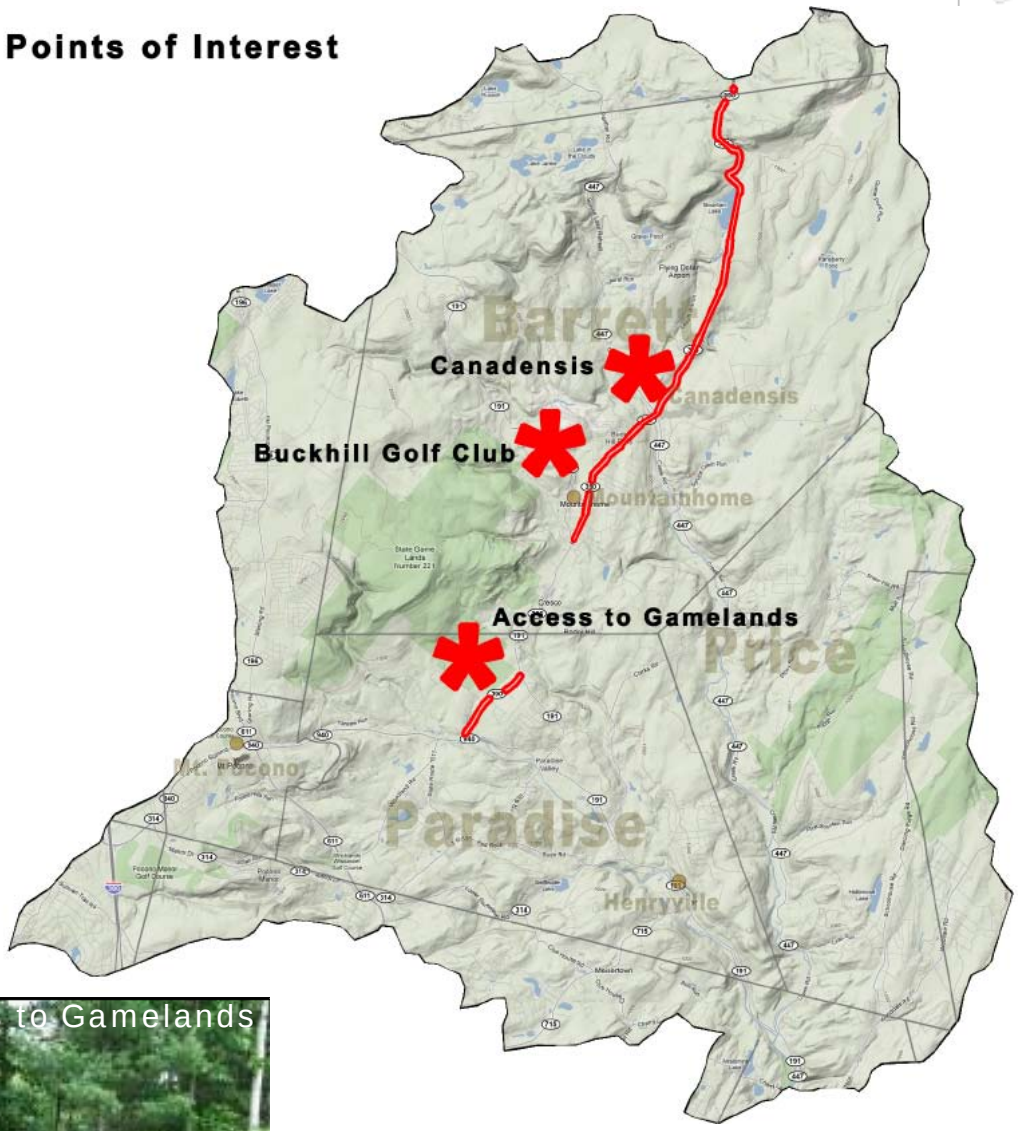
Route 390

Issues: Many Billboards, Unpaved Shoulders, Short Site Distances

Positives

Wide Shoulders, Low Traffic Volume, Low Noise & Pollution

Traffic Volumes (Cars per Day)
from SR 940 to SR 191 -- 7800
from SR 191 to SR 447 -- 6500
from SR 447 to Pike Co. -- 2400



Along Route 390

Buck Hill Golf Club

Access to Gamelands

Route 447

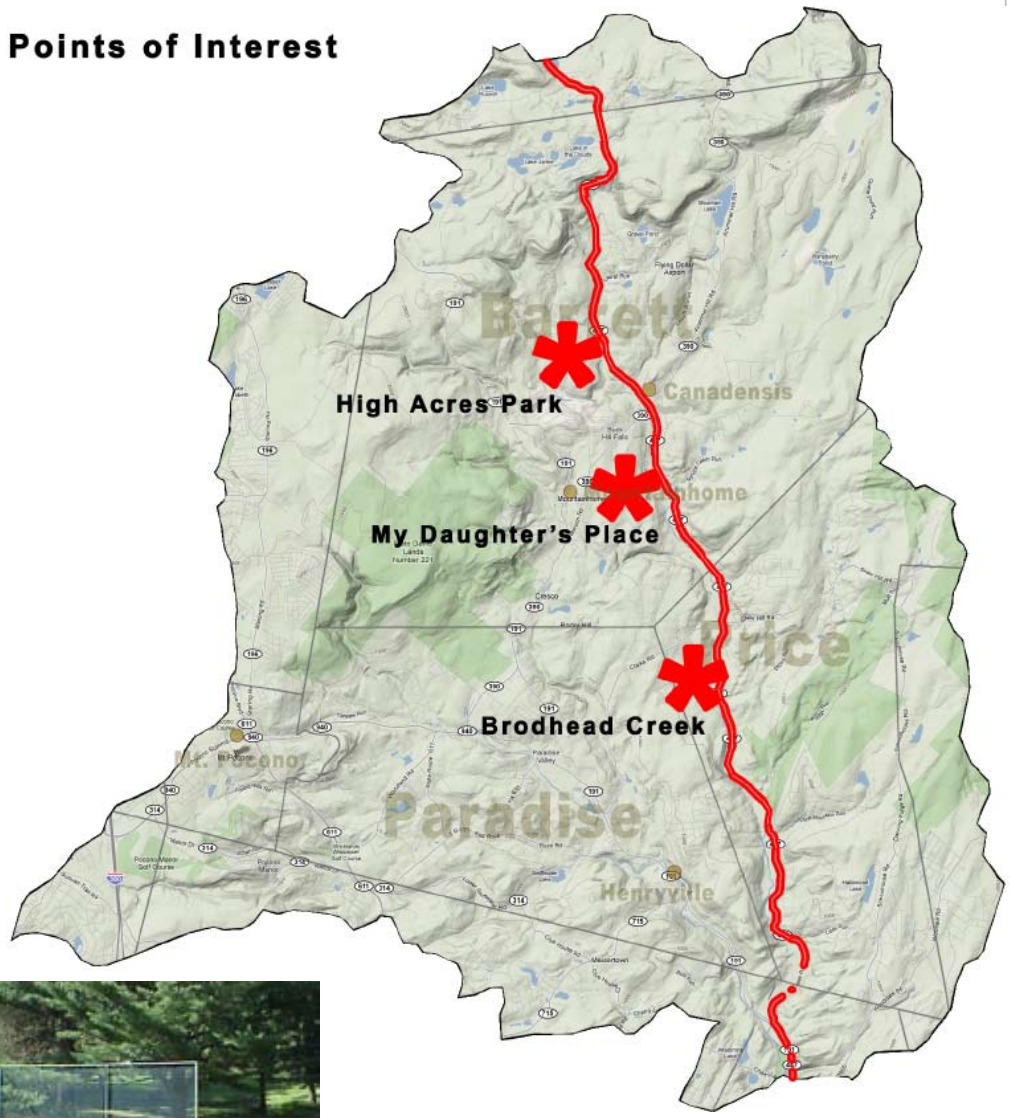
Issues:

Many Billboards, Small Shoulders, Short Site Distances,

Positives

Tranquil Wooded Scenery
Low Traffic Volume and Speeds

Traffic Volumes (Cars per Day)
From 447/191 split to SR 390 -- approx. 2300
To Pike County -- 950



Brodhead Creek

My Daughter's Place

High Acres Park

Route 191

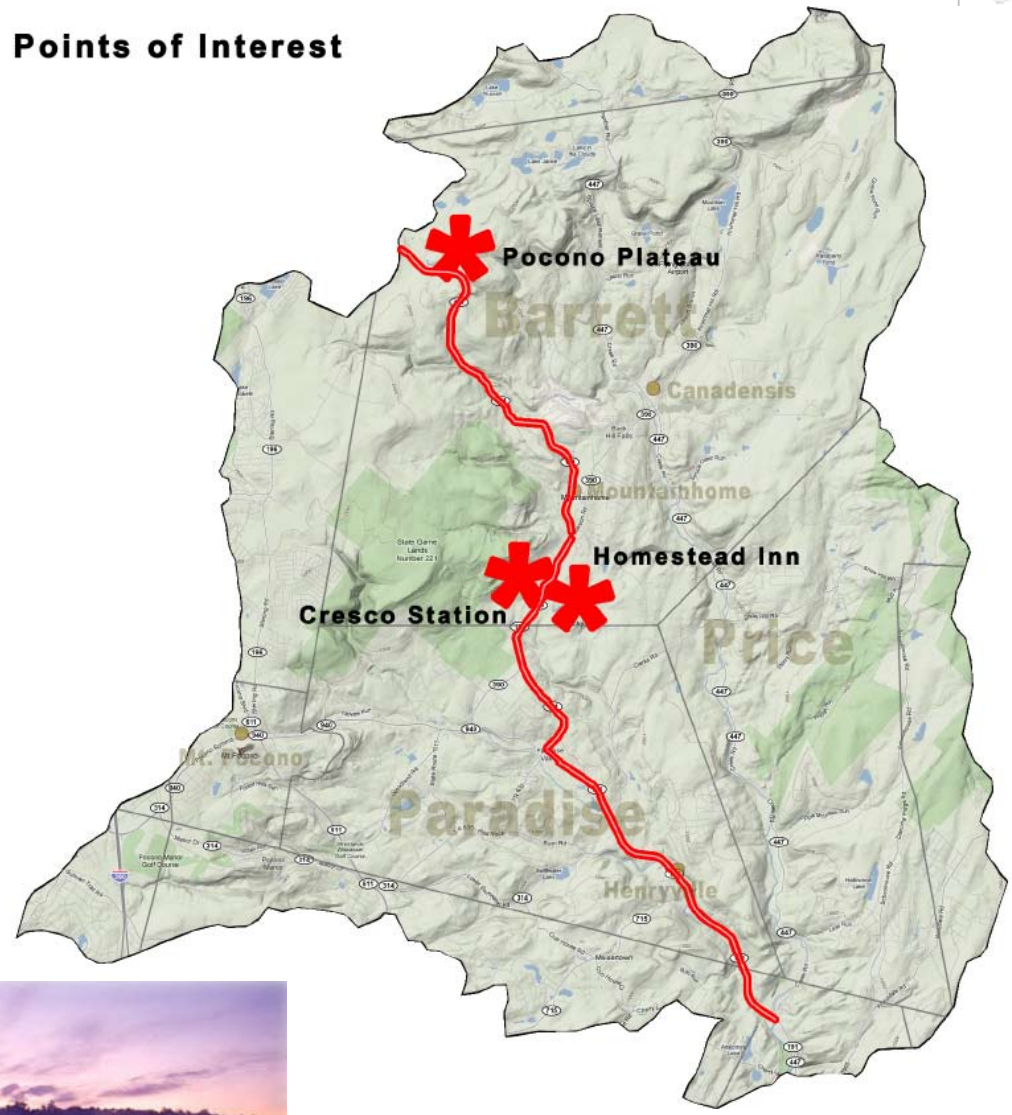
Issues:

Many Billboards, Small Shoulders, Short Site Distances

Positives

Tranquil Wooded Scenery, Low Traffic Volume and Speeds

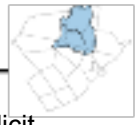
Traffic Volumes (Cars per Day)
From 447/191 split to SR 390 -- approx. 2300
To Pike County -- 950



Cresco Station

Homestead Inn

Pocono Plateau



4.5 Multi-Use Trail Issues and Opportunities

A very important trail opportunity that cannot be overlooked is the rail line which twists its way through the two watersheds for approximately seventeen miles. At one point in time two active railines traversed through the Pocono country side, but now there is only one active rail line. The second rail line has been removed which created an ideal space for the multi-use trail. Not only does this rail line provide potential linkages within our study area, it also allows for the opportunity to provide linkages extending beyond our study area for a more regional network.

A key resource that should be utilized when trying to create a trail system along the rail line is the Rails-to-Trails Conservancy.

The Rails-to-Trails Conservancy is a nonprofit organization based in Washington, D.C., whose mission is to create a nationwide network of trails from former rail lines. Rails-to-Trails Conservancy serves as the national voice for more than 100,000 members and supporters, 15,000 miles of rail-trail throughout the country and thousands of miles of potential rail-trails waiting to be built. When the Conservancy first opened its doors on February 7, 1986 there were fewer than 200 known rail to trails, but today there are more than 1,500 preserved pathways and trails.[4]

Currently the rail line is owned and operated by the Pennsylvania Northeast Regional Railroad Authority (PNRRA). The 100 mile regional rail system which stretches from Scranton through the Pocono region to East Stroudsburg and the Delaware Water Gap is almost exclusively a freight service. The Northeast Regional Railroad Authority states that the rail line has created hundreds of new jobs because of its service and the industries along the rail corridor which have benefited from its service. The PNRRA lists two major goals of the company:

1. Continue to be a major economic development force in Northeast Pennsylvania and continue to solicit, market, and expand new industries along our 100-mile regional rail network.

2. Complete the restoration of rail passenger commuter service between Scranton, the Pocono

Region, New Jersey and New York City. The PNRRA currently is the project sponsor of this vital project in Pennsylvania and, in partnership with New Jersey Transit, the project sponsor in New Jersey. Due to the future plans of the PNRRA our trail would utilize the Rails-with-Trail program. The Rails-to-Trails Conservancy describes Rails-with-Trails program as "a public path that runs parallel to a still-active rail line." There are more than 115 rail-with-trails in the country. In this case, the relationship between the trail and the rail is very significant. Rail-with-trails are operating under a wide variety of conditions. The rail and trail share an easement and are sometimes separated by extensive fencing. Some trails are adjacent to high-speed, high-frequency trains while others run alongside tourist railroads and slow-moving excursion trains. Rail-with-trails can also provide a unique opportunity for connecting non-motorized transportation with public transportation, such as when a trail leads to a train station."[6]

Some benefits of placing trails along rail lines are:

- The Rails-With-Trails Agency enhances local transportation networks by providing non-motorized local connections that are sometimes preferable to on-road bike lanes or sidewalks located on congested, dangerous roadways.
- Rails-with-trails benefits railroads, too. In most cases, the trail manager purchases a use easement or license from the railroad, providing financial compensation and in some cases reducing liability responsibility and cost to the railroad.
- In some instances, a fully developed trail will also provide the railroad with improved access for maintenance vehicles.

