

Cherry Creek Watershed Conservation Plan

FINAL REPORT

October, 2004



Prepared by:

BLOSS Associates & the Cherry Creek Sub-Association

of the Brodhead Watershed Association



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Monroe County Conservation District – Craig Todd, Darryl Speicher
Monroe County Planning Commission – John Woodling, Eric Bartolacci
Monroe County Historical Association – Candace McGreevy
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Delaware Water Gap Borough Council
Monroe County Open Space Advisory Board
Monroe County Planning Commission
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Cover photo by BLOSS Associates.

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Executive Summary

The purpose of the Cherry Creek Watershed Conservation Plan is to create a plan to help guide and prioritize conservation actions in the Cherry Creek watershed. It is intended to be shared by those concerned for the area, which is at a critical juncture in time if it is to preserve and enhance its special distinction.

The Plan is structured with continuous action and management options and opportunities of short to long-term duration. Promoting and encouraging outreach programs toward a greater understanding of the issues and a true commitment to the goals are crucial elements to success. Protecting stream corridors is particularly critical to water quality issues while ridgeline protection is particularly critical to maintaining scenic quality.

The planning area for this conservation plan is the Cherry Creek watershed area and two small adjacent watersheds that drain directly into the Delaware River. The Cherry Creek watershed area essentially defines Cherry Valley and can therefore be considered one and the same, covering approximately 13,314 acres, about 20.8 square miles in total. Ultimately the Plan is a means to assemble and focus planning efforts on a watershed-wide basis and identify specific water-related conservation and restoration projects.



Critical Decisions

“Cherry Valley” is widely recognized in the greater region as a unique and special place. This “gem” of Monroe County is rich in natural resources, harbors a vast array of native species of special concern, and has unique and distinct landforms, providing aesthetically pleasing vistas from locales and roads traversing the valley. Given these attractive factors along with close proximity to urban amenities, mass transportation and highway access, the threats of environmental degradation are real. Strong growth pressures in the region have led to sprawl development patterns with not enough consideration of the impact on both the quality and quantity of surface and groundwater of the watershed. As rooftops, parking lots and streets spread across the landscape, replacing forests and fields, streams suffer. Rain and snowmelt run rapidly off these man-made surfaces instead of soaking into the ground. This stormwater runoff carries sediment and pollutants into the streams, accelerates stream-bank erosion, and raises stream temperatures. We must consider watershed protection a priority as future development and planning occur.

The Foundation:

Public Involvement

The identification of watershed-specific problems, issues, concerns, and constraints has been a major focus of the public involvement process in developing the plan. Though much of the inventory information was gathered and collected from prior related plans and studies, other information was generated as part of the planning process and through meetings with the public and watershed partners regarding significant resources within the watershed.

Four Primary Goals were identified:

1. Preserve, protect and manage the watershed's unique resources.
2. Maintain and/or improve water quantity/quality throughout the watershed.
3. Create a network of greenways and greenways with trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery.
4. Promote and support stewardship efforts.

The following Vision Statement represents how citizens in the watershed will view the landscape in the watershed within the next 10 years. It reflects input from the public derived in preparation of the plan and what will happen when the watershed conservation plan is effectively implemented.

Vision Statement

In the year 2014 the watershed of Cherry Valley is a landscape rich in nature, scenery and history, and indicative of a community that cares about its pastoral qualities. The resources that make the watershed unique are unspoiled and provide visible evidence of the commitment of numerous conservation initiatives by residents and concerned citizens who have treasured, nurtured, and respected the valley's assets. The bucolic landscapes, forests, and wetlands in the watershed are managed to facilitate long-term health and diversity of flora and fauna. The clean water of the Cherry Creek Watershed supports healthy fisheries and wildlife. The watershed also provides safe and sufficient groundwater and drinking water. A system of greenways, safe roads for bicyclists and pedestrians, and ridgeline trails provides continuous wildlife corridors and opportunities to enjoy the watershed's resources while participating in safe, enjoyable and healthful activities such as walking, hiking and bicycling. Traditional ways of life such as farming, hunting, fishing and trapping are maintained. The high quality agricultural lands have been preserved for future generations. Public and private partnerships have worked in many positive ways to respond to the development pressures facing the valley and have created an oasis of nature in balance with its cultural community.

Critical Actions

Recommended early action items were identified by steering committee members, municipal officials and other stakeholders. Implementation responsibilities will be shared by individual landowners, municipalities, and various agencies as outlined in the Plan. Timeframes and details appear under related objectives in the *Management Options* tables, 7.4, found in Chapter 7.

Preservation and resource management is dependent upon cooperative and proactive participation.

- *Create and secure funding for a National Wildlife Refuge.*
- *Work with landowners on Key Conservation Tracts/Projects:*
 - Protect Kittatinny and Godfrey Ridges and links to Quiet Valley Living History Farm*
 - Pursue conservation options with PA Water Company property.*
- *Identify and protect most significant threatened prehistoric, historic and cultural sites.*
- *Enhance municipal zoning, land use and subdivision ordinances and comprehensive plans to define and protect historic and cultural resources:*
 - *encourage creative reuse of historic structures consistent with maintaining the historic character of the building.*
 - *Incorporate clear, reasonable design review standards for renovations to historic structures into municipal codes*
 - *Require enhanced review procedures and permits for demolition of historic structures.*

- *Encourage developers to use voluntary design guidelines following Conservation Subdivision Design concepts.*



Achieving the goal of maintaining and improving water quality in the Watershed is critical.

- *Restore in-stream habitat in areas degraded by flooding, canalization, loss of riparian buffer, and increased runoff.*
- *Update municipal 537 plans to ensure consistency.*
- *Develop sewage management programs to better manage on-lot septic systems.*
- *Encourage alternatives (such as land application) to stream discharges from sewage treatment plants where feasible.*
- *Encourage responsible use of fertilizers and pesticides.*
- *Manage nuisance wildlife such as geese.*

Greenway networks are the visual & ecological cornerstone of the Plan, preserving and enhancing opportunities to enjoy the natural beauty of Cherry Valley.

- *Complete a comprehensive greenway and trail plan that examines the feasibility of developing a watershed wide system of greenways to maintain*

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and enhance green infrastructure and scenic quality, and to examine trail opportunities and linkages including Kittatinny Ridge project, Godfrey Ridge trail, Brodhead, McMichael, and Pocono Creeks Greenways Plan, Quiet Valley Historical Farm, Appalachian Trail, and PennDOT Visitors Center.

- Promote bicycle and pedestrian compatibility on all state and local roads, including the implementation of traffic-calming techniques.
- Encourage ordinances that preserve and maintain historic character. Prohibit/restrict billboards and apply appropriate restrictions to other signs in keeping with the scenic/historic character and reduce visual clutter through better signage ordinances.
- Encourage improved signage, landscaping, buffer areas, driveways, and lighting of commercial facilities accessible from arterial roadways.
- Avoid road widening or realignments that detract from the rural character or serve to promote increased speeds.
- Encourage the use of edge striping to narrow travel lanes and increase shoulder widths.
- Develop/ enhance litter control program.



Developing partnerships for protection, securing funding, management and monitoring will signal commitment to crucial support elements.

- Conduct an outreach campaign to increase visibility of conservation

programs, benefits and stewardship opportunities.

- Utilize a variety of news media to communicate and interpret watershed values and issues.
- Support and evolve the "Friends of Cherry Valley" as a sustainable partnership to catalyze and oversee plan implementation.
- Identify, develop, and foster cooperative relationships with surrounding municipalities to work toward the creation of a regional greenway and trail system. Establish Environmental Advisory Councils in all watershed municipalities and explore creation of a watershed-wide EAC. Explore additional funding opportunities through state, federal, and private organizations.
- Explore the possibilities presented by Act 153 of 1996 authorizing the levying of taxes for financing the purchase of open space.
- Create fundraisers and special events to support greenway development.
- Develop landowner outreach and education program to promote conservation activities.
 - Encourage landowners and citizens to plant native species, plant or maintain riparian buffers and improve stream habitat.
 - Continue to make landowners aware of endangered species on their property.
- Organize a sustainable agriculture workshop for interested landowners with information on sustainable / best management practices for forestry and agriculture.
- Coordinate with other agencies to identify property owners of key agricultural lands and approach them regarding their participation in preservation programs.
- Encourage landowners to conserve privately owned woodlots.
 - Use sustainable forestry practices.

- Educate interested landowners about placing conservation easements on open land through donation or purchase.
- Conduct inventories of terrestrial wildlife and their habitats, including birds, reptiles and amphibians.
 - Conduct standard census work during breeding and non-breeding seasons.
 - Hold a "bioblitz" throughout the watershed.
 - Determine if areas in the watershed qualify as Important Bird Areas.
 - Continue with research on saw-whet owls and breeding birds.
- Develop more effective deer, geese, and other nuisance wildlife management programs.
- Implement programs to control/manage invasive and exotic species.
- Develop sign ordinance.
- Minimize visual impacts from cellphone-towers through local ordinances , (e.g. keep towers below 200 feet; no lights on towers, etc.)
- Review and assess effectiveness of existing local tree protection ordinances.
- Develop tree protection programs through local subdivision and zoning ordinances to protect and conserve forest cover.



Action Plan Summary

Preserve, protect and manage the watershed's unique resources

- Conserve at least 50 % of priority resource lands (agricultural, forest, wetland, riparian lands, ridges, scenic areas, geologic areas) in the watershed by 2007.
- Make significant advances in protecting and interpreting cultural heritage and resources in the watershed.
- Preserve and enhance green infrastructure in the watershed.

Maintain and/or improve water quantity / quality throughout the watershed.

- Maintain current baseflow and groundwater recharge in the watershed.
- Improve quantitative measures of benthic invertebrate and fishery quality.
- Improve, maintain, and enhance water quality by keeping the creek and its tributaries clean.

Create a network of greenways and greenways with trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery.

- Examine greenway and trail opportunities for the watershed.
- Develop a strategy for implementing a trail system.

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- Improve roadways for bicycle and pedestrian access and safety.
- Expand recreational opportunities in the watershed.
- Maintain and enhance roadways to preserve scenic quality and landscape character.

Promote and support stewardship efforts.

- Develop educational and outreach efforts to inform and involve the citizens of the watershed.
- Foster and develop partnerships to help monitor and implement plan recommendations.



Implementation

This document will be used to petition the Commonwealth to have the Cherry Creek Watershed Conservation Plan put on the Pennsylvania Rivers Conservation Registry. After obtaining this status, the watershed will be eligible for matching funds for the implementation of projects that are directly related to the actions and strategies identified in this plan. Thus, municipalities, the County, the

conservation district, and non-profit conservation groups will be able to leverage funds for these purposes.

COMMENTS / QUESTIONS:

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1.0 Project Area Characteristics

1.1 Plan Purpose

“Cherry Valley” is widely recognized in the greater region as a unique and special place, a place that is rich in scenery and which harbors a vast array of native species of special concern. The aesthetically pleasing bucolic landscapes and country roads provide an especially appropriate backdrop to the area’s rich history that is further revealed through unique and distinct landforms, all of which provide a very attractive place to live that is additionally complemented by close proximity to urban amenities just outside of the valley and easy transportation access to major metropolitan areas. However, given the strong growth pressures in the region, these qualities are being threatened by a sprawl development pattern that serves to degrade the bucolic environment and natural resources. Much of Monroe County’s past development growth occurred without enough consideration of its impact on both the quality and quantity of surface and groundwater of the watershed. As rooftops, parking lots and streets spread across the landscape, replacing forests and fields, streams suffer. Rain and snowmelt run rapidly off these man-made surfaces instead of soaking into the ground. This stormwater runoff carries sediment and pollutants into the streams, accelerates stream-bank erosion, and raises stream temperatures. Because of future development and planning we need to take watershed protection into consideration.

In terms of its regional setting Cherry Valley and Cherry Creek are located between two major gaps in the regionally significant Kittatinny Ridge (also known as the Blue Mountain). The Delaware Water Gap, a world renowned natural feature, is located at the confluence of Cherry Creek with the Delaware River. The headwaters area of Cherry Creek lies northwest of Wind Gap, a significant break in the ridge that has been used advantageously by transportation corridors both historical and present day.

Cherry Valley is therefore at a critical juncture in time if it is to preserve and enhance its special distinction. The Cherry Creek watershed area essentially defines Cherry Valley and can therefore be considered one and the same. The planning area for this conservation plan is the Cherry Creek watershed area with the addition of two small adjacent watersheds near the confluence that drain directly into the Delaware River but fall essentially in the same valley construct.

The purpose of the Cherry Creek Watershed Conservation Plan is to create a conservation plan to help guide and prioritize conservation actions in the Cherry Creek watershed. This document will also be used to petition the Commonwealth to have the Cherry Creek put on the Pennsylvania Rivers Conservation Registry. After obtaining this status, the Cherry Creek watershed will be eligible for matching funds for the implementation of projects that are directly related to the actions and strategies identified in this plan. Thus, municipalities, the County, the conservation district, and non-profit conservation groups will be able to leverage funds for these purposes.

Ultimately the plan is a means to assemble and focus planning efforts on a watershed-wide basis and identify specific water-related conservation and restoration projects. While much inventory information was gathered and collected from prior related plans and studies, other information was obtained through meetings with the public and watershed partners regarding significant resources within the watershed. The identification of watershed-specific problems, issues, concerns, and constraints was a major focus of the public involvement process performed in developing the plan.

1.2 Planning Process

The plan was produced with financial assistance obtained under the *Rivers Conservation Program* administered by the Pennsylvania Department of Conservation and Natural Resources (DCNR), and matching funds and in-kind services from the many partners acknowledged herein. The Brodhead Watershed Association (BWA) has spearheaded the development of the plan. BWA was formed in 1989 as a non-profit, non-governmental, educational organization. BWA was awarded a DCNR Rivers Conservation Planning Grant and on March 25, 1999 and signed a contract with DCNR to develop the Brodhead Watershed Conservation Plan, which was finalized in January 2002. At the completion of the Brodhead Watershed Conservation Plan the BWA received \$17,000 in funding via the Department of Environmental Protection's first round of Pennsylvania's Growing Greener grants and annexed the Cherry Creek Watershed as a Sub-Association of the BWA. The overall conservation goals established in the Brodhead Watershed by the BWA are identical to the Cherry Creek Watershed: to protect and improve water quality and the environment.

A Steering Committee composed of a broad spectrum of watershed partners and stakeholders, including local, regional and federal representatives, riparian landowners, and members of the public at large, provided advice and assistance throughout the development of the plan and served to underpin the planning process. These partners have worked diligently to produce this conservation plan. Their commitment to preserving and protecting the watershed bolsters the plan.

During the implementation phase of this plan, BWA will encourage municipalities, non-profit groups, and other appropriate grantee organizations to apply for funding to implement the strategies and actions included in this conservation plan. Implementation projects will bring this document to life. The BWA and its partners are committed to supporting local communities in the watershed as they begin to implement this plan. Also, BWA will continue to partner with other organizations, entities, and government agencies to assist in the implementation of the recommendations herein.

The Friends of Cherry Valley (FCV) is a non-profit organization that evolved during the planning process. The Brodhead Watershed Association and the Friends of Cherry Valley work cooperatively for the benefit of all Monroe County residents, generally, and the residents of the Cherry Valley area, specifically.

The Brodhead Watershed Association, through its Cherry Creek sub-association, provides leadership and coordination for a monthly stream monitoring program, an annual fecal coliform testing protocol and a variety of stewardship activities designed to heighten interest in an awareness of water quality and quantity issues.

Friends of Cherry Valley initiate and support conservation of the region's scenic beauty, wildlife, ecological and environmental resources, and rural character. FCV are currently pursuing the creation of a United States Fish and Wildlife "Greater Cherry Valley Wildlife Refuge" through community support and legislative action.

The two groups join in the continuing effort to help assist municipalities, residents, businesses and a variety of groups with protecting the area's natural resources through education, public programs, stream monitoring and baseline data collection and stream improvements and cleanups.

The planning process followed a four step process as outlined in DCNR's guidelines:

Step 1 – Determine Initial Public Interest:

This step first involved organizing a steering committee (advisory group) and developing a detailed scope of work with a proposed time line. It then focused on public meetings aimed at informing the general public and soliciting local volunteers to help conduct a stream walk inventory. Information obtained through the public involvement helped guide Step 2 efforts.

Step 2 – Collect and Analyze Resource Data

This step involved determining the physical, natural and cultural resources relating to surface water and ascertaining the status of resource information that is available and that was gathered for the project. Information was gathered by: in-kind services, donated professional services, volunteer efforts and by contracted services. The resources were then analyzed as they relate to issues, concerns or problems and in light of present and future conditions in the watershed.

Step 3 – Prepare Draft Watershed (River) Conservation Plan

The third step entailed preparation of a draft plan that provides background information, a map of the planning area, zoning and land use patterns, an inventory of resources gathered, an analysis of the appropriate resources and a listing of issues, concerns, opportunities and threats to the watershed values. Management options are put forth in the plan to address/solve the issues, opportunities and concerns and promote resource awareness and stewardship. Implementation, acquisition and development actions are listed with a proposed time frame, lead agency or contact person to undertake the activity. A public meeting was held to present the draft plan to the stakeholders and general citizenry with a 30 day period for review and comment.

Step 4 – Prepare Final Watershed (River) Conservation Plan

Step four will conclude with a record of the Public Meeting on the Draft Plan and settlement of substantive comments received on the Draft Plan and a final public meeting to explain the Plan features. Resolutions of support for the Final Plan will then be sought from the municipalities involved.

1.3 Prior/Ongoing Studies & Initiatives

Although relatively small in area the Cherry Creek watershed area has been studied in whole or in part by many recent and ongoing planning studies and initiatives. In general, prior studies and on-going initiatives point to the unique and special character of the watershed and its resources. Although the majority of Cherry Creek is currently listed as a High Quality Coldwater Fishery according to the PA Department of Environmental Resources, there are existing problems and threats to maintaining this state. The case for protection of the Cherry Creek Watershed is therefore apparent. Major challenges known in the watershed at the start of the planning process include the following:

- ***Water Quality and Quantity*** – Although water quality is generally excellent in most areas, development should be managed so watershed residents and visitors will have sufficient clean water for in-stream aquatic life, for human consumption, and continued wetland function. In order to accomplish this goal, on-lot septic systems will need to be maintained in proper working order so that wastewater does not degrade surface or groundwater. In addition, the impacts from both point and non-point sources of pollution will need to be mitigated.
- ***Stormwater and Flood Control*** – Uncontrolled stormwater runoff degrades streams in the Cherry Creek watershed by carrying pollutants, including sediment, to streams and by eroding streambanks causing more sediment to be washed into streams. Uncontrolled stormwater is also lost as a potential resource for recharge of groundwater. Stormwater runoff should be managed to decrease stream pollution (especially sedimentation) and maintain groundwater recharge. Although municipal ordinances do require stormwater management for new developments, they do not require control or treatment of pollutants that stormwater carries, nor do they encourage or require infiltration systems which use stormwater to recharge groundwater. The adoption of Best Management Practices (BMPs) would address these concerns, but only if municipalities adopt, and vigorously enforce, ordinances to implement these practices. The impact of runoff from existing development is not currently being addressed comprehensively in the watershed. Wetlands play a vital role in storing, treating and slowly releasing stormwater and are not adequately protected from filling or other encroachments. The potential exists for development of high-risk areas such as floodplains, wetlands, and steep slopes in the watershed which would lead to further increases in stormwater runoff.

- **Watershed Protection and Land Conservation** – The growing interest by municipal officials in using “*Growing Greener*” and “*Growing Smarter*” techniques such as “*Conservation Subdivision Design*” to manage future land development is encouraging, but more needs to be done to ensure that effective land-use ordinances are implemented throughout the entire watershed. This kind of planned growth recognizes the connections between land use and water resources and attempts to minimize impacts of development on the land and water resources of the Cherry Creek watershed. Such planned or “smart” growth will help protect land and water habitat for diverse species of flora and fauna. Ongoing county and regional open space planning efforts are beginning to incorporate land protection and connections with riparian areas, both to provide public access to streams in some areas and to protect those riparian areas from development. Special consideration should be given to the protection of species and natural communities of concern in the watershed.
- **Recreation** – Rapid growth in Monroe County has created a demand for increased recreational areas. More and affordable recreational opportunities are needed near where people live. While active recreational sites such as ball fields are not profuse in the valley, informal recreational opportunities including environmental education, nature trails, and bike and scenic driving tour routes are abundant in the Cherry Creek watershed and should be expanded. The watershed also has an abundance of historical and cultural resources, most of which are not well documented or protected. There is growing public support in establishing a watershed wide system of greenways and trails, which would also help further the recreation opportunities.
- **Economic Development** – Watershed residents favor economic development of a form that sustains local economies while maintaining the health and quality of natural systems. A principal economic development goal of the Monroe County Comprehensive Plan (Monroe 2020) is to “conserve the environmental quality that is the County’s principal attraction for visitors and residents alike (p. 100).” The Cherry Creek Watershed Conservation Plan is complementary to the Monroe 2020 planning effort and assumes that appropriate economic development and maintaining environmental quality go hand in hand.

The Cherry Valley hosts a variety of commercial enterprises that are complementary to the valley’s unique qualities including:

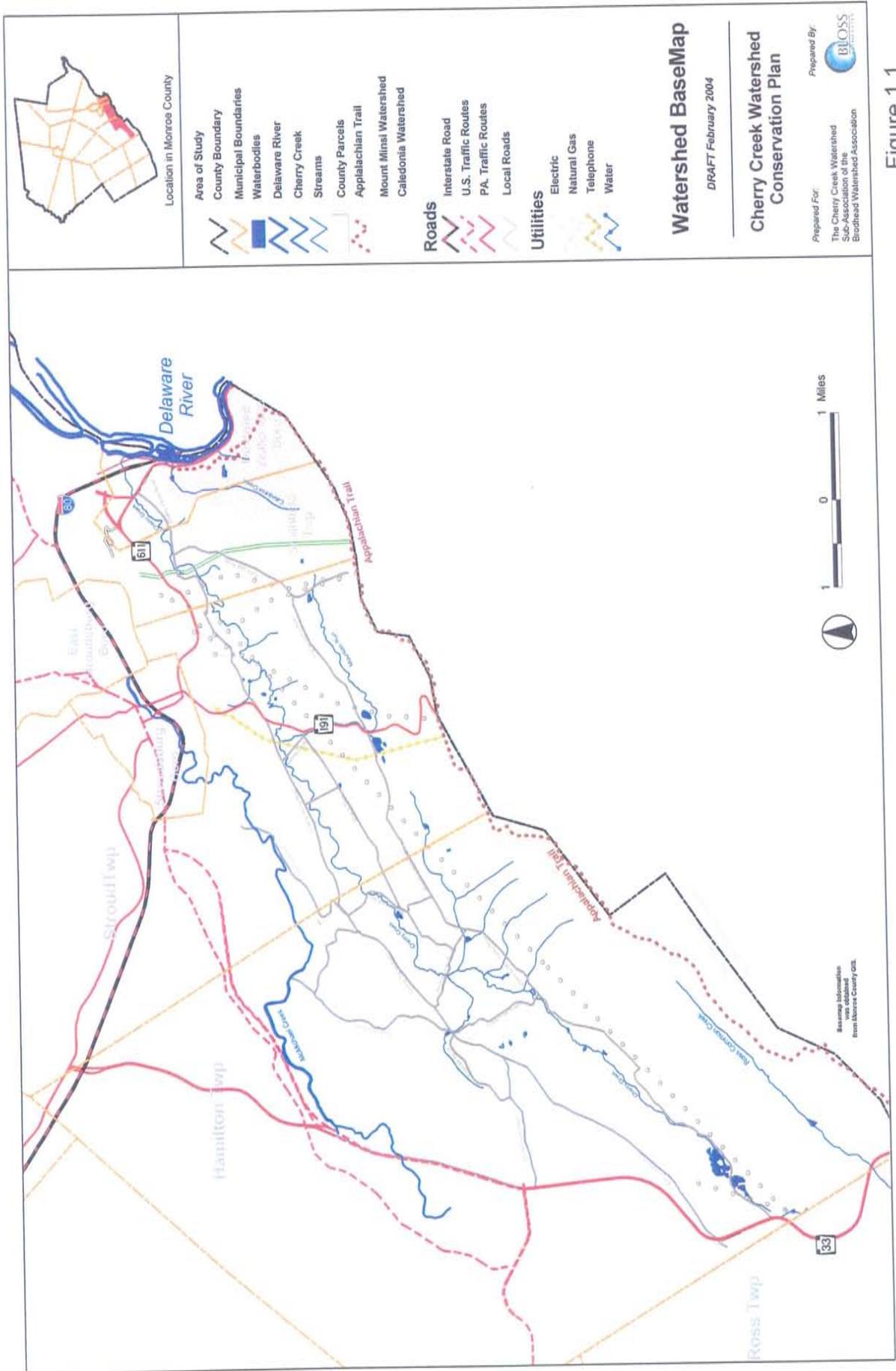
- Cherry Valley Vineyards
- Cherry Valley Apiary
- Cherry Valley Trout Hatchery
- Cherry Valley Tree Nursery
- The "world's largest" boomerang production facility
- Kirkridge Retreat Center
- Eagle Rest Tree Plantation
- Water supply wells and reservoirs
- A health care center

- Small active farms such as the “Blakeslee Farm”
 - Several equestrian facilities
 - Several resorts, camps, and golf courses
 - Eye Glass Factory (in old water wheel building)
- ***Eighty (80) Species and Natural Communities of Concern*** - Within the last few years scientists and naturalists have found and documented an extraordinary number of species and natural communities of concern in the greater Cherry Valley area including:
 - Three (3) Federal Threatened Species
 - Nine (9) PA Endangered Species
 - Seven (7) PA Threatened Species
 - Three (3) PA Rare Species
 - Two (2) species suspected of decline in PA
 - One (1) national Critically Endangered Ecosystem
 - One (1) national Endangered Ecosystem
 - One (1) national Threatened Ecosystem
 - Three (3) PA Special Concern Natural Communities
 - Three (3) US Fish and Wildlife Service Aquatic Species of Special Concern
 - Twenty-Three (23) US Fish and Wildlife Service Non-game Species of Management Concern
 - Eight (8) North America Wetland Conservation Act Priority Waterfowl Species
 - Sixteen (16) US Fish and Wildlife Service Bird Species of Regional Concern
- ***The Kittatinny Flyway*** – Labeled by The Audubon Society, as an *Important Bird Area (I.B.A)*, the Kittatinny Ridge is the premier raptor migratory corridor in the northeastern U.S., and one of the leading migration routes in the world. The Kittatinny Ridge funnels tens of thousands of raptors of sixteen (16) species during fall. Tremendous numbers of passerine species and other birds including hummingbirds, loons, and geese use the ridge as a migratory corridor during the spring and fall. This significant landform is also a key breeding site for many interior forest birds, including Watch-listed Wood Thrush, Black-throated Green Warbler, Scarlet Tanager, Red-eyed Vireo, Hooded Warbler, Watch-listed Cerulean Warbler, Watch-listed Black-throated Blue Warbler, Watch-listed Worm-eating Warbler, Ovenbird, and Rose-breasted Grosbeak. The potential for future residential development along the ridge top is the primary threat to the important habitat of these bird species.
- ***Scenic Quality*** – The Cherry Valley is noted frequently as one of the most important and respected scenic landscapes in the County. The recently completed Hamilton-Jackson-Pocono (HJP) Township Open Space and Recreation Plan describes the “Cherry Valley Scenic Area – Nestled between the parallel ridges of Godfrey Ridge and Kittatinny Ridge ... Cherry Valley is highly valued for its scenic quality and other unique natural, historic and cultural features. Open

farmland on the valley bottom is comfortably framed between wooded ridgelines. A relatively rural area very close to the twin boroughs of Stroudsburg and East Stroudsburg, the valley faces high development pressure....” Haphazard development threatens to destroy this valued composite of unique landscape attributes for future generations.

1.4 Resources Summary View

The following *Watershed Basemap* (Figure 1.1) shows the watershed plan study area as described more fully in Chapter II. The *Straight Line Diagram of Cherry Creek Watershed Resources* (Figure 1.2) illustrates a composite view of watershed resources as further described in Chapters II-VI. The diagram highlights resources on seven thematic lines: Contemporary Culture, Historical/Archeological, Villages/Towns, Stream Walk Results, Recreational, Scenery, and Ecology/Conservation. Resources are summarized by approximate location along creek-mile units from the confluence of Cherry Creek with the Delaware River. This chart was used during public meetings as a way to demonstrate the interplay of watershed resources distributed along the stream corridor that is bounded primarily by two dominant ridges. The clustering of resources between mile 6 and mile 12 is particularly notable. The centerline of the diagram also provides a summary of the stream walk assessment as related to these resources.



Watershed BaseMap

DRAFT February 2004

Cherry Creek Watershed Conservation Plan

Prepared For:
 The Cherry Creek Watershed
 Board and the
 Board of the
 Board Watershed Association



Prepared By:

Figure 1.1

1.5 Description of the Cherry Creek Watershed

Cherry Creek is a second and third order valley stream located on the north slope base of the Kittatinny Mountain in the southeastern area of Monroe County, Pennsylvania; Northampton County is located just south of that location. The plan area encompasses the Cherry Creek Watershed from the creek's confluence with the Delaware River in the Borough of Delaware Water Gap to its area of origination just east of Route 33 and south of Saylorsburg. Two large ponds are found in this area, and flow is substantially increased by large springs located a short distance downstream from the pond outflow.

The creek meanders for approximately 15 miles through a narrow, steep-sided valley, eventually emptying into the Delaware River at Delaware Water Gap. The elevation change from source to mouth is only about 370 feet, and numerous tributaries from the surrounding ridges feed the creek. The majority of Cherry Creek is listed as a High Quality Coldwater Fishery according to the Pennsylvania Department of Environmental Protection (PA-DEP) except for a relatively small area associated with the confluence with the Delaware River where it is listed as a Cold Water Fishery, Migratory Fishery. The watershed covers approximately 13,314 acres, about 20.8 square miles in total. The Cherry Valley substrate is primarily gravel, sand and silt with scattered cobble and boulders located in higher gradient riffle areas where scouring occurs. The underlying geology is a complex of limestone, shale and siltstone overlain with unconsolidated glacial deposits of silt, sand and gravel in the valley. Because of the limestone formations, Cherry Creek has a much higher pH, alkalinity and total dissolved solids than found in most Pocono area streams, which generally are acidic with a low mineral content.

The watershed contains a great deal of forested and agricultural area. The primary land uses in the watershed are residential development and agriculture. There are a few commercial enterprises located at the confluence in Delaware Water Gap and some at the headwaters near Saylorsburg. Riparian vegetation is well established, varying between trees that provide a thick canopy on the upper and lower stream to woody bushes that create heavy bank-side overhang, especially in the mid-valley area.

1.6 Political Setting

The Cherry Creek watershed is located entirely within Monroe County, northeastern Pennsylvania and is divided among four political jurisdictions: Hamilton Township, Stroud Township, Smithfield Township, and the Borough of Delaware Water Gap.

1.7 Socio-Economic Setting

Population and Employment

The population of Monroe County, the county in which the watershed is located, has nearly doubled since 1980 and is projected to grow by 60 percent by 2020. Managing the impact of this growth is at the root of the many recent planning efforts in the County. These efforts aim at managing growth in a way that conserves and protects natural and cultural resources while also encouraging the development of environmentally friendly businesses to provide close-to-home employment. The following summarizes the current population and employment situation:

Population

Monroe County's population boom began in the 1960s with the opening of Interstate 80. The trend continued during the '70s and '80s, and by the 1990 census, almost 96,000 people lived in the County. The 2000 census confirmed that the growth of the County continues – nearly 140,000 people live in the County today. The combination of further metropolitan in-migration and natural increase as county residents form new households and have children will result in continued growth over the next few decades and beyond. The projected population for the County in the year 2020 is 177,000 to 221,000.

Viewed together with average household size, this population estimate serves as a gauge for future housing demand. In 1990, average household size in Monroe County was 2.69 persons per house. Trends analyzed by the U.S Bureau of the Census show decreasing household size nationally and in Monroe County as well. Monroe County's demographic profile is approaching that of a typical suburban jurisdiction and its average household size is moving towards 2.5. The County is likely to see as many as 30,000 new dwelling units between 1998 and 2020 if the total population projected to 2020 lives in smaller household groupings as expected.

Industry and Employment

People who commute in from other areas hold many of Monroe County's jobs. For example, the Tobyhanna Army Depot is the County's largest employer, but fewer than 600 of its 3,600 employees live in the County. The majority of these employees commute from the Scranton/Wilkes-Barre area. Some workers also commute to Monroe County from Northampton and Carbon Counties to the south.

Likewise, many of Monroe County's residents commute to jobs outside of the county – many of these to the New York-New Jersey metropolitan areas, and some to the Allentown-Bethlehem-Easton area. The *Monroe County Comprehensive Plan* estimated that in 1998, an estimated 9,000 workers – or close to 18 percent of Monroe County's estimated 50,900 residents age 16 and older that are employed – commute out of Monroe County to work.

The County's labor force and its job base are not precisely aligned with each other. This trend is occurring in communities nationwide.

The *Monroe County Comprehensive Plan* projected the number of jobs in Monroe County in the year 2000 to be somewhere between 49,250 and 57,750, and growing at an estimated average annual growth rate of about 1.6-1.9 percent. In the decade following the year 2000, Monroe County's rate of employment growth is expected to level off at an annual average of around 1.6 percent, consistent with rates expected in the nearby counties of New Jersey.

The following table illustrates Monroe County's population growth between 1990 and 2000 as compared to municipalities of the watershed. While the percent change for municipalities of the watershed is on the whole lower than that for the County as a whole, the Townships are experiencing the most change while the Borough of Delaware Water Gap remains largely unchanged due to its relatively built out condition.

Population Change 1990-2000

County or Municipality	2000 Population	1990 Population	Population Change	Percent Change
Pennsylvania	12 281 054	11 881 643	399 411	3.4
Monroe County	138 687	95 709	42 978	44.9
Delaware Water Gap Borough	744	733	11	1.5
Hamilton Township	8 235	6 681	1 554	23.3
Smithfield Township	5 672	4 692	980	20.9
Stroud Township	13 978	10 600	3 378	31.9

Source: U.S. Census Bureau

Prepared by: Pennsylvania State Data Center

1.8 Land Use & Zoning

Land Use

Land use in the watershed is primarily residential and agricultural. However much of the watershed is still in a relatively undeveloped condition. Urbanized areas are found mostly in the northern part of the watershed in Smithfield and Stroud Townships and the Borough of Delaware Water Gap. Commercial and industrial land uses are also mainly concentrated proximate to the Route 80 interchange in Delaware Water Gap Borough and Smithfield Township. See: *General Land Use* (Figure 1.3).

Zoning & Land Use Controls

Existing Zoning is illustrated on the *Existing Zoning* (Figure 1.4) for the four municipalities that contain the project area. The predominant district for Hamilton and Smithfield Townships is “Residential” while the predominant district for Stroud Township and Delaware Water Gap Borough is “Conservation.” Stroud Township has an aggressive open space initiative program supported by a voter-approved tax for open space acquisition. Consequently many of the large parcels in the Township’s Conservation District in the watershed are being pursued for conservation setting a very appropriate tone for conservation throughout the watershed. The majority of land in Delaware Water Gap Borough’s Conservation District is already held in public ownership either municipal or Federal lands. Essentially all of the Mount Minsi subwatershed area in the Borough resides in public ownership.

Follow-up actions to Monroe 2020, the County’s Comprehensive Plan, adopted in June of 1999, and the Monroe County Open Space Plan, adopted in June 2001, resulted in all twenty municipalities in the county preparing joint municipal open space plans. Six joint municipal planning areas emerged for these follow-up planning efforts; three of which are contained in the watershed project area. Stroud Township is represented in the *Stroud Area Regional Open Space and Recreation Plan* completed in the spring of 2002. Delaware Water Gap Borough and Smithfield Township are represented in the *Eastern Monroe Regional Open Space & Recreation Plan* completed in June of 2002. Hamilton Township is represented in the *Hamilton-Jackson-Pocono (HJP) Open Space and Recreation Plan* completed in the fall of 2003.

Also as a direct result of the County’s Open Space Plan and Municipal Partnership Program, all municipalities have completed “*Growing Greener*” audits.¹ These audits provide recommendations for updating local plans and ordinances through the use of the *Growing Greener* techniques, including the model ordinance language for conservation subdivisions. Revisions to local ordinances based on these audits are needed in order to implement the goals and recommendations of the County Comprehensive Plan, the County Open Space Plan, and the recommendations contained in this watershed conservation plan. Again Stroud Township is leading the way with code revisions using the *Growing Greener* techniques. Hamilton Township is putting *Growing Greener* techniques into their new zoning ordinance and Smithfield Township is giving consideration to adoption of the techniques. Delaware Water Gap Borough is largely built-out and is less inclined to change codes in this regard; however, benefit may be realized through adoption of the *Growing Greener* Hamlet and Village design standards.

The Monroe County Conservation District also conducted an audit of municipal codes focused on municipal floodplain regulations. This audit points to weaknesses in the

¹ *Growing Greener* audits consist of a review of the municipality’s local plans and ordinances relative to land conservation goals. The *Growing Greener* program was developed by the Natural Lands Trust and the Pennsylvania Department of Conservation and Natural Resources.

existing codes and makes recommendations for correcting the same. See: Table 3.1 – *Floodplain Ordinance Provision Matrix*.

In addition to the joint open space planning efforts noted above a *Regional Comprehensive Land Use Plan* is currently being conducted for Hamilton, Stroud and Pocono Townships and the Borough of Stroudsburg. This plan should serve to support and guide that planning effort for the watershed area.

1.9 Transportation Routes

The major traffic routes in the Cherry Creek watershed include:

- Interstate Route 80
- PA Routes 611, 33, and 191.

Interstate Route 80 runs east-west through the far east end of the watershed. There is also one active rail line, which snakes diagonally through the east end of the watershed from Stroud Township to Delaware Water Gap. See: *Watershed Base Map* (Figure 1.1).

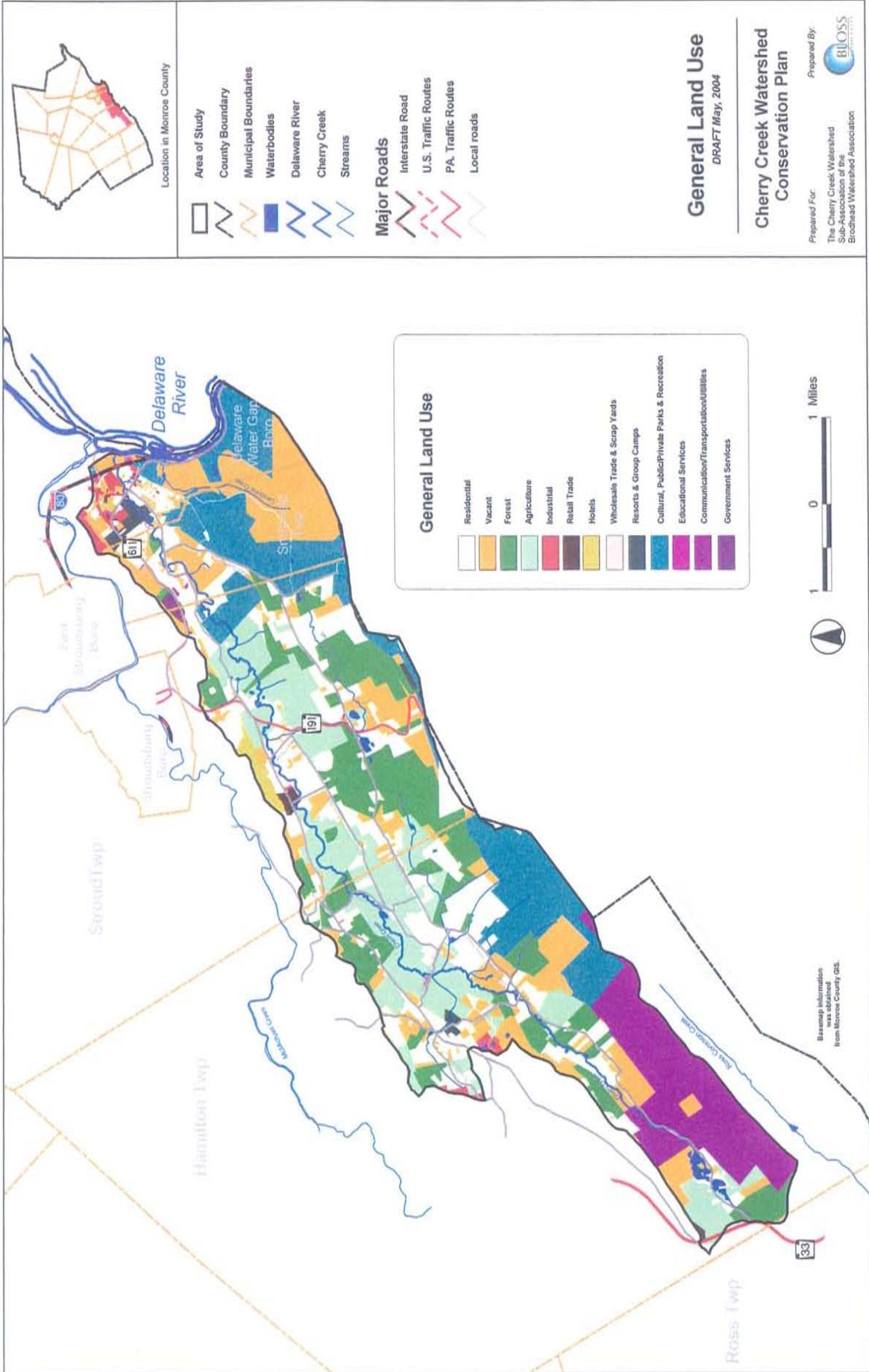


Figure 1.3

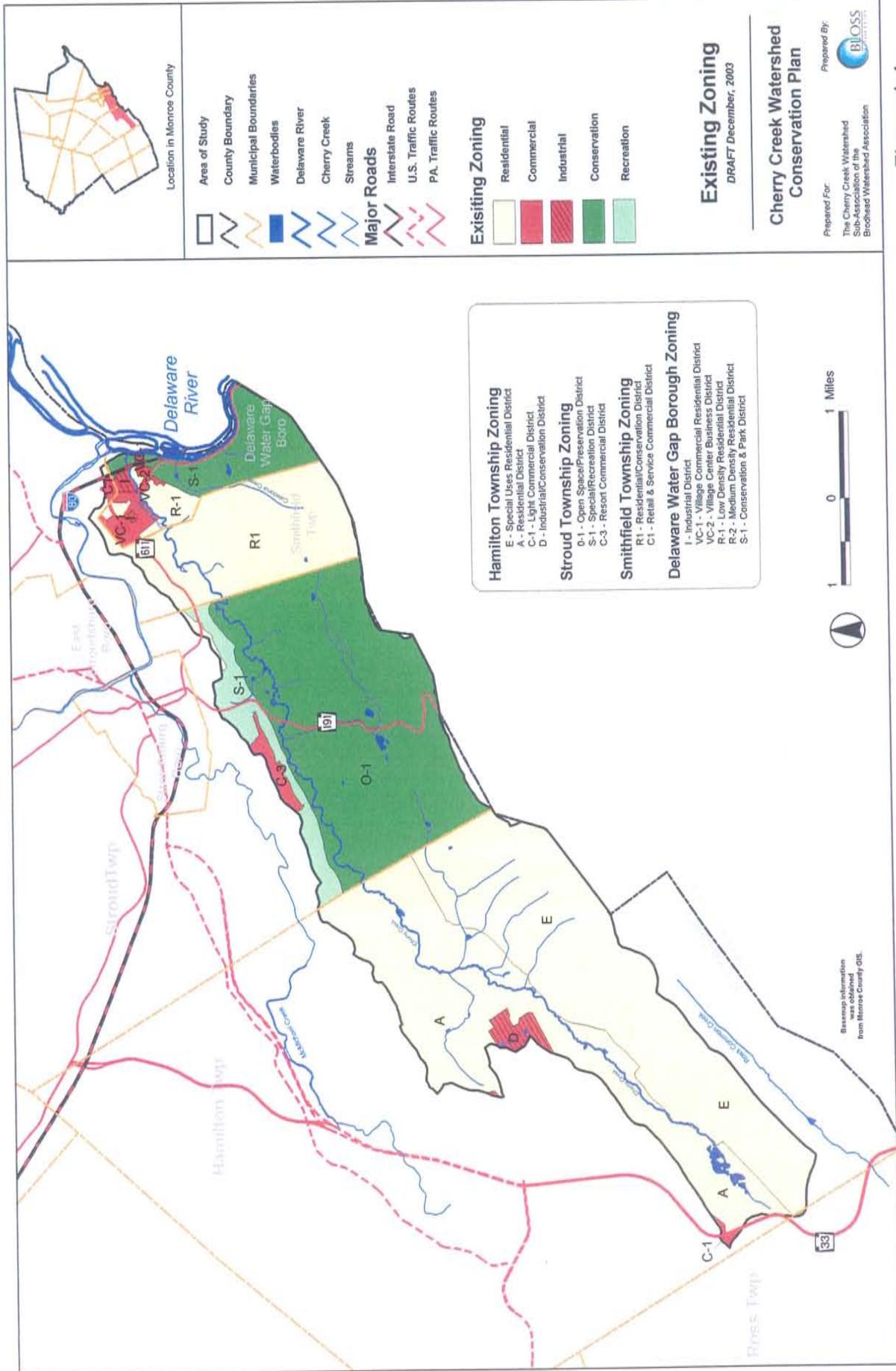


Figure 1.4

2.0 Land Resources

2.1 Topography / Geology

Topography

The Cherry Creek watershed lies within the *Blue Mountain Section* of the Valley and Ridge Province, characterized by long, parallel, sharp-crested ridges separated by long, narrow valleys. Elevations range from 1,600 feet along ridge-tops to 300 feet in the valley bottoms. Rapidly-weathering rocks underlie the valleys, while more resistant quartzite and sandstone form the higher ridges. The differential weathering characteristics and upright folds have produced the long valleys and ridges unique to this section. The *Topography* map (Figure 2.1) illustrates the narrow valley and long ridges of the watershed.