Some concerns associated with trails along active rail lines are:

- Safety is probably the biggest concern when considering a rail-with-trail project. Both railroads and potential trail managers may be apprehensive about placing a public trail close to an active railroad track, fearing an increase risk of accidents along the corridor. However, many successful rail-trails across the country stand as a testament to the ability of trains and trails to coexist.
- Some railroads may require trail managers to accept full liability when negotiating a rail-with-trail agreement, also called indemnification.[7]

In 2000 the RTC sent a survey to 61 Rail with Trail managers to ask them pertinent questions about their trails. One question was "Have any train-related crashes occurred on the trail"? Of the sixty-one respondents only one replied that they had a train related accident while the sixty others responded that they had never had an incident in all their years of operation.[8] The single incident occurred at an at-grade road crossing on the Illinois Prairie Path when a bicyclist ignored warning bells and flashing lights and rode around a lowered crossing gate and was injured in a collision with the train.

While the railroad provides a great opportunity for connections throughout the watersheds, a great deal of work must be done to get it underway.

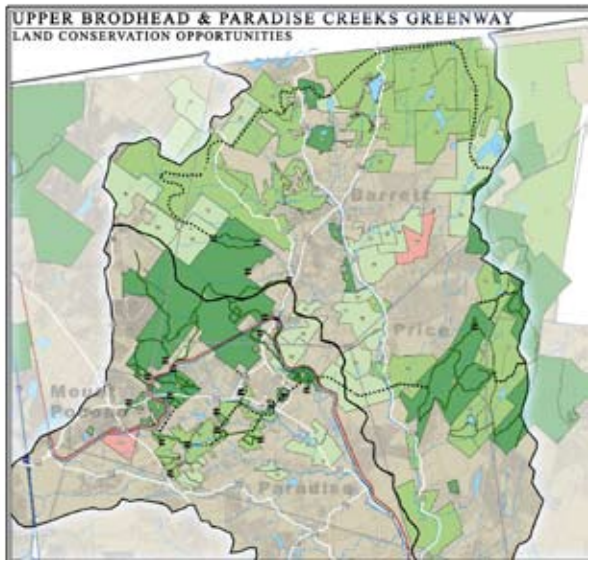
4.6 Footpath Trail Issues and Opportunities

In addition to a multi-use trail along the rail line corridor a foot trail loop has been proposed to cross through Price Township, Paradise Township, and Barrett Township. The proposed footpath is anchored by two very large parcels, the Pennsylvania State Gamelands 221 and the Delaware State Forest. The trail also passes through a variety of hunting / fishing clubs, resorts, and private land owners. A larger version of figure 5-15.1 can be found at the end of this report.

Existing and Proposed Trails

The proposed trails shown in the Land Conservation Opportunities (24" x 36" map at back of document) consist entirely of hiking and walking trails with off road vehicles being prohibited. Existing trails open to the public are condensed and somewhat isolated within the context of the Brodhead watershed. The Greenway plan proposes a loop trail to connect many of these isolated trails into a larger trail.

Crossing most of Barrett Township, a northern trail would connect Skytop Lodge, the Gamelands, and the Delaware State Forest. Additional short trails would exist in portions of the Delaware State Forest creating a more complete network of trails. The proposed southern trail would cross Paradise township, linking the State Forest with the Kurmes Preserve, while crossing through Mount Airy's trails and onto the Delaware State Forest to complete the loop



Key Destinations and Points of Interest

The points of interest along foot trails are most often natural features such as waterfalls, vistas and unique vegetation as opposed to man-made historic features. The proposed foot trail is no exception with many natural destinations that can not be accessed by motor vehicles thus making the quest more gratifying and tranquil.

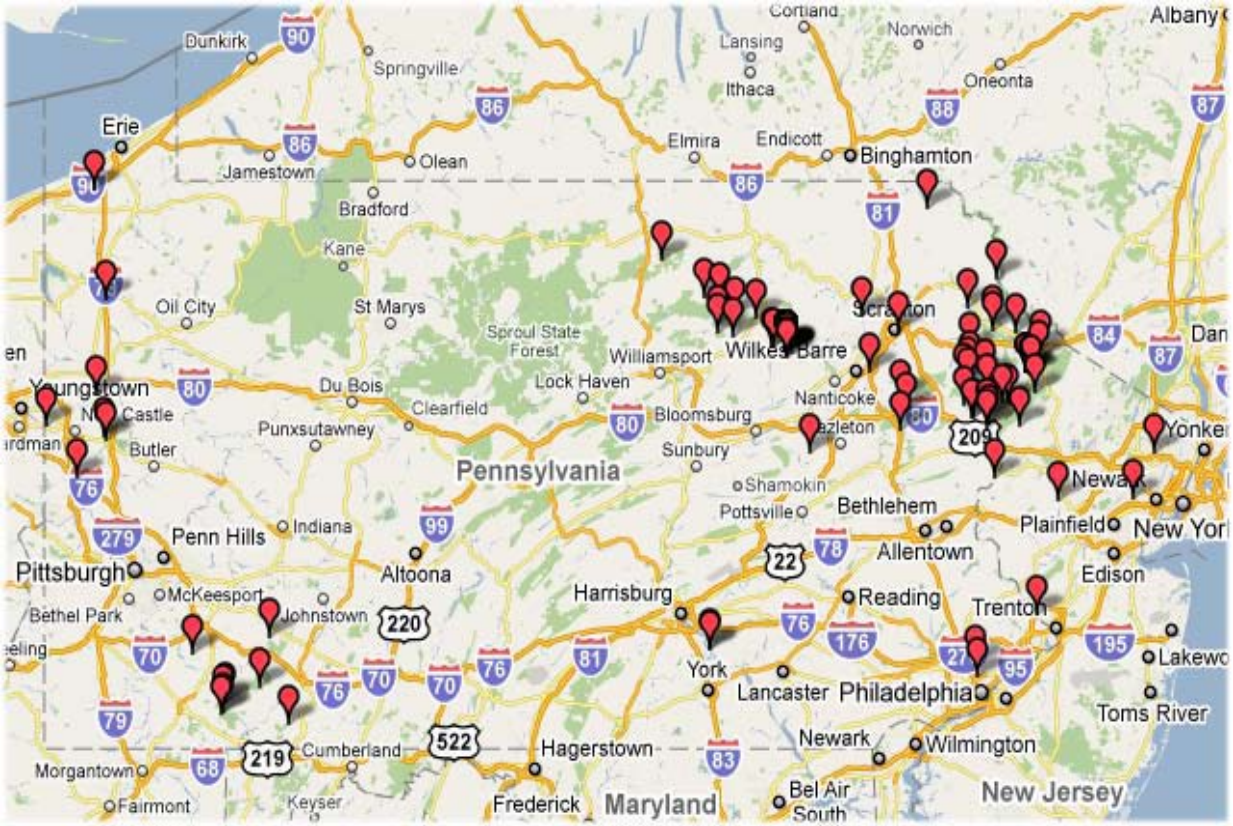
1. Waterfalls

The Pocono Region boasts an abundance of water falls when compared to the rest of Pennsylvania, making for a very scenic trail system. The map on the next page shows the large concentration of waterfalls in the Monroe County region. Below is a brief description of several major waterfalls within our watershed:

Indian Ladders – Indian Ladders is a double cascade waterfall that is approximately eighteen feet in height. The falls are found along a level, meandering nature trail that passes through a pine plantation before entering a narrow valley culminating at the falls. This nature trail makes a great first-time outing for young children. The Leavitt Branch begins about 250 feet above the falls in a series of bogs and meadows that are fed by Lake in the Clouds, ensuring a fairly constant water supply. Indian Ladders actually has two similar looking drops where the creek makes a twist as it falls over sandstone of the Pocono Formation.

Leavitt Falls – is close to the Skytop Lodge and differs from Indian Ladders in several ways due to a fold in the rock over which the water flows. A trail to Leavitt descends an incline of pale white Pocono sandstone, which confines the creek to a wide, swift-running flume, that slides over long skeins of algae. After making a crossing below Leavitt Falls, you will see the reclined and intricately terraced cascade hugging a rock wall on the right side. A large boulder slide, caused by the flood of 1955, fills the left side of the stream bed.

Skytop Lodge has some pre-1955 photos that show are evidence of the dramatic changes caused by the 1955 flood which destroyed a footbridge below the galls and washed out a wide, graded trail. (Them map below shows the density of waterfalls in the greater Monroe County compared to the rest of the state.)



Leavitt Falls

Paradise Falls

Rattle Snake Falls

2. Overlooks

The Little Knob offers some spectacular views of the watershed region. Even though navigating the rough landscape of this particular piece of land can be strenuous, it is well worth the reward once

the top is reached. This vista offers stunning views of the surrounding hills and valley.

Pine Knob, is another overlook, located in Paradise Township that offers eye-catching views of the township. This parcel is not open to public access but could be considered a priority for land acquisition/easement.

3. Natural Areas

Natural areas within the watershed can be other points of interest. These ecologically valuable areas offer some of the most uncommon plant and animal species in the region. A more detailed account of natural areas existing within the watershed are covered in section 1.3 of this report.

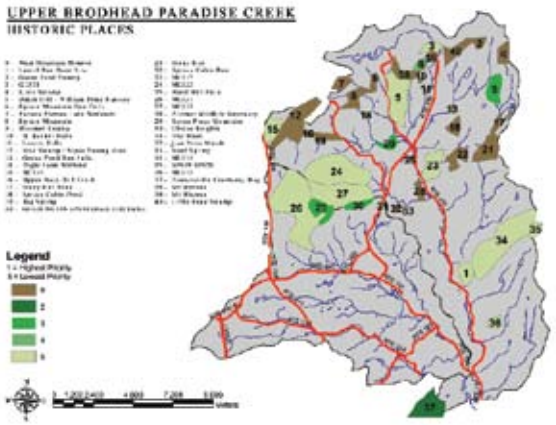


Figure 4-36

Inn to Inn Trail Program

One unique concept that has arisen as a result of the public participation process was an Inn to Inn Trail System (see Figure 5-17.2). This program would allow people to travel between two inns via foot trails or bike paths while their luggage would be delivered to their destination by vehicle.

Inn to Inn programs have been prevalent in Vermont for years and are just starting to catch on in California. Tourists and hikers use these inn to inn programs as an alternative form of vacationing. These types of trails allow hikers to hike from one inn to the next and stay overnight at each, essentially making a flexible hiking trip custom to the tourist's preferences.

In addition to catering to hiking tourists, the Inn to Inn trail would aid in bringing people to the region's inns. With so many inns and resorts in the area combined with the potential trail system, the Upper Brodhead / Paradise Creek Watersheds are ripe for opportunities to implement an inn to inn trail program.

Currently there are four main anchors to the recently discussed Inn to Inn trail program; Pocono Manor, Mount Airy Casino, Crescent Lodge and Skytop Lodge. (Figure 4-36) There are numerous other inns within the two watersheds that could be considered for this program as well. The total trail length would be about twenty-five miles. Several Inn to Inn programs sample can be viewed at:

http://www.inntoinn.com/

http://coloradoinfo.com/estespark/inntoinnhiking

Regional Footpath Connections

Whether proposing byways, bikeways, or footpaths it is important to identify possible connections outside of the study area. With the help of Don Miller, a Paradise Township resident and trail advocate, several potential regional trail corridors have been identified.

A Pocono River to River Trail linking the Delaware and Lehigh Rivers is an idea brought forth by Don Miller. The Pocono River to River Trail would utilize recently acquired and proposed Monroe County Open Space properties and existing State Forest and Game Land to create a premier woodland hiking experience. From the Lehigh River corridor terminus, this trail could potentially connect the Lackawanna State Forest Trail system and the Heritage River Corridors/Trail systems on the Susquehanna, Lackawanna and Lehigh River Valleys.

Pink Trail Corridor – is the primary middle route which utilizes the existing state lands as much as possible

Orange Trail Corridor – lower spur travels through Paradise Township, Mount Airy, PHLT, Kurmes Preserve and PMEDC's Lynchwood Lake

Red Trail Corridor – is an upper spur trail traveling through Barrett Township, Buck Hill Falls, Skytop Resort and Tobyhanna and/or Gouldsboro State Park.

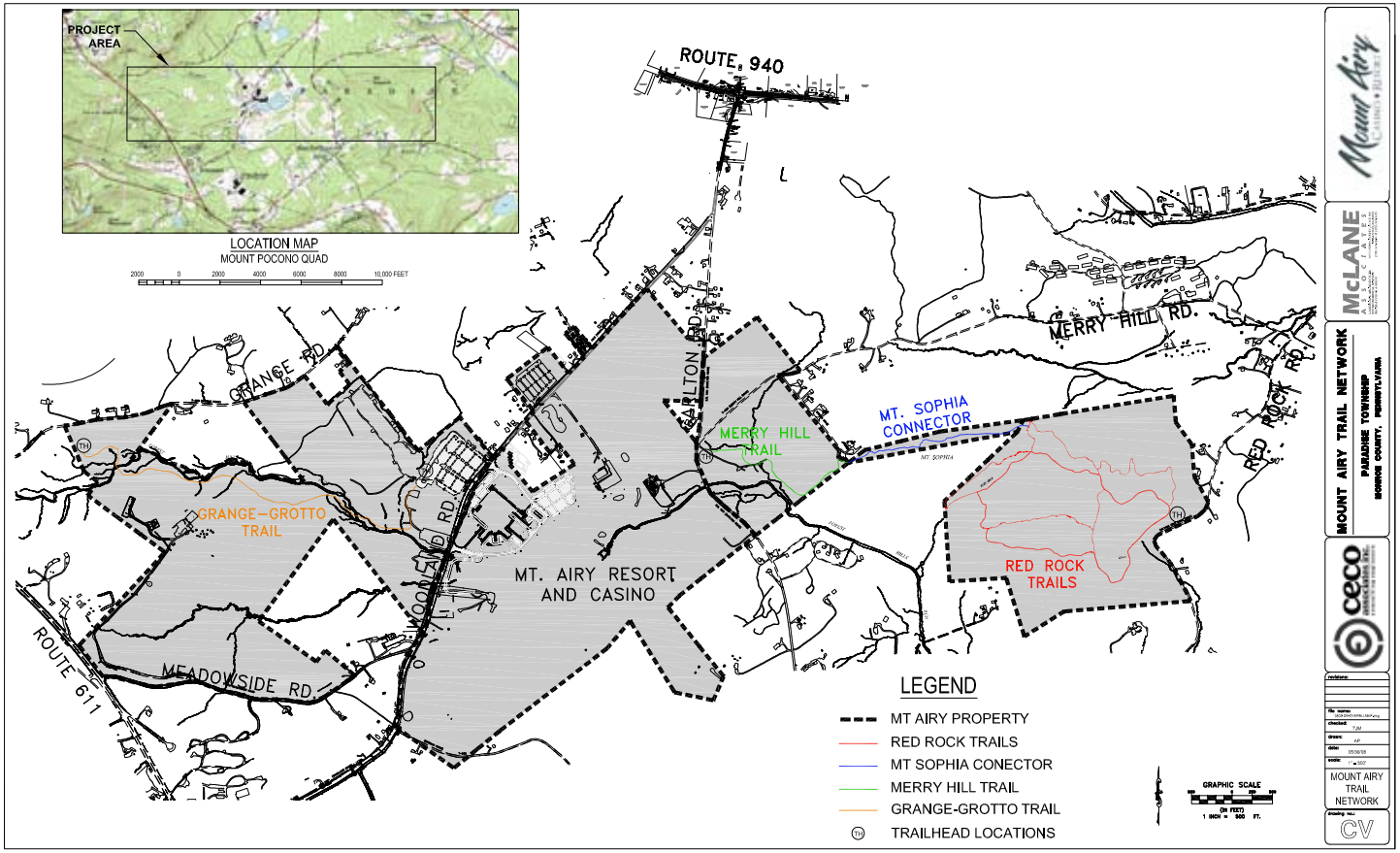
Original Map By Don Miller (Base altered to make more relevant to this greenway plan

Mount Airy Trail Network

Mount Airy Casino exemplifies how a large corporation can preserve green/open space, incorporate outdoor recreation and give back to the community while still making a profit.

Mount Airy Casino owns over 800 acres of land in Paradise Township but approximately 300 acres was left undeveloped and forever preserved. Mount Airy has also implemented approximately six miles of trails on their land which are open for full public access. Mount Airy Casino is a prototype for how large corporations can function as a private entity while still preserving woodlands and doing a community service through trail implementation.

(As of the writing of this plan Mount Airy Casino had completed the design and permitting phase for trail implementation but had not completed the physical implementation of the each trail.)



Greenway Development Options

5.1 Watershed Protection
5.2 Land Conservation
5.3 Community Connections

5 Greenway Development Options

This section provides recommendations for protecting water quality, conserving land, and for creating community linkages/connections. These recommendations have been derived from and are supported by previous sections of this report including: Data Collection and Analysis, Public Participation, Issues, Opportunities and Threats, and Greenway Linkages and Connections. Please refer back to these sections for additional information as needed.

Note: The Water Quality and Land Conservation recommendations are directly linked to each other. Since land conservation tools affect water quality in the watershed, they can be used as strategies to improve water quality along with preserving land.

Watershed Protection Recommendations:

1. Model Flood Plain Ordinance
2. Re-designate HQ streams to EV streams
3. Educate Public in Land Practices Through Brodhead Water Authority

Land Conservation Recommendations:

1. Create Official Maps
2. Joint Zoning Ordinances between Municipalities
3. Open Space Funding
4. Smart Growth Principals

Community Connection Recommendations

1. Footpath Implementation
2. Trail Meetings
3. Inn to Inn Trail System
4. Bikeways and Byways
5. Handicap Accessible Multi-Use Trail
6. Enact a Model Sign Ordinance

5.1 Watershed Protection Recommendations

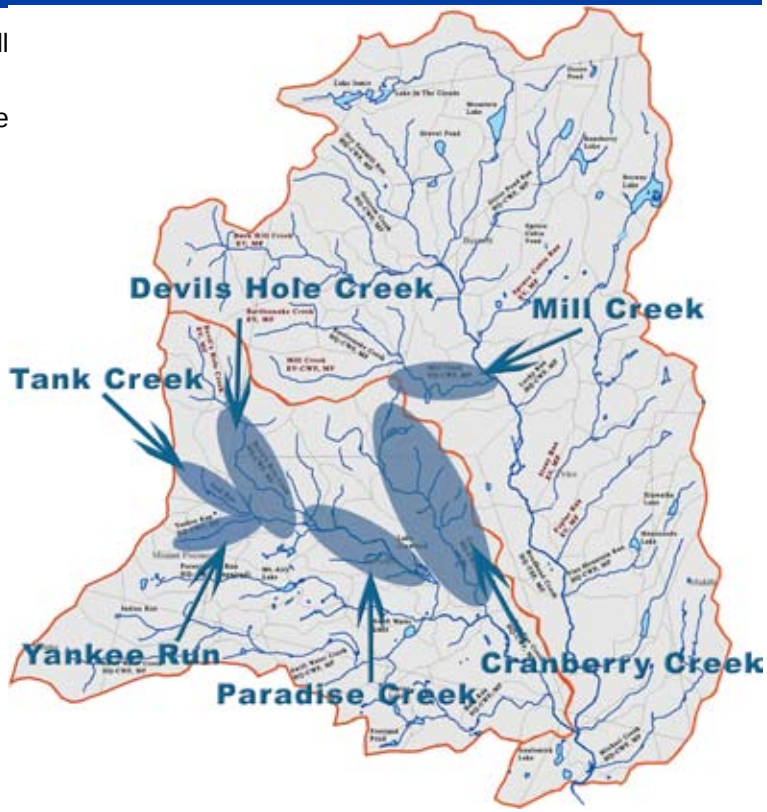
Recommendation 1 - Redesignate Streams to Exceptional Value

As discussed in Section Four, a High Quality stream designation provides strict levels of protection on a stream but the stream could still be degraded if "social or economic justification" is provided. One example would be Forest Hills Run which has a High Quality designation but is currently listed as "impaired". There are several speculations into who is responsible for the stream's impairment but regardless of the reasons which are most likely cumulative and non-point, an Exceptional Value designation would have better insured that Forest Hills Run did not suffer from impairment.

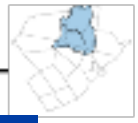
As noted earlier, Don Baylor has completed macro-invertebrate testing on many streams within the two watersheds. He has indicated that the following streams are eligible for Exceptional Value Designation.

- The remaining High Quality section of Devils Hole Creek
- Paradise Creek to Lake Crawford
- The remaining section of Mill Creek
- Cranberry Creek to Paradise Creek
- Tank Creek
- Yankee Run

While the streams mentioned above are eligible for redesignation all other streams throughout the greenway should be tested to see if they also qualify for redesignation.



Agency:	Role:
Pennsylvania Department of Environmental Protection	DEP will need to be petitioned to get any stream redesignated Exceptional Value.
Brodhead Watershed Association	The BWA has past experience with stream redesignation plus pertinent data on many streams throughout the watershed. They would be a great ally when petitioning for stream redesignation.
Municipalities	With support from applicable municipalities stream redesignation will be much more efficient.
Penn Future Stream Redesignation Handbook	The Penn Future Stream Redesignation Handbook provides a thorough step-by-step process on redesignating streams to High Quality and Exceptional Value.



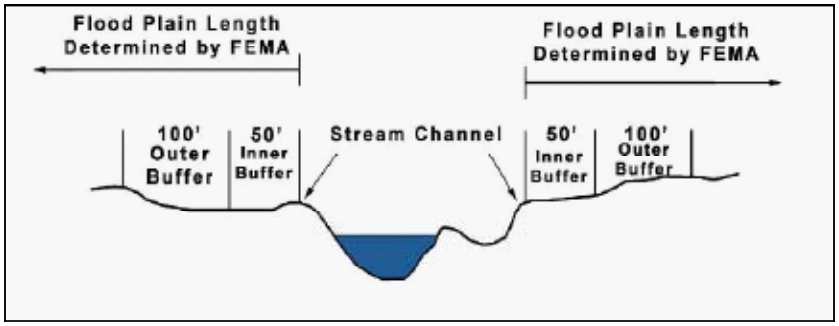
Recommendation 2 - Enact The Model Floodplain Ordinance

State and Federal (PA DEP and EPA) enforced regulation for sewage plants and industry wastewater are effective to a point, but accidents are bound to happen such as spills along roadways and sewage system failures that cannot be prevented no matter how many regulations are placed on them. Thus natural protection is important; vegetated buffers along watercourses will provide a source of cleansing before the contaminants can enter into the stream. Also buffers will protect against everyday stream pollutants and non-point pollution from roadway treatments, fertilizers etc.

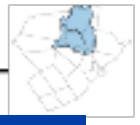
This greenway plan proposes that each municipality adopt through public process the model floodplain ordinance brought forth by the Monroe County Planning Commission. Not only does this ordinance place strict regulations upon activities within a floodplain, but it also places buffers on all water sensitive resources. This ordinance can potentially place high levels of buffer protection around approximately 7,300 acres (11.4 sq miles) of streams, 3,300 acres (5.1 sq miles) of wetlands, and 300 acres (0.47 sq miles) of lakes. This equates to approximately seventeen square miles of highly protected land if all four municipalities enact the ordinance.

It was suggested by the Planning Commission that the model floodplain ordinance be “a stand alone ordinance” and not part of any Zoning or Saldo documents to give the ordinance the most weight.

Since each municipality has different floodplain/buffer ordinances they are often difficult to regulate. The model flood plain ordinance will provide a uniform ordinance across several municipalities ensuring thorough regulation. The full model floodplain ordinance can be found in Appendix D.



Agency:	Role:
Monroe County Planning Commission	The planning commission will be called upon to answer any questions concerning the ordinance and provide funding for each municipality to enact the ordinance.
Monroe County Conservation District	The Monroe Conservation District also reviewed and supported the ordinance and could be called upon to answer additional questions concerning the ordinance. They will be primarily responsible for enforcing the ordinance.
Municipalities	Each municipality will need to enact the ordinance through a public voting process.

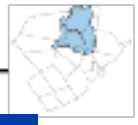


Recommendation 3 - Educate Through The Brodhead Watershed Authority

Stream redesignation, the model floodplain ordinance and many of the land conservation recommendations, will in all likelihood be met with much resistance from the general public. One of the best ways to make the public more accepting of these and other proposed changes is thoroughly educating them on the importance of preserving water quality.

The Brodhead Water Authority is dependent upon the natural process within the Upper Brodhead / Paradise Creek watersheds to produce clean water for their intake wells. However, they are not a regulatory agency and can not ensure that the water remains in its current clean state. The water authority can only educate people on the importance of clean water management tactics. (Please see Brodhead Water Authority key person interview in Section 2 for additional information)

Agency:	Role:
Municipalities	Before bringing any potentially controversial water/land preservation tactic before the public it would be beneficial to allow the Brodhead Water Authority to educate the public on issues that may arise. Education can be done through local newspapers, pamphlets, web sites, presentations etc. with the funding provided by the applicable municipality.
Schools	Today's children get very little outdoor interaction. In order for them to have a desire to continue to preserve this region's exceptional water quality they must first learn why it is important. School programs are a great way to educate the next generation.
Planning Commission	Coordinate with Brodhead Water Authority to set up educational programs. The planning commission, like municipalities, will propose potential controversial water/land preservation tactics that the public should be aware of before voting to enact them.



Recommendation 4 - Protection From Potential Impacts of Marcellus Shale Drilling

Marcellus Shale drilling could have a profound affect on water quality if left minimally regulated by the Commonwealth. Municipal or county officials need to understand the needs of their citizens within their jurisdiction, and those local citizens need to show support and interest in protection against the drilling. Public participation through petitioning representatives and senators to enact such bills as the FRAC Act will go along way in protecting water quality.

It is up to everyone within the Upper Brodhead / Paradise Creek watersheds to keep themselves up to date with current developments and regulations in order to make informed decisions about gas drilling. Ongoing public meetings are important for education and public support for regulation.

Agency:	Role:
Municipalities	Municipalities do have the option of keeping the Marcellus Shale drilling away from water sensitive areas through zoning, but they cannot completely limit it.
Local Citizens	Monroe County residents can lobby state senators and representatives to push legislation that protects water quality such as the FRAC Act. Local citizens can also participate in such groups as the Damascus Citizens for Sustainability to promote more strict drilling regulations and other legislation aimed at protecting water quality. PADEP and Delaware River Basin Commission are two agencies that are most responsible for overseeing the gas drilling industry. They could also be petition by local residents to incorporate tougher regulations.
Brodhead Water Authority	The BWA must educate those residents who will, with no regard to water quality, lease their land to these gas companies. These citizens, motivated only by money, feel that it is their right to allow gas drilling on their property. While it is, in fact, their right to do so, these citizens need to understand that what they do on their property can and will affect others.

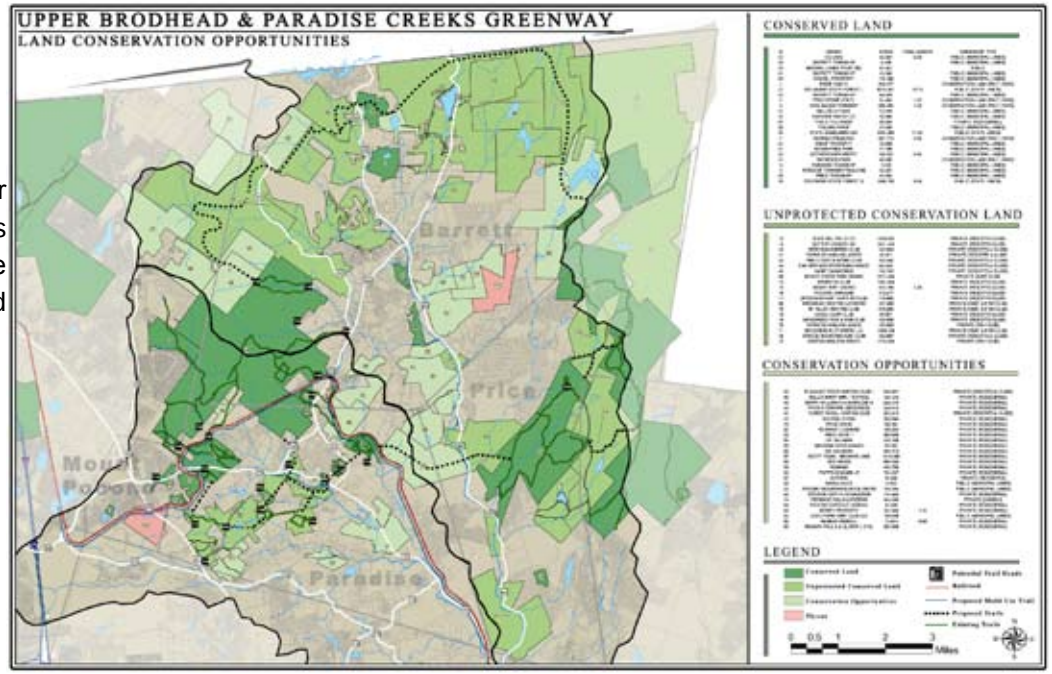
5.2 Land Preservation Recommendations

Recommendation 1 - Create Official Maps

All four municipalities should create Official Maps to identify all land conservation opportunities. Currently only Mount Pocono Borough has an approved official map while Paradise Township has an official map in draft form. The Land Conservation Opportunities Map (Figure 6-6) is a good starting point for official maps in both Barrett and Price Township. This map indicates many parcels that could be conserved for open space, but it is no means a comprehensive map of all possible conservation opportunities.

Parcels listed under the category "Conservation Opportunities" on the Land Conservation Map (right) are parcels most ready for land conservation. As discussed in section four of this report there are a variety of tools that can be used to protect these parcels such as conservation easements and TDR programs.

(A larger version of this map can be found at the end of this report.)



Agency:	Role:
Each Townships' Environmental Advisory Council (EAC) or Open Space Committees	EAC's and Open Space committees are responsible for identifying potential conservation opportunities and ultimately working with the Monroe County Planning Commission to create each township's official map. From this point the official maps will be brought before the public for review and acceptance. Actual conserving the parcels indicated on the official map is the final step which may be done through such tools as TDRs, easements, etc.
Land Owner	Whether the land owner is an organization or single owner, it is ultimately their decision wether to protect their parcel.
Monroe County Planning Commission	The Planning Commission has already completed official maps for several of the municipalities in Monroe County, including Mount Pocono, so they will be helpful in facilitating the official map process. The planning commission will be ultimately responsible for the mapping components of the official maps.
Land Trusts	Land trust organizations will be responsible for facilitating any conservation easements needed to protect the parcel.