Geology

The valley and ridge section of the basin is underlain by primarily shale, siltstone, and minor carbonate units. Fifteen thousand years ago, Wisconsinian glaciers covered the entire watershed. Nearly all areas in the watershed, with the exception of hilltops, are now covered with unconsolidated sediments deposited or reshaped during glacial melting. The valley and ridge section is generally covered by thicker glacial deposits. They are typically meltwater-derived and include ice contact, outwash, and lacustrine deposits. Rock fragments in the glacial sediments are generally similar to the composition of the underlying bedrock and are thus assumed to be locally derived. Colluvium – soil and rocks deposited at the base of steep inclines – decreases the topographic slope at the base of most hills throughout the basin. Alluvium (sediment deposited by flowing water) consisting of sand, gravel, and cobbles from eroded till deposits is common to many of the streams.

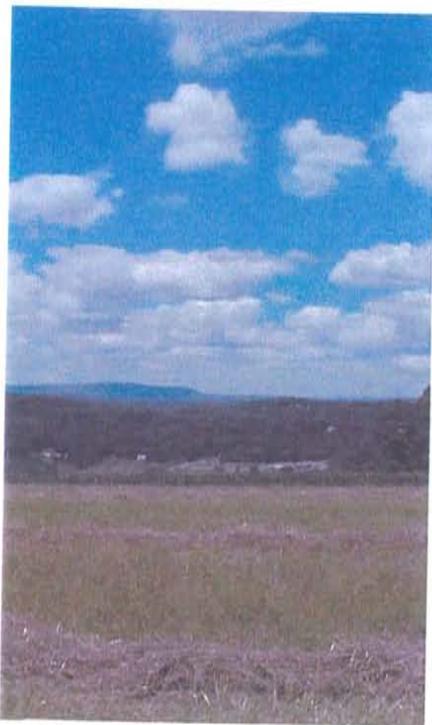
Bedrock geologic units underlying the watershed include undifferentiated Silurian-Devonian aged rocks that are found in a band across the northern part of the watershed, in the Godfrey Ridge area. The Silurian rocks have been intensely deformed by folding and faulting, resulting in dramatic topography and were formed 408 to 436 million years ago. The first jawed fishes and vascular plants appeared during the Silurian Period. The oldest rocks are found in the southernmost part of the watershed: Bloomsburg Red Beds, and the Shawangunk Formation. See: *Bedrock Geology* map (Figure 2.2).

Glacier Terminal Moraine Geology

Cherry Valley, its ridges and Kittatinny Mountain offer more proof of the existence of a continental ice sheet than perhaps anywhere else in the world. During the Quaternary Period (the geological history connected to the history of our human race) the Pleistocene Wisconsin late Woodfordian Stage glacial deposits and sculpture processes vividly portrayed the most recent major event to shape and form the physiography of Cherry Valley. H. Carvill Lewis, a Professor of the Academy of Natural Sciences of Philadelphia in his early 1880 report – “The Glacial Terminal Moraine in Pennsylvania and Western New York” describes these claims and why Cherry Valley is so beautiful and well known. Somewhere between 12,500 and 18,500 years ago the Wisconsin glacier terminal moraine, a vast ice sheet 1800 feet higher than the valley floor, began to melt and recede northwards leaving in its path all kinds of interesting features such as: kettles, kames, stratified and unstratified drift or till, striae and boulders.

In Saylorburg the accumulation of till covered with boulders fills the entire valley. Side to side kames (knob-like conical hills) and kettle holes (depressions) cover the entire landscape. Saylor’s Lake, formerly called Lake Poponoming, lies on top of the terminal moraine in a kettle hole surrounded by drift and is the most southern moraine lake in all of Pennsylvania.

Kames usually represent ancient watercourses containing stratified water-worn gravel of local origin with fine sand material at the bottom and coarse gravel on the surface. Between Stormville and Delaware Water Gap outstanding sets of kames running parallel with the valley are connected to one another by low gravel ridges on either side of Cherry Creek, which because of the presence of these kames is considered a sub-glacial stream.



View to Big Pocono across Moraine

Joining some of these conical hills on either side are cross kames that appear opposite ravines and depressions whose axes are at right angles to the valley.

Glacial striae (scratches and grooving appearing on large boulders) abound in the valley. Near Kemmererville opposite the old school house striae can be seen upon Clinton red shale. Above this, at the southwest end of a Clinton red shale hill, for a distance of one eighth mile the bare rounded rock prominently displays sharp parallel gouged lines a foot deep. Very large boulders of white Pocono sandstone, also striated, rest atop the red rocks indicating they acted as the carving tools. When looking up the valley South 37 degrees west one can observe a wall of glacial drift extending across the valley, which formed the back portion of the terminal moraine. At Table Rock within a mile of Delaware Water Gap the largest glacial groove in the state of Pennsylvania measures six feet wide and seventy feet

2.0 Land Resources

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Topography

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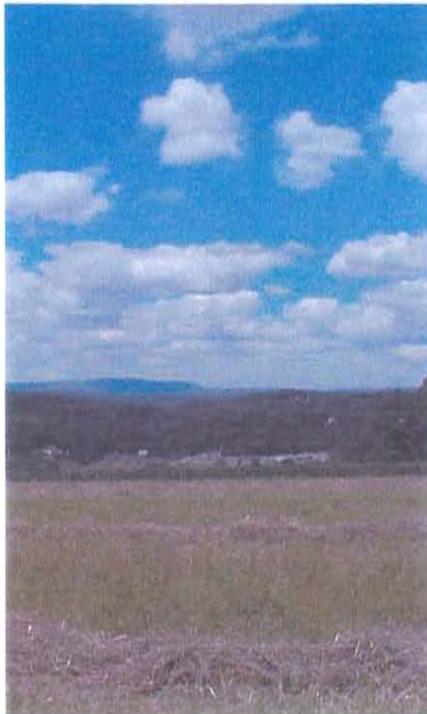
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In Saylorsburg the accumulation of till covered with boulders fills the entire valley. Side to side kames (knob-like conical hills) and kettle holes (depressions) cover the entire landscape. Saylor’s Lake, formerly called Lake Poponoming, lies on top of the terminal moraine in a kettle hole surrounded by drift and is the most southern moraine lake in all of Pennsylvania.

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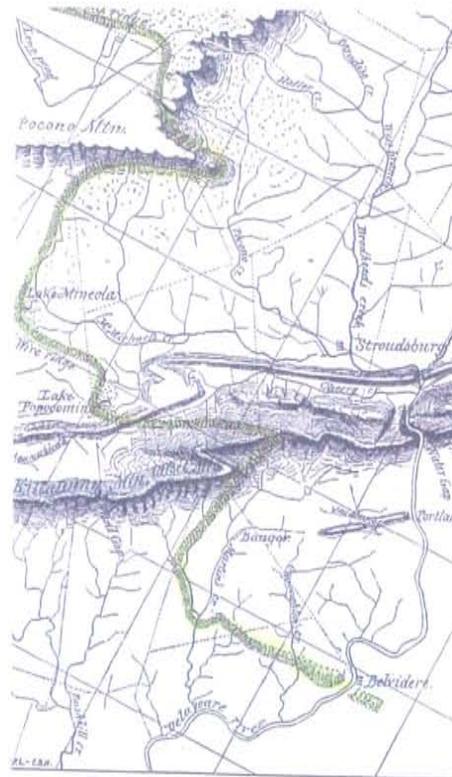
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long.

Huge ten to twenty five foot in diameter boulder blocks of Lower Devonian Fossiliferous Upper and Lower Helderburg limestone and fossiliferous Oriskany sandstone sit atop Kittatinny Mountain 1200 feet above the floor of Cherry Valley one and a half miles west of Fox Gap. These same rock Age-Groups also sit on top of the Clinton sandstone and shales of Poplar Valley Ridge (formerly called Red Ridge) at Tott's Gap (formerly called Tatamy's Gap). The Clinton Formation belongs to the Lower Silurian Period, which comprise the oldest rock in the valley. The only logical explanation for these two phenomena, is based on the following reasoning: first, the appearance of younger rock located at an elevation 800 feet higher and two miles south from Godfrey Ridge (the source of the Helderburg limestone and Oriskany Groups) and second, this same rock, also 800 feet higher and one and a half miles south of Godfrey Ridge, is the lifting and transporting force provided by a massive continental glacier.

Much of Cherry Valley's industry today, including farming, vineyards, tree farms, trout hatcheries, quarry operations etc., can be attributed to the great Wisconsin Glacier Terminal Moraine.¹



Line of Glacial Moraine from Belvidere, NJ to the Pocono Plateau through Cherry Valley

¹ Summary report by Peter F. Steele using: Second Geological Survey of Pennsylvania, Report of Progress, Report on the Terminal Moraine in Pennsylvania and Western New York, by H. Carvill Lewis, Professor of the Academy of Natural Sciences of Philadelphia, published by the Board of Commissioners for the Second Geological Survey, 1884; and The Wisconsin Stage of the First Geological District, Eastern New York, by Donald H. Cadwell, Editor, Bulletin Number 455, New York State Museum, The University of the State of New York, The State Education Department, Albany, New York 12230, June 1986.

Scenic Geologic Features

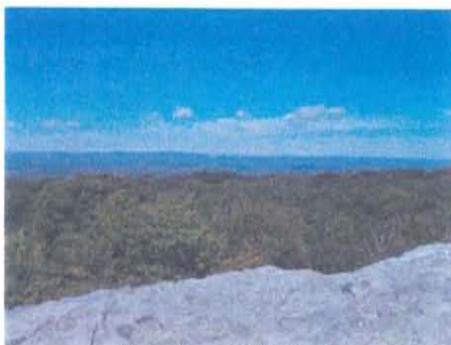
Outstanding Scenic Geological Features of Pennsylvania are documented in a report by the same name authored by the State Geologist Arthur A. Socolow (Environmental Geology Report 7, Parts 1 & 2, 1979). In the preface, Mr. Socolow notes, “*Scenery has been recognized as a natural resource since 1864, when the first state park, Yosemite Valley, California, was established ... Today, society recognizes these geologic features as a valuable environmental resource ... Because of their outstanding geologic significance, the geologic features described here become outdoor classrooms, places where you can study the earth’s surface in an almost natural condition, relatively undisturbed by human activities.*”

The following describes unique geologic sites that occur in the watershed study area, all of which lie in the Valley and Ridge province, Appalachian Mountain section:

Delaware Water Gap - *A highly scenic water gap cut by the Delaware River through the Kittatinny Mountain; the most attractive in the United States. Massive gray conglomerate and sandstone of the Shawangunk Formation of Silurian age supports the ridges and forms cliffs.*

Lake Lenape Cave Shelter- *A large overhanging cliff of quartzite of the Shawangunk Formation (Tammany Member Silurian age) was once used as living quarters by Leni Lenape Indians. This site has recently been excavated for artifacts left behind by the Indians. Excavation sites such as this supply much evidence used to piece together ancient cultures.*

Wolf Rocks – *Wolf Rocks have been called the most outstanding viewpoint from the Appalachian Trail in eastern Pennsylvania. The rock here is quartzite (Shawangunk Formation, Silurian age). It underlies The Little Offset ridge and crops out in a narrow band of bare rock. Wolf Rocks marks the southernmost point of continental glaciation along the Trail; the effects of the glacial climate extended far to the south, but the ice stopped here.*



View from Wolf Rocks

2.2 Soil Characteristics

Soils Types

Like geology, soils play an important role in determining stream chemistry, and are also important for development and land planning purposes. Properties such as thickness, texture, and moisture capacity make some soil associations better suited to certain uses, such as agriculture or development, than others.

Through the center of the valley proximate to Cherry Creek are dominantly deep soils formed in glacial outwash and alluvium mainly on terraces and floodplains. This is the *Wyoming-Chenango-Pope* general soil association. It consists of nearly level to sloping, deep, somewhat excessively drained and well drained soils underlain by glacial outwash and alluvium. Across the southeastern boundary of the watershed along the Kittatinny Ridge lie dominantly shallow and moderately deep soils formed in glacial till mainly in the valley and ridge province. This is the *Dekalb-Hazleton-Laidig* general soil association. It consists of sloping to moderately steep, moderately deep, and deep, well drained soils underlain by brownish glacial till and colluvium. Between the Cherry Creek and the Kittatinny Ridge lie dominantly deep soils formed in glacial till mainly in the Appalachian plateau province. This is the *Lackawanna-Wellsboro-Oquaga* general soil association. It consists of nearly level to sloping, deep and moderately deep, well drained and moderately well drained soils underlain by reddish glacial till. Across the northwestern boundary of the watershed along the Godfrey Ridge lie dominantly shallow and moderately deep soils formed in glacial till mainly in the valley and ridge province. This is the *Benson-Rock outcrop* general soil association. It consists of moderately steep to very steep, shallow, well drained soils and areas of rock outcrop underlain by calcareous and noncalcareous shale, slate, sandstone and quartzite.²

Limitations

Benson-Rock outcrop Association – This soil unit extends along the northern edge of the watershed; its steep slopes form the watershed boundary to the north. It consists of moderately steep to very steep bedrock ridges. The soils are mainly steep and hilly, but some rolling and nearly level soils can be found on ridgetops. Benson soils are shallow and well drained. This association is poorly suited to most crops grown in the region because of surface stones, rock ledges, and shallow depth to bedrock. Slope is also a major limitation.

Wyoming-Chenango-Pope – Through the center of the valley proximate to Cherry Creek are dominantly deep soils formed in glacial outwash and alluvium mainly on terraces and floodplains. It consists of nearly level to sloping, deep, somewhat excessively drained and well drained soils underlain by glacial outwash and alluvium. Most of this map unit has been cleared and is used for general crops. Much is presently idle or is in established

² General Soil Map and descriptions, Monroe County, Pennsylvania, U.S. Department of Agriculture Soil Conservation Service, compiled 1978.

communities. A few small areas are developed for homesites and recreation. The soils are suited for most crops commonly grown in the county. Most of the soils, however have a very low to moderate available water capacity, and crop yields decrease during dry periods. Management practices that conserve moisture, reduce runoff, and control erosion are essential. The major limitations for most uses are the rapid permeability and flooding.

Lackawanna-Wellsboro-Oquaga – Between the Cherry Creek and the Kittatinny Ridge lie dominantly deep soils formed in glacial till mainly in the Appalachian plateau province. This is the *Lackawanna-Wellsboro-Oquaga* general soil association. It consists of nearly level to sloping, deep and moderately deep, well drained and moderately well drained soils underlain by reddish glacial till. This map unit is mostly wooded. A few areas were cleared for crops, but large portions of these areas are now idle. Some of the wooded areas were cleared for villages, recreation areas, and resorts. Except where cleared, the soils are too stony for cultivation and are better suited to woodland, wildlife habitat, and recreation than to other uses. Cleared soils are suited to most crops commonly grown in the county. Protection of woodland from fire and improved woodland management are needed. Cleared areas need to be protected against runoff and erosion. The major limitations in addition to stoniness are the slow permeability, the seasonal high water table, and the moderate depth to bedrock.

Dekalb-Hazleton-Laidig – Across the southeastern boundary of the watershed along the Kittatinny Ridge lie dominantly shallow and moderately deep soils formed in glacial till mainly in the valley and ridge province. This is the *Dekalb-Hazleton-Laidig* general soil association. It consists of sloping to moderately steep, moderately deep, and deep, well drained soils underlain by brownish glacial till and colluvium. This map unit is mostly wooded. The soils are too stony for cultivation and are better suited to woodland, wildlife habitat, and recreation than to other uses. The main limitations in addition to stoniness are the moderate depth to bedrock, the slope, and the moderately slow permeability. Protection of woodland from fire and improved woodland management are needed.

Limitations for Septic Tank Effluent Absorption

Of particular concern for this watershed plan is the fact that most of the watershed has severe limitations for conventional, in-ground septic tank absorption fields. See the map of *Septic Tank Absorption Limitations* (Figure 2.3). Only a very small percentage of the soils in the watershed are classified as having moderate or slight limitations for septic tank absorption capacities. Thus, many homes in the rural areas of the watershed use alternative systems such as sand mounds for wastewater treatment. Given these limitations and the widespread use of sand mound systems throughout the watershed, it will be critical to the future health of the watershed that these systems are monitored and maintained in proper working order. To that end, the Action Plan recommends that municipalities establish sewage management programs to assure that on-lot systems are properly monitored and maintained.

This plan also encourages the exploration of other alternative systems for wastewater treatment, which would offer improvements over the prevalent technology. One such

alternative system is land application of treated sewage and industrial wastewater. The map of *Soil Suitability for Land Application of Treated Wastewater* (Figure 2.4) shows the location of soils in the watershed suitable for land application. Suitable soils were chosen according to their ranking in a table of suitable soils found in the *Manual for Land Application of Treated Sewage and Industrial Wastewater*, PA DEP, 1981. Soils are represented on the map in three categories:

- “Most Suitable” soils are those with a maximum application rate of 1.5”-2.0” per week. These soils are well drained (wooded or open). Their irrigation season is approximately March to December.
- “Suitable” soils are those with a maximum application rate of 1”-1.5” per week. These soils are shallow well drained to moderately well drained (wooded or open). Their irrigation season is approximately March to December.
- “Less Suitable” soils are those with a maximum application rate of 0.5” per week. They are somewhat poorly drained and have an irrigation season of approximately May to September.

“Not Suitable” soils are those that are poorly drained or slopes in excess of 15 percent.

These systems have not been used in the Cherry Creek watershed to date. However, in the nearby Brodhead watershed, Spruce Lake Retreat, in Barrett Township, uses a spray irrigation system at the headwaters of the Brodhead Creek. This wastewater system sprays into three forested zones totaling five acres. The permitted volume for 2001 was 494,000 gallons per month for the months of March through November. However, the actual volume sprayed during the 2001 nine-month permitted period was 228,000 gallons per month, on average.

Another system is operated by Pleasant Valley School District at their middle school in Brodheadsville.

An interesting nearby project is that of the Pike County Business Center, located in Blooming Grove Township, a 615-acre business park with a projected sewage flow of 10,000 gallons per day. Sewage will be collected from each site, treated, and returned to be recycled as flush water for toilets and urinals. The remaining 20% will be discharged to a spray irrigation field.

2.3 Protected Lands

About 3,688 acres of land, or 28% of the watershed, are publicly owned, including state lands, county lands, and municipal lands. Private protected lands, including private conservation lands, and purchased agricultural easements, total about 1465 acres, or about 11% of the watershed. Therefore about 39% of the watershed is protected through public and private means. Quasi-protected lands, or lands indicating a conservation interest, include agricultural security areas and Pennsylvania Act 319 lands that have not been permanently protected through private or public means total about 4000 acres, or

30% of the watershed. See the *Protected Lands* map (Figure 2.5) for the spatial distribution of these lands. They break out as follows:

Federally Owned Lands

There are approximately 2,208 acres of federally owned lands in the project area. Approximately 337 acres lie within the Mount Minsi subwatershed in Delaware Water Gap Borough and are under the jurisdiction of the Delaware Water Gap National Recreation Area (DWGNRA). See: Section 3.1 for a description of the DWGNRA. Another approximate 518 acres lies primarily in Smithfield Township east of Tott's Gap Road and intersects with the Appalachian Trail along the Kittatinny Ridge. About 80 acres of the eastern most portion of this tract lies in the Caledonia Creek subwatershed. Approximately 30 acres lie in Delaware Water Gap Borough under the jurisdiction of the DWGNRA, which includes a portion of the Appalachian Trail Head located near Lake Lenape that leads to the Mount Minsi overlook. In Hamilton Township there are two large federally owned tracts, one of approximately 582 acres and one of approximately 202 acres. These too intersect with the Appalachian Trail along the Kittatinny Ridge. The remainder of the federal acreage is composed of smaller parcels spread out along the Kittatinny Ridge.

State Owned Lands

There are no State Parks, State Game Lands or State Forests in the Cherry Creek watershed. However, the Commonwealth of Pennsylvania owns approximately 50 acres along the Kittatinny Ridge.

County Owned Lands

There are no county-owned lands in the watershed.

Municipal Lands

There are about 1430 acres of municipal-owned protected lands and parkland in the watershed.

Other Protected and Quasi-Protected Lands

Other protected lands in the watershed include private conservation lands – including those protected by fee acquisition, conservation easement, and purchased agricultural easements. Quasi-protected lands include agricultural security areas, and Pennsylvania Act 319 lands.

- Private conservation lands are those protected by private land trusts and conservancies, such the Nature Conservancy and the Pocono Heritage Land Trust. The Nature Conservancy and Pocono Heritage Land Trust have protected 628 acres of critical habitat, corridor, and buffer lands in

Cherry Valley including the 271-acre Blakeslee Farm, 45-acre Domotor tract, 175-acre Christine farm, and 137-acre Walker Property.

- Purchased Agricultural Easements permanently protect the 271-acre Blakeslee Farm and about 65 acres of additional agricultural lands in the watershed. Conservation easements also protect 70 acres on the Groner Farm in Stroud Township. Another 208 acres of the Fellencer Farm in Hamilton Township is under contract for an Agricultural Easement.
- Agricultural Security Areas are not protected but are areas deemed suitable for protection by purchased agricultural easements. A total of 1,452 acres of Cherry Valley land located in the watershed have been designated as agricultural security areas.
- Pennsylvania Act 319 lands are those protected under the “Clean and Green” program, which provides property tax breaks to owners. These lands are *not* permanently protected – a landowner can simply pay the back-taxes in order to develop the site (examples of this have already occurred in Monroe County). Act 319 lands in the watershed total approximately 4,348 acres and include both agricultural and forested lands.

2.4 Landfills

There are no active landfills located in the watershed.

2.5 Hazard Areas

Waste Sites

“Superfund” sites are listed on the National Priorities List (NPL) [<http://www.epa.gov/superfund/sites/npl/pa.htm>] No Superfund sites are listed for the watershed. The federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) established the Superfund Program. A query on EPA regulated facilities in “Envirofacts” lists two facilities in the watershed:

- HEICO CHEMICALS INC - ROUTE 611, DELAWARE WATER GAP, PA 18327 (no RCRA storage) - PAD003037504
- TRANSISTOR DEVICES INC CIRCUITEK DIV - BROAD ST, DELAWARE WATER GAP, PA 18327 (no RCRA storage) - PAD079164158

There have been no violations in the past 2 years and no current significant violations. At this time, no issues related to either of these companies impact the watershed.

Mines / Quarries

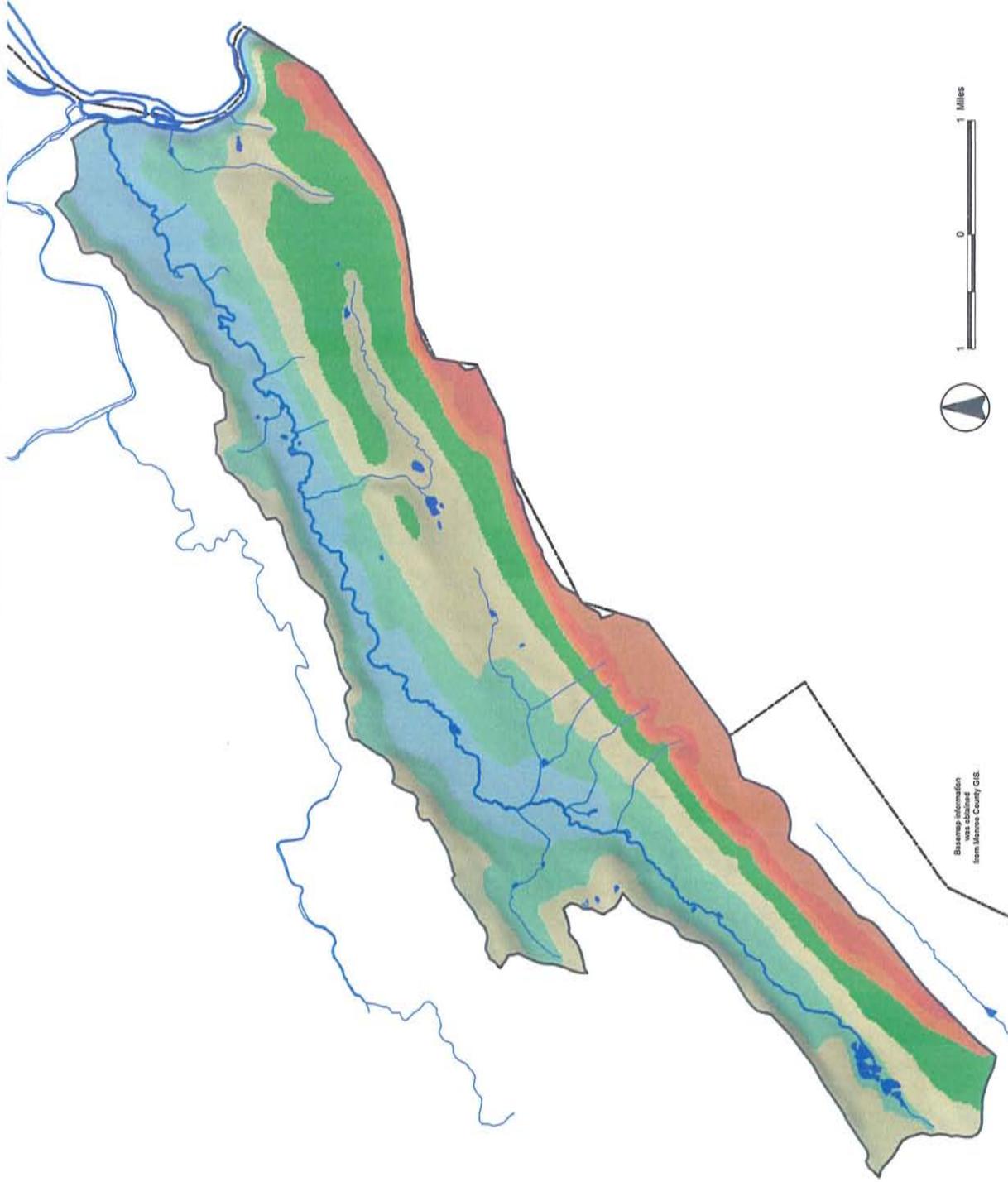
One major mining operation lies adjacent and partially within the Cherry Creek watershed boundary. Hanson Aggregates – Hamilton Township, Cherry Valley Road Located off the western portion of Cherry Valley Road, it is a limestone quarrying operation however the majority of the site is located outside the watershed. Hanson Aggregates is not permitted (does not have a permit) to discharge waste water into area rivers. An EPA Envirofacts query shows there have been no violations in the past 2 years and no current significant violations. At this time, no issues related to this company impact the watershed.

Sinkholes

Cherry Valley lies within the carbonate bedrock region of Eastern and Central Pennsylvania, which is primarily composed of limestone and dolomite. This increases the possible occurrence of sinkholes, a subsidence feature in an area underlain by carbonate bedrock. Though the area may be susceptible, there have been neither instances of nor concern about sinkholes reported in the area. Sources: Pocono Record Online; Archive search 1998-2004; Kochanev, W.E., 1999, Sinkholes in Pennsylvania: Pennsylvania Geological Survey, 4th ser., Educational Series 11, 33 p.

Storage Tanks Sites

According to recent data from the Pennsylvania Department of Environmental Protection eMapPA [<http://www.emappa.dep.state.pa.us/emappawebiste>], there are ten (10) storage tank locations in the Cherry Creek watershed. Five are located in Delaware Water Gap Borough, one in Smithfield Township, three in Stroud Township, and one in Hamilton Township. A storage tank location is a DEP primary facility type, and its sole sub-facility on eMapPA is the storage tank itself. Storage tanks are aboveground or underground, and are regulated under Chapter 245 pursuant to the Storage Tank and Spill Prevention Act. Storage tanks currently contain, have contained in the past, or will contain in the future, petroleum or a regulated hazardous substance.



Location in Monroe County

- Area of Study
- County Boundary
- Waterbodies
- Delaware River
- Cherry Creek
- Streams

Elevation Key (in feet)

	200 - 450
	450 - 650
	650 - 900
	900 - 1,200
	1,200 - 1,350
	1,350 - 1,500
	1,500 - 1,800
	1,800 - 2,300

Topography
DRAFT January, 2004

Cherry Creek Watershed Conservation Plan

Prepared For:
The Cherry Creek Watershed Sub-Association of the Brodhead Watershed Association

Prepared By:
 BLOSS CONSULTANTS



Base map information from Monroe County GIS.

Figure 2.1

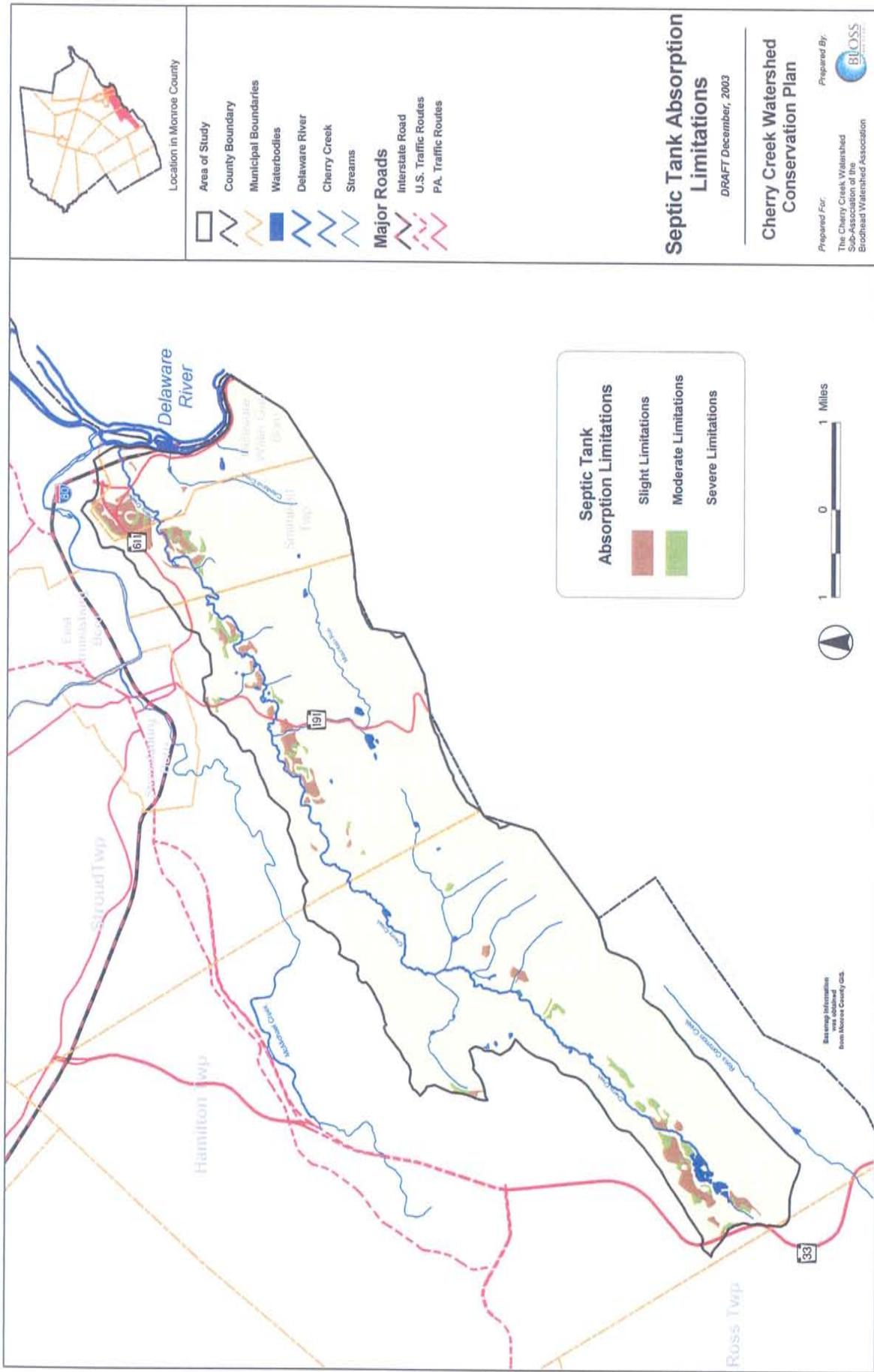


Figure 2.3

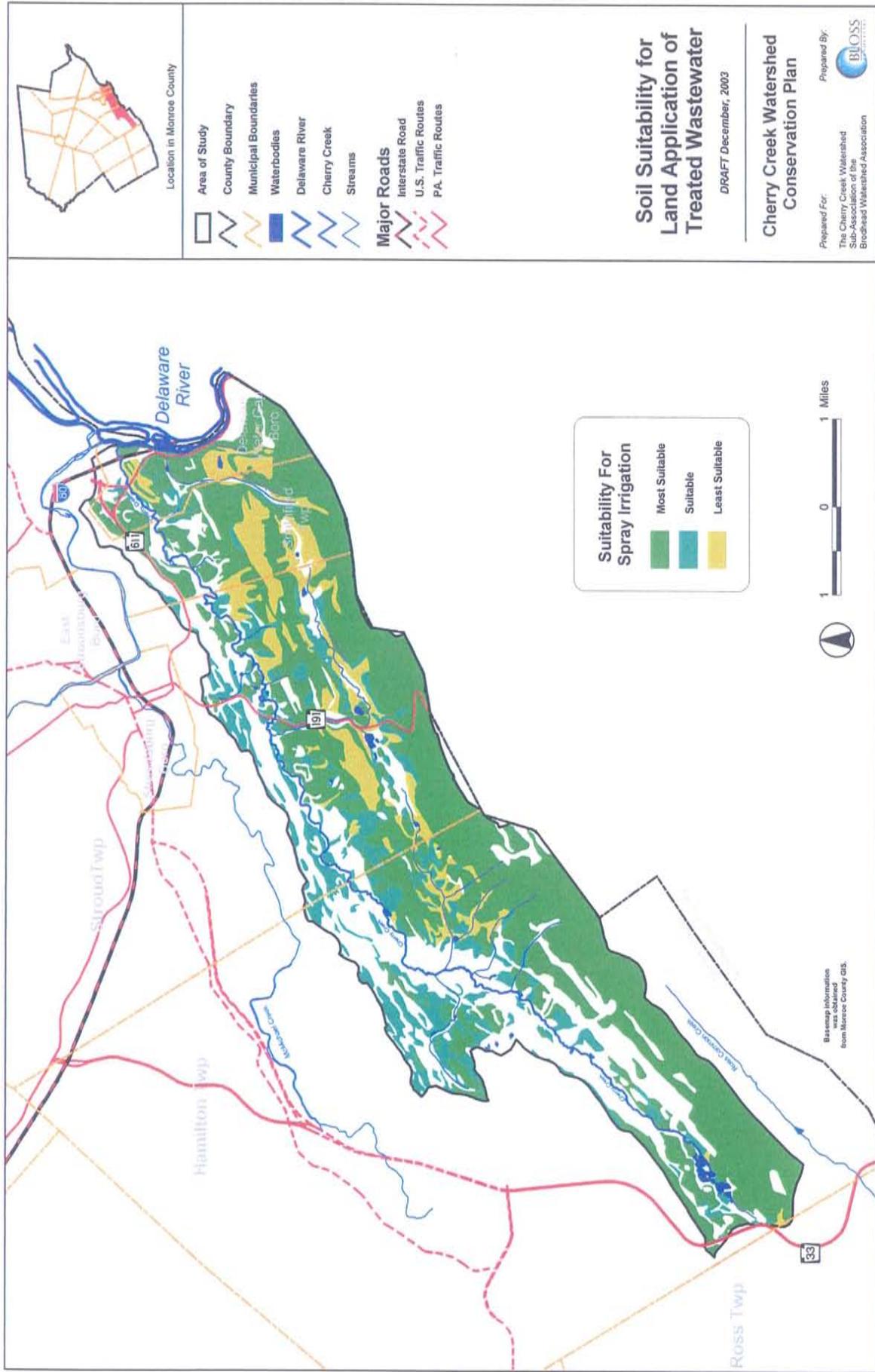


Figure 2.4

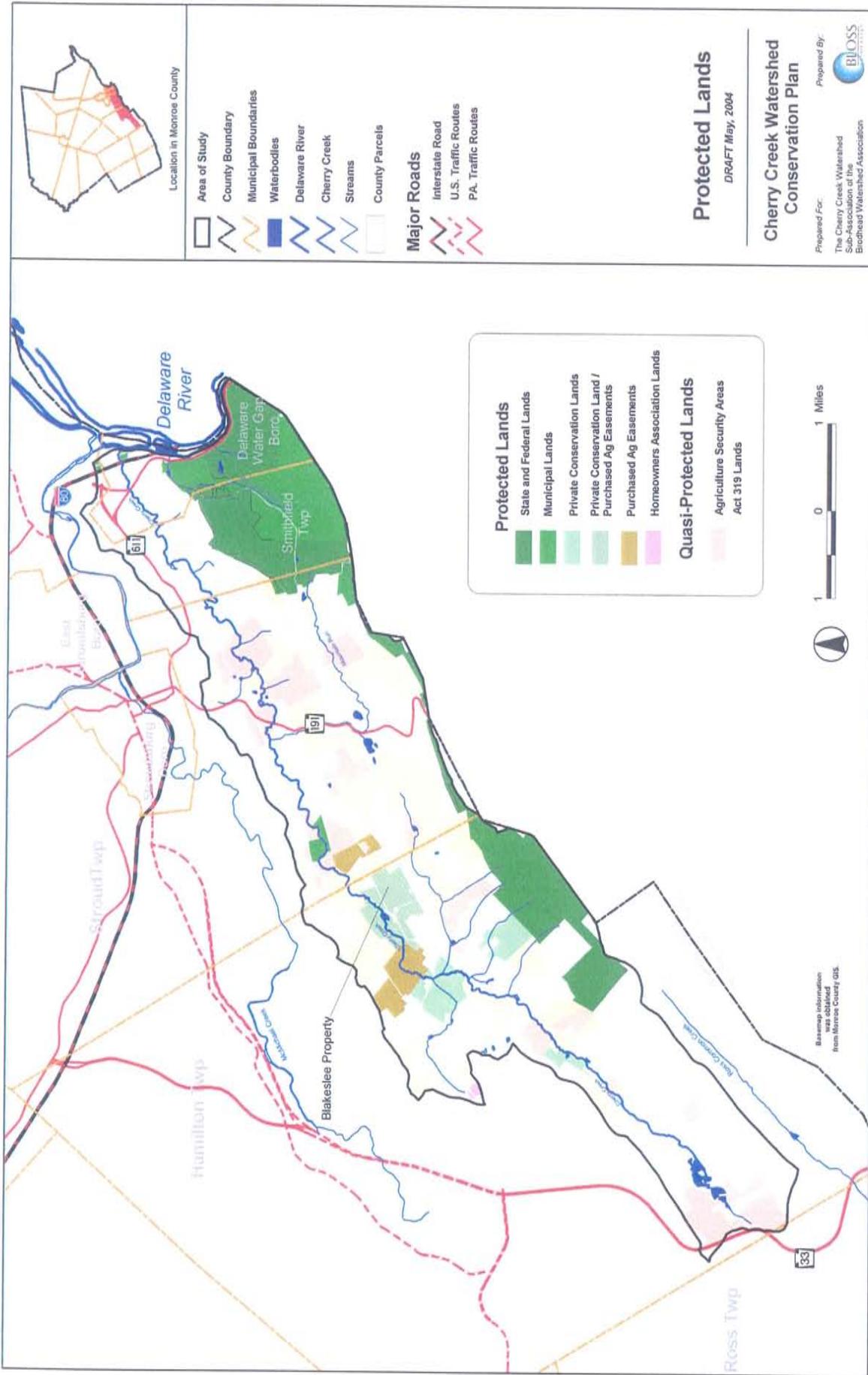


Figure 2.5

impair, public recreation and protection of scenic, scientific, and historic features contributing to public enjoyment.” (16 U.S.C. 460o et seq)

The enabling legislation that created Recreation Area also made it a unit of the National Park System. The general statutes that guide land management are applicable, among them are the National Park Service Organic Act (16 U.S.C sec 1 et seq) and the Act for Administration (16 U.S.C. 1a-1). These two acts also give the Secretary of Interior the authority to promulgate rules and regulations to effectively manage the National Park System.

In 1978, the section of the Delaware River flowing through the National Recreation Area was designated as the Middle Delaware Scenic and Recreational River and added to the national Wild and Scenic River System (16 U.S.C. 1274). This serves as a major impediment to constructing dams on the main stem of the river. This Act states that components of the Wild and Scenic Rivers System be preserved in their free-flowing condition in order "to protect the water quality of such rivers and to fulfill other vital national conservation purposes." (16 U.S.C. 1271).

3.2 Watershed Management Units

At the heart of watershed planning and management is the concept of watershed management units. This watershed conservation plan is meant to set up additional planning efforts at a more manageable scale, to keep the focus of the plan clear. Overall the plan represents a long-term process and continuous management commitment. There are many different watershed management units, including river basins, watersheds, subwatersheds, and catchments. A watershed can be defined as the land area that contributes runoff to a particular point along a waterway. A typical watershed can cover tens to hundreds of square miles, and extend over several political boundaries or jurisdictions. The largest management unit is the basin. The Cherry Creek flows to the Delaware River basin.

Watersheds are broken down into smaller geographic units called subwatersheds. Subwatersheds typically have a drainage area of 2 to 15 square miles, or larger, and include the land area draining to the confluence of two second-order streams or to the limits of a third order stream. This plan’s focus is on the Cherry Creek subwatershed and includes all the land that drains to the point where the Cherry Creek meets the Delaware River.

However, two adjacent small subwatersheds to the east that meet the Kittatinny Ridge and that also drain directly into the Delaware River have been included in the study area: The Caledonia Creek subwatershed and the Mount Minsi subwatershed.¹ Both are just over 300 acres in area. Due to their small size and location general management

¹ These small watersheds were included as recommended by the DCNR project manager to provide complete coverage for Monroe County as they are too small to justify separate plans.

3.0 Water Resources

3.1 The Cherry Creek Watershed

A watershed ultimately connects the communities within it through their common dependence on water resources. Our flowing creeks and streams are perhaps the best barometer of how well we accept stewardship of the land on which we live. Watersheds are important in every community because they embody our sense of place in the landscape, and their waters are important in our daily life. Watersheds are the geographic addresses for our communities.

Watershed Setting

Cherry Creek drains a watershed area of approximately 13,314 acres (about 20.8 square miles). The creek is listed as a High Quality Coldwater Fishery for most of its length according to the PA Department of Environmental Resources. Cherry Creek meanders for approximately 15 miles through a narrow, steep-sided valley, eventually emptying into the Delaware River at Delaware Water Gap. The elevation change from source to mouth is only about 370 feet, and numerous tributaries erupting from Kittatinny Mountain feed the creek. It empties into a section of the river that is designated as the Middle Delaware Scenic and Recreational River in close proximity to the Delaware Water Gap National Recreation Area.

Delaware Water Gap National Recreation Area & Delaware River

Delaware Water Gap National Recreation Area is located in New Jersey and Pennsylvania. It encompasses approximately 70,000 acres along 40.6 miles of the Delaware River. It is less than one hundred miles from the metropolitan areas of New York and Philadelphia. As a result, it is highly accessible to the ever-growing numbers of vacationers and new residents being drawn to the Poconos and the Delaware Highlands regions. Over six million people from around the world visit it annually and it is a focal point for intensive water-oriented recreational activity. Water quality in the upper section of the river and in the tributary streams is uniformly good to excellent. Maintaining this exceptional water quality is vital to the continued use and enjoyment of Recreation Area waters, which are a regionally and nationally recognized recreation and fisheries resource.

The National Recreation Area was established on September 1, 1965. It was originally intended to be associated with the lake, which was to be formed by the Tock's Island Dam project proposed by the United States Army Corps of Engineers. Although this project was de-authorized in 1992, the purposes for establishing the National Recreation Area remain and are outlined in its enabling legislation which includes providing: "public outdoor recreation benefits; preservation of scenic, scientific, and historic features contributing to public enjoyment; such utilization of natural resources as in the judgment of the Secretary of the Interior is consistent with, and does not significantly

strategies may be applied to them as if they were part of the Cherry Creek subwatershed. Specific actions to these subwatersheds will be noted as appropriate.

Management at the subwatershed level refers to assessment-level studies and specific projects within the smaller subwatershed units, while management at the watershed level refers to broader management issues across an entire watershed. The management units of watershed and subwatershed are most practical for local plans such as this one. Every watershed is composed of many individual subwatersheds, each having its own unique water resource objectives.

The recommendations of this plan focus on the more defined issues in the Cherry Creek subwatershed. This plan focuses on the importance of a subwatershed unit for several reasons:

- The influence of impervious cover on water quality, hydrology, and biodiversity is most evident at the subwatershed level, where the influences of individual development projects are easily recognizable.
- Because subwatershed management areas are limited to a smaller area, fewer pollutant sources are present to confuse management decisions.
- Subwatersheds are small enough to be within just a few political jurisdictions where it is easier to establish a clear regulatory authority and incorporate the smaller number of stakeholders into the management process.
- A subwatershed plan can generally be completed within two to three years and still allow ample time for goal development, agency coordination, and stakeholder involvement.