KEY PARCELS FOR WATERSHED PRESERVATION/LAND CONSERVATION

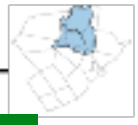
PARCEL OWNER	ACREAGE	MUNICIPALITY	RECOMMENDED ACTION
Doc Weiss	684	Coolbaugh	Easement
Mary Ann Miller / TB Price	121	Barrett	Easement
William Barry	222	Barrett	Easement
Edward Price	556	Barrett / Price	Easement
George Stone	328	Barrett	Easement
David Price	122	Barrett	Easement
Leonard Reinhart	193	Barrett	Easement
Alice Price	380	Barrett	Easement
Dr. Balabam	331	Barrett	Easement
Howard Phipps	721	Coolbaugh	Easement
Alice Makla	10	Mount Pocono	Easement
Paradise Falls Lutheran Assoc.	455	Paradise	Easement
Pocono Catholic School	32	Paradise	Easement
Dewey Property	307	Paradise / Barrett	Easement
Russel Nauman	75	Paradise / Barrett	Easement

Recommendation 2 - Joint Zoning Ordinances Between Municipalities

One major reason to create joint zoning ordinance between municipalities is to increase the use of the Transfer Of Development Rights (TDR's) programs. A large reason why TDR programs are under utilized is because of the difficulty of finding both "sending" and "receiving" parcels that fall under the same zoning laws. Creating joint zoning ordinances between several municipalities would increase the usefulness of this land conservation tool by creating more "sending" and "receiving" opportunities. The guidelines for creating joint ordinances can be found in Article VIII-A - Joint Municipal Zoning of the Pennsylvania Municipalities Planning Code.

Floodplain and buffer management will also greatly benefit from joint zoning and SALDO's. Combining municipality regulations will allow for regulation at more of a watershed level as opposed to the municipality level at which it currently operates.

Agency:	Role:
Barrett Township, Paradise Township, Price Township, Mount Pocono Borough	All four municipalities, or as many that would like to participate, would need to work together to create joint zoning ordinances. A multi-municipal plan, which has already been completed between Barrett Township, Paradise Township and Mount Pocono Borough, is the first step in creating zoning ordinances.
Monroe County Planning Commission	The planning commission can help coordinate all the technicalities that come along with combining SALDO's and ordinances.



Recommendation 3 - Creative Conservation Easements

A large percentage of lands within the watershed are owned by hunting and fishing clubs who are willing to place their land into a conservation easement, but are unwilling to allow full public access onto their lands. The Pocono Heritage Land Trust and other land trust organizations are searching in every place possible to attain enough funds necessary to purchase these easements. The Commonwealth of Pennsylvania will provide money to help purchase an easement only if there is full public access on the parcel they are helping to purchase. Because many of the hunt and fishing clubs are unwilling to allow for full public access onto the site there is very little chance that the land trust would be able to generate enough money to purchase the parcel. The hunting and fishing clubs could donate their land to a conservation easement and totally restrict public access but the club would receive no monetary compensation for the easement and still lose development rights.

An alternative to this problem is finding ways to allow for 'partial' public access onto these parcels which would require less funds needed to purchase the land. One example of an easement which allows for 'partial public access' is the Beagle Club in Stroudsburg. The owners received partial compensation for their conservation easement, andin turn allowed public access only twice a year to observe dog training.

Another unique conservation easement was the Pohoqualine fish club located in Chestnuthill. This fish club owns several hundred acres of land but they only use a small portion of this land from which to fish. A large percentage of land receives almost no use from the club members. The land trust who facilitated the easement was able to negotiate with the fish club to allow the public access on approximately three hundred acres of land for such activities as hiking trails and hunting. Another unique component of this conservation easement is that twice a year the fish club organizes a fishing program open to the general public to fish on the club's land.

This unique conservation easement offers benefits for the land trust organization and the property owner. The land trust organization is only required to provide partial compensation for the easement because the easement provides for partial public access. Also the land is protected from development forever ensuring that this large tract of forest remains undeveloped. The fish club gets compensated for the easement but still gets to keep a portion of their property off limits to the general public.

Agency:	Role:
Land Trust Organizations	The land trust organizations are needed to facilitate the conservation easements.
EAC's, Open Space Committees	These agencies will be responsible for finding possible conservation easements through Official Maps and other tools.
Monroe County & Municipalities	These government entities are ultimately responsible for providing the funding needed to purchase the easement.
Private Donors	Private donations of money to open space programs and conservation easements are welcome to help protect the land.

Recommendation 4 - Smart Growth Principles and Village Revitalization

Fragmented growth overwhelms adjacent older infrastructure and fragments traditional community linkages. Connections need to be maintained between town centers and villages throughout the region. It will become important to prevent development outside town centers and to foster economic growth and prosperity in town centers if development is necessary. Restoration tactics may include redesigned streetscapes, renovated store fronts and additional public amenities. In order to prevent urban sprawl, which leads to water quality degradation and focuses growth away from town centers, development which increases density, must occur. This can be achieved through conservation sub-divisions and more restrictive zoning that discourages sprawl development.

One of the most adverse affects of urban sprawl is traffic congestion and the resulting air pollution. Concentrating future commercial and service related development in or adjacent to traditional town centers can make public transportation more efficient and foster more alternative transportation options.

Agency:	Role:
Borough/Townships and the Monroe County Planning Commissions	Theses agencies will be the driving force of adjusting zoning laws to be consistent with the smart development vision of the watershed. Tax incentives may be offered for developers who surpass minimum zoning requirements and implement a variety of smart growth techniques.
Monroe County Planning Commission	The county planning commission can adjust for the refocus on development of town centers, and can allocate private and public funding towards this goal.

5.3 Community Connection Recommendations

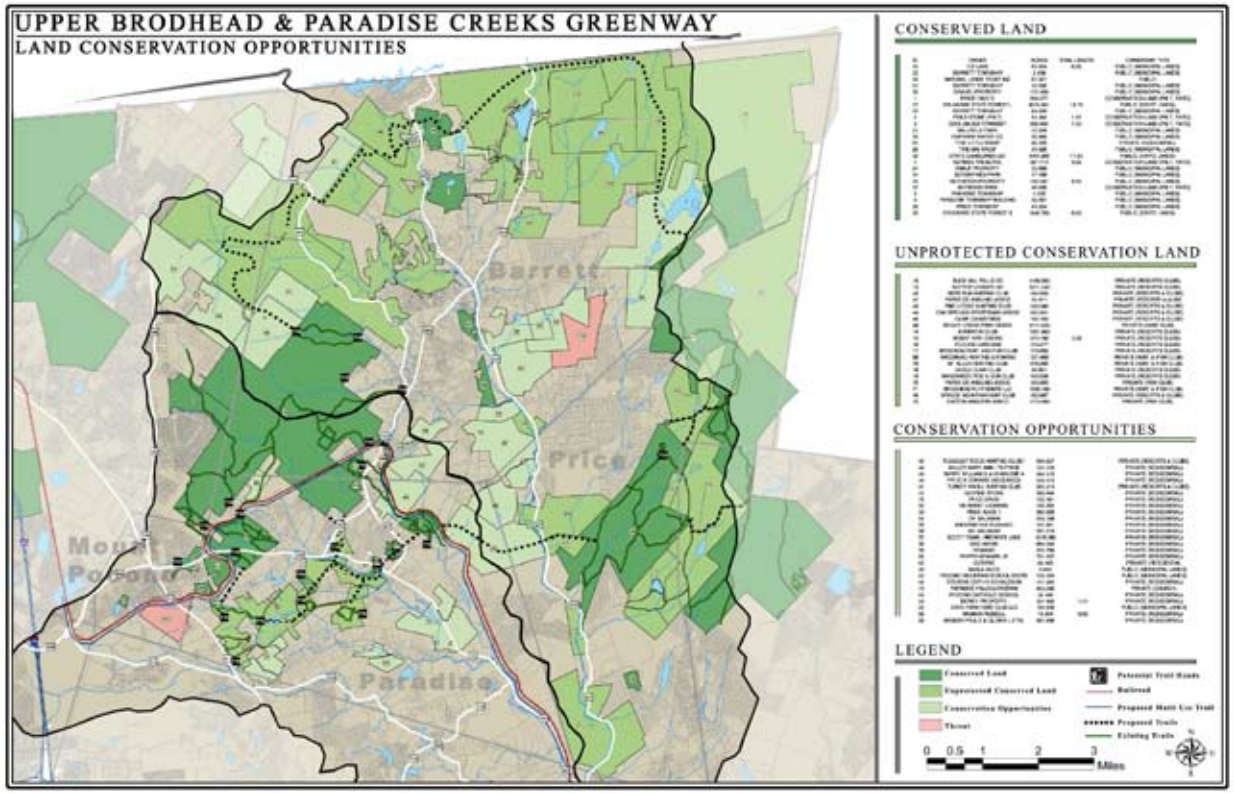
Recommendation 1 - Acquire Key Parcels Necessary To Implement Proposed Trail

The Land Conservation Opportunities map illustrates a potential trail loop anchored by Gamelands 221 and the Delaware State Forest. The trail has been broken down into two segments the "Northern Corridor" and the "Southern Corridor"

The Southern Corridor should be made the top priority when developing the greenway due its ease of implementation. The biggest challenge facing this corridor is the two hunting clubs situated between the two Delaware State Forest parcels.

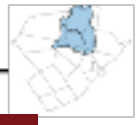
The biggest issue facing the formation of the trail through the northern corridor is obtaining permission from the owners of the Buck Hill Falls and Skytop Lodge to allow the public access to a portion of their properties.

While it might be too much to ask these landowners to open up their trails to the public all of the time, perhaps they trails could be open to the public on a limited basis. Opening the trails to the public (i.e. the first Sunday of the month) would not only allow for more hiking options for the general public but also increase the popularity and enhance the public image of the resorts.



KEY PARCELS FOR TRAIL IMPLEMENTATION

PARCEL OWNER	ACREAGE	MUNICIPALITY	GREENWAY:	RECOMMENDED ACTION
Mount Allen Hunt Club	619	Price	Southern Corridor	Trail Easement
Hiawatha Hunt Club	1350	Price / Middle Smithfield	Southern Corridor	Trail Easement
Echo Farm	717	Paradise / Price	Southern Corridor	Acquisition
Henry's Crossing Estates Inc	266	Paradise	Southern Corridor	Trail Easement
Noel Rituper	11	Paradise	Southern Corridor	Trail Easement
David Vansciver	21	Paradise	Southern Corridor	Trail Easement
Doris Headrick	32	Paradise / Mount Pocono	Southern Corridor	Trail Easement
Michael Synder	18	Paradise / Mount Pocono	Southern Corridor	Trail Easement
Don Miller	10	Paradise	Southern Corridor	Trail Easement
Pleasant Ridge Hunt Club	475	Coolbaugh / Barrett	Northern Corridor	Acquisition / Trail Easement
Flints and Fletches Hunting Club	279	Coolbaugh / Barrett	Northern Corridor	Acquisition / Trail Easement
Buck Hill Falls	4,500	Coolbaugh / Barrett	Northern Corridor	Trail Programs
Spruce Mountain Associations	473	Barrett	Northern Corridor	Trail Programs
Botshon Morton Trustee	158	Barrett	Northern Corridor	Trail Easement
Skytop Lodges	5000	Barret / Pike County	Northern Corridor	Trail Programs
Tighe Scott	610	Barrett	Northern Corridor	Acquisition



Recommendation 2 - Additional "Trail Roundtable" Meetings

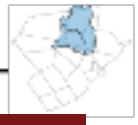
Identifying and mapping all potential and existing trails within the watershed study area is a cumbersome and time consuming task. The Land Conservation Map illustrates several miles of both existing and potential trails as well as numerous trail heads but this is by no means a comprehensive trails map.

In December of 2009 a "Trails Roundtable" meeting was held to discuss and map out trails throughout Monroe County. This meeting was very well attended but there is still much work to be done. Those who attended the meeting were asked to sketch out, on topographic maps, any existing trail of which they were aware. Once compiled this map will be a great asset to any outdoor enthusiast of Monroe County.

The Monroe County Planning Commission is still in the process of compiling all of this data into a trails map. Additional "Trail Roundtable" meetings are needed to review past work and add additional trails that were missed.

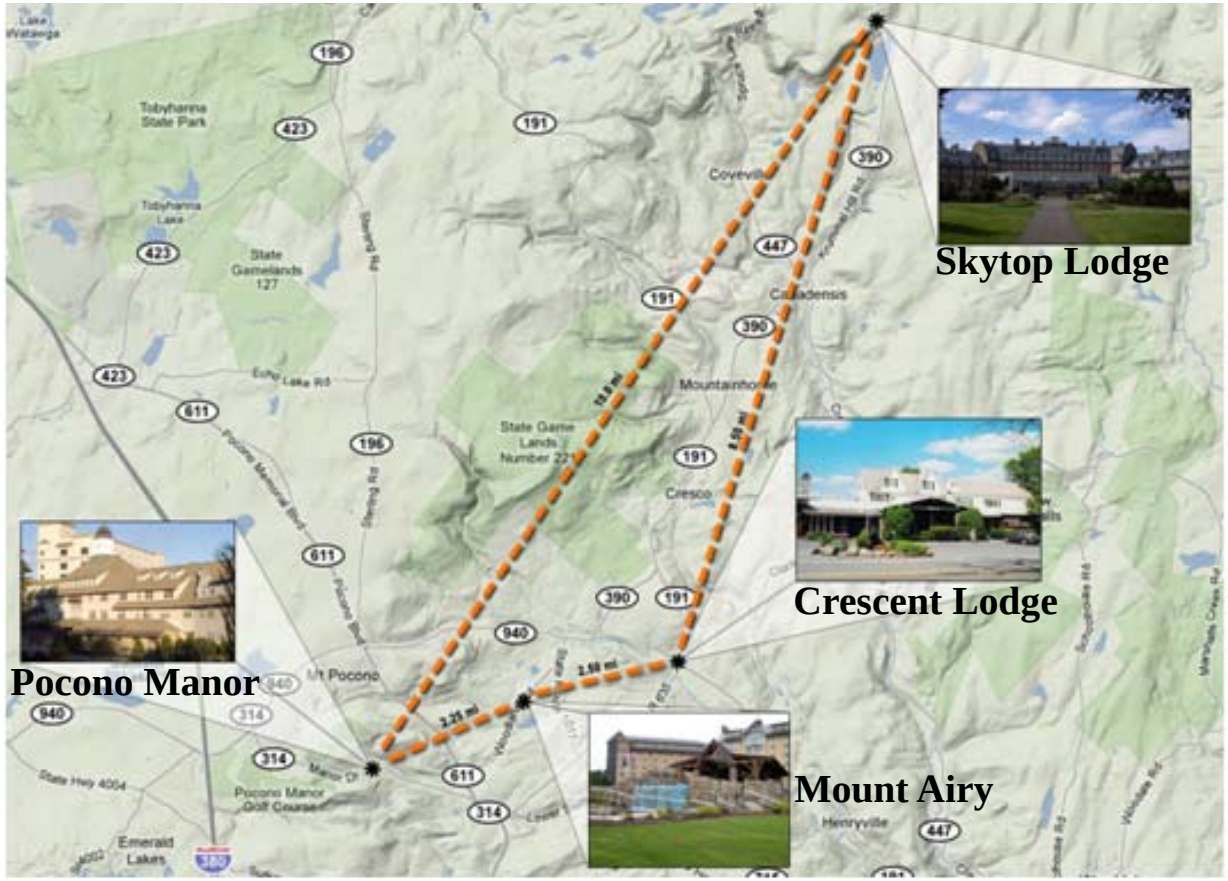
While these trail maps will be adequate for the average trail, user a long term goal of these "Trail Roundtable" meetings should be to precisely GPS the trail system. Currently only the Delaware State Forest and the Buck Hill Falls property have located trails using GPS. (Note: on trail maps all other existing trails have been traced from sources such as aerial views, topo maps etc. Thus they may not be very accurate.) An expansive GPS trail system has several advantages to the overall greenway plan. Such benefits include; more accurate and detailed mapping, less chance of new trail users getting lost, and quicker medical attention. GPS files are also easy to distribute among other entities who would want to plug these trails into a larger overall trail system.

Another possible benefit of a GPS trail system would be additional trail users participating in geocaching. Geocaching is a worldwide game of hide and seek. A geocacher can place a geocache anywhere in the world, pinpoint its location using GPS technology and then share the geocache's existence and location online. Anyone with a GPS unit can then try to locate the geocache. These new trail users will undoubtedly contribute to the well being the local economy through room rentals, food and beverage purchase etc.

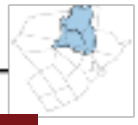


Recommendation 3 - Inn to Inn Trail System

An inn to inn trail system is a program that would allow people to travel between the two inns via foot trails or bike paths while their luggage would be delivered to the destination by vehicle. Various waterfalls within the watershed will be visible on this trail creating points of interest. This program could potentially increase revenue for those inns/ resorts participating in the program and any other business along the trail route.



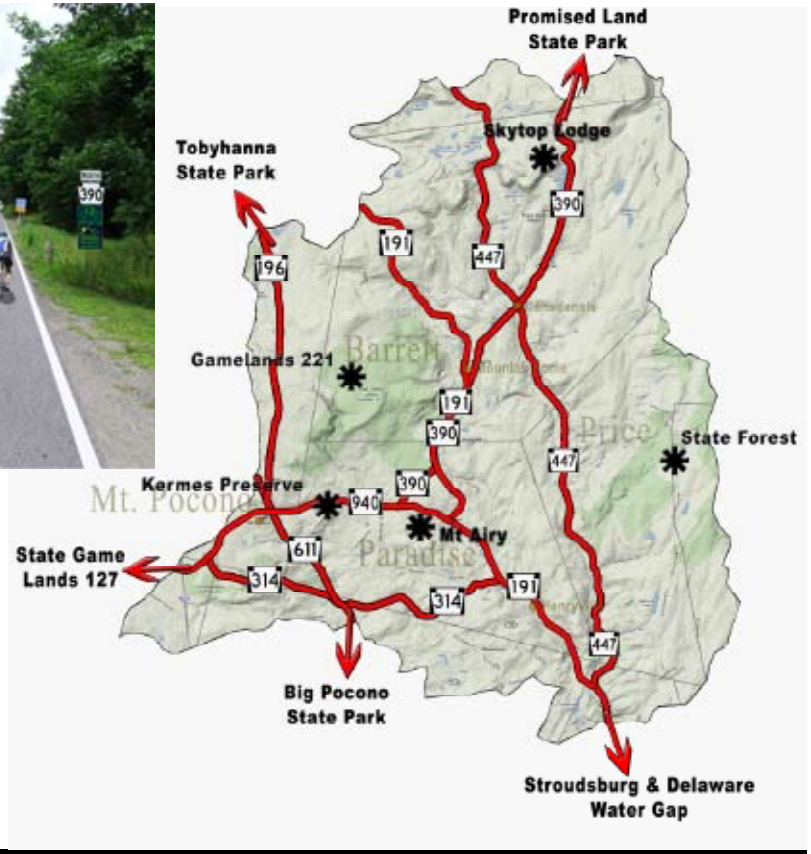
Agency:	Role:
Local Inns and Resorts	In order for this program to be successful inns and resorts must not only participate in the program but also promote it. Currently Skytop Lodge, Pocono Manor, Crescent Lodge and Mount Airy have expressed an interest in starting such a program. More inns are be expected to follow their lead.
Pocono Visitors Bureau	The Visitors Bureau will be able to market the Inn to Inn trail and begin to draw visitors and hikers to the area. The Visitors Bureau will be able to aid in compiling and producing advertising material and maps of the trail for tourists.



Recommendation 4 - Develop Byways and Bikeways Along Potential Routes

As discussed in section four of this report many roads within the watershed have the potential to become both scenic byways and bikeways. This plan is proposing the following routes be considered for both scenic byways and bikeways: Routes 447, 611, 390, 191, 196, 940 and 314.

Pursuit of National Scenic Byway designation should be the ultimate goal. This will include but not be limited to cleaning road shoulders and photo documentation for submittal to the National Scenic Byways Program as well as submit other required forms. The same routes are also recommended to serve as bikeways in the watershed that connect to other regional trails and bikeways. Road width will need to be increased to at least a ten foot minimum for a two-way bike lane and five foot minimum for a one-way bike lane according to Penndot standards. Road expansion will most likely be necessary in all cases for the roads listed.



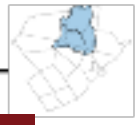
Agency:	Role:
PennDOT	PennDOT will play a large part in the approval process of road expansion for bikeways.
Monroe County Planning Commission	The Planning Commission will be involved in the construction and planning process.
Barrett, Paradise, and Price Townships, and Mount Pocono Borough	The townships/borough will be responsible for roadways within their respective areas and will provide the documentation associated with the submittal process for byways.
Scenic Byway Committees	Newly formed byway committees will be responsible for taking care of the specific details of creating a byway such as vehicle speed reduction and signage control. The committee will also need to organize marketing brochures of the byway and ultimately petition for the road to be recognized as a national scenic byway.

Recommendation 5 - A Handicap Accessible Multi-use Trail Along Rail line

Since this is the only multi-use trail proposed in the Greenway plan, it is important to pursue the construction of this trail. This type of trail reduces building cost because the land is already cleared. Because rail lines tend to twist and turn with the lands topography to prevent any steep inclines or declines, and are next to a rail line is an optimal place to create a handicap accessible trail. The trail would be able to comply with the Americans with Disabilities Act (ADA) regulations for handicap accessibility by not exceeding a 5% slope.

Currently the rail line is owned and operated by the Pennsylvania Northeast Regional Railroad Authority (PNRRA). This company will ultimately decide whether or not to allow for a multiuse trail along its rail line.

Agency:	Role:
Pennsylvania PNRRA	This is the main organization that will be involved with the Rails-to-Trails since they manage the rail lines. Coordination with the PNRRA is necessary to gain access rights along the rail lines to install a trail.
Township Planning Commission	Depending on which townships the rail line passes through, each township will be able to plan for a trail with the cooperation of the PNRRA.
Pennsylvania Growing Greener II	From 1995 to 2006 Pennsylvania has invested $43 million in trails through Growing Greener.



Recommendation 6 - Enact a Sign Ordinance

Scenic byways have been proposed along several major roads within the watershed. Billboards often detract from the general aesthetics of these roads reducing their chances of ever being considered for a national scenic byway. Having all of the billboards and advertisements condensed and placed on one large board that will be duplicated where necessary throughout the watershed will allow the county more control over roadway marketing. The repetition of the advertisement board will create a datum throughout the entire greenway project creating stronger uniformity. In order to control the numerous billboards that dot the watershed, a sign ordinance should be enacted to control these often unsightly advertisements. Before a sign ordinance can be enacted an inventory of all signs must be taken throughout each of the townships. Only Barrett Township and Paradise Township have done so up to this point leaving Price Township and Mount Pocono to complete their sign inventory. "Citizens for a Scenic Wisconsin" has created two model sign ordinances that are a good precedent to look to in creating Monroe County's sign ordinance.

The website can be found at the following location: 2 www.scenicwisconsin.org/modelord.htm

The above picture is just an idea for billboard uniformity/ consolidation. Other options should be considered.

Agency:	Role:
Barrett Township, Paradise Township, Price Township, and Mount Pocono Borough.	Once a sign inventory for all four municipalities has been completed a sign ordinance can be enacted. These municipalities must work together in order to enact the same sign ordinance in order to provide a sense of uniformity along the proposed byway. The next step is to design a unique iconic "brand".
Advertisers	After being informed of the new ordinance, advertisers will be responsible for complying with all sign restrictions and regulations.

Implementation Plan

6.1 - Organizational Structure
6.2 - Greenway Development Options
6.3 - Phased Development Plan
6.4 - Option Estimate For Probable Cost
6.5 - Potential Funding

6.1 Organizational Structure For Greenway Implementation

Once the plan has been adopted by a municipality it is the duty of that municipalities' supervisors to appoint representatives to a greenway implementation government entity. While this government entity should be represented by Upper Brodhead and Paradise Creek Greenway Study Committee members and other concerned local citizens; the entity should also be represented by municipal supervisors for additional political backing.

It is paramount to the success of achieving the goals of the greenway plan that the project planning area is defined by an "ecological planning unit" (watershed) rather than by political municipal boundaries. The Brodhead Creek and Paradise Creek watershed Greenways Planning Area (project area), includes all or portions of the participating municipalities of Mount Pocono Borough, Barrett, Paradise and Price Townships, and to a lesser extent, the adjacent municipalities of Coolbaugh, Pocono, Tobyhanna, Stroud, Smithfield and Middle Smithfield Townships, in Monroe County, Green Township in Pike County, and Dreher Township in southern Wayne County.

The organizational entity(s) responsible for the establishment, development, management and maintenance of the greenway must have some reasonable measure of authority to act, and to enlist the cooperation, financial and political support from all levels of federal, regional, state, and local government jurisdictions within the watershed. The organizational structure must include multi-municipal representation, (preferably by local elected officials), who function as municipal liaisons and are charged with the responsibility of acting on behalf of their respective municipalities, are empowered to make decisions on their behalf, and can advance the goals and specific implementation strategies of the greenway plan. The permanent management entity will ultimately be responsible for developing the greenway organizational structure and instituting various greenway advocacy, marketing, design, implementation and operational management functions.

The most expedient route to the establishment of a permanent greenway management entity would be to incorporate the required functional capabilities into an existing government or non-government organization (NGO). This organization would obviously have to have compatible goals and operational responsibilities, adequate qualified staff and/or additional staffing capabilities, the legitimate authority to take on the additional responsibilities, and be capable of fully implementing the strategies for achieving the greenway plan goals.

Whatever the final administrative vehicle selected to manage and implement the greenway plan, it will most definitely require the full cooperation and support of many allied organizations. At a minimum, supporting organizations will likely include:

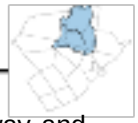
Local Municipal Government: Local municipal elected officials, planning commissions, zoning boards, building code and sewer enforcement officers, sewer and water authorities, environmental advisory commissions, park and recreation boards.

Monroe County Government: County Commissioners, Planning Commission, Conservation District, County Recreation, and various Open Space, Green Way, Trails and Conservation Boards and Commissions.

Pennsylvania State Government Agencies: Department of Conservation and Natural Resources (DCNR), Department of Environmental Protection (DEP), Department of Community and Economic Development (DCED), Department of Transportation (PENNDOT), Fish and Boat Commission, Game Commission and DCNR Bureau of Forestry, PA Infrastructure Investment Board (PENNVEST).

Federal Government: Federal departments, bureaus, services and agencies far too numerous to mention.

Non-Government Organizations (NGO): The Brodhead Watershed Association, the numerous Hunting and Fishing Clubs and Associations, Pocono Mountains Visitors Bureau.



6.2 Greenway Development Options

Property Ownership: As mentioned in previous sections of this report, the greenway study area contains many large tracts of land that are privately held, primarily by resorts, summer camps and hunting/fishing clubs and associations. Historically the owners of these parcels, in general, have proven to be wise stewards of the land and most have been particularly diligent in respecting and protecting sensitive natural resource areas.

Many of the current large tract property owners have a vested economic or personal interest in maintaining healthy forest cover and the natural scenic beauty of their parcels. The critical issue is that economic pressures have already taken their toll on the once thriving Pocono resort industry, and changes in recreational preferences and demographics could negatively impact these industries at any time.

This greenway plan acknowledges the importance of maintaining the economic vitality of the current beneficial private outdoor recreation opportunities enjoyed by sportsmen and tourists who use these large land holdings. The plan also recognizes a unique opportunity for mutually beneficial private/public partnership efforts including:

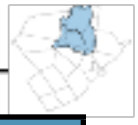
- The creation of a marketing plan to promote a greenway "brand" or identity.
- The preservation of scenic vistas and the implementation of scenic byway designations.
- The creation of a well conceived and designed, coordinated signage program to reinforce the greenway "brand" and foster a unique "Pocono Mountains sense of place"
- The development of a comprehensive multiuse trail system (hiking, biking, snowmobile, horse back riding, X country skiing, snow shoeing, etc) with an emphasis on providing and expanding pedestrian and other low impact transportation alternatives
- The restoration and expansion of historic community linkages and connections to the Borough of Mount Pocono and other villages and town centers through programs like: "Main Street", "Elm Street" and the federal "Complete Streets" initiative to create walk-able communities.
- The goal should be working together with all land owners to institute strict land use controls that will foster commercial development of historic villages and town centers and prevent strip development and signage clutter along scenic byways and to protect the natural scenic beauty of the greenway.

Extensive acquisition of private property and providing widespread public access to privately held land is not a goal of the greenway plan. Rather the plan suggests identifying key parcels that are strategically located within the greenway and that further the broader goals of watershed protection, preservation of sensitive natural resources and restoring historic community linkages and connectivity. The plan recommends that the key parcels identified in the greenway plan also be noted on municipal official maps, and that greenway and municipal officials reach out to selected parcel owners and communicate the public's interest. This strategy could offer a sustained, long term approach to property or easement acquisitions that are "opportunity" based and, if patiently implemented, could reduce public apprehension, and create more widespread acceptance and support for the greenway plan objectives.

Section five of this report identifies key parcels that are important for furthering the water quality, land preservation and community connection goals of the greenway plan and designates specific priority parcels for fee simple acquisition and/or conservation or trail public access easements. Other land use tools such as conservation subdivision planning, Official Maps, floodplain, riparian buffer and steep slope protection measures may also be useful in achieving the goals of the greenway plan.

6.3 Phased Development Plan

Immediate Implementation Strategies on a Municipality by Municipality Basis	
Barrett Township	• Petition DEP to have the southern section of Mill Creek re-designated “Exceptional Value”. • Begin to draft “Official Maps”. • Initiate talks with Skytop Lodge and Buck Hill Falls for the creation of hiking programs on their trails. • Begin process of forming Joint Zoning Ordinances.
Mount Pocono	• Petition DEP to have the southern section of Yankee Run re-designated “Exceptional Value”. • Initiate feasibility study for a Share-the-Road Bikeway along Route 940. • Initiate talks with the PNRRA to implement a multi-use trail along the rail line. • Begin process of forming Joint Zoning Ordinances.
Paradise Township	• Petition DEP to have the southern section of Devil’s Hole Creek re-designated “Exceptional Value”. • Adopt “Official Map”. • Complete Mount Airy trail network. • Begin process of forming Joint Zoning Ordinances.
Price Township	• Begin to draft “Official Maps”. • Initiate feasibility study for a Scenic Byway along Route 447. • Initiate and implement a Braille Trail along an already developed trail (e.g. Delaware State Forest). • Work with Paradise Township to acquire Echo Farm Hunt club. • Begin process of forming Joint Zoning Ordinances.
Ongoing Strategies	• Hold public meetings to provide an update on the status of greenway projects, inform residents of upcoming projects, build support for the greenway system, encourage volunteerism, and collect input. • Foster strong town centers through smart growth initiatives, proper zoning, Main and Elm Street Programs, etc. • Increase support and funding sources for the Open Space Program. • Host “Trail Roundtable” meetings on a consistent basis. • Maintain a dialogue with officials from neighboring municipalities regarding the continuation of regional trail and greenway projects across municipal boundaries.