3.3 Estimate of Impervious Cover

Numerous studies have shown a relationship between impervious cover and degraded water resources. Therefore an assessment of impervious cover is a good indicator of the general health of the watershed. An estimate of mean impervious cover by land use category was conducted by BLOSS Associates in the summer of 2002 as part of this conservation plan using a prescribed methodology and field survey assistance from planners at the Delaware River Basin Commission. A windshield survey was conducted from drivable roads in the watershed; land use categories identified on a preliminary map were then generalized to the entire watershed area through interpretation of aerial photography and GIS mapping tools. The majority of the watershed is under the 10% threshold where a watershed is said to be an “impacted” watershed. However, small areas near the confluence and in the headwaters area do have quite high percentages of impervious cover as a result of more intense land development. The creek in these locations is impacted more severely by stormwater runoff and should be high priority for restoration and other watershed management strategies. See: *Mean Impervious Cover* map (Figure 3.1).

3.4 Stream Order

Stream order is a general measure of a stream's location in a watershed and the number of tributaries the stream has. First-order streams have no tributaries. Second-order streams have only first-order streams as tributaries. Third-order streams have only first- and second-order streams as tributaries, and so on.

The furthest reach of Cherry Creek begins as a first-order stream from its point of origin near Saylorsburg and the Twin Ponds. Cherry Creek then turns into a second-order stream after it passes under Fetherman Road where an unnamed run flows into it. By the time the creek's flow reaches Kemmertown Road several unnamed runs have added to its volume making it a third-order stream until it reaches its confluence at the Delaware River. See *Stream Order* map (Figure 3.2).

Headwater streams are defined as first- and second-order streams. Headwater streams, although the smallest streams, are crucial in watershed management because they dominate the landscape through their sheer number and cumulative length. Although typically short in length, headwater streams actually comprise about 75% of the total stream mileage in the United States.

What happens in the local landscape is directly translated to headwater streams. As urbanization increases, streams handle increasing amounts of runoff, which degrades headwater streams and eventually, major tributaries.

Focusing on the headwater stream level in watershed management is important for several reasons:

- Headwater streams are exceptionally vulnerable to watershed changes;
- Headwater streams are often on the same scale as development projects;
- The public intuitively understands streams and strongly supports their protection;
- Headwater streams are good indicators of watershed quality.

Headwater streams have fewer upstream uses to cause problems and can be a reservoir of biodiversity, if protected. In addition, lower-order streams are narrower and therefore are more likely to have overhanging trees, lower temperatures, and better food sources for aquatic invertebrates.

Headwaters areas in the Cherry Creek watershed are delineated by the presence of first- and second-order streams on the *Stream Order* map (Figure 3.2).

3.5 Stream Designations

Water quality throughout the Cherry Creek watershed is generally high. Most of the watershed is classified as a high quality cold water fishery (HQ-CWF) under

Pennsylvania's water quality criteria (PA Code Title 25, Chapter 93.). About one mile from the confluence with the Delaware River the classification changes to cold water fishery, migratory fishery (CWF, MF). See *Stream Designations* map (Figure 3.3).

High Quality (HQ) and Exceptional Value (EV) status signifies that these streams are suitable for Pennsylvania's anti-degradation water quality protection strategies for waters that exceed state standards, and that possess exceptionally high water resource values. The Pennsylvania Fish and Boat Commission (PFBC) classifies a portion of the creek and several tributaries in the watershed as Class A wild trout streams, signifying the presence of significant populations of wild brook trout and brown trout.

State regulations in Chapter 93 define stream classifications and designated uses and describe how designated uses are used to determine allowable impacts from various permitted activities.

- Permitted discharges to Exceptional Value streams cannot change existing water quality.
- Permitted discharges to High Quality streams must maintain existing water quality except when social or economic justification for lowering water quality can be demonstrated.
- Permitted discharges to all other streams must protect existing uses (designations).

Stream Classifications and Designated Uses²

EV = Exceptional Value Waters. Special Protection. A surface water which is of exceptional ecological significance, such as thermal springs or wetlands which are exceptional value wetlands under Chapter 105.17(1); or a surface water that has excellent water quality, meeting the tests for High Quality Waters, and also meets other requirements such as: is located in a National wildlife refuge or a State game propagation and protection area; or is located in a designated State park natural area or State forest natural area, National natural landmark, Federal or State wild river, Federal wilderness area or National recreational area; or is an outstanding National, State, regional or local resource water; or is a surface water of exceptional recreational significance; or meets a biological test set forth in DEP regulations at Chapter 93.4b(a)(2) or is designated by the Fish Commission as a "Wilderness Trout Stream."

HQ = High Quality Waters. Special Protection. A surface water having quality which exceeds levels necessary to support designated uses as shown by meeting chemical or biological standards set forth in DEP regulations at Chapter 93.4b (a).

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

TSF = Trout Stocking Fishery. Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

² Chapter 93, Title 25, Pennsylvania Code of Regulations.

MF = Migratory Fishery. Passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which ascend to flowing waters to complete their life cycle.

Class A Wild Trout Water. A surface water classified by the Fish and Boat Commission based on species specific biomass standards, which supports a population of naturally produced trout of sufficient size and abundance to support a long term and rewarding sport fishery.

3.6 Wetlands

Wetlands are the transitional areas between clearly defined aquatic environments and clearly defined terrestrial environments. These areas are inundated by water at or near the surface of the land or are covered by shallow water. Wetlands can be scientifically delineated by the presence of hydric soils, hydrophytic plants, and water.

Wetlands serve many valuable functions. They provide quality wildlife habitat, filter runoff before it enters streams, and provide natural catchment basins for stormwater runoff. The natural filtration processes of wetlands have inspired communities and conservation districts to design and construct wetlands for the purposes of stormwater and sewage treatment.

Wetlands have important value in reducing water turbidity and improving water quality. They provide recreational opportunities for fishermen, hikers, hunters, and wildlife watchers. Wetlands also provide extremely important wildlife habitat. They provide water, food, and shelter for a multitude of creatures, ranging from the smallest amoeba to fish, reptiles, amphibians, furbearers, and waterfowl.

The biggest threat to wetlands today is development. Statewide statistics show that between 1956 and 1979 there was a 6 percent loss of wetlands. Forty-six percent of the loss was due to pond and lake construction, 37 percent to development, and 17 percent to agriculture. More recently, the Monroe County Conservation District has issued 142 permits for minor road crossings in wetlands in the last 10 years.

Various programs, such as the Conservation Reserve Program run by the U.S. Department of Agriculture or Ducks Unlimited's PA Habitat Stewardship Program, offer incentives to farmers and others to protect existing wetlands. Additionally, funds are available to farmers to fence off wet areas, allowing the area to revert to its natural state. Along with incentives, present regulations require anyone filling a wetland to mitigate the action by restoring or constructing replacement wetlands.

Wetland areas have been located on the National Wetland Inventory (NWI) maps by the United States Fish and Wildlife Service (USFWS). However these mapped locations are dated and are not all inclusive. Therefore the presence or absence of wetlands in the watershed should be evaluated at the site level by a qualified specialist. Hydric soils are a good indicator of additional potential wetland areas in the watershed. NWI wetlands

and hydric soils are illustrated on the *Wetlands & Floodplains* map (Figure 3.4) for the study area. There are roughly 4,743 acres of NWI wetlands in the watershed; major areas of which are located in the mid-valley section of the watershed primarily in Hamilton Township. Recent land acquisitions by the Nature Conservancy and Pocono Heritage Land Trust serve to protect a significant portion of these wetlands.

3.7 Floodplains

Although there are minimum floodplain management standards established by the Federal Emergency Management Agency (FEMA) and the PA Dept. of Community and Economic Development (DCED), the municipalities are not restricted to providing the minimum protection. In fact, they are encouraged by FEMA and DCED to adopt more restrictive measures.

Municipality	Enrolled in NFIP	Minimum Regulatory Provisions	Some Restrictive Regulatory Provisions	More Restrictive Regulatory Provisions	Considering More Restrictive Regulatory Provisions
Hamilton Twp.	X	X			
Smithfield Twp.	X		X		
Stroud Twp.	X		X		X
Delaware Water Gap Borough	X				

There are varying degrees of protection allotted to floodplains throughout the watershed (as noted in Table 3.1, previous page), which has led to uncoordinated management of floodplain corridors. Given the present atmosphere of inter-municipal cooperation, the time is right to consider the conservation of floodplain resources on a watershed basis.

3.8 Storm Water

Addressing stormwater runoff will help to reduce flooding, protect the quality of surface water, and address groundwater recharge. The Monroe County Planning Commission is currently considering the preparation of an Act 167 plan for the Cherry Creek watershed and estimates that this plan will be initiated toward the end of 2005. A model ordinance for the Brodhead watershed has recently been completed by the County and is expected to be adopted by the County in the fall of 2004. Until a detailed study of sub-watersheds and interrelated runoff calculations can be completed for the Cherry Creek watershed, which is integral to the model ordinance provisions, a zero increase in runoff matching predevelopment and post development runoff rates can be utilized so that the

basic principals of the model ordinance for the Brodhead watershed could be applied to the Cherry Creek watershed.

A municipal questionnaire sent out as part of the Act 167 Update for the nearby Brodhead and McMichael Creek watersheds showed several occurrences of small stream flooding and stream bank erosion through these watersheds during major storm events, resulting in both public and private property damages. These problems were found to be more pronounced in the more populated areas, most likely due to development encroachments onto floodplain areas, and from undersized culverts or bridges. During winter months, conditions of frozen ground coupled with high snowfall and rapid melting can also lead to flooding. Shallow bedrock can also contribute to rapid runoff.

Stormwater runoff also affects water quality. The conversion of farmland, forests, wetlands, and meadows to rooftops, roads, parking lots, and lawns creates a layer of impervious cover in the landscape. Water from storm events and melting snow runs rapidly off these surfaces, carrying pollutants to streams and aquifers, instead of slowly percolating into the soil. Research has shown that the amount of impervious cover in a subwatershed can be used to project the current and future quality of streams. In many regions of the country, as little as ten percent watershed impervious cover has been linked to stream degradation, with the degradation becoming more severe as the amount of impervious cover increases.

In residential areas, streams are contaminated by residential nutrient runoff from excessive applications of fertilizers, animal waste or malfunctioning septic systems; soil erosion, and streambank erosion. Bacteria, nutrients, sediments and erosion have been identified as water quality problems in the watershed, as a result of agricultural non-point source pollution and sediment from stream bank erosion. Habitat loss and eutrophication are other problems associated with stormwater runoff.

As indicated by the estimate of impervious cover discussed above, and the *Mean Impervious Cover* map (Figure 3.1), particular areas of stormwater concern are located both near the confluence and in the headwater area. These areas of more intense land development should be high priority for restoration and other watershed management strategies.

3.9 Water Quality & Quantity

Water quality data has been collected in the Cherry Creek watershed by the Monroe County Planning Commission and the Brodhead Watershed Association (Cherry Creek Stream Watchers). The results of County monitoring efforts are documented in the annual *Monroe County Water Quality Study*. Monroe County's annual water quality monitoring efforts began in 1985 (see: *Appendix A – Cherry Creek Stream Analysis*). The Cherry Creek is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF (High Quality Cold Water Fishery – Migratory Fishes) from its source to the SR 2006 Bridge (Cherry Valley Road) and CWF, MF (Cold Water Fishery – Migratory Fishes)

from the SR 2006 Bridge to its mouth. Stream analysis has occurred each year since 1995. EPA/County scoring schemes for repeat sites through 2003 have been tabulated and compared. An average score of 30.25 over 8 years and what appears to be an upward trend since the lowest score of 27 in 1997, is encouraging. The 2003 site is a DWGNRA boundary control point and is located over the dike at the corner of the Laird Technologies parking lot, approximately 200 yards upstream of the Route 80 Bridge. A habitat score of 199 and biological assessment score of 31 placed the testing site in the optimal category. No water chemistry samples were collected for lab analysis at the site, but conductivity was measured and elevated above expected levels.

Macroinvertebrate Analysis

Four sites on Cherry Creek were sampled on June 1, 2000. A total of 48 taxa were identified from the 100+ subsamples. The Creek differed from higher gradient, less alkaline Pocono area streams in having a good representation of burrowing mayflies present.

The study concluded that excellent water quality exists at the headwaters area station (near the hatchery); considerable decline is noted in water quality at site 2 (the church), water quality significantly improved at site 3 (near Route 191) to near that found at the headwaters area, and significantly declined at the easterly site in Delaware Water Gap. Reasons for the variations in water quality were not clear; some anthropogenic and some natural causes are suspected.

All stations have optimal water quality based on the presence of the mayfly as the dominant species. Caddis flies were well represented at all stations, and a few stoneflies, beetles and true flies made up most of the remainder of the samples. The full report is included in *Appendix B – Benthic Macroinvertebrates of Cherry Creek*.³

Citizen Volunteer Monitoring Program

The Cherry Creek Watershed Sub-Association was formed through a \$17,900 Growing Greener grant provided by the Department of Environmental Protection to the Brodhead Watershed Association. The heart of this program is a citizen volunteer stream monitoring program. Monitoring efforts began in the summer of 2001.

An initial training session for potential streamwatchers was held in the Spring of 2001. Forty-six citizens, attended the session which was led by trainers provided by the Environmental Alliance for Senior Involvement (EASI), Lackawanna County. Attendees represented all age groups from Boy Scouts/Girl Scouts to senior aged interested church and community members. Interest at the training session was very high, and monitoring of the Creek began in June, 2001. BWA received three stream monitoring chemical kits for its use through the EASI program, and data is input and recorded via the World Wide Web for this program.

³ Benthic Macroinvertebrates of Cherry Creek, Monroe County, PA, for Brodhead Watershed Association, Donald L. Baylor, Aquatic Resources Consulting, June 1, 2000.

The Cherry Creek program is an extension of the BWA effort that began in the Brodhead Watershed in 1989. In effect, streamwatchers in Cherry Creek have become the sixth team in the continuing monitoring effort.

Other components of the Growing Greener grant project included an aquatic assessment (both electro fishing and macroinvertebrate study) at four sites along the length of the creek. Educational materials and activities to bring the watershed concept to the increasing numbers of Cherry Valley residents as well as to the larger community also were funded as a part of that grant.

A total of 28 stream name signs permitting identification of Cherry Creek (and its tributaries) at significant road crossings of the creek were received and subsequently installed by municipal partners; PA Dot installed signs along state roadways at several locations, as well. As a part of the grant, this website was established, and a number of educational brochures were produced to heighten stewardship activities in the region.

In an effort to expedite the orderly and efficient process of stream monitoring on Cherry Creek, two sub-teams were formed, the East team headed by Peter Steele and the West team headed by Donna Faulstick and Nancy Veety. Both are familiar with stream monitoring techniques and processes

Nine monitoring sites on Cherry Creek are tested on a monthly basis, and the water testing kit is rotated between each of the two teams' members. Data sheets, on which the test results are recorded, are subsequently input to the web site by citizen volunteer recorder Nancy Veety.

West Team Monitoring Site Locations:

- Below Twin Lakes
- Cherry Valley Trout Hatchery
- Kemmertown Church Bridge
- Below Blakeslee Farm

East Team Monitoring Site Locations:

- Keller Farm
- Mountain Run
- Charles Grech Property Pool
- Eagle Rest Tree Farm
- Delaware Water Gap

Tests completed each month include the recording of: air and water temperature, pH, water level (low, medium or high), water color and clarity, current weather (clear, cloudy, rain, etc.), odor if present, sulfates, nitrates, phosphates, total dissolved oxygen, specific conductivity, and alkalinity. Should unusual results occur, the stream monitor communicates with team leader who then repeats the test to verify the concern. If measurements beyond safe parameters are confirmed, the Department of Environmental Protection is notified for follow-up and action.

Fecal coliform testing on Cherry Creek was completed in August, 2001, and high levels were reported at several sites. Additional testing and follow-up is in place to better determine the specific sources responsible for the elevated levels. A heavy population of geese and ducks on the stream are likely responsible for the high levels reported. The Swiftwater offices of the PA Department of Environmental Protection complete the laboratory analysis for these tests on an annual basis in Cherry Valley and throughout the Brodhead Watershed. Monitoring results are posted via the EASI Senior Environment Corps Water Monitoring Database (<http://www.environmentaleducation.org/action.lasso>). An informational summary and suggestions for linking to the databases for each location is included in *Appendix C – PaSEC Database*.

One finding of concern was an increase in nutrient concentrations in the creek. However, no thorough analysis of the available data has been completed for the Cherry Creek watershed. An assessment for Cherry Creek similar to the one done for the Pocono Creek study in the Brodhead Creek watershed would provide a valuable analysis of current conditions and trends.

Threats to the quality of water in the Cherry Creek watershed may be either “man-made” or naturally occurring. Threats to drinking water sources in the Cherry Creek watershed can be considered as Groundwater Threats or Surface Water Threats; since the two are inseparably linked in the hydrologic cycle, a problem with one will inevitably mean a problem with the other.

Groundwater Threats

Man Made Threats. Many human activities can negatively affect both groundwater quality and quantity. For many years it was generally believed that the filtering capabilities of the soil protected groundwater from contamination by human activities on the surface.

But with the discovery in the 1970's of human-made organic chemicals in groundwater, people began to realize how extensively our activities can affect groundwater. In fact, in a nationwide study commissioned by the U.S. Environmental Protection Agency, 65% of the private wells tested failed to meet at least one drinking water standard.

Those activities that can have a negative impact on groundwater can be categorized in four groups: waste disposal, resource extraction, agricultural practices, and urbanization.

Waste Disposal. The best-known source of groundwater contamination is waste disposal sites (landfills), both municipal and industrial, that were in existence before new regulations went into effect in 1988. There are no municipal landfills in the watershed.

A search of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database did not reveal any sites in the watershed. CERCLIS is sponsored by the EPA's Office of Superfund Remediation Technology Innovation, Information Management Center. The database contains information on site inspections, preliminary assessments, and remediation activities at hazardous waste sites

Septic systems are another potential source of groundwater contamination. If septic systems are improperly installed or maintained, bacteria, viruses, nitrate, phosphorus, chlorides, and the organic solvents that are found in many household cleaners as well as products sold to "clean" septic systems can all make their way into groundwater. As a result of poor construction or maintenance of their septic systems, rural homeowners are frequently the cause of contamination of their own wells. Improper management of land application of wastewater may also be a threat. Due to the generally poor soil conditions for septic systems, this is a major concern throughout most of the watershed not served by sewer.

Resource Extraction. As mines intersect aquifers and collect water, they interfere with groundwater storage and can lead to lowered water levels in wells. Stone quarries can have a negative impact on both groundwater and surface water sources. One resource extraction/stone quarry (Hanson Aggregates) operates on the western perimeter of the watershed in Hamilton Township.

Agriculture. Common agricultural practices such as fertilizing and applying pesticides are coming under increased scrutiny because groundwater samples have revealed nitrates and, in some cases, pesticides. The most prevalent problem is high levels of nitrate from over application of manure and fertilizer. Nitrate is especially harmful to babies, interfering with the blood's ability to transport oxygen, which causes the baby to suffocate (known as "blue baby" disease). Most of the agricultural practices in the watershed occur in close proximity to the stream corridor. In addition to the judicious approach with regard to the above practices, suitable riparian buffers can help protect the stream corridor from these and other impacts.

Urbanization. Many human activities and land use practices, which proliferate with urbanization, can negatively affect groundwater. Even cemeteries, for example, can contaminate groundwater. There are numerous old family cemeteries in the watershed (See: *Historic & Cultural Resources* map). Also many of the old farms in the valley buried or piled household waste in their back yards.

One effect of urbanization is recharge diversion. Soils that have been covered with impervious surfaces – roofs, parking lots, or streets – obviously cannot

absorb precipitation. Nor can soils that have been compacted by heavy machinery. As a result, much of the water from rain and snowmelt goes directly into streams and is never available to recharge groundwater. The *Mean Impervious Cover* map described earlier provides an indication of urbanization within the watershed.

Large concentrations of people can also lead to over pumping of aquifers. This can result in significant aquifer drawdown, which in turn reduces the quantity of stream flow. Stream water quality then suffers due to higher concentrations of sewage treatment plant effluent. Intensive pumping in coastal areas can cause salt water to be drawn into aquifers and wells. Polluted stream water can also be drawn into drinking water wells.

With increased population comes industrialization and an increase in the amount and variety of industrial activities, many of which can potentially contaminate groundwater. Leaking storage tanks at both industrial sites and gas stations have contaminated groundwater in many instances.

Most Storage tank locations listed in the Pennsylvania Department of Environmental Protection's web site (eMapPA) for the watershed occur in the vicinity of Delaware Water Gap and are listed as being in compliance. A Storage Tank Location is a DEP primary facility type, and its sole sub-facility on eMapPA is the storage tank itself (aboveground or underground), and are regulated under Chapter 245 pursuant to the Storage Tank and Spill Prevention Act. Storage tanks currently contain, have contained in the past, or will contain in the future, petroleum or a regulated hazardous substance.

Individual homeowners also impact groundwater through a number of activities. These include improper disposal of used oil and over application of fertilizer and pesticides on lawns and gardens. Homeowners use four to eight times the amount of fertilizer and pesticides per acre than farms. Golf courses are another potential source of groundwater contamination from overuse of fertilizer and pesticides.

Natural Contamination. Dissolved solids, calcium carbonate, and iron are common, naturally occurring constituents of groundwater that may affect its suitability for drinking water and other uses. High concentrations of chlorides and nitrates can also restrict use of water. These constituents enter water by leaching from rocks as water moves through them. Hardness is a property of water, usually measured by the concentration of calcium carbonate, which increases the amount of soap needed to produce lather. Much of the water drawn from wells in the watershed is "hard" due to the calcareous subsurface geology.

Radon, a naturally occurring radioactive gas formed from decaying uranium or radium deposits, is a natural contaminant of increasing concern. Where radon is present in bedrock it can dissolve in groundwater and become a health hazard either when consumed or when the gas escapes into the air during showering, cooking, and laundering.

Hydrogen sulfide is an infrequent natural contaminant of groundwater caused by water storage in certain types of shale rock. It imparts a characteristic rotten egg odor to the water, but is not seen as a health threat at the levels at which it makes water unpalatable.

Corrosive groundwater is common. Corrosivity involves many factors including high acidity and low concentrations of calcium carbonate. In a recent Penn State survey of groundwater in private wells, 60 percent had corrosive water. Corrosive water dissolves lead and copper from pipes and plumbing fixtures thus causing a health risk.

Surface Water Threats

Because surface waters such as rivers, streams, ponds, lakes, reservoirs and springs are by their nature more "visible," most people have more experience with this water source. Surface waters are often used for recreation, providing us with opportunities for swimming, boating, fishing, and camping. Most of us have pleasant memories and experiences related to these water habitats and view them as a wonder of nature, representing crisp, clear, clean water.

However, surface waters have a higher risk of contamination than groundwater, especially in the Cherry Creek watershed because the watershed is both a recreational area and a high growth area. This increases the human activity within the watershed and, thus, increases the chances of pollution. The largest water bodies in the watershed have either a concentration of housing or are a water feature associated with an adjacent recreational camp. Larger surface waters can be contaminated by pollution from non-point sources or point sources – usually permitted discharges from sewage treatment or industrial waste treatment plants.

Point Sources

Point sources of pollution are those sites, such as industries or sewage treatment plants, which discharge wastewater directly into a body of water. The entry point of the discharge is at one or more discrete locations in the stream and therefore its effects can be readily measured and regulated. The primary regulatory mechanism of point sources is the National Pollutant Discharge and Elimination System (NPDES), a permitting system set up by the Clean Water Act and enforced by the EPA and DEP. Most often these are permits for industrial waste, sewerage wastewater or a stormwater discharge. The permitting process attempts to minimize the impact of human activity on the surface water sources. The single point source discharge (Water Pollution Control Facility/outfall pipe) into the creek is from Laird Technologies, a manufacturer of high performance shielding for a broad range of engineered components for the electronics and building industries. The company was recently known as Instrument Specialties; the name changed after its sale in 2000 to a British company.

Non-Point Sources

Non-point source pollution are threats to surface water sources that cannot be traced to one particular discharge location. Run-off from farms, golf courses, street and highway systems, parking lots, recreational fields, leaking storage tanks or septic systems, railroad or vehicle accidents (i.e., chemical and fuel spills), are all considered "non-point source

pollution." Atmospheric deposition is also a significant non-point source of pollution. Airborne pollutants, from sources such as automobiles and coal fired power plants, fall to the ground through rain, snow, or fog, entering surface water.

Combined, these potential sources of pollution in the Cherry Creek watershed area pose the greatest threat to water quality. These threats run the full course of human activity from industrial and manufacturing centers, agriculture, residential homes and recreational uses.

In general, nutrients and pesticides from golf courses, agricultural uses and residential homes can threaten the receiving waters. Chemicals and waste products from industrial and commercial facilities, if not properly treated and disposed of, threaten surface waters; air pollution from automobiles and combustion can find its way into the hydrologic cycle; auto and truck accidents can introduce chemicals or fuels into a water source, and run-off from parking lots and streets and other roadways contains oil and grease, nutrients, sediment and road chemicals.

A contaminated aquifer can influence a surface water source when it discharges into a surface water source (e.g. when groundwater, contaminated by malfunctioning septic systems, parking lot runoff, or overuse of fertilizers or pesticides, enters a stream).

3.10 Water Supply

Private Drinking Water Systems

Everyone who lives, works, or visits the Cherry Creek watershed depends on the watershed for their drinking water supply. Water supplies can be either a private water system (an individual homeowner's well) or a public system.

A common source of drinking water in the Cherry Creek watershed is the private well. Most homeowners and small businesses in the Cherry Creek watershed depend on private wells for their drinking water supplies. Most wells are used for residential purposes, although small commercial entities also utilize wells for their drinking water source.

Unlike Public Water Systems, private systems are neither monitored nor regulated by the Department of Environmental Protection (DEP). The private individual (residential or small commercial operation) is responsible for both the quality and quantity of their private water systems.

Private drinking water systems (wells) can vary in depth from less than 100 feet to over 700 feet deep. In fact many wells in the valley bottom areas are shallow and are more often than not are artesian. These wells face the same threats to their water sources from contaminated groundwater as Public Water Systems, without the monitoring requirements of the Public Water Systems. Private systems depend on pumps, storage tanks and electrical service and, most importantly, the care of the homeowner, in order to operate. Whether affected by a drought, water contamination or a mechanical/electrical

malfunction, private drinking water system owners, for the most part, are "on their own" and are responsible for the operation and maintenance of these systems.

Public Drinking Water Systems

Public Water Systems are licensed and regulated by the Pennsylvania Department of Environmental Protection (DEP). A Public Water System provides water to the public for human consumption. The water system includes collection, treatment, and storage and distribution facilities. The system provides water for bottling or bulk hauling for human consumption.

Within this definition, the Department of Environmental Protection regulates three different categories of Public Water Systems as follows:

- **Community water system** - a water system, which serves at least 15 service connections, is used by year-round residents, or regularly serves at least 25 year-round residents.
- **Non-transient non-community water system** - a water system that regularly serves at least 25 of the same persons over 6 months per year; examples are a factory or a school.
- **Transient non-community water system** - a water system, which serves a facility, such as a restaurant, where 25 or more different people may drink the water each day.

Water systems may use "surface water" sources (streams, creeks, springs, lakes or reservoirs) and/or they may use "groundwater" sources (wells). Regardless of their size or the complexity of their treatment facilities, all are regulated by and report to DEP. Of course, these Public Water Systems are at risk from the various threats common to all water users in the Cherry Creek watershed, whether they utilize groundwater sources or surface water sources.

Community Water Systems in the Cherry Creek watershed include:

- Pennsylvania American Water Company (Blue Mountain System)
- Delaware Water Gap Borough Municipal Authority

Pennsylvania American Water Company

Pennsylvania American Water Company (PAWC), an investor owned public water system, operates the Blue Mountain System (Nazareth Service District / Stony Garden Reservoir and Plant) in the Cherry Creek watershed. PAWC is the largest landowner in Cherry Valley; they own 3,370 acres on the western end of the Valley where wells and two reservoirs are located. PAWC purchased the property in the 1970s from Blue Mountain Water Company who had owned the land since the early 1900s. In the valley, PAWC only taps four of the many springs existing on their property, and they use the water for backup only, generally during the summer months when other sources are low. They maintain a pumping station to move the water through pipes, most of which are

located on the surface, up and over the Blue Mountain ridge into Wind Gap and Nazareth.

Permits are in place to withdraw 780 million gallons of water per year from surface sources (streams, springs) and 74 million gallons per year from wells. The company maintains an entitlement with the Delaware River Basin Commission; that is, the company is exempt from making payments to DRBC for water withdrawal because it is "grandfathered", incorporated earlier than the 1961 DRBC Compact. Blue Mountain Water Company earlier owned this tract. PAWC's 2002 Annual Water Quality Report for the "Blue Mountain System" is available on their web site: (<http://www.amwater.com/awpr/paaw/media/pdf1442.pdf>).

Delaware Water Gap Borough Municipal Authority

The Borough water system is comprised of two active wells and one reserve well. The water is disinfected and stored in a 450,000 gallon storage tank and serves 285 customers. Both a certified operator as well as a certified laboratory monitor the water quality.

Wellhead Protection Areas

Because it is out of sight, groundwater is often out of mind. For many of us, we only take notice of well water if it looks, smells, or tastes funny. But groundwater can be contaminated well before any obvious signs appear. Yet it can be difficult to clearly track a groundwater pollutant to its source, especially considering the many layers of soil and rock that water seeps through to reach an aquifer. Cleaning up a contaminated well is very difficult and costly, and it may not return to potable for a relatively long time. Thus it is important to create a "safe zone" around a wellhead by protecting the surrounding land from any potentially harmful activities.

DEP's Wellhead Protection Program is predicated on the principle that it is cheaper to protect drinking water sources than to clean up after contamination occurs.

As required under the federal Safe Drinking Water Act, the Commonwealth of Pennsylvania, through the Bureau of Water Supply Management of the PADEP has developed a Wellhead Protection Program to protect ground-water sources used by public water systems from contamination that may have adverse effect on public health. Participation in the program is voluntary and builds upon the basic requirement for water purveyors to obtain the best available source and to take the appropriate actions to protect the source, thereby ensuring a continual and safe water supply (DEP, Pennsylvania Wellhead Protection Program, 2000).

The Pennsylvania Safe Drinking Water Regulations define a three-tiered wellhead protection zone. Zone 1, the innermost, ranges from 100 to 400 feet in radius, depending on source and aquifer characteristics. Zone 2 has been defined as the capture zone that is by default a half mile radius around the source, unless a rigorous hydrogeologic

delineation is performed. Zone 3 is the area beyond Zone 2 that contributes to the recharge to the aquifer within the capture zone.

The public water systems in the watershed are not involved in local Wellhead Protection Programs.

The *Pollution Vulnerability* map (Figure 3.5) illustrates the relative vulnerability of water supplies to pollution from surface or near-surface releases of contaminants. Natural protection of bedrock aquifers is provided by soil and sediment cover. Highly permeable soils (hydrologic soil groups A & B) provide little protection while less permeable soils (hydrologic soil groups C & D) provide progressively greater levels of protection. Alluvial deposits of sand and gravel serve as shallow water table aquifers in Monroe County. These deposits are highly permeable and, regardless of soil cover, are highly vulnerable to pollution.

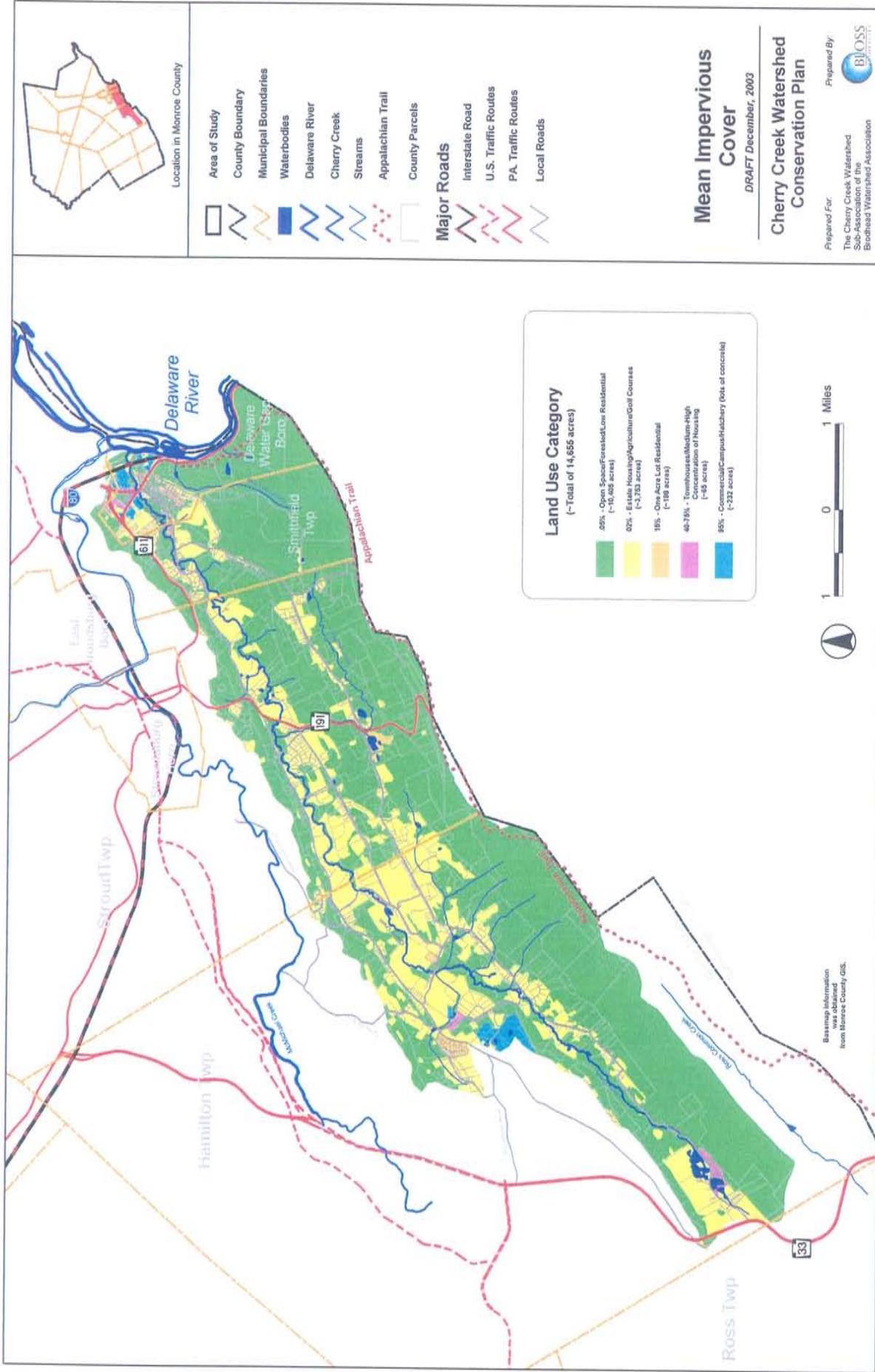
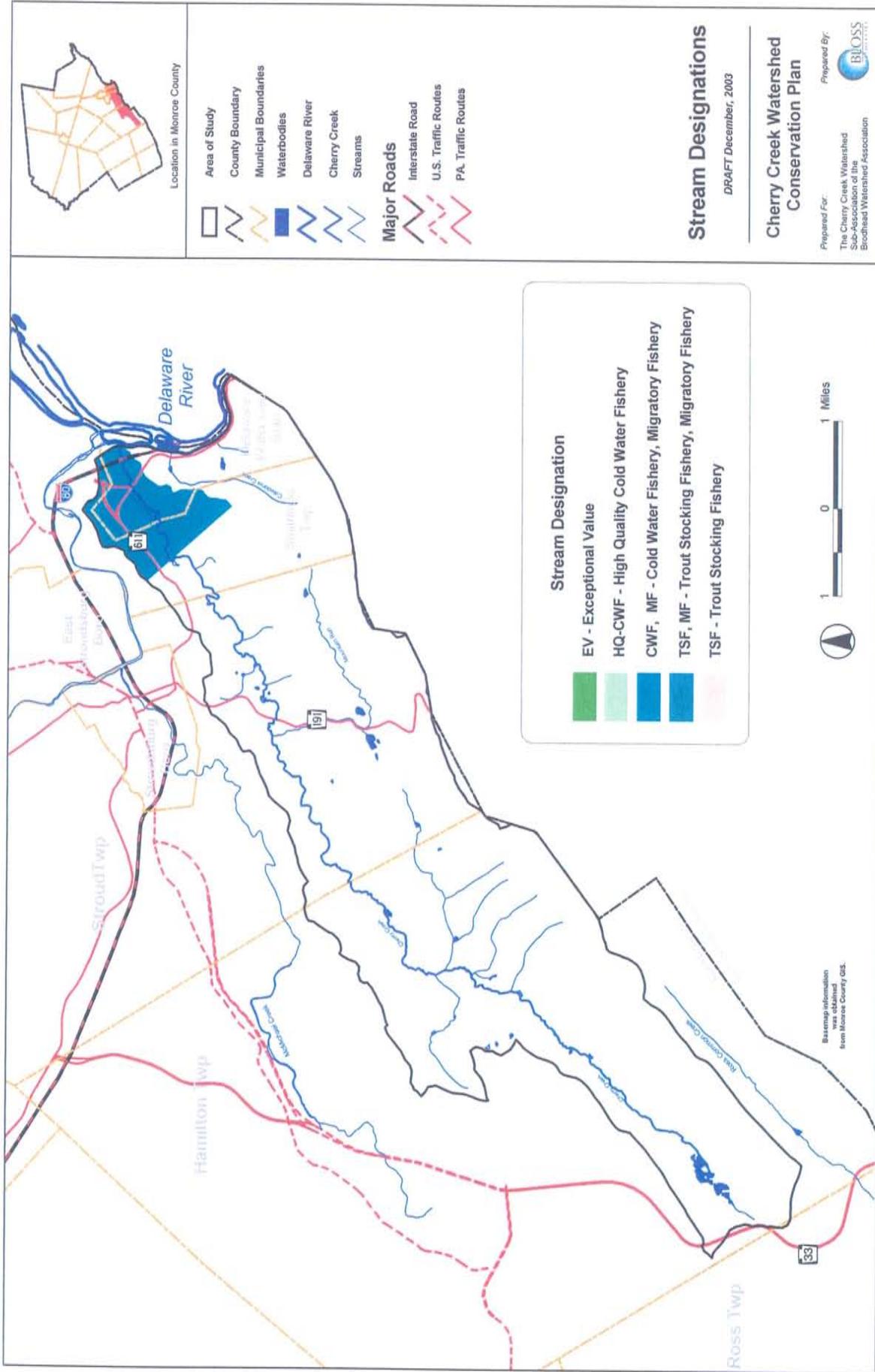


Figure 3.1



Base map information was obtained from Monroe County GIS.

Stream Designations

DRAFT December, 2003

Cherry Creek Watershed Conservation Plan

Prepared For:
The Cherry Creek Watershed
Sub-Association of the
Broomhead Watershed Association

Prepared By:



Figure 3.3

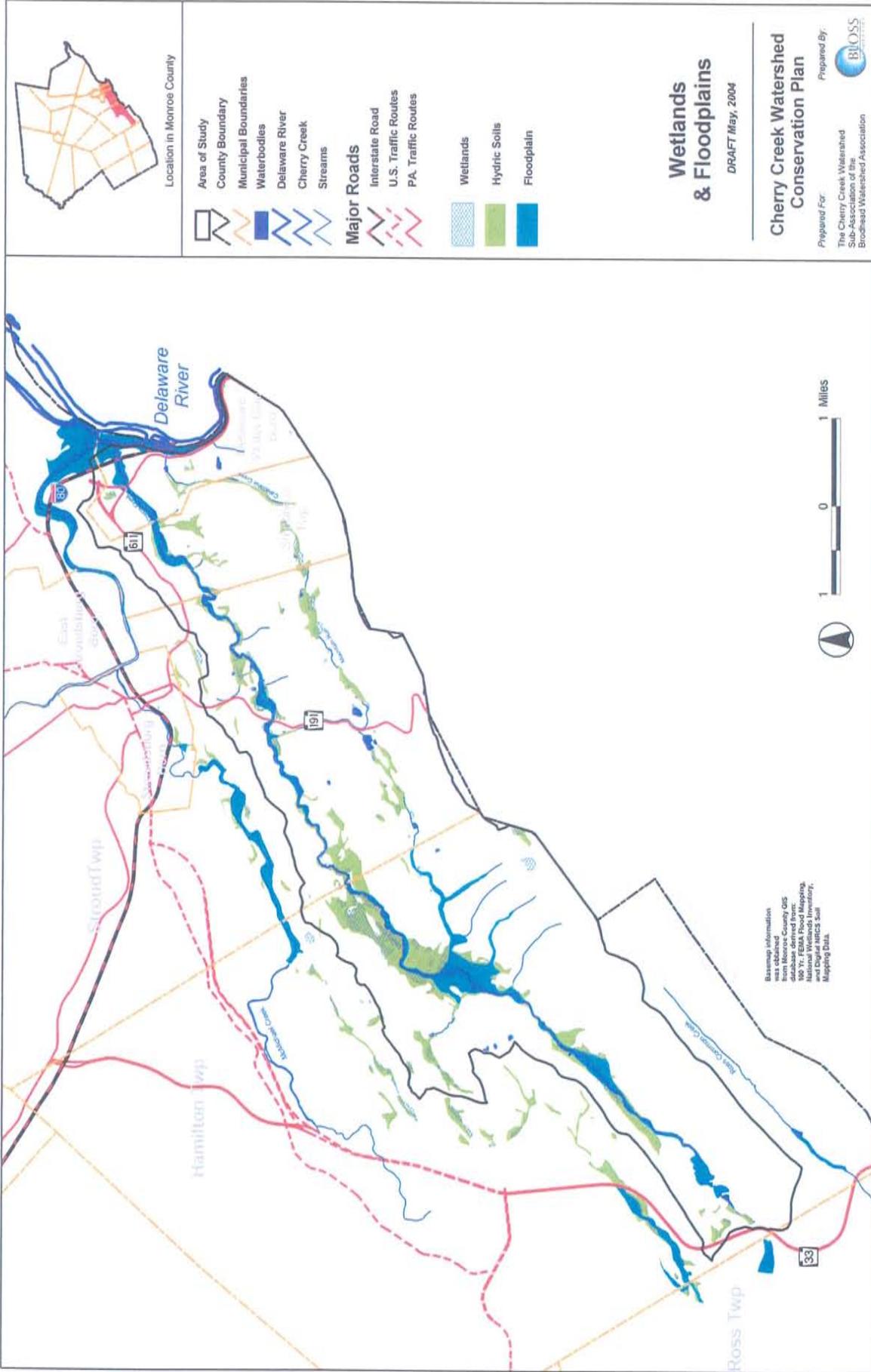


Figure 3.4

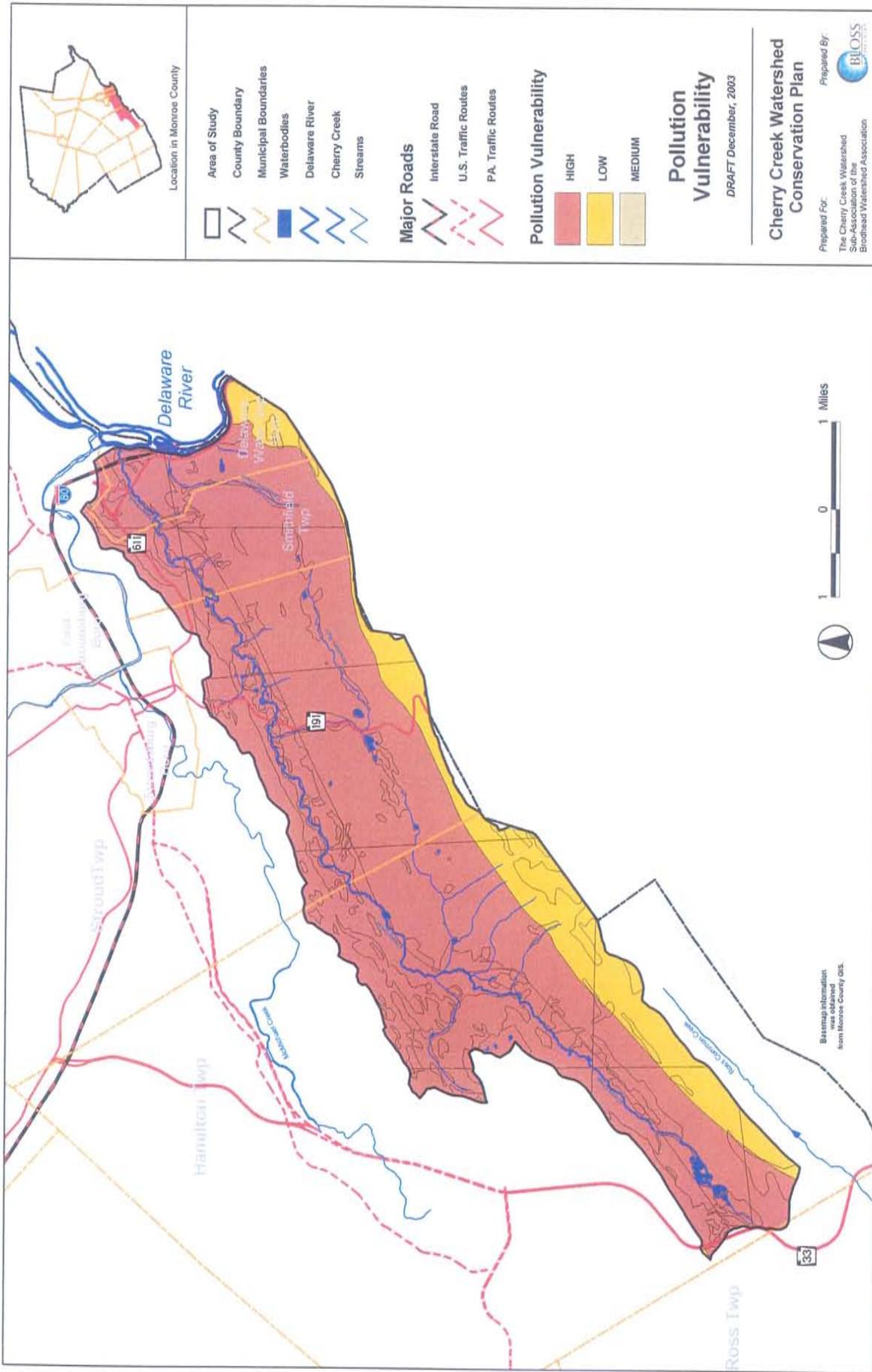


Figure 3.5

4.0 Biological Resources

4.1 Critical Land Areas

Natural Areas Inventory Sites

Important natural features of the Cherry Creek watershed were first identified in 1991 with the completion of the *Monroe County Natural Areas Inventory*. This inventory was the result of a combined effort between the Department of Community Affairs, The Nature Conservancy, and Monroe County. An update of this report was conducted in 1999 in conjunction with the development of the Monroe County Open Space Plan, adopted in June 2001.