Watershed Protection / Land Conservation Development Strategies	
Short Term Strategies	• Petition to have applicable streams mentioned in 5.1(Recommendation 1)redesignated to “Exceptional Value”. • Conduct a feasibility study for implementation of Model Floodplain Ordinance. • Create and distribute educational information through the Brodhead Watershed Authority to educate the public on the importance of water quality and floodplain protection. • Evaluate zoning opportunities that may protect against potential impacts of Marcellus shale drilling. • Purchase or place easements upon any parcel when opportunity arises.
Mid Term Strategies	• Have remaining “High Quality” streams tested to see if they qualify for “EV” redisignation. • Have a Barrett Township and Price Township approve Official Maps. • Implement Model Floodplain Ordinance. • Implement zoning regulations that may protect against potential impacts of Marcellus Shale drilling. • Purchase or place easements upon any parcel when opportunity arises.
Long Term Strategies	• Redesignate all additional qualifying streams to “Exceptional Value”. • Organize local grassroot/nonprofit groups to protest and keep a watchful eye on any Marcellus Shale drilling. • Institute a GPS trail network. • Continue to update Official Maps. • Purchase or place easements upon any parcel when opportunity arises.

Bikeway / Byway Development Strategies	
Short Term Strategies	• Brainstorm bikeway and byway signage concepts (color scheme, size, shape, logo) that will adhere to the overall greenway branding package. Branding may include but is not limited to pavement markings and roadside signage. • Begin to petition PennDOT for expansion of portions of Route 940 and any another changes needed to form a share-the-road bikeway. • Appeal to the National Scenic Byways Program for grants for the implementation of 447 as a scenic byway. • Initiate new volunteer corps for such activities as road cleaning, sign inventory etc. • Propose a Model Sign Ordinance to control billboards along each road.
Mid Term Strategies	• Gather public input on bikeway and byway signage concepts. Choose a signage concept and implement it. • Working with the Pocono Mountain's Visitor's Bureau to create brochures and other marketing materials for the Route 940. share-the-road bikeway and Route 940 scenic byway. • Implement Route 940 as a share-the-road bikeway. • Implement Route 447 as a scenic byway. • Begin scenic byway and share-the-road bikeway feasibility studies for Routes 314/611/196, 940,390,447 and191. • Enact a Sign Ordinance in as many municipalities as possible. • Initiate conversations with surrounding counties and municipalities to expand the byway and bikeway systems.
Long Term Strategies	• Continue to look to implement byway/bikeways along Routes 314/611/196, 940,390,447 and 191 as monies become available. • Petition the National Scenic Byways Program for National Scenic Byway designation on applicable roads. • Continue to assess, monitor and maintain the byways and bikeways.

Trail Network Development Strategies	
Short Term Strategies	• Brainstorm trail signage concepts (color scheme, size, shape, logo) that will adhere to the overall greenway branding package. Although future trail development will most likely be piecemeal, a well-thought out and accepted brand can assure that each trail segment still has a regional, greenway appeal. • Initiate conversations with state agencies to discuss trail access between state and non-state owned lands. • Initiate planning efforts for trail layout at newly acquired county, municipal or land trust properties. • Identify and approach key property owners to discuss property acquisition or conservation easements. • Initiate the development of a regional volunteer corps that would assess, build and maintain trails and heighten community awareness of the greenway. • Initiate feasibility studies for the implementation of a Braille Trail in the various locations throughout the watershed.
Mid Term Strategies	• Gather public input on trail signage concepts. Choose a signage concept and implement it. • Complete the design phase for the handicap accessible multi-use trail . • Work with the state to update their trails and install directional signage. Utilize the new volunteer corps. • Monitor and assess the state of recently built trails for sustainability, usage and potential for additional connectivity. • Move toward the design stage for new trail networks at already acquired properties. • Hold more serious discussions with key property owners about land acquisition or easements; apply for grants to fund future acquisition. • Implement Braille Trails to appeal to a wider demographic of greenway users.
Long Term Strategies	• Construct the handicap accessible multi-use trail. • Acquire remaining parcels of land needed for the entire trail systems. • Look to expand trail network to areas outside of the watershed area. • Start construction of additional primary and secondary natural surface trail networks. • Continue to assess, monitor and maintain the existing trails.

6.4 Option Estimate For Probable Cost

Upper Trail Network:

UPPER TRAIL NETWORK				$	6,242,700.00
Line Item Description	Estimated Quantity (EQ) and Units		Unit Cost (UC)		Total Cost (EQ x UC)
PHASE ONE				$	1,688,550.00
DEVELOP SIGNAGE PACKAGE FOR TRAILS THAT ADHERES TO OVERALL GREENWAY BRANDING	1	LS	$ 2,500.00	$	2,500.00
EXISTING TRAIL HEADS, UPDATES	5	EA	$ 5,000.00	$	25,000.00
EXISTING TRAIL HEAD AMENITIES, UPDATES *	5	LS	$ 6,000.00	$	30,000.00
NATURAL SURFACE TRAIL NETWORKS (1° AND 2°) - FEASIBILITY STUDIES AND NEW TRAIL CONCEPT AND DESIGN PLANS	2	EA	$ 75,000.00	$	150,000.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 5 MILES (FOCUS ON MUNICIPAL & COUNTY LANDS)	26400	LF	$ 9.00	$	237,600.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 10 MILES (FOCUS ON MUNICIPAL & COUNTY LANDS)	52800	LF	$ 4.00	$	211,200.00
INITIATE TALKS ON DEVELOPING A TRAIL PROGRAM WITH PRIVATE INNS, ASSOCIATIONS, ETC.	3	EA	$ 500.00	$	1,500.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	3	EA	$ 250.00	$	750.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	100	EA	$ 10.00	$	1,000.00
STREAM CROSSINGS - WOODEN BRIDGE	2	EA	$ 2,800.00	$	5,600.00
STREAM CROSSINGS - BOULDER STEPPING STONES	1	EA	$ 900.00	$	900.00
INITIATE DISCUSSIONS WITH KEY PROPERTY OWNERS	1	LS	$ 2,500.00	$	2,500.00
TRAIL EASEMENTS (20' WIDE)	1	AC	$ 20,000.00	$	20,000.00
PROPERTY ACQUISITION	1	EA	$ 1,000,000.00	$	1,000,000.00

PHASE TWO				$	3,970,050.00
NEW TRAIL HEADS	8	EA	$ 32,000.00	$	256,000.00
TRAIL HEAD AMENITIES *	8	LS	$ 8,000.00	$	64,000.00
NEW LOOKOUT AREAS	7	EA	$ 1,800.00	$	12,600.00
LOOKOUT AREAS, AMENITIES	7	LS	$ 2,000.00	$	14,000.00
NATURAL SURFACE TRAIL NETWORKS (1° AND 2°) - FEASIBILITY STUDIES AND NEW TRAIL CONCEPT AND DESIGN PLANS	1	EA	$ 75,000.00	$	75,000.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 20 MILES	105600	LF	$ 9.00	$	950,400.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 25 MILES	132000	LF	$ 4.00	$	528,000.00
IMPLEMENT THE TRAIL PROGRAM WITH PRIVATE INNS, ASSOCIATIONS, ETC.	3	EA	$ 5,000.00	$	15,000.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	5	EA	$ 250.00	$	1,250.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	300	EA	$ 10.00	$	3,000.00
STREAM CROSSINGS - WOODEN BRIDGE	2	EA	$ 2,800.00	$	5,600.00
STREAM CROSSINGS - BOULDER STEPPING STONES	3	EA	$ 900.00	$	2,700.00
ADDITIONAL DISCUSSIONS WITH KEY PROPERTY OWNERS	1	LS	$ 2,500.00	$	2,500.00
TRAIL EASEMENTS (20' WIDE)	2	AC	$ 20,000.00	$	40,000.00
PROPERTY ACQUISITION	2	EA	$ 1,000,000.00	$	2,000,000.00

PHASE THREE				$	584,100.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 10 MILES (FOCUS ON HUNT AND FISH CLUBS)	52800	LF	$ 9.00	$	475,200.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 5 MILES (FOCUS ON HUNT AND FISH CLUBS)	26400	LF	$ 4.00	$	105,600.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	2	EA	$ 250.00	$	500.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	100	EA	$ 10.00	$	1,000.00
STREAM CROSSINGS - BOULDER STEPPING STONES	2	EA	$ 900.00	$	1,800.00

Lower Trail Network

LOWER TRAIL NETWORK			$	6,581,490.00
Line Item Description	Estimated Quantity (EQ) and Units		Unit Cost (UC)	Total Cost (EQ x UC)
PHASE ONE				$ 1,599,350.00
DEVELOP SIGNAGE PACKAGE FOR TRAILS THAT ADHERES TO OVERALL GREENWAY BRANDING	1	LS	$ 2,500.00	$ 2,500.00
EXISTING TRAIL HEADS, UPDATES	18	EA	$ 5,000.00	$ 90,000.00
EXISTING TRAIL HEAD AMENITIES, UPDATES *	18	LS	$ 6,000.00	$ 108,000.00
MULTI-USE TRAIL (9' WIDE) - FEASIBILITY STUDY	1	LS	$ 75,000.00	$ 75,000.00
NATURAL SURFACE TRAIL NETWORKS (1° AND 2°) - FEASIBILITY STUDIES AND NEW TRAIL CONCEPT AND DESIGN PLANS	5	EA	$ 75,000.00	$ 375,000.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 10 MILES (FOCUS ON MUNICIPAL & COUNTY LANDS) - CLEAR & GRUB, LEVELING & GRADING	52800	LF	$ 9.00	$ 475,200.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 20 MILES (FOCUS ON MUNICIPAL & COUNTY LANDS) - CLEAR & GRUB, LEVELING & GRADING	105600	LF	$ 4.00	$ 422,400.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	5	EA	$ 250.00	$ 1,250.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	200	EA	$ 10.00	$ 2,000.00
STREAM CROSSINGS - WOODEN BRIDGE	1	EA	$ 2,800.00	$ 2,800.00
STREAM CROSSINGS - BOULDER STEPPING STONES	3	EA	$ 900.00	$ 2,700.00
INITIATE DISCUSSIONS WITH KEY PROPERTY OWNERS	1	LS	$ 2,500.00	$ 2,500.00
TRAIL EASEMENTS (20' WIDE)	2	AC	$ 20,000.00	$ 40,000.00
PHASE TWO				$ 2,374,950.00
NEW TRAIL HEADS	4	EA	$ 32,000.00	$ 128,000.00
TRAIL HEAD AMENITIES *	4	LS	$ 8,000.00	$ 32,000.00
NEW LOOKOUT AREAS	3	EA	$ 1,800.00	$ 5,400.00
LOOKOUT AREAS, AMENITIES	3	LS	$ 2,000.00	$ 6,000.00
MULTI-USE TRAIL (9' WIDE) - COMPLETE CONSTRUCTION DOCUMENTS	1	LS	$ 45,000.00	$ 45,000.00
NATURAL SURFACE TRAIL NETWORKS (1° AND 2°) - FEASIBILITY STUDIES AND NEW TRAIL CONCEPT AND DESIGN PLANS	3	EA	$ 75,000.00	$ 225,000.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 10 MILES - CLEAR & GRUB, LEVELING & GRADING	52800	LF	$ 9.00	$ 475,200.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 25 MILES - CLEAR & GRUB, LEVELING & GRADING, BY HA	132000	LF	$ 4.00	$ 528,000.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	5	EA	$ 250.00	$ 1,250.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	200	EA	$ 10.00	$ 2,000.00
STREAM CROSSINGS - WOODEN BRIDGE	1	EA	$ 2,800.00	$ 2,800.00
STREAM CROSSINGS - BOULDER STEPPING STONES	2	EA	$ 900.00	$ 1,800.00
ADDITIONAL DISCUSSIONS WITH KEY PROPERTY OWNERS	1	LS	$ 2,500.00	$ 2,500.00
TRAIL EASEMENTS (20' WIDE)	6	AC	$ 20,000.00	$ 120,000.00
PROPERTY ACQUISITION	1	EA	$ 800,000.00	$ 800,000.00
PHASE THREE				$ 2,607,190.00
MULTI-USE TRAIL (9' WIDE) - CONSTRUCT 17 MILES OF TRAIL - CLEAR & GRUB, LEVELING & GRADING	89760	LF	$ 24.00	$ 2,154,240.00
CONSTRUCT PRIMARY TRAILS (5' WIDE) FOR ALREADY DESIGNED TRAILS - 5 MILES (FOCUS ON HUNT AND FISH CLUBS) - CLEAR & GRUB, LEVELING & GRADING	26400	LF	$ 9.00	$ 237,600.00
CONSTRUCT SINGLE-TRACK TRAILS (1.5' WIDE) FOR ALREADY DESIGNED TRAILS - 10 MILES (FOCUS ON HUNT AND FISH CLUBS) - CLEAR & GRUB, LEVELING & GRADING, BY HA	52800	LF	$ 4.00	$ 211,200.00
SIGNAGE - DIRECTIONAL, SAFETY (FOR TRAIL, INTERSECTIONS)	5	EA	$ 250.00	$ 1,250.00
TRAIL MARKERS, 4"x 4" RECYCLED PLASTIC - ALONG TRAIL	200	EA	$ 10.00	$ 2,000.00
STREAM CROSSINGS - BOULDER STEPPING STONES	1	EA	$ 900.00	$ 900.00

Byways/Bikeways

Option Estimate For Probable Cost

Route 314-611-196

BRIEF DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL COST
BITUMINOUS PAVING - 3' ADDITIONAL SHOULDER	SY	29,920	$60.00	$1,795,200.00
WHITE HOT THERMO PLASTIC PAVEMENT MARKINGS - 4" / W LINE STRIPING	SF	29,920	$5.00	$149,600.00
BIKER - CHEVRON THERMOPLASTIC PAVEMENT MARKING - EVERY 1/2 MILE	EA	32	$300.00	$9,600.00
"SHARE THE ROAD" SIGN @ INTERSECTIONS	EA	32	$500.00	$16,000.00
LOGO BRANDING ALLOWANCE	LS	1	$2,500.00	$2,500.00
INTERSECTION DIRECTIONAL SIGNAGE	EA	32	$800.00	$25,600.00
ESTIMATE TOTAL				**$1,998,500.00**

Option Estimate For Probable Cost

Route 940

BRIEF DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL COST
BITUMINOUS PAVING - 3' ADDITIONAL SHOULDER ON HALF OF TOTAL LF	SY	21,120	$60.00	$1,267,200.00
WHITE HOT THERMO PLASTIC PAVEMENT MARKINGS - 4" / W LINE STRIPING	SF	42,235	$5.00	$211,175.00
BIKER - CHEVRON THERMOPLASTIC PAVEMENT MARKING - EVERY 1/2 MILE	EA	48	$300.00	$14,400.00
"SHARE THE ROAD" SIGN	EA	46	$500.00	$23,000.00
LOGO BRANDING ALLOWANCE	LS	1	$2,500.00	$2,500.00
INTERSECTION DIRECTIONAL SIGNAGE	EA	46	$800.00	$36,800.00
ESTIMATE TOTAL				**$1,555,075.00**

Option Estimate For Probable Cost

Route 390

BRIEF DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL COST
BITUMINOUS PAVING - 3' ADDITIONAL SHOULDER	SY	33,440	$60.00	$2,006,400.00
WHITE HOT THERMO PLASTIC PAVEMENT MARKINGS - 4" / W LINE STRIPING	SF	33,405	$5.00	$167,025.00
BIKER - CHEVRON THERMOPLASTIC PAVEMENT MARKING - EVERY 1/2 MILE	EA	38	$300.00	$11,400.00
"SHARE THE ROAD" SIGN	EA	42	$500.00	$21,000.00
LOGO BRANDING ALLOWANCE	LS	1	$2,500.00	$2,500.00
INTERSECTION DIRECTIONAL SIGNAGE	EA	42	$800.00	$33,600.00
ESTIMATE TOTAL				**$2,241,925.00**

Option Estimate For Probable Cost

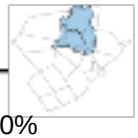
Route 191

BRIEF DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL COST
BITUMINOUS PAVING - 3' ADDITIONAL SHOULDER	SY	17,600	$60.00	$1,056,000.00
WHITE HOT THERMO PLASTIC PAVEMENT MARKINGS - 4" / W LINE STRIPING	SF	17,582	$5.00	$87,910.00
BIKER - CHEVRON THERMOPLASTIC PAVEMENT MARKING - EVERY 1/2 MILE	EA	20	$300.00	$6,000.00
"SHARE THE ROAD" SIGN	EA	10	$500.00	$5,000.00
LOGO BRANDING ALLOWANCE	LS	1	$2,500.00	$2,500.00
INTERSECTION DIRECTIONAL SIGNAGE	EA	10	$800.00	$8,000.00
ESTIMATE TOTAL				**$1,165,410.00**

Option Estimate For Probable Cost

Route 447

BRIEF DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL COST
BITUMINOUS PAVING- 3' ADDITIONAL SHOULDER	SY	51,040	$60.00	$3,062,400.00
WHITE HOT THERMO PLASTIC PAVEMENT MARKINGS - 4" / W LINE STRIPING	SF	51,035	$5.00	$255,175.00
BIKER - CHEVRON THERMOPLASTIC PAVEMENT MARKING - EVERY 1/2 MILE	EA	56	$300.00	$16,800.00
"SHARE THE ROAD" SIGN	EA	46	$500.00	$23,000.00
LOGO BRANDING ALLOWANCE	LS	1	$2,500.00	$2,500.00
INTERSECTION DIRECTIONAL SIGNAGE	EA	46	$800.00	$36,800.00
ESTIMATE TOTAL				**$3,396,675.00**



6.5 Potential Funding

State Funding

Pennsylvania Department of Conservation and Natural Resources (DCNR) - DCNR provides a single point of contact for communities and nonprofit conservation agencies seeking state assistance in support of local conservation initiatives. This assistance can take the form of grants, technical assistance, information exchange and training. These programs are described below:

Mr. Lorne Possinger,
Beltzville State Park, 2950 Pohopoco Drive,
Lehighton, PA 18235-8905.
Phone : (610) 377-5750;
email: lpossinger@state.pa.us.

Community Grants - Community Grants are awarded to municipalities for recreation, park and conservation projects. These include the rehabilitation and development of parks and recreation facilities; acquisition of land for park and conservation purposes; and technical assistance for feasibility studies, trails studies, and site development planning. Grants require a 50 percent match except for some technical assistance grants and projects eligible as small community projects. The small community component provides 100 percent funding - $20,000 maximum - for material costs and professional design fees to municipalities with fewer than 5,000 residents so they may develop basic recreation projects.

Land Trust Grants provide 50 percent funding for acquisition and planning of open space and natural areas, which face imminent loss. Lands must be open to public use and priority is given to habitat for threatened species. Eligible applicants are nonprofit land trusts and conservancies.

River Conservation Grant

River Conservation Grants are available to municipalities, counties, municipal and inter-municipal authorities, and river support groups to conserve and enhance river resources. River support groups must be nonprofits, which are designated to act on behalf of interested municipalities. Planning grants are available to identify significant natural and cultural resources, threats, concerns and special opportunities and to develop river conservation plans. Implementation grants are available to carry out projects or activities defined in an approved river conservation plan. Grants require a 50 percent match.

Pennsylvania Recreational Trails Program Grants - Pennsylvania Recreational Trails Program Grants provide funds to develop and maintain recreational trails and trail related facilities for motorized and nonmotorized recreational trail use. Eligible applicants include federal and state agencies, local governments and private organizations. Match requirements for Pennsylvania Recreational Trails Program Grants are 80% grant money, up to a maximum of $100,000, and 20% project applicant money. However, acquisition projects will require a 50/50 match. “Soft match” (credit for donations of funds, materials, services, or new right-of-way) is permitted from any project sponsor, whether a private organization or public agency. Eligible project categories include: maintenance and restoration of existing recreational trails; development and rehabilitation of trailside and trailhead facilities and trail linkages; purchase and lease of recreational trail construction and maintenance equipment; construction of new recreational trails (with restrictions on new trails on Federal land); and, acquisition of easements or property for recreational trails or recreational trail corridors. Funding for the Recreational Trails Program is provided to the Commonwealth through the Federal Highway Administration (FHWA) and the Transportation Equity Act for the 21st Century (TEA 21).

Heritage Parks Grants - Heritage Parks Grants promote public-private partnerships to preserve and enhance natural, cultural, historic and recreation resources to stimulate economic development through heritage tourism. Grants are available to municipalities, nonprofit organizations or federally designated commissions acting on behalf of the municipalities in a heritage park area. Grants are awarded for a variety of purposes including feasibility studies; development of management action plans for heritage park areas; specialized studies; implementation projects; and hiring of state heritage park managers. Grants require a 25-50 percent local match.

Growing Greener Grants - DCNR will use Growing Greener funds to augment the existing grant programs listed above. Over five years, DCNR will allocate Growing Greener funding over several existing grant programs to help more communities and organizations meet their conservation and recreation goals. "Growing Greener" will spend $645.9 million over five years — $105.9 million the first year, and $135 million a year for the next four. It will come from about $473.4 million in new money from the General Fund and $172.5 million in funds redirected from the Recycling and Hazardous Sites Cleanup funds, and the Landfill Closure Accounts.

Rails-to-Trails Grants - Rails-to-Trails Grants provide 50 percent funding for the planning, acquisition or development of rail-trail corridors. Eligible applicants include municipalities and nonprofit organizations established to preserve and protect available abandoned railroad corridors for use as trails or future rail service.

The Duke Ellington Building
2121 Ward Ct., NW
5th Floor
Washington, DC 20037
+1-202-331-9696

The Pennsylvania National Guard – The Pennsylvania National Guard and the U.S. Army Reserves both provide engineering and construction services at no cost or at a reduced cost to communities undertaking certain public projects. There is no fixed schedule for their services and all requests are reviewed on a case by case basis.

National Guard 1-800-GO-GUARD

Northeast Pennsylvania Urban & Community Forestry Program - The Northeast Pennsylvania Urban and Community accepts grant applications from organizations, communities, and citizen groups for urban and community forestry projects. This is a federally funded grant program directed by the PA Urban and Community Forestry Council in cooperation with the USDA Forest Service, Northeastern Area, State & Private Forestry (Forest Service), the Pennsylvania State Forester; and the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, Rural and Community Forestry Section (PA DCNR Forestry RCF).

One College Green
Keystone College PO Box 1636
La Plume, PA 18440

Pennsylvania Historical and Museum Commission Historic Preservation Grants - Eligible organizations are colleges/universities, conservancies, historic preservation organizations, historical societies, local governments, museums, and other historical organizations. Keystone Historic Preservation Grants requiring 50/50 cash match are available for the preservation, restoration and/or rehabilitation of historic resources listed in or eligible for listing in the National Register of Historic Places. Grant requests should range from $5,000 to $100,000. All grant projects must relate to identifying, preserving, promoting and protecting the historic and archaeological resources of Pennsylvania for the benefit of the public.

Pennsylvania Historical and Museum Commission
State Museum Building
300 North Street
Harrisburg, PA 17120
Phone (717) 787-3362

Federal Funding

Land and Water Conservation Program -The LWCF program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across

the United States. Only political subdivisions (municipalities, municipal agencies and school districts) are eligible to receive LWCF funding. Annual appropriations of federal funds are made to the states to provide 50 percent matching grants for general public outdoor park, recreation and conservation projects.

Deputy Secretary
Office of Conservation and Technical Services
Dept. of Conservation and Natural Resources
P.O. Box 8767
Harrisburg, PA 17105-8767
Tel: 717-787-9306

US Fish and Wildlife Service, Department of Interior Wildlife Conservation and Appreciation Grants - Eligible projects are for those whose main purpose is to provide opportunities for the public to use and enjoy fish and wildlife through non-consumptive activities. All designated fish and wildlife agencies are eligible to apply. Potential assistance is available for expanding public recreational opportunities pertaining to non-game wildlife enjoyment, including trails and waterways. Grants range from $10,000 to $25,000.

Contact Chief Division of Federal Aid 703-358-2156. Fish and Wildlife Service, Department of the Interior, Washington DC20240. FW9_Federal_Aid@fws.gov

US Department of Housing and Urban Development Community Development Block Grant – Small Cities Program - Eligible types of projects include: acquisition, rehabilitation, or construction of certain public works facilities, clearance, housing rehabilitation, code enforcement, relocation payments, administrative expenses, economic development, completing existing urban renewal projects, and certain public services. Eligible applicants are states that administer this program for the non-entitlement communities in their jurisdiction. Neighborhood-based non-profit organizations may act as sub-grantees to carry out neighborhood revitalization.

U.S. Department of Housing and Urban Development
451 7th Street S.W., Washington, DC 20410
Telephone: (202) 708-1112

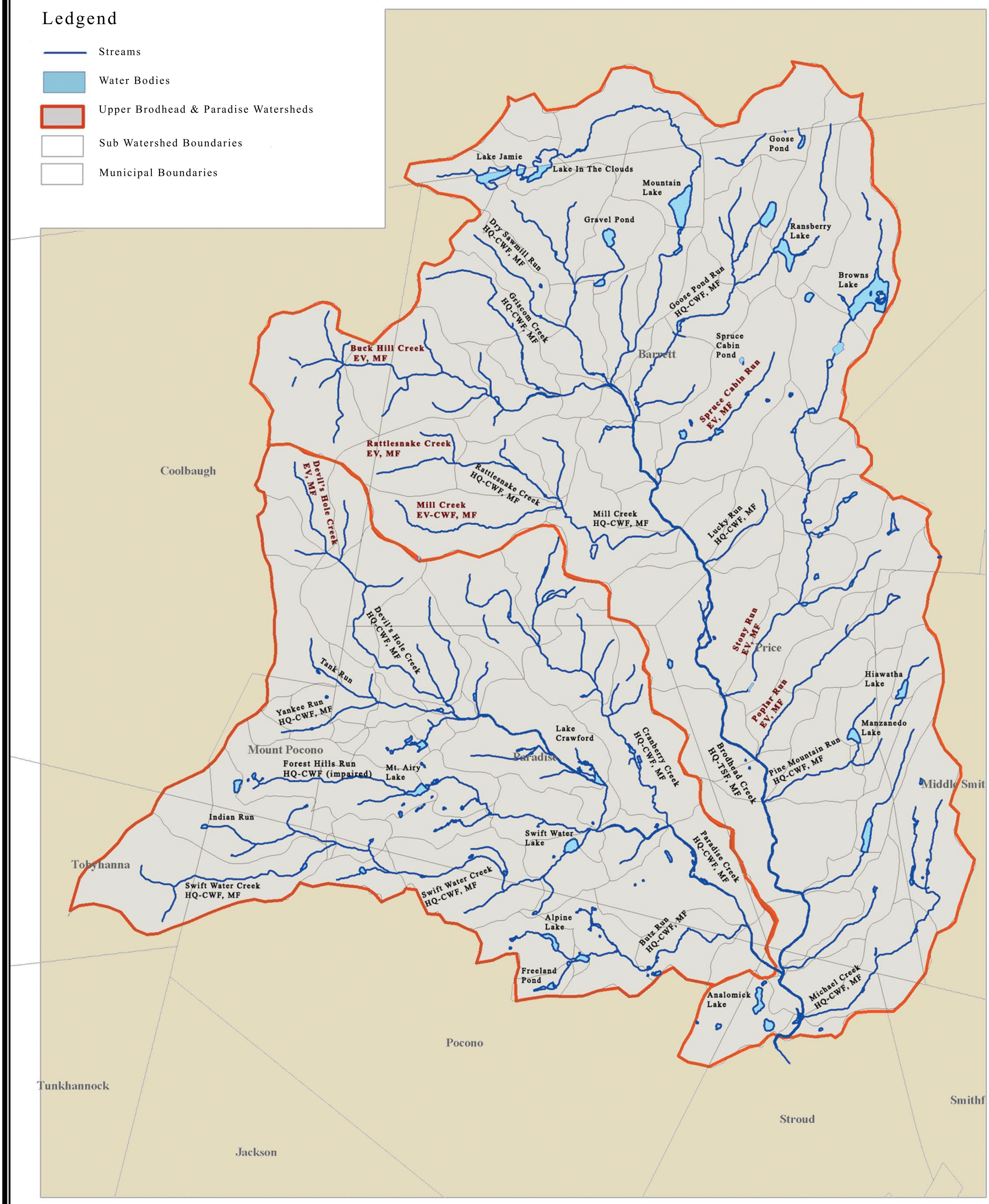
The Grants Program sponsored by **EPA's Environmental Education Division (EED), Office of Children's Health Protection and Environmental Education** - supports environmental education projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. EPA awards grants each year based on funding appropriated by Congress. Annual funding for the program ranges between $2 and $3 million. Most grants will be in the $15,000 to $25,000 range.

There are a variety of private funding sources that may be available for park development and enhancements. Large corporations, companies and foundations often support public works such as park improvements through monetary or employee volunteer programs and several large companies are located in the Poconos such as Sanofi-Pasteur. School districts such as the Pocono Mountain School District may encourage their students to get involved in fundraisers, design and/or litter cleanups. A "Friends-of-the-Park" group can help raise grass roots funding for the park. Lastly, local contractors, landscapers, and masons may be of assistance in providing in-kind services for landscaping, shelter and gazebo construction and upgrades to the historic building remnants within the park.