The emphasis of the *Monroe County Natural Areas Inventory* is upon locations for species listed as rare, threatened, or endangered in Pennsylvania and exemplary natural communities. A few of these species are listed by The Nature Conservancy as globally imperiled Exemplary Natural Communities. NAI sites are shown on the map of *Sensitive Lands* (Figure 4.1). NAI sites located within the watershed include:

- Hartman's Cave
- Mansfield Seep
- Cherry Creek Valley
- Aquashicola Creek Wetland
- Cherry Creek Fen
- Appalachian Trail (including the Big and Little Offset Barrens)
- Tott's Gap
- Mount Minsi
- Delaware Water Gap
- Delaware Water Gap View
- Cliff South of Lake Lenape

Natural Treasures Registry Sites

The Monroe County Open Space "Natural Treasures Registry" (NTR) project was initiated during preparation of the County Open Space Plan to allow County citizens and other interested individuals to suggest or identify areas of special interest or unique natural features that could be considered for eventual protection. Using a *Natural Treasures Registry* referral form, individuals and organizations were asked to identify and register "lost" natural areas that may not be included in existing County or state natural areas inventories. This effort is ongoing. The whole of Cherry Valley was nominated due to its unique bucolic and scenic quality and its important contribution to biodiversity at the state and federal level of importance.

The Nature Conservancy's Conservation Plan

The Nature Conservancy is a private not-for-profit organization that works to maintain biodiversity and protect endangered species and exceptional natural areas. With funding

from the Pennsylvania Fish and Boat Commission, The Nature Conservancy has recently conducted a wetland habitat management and monitoring plan.

The Valley's many special habitats include hillside seeps, limestone fen wetlands, and a bat hibernaculum. Located along the northern side of the Kittatinny Ridge, it is part of a premier bird migration corridor in North America, especially for birds of prey. Wolf Rocks, one of the most spectacular vistas along the Appalachian Trail, overlooks the Valley.

The Nature Conservancy's work to date in Cherry Valley includes the following activities:

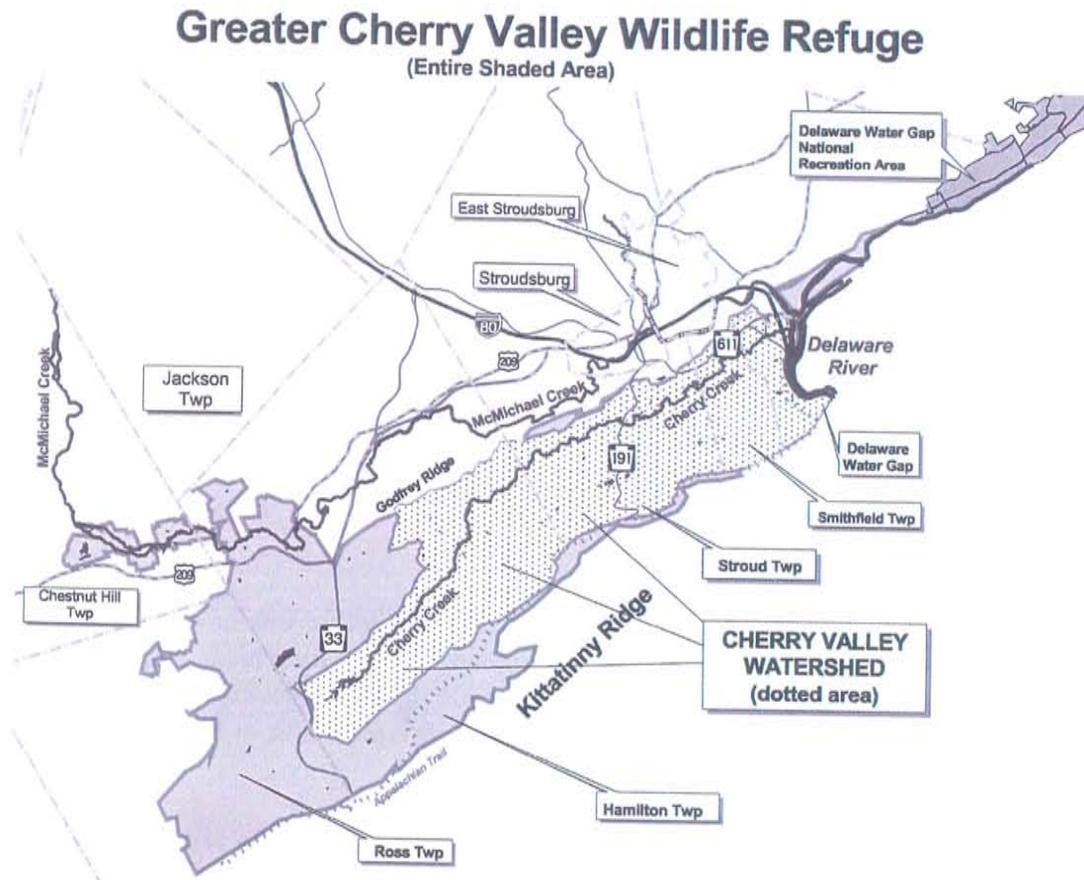
- Conducting inventories of rare plants, animals, and natural communities
- Helped the Pocono Heritage Land Trust preserve 110 acres on Lower Cherry Valley Road
- Acquired the 45-acre Domotor property (with more than a dozen springs and frontage along Cherry Creek)
- Acquired the 271-acre Blakeslee Farm (with extensive wetlands and approximately 3/4 mile frontage on both sides of Cherry Creek).
- Acquired a 165 acre conservation easement in the middle of the Valley.
- Begun removal of purple loosestrife, an invasive plant which rapidly spreads throughout wetland areas eliminating habitat for other plants and animals
- Developed a biological monitoring and management plan to guide wetland conservation, restoration, and management work
- Began wetland restoration and management at key sites throughout the Valley.
- Helped local land owners apply to the Monroe County Agricultural Preservation Program for the sale of agricultural easements
- Discussing additional conservation options with landowners throughout the Valley

Greater Cherry Valley Wildlife Refuge

Due to the unique and rich diversity of the watershed biological resources and with the support of many organizations, such as the local municipalities, the Pocono Heritage Land Trust, The Nature Conservancy, the Monroe County Agricultural Land Preservation Board and the Monroe County Conservation District, a citizen's group "Friends of Cherry Valley" is spearheading an effort to establish a National Wildlife Refuge, which would allow interested landowners to sell land or conservation easements to the U.S. Fish and Wildlife Service on a strictly voluntary basis. The boundary of this Greater Cherry Valley Wildlife Refuge identifies an area of over 33,000 acres of potential interest. The centerpiece of this is 13,000 plus acres in the Cherry Valley Watershed (see map insert below). A letter and petition campaign was initiated during the summer of 2003 in order to approach Congress for this designation. A National Wildlife Refuge will provide local landowners with one additional tool to contemplate as they consider the future of their land. And, importantly, it could bring significant financial resources to help meet the

area's conservation challenges. In addition, a National Wildlife Refuge could provide additional staff resources to help inventory, manage, and restore habitat for native plants and wildlife.

The National Wildlife Refuge System is the only national network of public lands in the world set aside specifically for the conservation of fish, wildlife, and plants. Its mission is to administer a national network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. Comprising more than 500 refuges in 50 states and five U.S. territories and encompassing 93 million acres, the Refuge System boasts more units than the National Forest System and more acres than the National Park System. National Wildlife Refuges are special places with significant natural resources where the US Fish and Wildlife Service acquires land and/or conservation easements. Each refuge has an 'Acquisition Boundary' within which the Service can acquire land from willing sellers. Land that is acquired by the Service comprises the 'Refuge Boundary'. Lands within the Refuge Boundary are managed for wildlife and habitat conservation.



Guiding Principles of the National Wildlife Refuge System

We are land stewards, guided by Aldo Leopold's teachings that land is a community of life and that love and respect for the land is an extension of ethics. We seek to reflect that land ethic in our stewardship and to instill it in others.

Wildlands and the perpetuation of diverse and abundant wildlife are essential to the quality of the American life.

We are public servants. We owe our employers, the American people, hard work, integrity, fairness, and a voice in the protection of their trust resources.

Management, ranging from preservation to active manipulation of habitats and populations, is necessary to achieve Refuge System and U.S. Fish and Wildlife Service missions.

Wildlife-dependent uses involving hunting, fishing, wildlife observation, photography, interpretation, and education, when compatible, are legitimate and appropriate uses of the Refuge System.

Partnerships with those who want to help us meet our mission are welcome and indeed essential.

Employees are our most valuable resource. They are respected and deserve an empowering, mentoring, and caring environment.

We respect the rights, beliefs, and opinions of our neighbors.

Important Bird Areas (IBA)

IBA is a bird habitat conservation project administered by the National Audubon Society. The IBA program is a global effort to identify the areas that are most important for maintaining bird populations, and focus conservation efforts at protecting these sites. IBAs are cited by the PA Department of Conservation and Natural Resources (DNCR) as important to consider during the development of a Pennsylvania Watershed Conservation Plan.

Important Bird Areas are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected.

To qualify as an IBA, sites must satisfy at least one of the following criteria. The site must support:

- Species of conservation concern (e.g. threatened and endangered species);
- Restricted-ranges species (species vulnerable because they are not widely distributed);

- Species that are vulnerable because their populations are concentrated in one general habitat type or biome; or
- Species, or groups of similar species (such as waterfowl or shorebirds), that are vulnerable because they occur at high densities due to their congregatory behavior.

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

The entire Kittatinny Ridge (#51) is considered an Important Bird Area, encompassing 280 square miles of forested ridge. This ridge forms the southern boundary of Monroe County, and is a major land feature of the Cherry Creek watershed. The Kittatinny Ridge is the premier raptor migration corridor in the northeastern United States.

4.2 Wildlife

The biologic quality of Monroe County in general and especially of the greater Cherry Valley area is recognized not only by the county itself, but also by the Commonwealth of Pennsylvania, the U.S. Environmental Protection Agency, and the Nature Conservancy. In a preliminary evaluation, 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. Biodiversity is defined by the EPA as "the variety and variability among living organisms and the ecological complexes in which they occur".

Terrestrial Wildlife

The landscape of the Cherry Creek watershed, with its forests and streams, ponds, and bogs, provides valuable habitat for wildlife. The most well-known mammal species are game animals, including black bear and white tailed deer. Squirrel, raccoon, woodchuck, skunk, and opossum are found in the more developed areas of the watershed. Common furbearers include mink, muskrat, beaver, and otter, all of which are associated with and depend upon clean water. A 1995 study of Monroe County found a total of 231 species in the county: 40 species of herpetofauna, 147 species of birds, and 44 species of mammals. Based on observations of Randy Schuler, local trapper, and bat hibernaculum investigations by James Hart the Cherry Creek watershed supports the following mammals:

Marsupials:

- Virginia Opossum (*Didelphis virginiana*)

Insectivores

- Eastern Mole (*Scalopus aquaticus*)
- Star-nosed Mole (*Condylura cristata*)

Bats

- Eastern Small-footed Myotis (*Myotis leibii*) – Threatened
- Little Brown Myotis (*Myotis lucifugus*)
- Northern Myotis (*Myotis septentrionalis*) – Rare
- Eastern Pipistrelle (*Pipistrellus subflavus*)
- Big Brown Bat (*Eptesicus fuscus*)

Lagomorphs

- Eastern Cottontail (*Sylvilagus floridanus*)
- Snowshoe Hare (*Lepus americanus*)

Rodents

- Eastern Chipmunk (*Tamias striatus*)
- Woodchuck (*Marmota monax*)
- Gray Squirrel (*Sciurus carolinensis*)
- Red Squirrel (*Tamiasciurus hudsonicus*)
- Northern Flying Squirrel (*Glaucomys sabrinus*) – Restricted
- Beaver (*Castor canadensis*)
- Common Muskrat (*Ondatra zibethicus*)
- Porcupine (*Erethizon dorsatum*)

Carnivores

- Coyote (*Canis latrans*)
- Red Fox (*Vulpes vulpes*)
- Gray Fox (*Urocyon cinereoargenteus*)
- Black Bear (*Ursus americanus*)
- Raccoon (*Procyon lotor*)
- Ermine (*Mustela erminea*)
- Long-tailed Weasel (*Mustela frenata*)
- Mink (*Mustela vison*)
- Striped Skunk (*Mephitis mephitis*)
- Northern River Otter (*Lutra canadensis*) – At Risk

Even-Toed Hoofed Mammals

- White-tailed Deer (*Odocoileus virginianus*)

Reptiles and Amphibians

A wide variety of amphibians and reptiles inhabit the woods, meadows, wetlands, and waters of the Cherry Creek watershed. Amphibians evolved from fishes about 350 million years ago to become earth's first terrestrial vertebrates and are still dependent upon clean water in one important way – for reproduction. Jelly-like eggs are laid in

water, hatch into gilled larvae or tadpoles, and later metamorphose into air-breathing amphibians. These adults are still dependent upon water for their survival – they need to maintain moist skins even in their terrestrial lives. Amphibians are often dependent upon “vernal pools” for their reproduction. Formed by spring runoff in wooded depressions, these pools lack predatory fish and turtles and provide a safe area for breeding before drying up in mid-summer. Reptiles evolved about 300 million years ago from amphibians. They are completely terrestrial in their breeding and inhabit both terrestrial and aquatic habitats. Research at selected properties in Cherry Valley by Herpetological Associates in 2002 and 2003 included five turtle species, five snake species, and 12 amphibian species which are listed below. This is by no means a comprehensive list of the Valley's reptiles and amphibians, but does represent definitive species found on specific properties in the Valley:

Turtles:

- Common Snapping Turtle (*Chelydra s. serpentina*)
- Eastern Box Turtle (*Terrapene c. carolina*)
- Eastern Painted Turtle (*Chrysemys p. picta*)
- Spotted Turtle (*Clemmys guttata*)
- Wood Turtle (*Glyptemys [Clemmys] insulpta*)

Snakes:

- Eastern Garter Snake (*Thamnophis s. sirtalis*)
- Eastern Ribbon Snake (*Thamnophis s. sauritus*)
- Eastern Milk Snake (*Lampropeltis t. triangulum*)
- Northern Brown Snake (*Storeria d. dekayi*)
- Northern Water Snake (*Nerodia s. sipedon*)

Frogs & Toads:

- American Toad (*Bufo americanus*)
- Northern Spring Peeper (*Pseudacris c. crucifer*)
- Bullfrog (*Rana catesbeiana*)
- Green Frog (*Rana clamitans*)
- Pickerel Frog (*Rana palustris*)
- Wood Frog (*Rana sylvatica*)

Salamanders:

- Red Spotted Newt (*Notophthalmus v. viridescens*)
- Northern Dusky Salamander (*Desmognathus f. fuscus*)
- Redback Salamander (*Plethodon cinereus*)
- Longtail Salamander (*Eurycea l. longicauda*)
- Northern Two-lined Salamander (*Eurycea bislineata*)
- Northern Red Salamander (*Pseudotriton r. ruber*)

The biggest problem facing reptiles and amphibians in the watershed is loss of habitat. Motor vehicles also kill a large number of amphibians and reptiles as they cross roads.

Aquatic Wildlife

The Cherry Creek watershed supports coldwater fishes throughout most of its length. A total of fifteen fish species were collected from four sampling stations in September 2000. The number of taxa declined in a downstream direction with ten species in the western two sampling sites, nine at the site just east of mid-valley and seven at the easterly sampling site located in Delaware Water Gap. Three species (wild brown trout, white sucker and American eel) were found at all four stations.

The Creek has a reproducing wild trout population along its entire length, but numbers decrease from source to mouth, likely due to a decline in habitat quality, and perhaps because of warmer water temperatures. The decrease is attributed to the lack of pools, the scarcity of boulders and cobbles to support aquatic macroinvertebrates, sand-gravel deposits that cause low-velocity flats, and the paucity of instream refuge and foraging sites for trout of all sizes.

The estimated biomass of wild brown trout in the two sampling stations nearer the source of Cherry Creek greatly exceeded the PA Fish and Boat Commission's standard for Class A trout streams (44 pounds per acre), at 312 pounds per acre near the hatchery and 154 pounds per acre several miles downstream (at the Cherry Valley Methodist Church). Wild and hatchery-bred brown, brook and rainbow trout were found together only at the sampling station near the hatchery. The full report by Aquatic Resources Consulting is included in *Appendix D - Fishery Survey of Cherry Creek*

Avian Wildlife (Birds)

Bounded on the north by Godfrey's Ridge to the south by the Kittatiny Ridge, the Cherry Creek watershed, in southern Monroe County, PA is home to a rich and varied avifauna. The geologic history of uplift and folding of the earth's crust, combined with more recent periods of glaciation and present day hydrologic forces, have created a diversity of habitats, ridge top hardwood forests, intact riparian life zones and a mosaic of wetland types that provide for birds during all stages of the annual cycle.

The Kittatiny Ridge (Blue Mountain) is the southern boundary of the Cherry Valley. Perhaps most famous for the fall migration of diurnal raptors recorded along its length from places like Hawk Mountain, the Kittatiny Ridge provides excellent nesting habitat for a variety of neotropical migrants and resident species alike. Recent surveys conducted by the Pocono Avian Research Center indicate that the Cerulean Warbler, a species showing severe population declines across much of its historic breeding range, is doing well on the Kittatiny Ridge. Scarlet Tanager, Yellow-throated Vireo and Worm-eating Warbler were also found in good numbers during breeding bird surveys along the ridge.

In the bottomland forests and wetlands associated with the main stem of Cherry Creek there are varying degrees of human land uses which are indicative of an agrarian community, along with burgeoning residential development. The Pocono Avian Research Center has conducted two years of breeding bird surveys at various locations along Cherry Creek. The results of these studies indicate that there are a good number of Neotropical migrants, and resident birds using these habitats for breeding, including Wood Thrush, Veery, Ovenbird, Golden-crowned Kinglet, Acadian Flycatcher, Ruby-

throated Hummingbird and Blue-headed Vireo. Many of these birds are listed on the National Audubon Society's *Watchlist* for PA. Preliminary interpretation of the surveys showed that sites with human alterations showed greater species diversity, primarily grassland, and edge species, while the undeveloped tracts with intact riparian zones had higher densities of neotropical migrants.

The Kittatiny Ridge is world renowned for its use by fall migrating diurnal raptors. Every species of diurnal raptor found in the northeastern United States and Canada, including Northern Goshawk, Peregrine Falcon and Northern Harrier, has been recorded along the Kittatiny Ridge. Reports of Bald Eagle and Osprey are becoming much more frequent not just from the ridge top but along Cherry Creek. Evidence is also building that the Cherry Valley and Kittatiny Ridge are providing critical stop over habitat during spring and fall migration for many birds not just raptors. Owls and Nightjars are found throughout the watershed. The most common of the nocturnal raptors is the Barred Owl, which is associated with swamps and bottomland forests. In the dryer forests and in more developed areas the Great-horned Owl and Screech Owl are found. There is some evidence that the smallest of our nocturnal raptors, the Northern Saw-whet Owl, uses the valleys of the Cherry Creek Watershed as migration corridors. The nocturnal bird of concern now is the Whip-poor-will, which seems to be disappearing from the forests of the watershed and the entire region at an alarming rate.

During the annual Christmas Bird Counts conducted by the Pocono Audubon Society the Cherry Creek watershed is one of the few places in the region to regularly report Yellow-rumped Warbler and Bluebirds. Depending on conditions, several species of northern finches such as the Evening Grosbeak, Pine Siskin, Common Redpolls and Crossbills can be found in the watershed. The heavily forested nature of the watershed makes it prime habitat for woodpeckers and several of the rarer species are found here including the Red-headed Woodpecker, the Pileated Woodpecker and the Yellow-bellied Sapsucker.

Game birds can be found throughout the watershed. Mourning Dove, Ruffed Grouse, Ring-necked Pheasant and Wild Turkey all call the fields, forests and hedgerows of the valley home. In addition shorebirds can be seen foraging throughout the emergent wetlands and on along the widely meandering banks of Cherry Creek.

Non-migratory Canada Geese, domestic ducks and geese are a growing problem within the watershed. They pollute the waters with fecal matter, damage crops, and create unsanitary environments along water edges, Starlings and House Sparrows are not the problem in the Cherry Creek watershed that they are in some other agrarian communities but they are still causing problems for other cavity nesting birds. The Brown-headed Cowbird's impact on overall bird populations in the watershed is not yet known.

Due to its unique natural history and varied habitats, the Cherry Creek watershed is home to a wonderfully diverse avifauna. The greatest threat to bird populations in the Cherry Valley is habitat manipulation as either fragmentation or outright loss. Continued research by the Audubon Society and Pocono Avian Research Center will be invaluable

in recording the changing dynamics of avian populations in the watershed and monitoring the effectiveness of resource management on a habitat scale.

4.3 Pennsylvania Natural Diversity Inventory Species

The Pennsylvania Natural Diversity Inventory (PNDI) database was established in 1982 as a joint effort of the Pennsylvania Science Office of The Nature Conservancy, the Pennsylvania Department of Environmental Resources (now the Department of Conservation and Natural Resources), and the Western Pennsylvania Conservancy. Since its development, the PNDI database has become Pennsylvania's chief storehouse of information on outstanding natural habitat types (natural communities). Its focus is on species rarity and areas of highest natural integrity in order to protect the full range of biological diversity in region. A complete listing of PNDI species obtained from the Pennsylvania Natural Heritage Program is contained in *Appendix E - PNDI List for Cherry Creek Watershed*.

The US Fish and Wildlife Service has identified 80 species and natural communities of concern in the Greater Cherry Valley Area including:

- 3 Federal Endangered Species (1 is historic)
- 3 Federal Threatened Species
- 9 PA Endangered Species
- 7 PA Threatened Species
- 3 PA Rare Species
- 2 species suspected of decline in PA
- 1 national Critically Endangered Ecosystem
- 1 national Endangered Ecosystem
- 1 national Threatened Ecosystem
- 3 PA Special Concern Natural Communities
- 3 US Fish and Wildlife Service Aquatic Species of Special Concern
- 23 US Fish and Wildlife Service Nongame Species of Management Concern
- 8 North America Wetland Conservation Act Priority Waterfowl Species
- 16 US Fish and Wildlife Service Bird Species of Regional Concern

Important Habitats

The emphasis of both the Pennsylvania Natural Diversity Inventory (PNDI) database and the *Monroe County Natural Areas Inventory* is upon locations for outstanding natural habitat types, exemplary natural communities, and rare, threatened, or endangered species. NAI sites are shown on the map of *Sensitive Land Areas* (Figure 4.1).

Cherry Valley is part of a major flyway for birds of prey along Blue Mountain (Kittatinny Ridge) including but not limited to:

- peregrine falcon (US Fish And Wildlife Service nongame species of management concern),
- red-shouldered hawk (US Fish And Wildlife Service nongame species of management concern),
- northern harrier (US Fish And Wildlife Service nongame species of management concern),
- American kestrel (US Fish And Wildlife Service species of regional concern)

Kittatinny Ridge migration corridor is considered a National Endangered Ecosystem and “Riparian Forest” as found in the watershed is considered a National Threatened Ecosystem.

The Cherry Creek watershed also provides habitat for numerous other bird species including:

- 23 US Fish and Wildlife Service Nongame Species of Management Concern
- 8 North American Wetland Conservation Act Priority Waterfowl Species
- 16 US Fish and Wildlife Service Bird Species of Regional Concern;

...and many other local species of mammals, reptiles, amphibians, and insects.

4.4 Vegetation

The Valley's many special habitats include hillside seeps, limestone fen wetlands, and a bat hibernaculum. Located along the northern side of the Kittatinny Ridge, it is part of a premier bird migration corridor in North America, especially for birds of prey. Wolf Rocks, one of the most spectacular vistas along the Appalachian Trail, overlooks the Valley

Land Cover

The entire watershed is heavily forested, and agricultural use is limited to the drier sections of the floodplain extending back to the base of the mountains, mostly in the upper and mid-valley region.

Wetland/Aquatic Community

Cherry Valley was formed as a result of glaciers, glacial lakes and lake bottom sediment. Some have said that the mud in the valley is as much as 80 feet deep in some spots. The resultant numerous, high-yield springs throughout the valley help create and maintain a unique system of wetlands. Limestone rock provides a high pH parent material that produces soils supporting a diversity of special plants and natural communities.

According to the Nature Conservancy, at least ten rare plant species exist in the Valley including:

- *Carex bebbii*, Bebb's sedge
- *Carex flava*, yellow sedge
- *Conioselinum chinense*, hemlock-parsley
- *Epilobium strictum*, downy willow-herb
- *Eriophorum viridicarinatum*, thin leaved cotton-grass
- *Lobelia kalmii*, brook lobelia
- *Parnassia glauca*, grass-of-Parnassus
- *Ranunculus trichophyllus*, water-crowfoot
- *Troillius laxus*. Spreading globeflower
- And, the Hillside graminoid fen plant community

The Nature Conservancy began taking an interest in the valley in 1999, and they have had scientists complete an on-the-ground inventory of rare plants and animals found here. One of the rare species uncovered is the small aquatic buttercup that occurs in Cherry Creek. The buttercup looks like seaweed in the water and prefers clean streams in limestone valleys. Another plant on the Pennsylvania list of rare species found here is grass-of-Parnassus as well as many others, more fully described below. Limestone wetlands or fens also are present in Cherry Valley, as well.

Invasive Species

Exotic plants are a serious threat to the watershed. These species grow aggressively, spread, and displace native plants that have more value as forage and habitat for indigenous animal species. In addition, invasive species can disturb or alter natural communities within an ecosystem, often upsetting the natural balances required to keep these systems functioning properly. Endangered, rare, and threatened native species are especially at risk.

Invasive plants are generally undesirable because they are difficult to control. Most invasive plants arrived from other continents and as such are often referred to as "exotic," "alien," "introduced," or "non-native." Invasive plants are noted for their ability to grow and spread aggressively. They can be trees, shrubs, vines, grasses, or flowers. Invasive plants have the ability to reproduce rapidly by roots, seeds, shoots, or by a combination of all three. They also have the ability to adapt to a diverse range of growing conditions and once established, exploit or colonize these areas. Second to habitat loss from development, invasive plants are the next major factor contributing to the decline of native plants in the watershed.

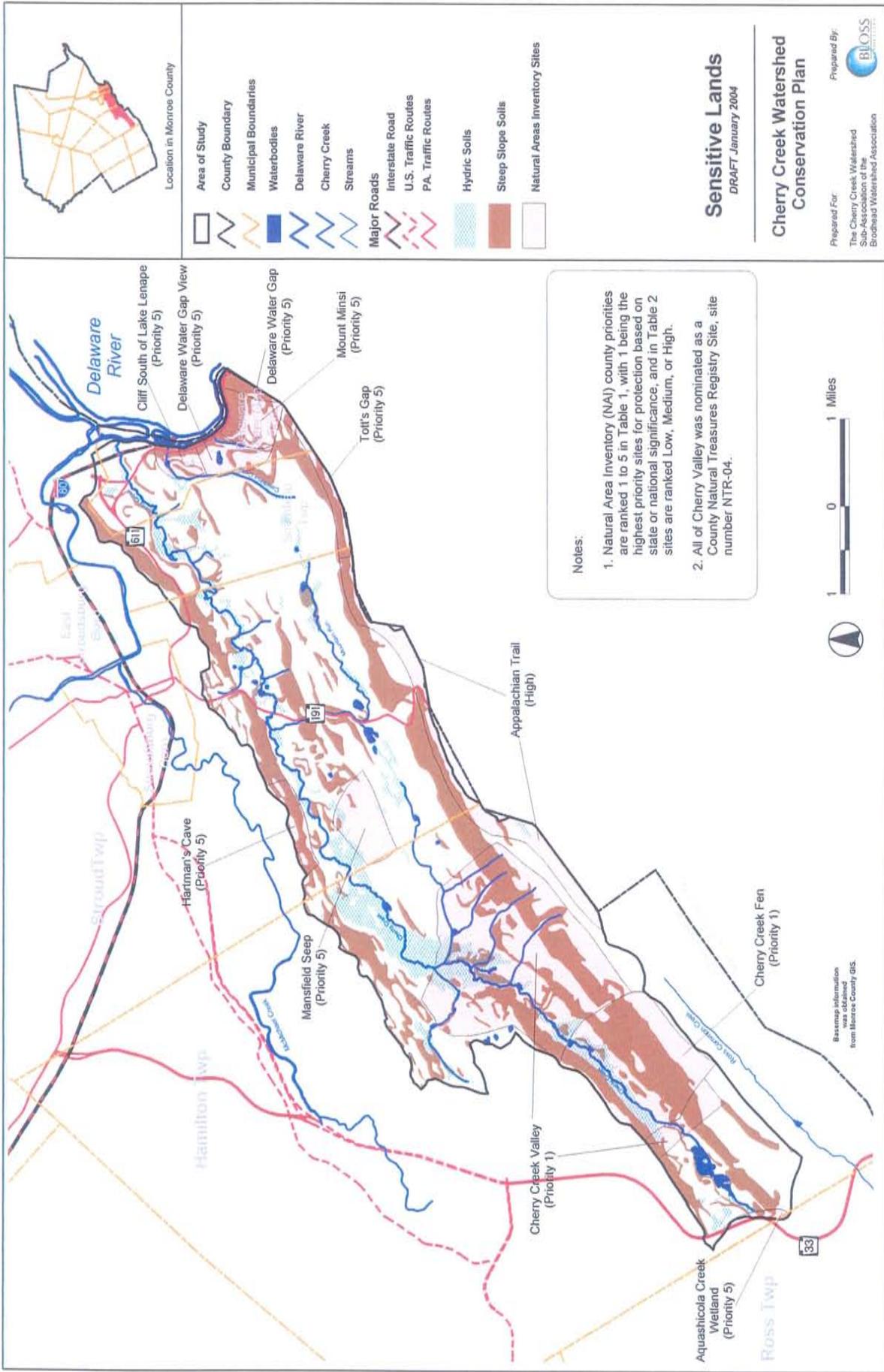
Recognition of invasive plants, understanding the potential damage they can cause, managed control, and most importantly, avoiding the use of them in plantings, is essential to stopping their spread and protecting native vegetation.

The following species have been documented by DCNR Bureau of Forestry as serious threats in Northeastern Pennsylvania and are present in the Cherry Creek watershed:

Amur Honeysuckle	<i>Lonicera maackii</i>	Shrub - seeds spread by birds
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub - seeds spread by birds
Bull Thistle	<i>Cirsium vulgare</i>	Noxious Weed – seed in open fields
Canada Thistle	<i>Cirsium arvense</i>	Noxious Weed – seed in open fields
Garlic Mustard	<i>Alliaria petiolata</i>	Noxious Weed – seed in woodland understory
Jap. Honeysuckle	<i>Lonicera japonica</i>	Vine – seed spread by birds
Jap. Stilt Grass		
Multiflora Rose	<i>Rosa multiflora</i>	Shrub – seed spread by birds
Norway Maple	<i>Acer platanoides</i>	Tree – straight species spread by seed
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Vine – spread by seed
Purple Loosestrife	<i>Lythrum salicaria</i>	Wetland Flower - root or seed in waterways
Reed Grass	<i>Phragmites australis</i>	Wetland grass - forms huge colonies
Reed Canary Grass		
Tatarian honeysuckle	<i>Lonicera tatarica</i>	Vine- seed spread by birds
Tree of Heaven	<i>Ailanthus altissima</i>	Tree – spread by seed
Jap. Knotweed	<i>Polygonum cuspidatum</i>	Noxious Weed - dense stands in wet areas

There is a native strain of *Phragmites* which appears to not be a threat to native plant communities. The foreign strain is, however, one of the most significant invasive plant threats. Several *Phragmites* patches in the valley appear to not be exhibiting invasive behaviors and may be native strains. These patches shall be monitored.

The Nature Conservancy has been working with volunteers to remove Purple Loosestrife at critical areas in Cherry Valley. To date these efforts have been rather effective at significantly reducing Purple Loosestrife and encouraging native vegetation. Future efforts will examine other invasives at key sites including *Phragmites australis*, Reed Canary Grass, and Japanese Stilt Grass



Sensitive Lands
DRAFT January 2004

Cherry Creek Watershed Conservation Plan

Prepared For:
The Cherry Creek Watershed Sub-Association of the Broadhead Watershed Association

Prepared By:
BLOSS CONSULTANTS

Figure 4.1

5.0 Cultural Resources

The great scenic and environmental value of Monroe County and in particular the Cherry Valley has not gone unnoticed at the national scale. As early as 1923, Monroe County was recommended as part of a large natural reserve by the landscape architect Warren Manning in his *National Plan for the United States*. Manning anticipated the growth of the industrial east and selected Monroe County as having qualities that should be protected as a focus for outdoor recreation.

The Cherry Creek Watershed is part of the larger Delaware River Watershed which boasts one of the greatest concentrations of historical buildings, canals and landmarks in the nation.

5.1 Recreation / Open Space

See *Recreation/Open Space* map (Figure 5.1) for information on the location of federal and state owned lands, municipal facilities, and other recreation/open space areas.

State Parks, Game Lands & Forests

There are no State Parks, State Game Lands or State Forests in the Cherry Creek watershed. However, the Commonwealth of Pennsylvania owns approximately 50 acres along the Kittatinny Ridge.

County & Municipal Recreation Lands

Monroe County has received a *Growing Greener* planning grant in which municipalities, organized as a region, developed joint municipal park, recreation and open space plans. In the local planning process, the municipal parks, recreation and open space inventories were developed in detail as was appropriate for that level. At the county level, broad information about local parks is being used for planning purposes. The goal is to create a big picture of public parks and recreation as it relates to the present and projected needs of the public in order to improve and expand public parks and recreation within the County.

The following is a list of municipal parks and open space lands in the watershed:

- FSR Homestead – Hamilton Twp, 5 acres
- Open Space – Hamilton Twp, 2 acres
- Kittatinny Ridge Conservation Lands – Stroud Twp, 75 acres
- Totts Gap Trail Head – Stroud Twp, 30 acres
- Porter Farm – Stroud Twp, 48 acres

Greenways, Trails, and Public Access Linkages

There are tremendous opportunities to establish and protect an interconnected network of green space and trails in the Cherry Creek watershed. Advocates for open space preservation are commonly referring to such a network as “green infrastructure”, which has been defined as “an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations.” [Benedict, M. and E. McMahon, 2002. “Green Infrastructure: Smart Conservation for the 21st Century.” Sprawl Watch Clearinghouse. Washington, D.C.]

Preserving corridors of green space along stream and ridgelines will be key to avoiding fragmenting wildlife and fisheries habitat in the watershed. Establishing a protected green infrastructure network in the Cherry Valley could also have benefits for people; as some open space corridors could have trails, which would provide places for walking, hiking and bicycling between community centers, which can promote alternative forms of transportation and provide health benefits close to home.

This greenway and trail network would be established over the next 10 to 20 years. The network would be a combination of lands in public and private ownership. Some important open space areas in the watershed are protected through existing federal, state and municipal parks. Some pieces of the trail network are in place today such as the Appalachian Trail. The following sections of the report list

- Existing trails, bicycling, and scenic driving routes,
- Proposed greenway and trail corridors, and
- Connections with other regionally significant park, open space and trail resources.

See: *Greenways and Trails - Vision Plan* map (Figure 5.2) for how a green infrastructure system can function in the watershed.

Existing Trails & Public Access

The Appalachian Trail (AT) is the major existing trail in the Cherry Creek watershed, which runs along the entire southeastern border of the watershed and intersects with each of the federally owned lands referenced above. Congress recognized the AT in 2000 as one of sixteen National Millennium Trails. Millennium Trails received a White House Millennium Council logo, have a map and description in the National Trails website (<http://www.millenniumtrails.org>) and were honored in a national event on National Trails Day 2000, and benefit from increased recognition through enhanced media visibility and special partnership and funding opportunities. In addition to the access noted above near Lake Lenape there is an additional trail head access within the watershed located at the top of the Kittatinny Ridge at its intersection with Route 191.

Trails in the study area and within the Delaware Water Gap National Recreation Area include:

- **Appalachian Trail (AT) South in Pennsylvania (white blaze)**
This trail can be started at Lake Lenape parking area off Mountain Road in the town of Delaware Water Gap. The trail climbs 1-1/2 miles and 1,060 ft. to the top of Mt. Minsi. There is also a trail head access at the top of the Kittatinny Ridge where the trail crosses Route 191.
- **Table Rock Spur**
This 1/4-mile spur branches off the right of the AT southbound (Hike 1 above), 1/3-mile past Lake Lenape, to a view of Kittatinny Ridge.
- **Mt. Minsi Fire Road (No bikes or vehicles)**
This dirt road begins at Lake Lenape parking area and climbs 1-1/2 miles and 1,060 ft. to the top of Mt. Minsi. Combined with the AT (Hike 1 above) the road forms a 4-mile loop on Mt. Minsi. Smaller unused roadways lead to and around Lake Latini.
- **Spur to the Appalachian Trail**
This 1/4-mile blue-blazed trail begins across Route 611 from Resort Point parking area, and climbs alongside a stream that once ran through the basement of Kittatinny Hotel. (Look in the parking area for the base of the hotel's fountain.) At the top of the trail, turn left for views of the Gap along the AT southbound, or turn right to Lake Lenape and the AT northbound

[From: <http://www.nps.gov/dewa/Activities/Hikes/hikeWGAP.html>]

Existing Bicycle and Scenic Driving Routes

Due to its scenic quality and relatively low traffic volume roads, Cherry Valley is a popular bike touring area for long distance riders. In addition, the Stroudsburg YMCA hosts an annual ride from Stroudsburg Borough that returns to the Borough via two alternative routes through Cherry Valley.

Proposed Greenways

The *Monroe County Open Space Plan*, adopted by the Monroe County Commissioners in June, 2001, outlines a concept for a countywide greenway system with nine greenway "spines", or major greenway corridors. In addition, a demonstration greenway for the county was proposed in the *Greenway Project Feasibility Study*. This demonstration greenway, a three-mile section of trail called the "Godfrey Ridge Trail", is located in the most rapidly urbanizing section of the watershed. The focus on a demonstration greenway that has high visibility and is part of a larger greenway system is a critical first step to the realization of a greenway system throughout the county and the watershed.

This Cherry Creek watershed plan incorporates by reference the goals and recommendations as put forth by the *Monroe County Open Space Plan* relating to the development of greenways in the watershed. The County Open Space Plan proposes the following greenway and trail projects in the watershed:

- **Godfrey Ridge Trail**
The Godfrey Ridge Trail is part of the larger *Brodhead Greenway & Trail System*. The preferred route for this trail follows the route of the old trolley line that used to connect Delaware Water Gap Borough to Stroudsburg. It would also provide linkage to the proposed *Liberty to Water Gap Trail* planned to link to the Statue of Liberty in Jersey City, New Jersey.
- **Brodhead, McMichael, and Pocono Creeks Greenways Plan**
This plan highlights opportunities for a connecting trail from the McMichael Creek corridor over and along Godfrey Ridge and into Cherry Valley.
- **Cherry Valley-Godfrey Ridge Trail**
This conceptual greenway corridor follows two parallel linear features, as its name implies. The ridge intersects with the proposed Godfrey Ridge Trail as described in the *Monroe Greenway Feasibility Project Study* near its serpentine descent into the Borough of Delaware Water Gap. Cherry Creek meets the Delaware River just north of the historic Delaware Water Gap Train Station. From these points, the corridor runs southeasterly through Cherry Valley, the smallest discrete watershed in the County. Cherry Valley is a limestone valley with a unique ecosystem, highly acclaimed for its visual quality. The other parallel ridge forming this valley is the Kittatinny Mountain with the Appalachian Trail traversing its top. The county roads that travel through this valley are a favorite with long-distance bicyclists. From Delaware Water Gap, approximately 3.5 miles, Route 191 bisects the valley, connecting Stroudsburg with Bangor in Northampton County. Traveling another 2.5 miles through the valley, there is the small hamlet of Stormsville, a farming community that once boasted a stagecoach stop, a farrier, a saddlemaker, a general store, a butcher shop, and a grange hall. The ridge through this section contains the Stroudsmoor Country Inn, and the Living History Farm of "Quiet Valley." The ridge has historically provided a pathway for hikers, equestrians, and more recently, mountain bikers. Another 2.0 miles away is the hamlet of Bossardsville, a crossroads where one can head west to the small community of Hamilton Square and Sciota Village. The ridge ends near Hamilton Square. Traveling southwesterly for another 3.5 miles, the valley ends near the Cherry Valley Vineyards and is bisected by the limited access highway Route 33. The valley still contains many small farms throughout its length. Total approximate length is eight (8) miles.
[From: <http://www.monroe2020.org>]

Regional Linkages

- **Middle Delaware River National Scenic River**
Thirty five miles of the Delaware River were added to the National Wild and Scenic Rivers System in 1978. The designated segment runs from the point where the river crosses the northern boundary of the Delaware Water Gap National Recreation Area to the point where the river crosses the southern boundary. This segment of the Delaware flows through the Delaware Water Gap National Recreation Area and cuts an "S" curve through Kittatinny Ridge. This beautiful landscape provides great recreational opportunities in addition to sightseeing and geological study value.
[From: <http://www.nps.gov/rivers/wsr-delaware-middle.html>]
- **Appalachian Trail**
The Appalachian National Scenic Trail is a 2,167-mile footpath along the ridge crests and across the major valleys of the Appalachian Mountains from Mt. Katahdin in Maine to Springer Mountain in north Georgia. [From www.nps.gov/appa]. Approximately 12 miles of the trail follows the southern border of the watershed along the Kittatinny Ridge.
- **Paulinskill Valley Trail**
Just east of Delaware Water Gap, the Paulinskill Valley Trail, a New Jersey State Park, stretches 27.3 miles from Sparta Junction to Columbia and runs very near the Monroe County border and future rail-trail development intending to connect to the Delaware Water Gap.
- **DWGNRA/McDade Trail**
The McDade Recreational Trail is a planned recreational trail which, when completed, will extend for 40 miles on the Pennsylvania side of the Delaware Water Gap National Recreation Area. [From: <http://www.nps.gov/dewa/Activities/actBIKE.html#MRT>]

DWGNRA adopted a Park Trails Plan in 1999. The plan called for a primary trail or "spine" which paralleled the Delaware River on both the New Jersey and Pennsylvania sides of the park as high priorities. These spines would later be the frameworks for a network of trails leading to various facilities and features within the park. The primary spine for the trails on the Pennsylvania side of the park was named by Congress as the Joseph M. McDade Recreational Trail (MRT).

The MRT would provide trail access to two communities bordering DWGNRA: Shawnee-on-the-Delaware to the south and the borough of Milford to the north. For much of its length, the proposed trail parallels the Delaware River and US Route 209 on relatively flat terraces of the river valley. The first section is now open for hiking, biking, and cross-country skiing. This section of the trail runs about 5 miles from Hialeah Picnic Area

to Turn Farm trailhead parking area on River Road. This section is mostly flat, with a slight climb approaching Riverview and continuing to Turn Farm. Connection to the PennDOT Welcome Center to the McDade Trail will be provided by the proposed Shawnee Trail.

Private Recreation Areas

There are two privately owned golf courses located in the watershed. The Cherry Valley Golf 18-hole course is located in Smithfield Township and straddles both sides of the Cherry Creek. The Delaware Water Gap County Club has an 18-hole course that lies in Delaware Water Gap Borough and Smithfield Township predominantly in the Caledonia Creek subwatershed.

There are also two privately owned and operated basketball camps run seasonally (summer months). The Pocono Invitational Basketball Camp is located in Hamilton Township off Fetherman road on an approximate 25 acre parcel. The Philadelphia 76ers Camp is located in Stroud Township on Poplar Valley Road on an approximate 75 acre tract.

5.2 Historic Resources

Historical Overview and Highlights

Part of a warm and shallow sea more than half a billion years ago, the area we call the Poconos silted in and subsided again and again for millennia. Then folding, uplifting, and fresh-water erosion of the rock softened the hard edges of the Appalachians and cut out wind and water gaps. Glaciers a mile high scoured the earth, loaded with rock and debris – halting here as recently as 15,000 years ago, when modern humans were moving across the land bridge spanning the Bering Sea. Some of the continent's millions of buffalo and elk, mastodon, camels, and other large mammals had made this home.

Hunting and gathering Indians lived in the area of the confluence with the Delaware River as early as 10,000 years ago. Agriculture and more settled villages were common here by the 1500s. For white settlers, the Delaware and other rivers were public roadways. During the 1700s most of the white population lived in the Delaware River Valley, the Cherry Creek Valley and the Stroudsburg or Pleasant Valley (the Route 209 valley). In the early 1800s, people started to settle the valleys carved by the streams coming from the Pocono Plateau. In these narrow valleys with their rocky hillsides, the growing season was shorter than in the lower elevations. Sheep pasturing was a common use of the land.