Kathleen Kirkland
U.S. EPA, Region 3
Environmental Education Grants (3CG00)
1650 Arch Street
Philadelphia, PA 19103-2029
kirkland.kathleen@epa.gov

UPPER BRODHEAD/PARADISE GREENWAY PLAN

Upper Brodhead and Paradise Creek PADEP Water Quality Designations



EV Streams

- Buck Hill Creek
- Rattlesnake Creek
- Devil's Hole Creek
- Mill Creek
- Spruce Cabin Run
- Stony Run
- Poplar Run
- Indian Run
- Swiftwater Creek

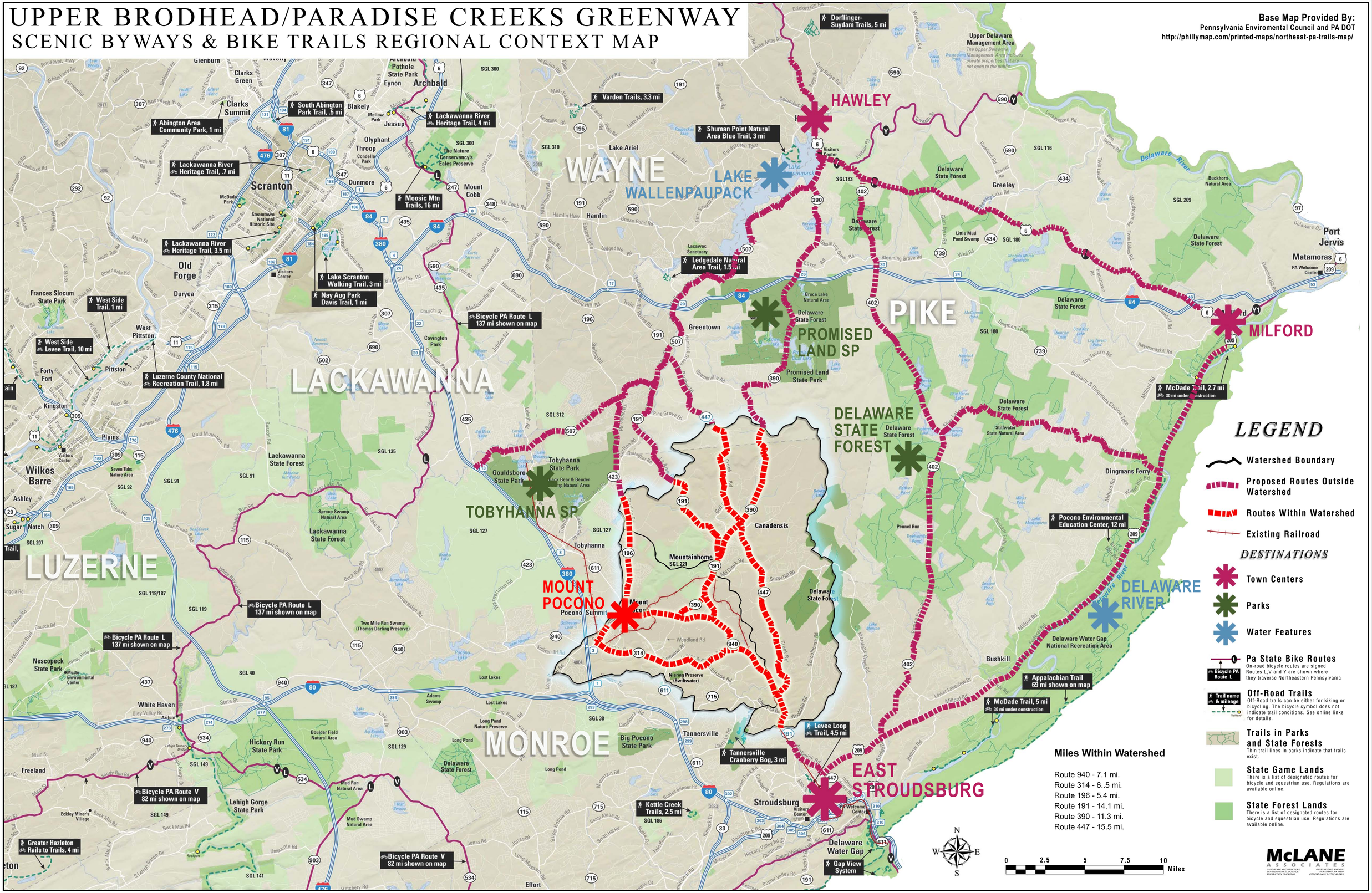
HQ Streams

- Dry Sawmill Run
- Griscom Creek
- Rattlesnake Creek
- Devil's Hole Creek
- Tank Run
- Yankee Run
- Goose Pond Run
- Butz Run
- Mill Creek
- Lucky Run
- Brodhead Creek
- Paradise Creek
- Pin Mountain Run
- Michael Creek
- Cranberry Creek

McLANE ASSOCIATES
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SCIENCE
RECREATION PLANNING
601 STAFFORD AVENUE
SCRANTON, PA 18503
(570) 347-3668 / F (570) 341-5413

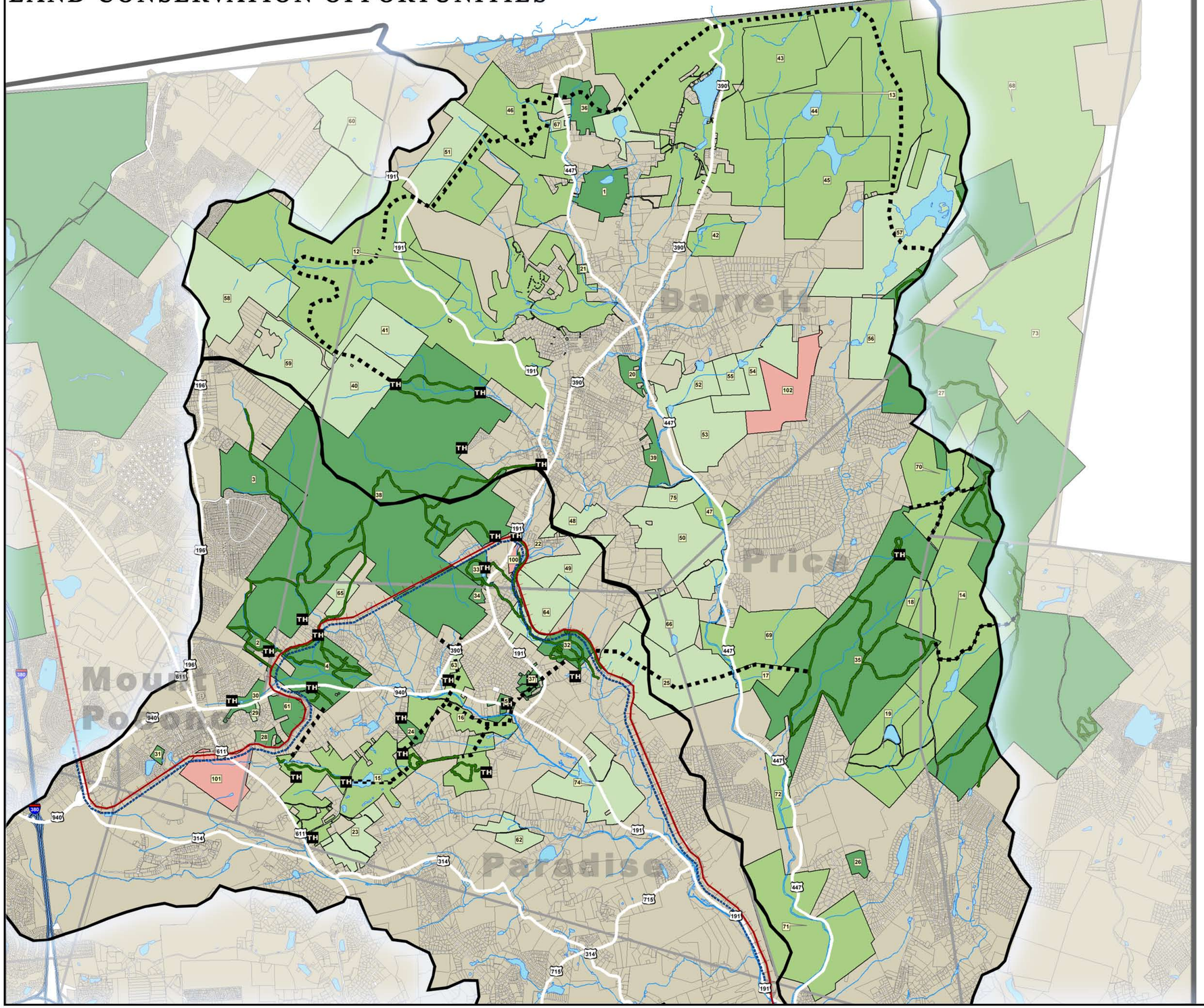
UPPER BRODHEAD/PARADISE CREEKS GREENWAY

SCENIC BYWAYS & BIKE TRAILS REGIONAL CONTEXT MAP



UPPER BRODHEAD & PARADISE CREEKS GREENWAY

LAND CONSERVATION OPPORTUNITIES



CONSERVED LAND

ID	OWNER	ACRES	TRAIL LENGTH	OWNERSHIP TYPE
33	ICE LAKE	65.634	0.86	PUBLIC (MUNICIPAL LANDS)
22	BARRETT TOWNSHIP	2.406		PUBLIC (MUNICIPAL LANDS)
39	NATURAL LANDS TRUST INC	87.527		PUBLIC
21	BARRETT TOWNSHIP	10.332		PUBLIC (MUNICIPAL LANDS)
36	GRAVEL PROPERTY	172.459		PUBLIC (MUNICIPAL LANDS)
1	PRICE DALE D	204.077		CONSERVATION LAND (PHLT, PARC)
27	DELAWARE STATE FOREST L	5074.691	15.73	PUBLIC (STATE LANDS)
20	BARRETT TOWNSHIP	64.029		PUBLIC (MUNICIPAL LANDS)
2	FEILD STONE (PHLT)	51.352	1.57	CONSERVATION LAND (PHLT, PARC)
3	COOLBAUGH TOWNSHIP	288.456	1.03	CONSERVATION LAND (PHLT, PARC)
31	BALLFEILD PARK	15.229		PUBLIC (MUNICIPAL LANDS)
30	FAIRVIEW WATER CO	59.946		PUBLIC (MUNICIPAL LANDS)
61	"THE LITTLE KNOB"	86.355		PRIVATE (RESIDENTIAL)
28	"THE BIG KNOB"	31.520		PUBLIC (MUNICIPAL LANDS)
38	STATE GAMELANDS 221	4494.200	11.95	PUBLIC (STATE LANDS)
4	KERMES PRESERVE	397.110	3.92	CONSERVATION LAND (PHLT, PARC)
24	KNAUF PROPERTY	35.889		PUBLIC (MUNICIPAL LANDS)
34	SEVEN PINES PARK	17.469		PUBLIC (MUNICIPAL LANDS)
32	NOTHSTEIN PROPERTY	130.537	2.93	PUBLIC (MUNICIPAL LANDS)
37	SKYWOOD PARK	46.935		CONSERVATION LAND (PHLT, PARC)
5	PARADISE TOWNSHIP	1.032		PUBLIC (MUNICIPAL LANDS)
5	PARADISE TOWNSHIP BUILDING	32.287		PUBLIC (MUNICIPAL LANDS)
26	PRICE TOWNSHIP	41.504		PUBLIC (MUNICIPAL LANDS)
35	DELEWARE STATE FOREST S	1848.793	9.06	PUBLIC (STATE LANDS)

UNPROTECTED CONSERVATION LAND

12	BUCK HILL FALLS CO	4409.293		PRIVATE (RESORTS CLUBS)
13	SKYTOP LODGES INC	3211.240		PRIVATE (RESORTS CLUBS)
42	DEER RUN HUNTING CLUB	180.593		PRIVATE (RESORTS & CLUBS)
47	PARKSIDE ANGLING ASSOC	87.671		PRIVATE (RESORTS & cLUBS)
43	PINE LODGE HUNTING CLUB	526.240		PRIVATE (RESORTS & CLUBS)
44	OAK SPRINGS SPORTSMAN ASSOC	683.201		PRIVATE (RESORTS & CLUBS)
45	CAMP CANADENSIS	760.783		PRIVATE (RESORTS & CLUBS)
68	BRIGHT CREEK PARK ASSOC	3111.956		PRIVATE (HUNT CLUB)
14	HIAWATHA CLUB	1351.868		PRIVATE (RESORTS CLUBS)
15	MOUNT AIRY CASINO	870.748	3.65	PRIVATE (RESORTS CLUBS)
16	POCONO GARDENS	315.277		PRIVATE (RESORTS CLUBS)
17	BRODHEAD HUNT AND FISH CLUB	119.682		PRIVATE (RESORTS CLUBS)
69	BRODHEAD HUNTING & FISHING	507.469		PRIVATE (HUNT & FISH CLUB)
70	MT ALLEN HUNTING CLUB	618.290		PRIVATE (HUNT & FISH CLUB)
18	EAGLE CLAW CLUB	64.651		PRIVATE (RESORTS CLUBS)
19	MANZANEDO ROD & GUN CLUB	433.036		PRIVATE (RESORTS CLUBS)
72	PARKSIDE ANGLING ASSOC	125.263		PRIVATE (FISH CLUB)
71	BRODHEAD FLYFISHERS LLC	1058.166		PRIVATE (HUNT & FISH CLUB)
46	SPRUCE MOUNTAIN HUNT CLUB	452.687		PRIVATE (RESORTS & CLUBS)
73	EASTON ANGLERS ASSOC	1713.589		PRIVATE (FISH CLUB)

CONSERVATION OPPORTUNITIES

40	PLEASANT RIDGE HUNTING CLUB I	504.627		PRIVATE (RESORTS & CLUBS)
48	MILLER MARY ANN / TB PRICE	121.376		PRIVATE (RESIDENTIAL)
49	BARRY WILLIAM G & CHARLENE A	222.579		PRIVATE (RESIDENTIAL)
50	PRICE K EDWARD (DECEASED)	556.412		PRIVATE (RESIDENTIAL)
41	TURKEY KNOLL HUNTING CLUB	283.213		PRIVATE (RESORTS & CLUBS)
51	GEORGE STONE	328.844		PRIVATE (RESIDENTIAL)
75	PRICE DAVID	122.461		PRIVATE (RESIDENTIAL)
52	REINHART LEONARD	193.204		PRIVATE (RESIDENTIAL)
53	PRICE ALICE T	380.626		PRIVATE (RESIDENTIAL)
54	DR. BALABAN	315.158		PRIVATE (RESIDENTIAL)
55	SHOESMITH R RUCHARD	101.831		PRIVATE (RESIDENTIAL)
56	DR. BALABAM	331.015		PRIVATE (RESIDENTIAL)
57	SCOTT TIGHE / BROWN'S LAKE	1018.090		PRIVATE (RESIDENTIAL)
58	DOC WEISS	684.040		PRIVATE (RESIDENTIAL)
59	ROMANO	410.756		PRIVATE (RESIDENTIAL)
60	PHIPPS HOWARD JR	721.297		PRIVATE (RESIDENTIAL)
67	GUTHRIE	43.665		PRIVATE (RESIDENTIAL
29	MAKLA ALICE	9.803		PUBLIC (MUNICIPAL LANDS)
23	POCONO MOUNTAIN SCHOOL DISTRI	195.354		PUBLIC (MUNICIPAL LANDS)
62	STEVENS EDITH H DONALDSON	117.260		PRIVATE (RESIDENTIAL)
74	PARADISE FALLS LUTHERAN	455.096		PRIVATE (CHURCH)
63	POCONO CATHOLIC SCHOOL	32.460		PRIVATE (RESIDENTIAL)
64	DEWEY PROPERTY	307.992	1.31	PRIVATE (RESIDENTIAL)
25	ECHO FARM HUNT CLUB LLC	724.639		PUBLIC (MUNICIPAL LANDS)
65	NAUMAN RUSSELL	75.644	0.62	PRIVATE (RESIDENTIAL)
66	NAUMAN PAUL E & GLORIA L ETAL	301.836		PRIVATE (RESIDENTIAL)

LEGEND

- Conserved Land
- Unprotected Conserved Land
- Conservation Opportunities
- Threat
- Potential Trail Heads
- Railroad
- Proposed Multi Use Trail
- Proposed Trails
- Existing Trails

0 0.5 1 2 3 Miles

N W E S