One of the most notorious land scams perpetrated against the Lenni-Lenape, the first residents of the area, was the infamous Walking Purchase of 1737. Two sons of William Penn had acquired a deed signed by their father with the Lenni-Lenape which gave to

William Penn and his heirs a generally triangular piece of land in the Pocono Mountains area of eastern Pennsylvania. The boundary was defined as “as far as a man could walk in a day and half. While this meant a leisurely stroll to the Lenni-Lenape, the Penn brothers recruited the fastest walkers in the area. The Lenni-Lenape anticipated that the day-and-a-half walk through the heavy forest would cover no more than thirty-five miles. The Penn brothers recruited the three fastest men in the area, including the only one who survived the grueling pace, Edward Marshall. The Lenni-Lenape could not keep up with Marshall, who had run some sixty-five miles. When the hoax was over, the Penn brothers had gained for themselves twelve hundred square miles of prime hunting land in northeastern Pennsylvania and the undying hatred of the Lenni-Lenape. In revenge, the Lenni-Lenape killed Marshall’s pregnant wife and, in another raid, his son Peter Marshall went into hiding on the island in the Delaware that today bears his name. Marshall moved to New Jersey and lived to almost 90 years old. Marshall’s Creek in the eastern Brodhead watershed still bears his name. Other settlements in the Walking Purchase were attacked, especially in Smithfield Township and at Depuis and Brodheads in the Water Gap area.¹

Antoine Dutot founded Delaware Water Gap in 1793. He opened a hotel for travelers there, thus the beginning of the Pocono resort industry. The Gap became one of the best inland resort towns in the nation from 1870 to 1910. Most old homes in the community were boarding houses in the community's heyday, and large frame hotel buildings were in evidence all along the river. Among the most notable was Kittatinny House 1822-1931. In the early twentieth century there were over twenty hotels located in the Delaware Water Gap. Today only a few remain including the old Deerhead Inn famous as a Jazz mecca for over half a century and headquarters for the annual Celebration of the Arts Festival. However, several Bed and Breakfast establishments now operate in the Borough in remodeled vintage houses.

Cherry Valley is still one of the most scenic areas of Monroe County. According to *The Bells Ringing the Message of Progress in Monroe County*, (1915) the Cherry Creek was named after Edward or “Ned” Cherry who was one of the earliest settlers in the area, before 1738. The valley through which the stream flowed was called Cherry Valley.

Cherry Valley sits along a limestone ridge so many lime kilns operated in the area. Before the advent of commercial fertilizer, the limestone industry was important to Monroe County. Bossardsville was considered the best lime burning center. A farmer would usually build one or two lime kilns. He would quarry or buy limestone rock chunks. The chunks of limestone were burned in the summer to be ready for use on the fields in September. Some farmers kept four lime kilns burning continuously with wood or coal, although lime burned with wood was considered better. At the height of this thriving industry, over 2000 bushels of lime each day were hauled from the Williams lime kiln in Bossardsville alone. (*Landmarks of Monroe County* by William Lesh)

¹ *Delaware Diary*, by Frank Dale (Rutgers Univ. Press 1996), page 6-7 (See hand-drawn map of Walking Purchase Territory).

Supporting another industry, Cherry Valley was the source for sand for the East Stroudsburg glass factories. But land in the fertile valley has traditionally been used for farming. Dairy farms flourished and by 1880, farmers had joined together to have a cooperative creamery. In 1900, dairying was the most important farming occupation in the county.

Rail service in the area began in 1856, with the completion of the Delaware Lackawanna and Western Railroad. And the railroad, too, followed the waterways: from the southwest bank of the Brodhead to Experiment Mills (now Minisink Hills) in Smithfield Township, where it crossed to the northeast bank of the creek, the railroad followed the Brodhead Creek to the Paradise (or West Branch) as it climbed the Pocono Plateau. In 1882, the New York Susquehanna and Western Railroad through Monroe County used the Brodhead Creek Valley from Delaware Water Gap to Stroudsburg.

Between the 1980s and 2000, with the advent of new highways, population boomed in the area, increasing from under 100,000 to over 140,000. New roads, schools, housing, sewage treatment plants, industry and shopping developments have resulted, in some cases changing the character of entire townships from rural to semi-suburban and affecting the quantity and quality of streams and groundwater.

The history of any area is affected by its geography, wildlife, climate, natural resources – and, often very dramatically, by its human inhabitants. Fast-forward 100 years, and you’ll see that the history of the Cherry Creek Watershed is being shaped right now, by you. Will the valley be part of a National Wildlife Refuge?

National Register of Historic Places Sites

The National Register of Historic Places is the nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior. [From: <http://www.cr.nps.gov/nr/about.htm>]

The following is a list of sites listed on the National Register of Historic Places in the watershed, derived from Monroe County GIS data and arranged by municipality:

HAMILTON:
Bell School, 1871-72

Church of the Mountain, 1854
SMITHFIELD:
DePui Farm, ca. 1784

DELAWARE WATER GAP:
The Glenwood, 1855
Dutot School, 1870

STROUD:
Kellers Church, 1828

Historic Areas

The Monroe County Historic Legacy report identifies several historic areas in or proximate to the watershed. These are located on the map *Historic Resources* (Figure 5.3). These and other potential historic areas should be evaluated for qualification as possible historic districts or historic landscapes. The National Park Service Bulletin Number #18 provides guidelines and procedures for evaluating and nominating potential historic landscapes to recognize and preserve their historic landscape character.

These historic areas are listed below, by municipality:

STROUD:

Cherry Valley Road

HAMILTON:

Bossardsville

Stormsville

Kemmertown

Saylorsburg Village

DELAWARE WATER GAP:

Delaware Water Gap Borough

SMITHFIELD:

Minisink Hills

Historic Sites, Structures, and Locations in the Cherry Creek Watershed

Some sites have been identified, and are described below. Others remain to be researched.

- *Cherry Valley Trout Hatchery*, located in Hamilton Township, has been in operation since the mid-twentieth century.
- *Lime Kilns*, approximately five lime kilns are located in the valley and highlight the valley's early tie to farming.
- *Quiet Valley Farm* is a living history museum operated by a non-profit organization. Interpretive tours and demonstrations teach about farm life in the 1800's. An annual ice harvest demonstrates this early industry. A possible project would be to build a pond on the farm, or acquire a nearby pond to assure the demonstrations can continue. The farm is located in the

adjacent McMichael Creek watershed but an access road to the farm leads up out of the hamlet of Stormville.

- *Saylors Lake*, on Lake Creek, was one of the larger ice harvesting operations in the watershed and is just outside the headwater area of Cherry Creek in the McMichael Creek watershed. It is also the southern most glacial moraine lake or “kettle lake” in the state.
- *Village of Stormville* – This village lies in the heart of the watershed and contains a number of buildings of historic interest including: a former stagecoach stop, grange hall, tack shop, butcher shop, lime kilns, a gothic-style tobacco barn, a log cabin (first in the valley) and a general store.
- *Creekside Park at the Delaware Water Gap Train Station* – The Lackawanna Chapter of the Railway and Locomotive Historical Society is in the midst of a five-year effort to restore the historic Delaware Water Gap train station, built in 1903. Their efforts include restoration of a creek side park, located between the railroad tracks and the Brodhead Creek. This area was once a landscaped “welcoming area” for the tourists who traveled to nearby resorts by train. Plans for the area include linkages to several nearby hiking trails and the planned Pocono Mountains Welcome Center (PennDOT).

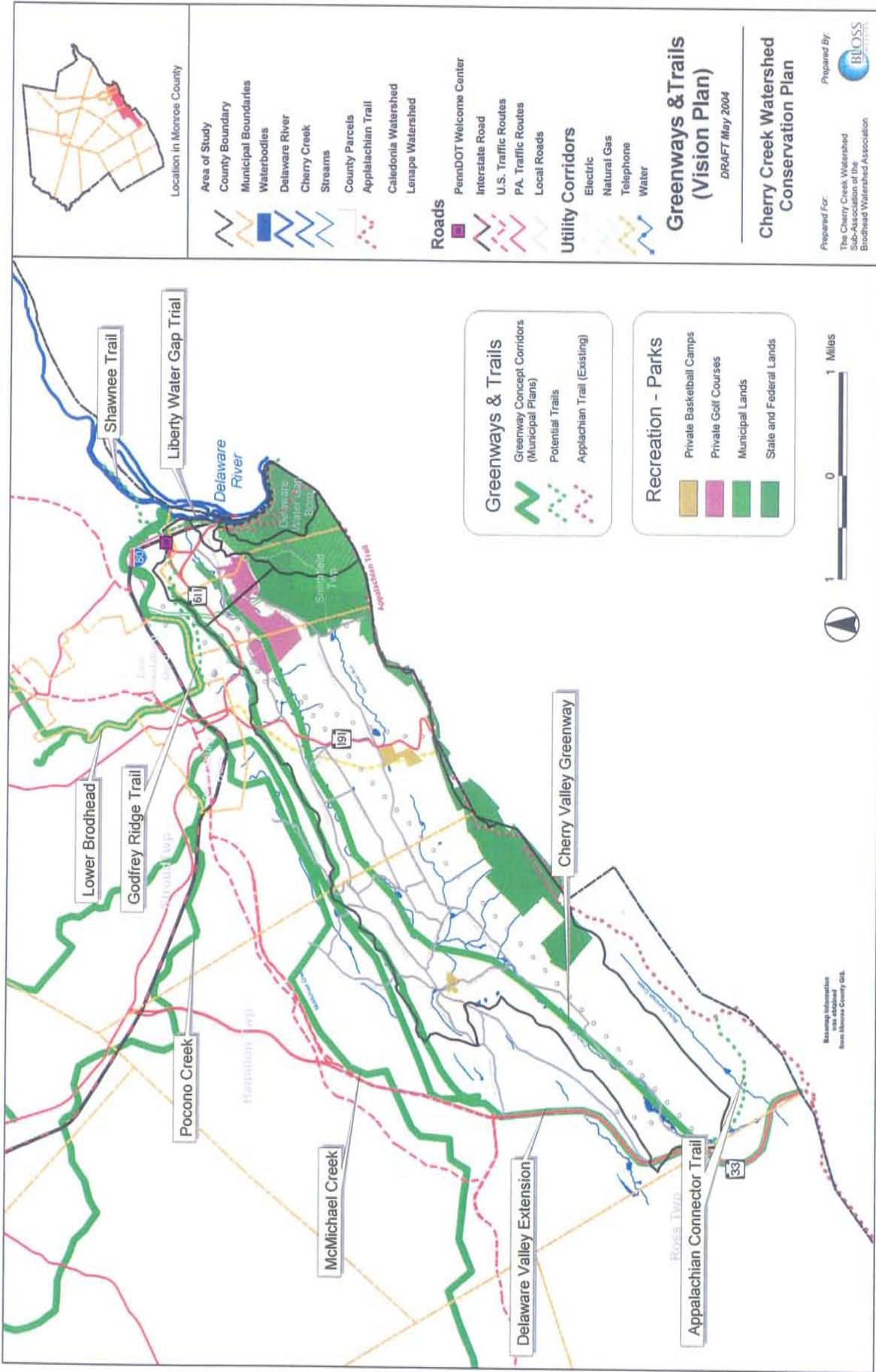


Figure 5.2

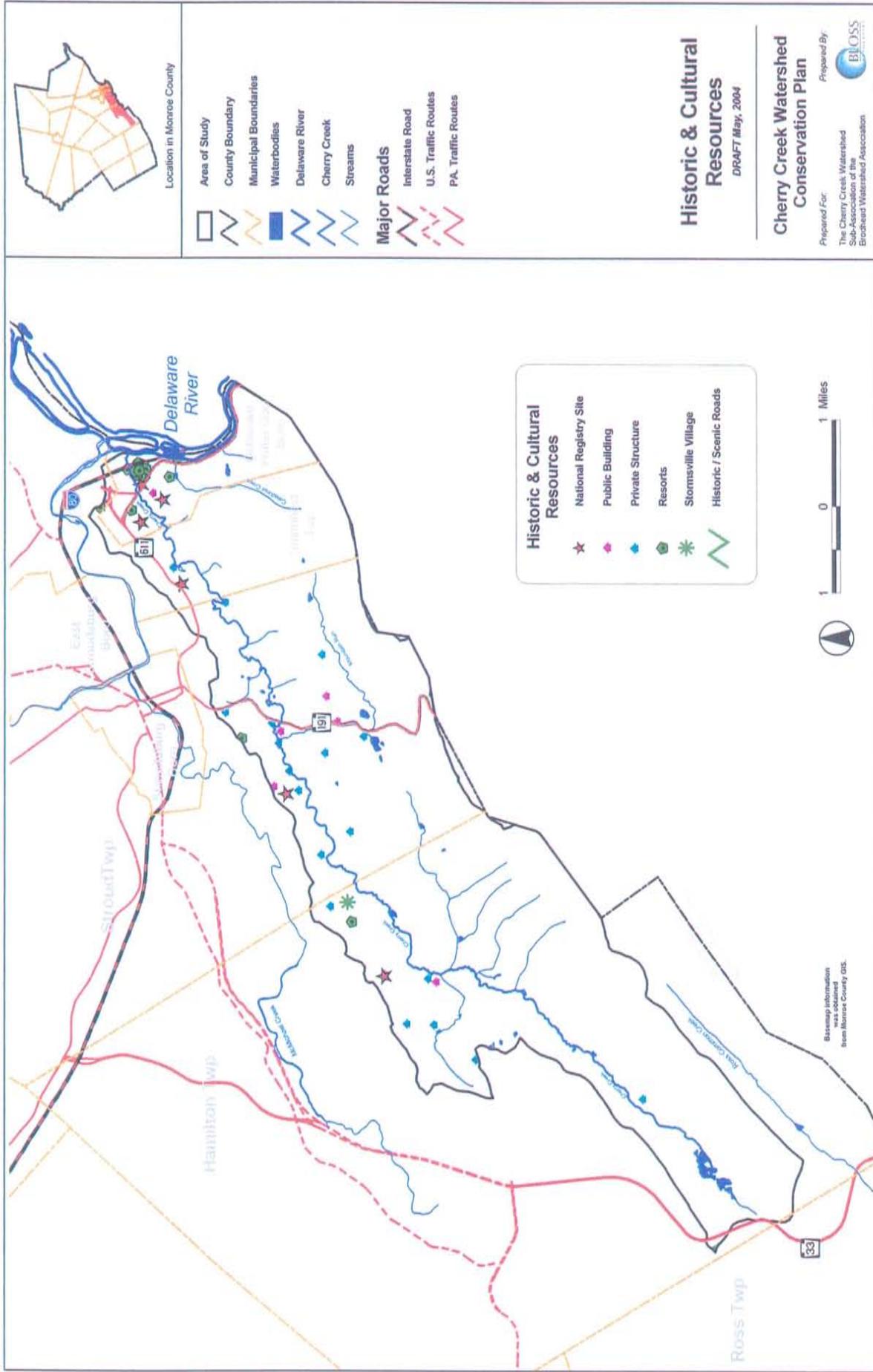


Figure 5.3

6.0 Identifying Issues, Concerns, Constraints & Opportunities

In order to identify the issues and concerns of watershed residents, several methods of gathering public input were employed. Information was collected using a variety of public involvement tools/techniques including: meeting regularly with a Study Advisory Committee (SAC), facilitating public meetings, conducting key person interviews, carrying out a citizen survey, and conducting a stream walk assessment using citizen volunteers. Also, issues were identified through an extensive review of prior studies. The recommended Actions and Management Options listed in Chapter 7, *An Action Plan for the Cherry Creek Watershed*, have been designed around these identified issues and opportunities.

6.1 Study Advisory Committee Meetings

The public involvement campaign began with a search for watershed partners who would serve as the backbone of the planning process. Many individuals, organizations, representatives and agencies were willing to participate. A group of about twenty individuals, agencies and organizations formed the advisory committee. The advisory committee included local, regional and federal watershed partners. Initially, the steering committee met about every other month to formulate an overall conservation planning strategy. Throughout the planning process the study advisory committee meetings were conducted as informal work sessions where the major directional decisions were made.

The first study committee meeting was held September 5, 2002 at the Delaware Water Gap Municipal Building. Project goals, scope of work and timeline were reviewed and potential key person interviewees were identified. A “results” brainstorming session was also conducted in which committee members described desired outcomes of this project which included the following:

Watershed Condition:

- Maintain quality of life
- Maintain historic values
- Maintain ecological condition of valley

Water Quality:

- Improved stream and water quality
- Need to find ways to respond to development in the next 20 years – address stormwater issues
- Address problem of people nuisance wildlife (geese/ducks)
- Develop a countywide sewer system

Education:

- Educate landowners and public on why Cherry Valley is special (history, geology) and the role they can play in maintaining the quality of the watershed

Coordination and Planning:

- Maintain quality of life
- Establish an institutional / organizational framework to guide future watershed activities
- Develop a foundation for a future watershed management plan (which would take a more quantitative approach such as developing a water budget)
- Need to create a dynamic plan that can be modified and updated as conditions and needs change

A second committee meeting was held on October 10, 2002 at the Christ Hamilton Lutheran Church (Covenant House Community Building) in Bossardsville and preceded the first public meeting. A draft citizen survey questionnaire and project fact sheet was reviewed, and initial key person interviews were discussed. The citizen survey questionnaire and the project fact sheet are included in *Appendix F*.

The third committee meeting was held on January 30, 2003 at the Stroud Township Municipal Center. The purpose of this meeting was to review planning process progress as several project initiatives were completed or ongoing since the last committee meeting including: the first public meeting, the stream walk assessment and the mailing of the citizen survey. Also, the recent formation of the “Friends of Cherry Valley” whose mission and vision overlap with this planning effort was noted. Copies of an updated Fact Sheet were handed out and discussed. It was decided that the fact sheet could be expanded into an 11x17 fold out to be more informative as a handout for the upcoming second public meeting to be held on March 20, 2003. The *Special Places* map developed from the first public meeting was presented and reviewed. Also the *Straight-Line Diagram of Watershed Resources* was reviewed (See: Chapter 1). Overlapping resources within watershed mile segments were noted. The *Mean Impervious Cover* map of the watershed was introduced and the project consultant explained how the methodology used to produce this map was derived from that used by the Delaware River Basin Commission planners for the Pocono Creek study.¹ Don Baylor of Aquatic Resources summarized the results of the *Cherry Creek Stream Walk Assessment* while pointing out certain areas on the *Stream Walk Results* maps. Results were also summarized by the project consultant in an associated table (included in *Appendix G – Stream Walk Assessment Matrix*). In discussing the results, Don cited the primary problems in the creek corridor as:

¹ Planner Pamela V’Combe, DRBC, presented the basic methodology to BLOSS Associates and assisted in the windshield survey. BLOSS Associates interpreted the results from the windshield survey using aerial photography for the project area and cover classes provided by DRBC.

- Silt deposition,
- Some unstable banks,
- Down trees, and
- Poor habitat because of silt deposition.

Don also noted that the worst problem area is that of the old Blakeslee Farm. The area has no banks, is full of silt, has poor habitat, and is a lot wider than normal. Don referred to the area as a possible prime rehabilitation area. If rehabilitated it may better ‘silty’ areas down stream. With regard to the Blakeslee Farm, Michael Pressman of the Nature Conservancy noted that the farmers, the Nature Conservancy, & the US Dept. of Agriculture have approved & signed a Farm Conservation Plan. The Plan will call for the installation of grass buffer zones around all waterways & roads, which may decrease stream silt deposition and that there will be a shift from corn operations to hay operations over time. Corn requires more tilling. Hay will keep the soils intact better and longer.

A draft *List of Problems, Issues, and Concerns* gathered from the first public meeting, municipal meetings, and key person’s interviews was handed out. The list was broken down into four subheadings:

- Conservation / Preservation
- Education / Awareness
- Management
- Recreation

The Education / Awareness category had the most listed items. One of the purposes of making this list was to facilitate the visioning process later in the meeting. It was noted that multi-municipal open space plans (HJP, Stroud Region, & Eastern Monroe) have identified Cherry Valley as an important conservation area. Also, the “Greater Cherry Valley’s” potential for National Wildlife Refuge status was noted. (See: *Appendix H – Greater Cherry Valley Wildlife Refuge Initiative*). The greater Cherry Valley ranks # 43 out of approximately 500 potential areas in the nation.

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The third committee meeting concluded with a brainstorming session on ideas of what the Cherry Creek Watershed area should be like in the future. David Lange, Community Planner with the Rivers and Trails Program facilitated using his “magic wall,” in grouping the ideas into categories. These topical categories were then used to help draft a Vision Statement and goals.



Magic Wall & Study Advisory Committee

The fourth committee meeting was held on February 20, 2003 at the Smithfield Township Municipal Building. The purpose of this meeting was to review results and feedback from January 20 Study Advisory Committee (Meeting #3) and revise the initial draft Vision Statement crafted by the project consultants using collected input from the committee. Another brainstorming session was facilitated to identify and develop a list of potential actions that could be done within the next three years to help achieve the goals and vision for the watershed.

The following were listed:

- The identification & preservation of historic & prehistoric sites;
- Get the Friends of Cherry Valley organized, structured, & enabled to catalyze & oversee planning implementation;
- Implementation of conservation design ordinances, conservation zoning & aggressive land acquisition programs;
- Continue farm land conservation by purchases / easements;
- Develop watershed management plan, water testing / water quality;
- Preservation of greenway corridors along Cherry Creek and the ridges;
- Continued protection & enhancement of wildlife & vegetation, also reintroduction of native species being crowded out by non-native invasive species and control/management of the latter;
- Enhance & restore riparian buffers through acquisitions / easements;
- A National Wildlife Refuge established & funded;
- Roadway improvements (especially Cherry Valley Road & Middle Road) to provide safer walking and biking, i.e. Bicycle and pedestrian “friendly” roadways. (Maybe separate bike lanes or pathways.);
- Fluvial Geomorphology Assessment;
- Protection & enhancement of Scenic Vistas, through zoning easements / acquisitions, etc.;
- Develop an out reach program to educate and encourage watershed stewardship;
- Land use ordinance changes to reduce residential / commercial development;
- Encourage & manage the appropriate use of industrial and commercial sites, e.g. mining closures done in beneficial ways;
- Clean up eyesores & potential contaminants;
- Begin in-stream habitat improvement & bank stabilization;
- Encourage preservation of open space and the development of some greenways with trails;
- Implement zoning to protect open-space & environmentally sensitive areas;
- Implement timber harvest regulations on the municipal level that manage timber harvesting to minimize visual & environmental impacts;
- Maintain scenic vistas and important viewsheds;

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Magic Wall & Study Advisory Committee

We also wanted to know what is positive about the watershed and what residents are concerned about preserving for the future. In order to protect the resources of the watershed, it is necessary to inventory what is already here that is valuable. The attendees were asked to identify “special places” in the watershed on additional basemaps spread out on tables for that purpose. There was also time after the close of the meeting for attendees to continue working on the maps. Results of the special places mapping exercise are illustrated by the *Special Places* map (Figure 6.1) and the following list:

Unique Lands:

- All of Cherry Creek Watershed
- Eagle Rest Tree Plantation, choose & cut Christmas trees (tree farm), owned by Alden & Ann Featherman
- Some underdeveloped Land- Possibly owned by the National Park Service
- The Gorge along 191/Mtn. Run
- Headwaters of Cherry Creek
- Cherry Creek as a Exceptional Value Stream
- Kettle Bog
- Collections of Flowing Springs
- Limestone Springs, on American Water Company property (a big spring)

Recreational Resources:

- The Appalachian Trail
- Totts Gap / Appalachian Trail
- Kirkridge Shelter, Retreat Center, Hang-Gliding Area

Scenic Quality:

- Cherry Valley Point
- Valley Views (Blakeslee Farm)
- Valley Views
- Views along Cherry Valley Road- long distance views
- Views from the top of the hill
- Wolf Rocks- Great View Point

Cultural Resources:

- 5 Lime Kilns
- Glacier ‘Dump’- by rocks
- Cherry Valley Winery
- Glenwood Hotel
- The Deerhead Inn- cultural & historic center
- Delaware Water Gap Golf Course (former Wolf Hollow Golf Course)
- Church in Delaware Water Gap, Mountain / Gazebo / Hostel Shelter
- Castle Inn (Fred Waring performance)
- Merwine home, good acreage on stream front (like to preserve)

- Adopt a highway litter clean-up program for local roads;
- Develop watershed-wide greenway system;
- Develop an equine / cross country trail system.

Discussion regarding the logistics and the format for the next Public Meeting #2 to be held on March 20, 2003 completed the agenda for this meeting. Using the information obtained from the outreach process to date the consultants began to draft potential goals and actions. The second Public Meeting will be held on March 20 at either Christ Hamilton Lutheran Church or the Cherry Valley United Methodist Church. It was suggested by Michael Pressman of the Nature Conservancy that information with regard to the groups and programs currently operating in the valley be somehow incorporated into the next meeting to help clear up the public's confusion on what is happening in the valley. The consultants suggested that an extra hour before the official start of the Public Meeting be devoted to an Open House for informal discussion and display of current and ongoing planning, programs, and projects focused on the Cherry Valley. The list of groups and programs currently operating in Cherry Valley is included in *Appendix I*.

The fifth committee meeting was held on May 1, 2003 at the Delaware Water Gap Town Hall. The purpose of this meeting was to review results of the March 20 Public Meeting #2, the Revised Draft Vision Statement, and Potential Actions and Craft Draft Action Plan. The remaining Study Advisory Committee meetings focused on further refinement of the Draft Action Plan and the Draft Report.

6.2 Public Meetings

Public Meeting #1

Public Meeting #1 was held on October 10, 2002 at the Christ Hamilton Lutheran Church (Covenant House Community Building) in Bossardsville. The meeting was held to help identify issues, concerns and threats to resources in the watershed (See *Appendix J – Relevant Newspaper Clippings*). This meeting also served to introduce the planning effort to the public and collect information from the public in facilitated group discussion aimed at answering three basic sets of questions:

- What are the “special places” within the watershed?
- What are the threats/possibilities for the watershed in the next ten years? and
- What should we do to maintain the watershed for the future?

Close to thirty citizens turned out for this meeting which was held immediately following the second Study Advisory Committee meeting held at the same location. Advisor Committee members helped greet members from the larger public and participated throughout the meeting as well. As attendees gathered they were asked to locate where they lived in the watershed by placing a pin on the watershed base map. There was a good distribution of representation throughout the watershed.

- Cherry Valley Grange Hall
- Old Stone House
- Old Stone House- former Schoonover Farm (Nolan)
- Bell School
- God's Sanctuary- creek side chapel
- Poplar Valley Church
- Kellers Church
- Cherry Valley Church
- Kemmertown Cemetery- historic

The meeting began with a presentation about challenges and opportunities in the Brodhead watershed. Next, attendees were asked what they thought. A group discussion focused on answering the three questions outlined above. Attendees' responses were captured. A summary list of public input identified the following issues, threats and concerns facing the Cherry Creek as a result of this first public meeting in order of the number of votes received at the end of the discussion:

- Concern about future over-development and potential impacts to water quality, scenic quality;
- Loss of farmland from development and impact from new septic systems on water quality;
- Concern about future impact on aquifer from potential increased water withdrawals by Pennsylvania American Water Company (unclear what they are permitted to withdraw and what amounts they are planning to withdraw in the future);
- Lack of scientific data about whether current groundwater quality and quantity is sufficient to support future growth;
- Lack of landowner awareness of good streamside stewardship;
- Littering and trash along highways - lack of respect;
- Concern about use of pesticides and herbicides (i.e. Atrazine spraying) on lawns and farms and impacts on quality of groundwater and headwater streams;
- Landowner concern about trespassing and liability;
- Concern that existing municipal codes are outdated or inadequate;
- Lack of awareness about the uniqueness of Cherry Creek;
- Landowners lack knowledge about sources of assistance and what to do about streambank erosion and trees falling in streams;
- Lack of integrated dynamic watershed planning;
- Concern about new housing development and resulting water quality problems from stormwater runoff and septic tanks;
- Need for landowners to have a role in future decisions about the watershed;
- Landowners lack knowledge about why trees falling in streams (some natural causes, man-made causes);

- Slow agency response to address streambank erosion problems leading to landowners doing the work themselves;
- Concern about new upstream development and the impact to water quality from what they do on the land;
- Hard to bring landowners together in large geographic area.

Public Meeting/Workshop #2

Public Meeting #2 was held on March 20, 2002. For the first hour there was a Special Open House - discussing & detailing the conservation programs and projects underway or already available for landowners in the watershed. Over 40 citizens and stakeholders attended. The meeting began with a presentation of watershed resources and issues identified to date. The presentation was then followed by a general discussion and comments on the draft vision statement.

The larger group was then divided up into four discussion groups to review draft goals and identify potential watershed actions. The following is the resulting list of draft goals:

- Goal # 1 - Preserve, protect and manage and the watershed's unique resources.
- Goal # 2 – Improve water quality throughout the watershed;
- Goal # 3 – Preserve and enhance the scenic quality of the valley;
- Goal #4 – Create a network of greenways and trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery;
- Goal # 5 – Promote and support stewardship efforts.

Public Meeting #3

Public Meeting #3 was held on June 2, 2004 to present the Draft Plan and start the 30-day citizen review process.

6.3 Stream Walk Assessment

A Stream Walk Assessment of the Cherry Creek was conducted to provide a benchmark study to help assess the overall health of the watershed and to identify potential management strategies. A description of the stream walk process and a summary results matrix can be found in *Appendix G - Stream Walk Assessment Matrix*. The spatial location of the assessment results are illustrated on the *Stream Walk Results* maps (Figures 6.2).

The major problems identified by the stream walk assessment were:

- Silt deposition,
- Some unstable banks,
- Down trees, and
- Poor habitat because of silt deposition.

The worst problem area is that of the old Blakeslee Farm. The area has no banks, is full of silt, has poor habitat, and is a lot wider than normal.

As a supplement to the stream walk assessment Gary Bloss of BLOSS Associates (project consultant) and Brian C. Nolan (landowner) kayaked the section from the bridge at the Blakeslee Farm down to the Eagle Rest Tree Farm in the early fall of 2003. Fourteen (14) deadfall trees “strainers” were encountered and noted in this approximate five (5) mile section of the creek. While normal deadfall of trees in the stream is healthy for the stream this preponderance of deadfall appears to indicate a condition more closely associated with unstable bank conditions.

6.4 Citizen Survey

In the beginning of November 2002, the Brodhead Watershed Association through its Cherry Creek Watershed Sub-Association spearheaded an effort to gather thoughts of citizens who lived in the watershed area. Approximately 950 surveys were sent out to landowners whose land is located within the Cherry Creek Watershed area. There was an outstanding response rate of 23%.

Most of the respondents were from Hamilton and Stroud Townships and have lived there for more than 30 years. Also, most live next to or less than a quarter mile away from the Cherry Creek or its tributaries. Most believe that Cherry Creek is of moderately clean quality and would wade in it occasionally. The most frequent activities engaged in, in the watershed are: enjoying nature, gardening, bird watching, and walking/running. Activities occasionally done were hiking and biking.

Current major problems cited in the watershed were:

- Loss of agricultural land and open space to development,
- Increased vehicular traffic, and

- Loss of wetlands.

Current occasional problems cited in the watershed were:

- Loss of scenic quality,
- Trash and litter / illegal dumping,
- Less groundwater (withdraws from wells),
- Threats to drinking water quality,
- Soil loss and sedimentation from new development and agricultural practices,
- Fertilizer & herbicide runoff from lawns, farms & golf courses,
- Property damage from wildlife,
- Solid waste disposal,
- Storm water runoff from parking lots & streets,
- Water contamination from failing septic tanks, animal waste from dogs, geese, farm animals, etc., and
- Frequency of flooding.

Most respondents believe it's very important to protect the streams & lakes in the watershed and to preserve farming in the community. Actions that respondents labeled as very important if money were used to improve the Cherry Creek Watershed were to:

- Encourage preservation of open space as part of new development,
- Protect environmentally sensitive areas,
- Encourage municipalities to work on more effective planning and zoning,
- Preserve more natural areas,
- Preserve scenic quality,
- Work with landowners on ways to protect water quality,
- Repair malfunctioning septic systems,
- Restore degraded streams, and
- Create a watershed wide system of greenways and trails.

A more detailed summary of the Cherry Creek Watershed Survey is included in *Appendix F*.

6.5 Key Person Interviews

Over twenty interviews were conducted in person or as phone conversations. The project was explained and the geographic extent of the watershed was described. The following interview questions were developed as a guide and starting point to help draw out relevant information from each identified individual and to determine their ideas regarding issues, opportunities, concerns and potential threats in the watershed. A list of key interviewees is included in *Appendix K*.

Interview questions:

- ✓ What specific opportunities or concerns are you aware of that might help or hinder the development of a watershed management plan?

- ✓ What special places are you aware of in the corridor (natural, historic, cultural, etc.)?
- ✓ Do you have any specific ideas for the protection of lands within the watershed? If so where?
- ✓ Are you aware of any special needs that should be addressed in the planning process?
- ✓ How do you envision the implementation of a successful watershed management plan next 3-5 years?

Opportunities / Concerns:

- Sprawl and unchecked land development,
- Impact of development especially erosion,
- Impact of development on scenic beauty,
- Forest fragmentation of interior forest for breeding, i.e. songbirds,
- Need to inform people on the rules of management of the waterway (what are the rules?),
- As a common regional resource the watershed provides a focal point for people to come together and get excited about conservation and protect something valuable to their community,
- Ecotourism opportunity,
- Effect of new development on water supply (additional private wells),
- Need for more open-space areas,
- There was a dramatic change in quality around 1958,
- Landowners abusing land carrying capacities,
- Opportunity for encouraging stewardship of the land, maintaining scenic quality, and increasing water quality of Cherry Creek,
- Clean up Lake Lenape (which appears to be affected by Eutrophication), and
- Provide trail link to the Appalachian Trail in the headwater area from in the vicinity of the Cherry Valley Vineyard.

Special Places:

- Train Station property, by DWG Bridge,
- Lime kilns,
- Cherry Valley Golf Course could be used for schools or as a County course (revenue generator),
- Old estates in the valley:

- Groner Farm
- Fellencer Farm
- Fetherman Farm,
- Church on Kemmertown Road,
- John McDowell's house was one of the 1st in the valley (currently owned by Christine family) - John McDowell, who was the 1st person to settle and live on this property in the 1700s, married a DePue daughter. The DePue's were the first non-native settlers in Monroe County (the present stone house was built in 1824 by Shaw, McDowell's son in law, on the same foundation as a previous log cabin burned down),
- Indian burial grounds,
- Hollows were named after Jacob Fetherman and his sons,
- The oldest house in the valley is toward DWG , it's a stone house once owned by Ray Roberts, and it's on Cherry Valley Road opposite the duck pond;

Land Protection:

- Add to the state game lands,
- Make a special conservancy reserve,
- Buy special lands to keeping them from development and make them available for public use,
- The Porter Farm (old goat farm) containing approximately 48 acres,
- Need to limit building especially upstream,
- Protection of agricultural lands,
- Tax relief for landowners who maintain property as open-space,
- What has been going on so far is great e.g. the Blakeslee Farm acquisition and a pending deal for the Cherry Valley fens,
- Would like to see Cherry Valley kept near to its current state, i.e. limit new development.

Special needs:

- Linkages between the special places.
 - Scenic drive through the watershed,
 - Creek side hiking trail,
 - Scenic Drive Loop,
 - Support with interpretive brochures and/or audiotape (educational, informative, historical, scenic, and accessible to all types of persons from those who are avid hikers to those who are physically challenged),

- Encouraging landowners to agree to manage their lands in a particular way,
- Scenic designation might be an important consideration,
- Many residents may not realize the threats to valley with regard to scenic degradation,
- Need management strategy for dangerous and/or felled old growth in or over Cherry Creek,
- Need open space tax relief,
- Education of land owners to avoid any potential misunderstandings about the plan and the process and to have a say in the future changes in the watershed,
- Establish credibility of people working on the conservation projects in the watershed,
- Maintain water quality.

Implementation of a successful watershed management plan:

- Formation of an organization of concerned peoples to help implement plan actions,
- Workshops for landowners and municipalities would key on what are the options or tools available for implementing the plan,
- Helping landowners take the next step toward protecting the lands;
- Helping municipalities take the first step in developing zoning or protective measures,
- Develop a broad public education and awareness campaign;
- Formation of a possible National Wildlife Refuge in the greater Cherry Valley as recently reported,
- Create an information video on a successful or non-successful watershed conservation plan,
- Develop measures of success for maintaining scenic quality, encouraging stewardship of the land, and increasing quality of Cherry Creek.

6.6 Build-out Analysis

A Build-out analysis was performed by the Monroe County Planning Commission to assist in determining the potential developmental growth facing the watershed. Using population numbers from the 2000 census and the watershed boundary overlay, a year 2000 existing population was established by municipality in the watershed. Projections to the year 2020 were then calculated based on current trends. The analysis removed some of the environmental constraints from “developable” parcels within the watershed e.g. wetlands (NWI), steep slopes to determine the available acreage open to development and in order to apply growth factors based on current zoning. A parcel was

considered developable if it is listed vacant or has no building improvements or is a potentially developable parcel such as a hotel, hunting or fishing club lands, or water company land, or a property currently using Act 319 tax incentives. If it is not developable according to these criteria then it was classified as not developable. It should be remembered that this is a subjective analysis to obtain a general indication of the potential development facing the watershed. Developable land by municipality in the watershed using these criteria resulted in the following acreages:

- Hamilton Township - 6874 acres
- Stroud Township - 4658 acres
- Smithfield Township - 1794 acres
- Delaware Water Gap Borough – 1154

Except for Delaware Water Gap Borough this analysis assumes the use of individual wells and septic systems. If public water and/or sewer were provided, the numbers would reflect a different scenario. Under the former scenario build-out would occur in the watershed between the years 2030 and 2105 (See: Table 6.1 – Summary Results - Build-Out Analysis).

**TABLE 6.1 - SUMMARY RESULTS
BUILD-OUT ANALYSIS: CHERRY CREEK WATERSHED**

Township	2000 Existing		2020 Projections			Build Out Projections					Year Build Out is Reached Based on Current Zoning
	Existing Housing Units in Watershed	Existing Population in Watershed	Projected Housing Units in Watershed	Projected Population in Watershed	Additional Potential Housing Units in Watershed	Build Out Housing Units in Watershed	Additional Potential Population in Watershed	Build Out Population in Watershed	Average Housing Units/Year (1993-2002) in Watershed		
Delaware Water Gap	345	744	385	832	156	501	336	1080	2	2078	
Hamilton	266	766	606	1600	1304	1570	3442	4208	17	2077	
Ross	0	0	0	0	2	2	6	6	0	---	
Smithfield	122	282	242	644	631	753	1677	1959	6	2105	
Stroud	235	602	995	2677	1133	1368	3049	3651	38	2030	
Watershed	968	2394	2228	5752	3225	4193	8510	10904	---	---	

This analysis is based on data collected and analyzed by the Monroe County Planning Commission in cooperation with the Cherry Valley Rivers Conservation Plan. Except for Delaware Water Gap Borough this analysis assumes the use of individual wells and septic systems. If public water and/or sewer were provided, the additional potential housing units would increase by approximately 748 units representing a population increase of approximately 2,000 while the build out date for all municipalities except Smithfield Township would remain the same.

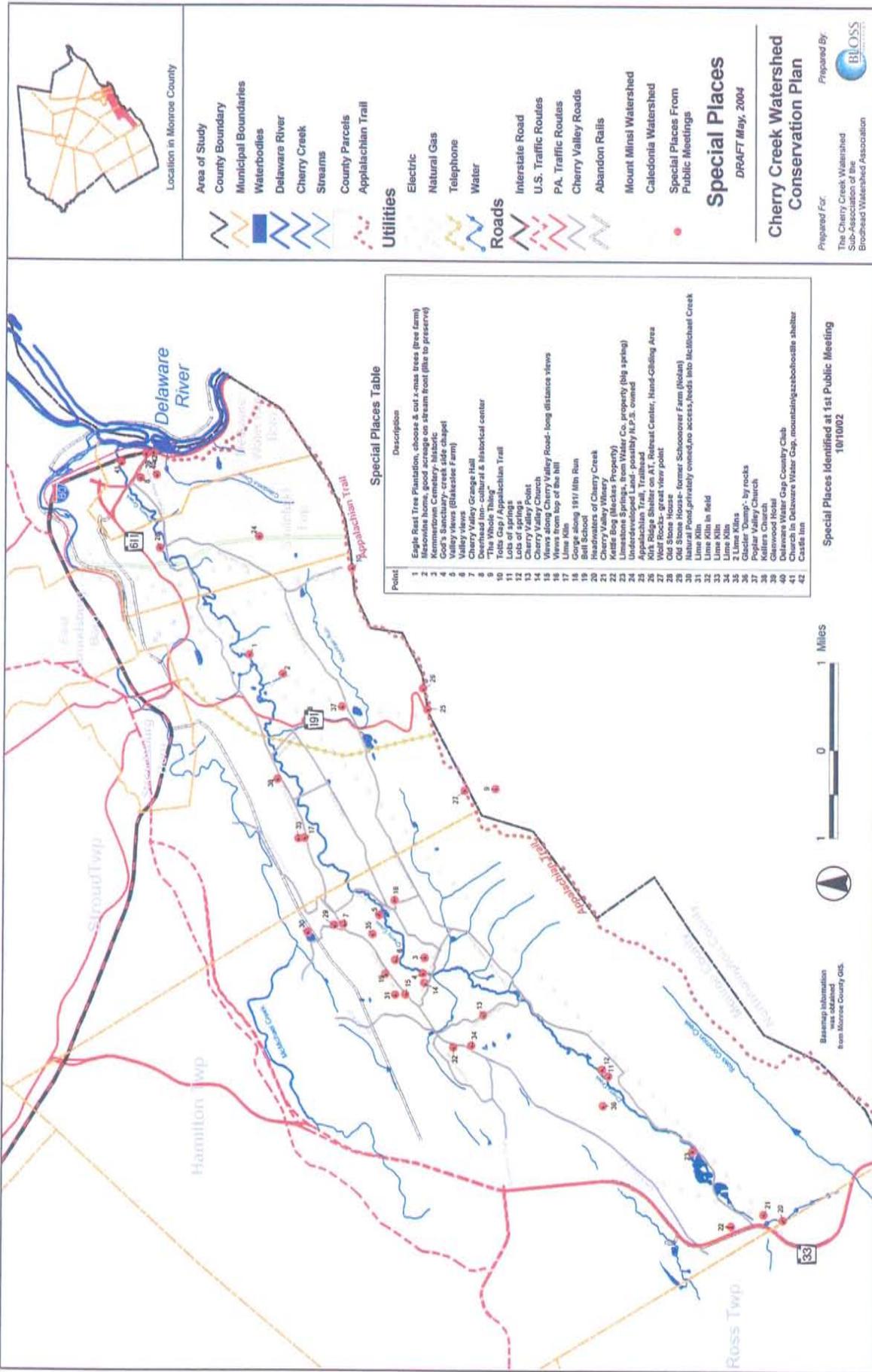


Figure 6.1

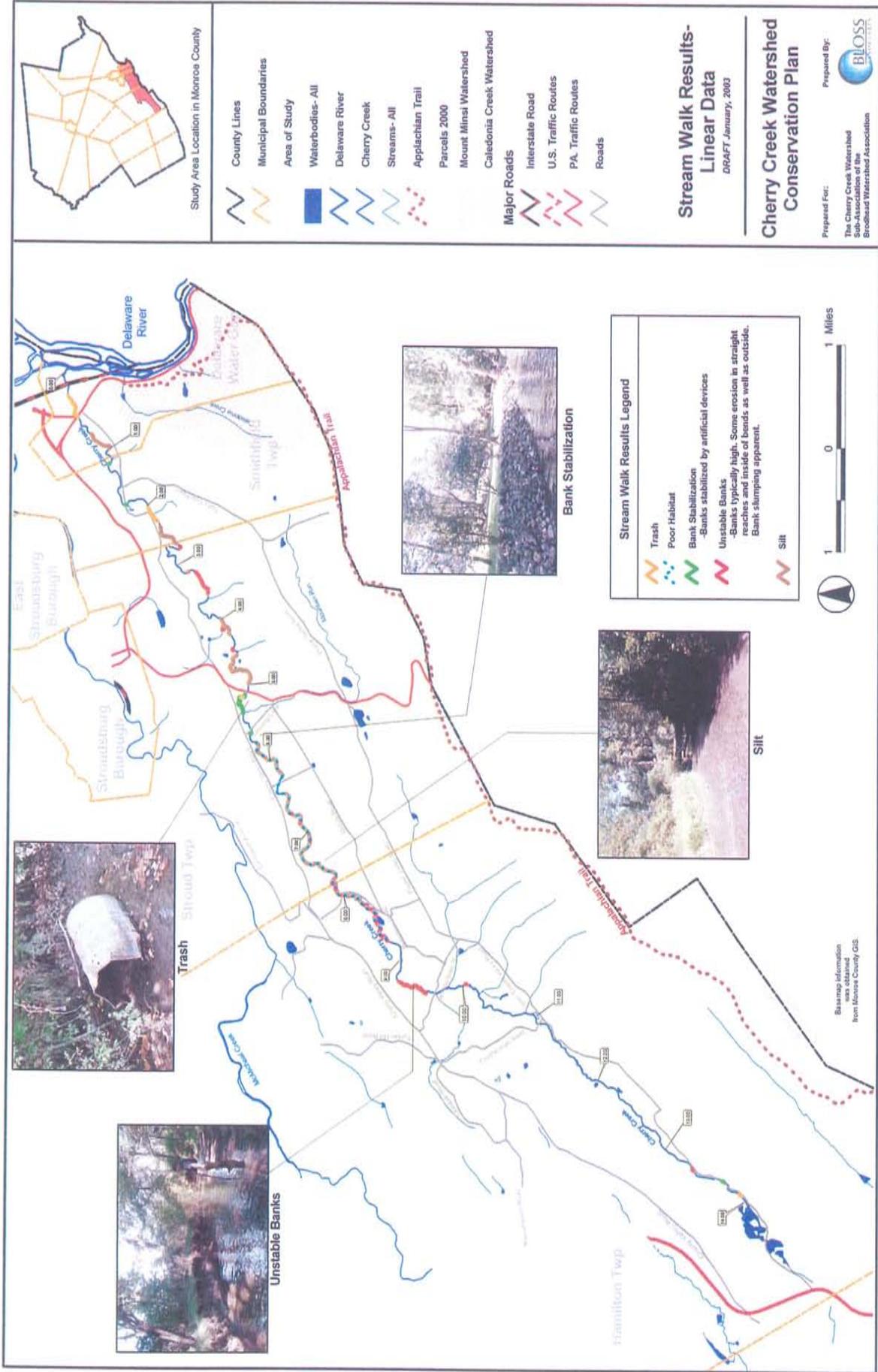


Figure 6.2b

7.0 Action Plan & Management Options

Potential actions and management options were identified throughout the course of the study and the public involvement efforts. This chapter starts with a vision statement for the Cherry Creek watershed that was developed and refined over the course of the study. It then identifies the broad goals for the watershed that were crafted from identified issues, concerns, constraints and opportunities that were originally listed under topical headings. These broad goals then serve to provide the overall “drivers” and underlying framework for a collection of potential management options and action items aimed at achieving the vision.

7.1 Vision Statement

The vision statement represents how citizens in the watershed will view the landscape in the watershed within the next 10 years. It reflects input from the public derived in preparation of the plan and what could happen if the watershed conservation plan is effectively implemented:

Ten years from now, in the year 2014, the watershed of Cherry Valley is a landscape rich in nature, scenery and history, and indicative of a community that cares about its pastoral qualities. The resources that make the watershed unique are unspoiled and provide visible evidence of the commitment of numerous conservation initiatives over generations by residents and concerned citizens who have treasured, nurtured, and respected the valley's assets. The bucolic landscapes, forests, and wetlands in the watershed are managed to facilitate long-term health and diversity of flora and fauna. The clean water of the Cherry Creek Watershed supports healthy fisheries and wildlife. The watershed also provides safe and sufficient groundwater and drinking water. A system of greenways, safe roads for bicyclists and pedestrians, and ridgeline trails provides continuous wildlife corridors and opportunities to enjoy the watershed's resources while participating in safe, enjoyable and healthful activities such as walking, hiking and bicycling. Traditional ways of life such as farming, hunting, fishing and trapping are maintained. The high quality agricultural lands have been preserved for future generations. Overall the scenic beauty, rural character and natural environment of the valley are unsurpassed in a region so close to major population centers. Many public and private partnerships have worked in positive ways to respond to the development pressures facing the valley and have created an oasis of nature in balance with its cultural community.

7.2 Goals

These goal statements describe the broad, general goals the plan is striving for:

Goal # 1 – *Preserve, protect and manage the watershed's unique resources.*

Goal # 2 – *Maintain and/or improve water quantity / quality throughout the watershed.*

Goal # 3 – *Create a network of greenways/conservation corridors and greenways with trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery.*

Goal # 4 – *Promote and support stewardship efforts.*

7.3 Management Options

Objectives that are more easily measured for a specific management activity and that would advance each driving goal were identified. Specific actions are then listed under each objective. The action items address the problems and/or enhance the opportunities associated with that objective. Potential lead agencies and a recommended timeframe are identified for each action item. The timeframe is the suggested implementation time necessary for completion of that action. Timeframes are based on the following:

- Short = One to three years;
- Medium = Three to five years; and
- Long = Five to ten years.

This plan recognizes that there will be limited financial and human resources available to execute the many recommended action items. Therefore some change in the timeframe for action implementation is expected, as well as the group(s) responsible for carrying out the recommended actions.

Early action items were identified by steering committee members, municipal officials and other stakeholders and are summarized in the Executive Summary for this report.

The objectives for each driving goal are summarized below. Tables that detail the associated action items, responsible parties, priority and timeframe follow this summary.

Goal #1 – Preserve, protect and manage the watershed's unique resources.

Objective #1: Conserve at least 50 % of priority resource lands (agricultural, forest, wetland, riparian lands, ridges, scenic areas, unique geologic features) in the watershed by 2007.

Objective #2: Make significant advances in protecting and interpreting cultural heritage and resources in the watershed.

Objective #3: Preserve and Enhance Green Infrastructure in the Watershed.

Goal #2 – Maintain and/or improve water quantity / quality throughout the watershed.

Objective #1: Maintain current baseflow and groundwater recharge in the watershed.

Objective #2: Improve quantitative measures of benthic invertebrate and fishery quality.

Objective #3: Improve, maintain, and enhance water quality by keeping the creek and its tributaries clean.

In addressing this goal it should be recognized that in general, projects in headwaters areas should be given priority whenever possible due to their sensitivity to development. In addition, repairing a problem low in a watershed without addressing problems upstream will often lead to revisiting the repaired site sometime in the future.

Goal #3 – Create a network of greenways and greenways with trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery.

Objective #1: Examine greenway and trail opportunities for the watershed.

Objective #2: Develop a strategy for implementing a trail system.

Objective #3: Improve roadways for bicycle and pedestrian access and safety.

Objective #4: Expand recreational opportunities in the watershed.

Objective #5: Maintain and enhance roadways to preserve scenic quality and landscape character.

Greenways in general are aimed at preserving and conserving a connected green infrastructure throughout the valley that also connects to the larger region. In Cherry Valley this translates primarily into conserving and protecting the Cherry Creek and its tributary stream corridors with riparian buffers and conserving and preserving the ridgelines flanking the valley. Protecting the stream corridors is

particularly critical to water quality issues while ridgeline protection is particularly critical to maintaining scenic quality. In addition, the country roadways through the valley provide corridors rooted in history and a linear platform for visual appreciation of the valley. Some of these corridors may also provide opportunities for safe alternative forms of transportation and recreation via bikeways and trails that can serve multiple user groups. Feasibility studies to assess appropriate locations for trails and bikeways through these corridors should in general be conducted while working with landowners (including camps and resorts), municipalities, specific user groups, and state and local agencies. Potential opportunities and impacts need to be analyzed. Considerations should include at a minimum:

- Regional trail connections to other existing and proposed trail systems;
- The provision of adequate access to trails through conveniently located trailheads that include appropriate facilities;
- Consideration of various user groups, e.g. hikers, birders, mountain bikers, equestrians;
- Linkages to key areas in or near the watershed, e.g. Quiet Valley Historic Farm, Godfrey Ridge, and the Appalachian Trail (an existing Millennium Greenway).

Goal #4 – Promote and support stewardship efforts.

Objective #1: Develop educational and outreach efforts to inform and involve the citizens of the watershed.

Objective #2: Foster and develop partnerships to help monitor and implement plan recommendations.

In general, outreach campaigns need to be conducted to increase visibility of conservation programs, benefits and stewardship opportunities. Elements of these campaigns could include:

- Development of an education and outreach program about resource protection focusing on open space preservation.
- Creation of a speaker's bureau to inform local organizations about watershed issues.
- Education of landowners and citizens on fiscally efficient land use and management practices
- Inviting local land trusts and conservation organizations into each municipality to provide educational programs and to introduce a local contact outside of municipal government.
- Establishing a Cherry Valley newsletter to inform residents about valley history, community events, and ongoing efforts to maintain the culture and heritage of the valley.

- Offering regional special events (concerts, walking tours, bike tours, cleanups, etc.)
- Develop a “cleanup” litter control and beautification program that cleans up and helps eliminate roadside litter.

7.4 Management Options Tables

The management options tables include action items identified and developed during the public involvement process. The recommended action items listed in the tables are intended to help achieve the driving goals and are listed under measurable objectives for those goals. Potential responsible parties, a time frame for completion, and a priority are identified for each action item. While many action items could be listed under more than one goal, each is listed only once under the goal with which it is most closely associated.

Abbreviations used in the tables include the following:

ACOE – Army Corps of Engineers
AG-BD. – Monroe County Agricultural Land Preservation Board
ATC – Appalachian Trail Council
AUDUBON – Pennsylvania Audubon Society
BWA – Brodhead Watershed Association (Cherry Creek Watershed Sub-Association)
DCNR – Pennsylvania Department of Conservation & Natural Resources
DEP – PA Department of Environmental Protection
FBC – PA Fish and Boat Commission
FCV – Friends of Cherry Valley
FWS – U.S. Fish & Wildlife Service
MCCD - Monroe County Conservation District
MCCE - Monroe County Cooperative Extension
MCHA – Monroe County Historical Association
MCLCB – Monroe County Litter Control & Beautification
MCPC – Monroe County Planning Commission
NRCS – Natural Resources Conservation Service
OSAB – Monroe County Open Space Advisory Board
PEC – Pennsylvania Environmental Council
PennDOT – PA Department of Transportation
PHLT – Pocono Heritage Land Trust
PHMC – Pennsylvania Historic and Museum Commission
PMC – Pocono Medical Center
PMVB – Pocono Mountain Vacation Bureau
PGC – PA Game Commission
TNC – The Nature Conservancy
TU – Trout Unlimited

Some of the action items contain footnotes referencing similar or same actions that were identified in other related plans or to a specific public meeting where the action was identified. These footnote references are as follows:

¹Actions Identified at the Second Public Meeting for the Cherry Creek Watershed Conservation Plan

²Stroud Area Regional Open Space & Recreational Plan, 2002

³Eastern Monroe Regional Open Space & Recreation Plan, Revised Draft June 2002

⁴Brodhead Watershed Conservation Plan, January 2002

⁵Hamilton, Jackson, & Pocono Open Space and Recreation Plan, October, 2003.

GOAL#1: Preserve, protect and manage the watershed's unique resources.				
1.1 Objective #1: Conserve at least 50 % of priority resource lands (agricultural, forest, wetland, riparian lands, ridges, scenic areas, geologic areas) in the watershed by 2007.				
	Action Item	Responsible Parties	Timeframe	Record of Action
1.1.a	Protect 25 % of agricultural lands in the watershed by 2008 through conservation easements and fee title acquisition from willing landowners.	Municipalities, OSAB, TNC,PHLT, AG-BD, DCNR	1-3 years	Ongoing
1.1.b	Protect 50 % of important forest areas in the watershed by 2008 through conservation easements and fee title acquisition from willing landowners.	Municipalities, OSAB, TNC,PHLT, DCNR, ATC	3-5 years	Ongoing
1.1.c	Identify and preserve other priority resource lands (wetlands, riparian lands, ridges, scenic areas, geologic features) through conservation easements and fee title acquisition from willing landowners.	Municipalities, MCPC, OSAB, FCV, DCNR, PHLT, TNC	1-3 years	Ongoing
1.1.d	Create and secure funding for a National Wildlife Refuge.	FCV, Municipalities, Land Trusts	1-5 years	Early Action – initial efforts begun
	Work with Landowners			
1.1.e	Key Conservation Tracts/Projects: <ul style="list-style-type: none"> - Protect Kittatinny and Godfrey Ridges and links to Quiet Valley Living History Farm - Pursue conservation options with PA Water Company property 	Municipalities, MCPC, OSAB, CVF AUDUBON, DCNR, PHLT, TNC, ATC	1-5 years	Early Action See Greenway Actions

1.2	Objective #2: Make significant advances in protecting and interpreting cultural heritage and resources in the watershed.			
	Action Item	Responsible Parties	Timeframe	Record of Action
	Protect Important prehistoric, historic and cultural sites.			
1.2.a	Identify and protect most significant threatened prehistoric, historic and cultural sites (may be combined with Action Item 1.2.d).	MCHA, Municipalities, local historical societies	1-3 years	Recommended Early Action
1.2.b	Enhance municipal zoning, land use and subdivision ordinances and comprehensive plans to define and protect historic and cultural resources: - encourage creative reuse of historic structures consistent with maintaining the historic character of the building. - Incorporate clear, reasonable design review standards for renovations to historic structures into municipal codes - Require enhanced review procedures and permits for demolition of historic structures.	Municipalities, MCPC, PHMC	1-3 years	Recommended Early Action
1.2.c	Form a historic society for the watershed to advocate for protection and promote interpretation.	Municipalities, FCV, BWA	5-10 years	
	Interpret Historic Resources			
1.2.d	Develop and implement a plan for interpreting historic and cultural resources in the watershed (may be combined with Action Item 1.2.a).	Local Historical Societies, FCV, MCCD, MCHA, PMVB, MCPC	5-10 years	
	Implement Other Important Projects			
1.2.e	Restore the Creek-side Park at the Delaware Water Gap Train Station for historical interpretation and tourism (Delaware Water Gap Station Restoration Project).	Lackawanna Chapter of the Railway and Locomotive Historical Society, Inc., Municipalities, County, PennDOT, PMVB	1-10 years	\$40,000 Community Development Block Grant received for eng. repair plan; Ongoing: website for the project under construction

1.2.f	Collaborate on projects such as trail development along historic routes as a way to advance historic and cultural resource protection and outreach in the community.	MCHA, Municipalities, local historical societies	5-10 years	
1.3	Objective #3: Preserve and Enhance Green Infrastructure in the Watershed.			
	Action Item	Responsible Parties	Timeframe	Record of Action
	Identify Important Resource Lands			
1.3.a	Develop and adopt a <i>Green Infrastructure Map</i> for the watershed that will guide future development Encourage municipalities to: - Map existing resources prior to site development - Adopt a <i>Map of Potential Conservation Lands</i> that identifies resource priorities	Municipalities, MCPC, Regional Open Space Committees	1-3 years	Follow-up Action to municipal <i>Growing Greener</i> audits done for all municipalities
1.3.b	Develop a forum for the integration of multi-municipal comprehensive plans that include the Cherry Creek watershed and insure their consistency.	Municipalities, MCPC	1-3 years	Recommended Early Action (Stroud & Hamilton Twps are currently completing a joint comprehensive plan)
	Implement Municipal Ordinances			
1.3.c	Make greater use of zoning and subdivision regulations to enhance environmental protection and land preservation. Options include: <ul style="list-style-type: none"> • Implement the recommendations of the “<i>Growing Greener</i>” audit done for each municipality by effecting changes to plans and ordinances to enact “Conservation Subdivision Design”. • Strengthen floodplain, steep slope, and stream bank buffer ordinances.⁵ • Require mandatory dedication of open space and fee-in-lieu-of provisions.⁵ • Adding an open space district to existing codes.² • Incorporate Village and Hamlet Design standards.⁵ 	Municipalities, MCPC	1-3 years	Ongoing: watershed municipalities have begun to examine and modify their ordinances to incorporate some of these changes

	Promote Conservation Subdivision Design			
1.3.d	Encourage developers to use voluntary design guidelines following Conservation Subdivision Design concepts.	Municipalities, MCPC, MCCD, Developers	1-3 years	Recommended Early Action
	Evaluate Establishing a Transfer of Development Right program			
1.3.e	Evaluate the feasibility and consider the use of Transfer of Development Rights (TDR) to conserve priority open space lands and foster the development of more compact Villages and Hamlets while also fostering traditional village design.	Municipalities, MCPC	5-10 years	

GOAL#2: Maintain and/or improve water quantity / quality throughout the watershed.				
2.1 Objective #1: Maintain current baseflow and groundwater recharge in the watershed and improve quantitative measures of benthic invertebrate and fishery quality.				
Action Item		Responsible Parties	Timeframe	Record of Action
Protect Ground Water Resources				
2.1.a	Establish a Water budget, Assess base flow and establish a Water Budget for the watershed to guide future land use decisions.	BWA, MCCD, TNC	3-5 years	
2.1.b	Locate, delineate, and map significant recharge zones throughout the watershed.	BWA, MCCD, TNC	3-5 years	
2.1.c	Strengthen land use ordinances to better protect water resources, including: <ul style="list-style-type: none"> - Groundwater recharge areas. - Headwaters areas. - Limit total impervious surfaces to no more than 10 % of the watershed 	Municipalities, MCPC, MCCD, Scientific Community	1-3 years	Ongoing: do in conjunction with revisions and modifications for 1.3.c above
Improve quantitative measures of benthic invertebrate and fishery quality				
2.1.d	Restore in-stream habitat in areas degraded by flooding, chenalization, loss of riparian buffer, and increased runoff.	TU, BWA, FCV, Fishing clubs Municipalities, PennDOT, ACOE, FWS, landowners	1-5 years	Recommended Early Action (Blakeslee Farm e.g. stream stabilization)

2.2 Objective #2: Improve, Maintain, and Enhance Water Quality by keeping the Creek and its tributaries Clean.				
Action Item		Responsible Parties	Timeframe	Record of Action
	Improve management of on-lot septic systems			
2.2.a	Update municipal 537 plans to ensure consistency.	Municipalities, with DEP, MCPC	1-5 years	Recommended Early Action
2.2.b	Develop sewage management programs to better manage on-lot septic systems.	Municipalities, with DEP, MCPC	1-3 years	Recommended Early Action
2.2.c	Create on-lot sewer management district. ¹ (ties to 2.2b)	Municipalities, with DEP, MCPC	3-5 years	
	Improve management of sewage treatment plants			
2.2.d	Encourage DEP to take prompt action on known sewage treatment plant violations. ⁴	Municipalities, FCV, BWA, TU, MCCD	Ongoing	Ongoing
2.2.e	Encourage alternatives (such as land application) to stream discharges from sewage treatment plants where feasible. ⁴	Municipalities, DEP, MCCD, MCPC	1-5 years	Recommended Early Action
2.2.f	Identify environmentally sound lands to be used for land disposal of treated wastewater and acquire where economically feasible. ⁴	Sewage treatment plant permittees, MCPC, MCCD, Municipalities	5-10 years	
	Encourage use of best management practices for non point sources of water pollution			
2.2.g	Encourage responsible use of fertilizers and pesticides.	Municipalities, FCV, MCCD, MCPC, NRCS	Ongoing	Recommended Early Action
	Conduct a water quality assessment study.	FCV, BWA, TU, FBC, DEP	1-5 years	Recommended Early Action

	Clean up Lake Lenape	FCV, BWA, TU, FBC, DEP	5-10 years	
2.2.i	Mitigate and encourage alternatives to the use of road salt effects on stormwater runoff and street damage. ¹	Municipalities, MCCD, MCPC PennDOT	5-10 years	
	Coordinate and continue existing water quality monitoring programs			
2.2.j	Continue and expand existing water quality monitoring programs	MCCD, DEP, BWA, (Stream-watchers), FCV	5-10 years	Ongoing
2.2.k	Partner with other watershed groups to hire paid countywide water quality monitor	MCCD	5-10 years	
	Improve protection of drinking water sources			
2.2.l	Develop programs to protect existing and potential future sources of drinking water.	Water suppliers, Municipalities	5-10 years	
2.2.m	Strengthen ordinances to protect ground water quality and supply.	Water suppliers, Municipalities, MCPC, MCCD	1-3 years	Ongoing: do in conjunction with revisions and modifications for 1.3.c above

GOAL#3: Create a network of greenways and greenways with trails that provide linkages for wildlife and recreational opportunities to enjoy nature and scenery.

3.1 Objective #1: Examine Greenway and Trail Opportunities for the watershed.

Action Item	Responsible Parties	Timeframe	Record of Action
<p>3.1.a</p> <p>Complete a comprehensive greenway and trail plan that examines the feasibility of developing a watershed wide system of greenways to maintain and enhance green infrastructure and scenic quality, and to examine trail opportunities and linkages including:</p> <ul style="list-style-type: none"> - Kittatinny Ridge project - Godfrey Ridge trail - Brodhead, McMichael, and Pocono Creeks Greenways Plan - Quiet Valley Historical Farm - Appalachian Trail - PennDOT Visitors Center 	<p>Municipalities, MCPC, MCCD, PennDOT, FCV, Non-profit organizations, landowners, Regional Open Space Committees</p>	<p>1-10 years</p>	<p>Recommended Early Action for key greenway corridors in the watershed</p>
<p>3.1.b</p> <p>Create link to the Appalachian Trail from Cherry Valley Vineyard and Lower Cherry Valley Road in the upper watershed.</p>	<p>Municipalities, MCPC, MCCD, PennDOT, FCV, Non-profit organizations, landowners, Regional Open Space Committees</p>	<p>1-10 years</p>	<p>Recommended Early Action</p>

3.2	Objective #2: Develop a strategy for implementing a trail system.			
Action Item		Responsible Parties	Timeframe	Record of Action
3.2.a	<p>Preserve trail linkage opportunities where feasible through identified greenway corridors via an appropriate variety of land acquisition techniques:</p> <ul style="list-style-type: none"> - easements - dedication - fee simple acquisition 	Municipalities, MCPC, Non-profit organizations, DCNR	Ongoing	Ongoing
3.2.b	Promote the health and wellness benefits of trail recreation through partnerships with health professionals through new alliances now through PANA.	Municipalities, MCPC, Non-profit organizations, PMC	5-10 years	
3.2.c	Manage trails with regard to multiple user groups and potential user conflicts.	Municipalities, MCPC, Non-profit organizations, DCNR	3-5 years	
3.2.d	Develop and manage an "Adopt-a-Trail" program to organize maintenance of local trail segments by organizations.	Municipalities, MCPC, Non-profit organizations, DCNR	5-10 years	
3.3	Objective #3: Improve Roadways for Bicycle and Pedestrian Access and Safety.			
Action Item		Responsible Parties	Timeframe	Record of Action
	Develop a bicycle and pedestrian plan			
3.3.a	Conduct a bicycle and pedestrian compatibility study for all roadways in the watershed.	Municipalities, MCPC, PennDOT	3-5 years	

3.3.b	Promote bicycle and pedestrian compatibility on all state and local roads, including the implementation of traffic-calming techniques.	Municipalities, MCPC, Non-profit organizations, PennDOT	Ongoing	Recommended Early Action
3.3.c	Develop and promote walking and biking tours throughout the region.	Municipalities, MCPC, Non-profit organizations, YMCA, local outfitters, PennDOT	5-10 years	
3.4	Objective #4: Expand Recreational Opportunities in the Watershed.			
	Action Item	Responsible Parties	Timeframe	Record of Action
3.4.a	Provide outdoor recreation facilities to access and enjoy nature and to demonstrate success: birding, picnicking, hiking	Municipalities, MCPC, Non-profit organizations, DCNR	1-3 years	Recommended Early Action (best done in conjunction with trail development in greenways)
3.4.b	Encourage landowners to allow access to lands for hunting and fishing	Municipalities, MCPC, Non-profit organizations, TU, FWS	Ongoing	Recommended Early Action
3.5	Objective #5: Maintain and Enhance Roadways to Preserve Scenic Quality and Landscape Character.			
	Action Item	Responsible Parties	Timeframe	Record of Action
3.5.a	<p>Develop a scenic byway plan for Cherry Valley.⁵</p> <ul style="list-style-type: none"> - Identify scenic highways in Cherry Valley - Designate scenic highways - Promote use of conservation easements and innovative zoning techniques to preserve the views along designated scenic roads 	Municipalities, MCHA, PennDOT, PHLT, TNC	5-10 years	

3.5.b	Encourage ordinances that preserve and maintain historic character Prohibit/restrict billboards and apply appropriate restrictions to other signs in keeping with the scenic/historic character and reduce visual clutter through better signage ordinances.	Municipalities, MCPC	1-3 years	Recommended Early Action
3.5.c	Encourage improved signage, landscaping, buffer areas, driveways, and lighting of commercial facilities accessible from arterial roadways.	Municipalities, MCPC	1-3 years	Recommended Early Action
3.5.d	Avoid road widening or realignments that detracts from the rural character or serves to promote increased speeds.	Municipalities, PennDOT, MCPC, FCV	Ongoing	Recommended Early Action
3.5.e	Encourage the use of edge striping to narrow travel lanes and increase shoulder widths.	Municipalities, PennDOT, MCPC, FCV	Ongoing	Recommended Early Action
3.5.f	Develop/ enhance litter control program.	Municipalities, FCV, PennDOT, MCLCB	Ongoing	Recommended Early Action
3.5.g	Develop new scenic pull-offs and viewpoints.	Municipalities, PennDOT	3-5 years	
3.5.h	Work with the state on a Cycle PA bike route (buy key parcels, trail compatibility, and litter free).	Municipalities, PennDOT	Ongoing	

GOAL#4: Promote and support stewardship efforts.

4.1

Objective #1: Develop Educational and Outreach Efforts to inform and involve the Citizens of the Watershed.

	Action Item	Responsible Parties	Timeframe	Record of Action
4.1.a	Conduct an outreach campaign to increase visibility of conservation programs, benefits and stewardship opportunities.	Municipalities, MCPC, BWA, FCV, PHLT, TNC, MCCD	1-3 years	Recommended Early Action
4.1.b	Establish an ongoing countywide forum for watershed stakeholders to share information about watershed issues and actions, and to ensure the continuation of a successful public input process in future open space planning efforts	Municipalities, MCPC, MCCD, BWA, FCV	Ongoing	
4.1.c	Utilize a variety of news media to communicate and interpret watershed values and issues. <ul style="list-style-type: none"> - Conduct a Media campaign- TV/radio/Internet. - Distribute periodic press releases on open space and recreation efforts. - Publish information about watershed issues on a regular basis in the media (including newspapers, radio, television.) - Consider creating an educational video via local media channels and the "GreenWorks.tv" network. - Develop directional and informational signs for open space and recreation lands. - Develop a brochure for bicycle routes that describes the routes, difficulty ratings, and trail qualities. - Promote the theme of "Forever Green", identified in the Monroe County Open Space Plan. 	Municipalities, MCPC, MCCD, BWA, FCV, TNC, PHLT, BWA	Ongoing	Recommended Early Action

4.1.d	Organize watershed awareness raising activities, especially activities that involve children. - Work with and/or support existing school programs addressing stewardship issues.	BWA, TU, MCCD, PMVB, School districts, water suppliers, Municipalities, MCPC, Non-profit organizations	Ongoing	Continue & Expand
4.1.e	Create a formal volunteer system to identify volunteer projects and resources. - Create a master list of existing volunteer groups and potential services provided.	Municipalities, MCPC, BWA, FCV	Ongoing	FCV will call for volunteers in their upcoming newsletters
4.2	Objective #2: Foster and Develop Partnerships to help monitor and implement Plan Recommendations.			
Action Item		Responsible Parties	Timeframe	Record of Action
4.2.a	Support and evolve the “Friends of Cherry Valley” as a sustainable partnership to catalyze and oversee plan implementation.	Municipalities, MCPC, FCV, Non-profit organizations, MCCD	1-3 years	Recommended Early Action
4.2.b	Develop network of watershed residents to share information, work together.	Municipalities, MCPC, Non-profit organizations, FCV, MCCD	Ongoing	Done in conjunction with 4.1.e
4.2.c	Identify opportunities to work with other groups to explore possibilities for agricultural land preservation, natural resource conservation, and the development or trail/greenway connections.	Municipalities, MCPC, Non-profit organizations, FCV, DCNR	3-5 years	
4.2.d	Identify, develop, and foster cooperative relationships with surrounding municipalities to work toward the creation of a regional greenway and trail system.	Municipalities, MCPC, Non-profit organizations, FCV, DCNR	1-5 years	Recommended Early Action
4.2.e	Establish Environmental Advisory Councils in all watershed municipalities and explore creation of a watershed-wide EAC.	Municipalities PEC, MCPC	1-5 years	Recommended Early Action Stroud Twp. Has established an EAC

4.2.f	Create a "community conservation corps" to encourage riparian neighbors to work together.	Concerned Citizens MCCD, Audubon Society Garden clubs, FCV	5-10 years	
4.2.g	Raise funds for and hire staff person to oversee and/or help implement the recommendations of this plan.	BWA, FCV, DCNR	3-5 years	
4.3	Objective #3: Secure Funding for Plan Programs and Actions.			
	Action Item	Responsible Parties	Timeframe	Record of Action
4.3.a	Explore additional funding opportunities through state, federal, and private organizations.	Municipalities, MCPC, PHLT, FCV, TNC	1-5 years	Recommended Early Action
4.3.b	Develop a policy for creating an endowment for the purchase of open space.	Municipalities, MCPC, PHLT	3-5 years	
4.3.c	Explore the possibilities presented by Act 153 of 1996 authorizing the levying of taxes for financing the purchase of open space.	Municipalities	1-5 years	Recommended Early Action (Stroud Twp has authorized this tax successfully)
4.3.d	Create fundraisers and special events to support greenway development.	Concerned citizens, Non-profit organizations, FCV	1-5 years	Recommended Early Action
4.4	Objective #4: Encourage voluntary commitment to protection of important watershed resources.			
	Action Item	Responsible Parties	Timeframe	Record of Action
4.4.a	Develop landowner outreach and education program to promote conservation activities. Encourage landowners and citizens to plant native species, plant or maintain riparian buffers and improve stream habitat. Continue to make landowners aware of endangered species on their property.	Municipalities, MCPC, MCCD, Non-profit organizations, TNC	Ongoing	Recommended Early Action

4.4.b	Organize a sustainable agriculture workshop for interested landowners with information on sustainable / best management practices for forestry and agriculture.	NRCS, MCCE, MCPC, Municipalities, MCCD	1-3 years	Recommended Early Action
4.4.c	Coordinate with other agencies to identify property owners of key agricultural lands and approach them regarding their participation in preservation programs.	Municipalities, MCPC, AG-BD, TNC, PHLT, MCCD	1-5 years	Recommended Early Action
4.4.d	Develop education programs to encourage landowners and citizens to plant native species, plant or maintain riparian buffers and improve stream habitat.	Municipalities, MCPC, MCCD, MCCE, TNC, FCV	Ongoing	Ongoing: Expand current efforts conducted by TNC
4.4.e	Encourage landowners to conserve privately owned woodlots. - Use sustainable forestry practices -	DCNR, BWA, FCV, MCCD, MCCE, Concerned Citizens	Ongoing	Recommended Early Action
4.4.f	Educate interested landowners about placing conservation easements on open land through donation or purchase.	BWA, CVF, Pocono Heritage Land Trust, TNC, & other land trusts, MCCD	1-5 years	Recommended Early Action
4.4.g	Develop welcoming committee to promote Cherry Valley's unique assets to new landowners.	FCV	Ongoing	FCV have address this through their mission
4.4.h	Organize a sustainable agriculture workshop for interested landowners with information on sustainable / best management practices for forestry and agriculture. ²	NRCS, MCCE, MCPC, Pocono Heritage Land Trust, Municipalities	1-3 years	Recommended Early Action
4.4.i	Work with quarry to limit impacts of operations to adjacent residents (dust,etc.) ¹	Municipalities, MCPC	1-5 years	

4.5 Objective #5: Land Management				
Action Item		Responsible Parties	Timeframe	Record of Action
Preserve Key Fish and Wildlife Habitat Areas				
4.5.a	Use incentive-based approaches to protect, restore, and conserve important fish and wildlife habitat and direct development away from important habitat areas.	Municipalities, MCPC, MCCD, USFWS, TNC, PHLT, Fishing and Hunting Clubs	3-10 years	
Enhance Ongoing Fish and Wildlife Management Programs				
4.5.b	Conduct fisheries inventories in high priority stream areas and review fish stocking programs. ⁴	PA Fish Commission	3-10 years	
4.5.c	<p>Conduct inventories of terrestrial wildlife and their habitats, including birds, reptiles and amphibians.</p> <ul style="list-style-type: none"> ▪ Conduct standard bird census work during breeding and non-breeding seasons. ▪ Hold a "bioblitz" throughout the watershed. ▪ Determine if areas in the watershed qualify as Important Bird Areas. ▪ Continue with research on saw-whet owls and breeding birds.⁴ 	Scientific community, TNC	Ongoing	Recommended Early Action
4.5.d	Conduct mussel inventory of Cherry Creek	TNC	1-3 years	In planning stages

4.5.e	Work with appropriate agencies and landowners to promote wildlife management.	PGC, USFWS, FCV, PA American Water Company	3-10 years	
4.5.f	Develop more effective deer, geese, and other nuisance wildlife management programs.	DCNR (game commission), Ducks Unlimited Fishing and hunting clubs	Ongoing	Recommended Early Action (deer excluders, etc)
4.5.g	Implement programs to control/manage invasive and exotic species.	MCCE; TNC; Delaware River Invasive Plant Partnership (DRIPP) Volunteers	Ongoing	Recommended Early Action
4.5.h	Create riparian parks, using Army Corps of Engineers habitat restoration program.	ACOE, PennDOT, Municipalities, MCCD	3-10 years	
4.5.i	Develop a Natural Open Space Management Plan for all undeveloped municipal land in the watershed and actively undertake a program for the enhancement of wildlife habitat within municipally owned open space (consult a naturalist during development and implementation). This could include nesting boxes for birds and small animals. ²	Regional Open Space Committee; Brodhead, McMichael, Pocono Creeks Greenway Committee, MCCD Municipalities, local volunteer organizations,	Ongoing	Recommended to be done in conjunction with municipal land purchases & retroactively on existing acquisitions
4.6 Objective #6: Local Codes to promote stewardship				
	Action Item	Responsible Parties	Priority	Timeframe/ Record of Action
4.6.a	Develop sign ordinance. ¹	Municipalities	1-3 years	Recommended Early Action
4.6.b	Minimize visual impacts from cellphone-towers through local ordinances , (e.g. keep towers below 200 feet; no lights on towers, etc.. ¹)	Municipalities, MCPC	1-3 years	Recommended Early Action
4.6.c	Review and assess effectiveness of existing local tree protection ordinances Develop tree protection programs through local subdivision and zoning ordinances to protect and conserve forest cover. ^{4,5}	Municipalities, MCPC MCCD, DCNR, FCV	1-3 years	Recommended Early Action

7.5 Incorporating Related Planning Efforts

Abstracts and information of related plans and studies relevant to this plan are included in this plan by reference. A review of these studies was conducted to help identify issues, concerns and constraints and potential management options for the Cherry Creek Watershed Conservation Plan. These findings have been incorporated throughout. Some of the key related planning efforts include the following:

The ***Monroe County Comprehensive Plan (Monroe 2020)*** provides a countywide policy document to help steer growth and development in a positive economic fashion while maintaining, preserving, and enhancing a high environmental quality. The Comprehensive Plan, part of the three-year Monroe 2020 planning effort, was adopted in July of 1999 by the county commissioners. The ***Monroe County Comprehensive Plan*** is incorporated by reference in this watershed conservation plan and should be considered an integral part of the plan.

The ***Monroe County Water Supply and Model Wellhead Protection Study*** is incorporated by reference in the Comprehensive Plan and should also be considered an integral part of this plan. This plan recognizes that a primary recommendation of the ***Monroe County Water Supply and Model Wellhead Protection Study*** is to provide sewer systems as a primary means for handling wastewater. However, this plan strongly encourages alternatives to stream discharge whenever environmentally and economically feasible.

This plan also supports the goals and recommendations as put forth in the ***Monroe County Open Space Plan***, a separately completed element of the County Comprehensive Plan. This Open Space Plan was adopted in June of 1999 by the county commissioners and set off the development of joint municipal open space plans that were subsequently completed including the following plans that contain area within the Cherry Creek Watershed:

- Stroud Area Regional Open Space & Recreational Plan, 2002
- Eastern Monroe Regional Open Space & Recreation Plan, Revised Draft June 2002
- Hamilton, Jackson, & Pocono Multi. Municipal Plan, 2003

The ***Brodhead Watershed Conservation Plan*** was completed in January 2002. The Brodhead Creek was added to the Pennsylvania Rivers Registry that same year and plan implementation was begun. Several grants supporting the plan were secured and have been initiated or completed.

TNC Conservation Plan (Reptile Species Inventory and Habitat Monitoring, Management, and Restoration) identified a 6.5-mile stretch of Cherry Creek along which numerous fens have confirmed and/or suspected populations of several rare and threatened species. This study builds on previous reptile inventory, nesting, and habitat evaluation studies conducted by The Nature Conservancy. Because of the number and

size of the populations located throughout the valley, several years of presence/absence surveys are needed to thoroughly document the location, sizes, and age structures of the various populations as well as the location of nests. This information will greatly aid current and future protection efforts in the Valley.

7.5 Potential Funding Sources

A list of watershed funding sources that can assist implementation efforts identified by the potential management options and action items outlined in this report have been included in *Appendix L - Watershed Funding Sources*.

Appendices

Appendix A

Cherry Creek Stream Analysis

CHERRY CREEK STREAM ANALYSIS

1995

Three sites were sampled on this stream for this year's study. The first site was located at the Blue Mt. Water Company in the headwaters of the stream. The fecal coliform at this site was above the maximum level for contact recreational use and was not expected at this site. The habitat at this site was exceptional and ranked in the optimal category. The macroinvertebrate sample at this site was promising. The number of taxa was 27, the EPT score was 17 and the contribution of dominant taxa was 35%.

The second site was chosen due to the fact that it was approximately in the middle of the watershed, downstream of the Blakeslee Road bridge. This site also had elevated levels of fecal coliform. The count was again over the maximum level for contact recreational use. This may be due to the fact that it is located downstream of a farm. The habitat at this site was drastically altered from the first site. The stream is channelized at this point and has a large sediment deposition. The habitat score of 153 places this site in the suboptimal category and demonstrates the lack of suitable habitat. The contribution of dominant taxa at this site was 61.1%.

The third site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The ammonia level at this site was 0.199; ammonia levels of 0.2 mg/l and above are lethal to trout. The total phosphorous was 0.183 which is above the maximum level for rivers and streams. Fecal coliform levels at this site are also elevated but still within the maximum levels for contact recreational use. This habitat score of 196 placed this site in the optimal category. The macroinvertebrate sample at this site was healthy. The contribution of dominant taxa was 20%.

1996

Two sites were sampled on this stream for this year's study. The first site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The fecal coliform levels at this site were above the maximum levels for contact recreational use. A habitat score of 193 placed this site in the optimal category. The macroinvertebrate score of 29 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes > 10 square miles scoring scheme.

The second site was located at the Blue Mt. Water Company in the headwaters of the stream. This site was tested in order to verify the results from the previous years study. All parameters tested were within acceptable limits. The fecal coliform at this site was <20/100 mls this year. Last year it had been above the level for contact recreational use. The habitat at this site was ranked in the optimal category again this year. The macroinvertebrate sample at this demonstrates a healthy community. The Hilsenhoff Biotic Index was 3.86.

1997

This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The fecal coliform levels at this site were above the maximum levels for contact recreational use again this year. A habitat score of 203 placed this site in the optimal category. The macroinvertebrate score of 27 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes > 10 square miles scoring scheme.

1998

This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. It was added to the County program in 1991 along with three other sites. The other sites are located on Shawnee Creek (98-5), Bushkill Creek (98-6), and Brodhead Creek (98-4). These sites were added in order to assist the DRBC (Delaware River Basin Commission) and the NPS (National Park Service) in gathering data concerning the Boundary Control Points for the DWGNRA (Delaware Water Gap National Recreation Area). These sites serve as monitoring stations and were established as a result of the redesignation of portions of the Delaware River as Outstanding Basin Waters. The fecal coliform levels at this site were above the maximum levels for contact recreational use again this year. A habitat score of 199 placed this site in the optimal category. The macroinvertebrate score of 33 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme. Some improvement has been seen in the scoring this year from the previous two years.

1999

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth. This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. It was added to the County program in 1991 along with three other sites. The other sites are located on Brodhead Creek (99-21), Bushkill Creek (98-22), and Shawnee Creek (98-24). These sites were added in order to assist the DRBC (Delaware River Basin Commission) and the NPS (National Park Service) in gathering data concerning the Boundary Control Points for the DWGNRA (Delaware Water Gap National Recreation Area). These sites serve as monitoring stations and were established as a result of the redesignation of portions of the Delaware River as Outstanding Basin Waters.

The fecal coliform levels were elevated at this site. The dissolved oxygen result was below that which is expected for this site. These results may be due to the low flow that was experienced at the time of sampling. A habitat score of 201 placed this site in the optimal category. The macroinvertebrate score of 29 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2000

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth. This site is a DWGNRA boundary control point and is located over the dike at the corner of the Instrument Specialties Inc. parking lot, approximately 200 yards upstream of the Route 80 bridge. Total phosphorous was above the recommended maximum level. Conductivity and total dissolved solids were also elevated. The fecal coliform levels were elevated at this site again this year. A habitat score of 202 placed this site in the optimal category. The macroinvertebrate score of 31 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2001

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth.

CHERRY CREEK STREAM ANALYSIS

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Three sites were sampled on this stream for this year's study. The first site was located at the Blue Mt. Water Company in the headwaters of the stream. The fecal coliform at this site was above the maximum level for contact recreational use and was not expected at this site. The habitat at this site was exceptional and ranked in the optimal category. The macroinvertebrate sample at this site was promising. The number of taxa was 27, the EPT score was 17 and the contribution of dominant taxa was 35%.

The second site was chosen due to the fact that it was approximately in the middle of the watershed, downstream of the Blakeslee Road bridge. This site also had elevated levels of fecal coliform. The count was again over the maximum level for contact recreational use. This may be due to the fact that it is located downstream of a farm. The habitat at this site was drastically altered from the first site. The stream is channelized at this point and has a large sediment deposition. The habitat score of 153 places this site in the suboptimal category and demonstrates the lack of suitable habitat. The contribution of dominant taxa at this site was 61.1%.

The third site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The ammonia level at this site was 0.199; ammonia levels of 0.2 mg/l and above are lethal to trout. The total phosphorous was 0.183 which is above the maximum level for rivers and streams. Fecal coliform levels at this site are also elevated but still within the maximum levels for contact recreational use. This habitat score of 196 placed this site in the optimal category. The macroinvertebrate sample at this site was healthy. The contribution of dominant taxa was 20%.

1996

Two sites were sampled on this stream for this year's study. The first site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The fecal coliform levels at this site were above the maximum levels for contact recreational use. A habitat score of 193 placed this site in the optimal category. The macroinvertebrate score of 29 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes > 10 square miles scoring scheme.

The second site was located at the Blue Mt. Water Company in the headwaters of the stream. This site was tested in order to verify the results from the previous years study. All parameters tested were within acceptable limits. The fecal coliform at this site was <20/100 mls this year. Last year it had been above the level for contact recreational use. The habitat at this site was ranked in the optimal category again this year. The macroinvertebrate sample at this demonstrates a healthy community. The Hilsenhoff Biotic Index was 3.86.

1997

This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. The fecal coliform levels at this site were above the maximum levels for contact recreational use again this year. A habitat score of 203 placed this site in the optimal category. The macroinvertebrate score of 27 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes > 10 square miles scoring scheme.

1998

This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. It was added to the County program in 1991 along with three other sites. The other sites are located on Shawnee Creek (98-5), Bushkill Creek (98-6), and Brodhead Creek (98-4). These sites were added in order to assist the DRBC (Delaware River Basin Commission) and the NPS (National Park Service) in gathering data concerning the Boundary Control Points for the DWGNRA (Delaware Water Gap National Recreation Area). These sites serve as monitoring stations and were established as a result of the redesignation of portions of the Delaware River as Outstanding Basin Waters. The fecal coliform levels at this site were above the maximum levels for contact recreational use again this year. A habitat score of 199 placed this site in the optimal category. The macroinvertebrate score of 33 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme. Some improvement has been seen in the scoring this year from the previous two years.

1999

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth. This site is a DWGNRA boundary control point and is located beyond the dike at Instrument Specialties. It was added to the County program in 1991 along with three other sites. The other sites are located on Brodhead Creek (99-21), Bushkill Creek (98-22), and Shawnee Creek (98-24). These sites were added in order to assist the DRBC (Delaware River Basin Commission) and the NPS (National Park Service) in gathering data concerning the Boundary Control Points for the DWGNRA (Delaware Water Gap National Recreation Area). These sites serve as monitoring stations and were established as a result of the redesignation of portions of the Delaware River as Outstanding Basin Waters.

The fecal coliform levels were elevated at this site. The dissolved oxygen result was below that which is expected for this site. These results may be due to the low flow that was experienced at the time of sampling. A habitat score of 201 placed this site in the optimal category. The macroinvertebrate score of 29 placed this site in the slightly impaired category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2000

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth. This site is a DWGNRA boundary control point and is located over the dike at the corner of the Instrument Specialties Inc. parking lot, approximately 200 yards upstream of the Route 80 bridge. Total phosphorous was above the recommended maximum level. Conductivity and total dissolved solids were also elevated. The fecal coliform levels were elevated at this site again this year. A habitat score of 202 placed this site in the optimal category. The macroinvertebrate score of 31 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2001

This stream is classified in Title 25 of the Pennsylvania Code as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth.

The first site (01-13) is located immediately downstream of Kemmertown Road. The fecal coliform at this site was slightly elevated. A habitat score of 179 is indicative of a moderately supportive habitat. The biological assessment score of 31 placed this site in the optimal category for the Northern Shale Valleys and Slopes < 10 square miles.

The second site (01-24) is a DWGNRA boundary control point and is located over the dike at the corner of the Instrument Specialties Inc. parking lot, approximately 200 yards upstream of the Route 80 bridge. It was added to the County program in 1991 along with three other sites. The other sites are located on Brodhead Creek (01-23), Bushkill Creek (01-22), and Shawnee Creek (no longer sampled). These sites were added in order to assist the DRBC (Delaware River Basin Commission) and the NPS (National Park Service) in gathering data concerning the Boundary Control Points for the DWGNRA (Delaware Water Gap National Recreation Area). These sites serve as monitoring stations and were established as a result of the redesignation of portions of the Delaware River as Outstanding Basin Waters. All water chemistry parameters tested were found to be within acceptable limits. A habitat score of 193 placed this site in the optimal category. The biological assessment score of 33 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2002

(This stream is classified as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth.) This site is a DWGNRA boundary control point and is located over the dike at the corner of the Laird Technologies parking lot, approximately 200 yards upstream of the Route 80 bridge. No water chemistry samples were collected for lab analysis at this site. The temperature at this site was slightly above the recommended maximum. A habitat score of 200 placed this site in the optimal category. The biological assessment score of 29 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

2003

(This stream is classified as HQ-CWF, MF from its source to the SR 2006 bridge (Cherry Valley Road) and CWF, MF from the SR 2006 bridge to its mouth.) This site (CHERCRI1) is a DWGNRA boundary control point and is located over the dike at the corner of the Laird Technologies parking lot, approximately 200 yards upstream of the Route 80 bridge. No water chemistry samples were collected for lab analysis at this site. The conductivity was elevated above expected levels at this site. A habitat score of 199 placed this site in the optimal category. The biological assessment score of 31 placed this site in the optimal category for the Northern Shale Valleys and Slopes, Riffle/Run > 10 square miles scoring scheme.

STREAM	SITE ID	SITE LOCATION	LATITUDE	LONGITUDE	TOWNSHIP	SUBREGION	PREVIOUS NUMBERING SYSTEM	YEARS TESTED
Cherry Creek	CHERCRO1	100 yards upstream of Route 611 in Delaware Water Gap Borough			Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	85-43	1985
	CHERCRO2	First bridge west of Delaware Water Gap Borough on LR45010			Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	85-44	1985
	CHERCRO3	At the confluence with the discharge for Instrument Specialties			Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	86-43, 88-128, 89-12	1989, 1988, 1986
	CHERCRO4	60 yards downstream of Stormsville bridge			Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	86-63, 89-11, 95-31	1995, 1989, 1986
	CHERCRO5	Downstream from Old Ronson Site of Corral R.O.W.			Delaware Water Gap Borough	Northern Shale Valleys and Slopes < 10 square miles	86-78	1986
	CHERCRO6	@ Kennertown Bridge			Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	86-85	1986
	CHERCRO7	10 yards upstream from bridge at the pumping station access			Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	32752	1989
	CHERCRO8	at bridge at bridge by the Cherry Valley Methodist Church, near the 1918 bridge			Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	32782	1989
	CHERCRO9	30 yards upstream of the combined discharge for Instrument Specialties and Delaware Water Gap STP			Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	90-27	1990
	CHERCRO10	Downstream of the combined discharge for Laird Technologies and Delaware Water Gap STP			Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	90-28, 91-26	1991, 1990
	CHERCRI1	Over the dike at the corner of the Laird Technologies parking lot, 200 yards upstream of Route 80, DWGNRA boundary control point	40 59 10.75	-75 08 29.08	Delaware Water Gap Borough	Northern Shale Valleys and Slopes > 10 square miles	91-25, 92-26, 93-27, 94-01, 95-32, 96-18, 97-05, 98-03, 99-20, 00-23, 01-24	2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995, 1994, 1993, 1992, 1991
	CHERCRI2	Upstream of bridge on Cherry Drive, north of Lower Cherry Valley Road	40 54 52.30	-75 16 11.10	Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	93-33, 94-16	1994, 1993
	CHERCRI3	At Blue Mt. Water Co.	40 54 12.72	-75 16 59.42	Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	95-31, 96-26	1996, 1995
	CHERCRI4	Downstream of Kennertown Rd	40 56 12.50	-75 15 10.30	Hamilton Township	Northern Shale Valleys and Slopes < 10 square miles	37999	2001

Appendix B

Benthic Macroinvertebrates of Cherry Creek

BENTHIC MACROINVERTEBRATES
OF
CHERRY CREEK
MONROE COUNTY, PA
JUNE 1, 2000
FOR
BRODHEAD WATERSHED ASSOCIATION

Submitted by
Donald L. Baylor
For
Aquatic Resource Consulting
1036 Locust Lane
Stroudsburg, PA 18360

BENTHIC MACROINVERTEBRATES OF CHERRY CREEK, MONROE COUNTY, PA, JUNE 1, 2000 FOR BRODHEAD WATERSHED ASSOCIATION

BACKGROUND

On June 1, 2000, at the request of the Brodhead Watershed Association, Aquatic Resource Consulting biologists sampled benthic macroinvertebrates at four stations on Cherry Creek, Monroe County, PA. The purpose of the sampling was to document water quality and gather baseline biological data as an initial step in the establishment of a water quality monitoring program through a Growing Greener Grant from Pennsylvania Department of Conservation and Natural Resources.

Cherry Creek drains the Cherry Valley section of southern Monroe County flowing approximately 23 miles to the Delaware River in the vicinity of the village of Delaware Water Gap. A small portion of the flow originates in ponds just east of Route 33 and south of Saylorsburg. Cherry Creek's flows are augmented substantially by large springs a short distance downstream from the pond outflow and above the trout hatchery. Cherry creek is somewhat unique in Monroe County where high gradient freestone streams of low alkalinity predominate. Cherry Creek is a moderately alkaline, low gradient, spring creek

Aquatic macroinvertebrates are preferred indicators of stream water quality because of their limited mobility, one to three year life cycles, and specific sensitivities to pollutants. Clean streams usually support numerous species of invertebrates, theoretically evenly represented numerically. Impairment may be indicated by low taxa richness, shifts in community balance toward dominance of pollution-tolerant forms, or overall scarcity of invertebrates (Plafkin, et al. 1989). In order to assure an accurate assessment, recent work in bio-monitoring stresses the use of several parameters, or metrics, to measure different components of the community structure.

METHODS

Benthic Macroinvertebrates

Sampling methods followed those recommended by Hilsenhoff (1982) and the Environmental Protection Agency Protocol III (Environmental Analysts, 1990). At each station, two samples were taken from a riffle/run area with a kick screen device of 521-micron nytex. Samples were taken by placing the screen against the substrate and disturbing the substrate above the screen with a four-pronged cultivating tool. Rocks from within the sample area were also cleaned by hand to collect organisms that were firmly attached. Organisms and debris were composited for each station in a plastic bag and preserved in Kahle's solution for transport to the laboratory.

In addition, slower water, depositional habitats were sampled to document species present that might be unique to Cherry Creek but that are not typically found in the riffle/run habitat. Invertebrates from these samples were kept separate from the riffle/run composites and were not included in calculating metrics.

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In the laboratory, organisms were placed in an enamel pan marked with numbered grids and picked from the debris starting with a randomly selected grid until over 100 organisms were obtained. Organisms were identified to the lowest taxonomic level practicable, enumerated, and assigned a pollution tolerance value if known (Bode, et al. 1996 and Environmental Analysts 1990). Taxa richness, modified EPT index, percent modified mayflies, percent dominant taxon, and Hilsenhoff biotic index values were calculated for each station to apply PA Department of Environmental Protection (DEP) Central Office's most recent draft guidance for use with special protection and anti-degradation studies (communication from Thomas E. Stauffer, Northeast Regional Office Water Pollution Biologist).

1. Taxa Richness – is an index of diversity. The number of taxa (kinds) of invertebrates indicates the health of the benthic community through measurement of the variety of species present. Generally, number of species increases with increased water quality. However, variability in natural habitat (stream order and size, substrate composition, current velocity) also affects this number.

2. Modified EPT Index – is a measure of community balance. The insect orders Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies) collectively referred to as EPT, are generally considered pollution sensitive (Plafkin et al. 1989). Thus, the total number of taxa within the EPT insect groups minus those considered pollution tolerant (Modified EPT index) is used to evaluate community balance. Healthy biotic conditions are reflected when these taxa are well represented in the benthic community.

5. Percent Dominant Taxon – measures evenness of community structure. It is the percent of the total abundance made up by the single most abundant taxon. Dominance of a few taxa may suggest environmental stress; however, the tolerance value of the dominant taxon must be considered.

4. Percent Modified Mayflies – is another measure of balance. Mayflies are considered one of the least tolerant orders to organic pollution and acidification. Undisturbed streams usually have an abundance of mayflies. Pennsylvania environmental agencies use the percent contribution of mayflies to the total number of organisms as an indication of water quality. The value is modified to exclude mayflies considered pollution tolerant.

5. Modified Hilsenhoff Biotic Index – is a direct measure of pollution tolerance. Since many of the aquatic invertebrate taxa have been associated with specific values for tolerance to organic pollutants, a biotic index is also used to measure the degree of organic pollution in streams. The biotic index value is the mean tolerance value of all organisms in a sample. This metric has been modified to use more recent

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pollution tolerance values, which range from 0.00 to 10.00; the higher the value, the greater the level of pollution indicated (Table 1).

Table 1. Evaluation of water quality using biotic index values (Hilsenhoff, 1987)

BIOTIC INDEX	WATER QUALITY	DEGREE OF ORGANIC POLLUTION
0.00-3.50	Excellent	None Apparent
3.51-4.50	Very Good	Possible Slight
4.51-5.50	Good	Some
5.51-6.50	Fair	Fairly Significant
6.51-7.50	Fairly Poor	Significant
7.51-8.50	Poor	Very Significant
8.51-10.00	Very Poor	Severe

Each of the five metrics uses a different scoring scale, so they were converted to the same scale using normalizing scores (PA DEP, 1999 – Table 2). The normalized scores were then added for each station to arrive at the biological condition score. Although Station 1 is not assumed to be pristine due to the hatchery outfall, it was the uppermost station sampled in the drainage that would include the input of large springs just above the hatchery and was used as a reference condition. Stations 2-4 were compared to Station 1 for percent similarity.

Table 2. Biological condition scoring criteria for converting metric values to normalized scores for comparison to reference stations.

METRIC	METRIC VALUE COMPARISON TO REFERENCE			
	>80%	79-70%	69-60%	<60%
Taxa Richness (candidate/reference)	>80%	79-70%	69-60%	<60%
Modified EPT Index (candidate/reference)	>80%	79-60%	59-50%	<50%
Mod. Hilsenhoff Biotic Index (candidate-reference)	<0.71	0.72-1.11	1.12-1.13	>1.13
Percent Dominant Taxon (candidate-reference)	<10	11-16	17-20	>20
Percent Modified Mayflies (candidate-reference)	<12	13-20	21-40	>40
Normalizing Score	6	4	2	0

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In addition to these five metrics in the PA DEP scoring regime, Shannon-Weiner species diversity, equitability, and percent filtering collectors were calculated for each station. These metrics were not used in arriving at the composite scores for calculating biological condition and percentage similarity of stations. They were used to give additional insight into the benthic community structure of Cherry Creek. A brief explanation of these metrics follows:

1. Shanon Weiner Species Diversity - measures the number of species and their numerical balance. Undegraded streams usually support numerous species of macroinvertebrates, theoretically evenly represented. Diversity values in unpolluted streams generally range from 3 to 4; in degraded streams, values often fall below 1 (Wilhm, 1970).
2. Equitability - is a measure of the evenness with which the individuals are distributed among the taxa. The value compares the distribution in the sample to that expected in undisturbed streams. Equitability usually ranges between 0.6 and 0.8 in undisturbed streams. Slight levels of degradation reduce equitability below 0.5 – usually between 0.3 and 0.0 (Plafkin, et al., 1989).
3. Percent Filtering Collectors - The percentage of invertebrates in the sample from the filtering collector functional feeding group is a measure of the impact of suspended solids usually resulting from sediment in run-off. Filtering collectors are generally the first benthic organisms to be reduced in abundance by silt in the water column, as suspended solids clog their filter-feeding mechanisms.

Habitat

Habitat was assessed at each station using the format prescribed in the Environmental Protection Agency's Rapid Bioassessment Protocols (Plafkin, et al., 1989) and subsequently modified for use by PA DEP. Each station was evaluated visually for 12 parameters, which were rated on a scale of 1 to 20. Scores for all parameters were added to yield a total habitat score.

SAMPLING STATIONS

The following stations on Cherry Creek were sampled for benthic macroinvertebrates on June 1, 2000 (Figure 1):

1. Adjacent to a small pond immediately below Cherry Valley Trout Hatchery : latitude N 40 degrees 54.716', longitude W 75 degrees 16.265', at 459' elevation.

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2. Just above Kemmerertown Road crossing near Cherry Valley Church: latitude N 40 degrees 56.201', longitude W 75 degrees 15.148' at 407' elevation.
3. Approximately 0.9 stream miles above the Route 191 crossing: latitude N 40 degrees 57.610', longitude W 75 degrees 12.488' at 389' elevation.
4. Approximately 100 yards above the Route 611 crossing in Delaware Water Gap: latitude N 40 degrees 59.085', longitude W 75 degrees 8.746' at 330' elevation.

RESULTS AND DISCUSSION

Habitat Assessment

Habitat scores for all stations fell within the suboptimal category (Table 3). All stations had well vegetated banks with little signs of erosion. Between Stations 2 and 3, however is an area where grazing has badly degraded the stream banks, probably contributing considerable sediment during storm events. Stations 1 and 2 lacked larger size particles in the substrate. At these stations, substrate was primarily gravel and small cobble. Station 1 had considerable imbeddedness with very fine sediment in areas of slower current velocities. Station 3 had the best diversity in terms of substrate particle sizes and velocity/depth regimes. Station 2 attained an overall score slightly higher than other stations. This station, however, was below a reach of Cherry creek that flows through a swampy area that is relatively flat and impounded somewhat by old beaver dams.

Benthic Macroinvertebrates

A total of 48 taxa of benthic macroinvertebrates were identified from the 100+ organism subsamples from the four stations on Cherry Creek (Appendix A). At each station several taxa not found in the riffle-run habitats were collected from the slow water, depositional samples (Appendix B). Ephemeroptera (mayflies) and Trichoptera (caddisflies) were well represented at all stations with a few Plecoptera (stoneflies), Coleoptera (beetles), and Diptera (true flies) comprising most of the remainder of the samples. Cherry Creek differed from most higher gradient, less alkaline Pocono area streams in having a good representation of burrowing mayflies (Ephemeridae). *Ephemera varia* were found at Station 3 though not abundant in the 100+ riffle-run subsample, and *Hexagenia limbata* were found in the slow water, depositional sample from Station 4. *Anthopotamus* sp. mayflies, relatively uncommon in Pocono streams,

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Table 3. Habitat assessment of sampling stations on Cherry Creek, June 1, 2000.

Score ranges: optimal 240-192, suboptimal 180-132, marginal 120-72, poor <60.

HABITAT PARAMETER	SCORE			
	Station 1	Station 2	Station 3	Station 4
1. Instream Cover	5	7	13	10
2. Epifaunal Substrate	8	9	11	8
3. Imbeddedness	6	14	13	9
4. Velocity/Depth Regimes	12	12	17	11
5. Channel Alteration	19	20	20	20
6. Sediment Deposition	8	13	12	10
7. Frequency of Riffles	18	12	6	8
8. Channel Flow Status	20	20	17	17
9. Condition of Banks	19	19	16	13
10. Bank Vegetative Protection	20	20	18	17
11. Grazing & Other Disruptive Pressure	18	19	14	15
12. Riparian Zone Width	18	20	12	14
TOTAL SCORE	171	185	169	152

were also known by this researcher to be abundant in Cherry Creek near the Route 191 crossing. They were not found in this study, however – possibly because they were in a life stage not readily collected at the time of sampling.

Station Comparisons - Invertebrates

Station 1 was superior to the other three in nearly all metrics. The Hilsenhoff biotic index value at Station 4 was similar, but all other values in the DEP community metrics plus diversity and equitability were superior at Station 1. Thus, Station 1 was used as a reference station, and stations 2-4 were compared to it in terms of their percent similarity (Table 4). Although the percentages of the dominant taxon varied among the stations, all were given the optimal score in comparison to the reference. This was done because at all stations, the dominant species was the mayfly *Ephemerella dorothea*, which has a pollution tolerance value of only 1 (Appendix A). When the dominant taxon is an intolerant species, a higher percentage is not considered to be evidence of pollution-induced imbalance.

Station 2 had lower taxa richness, lower EPT index, and a higher (poorer) biotic index value than Station 1 (Table 4). Station 2 scored only 47% similarity to Station 1 according to DEP's biological condition scoring. Diversity and equitability were optimal at Station 1 but fell below the expected clean stream ranges at Station 2. These data

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Table 4. Macroinvertebrate community metrics and scores for samples collected from four Cherry Creek stations on June 1, 2000.

METRIC	STATION 1		STATION 2		STATION 3		STATION 4	
	V A L U E	S C O R E	V A L U E	S C O R E	V A L U E	S C O R E	V A L U E	S C O R E
Number of Organisms in Subsample	122	-	116	-	118	-	126	-
Shannon-Weiner Diversity Index	4.08	-	2.53	-	3.58	-	2.07	-
Equitability	0.82	-	0.49	-	0.62	-	0.46	-
Percent Filtering Collectors	7%	-	2.6%	-	21%	-	33%	-
Taxa Richness	29	6	14	0	26	6	10	0
Modified EPT Index	20	6	8	0	15	4	4	0
Hilsenhoff Biotic Index	2.53	6	3.35	4	3.36	4	2.51	6
Percent Dominant Taxon	24%	6	41%	6	31%	6	52%	6
Percent Modified Mayflies	65%	6	50%	4	47%	4	53%	4
Biological Condition Score		30		14		24		16
Percent of Reference		100		47		80		53

suggested considerable degradation of water quality from Station 1 to Station 2. The cause was not clear. Habitat in the immediate areas of the sampling stations was not significantly different. In fact, Station 2 scored slightly higher than Station 1 (Table 3). One factor may be the swampy area of old beaver dams upstream from Station 2. This area could elevate summer water temperatures and release trapped silt during high flows. There was a very low percentage of filtering collectors at Station 2, suggesting either low food availability for this group or that there may have been episodes of suspended solids clogging their feeding mechanisms.

Station 3 scored 80% similarity to the reference (Station 1), indicating 33% recovery from Station 2 (Table 4). Taxa richness and EPT index values rose above those at Station 3 but not as high as values at Station 1. The biotic index value was

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approximately the same at stations 2 and 3. Diversity and equitability rose above Station 2 values but not as high as those at Station 1. Although the overall habitat score for Station 3 was not as high as that for Station 2, the substrate diversity and flow velocity in the immediate area of the sample were more favorable to a diverse macroinvertebrate population than those at Station 2 and other stations. This small area of superior instream macroinvertebrate habitat may account for some improvement in the sample values. Increased current velocity at the sampled riffle over other areas sampled may have kept the substrate cleaner (less embedded). There were also more boulders and cobble in the substrate particle mix here than at other stations offering added diversity of microhabitat niches

Station 4 scored 53% of the reference station, indicating a 27% decline from Station 3 (Table 4). Taxa richness and modified EPT index values were the lowest of the stations sampled, as were the diversity and equitability values. The biotic index value, however, was the best of all stations sampled – very similar to that at Station 1 - due primarily to the greater proportion of the dominant taxon, the mayfly *Ephemerella dorothea*. *E. dorothea* are frequently found in great abundance just prior to their June emergence as adults. The anomaly that community metrics are generally poorest here except for the most direct measure of organic pollution - biotic index – is puzzling. These results may suggest some form of water quality or habitat degradation other than oxygen demanding pollutants. Samples from later in the season after *E. dorothea* have emerged and are not as abundant might yield much poorer biotic index values and a much lower percentage of mayflies.

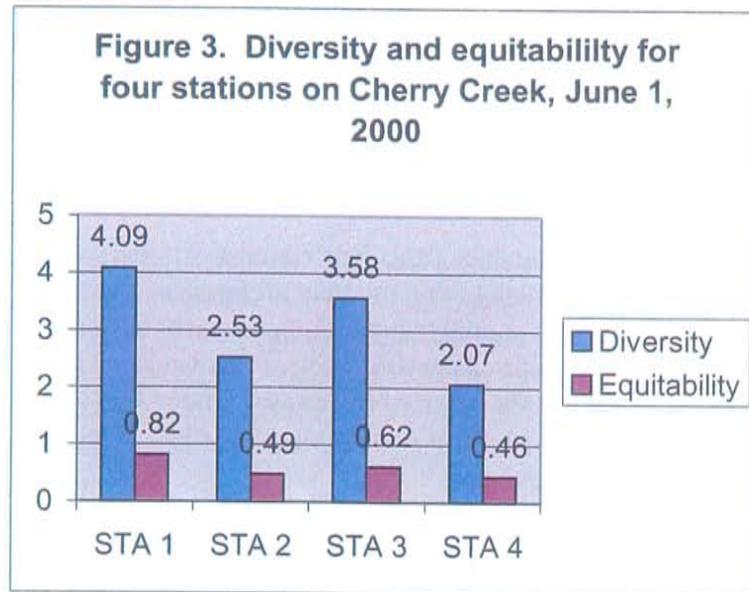
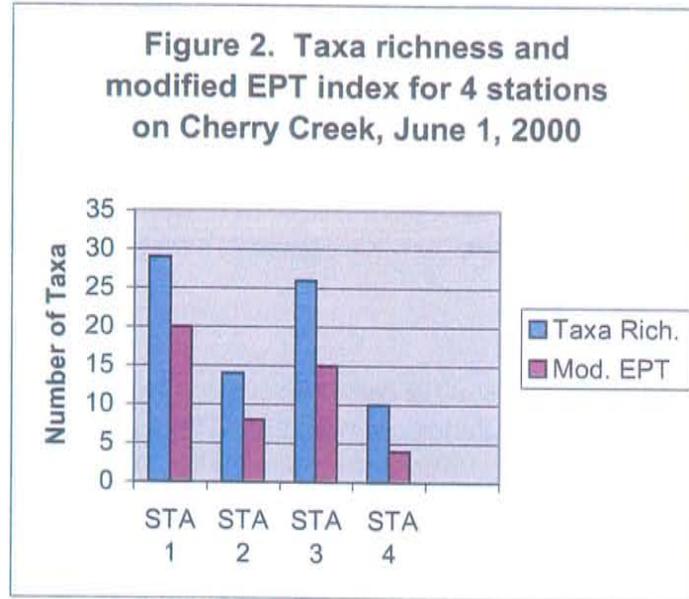
SUMMARY

Benthic macroinvertebrate samples from four stations on Cherry Creek on June 1, 2000 suggested excellent water quality at an upstream reference station near the hatchery, considerable decline in water quality near Kemmerertown Road crossing, recovery to water quality closer to the reference station above the Route 191 crossing, and another decline in water quality near the town of Delaware Water Gap (Figures 2 and 3). Reasons for these variations in water quality were not clear. Some anthropogenic and some natural causes are suspected.

RECOMMENDATIONS

Cherry creek should be sampled for benthic macroinvertebrates periodically to monitor water quality trends. It would be valuable to repeat sampling at the four stations used in this study. It may also be instructive to add sampling stations to further isolate possible water quality impacts.

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Figures 2 and 3. Graphs of selected benthic macroinvertebrate metrics from four stations On Cherry Creek, June 1, 2000 showing water quality trends.

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Appendix A. Taxa, numbers, biotic index value (BI) and functional feeding group (FFG) designation for benthic macroinvertebrate samples from Cherry Creek June 1, 2000. SC = scraper, CG = collector gatherer, FC = filtering collector, P = predator, SHR = shredder.

TAXA	STATIONS				BI	FFG
	1	2	3	4		
Ephemeroptera (mayflies)						
<i>Epeorus vitrea</i>	2	-	1	-	0	SC
<i>Ephemerella dorothea</i>	29	48	36	66	1	CG
<i>E. invaria</i>	4	3	4	1	1	CG
<i>Drunella cornuta/cornutella</i>	3	3	-	-	0	CG
<i>D. walkeri</i>	1	-	1	-	0	CG
<i>D. lata</i>	2	-	-	-	0	CG
<i>Serratella deficiens</i>	13	1	5	-	2	CG
<i>Dannella simplex</i>	-	2	-	-	2	CG
<i>Paraleptophlebia sp.</i>	4	-	1	-	1	CG
<i>Habrophebiodes sp.</i>	-	-	-	1	6	CG
<i>Stenonema ithaca</i>	2	-	6	-	3	SC
<i>S. sp.</i>	3	-	-	-	4	SC
<i>Leucrocuta sp.</i>	2	-	-	-	1	SC
<i>Nixe sp.</i>	-	-	1	-	2	SC
<i>Isonychia sp.</i>	1	-	-	-	2	FC
<i>Baetis tricaudatus</i>	3	22	9	8	6	CG
<i>B. intercalaris</i>	7	-	-	-	4	CG
<i>B. pluto</i>	-	-	1	-	6	CG
<i>B. sp.</i>	-	1	-	-	6	CG
<i>Acentrella amplus</i>	-	-	1	-	6	CG
<i>A. turbida</i>	6	-	-	-	4	SCR
<i>Ephemera varia</i>	-	-	1	-	3	CG
Trichoptera (caddisflies)						
<i>Cheumatopsyche sp.</i>	4	-	-	-	5	FC
<i>Ceratopsyche sparna</i>	2	-	-	-	1	FC
<i>C. sp.</i>	1	-	1	-	4	FC
<i>Hydropsyche betteni</i>	-	1	9	-	6	FC
<i>Rhyacophila manistee</i>	1	-	-	-	1	P
<i>Agapetus sp.</i>	-	-	1	-	1	P
<i>Dolophilodes distinctus</i>	-	-	1	13	0	FC
<i>Chimarra aterrima</i>	1	2	1	-	4	FC

Appendix A. continued						
TAXA	STATIONS				BI	FFG
	1	2	3	4		
<i>Psychomyia namada</i>	-	-	1	-	2	CG
<i>Polycentropus sp.</i>	-	-	1	-	6	FC
<i>Pycnopsyche sp.</i>	-	1	-	-	4	SH
<i>Micrasema wataga</i>	-	-	1	-	2	SH
Plecoptera (stoneflies)						
<i>Acroneuria abnormis</i>	5	-	-	-	0	P
<i>A. carolinensis</i>	1	-	-	-	0	P
<i>Leuctra sp.</i>	-	-	-	1	0	SHR
Coleoptera (beetles)						
<i>Psephenus herricki</i>	1	-	4	-	4	SC
<i>Optioservus sp.</i>	2	4	-	-	4	SC
<i>Stenelmis sp.</i>	13	-	2	-	5	SC
Diptera (true flies)						
Chironomidae	4	24	15	4	6	-
<i>Antocha sp.</i>	1	-	-	-	3	CG
<i>Atherix sp.</i>	1	3	-	-	4	P
<i>Simulium sp.</i>	3	-	12	28	5	FC
<i>Blepharicera sp.</i>	-	-	1	-	0	-
Isopoda (sowbugs)						
<i>Caecidotea sp.</i>	-	-	1	2	6	CG
Oligochaeta (worms)						
<i>Lumbricina sp.</i>	-	-	-	2	8	CG

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Appendix B. Taxa of benthic macroinvertebrates found in slow water habitats on Cherry Creek, June 1, 2000.

STATION 1

Tipula sp., *Paragnetina media*, *Gammarus sp.*

STATION 2

Baetis pluto, *Eurylophella verisimilis*, *Perlesta placida*

STATION 3

Tricorythodes sp., *Dannella simplex*, *Rhyacophila fuscula*, *Pycnopsyche sp.*

Nigronia serricornis, *Hexatoma sp.*, *Musculium sp.*, *Gomphus sp.*, *Lumbricina sp.*

Sphaerium sp.

STATION 4

Hexagenia limbata, *Centroptilum sp.*, *Pycnopsyche sp.*, *Pisidium sp.*,

Planorbella sp., Ephydriidae, Crixidae

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Appendix C

Pennsylvania SEC Water Monitoring Database

Appendix C – PA SEC Database for Cherry Creek Watershed

Monitoring Data by Site - EASI

Site ID	Sequence No. (Old Site ID)	Web Host ID	Water Body Name/Watershed	Site Location
04751:13.87:20010624	<u>959</u>	nhv7347	Cherry Creek	Twin Lakes Cherry Valley
04751:11.64:20010620	<u>958</u>	nhv7347	Cherry Creek	Trout Hatchery
04751:9.70:20010613	<u>957</u>	nhv7347	Cherry Creek	Kemmertown Church Bridge
04751:6.72:20010609	<u>956</u>	nhv7347	Cherry Creek	Below Blakeslee Farm
04751:6.06:20010604	<u>955</u>	nhv7347	Cherry Creek	Keller Farm
04751:6.57:20010820	<u>954</u>	nhv7347	Cherry Creek	Mountain Run @ Poplar Valley Road
04751:4.54:20010819	<u>953</u>	nhv7347	Cherry Creek	Grech Property Pool
04751:3.69:20010714	<u>952</u>	nhv7347	Cherry Creek	Eagle Rests
04751:0.61:20010604	<u>951</u>	nhv7347	Cherry Creek	Delaware Water Gap

The Cherry Creek Watershed website provides a link to the Streamwatch Program through www.cherrycreekwatershed.net. The Site ID table above appears there and leads to the database for each monitoring site.

Tests completed each month include the recording of: air and water temperature, pH, water level (low, medium or high), water color and clarity, current weather (clear, cloudy, rain, etc.), odor if present, sulfates, nitrates, phosphates, total dissolved oxygen, specific conductivity, and alkalinity. Should unusual results occur, the stream monitor communicates with team leader who then repeats the test to verify the concern. If measurements beyond safe parameters are confirmed, the Department of Environmental Protection is notified for followup and action.

Species & Ecological Communities Tracked by PNHP Within the Cherry Creek Watershed - Monroe County, PA

ELCODE	Scientific Name	Common Name	Last Observation	State Rank	Global Rank	Proposed State Status
HPAH-----	Acidic shrub swamp	Acidic Shrub Swamp	1989-06-20	S3	G5	
PDAST01100	Aster ericoides	White Heath Aster	1982-08-26	S3	G5	TU
PMCYP031M0	Carex bebbii	Bebb's Sedge	1999-06-24	S1	G5	PE
PMCYP032B0	Carex buxbaumii	Brown Sedge	1993-06-16	S3	G5	TU
PMCYP034T0	Carex flava	Yellow Sedge	1994-06-08	S2	G5	PT
PMCYP034T0	Carex flava	Yellow Sedge	1997-06-04	S2	G5	PT
PMCYP033DN0	Carex tetanica	A Sedge	1993-06-16	S2	G4G5	PT
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	1967-07	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	1995-08-15	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	1998-SU	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	1999	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	2000-06-22	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	2000-07-17	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	2000-07-17	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	2000-07-17	S2	G3	PE
ARAAD02040	Clemmys muhlenbergii	Bog Turtle	2001-06-16	S2	G3	PE
PDAP10P010	Conioselinum chinense	Bog Turtle	1999-09-24	S1	G5	PE
PDFUM04040	Dicentra eximia	Hemlock-parsley	1997-05-05	S1	G4	PE
GLCAE-----	Drainage patterns	Wild Bleeding-hearts	1979	SNR	GNR	
PDONA060X0	Epiobium strictum	Drainage Patterns	1994-08-23	S3	G5?	PE
PDONA060X0	Epiobium strictum	Downy Willow-herb	1999-09-24	S3	G5?	PE
PMCYP0A0E0	Eriophorum viridicarinatum	Downy Willow-herb	1999-09-24	S3	G5?	PE
GLJA-----	Erosional remnant	Thin-leaved Cotton-grass	1994-06-08	S2	G5	PT
PDAQU010R0	Ilex opaca	Erosional Remnant	1979	SNR	GNR	
AFBAA02020	Lampetra appendix	American Holly	1989-07-03	S2	G5	PT
PDER10P050	Leucothoe racemosa	American Brook Lamprey	1998-07-24	S3	G4	CR
PDER10P050	Leucothoe racemosa	Swamp Dog-hobble	1989-06-20	S2S3	G5	TU
PDER10P050	Leucothoe racemosa	Swamp Dog-hobble	1997-05-22	S2S3	G5	TU
PDCAM0E0W0	Lobelia kalmii	Swamp Dog-hobble	1997-05-22	S2S3	G5	TU
AMACC01150	Myotis septentrionalis	Brook Lobelia	1994-08-23	S1	G5	PE
AMAFF08100	Neotoma magister	Northern Myotis	1996-02-06	S3B, S3N	G4	CR
HTHF-----	Northern appalachian acidic cliff community	Alleggheny Woodrat	1993-07-28	S3	G3G4	PT
HTHK-----	Northern appalachian acidic rocky summit community	Northern Appalachian Acidic Cliff Community	1997-05-05	S5	G5	
PDSAX0P050	Parnassia glauca	Northern Appalachian Acidic Rocky Summit Community	1983-05-13	S2	GNR	
PDSAX0P050	Parnassia glauca	Carolina Grass-of-parnassus	1984-06-23-	S2	G5	PE
PDSAX0P050	Parnassia glauca	Carolina Grass-of-parnassus	1997-06-04	S2	G5	PE
PDPGN0L210	Polygonum ramosissimum	Carolina Grass-of-parnassus	2003-05-01	S2	G5	PE
PDROS1C161	Prunus pumila var. depressa	Bushy Knotweed	1965-07-01	SH	G5	TU
PDROS1C161	Prunus pumila var. depressa		1983-07-12	S1	G5T5	PE
PDROS1C163	Prunus pumila var. susquehannae		1997-08-12	S1	G5T5	PE
PDROS1C163	Prunus pumila var. susquehannae		1991-08-08	S2	G5T4	PT
PDRAN0L0A5	Ranunculus aquatilis var. diffusus	White Water-crowfoot	1992-08-06	S2	G5T4	PT
PDRAN0L0A5	Ranunculus aquatilis var. diffusus	White Water-crowfoot	1997-06-04	S3	G5T5	PR
PDRAN0L0W0	Ranunculus flabellaris	White Water-crowfoot	1997-08-12	S3	G5T5	PR
PDSAL020K0	Salix candida	Yellow Water-crowfoot	1989-06-20	S2	G5	N
PMCYP0Q1F0	Schoenoplectus smithii	Hoary Willow	1993-08-04	S1	G5	PT
PMCYP0Q1F0	Schoenoplectus smithii	Smith's Bulrush	1956-08-24	S1	G5?	PE
PMCYP0Q1F0	Schoenoplectus smithii	Smith's Bulrush	1970-09-01	S1	G5?	PE
HPDA-----	Shrub fen	Smith's Bulrush	1978-09-03	S1	G5?	PE
ICMAL05060	Slygobromus allegheniensis	Shrub Fen	1987-09-14	S1	G2G3	
PDRAN0P022	Trollius laxus sensu stricto	Allegheny Cave Amphipod	1961-03	S2S3	G4	
			1991-04-20	S1	G3Q	PE

Appendix D

Fishery Survey of Cherry Creek

**FISHERY SURVEY
OF CHERRY CREEK**

September 2000

Prepared for

Brodhead Watershed Association

Jim Hartzler
Aquatic Biologist

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BACKGROUND

On 22 and 28 September 2000, Aquatic Resource Consulting conducted an inventory of the fish community of Cherry Creek (Monroe County, PA). The survey was requested by the Brodhead Watershed Association for the purpose of establishing a database to characterize the ecosystem. The presence and abundance of trout species was of particular interest because members of this family are considered good indicators of water quality. Future surveys would then permit the monitoring of changes in the fishery that might be related to land use in the watershed. Poorly regulated discharges and non-point source runoff from anthropogenic stresses (agriculture, land development, and contaminants) have the potential to degrade or pollute surface water quality and to adversely impact the biotic community – aquatic macroinvertebrates and fish. A survey of the benthic macroinvertebrate community was also conducted in 2000 at the same locations in Cherry Creek that were electrofished. That information is available in a separate report.

SITE DESCRIPTION

Cherry Creek at the sample locations is a second order valley stream located at the base of Kittatinny Mountain in southeastern Monroe County (Figure 1). It originates from springs near Saylorsburg, PA, and meanders approximately 15 miles through a relatively narrow, steep-sided valley before emptying into the Delaware River at Delaware Water Gap, PA. Elevation change from source to mouth is only 340 feet. Along its course, numerous tributaries erupting from Kittatinny Mountain feed Cherry Creek. Substrate material is primarily gravel, sand and silt, with scattered cobble and boulders in higher gradient riffle areas where scouring occurs. Riparian vegetation is well established and stable, alternating between trees that provide a thick canopy on the upper and lower stream to woody shrubs which create an impenetrable bankside overhang, particularly in the mid-valley area. Underlying geology is a complex of limestone, shale and siltstone overlain with unconsolidated glacial deposits of silt, sand, and gravel in the valley (Carswell and Lloyd 1979). As a consequence of the limestone formations, Cherry Creek has a much higher pH, alkalinity, and total dissolved solids than most Pocono area streams, which tend to be acidic with a low mineral content (Monroe County Water Quality Survey 1995).

Land use within Cherry Valley is limited to residential development with scattered commercial enterprises near the headwater area at Saylorsburg and at the mouth in Delaware Water Gap, PA. The entire watershed is heavily forested. Agriculture is limited to drier portions of the floodplain extending back to the base of the mountains, primarily in the upper and mid-valley region. Three golf courses are located in or near Delaware Water Gap. The only point source discharge is from Instrument Specialties, a tool and die manufacturer located in Delaware Water Gap. Cherry Creek is classified as a High Quality Coldwater Fishery by the PA Department of Environmental Protection.

METHODS

The fish community of Cherry Creek was sampled using a Coffelt BP1C variable voltage backpack electrofishing unit with hand held electrodes and 1/8 inch mesh nets. Three consecutive runs were made in an upstream direction. All trout were collected in each run and kept in separate containers, then enumerated, weighed, measured, and released. Quantitative estimates of population and biomass were made only for trout using the depletion removal technique (Zippin 1958). Other fish species were collected for identification on the first run from which relative abundance was estimated.

Four stations on Cherry Creek were sampled, located as follows (Figure 1):

- (1) Hatchery – below the discharge from the Cherry Valley Hatchery (length = 335 feet).
- (2) Church – below the Kemmerville Road bridge adjacent the Cherry Valley Methodist Church (length = 380 feet).
- (3) Rt. 191 – at a private residence approximately ½ mile upstream from the Cherry Valley Road/Rt. 191 intersection (length = 380 feet).
- (4) Delaware Water Gap (DWG) – just upstream from the trolley station in Delaware Water Gap, PA (length = 790 feet).

RESULTS AND DISCUSSION

Fish Community

Fifteen fish species were collected at the four sampling stations on Cherry Creek (Table 1). The number of taxa declined in a downstream direction, with sites #1 and #2 each supporting ten species, nine at site #3, and only seven at station #4 (Delaware Water Gap). The fish community of Cherry Creek included a diverse mix of coldwater and coolwater species, but also a few fish classified as warmwater species because of a preference for temperatures exceeding 22 degrees C (72 degrees F) – see Table 2. Coldwater taxa intolerant to environmental perturbation – primarily brown trout (*Salmo trutta*) – predominated at the two upstream stations. Cool and warmwater species less sensitive to degraded conditions, such as white sucker (*Catostomus commersoni*), American eel (*Anguilla rostrata*), and blacknose dace (*Rhinichthys atratulus*) were more numerous on the lower stream areas. Stocked trout or hatchery escapees, including brown, brook (*Salvelinus fontinalis*), and rainbow (*Oncorhynchus mykiss*), were found only at the Hatchery station (site #1). Distinction between wild and hatchery fish was based on external coloration and the condition of fins; hatchery trout recently released tend to be less colorful and to display fin erosion caused by crowding and abrasion.

Only three species were recovered at all four stations: wild brown trout, white sucker, and American eel (Table 1). Both brown trout and white suckers have a widespread distribution in colder streams in the Northeastern U.S., and both spawn at relatively cold temperatures (< 10 degrees C [<50 degrees F]) – trout in the fall and suckers in the spring. The primary forage of trout is aquatic macroinvertebrates, many of which, like trout, demand high water quality. White suckers, however, are indiscriminate bottom feeders more tolerant of warm temperatures and degraded stream conditions caused by siltation and contaminants. Eels are common in tributary streams to the Delaware River, even those with obstructions to flow and fish movement; the ability of eels to bypass man-made dams is legendary. Eels are catadromous – the adults descend streams in the fall to spawn in the ocean, primarily in the Sargasso Sea near Bermuda. The small eels (elvers) soon ascend freshwater streams along the Atlantic coast where they remain until they reach adulthood.

Table 1. Summary of electrofishing data at four stations on Cherry Creek sampled on 22 and 28 September 2000. A slash (-) indicates species was absent.

KEY: A = Abundant (>25 individuals); C = Common (10-25);
P = Present (5-10); R = Rare (<5).

<u>STATION</u>		#1 (Hatchery)	#2 (Church)	#3 (Rt. 191)	#4 (DWG)
Length	(feet)	335	380	380	790
Avg. width	(feet)	15	20	28	31
Area – acres		0.12	0.17	0.25	0.55
	Hectares	0.05	0.07	0.10	0.22

<u>FISH SPECIES</u>		<u>RELATIVE ABUNDANCE</u>			
Brown trout	<i>Salmo trutta</i>	A	A	A	C
Rainbow trout	<i>Oncorhynchus mykiss</i>	R	-	-	-
Brook trout	<i>Salvelinus fontinalis</i>	R	-	-	-
White sucker	<i>Catostomus commersoni</i>	C	C	A	P
American eel	<i>Anguilla rostrata</i>	P	P	A	A
Blacknose dace	<i>Rhinichthys atratulus</i>	P	P	A	-
Common shiner	<i>Luxilus cornutus</i>	P	P	A	-
Cutlips minnow	<i>Exoglossum maxillingua</i>	-	P	P	P
Tessellated darter	<i>Etheostoma olmstedii</i>	A	P	P	R
Fallfish	<i>Semotilus corporalis</i>	-	P	-	-
Pumpkinseed	<i>Lepomis gibbosus</i>	-	R	-	R
Rock bass	<i>Ambloplites rupestris</i>	R	-	-	R
Redfin pickerel	<i>Esox americanus</i>	-	R	R	-
Slimy sculpin	<i>Cottus cognatus</i>	R	-	-	-
Longnose dace	<i>Rhinichthys cataractae</i>	-	-	R	-

Table 2. Classification of fish species collected from Cherry Creek on 22 and 28 September 2000.

SPECIES	CRITERIA			
	Distribution	Temp.	Trophic Class	Tolerance
Brown trout	S	C	TC	I
Rainbow trout	S	C	TC	I
Brook trout	B,L	C	TC	I
White sucker	S,L	CW	GF	T
American eel	S,L	W	TC	T
Blacknose dace	B,S	CW	GF	T
Common shiner	S,L	CW	GF	M
Cutlips minnow	S,L	W	BI	I
Tessellated darter	S,L	CW	BI	M
Fallfish	S,L	CW	GF	M
Pumpkinseed	S,L	W	GF	M
Rock bass	S,L	CW	TC	M
Redfin pickerel	S,L	W	TC	M
Slimy sculpin	B,L	C	BI	I
Longnose dace	B,S	CW	BI	M

KEY

Distribution: B = brooks (flowing waters < 5 m wide);
 S = streams (flowing waters 5-10 m wide);
 L = lakes (includes ponds & reservoirs).
Temperature: C = coldwater; W = warmwater; CW = inhabits both types (coolwater).
Trophic Class: GF = generalist feeder (omnivore); BI = benthic insectivore;
 TC = top carnivore.
Tolerance (to environmental perturbation): T = Tolerant; I = Intolerant;
 M = Intermediate

The fish community at each station reflected not only the temperature regime, but also the quality of habitat. In a freshwater ecosystem, habitat - an organism's living area - includes the substrate (stream bottom material), channel configuration (pools, riffles, runs, flats) as influenced by the flow rate and stream gradient, instream structure (boulders, deadfalls, organic debris), and bankside vegetation. Each fish species has specific habitat needs to reproduce, grow and survive, such as suitable spawning areas, forage, and refuge sites. These features affect taxa distribution and abundance.

Trout, both wild and hatchery fish, predominated at station #1 below the outfall from the Cherry Valley Trout Hatchery (Table 1). Brown trout predominated, but two brook trout, one wild and one of hatchery origin, were also found. The wild individual may have drifted downstream from a headwater tributary since brook trout are known to require upwelling groundwater (springs) to reproduce. In addition, a total of nine rainbow trout were collected - three wild fish and six hatchery fish. Based upon their size, all the wild rainbows were probably yearling fish or older, so these may have been fingerling rainbows that escaped from the hatchery in previous years and survived rather than the product of natural reproduction in Cherry Creek. In addition to white suckers and American eels, several slimy sculpin (*Cottus cognatus*), a few common shiners (*Luxilus cornutus*), and one rock bass (*Ambloplites rupestris*) were also netted. Slimy sculpins are restricted to colder, unpolluted headwater streams; their habit of depositing eggs on the underside of rocks limits their distribution to waterways with minimal siltation and a cobble, boulder substrate. Common shiners are a small minnow with a moderate tolerance to stream degradation and omnivorous foraging habits, i.e., feeds on both algae and macroinvertebrates. Origin of the rock bass is uncertain, since its distribution is normally limited to larger streams and lakes rather than colder, headwater brooks. Habitat features at the Hatchery sampling location were good, with alternating pools and riffles, overhanging vegetation, and scattered boulders on a gravel/sand substrate.

Wild brown trout were also the most numerous species at site #2, followed by white sucker. Six additional species absent at site #1 were also collected - blacknose dace (*Rhinichthys atratulus*), cutlips minnow (*Exoglossum maxillingua*), tessellated darter (*Etheostoma olmstedi*), fallfish (*Semotilus corporalis*), pumpkinseed (*Lepomis gibbosus*), and redfin pickerel (*Esox americanus*). Most prefer a coolwater thermal range (20-22 degrees C [68-72 degrees F]). Spawning occurs when a certain minimum temperature is reached, usually in late spring or early summer. The pumpkinseed and pickerel probably

dispersed from impoundments in the Cherry Creek drainage, since both species usually inhabit warmer lakes or bogs rather than streams. The tessellated darter and the other minnow species – blacknose dace, cutlips minnow, and fallfish – are extremely adaptable and fairly small species which can subsist on tiny macroinvertebrates and algae. The stream area at station #2 was characterized by significant sediment deposits, primarily sand and gravel, lateral scour pools on outside bends, and thick, overhanging bankside vegetation, mostly speckled alder (*Alnus incana*).

Suckers, eel, dace, and shiners were numerically as abundant as brown trout at station #3, where pool areas were limited, velocity diminished, and sand/gravel flats predominated – not prime trout habitat. Almost all fish were collected in deeper cuts adjacent brush-lined banks. Cutlips minnow and tessellated darter were also present, with one redbfin pickerel and one longnose dace, a close relative to blacknose dace (Table 1). Longnose dace are associated with swift flows, which apparently provide essential spawning or refuge features; if present, generally only a few individuals are found.

Blacknose dace and eels were the most abundant species at the Delaware Water Gap site, followed by suckers and cutlips minnow (Table 1). Only 15 wild brown trout were collected, even though as much stream area was sampled at this location as the three other sites combined. A few tessellated darters, pumpkinseed, and rock bass were also present. The species representation here reflected not only the warmer temperature regime and habitat features at this most downstream stretch but also the resident fish community in the Delaware River. Dispersal of fish to and from the Delaware probably influenced the species composition near the mouth of Cherry Creek since there is no obstruction to fish passage. Physical characteristics may also affect fish distribution. The wider channel creates sluggish flows and increased sediment deposition. Sand and gravel was the primary substrate material – the least productive for aquatic macroinvertebrates, which are the primary forage item for many of these fish species, including trout. Large portions of the stream were barren flats of uniform depth with little instream structure (deadfalls, debris piles, and boulders) where fish can find refuge or foraging sites. Furthermore, overhanging bankside vegetation that provided cover on the upper stream sites was minimal.

Trout Population

Cherry Creek has a reproducing wild trout population from the upper sampling station below the Cherry Valley Hatchery to the mouth in Delaware Water Gap. However, numerical abundance, biomass (weight of fish per area of stream), and size distribution (relative numbers of each age group represented in the population) varied at each location. Numbers of trout were significantly lower at the two lower stations, just above and at Delaware Water Gap. Decline in habitat quality was probably the cause, but this decrease may also be attributable in part to warmer temperatures. A few brook and rainbow trout, both wild and of hatchery origin, were found at the most upstream station below the Hatchery; some may have escaped from the Cherry Valley Hatchery in 2000 or prior years

Approximately the same number of brown trout were collected at sites #1 and #2 (Table 3). However, far more fingerling (young-of-year, or 0+ age) and larger trout were taken at the upper station just below the Cherry Valley Hatchery. This suggests that spawning success was much higher at this stream area. Also, many of the larger trout at this station (ten fish exceeded 15 inches in length) may have been fish which escaped from Hatchery ponds. After a year or two in the stream, these fish are indistinguishable from those produced by spawning activity; they are "wild" fish. Actually, the trout population at site #2 was more balanced and probably more stable, with a more even representation by yearling and older fish. Numbers of trout declined significantly at sites #3 and #4, particularly for the smallest and largest size groups. This indicated poor spawning success and/or survival after hatching, as well as low production and/or high mortality of adult brown trout.

Good statistical regressions allowed precise estimates of the wild brown trout population, both numbers and biomass, at each station. Population estimates were calculated for each size group of brown trout. Each size group corresponded to a particular age group, or cohort, of fish. A length-frequency (L-F) distribution was prepared for all trout collected at the four stations on Cherry Creek (Figure 2). The peaks in this graph represent the average size of an age class; the valleys occur between age cohorts. The 0+ age group is easily identified – those fish less than 130 mm (5 inches). The sizes of older age groups are more difficult to distinguish when fish from all four sample locations are considered. This is because the growth rate increases as we move downstream in response to higher average temperatures during the warmer months. Temperature regulates growth in exothermic [cold-blooded] animals. However, when separate L-F distributions

Table 3. Number, population and biomass estimates, and average condition factors (K) of wild brown trout collected at four stations on Cherry Creek on 22 and 28 September 2000.

BROWN TROUT	#1 (Hatchery)	#2 (Church)	#3 (Rt. 191)	#4 (DWG)
<u>Age Group</u>	NUMBER COLLECTED			
0+ (young of year)	50	26	12	3
1+ (yearlings)	9	30	9	7
2+ (adults < 320 mm)	6	16	8	5
3+ (adults > 320 mm)	13	7	1	0
<i>1</i>				
<u>Age Group</u>	POPULATION ESTIMATE			
0+ (young of year)	63	26	15	3
1+ (yearlings)	9	34	10	7
2+ (adults < 320 mm)	6	16	9	5
3+ (adults > 320 mm)	13	7	1	0
	ESTIMATED BIOMASS			
kilograms/hectare	278	138	26	10
pounds/acre	312	154	30	11
	<i>2</i>			
<u>Age Group</u>	AVG. CONDITION FACTOR			
0+ (young of year)	0.80	0.95	-	0.87
1+ (yearlings)	0.86	0.95	-	0.90
2+ (adults < 320 mm)	0.94	0.94	-	0.95
3+ (adults > 320 mm)	0.94	0.96	-	-

1- Based upon the length-frequency distribution, age of trout was related to size and growth rate. This varied among stream areas sampled. For example, young-of-year trout were less than 120 mm at station #1 but somewhat larger (<160 mm) at station #4 because of faster growth, presumably due to warmer temperatures.

2- Weights and condition factors of trout were not measured at station #3 because of equipment malfunction.

were prepared for wild brown trout at each station, the average size of yearling (1+) trout at the sampling time at sites #1 to #4 was determined to be 160 mm (6.3 inches), 180 mm (7.1 inches), 210 mm (8.3 inches), and 230 mm (9.1 inches), respectively. These values are similar to those obtained on many area Pocono streams. Estimating age of fish beyond 10 inches using the L-F distribution is not recommended because of overlap in size of year classes. For example, the largest yearlings may be the same size as the smallest two-year-olds because of differences in growth between individual fish. Therefore, the size limit boundary chosen in this study for 2+ and 3+ year-old brown trout (320 mm, or 12.6 inches), may be somewhat arbitrary. However, few fish collected exceeded this length. In addition, population estimates for the largest fish are considered more accurate because sampling efficiency for this group is quite high, approaching 100%. The largest brown trout collected, taken below the Cherry Valley Hatchery, measured 483 mm (19.0 inches) and weighed 965 grams (2.1 pounds).

Estimated biomass of wild brown trout at sites #1 and #2 far exceeded the PA Fish & Boat Commission's standard for Class A trout streams (40 kg/hectare [44 pounds/acre]). Biomass below the Cherry Valley Hatchery was calculated as 278 kg/hectare (312 pounds/acre), while the value at site #2 was approximately half that value (Table 3). Values on most "freestone" Pocono streams – those with low dissolved solids – rarely exceed 100 kg/hectare and usually average 25-50 kg/hectare. The high carrying capacity for brown trout on Cherry Creek may be related to the higher dissolved mineral content or nutrient levels that increases the production of aquatic macroinvertebrates, the primary forage of trout and many other fish species. Numerous studies have shown a higher production of fish and invertebrates on such "limestone" streams. Of course, the large number of larger trout collected below the Cherry Valley Hatchery, some of which may have originated in the Hatchery, could have artificially elevated the biomass at this location. The biomass downstream at the Church site, however, would be unaffected by fish from the Hatchery and was probably the best estimate of carrying capacity on upper Cherry Creek. Biomass at the lower stream stations was much lower because few larger trout were present (Table 3).

The condition factor (K) for most groups of trout at the four stations on Cherry Creek was generally good (Table 3). Condition is a statistical calculation comparing weight to length; more robust fish have a higher condition. Wild trout generally display values between 0.90 and 1.10; lower values may indicate lack of forage, poor feeding, or stress from crowding or disease. Almost all age groups on

Cherry Creek were within the normal range. Young-of-year and yearling trout at the Hatchery site displayed somewhat lower condition values, but the condition of large trout at that location improved. Condition was not calculated for fish at site #3 because the weigh scale malfunctioned and weights of trout were not measured.

SUMMARY

Cherry Creek is a low gradient stream of moderate alkalinity located in a relatively undeveloped valley in Monroe County, PA. Four stream areas were electrofished between the headwaters area near Saylorburg, PA, and the juncture with the Delaware River. The stream supports a diverse fish community consisting of 15 species. Wild brown trout (*Salmo trutta*), a coldwater species intolerant to environmental degradation, predominated at the two upstream sampling stations but was also found at the two lower sites as well. White suckers (*Catostomus commersoni*) and American eel (*Anguilla rostrata*), two intolerant species preferring warmer temperatures, were also collected at all four locations. A mix of dace, minnows and darters adapted to both cool and warmwater ecosystems were also found at each station. Their numbers increased in a downstream direction, reflecting not only the warmer temperature regime but also physical instream features.

Biomass of wild brown trout at the two upper valley sample areas was 3 to 6 times the PA Fish & Boat Commission's standard (40 kg/hectare) for Class A trout streams. The presence of young-of-year (0+ age) brown trout provided evidence of natural reproduction at all sample locations. However, numbers and weight of trout declined significantly at the two locations nearer the Delaware River, probably in response to habitat degradation. This decrease can be attributed to the lack of pools, the scarcity of boulders and cobbles to support aquatic macroinvertebrates, sand-gravel deposition causing the proliferation of low-velocity flats, and the paucity of instream refuge and foraging sites for trout of all sizes. Wild and hatchery-bred brown, brook, and rainbow trout were found together only at the most upstream station – just below the Cherry Valley Hatchery. Escape of fish from the hatchery ponds may explain the presence of rainbow trout, but brook trout were probably the product of natural reproduction in Cherry Creek or an upstream tributary.

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Appendix E

PNDI List and Key for Cherry Creek Watershed

Element Ranking List - Pennsylvania Natural Heritage Program (PNHP) Global Rank Definitions

Global ranks (i.e. range-wide conservation status ranks) are assigned at NatureServe's Headquarters or by a designated lead office in the Heritage/Conservation Data Center Network.

Basic Global Rank Codes and Definitions

GX Presumed Extinct - Believed to be extinct throughout its range. Not located despite intensive searches of historic sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

GH Possibly Extinct - Known from only historical occurrences. Still some hope of rediscovery.

G1 Critically Imperiled - Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).

G2 Imperiled - Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).

G3 Vulnerable - Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

G4 Apparently Secure - Uncommon but not rare, and usually widespread. Possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.

G5 Secure - Common, typically widespread and abundant. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

Variant Global Ranks

G#G#Range Rank - A numeric range rank (e.g., G2G3) is used to indicate uncertainty about the exact status of a taxon.

GU Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

G? Unranked - Global rank not yet assessed.

HYB Hybrid - Element represents an interspecific hybrid.

Rank Qualifiers

? Inexact Numeric Rank - Denotes inexact numeric rank.

Q Questionable Taxonomy - Taxonomic status is questionable; numeric rank may change with taxonomy.

CCaptive or Cultivated Only - Taxon at present is extant only in captivity or cultivation, or as a reintroduced population not yet established.

Intraspecific Taxon Ranks

T Intraspecific Taxon (trinomial) - The status of intraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species= basic rank (e.g., a G1T2 subrank should not occur). A population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an intraspecific taxon and given a T rank; in such cases a Q is used after the T rank to denote the taxon's questionable taxonomic status.

The Nature Conservancy (6 August 1996 version) State Rank Definitions

State Rank Codes and Definitions

SX Extirpated - Element is believed to be extirpated from the "state" (or province or other subnational unit).

SHHistorical - Element occurred historically in the state (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 years, and suspected to be still extant. Naturally, an Element would become SH without such a 20-year delay if the only known occurrences in a state were destroyed or if it had been extensively and unsuccessfully looked for. Upon verification of an extant occurrence, SH-ranked Elements would typically receive an S1 rank. The SH rank should be reserved for Elements for which some effort has been made to relocate occurrences, rather than simply ranking all Elements not known from verified extant occurrences with this rank.

S1Critically Imperiled - Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals or acres.

S2Imperiled - Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals or acres.

S3Vulnerable - Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences.

S4Apparently Secure - Uncommon but not rare, and usually widespread in the state. Usually more than 100 occurrences.

S5Secure - Demonstrably widespread, abundant, and secure in the state, and essentially ineradicable under present conditions.

S?Unranked - State rank is not yet assessed.

SUUnrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible, the most likely rank is assigned and a question mark added (e.g., S2?) to express uncertainty, or a range rank (e.g., S2S3) is used to delineate the limits (range) of uncertainty.

S#S#Range Rank - A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the Element. Ranges cannot skip more than one rank (e.g., SU should be used rather than S1S4).

HYBHybrid - Element represents an interspecific hybrid.

SEExotic - An exotic established in the state; may be native in nearby regions (e.g., house finch or catalpa in eastern U.S.).

SE#Exotic Numeric - An exotic established in the state that has been assigned a numeric rank to indicate its status, as with S1 through S5.

SAAccidental - Accidental or casual in the state (i.e., infrequent and outside usual range). Includes species (usually birds or butterflies) recorded once or only a few times. A few of these species may have bred on the one or two occasions they were recorded. Examples include European strays or western birds on the East Coast and vice-versa.

SZZero Occurrences - Not of practical conservation concern in the state because there are no definable occurrences, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long distance migrants whose occurrences during their migrations have little or no conservation value for the migrant as they are typically too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped, and protected. In other words, the migrant regularly passes through the subnation, but enduring, mappable Element Occurrences cannot be defined. Typically, the SZ rank applies to a non-breeding population in the subnation -- for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population, for example certain Lepidoptera which regularly die out every year with no significant return migration. Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ only applies when the migrants occur in an irregular, transitory, and dispersed manner.

SPPotential - Potential that Element occurs in the state but no extant or historic occurrences reported.

SRRreported - Element reported in the state but without a basis for either accepting or rejecting the report. Some of these are very recent discoveries for which the program hasn't yet received first-hand information; others are old, obscure reports.

SRRFReported Falsely - Element erroneously reported in the state (e.g., misidentified specimen) and the error has persisted in the literature.

SSYSynonym - Element reported as occurring in the state, but state does not recognize the taxon; therefore the Element is not ranked by the state.

*S rank has been assigned and is under review. Contact the individual state Natural Heritage program for assigned rank. Not ProvidedSpecies is known to occur in this state. Contact the individual state Natural Heritage program for assigned rank.

Breeding Status Qualifiers

BBreeding - Basic rank refers to the breeding population of the Element in the state.

NNon-breeding - Basic rank refers to the non-breeding population of the Element in the state.

NoteA breeding status subrank is only used for species that have distinct breeding and/or non-breeding populations in the state. A breeding-status SRANK can be coupled with its complementary non-breeding-status SRANK. The two are separated by a comma, with the higher-priority rank listed first in their pair (e.g., AS2B,S3N@ or ASHN,S4S5B@).

Other Qualifiers

?Inexact or Uncertain - Denotes inexact or uncertain numeric rank. For SE denotes uncertainty of exotic status. (The ? qualifies the character immediately preceding it in the SRANK.)

CCaptive or Cultivated - Element is presently extant in the state only in captivity or cultivation, or as a reintroduced population not yet established.

The Nature Conservancy (6 August 1996 version)

Pennsylvania Status Definitions

Native Plant Species Legislative Authority: Title 17 Chapter 45, Conservation of Native Wild Plants, January 1, 1988; Pennsylvania Department of Conservation and Natural Resources.

Native Plant Status Codes and Definitions

PEPennsylvania Endangered - Plant species which are in danger of extinction throughout most of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.

PT Pennsylvania Threatened - Plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent their future decline, or if the species is greatly exploited by man.

PRPennsylvania Rare - Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Disjunct Significantly separated from their main area of distribution.

Endemic Confined to a specialized habitat.

Limit of Range At or near the periphery of their natural distribution

Restricted Found in specialized habitats or habitats infrequent in Pennsylvania.

PX Pennsylvania Extirpated - Plant species believed by the Department to be extinct within this Commonwealth. These plants may or may not be in existence outside the Commonwealth.

PV Pennsylvania Vulnerable - Plant species which are in danger of population decline within Commonwealth because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.

TU Tentatively Undetermined - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.

N No current legal status exists, but is under review for future listing.

Wild Birds and Mammals Legislative Authority: Title 34 Chapter 133, Game and Wildlife Code, revised Dec. 1, 1990, Pennsylvania Game Commission.

Wild Birds and Mammals Status Codes and Definitions

PE Pennsylvania Endangered - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public Law 93 205 (87 Stat. 884), as amended.

PTPennsylvania Threatened - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".

NNo current legal status but is under review for future listing.

Fish, Amphibians, Reptiles, and Aquatic Organisms Legislative Authority: Title 30, Chapter 75, Fish and Boat Code, revised February 9, 1991; Pennsylvania Fish Commission.

Fish, Amphibians, Reptiles, and Aquatic Organisms Status Codes and Definitions

PE Pennsylvania Endangered - All species declared by: 1) the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission, Executive Director to be threatened with extinction and appear on the Pennsylvania Endangered Species List published by the Pennsylvania Bulletin.

PTPennsylvania Threatened - All species declared by: 1) the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens, and appear on a Threatened Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission Executive Director to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin. PC Animals that could become endangered or threatened in the future. All of these are uncommon, have restricted distribution or are at risk because of certain aspects of their biology.

NNo current legal status, but is under review for future listing.

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

Invertebrates Status Codes and Definitions

N No current legal status but is under review for future listing.

Pennsylvania Biological Survey (PBS) Suggested Status Definitions

Pennsylvania Biological Survey (PBS) Suggested Status Codes and Definitions

Note: the same PBS Status codes and definitions are used for all PNDI tracked species.

PE Pennsylvania Endangered - Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently

found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public Law 93 205 (87 Stat. 884), as amended.

PTPennsylvania Threatened - Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".

PRPennsylvania Rare - Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Disjunct Significantly separated from their main area of distribution

Endemic Confined to a specialized habitat.

Limit of Range At or near the periphery of their natural distribution

Restricted Found in specialized habitats or habitats infrequent in Pennsylvania.

CP Candidate Proposed - Species comprising taxa for which the Pennsylvania Biological Survey (PBS) currently has substantial information on hand to support the biological appropriateness of proposing to list as Endangered or Threatened.

CACandidate at Risk - Species that although relatively abundant now are particularly vulnerable to certain types of exploitation or environmental modification.

CR Candidate Rare - Species which exist only in one of a few restricted geographic areas or habitats within Pennsylvania, or they occur in low numbers over a relatively broad area of the Commonwealth.

CUCondition Undetermined - Species for which there is insufficient data available to provide an adequate basis for their assignment to other classes or categories.

PXPennsylvania Extirpated - Species that have disappeared from Pennsylvania since 1600 but still exist elsewhere.

DLDelisted - Species which were once listed but are now cited for delisting.

NNo current legal status, but is under study for future listing.

Federal Status Definitions

Native Plant and Animal Species Legislative Authority: United States Endangered Species Act of 1973: Public Law 93-205. U.S. Fish and Wildlife Service.

Federal Status Codes and Definitions

LE Listed Endangered - A species which is in danger of extinction throughout all or a significant portion of its range.

LTListed Threatened - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

LELTListed Endangered in part of range; listed Threatened in the remaining part.

PEProposed Endangered - Taxa proposed to be listed as endangered.

PTProposed Threatened - Taxa proposed to be listed as threatened.

PEPTProposed Endangered in part of range; proposed Threatened in the remaining part.

CCandidate for listing.

E(S/A)Treat as Endangered because of similarity of appearance.

T(S/A)Treat as Threatened because of similarity of appearance.

XEEssential Experimental population.

XNNonessential Experimental population.

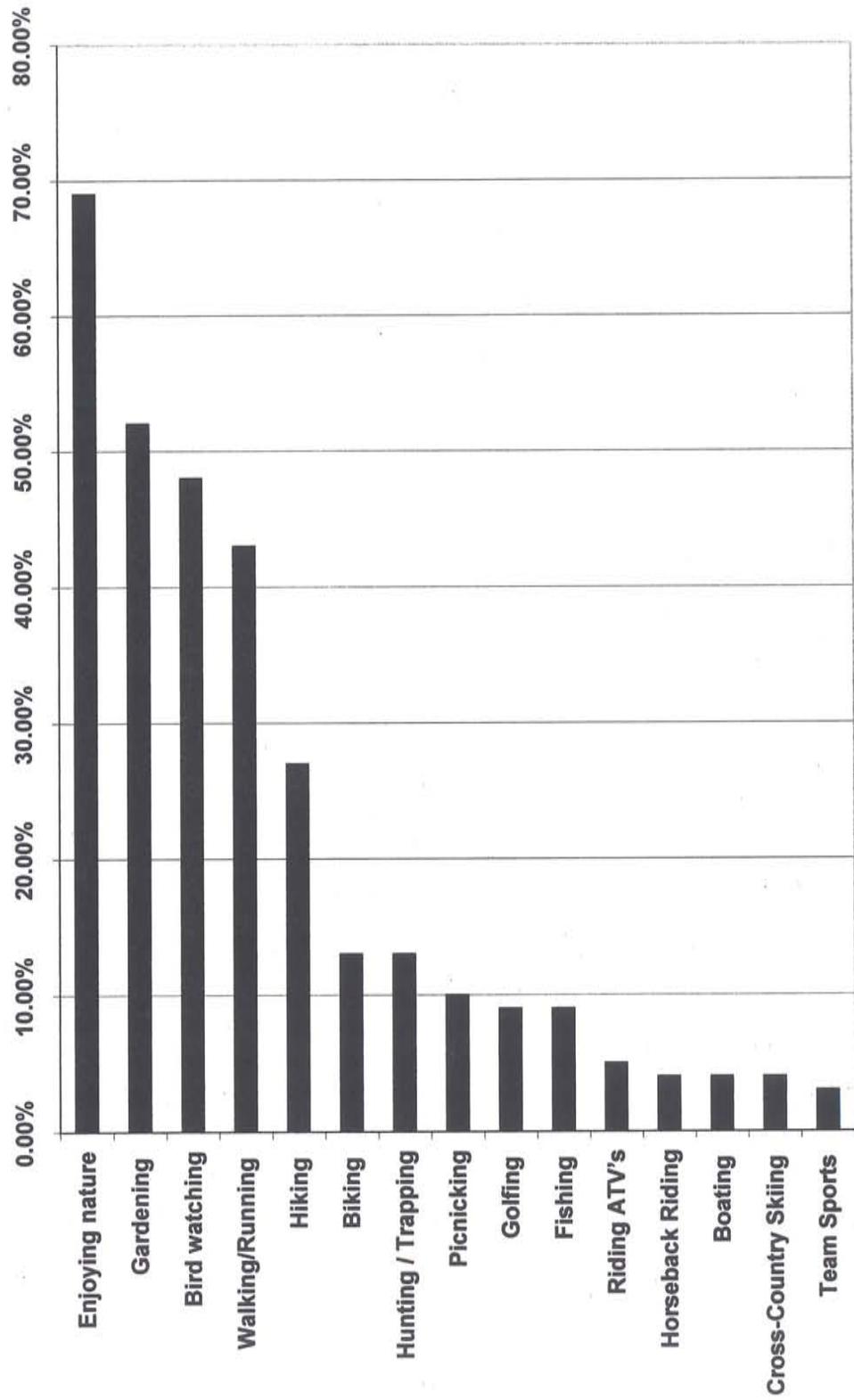
"xy" (mixed status)Status varies for different populations or parts of range.

"x" NLStatus varies for different populations or parts of range with at least one part not listed.

Appendix F

Citizen Survey and Project Fact Sheet

Survey Responses of Activities Frequently Done in the Cherry Creek Watershed



Fact Sheet

Cherry Creek Watershed Conservation Plan



A Sub-Association of the Brodhead Watershed Association
Box 339, Henryville, PA 18332 (570) 839-1120



The Brodhead Watershed Association is leading an effort to develop a Watershed Conservation Plan for the Cherry Creek Watershed, from the head waters near Saylorsburg to the mouth in Delaware Water Gap. With help from citizens like yourself, we can ensure that the plan responds to the needs of our community.

A Special Place That Deserves Special Attention

The Cherry Valley is a unique natural and cultural resource. Cherry Creek is recognized as a High Quality Cold Water Fishery with naturally reproducing wild trout. Due primarily to the underlying limestone bedrock in the watershed, rare plants, animals and natural communities have been inventoried by The Nature Conservancy. Cherry Valley also has unique scenic beauty. The Kittatinny Ridge provides a striking forested backdrop and open tracts of farmland provide many pastoral vistas.

An Opportunity for Positive Change

Change is taking place in the valley as development of open lands continues. Working in partnership with landowners, municipal officials, business and industry, and agencies, we are working to ensure that the watershed maintains its unique character.

A Locally Based Plan

With funding from the PA Rivers Conservation Program, we are developing a plan for the watershed that will set-out a positive direction for us to follow in the future. The Watershed Conservation Plan will include:

- ✓ an inventory of natural, recreational and cultural resources;
- ✓ an analysis of the current condition, uses, and issues facing the watershed;
- ✓ an action plan for improved conservation and management of the Cherry Creek watershed.

Benefits from the Plan

When the Cherry Creek plan is complete, and with community support, we will submit the plan to the state. Approval of the plan will then make us eligible for additional funding to carry out important watershed projects. Strong partnerships to carry out the Cherry Creek Watershed Conservation Plan will be fostered and will be built upon successful work underway in the valley.

Current Stewardship Efforts

Active projects in the watershed include the Streamwatchers, a group of volunteers that go out monthly and test the condition of our stream quality. The Nature Conservancy is working with landowners to inventory unique species and conserve key properties in the valley. Many farmers in the valley have included their farms in an Agricultural Security Area. This designation recognizes the important stewardship role that landowners play in maintaining the quality of the valley.

How You Can Help

- ✓ Participate in upcoming meetings.
- ✓ Fill out our survey on watershed issues and needs.
- ✓ Join the Watershed Association;
call (570) 839-1120 for more information

For More Information

To learn more about the Cherry Creek watershed project, visit our website at www.cherrycreekwatershed.net or contact Gary Bloss, Project Consultant at (570) 992-0899 or email at bloss@epix.net.

Results from the Cherry Creek Watershed Survey:

Due to the fact we received a little more than 20% of the surveys back, we feel that the survey was quite a success. Here is a summary of the results:

- ◆ Most of the respondents had property located in Hamilton Township or Stroud Township and have lived there for more than 30 years. Also, most live less than a quarter mile from Cherry Creek.
- ◆ Most believed that Cherry Creek is of moderately clean quality and they would wade in it occasionally.
- ◆ The most frequent activities engaged in, in the watershed are: enjoying nature, gardening, bird watching, and walking/running. Activities occasionally done were hiking and biking.
- ◆ Projects most heard about being done in the watershed area were: Nature Conservancy studies and recent land purchases, open space plans and acquisitions, and Monroe County Agricultural Land Preservation Program.
- ◆ Projects least heard about being done in the watershed area were: Streamwatchers water quality monitoring program, Streamwalk assessment, and Kittatinny Ridge Project.
- ◆ Current major problems sited in the watershed were: loss of agricultural land and open space to development, increased vehicular / auto traffic, and loss of wetlands.
- ◆ Current occasional problems sited in the watershed were: loss of scenic quality, trash and litter / illegal dumping, less groundwater from water withdrawals from wells, threats to drinking water quality, soil loss and sedimentation from new development and agriculture practices, fertilizer & herbicides runoff from lawns, farms & golf courses, property damage from wildlife, solid waste disposal, storm water runoff from parking lots & streets, water contamination from failing septic tanks, animal waste from dogs, geese, farm animals, etc., and frequency of flooding.
- ◆ Major problems in the next 5 to 10 years sited in the watershed were: loss of agricultural land and open space to development, increased vehicular / auto traffic, loss of wetlands, loss of scenic quality, trash and litter / illegal dumping, less groundwater from water withdrawals from wells, threats to drinking water quality, soil loss and sedimentation from new development and agriculture practices.
- ◆ Occasional problems in the next 5 to 10 years sited in the watershed were: fertilizer & herbicides runoff from lawns, farms & golf courses, property damage from wildlife, solid waste disposal, storm water runoff from parking lots & streets, water contamination from failing septic tanks, animal waste from dogs, geese, farm animals, etc., and frequency of flooding.
- ◆ Most respondents believe its very important to protect the streams & lakes in the watershed, also that it is very important to preserve farming in the community.
- ◆ Actions that respondents labeled as very important if money were used to improve the Cherry Creek and surrounding areas were to: encourage preservation of open space as part of new development, protect environmentally sensitive areas, encourage municipalities to work together on more effective planning and zoning, preserve more natural areas, preserve scenic quality, work with landowners on ways to protect water quality, repair malfunctioning septic systems, restore degraded streams, and create watershed wide system of greenways and trails.
- ◆ Actions that respondents labeled as important if money were used to improve the Cherry Creek and surrounding areas were to: create a litter clean up program, preserve historic buildings, environmental education programs, stormwater management programs, and flood loss prevention actions.

Some survey resposes to- What Do You Think?

General

- *Congratulations on the planning and the achievements thus far! The meeting at Hamilton Church was informative, Good Work!*
- *Thrilled people are working on it. Thank You!*
- *I appland your efforts and recognize the importance of protecting our watershed and remaining open lands.*
- *Love Cherry Valley.*

Agricultural Lands

- *As an individual land-owner, I regret the loss of farms in the Valley, which has led to unabated development. The vast majority of these homes are of a size and cost that leads one to believe that their owners made their living outside the area and bring their urban/suburban attitude to a rural area. The long term residents of this beautiful valley have done the best they could with limited resources available to them. The stewardship is taken quite seriously! I hope a balance can come to both viewpoints.*
- *Farming itself is not as important as preserving land from being developed.*
- *How to preserve farm lands and not develop them.*
- *Encourage more farms; lower taxes on large landowners to encourage less development.*
- *Promote profitable organic farming in the valley.*

Land Conservation

- *Would love to see Cherry Valley's open beauty preserved.*
- *I believe that major damage has already been done to the entire area; and it will be a cold day in hell before the municipalities will do anything to stop growth and pollution in the Cherry Valley area.*
- *I'm glad the valley is being preserved. We need to continue before it is too late to preserve.*
- *I would like it fully restored, no more building homes, gas stations, banks, and all the unnecessary distribution of land and water ways. I want the trapping of animals stopped, also stop the destruction of all plants & trees.*
- *I bought my acre of land and built a home without disturbing the environment. A fight to stop erosion, but I did it and bought another acre adjoining when I found out the development was occurring. All this in 22 years. In only a few months, I have seen erosion of the adjoining land, dirty roads, unlawful burning of trees during the night, an ash covered neighborhood uncovered dirt trucks, etc. Developers must be stopped. We do not have land left except for the National Park. It is so sad. I gave an acre to DWG in order to protect it.*
- *If we let the developers do what they want, there won't be a creek or any wildlife left to worry about. We must protect the water & surrounding areas which feed the creek.*
- *I'm wondering what the impact will be when the water company timbers it's property as has been rumored. As past president of Pocono Forestry Association I can vividly imagine the devastation to trees & ecosystems that will follow this action, changing forever (at least my lifetime I should say) the beauty of a very special area.*

Managing Growth

- *Limit development w/ better zoning.*
- **PLEASE STOP THE DEVELOPMENT! NOW!**

Recreation / Trails

- *We would like the emphasis to be on maintaining the natural beauty of the area through conservation and anti-pollution efforts rather than active development of parks/recreation areas and educational programs.*
- *Less emphasis on recreational facilities, more on preservation of natural beauty.*
- *Some public access is important but should be limited given sensitive plants, etc. Also only 'low impact' type facilities should be pursued.*
- *I would like to see a community park or recreation center.*
- *Would like to see bike lanes or trails.*
- *Can trailways be developed in nature that go along cherry creek / transverse it, hook up with other trails ie. Kittatinny Ridge?*

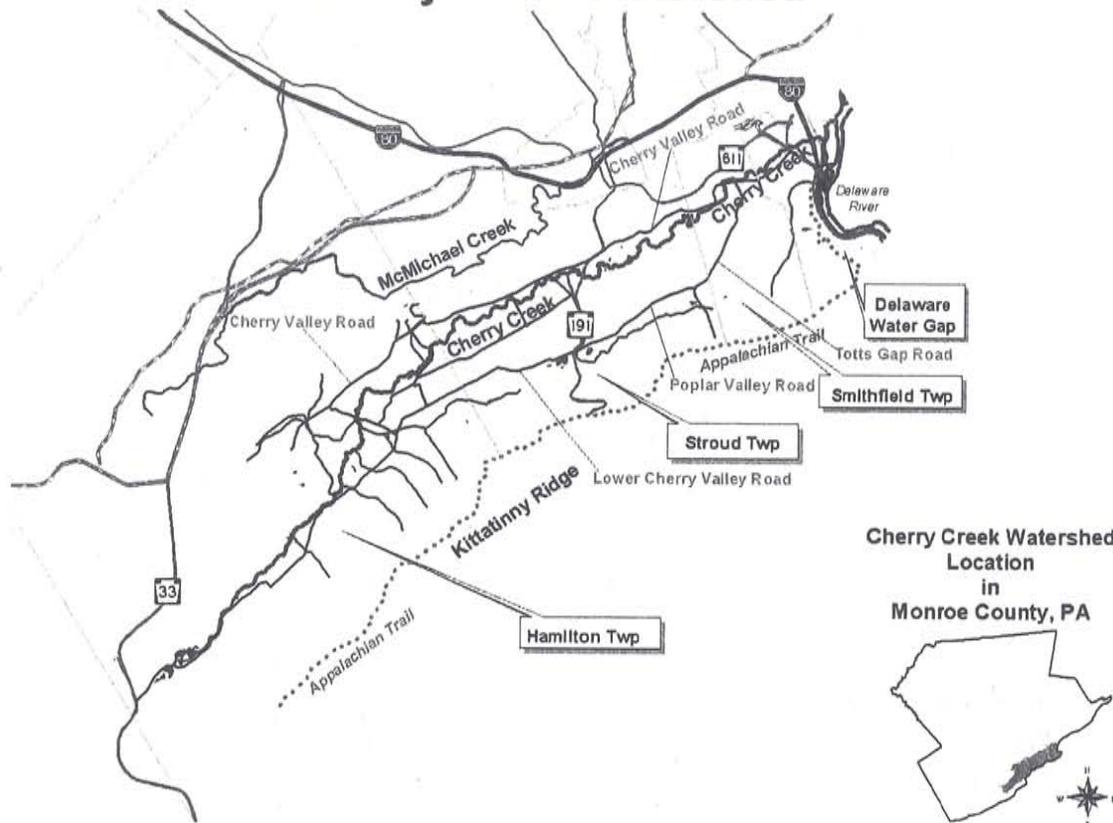
Wildlife

- *How will this project affect the Nat. Fish & Wildlife Refuge Plan? Are the overall goals the same?*
- *Need more pointed wildlife management under control on PA Game Comm State Biologist not politicians on private wildlife groups sound forest management.*

Water Quality

- *I've lived in the valley for 67yrs and have seen how it has grown, 25yrs ago if 10 cars went by our house that was a lot- today 20 cars go by in 15min, we use to swim in the creek when I was growing up, the water was clear as spring water, I've seen it slate gray during the summer. I had no idea what caused this problem.*
- *Reduce/eliminate pesticides from running off.*

Cherry Creek Watershed



More Facts on the Cherry Creek Watershed:

- The Cherry Creek Watershed covers 13,314 acres, about 20.8 square miles in total. The elevation change from source to mouth is only about 370 feet. The watershed includes parts of 4 municipalities: Hamilton Township, Stroud Township, Smithfield and the Borough of Delaware Water Gap.
- The Cherry Creek is a second order valley stream located at the north slope base of Kittatinny Mountain in southeastern Monroe County, Pennsylvania.
- The Creek meanders for approximately 15 miles through narrow, steep-sided valley, eventually emptying into the Delaware River at the Delaware Water Gap.
- Cherry Creek is designated as a High Quality Cold Water Fishery according to the PA Department of Environmental Protection.
- The underlying geology is a complex limestone, shale and siltstone overlain with unconsolidated glacial deposits of silt, sand and gravel in the valley. Because of the limestone formations, Cherry Creek has a much higher pH, alkalinity and total dissolved solids than is found in most Pocono area streams, which generally are acidic with a low mineral content.
- A total of 15 fish species were collected from four sampling stations in September 2000.
- Cherry Valley was formed as a result of glaciers, glacial lakes and lake bottom sediment. The resultant numerous, high-yield springs throughout the valley helps create and maintain a unique system of wetlands.
- According to the Nature Conservancy, at least ten rare plant species exist in the valley.
- Cherry Valley is part of a major raptor flyway along the Blue Mountain's Kittatinny Ridge, and spectacular views of the valley are seen from Wolf's Rock, one of the most scenic parts of the entire Appalachian Trail.

Appendix G

Stream Walk Assessment Matrix

Cherry Creek Watershed Conservation Plan

In association with the Bradhead Watershed Association
 Box 339, Henryville, PA 18332 (570) 839-1120

Cherry Creek

Streamwalk Assessment, August 2002

Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
0.00-0.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposit (~)10% Rip-Rap at 611 bridge 	<ul style="list-style-type: none"> Moderately stable- Banks low, slight erosion on outside of bends, mostly protected by roots and vegetation RR bridge slightly narrows channel, Rte 80 arched bridge (no impact) 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% <i>Ambiguous creek terminus, we walked approx. 1/4 mile beyond end</i> 	<ul style="list-style-type: none"> Good - About 30-50% of bottom is rubble, boulder, or gravel or other suitable habitat- Some deeper areas in pools, runs, or riffles
0.25-0.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposit 10% Manmade debris- one house up-stream left side before 611 bridge had trash dump behind house shed, not to creek. More human debris than other segments Drain Pipes-storm drains at state bridge Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% <i>Parking lots by trolley station has no cover by creek, up-stream right</i> 	<ul style="list-style-type: none"> Good <i>Old remains of concrete dam makes small waterfall below 611 bridge</i>
0.50-0.75	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
0.75-1.00	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths <i>Huge tree recently blew over creek at 1 mile mark. Owner was concerned about removal as back up would flood nearby properties. He asked DEP but they didn't help and told him not to use a chain saw due to pollution risk from gas engine. We think that is ridiculous.</i> 	<ul style="list-style-type: none"> Good
1.00-1.25	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- Rocks, bank & dams Sediment deposits 20% of segment Rip-rap 10% of segment 	<ul style="list-style-type: none"> Moderately stable Artificial devices- stones, cement block, ties 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slow runoff appears excellent Canopy cover over stream channel is less than 50% <i>1-1.1 lawns, erosion control / log jam at 1.20 needs removal</i> 	<ul style="list-style-type: none"> Good

*Comments in italics are from streamwalk volunteers

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Cherry Creek Watershed Conservation Plan

In association with the Broadhead Watershed Association
 Box 339, Henryville, PA 18332 (570) 839-1120

Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
1.25-1.50	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- some wash in Sediment deposits 20% of segment Wood duck habitat 1.4 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good. Canopy cover is greater than 50% More trees down, blocking stream, than elsewhere 	<ul style="list-style-type: none"> Good
1.50-1.75	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable Artificial devices- some stones being added by duck pond to stabilize bank Upstream Right 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good. Canopy cover is greater than 50% Lawn by duck pond along road 	<ul style="list-style-type: none"> Good
1.75-2.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits 10% of segment 	<ul style="list-style-type: none"> Moderately stable Surprisingly clean where duck pond feeds into creek, evidence of ongoing stabilization of banks with stone 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good- excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
2.00-2.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits 10% of segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
2.25-2.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposit 10% of segment Silt very easily kicked up, making creek cloudy 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% Last .1 mile unprotected golf course, much seaweed. 	<ul style="list-style-type: none"> Good
2.50-2.75	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
2.75-3.00	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% Lawn at golf course 	<ul style="list-style-type: none"> Fair: about 10-30% of area is boulder, rubble, gravel - habitat available is less than desirable mostly shallow with a few deeper areas, otherwise good 6 trees, trash (not much), drain pipes (loose formerly for roads, Smithfield TWP), many feeder streams, a lot still w/water, 150 yd lawn at 3.0 mile

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Cherry Creek Watershed Conservation Plan

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*Comments in *italics* are from streamwalk volunteers

Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
3.00-3.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits 10% of segment 	<ul style="list-style-type: none"> Moderately unstable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
3.25-3.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits 15% of segment 	<ul style="list-style-type: none"> Moderately unstable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is <i>close to</i> 50% 	<ul style="list-style-type: none"> Good
3.50-3.75	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good-excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good Beaver Dam
3.75-4.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits 10% of segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good-excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good Beaver Dam
4.00-4.25	<ul style="list-style-type: none"> Water is clear, appears clean <i>murky</i> Sediment deposits on 75% of segment <i>Wood duck habitat</i> 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
4.25-4.50	<ul style="list-style-type: none"> Water is clear, appears clean <i>murky</i> Sediment deposits on 15% of the segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% <i>Almost 300 yrd. Lawn by swimming hole by Greck home</i> 	<ul style="list-style-type: none"> Good
4.50-4.75	<ul style="list-style-type: none"> Water is clear, appears clean <i>cloudy</i> Sediment deposits on 90% of segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Fair

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Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
4.75-5.00	<ul style="list-style-type: none"> Water is clear, appears clean <i>cloudy</i> Sediment deposits on 25% of the segment All sediment noted from 5.0 to 4.0 describes areas of deepest sediment (covers part of shoes). All stream bottoms had visible sediment, which clouded water as we walked through it. 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
5.00-5.25	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris-52 gallon steel drum Sediment deposits on 5% of segment Channelization-5% of segment 	<ul style="list-style-type: none"> Moderately stable <i>Widened below 191 bridge</i> 	<ul style="list-style-type: none"> Left-approximately 1 active channel width Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good
5.25-5.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 30% of the segment Channelization on 10% of segment Rip-rap on 1% of segment <i>Old tire and metal pail in water</i> 	<ul style="list-style-type: none"> Moderately stable, <i>under cutting behind Groner's house</i> Artificial devices- <i>stabilized with rock</i> 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Excellent: More than 50% of bottom is rubble, boulder, gravel, submerged logs, and undercut banks. Good variety of riffles and deep pools or runs
5.50-5.75	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 30% of segment Channelization on 1% of segment Rip-rap on 200' of right side segment 	<ul style="list-style-type: none"> Moderately unstable Artificial devices-200' of rip-rap w/ lawn beyond Bridge Crossings- <i>widened below bridge</i> 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths, except 250' on left side Right-at least 2 or more active channel widths, except 200' on right side Quality for slowing runoff appears excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Good Trout
5.75-6.00	<ul style="list-style-type: none"> Water is clear, appears clean Unpleasant odor, <i>muck smell of sewage</i> Sediment deposits on 80% of segment Channelization on 10% of segment 	<ul style="list-style-type: none"> Moderately stable, 20' section <i>high bank</i> 	<ul style="list-style-type: none"> Left- 1/2 to 1/3 active channel width Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Poor: Less than 10% of area is boulder, rubble, gravel, or other stable habitat- mostly wide, shallow and flat with an obvious lack of habitat
6.00-6.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 70% of segment Channelization on 2% of segment 	<ul style="list-style-type: none"> Moderately stable Bridge Crossings- <i>no disturbance</i> 	<ul style="list-style-type: none"> Left-at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Poor: Less than 10% of area is boulder, rubble, gravel, or other stable habitat- mostly wide, shallow and flat with an obvious lack of habitat

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Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
6.25-6.50	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- 2 dams 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Fair
6.50-6.75	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 50% of segment Manmade debris- 3 manmade dams 40+ years old, 2 bridges 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- 1/2 to 1/3 active channel width Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair
6.75-7.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 65% of segment 	<ul style="list-style-type: none"> Moderately unstable Silt, high bank on right, no fish 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair
7.00-7.25	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- foot bridge Sediment deposits on 80% of segment Slow water / muck 	<ul style="list-style-type: none"> Moderately stable High bank on right side 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Poor
7.25-7.50	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- foot bridge Sediment deposits on 100% of segment Channelization on 3% of segment 	<ul style="list-style-type: none"> Bridge Crossing- below widened stream channel 	<ul style="list-style-type: none"> Quality for slowing runoff appears excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Poor
7.50-7.75	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 100% of segment 	<ul style="list-style-type: none"> Stable- Low, outside bends protected by roots & vegetation. No signs of erosion. 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears excellent Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Poor
7.75-8.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 100% of segment 	<ul style="list-style-type: none"> Moderately unstable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Poor

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Cherry Creek Watershed Conservation Plan

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Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
8.00-8.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 100% of segment 	<ul style="list-style-type: none"> Unstable- Banks typically high. Some erosion in straight reaches and inside of bends as well as outside. Bank slumping apparent. 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears poor Canopy cover is less than 50% 	<ul style="list-style-type: none"> Poor
8.25-8.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 100% of segment 	<ul style="list-style-type: none"> Unstable 	<ul style="list-style-type: none"> Left- less than 1/3 active channel width Right- less than 1/3 active channel width Quality for slowing runoff appears good Canopy cover is less than 50% 	<ul style="list-style-type: none"> Poor
8.50-8.75	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- areas of concrete 	<ul style="list-style-type: none"> Unstable 	<ul style="list-style-type: none"> Left- less than 1/3 active channel width Right- less than 1/3 active channel width Quality for slowing runoff appears poor Canopy cover is less than 50% 	<ul style="list-style-type: none"> Poor
8.75-9.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 30% of segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair Fresh water clams, algae
9.00-9.25	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 30% of segment 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair
9.25-9.50	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 70% of segment 80% Algae 	<ul style="list-style-type: none"> Unstable Clay Bridge Crossing- doesn't widen area 	<ul style="list-style-type: none"> Left- approximately 1 active channel widths Right- approximately 1 active channel widths Quality for slowing runoff appears good Canopy cover is less than 50% Over grown farm fields 	<ul style="list-style-type: none"> Fair
9.50-9.75	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- 1 Sediment deposits on 40% of segment 	<ul style="list-style-type: none"> Unstable, clay banks 	<ul style="list-style-type: none"> Left- less than 1/3 active channel width Right- less than 1/3 active channel width Quality for slowing runoff appears good Canopy cover is less than 50% Over grown fields 	<ul style="list-style-type: none"> Fair
9.50-9.75	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris- Litter along blacktop road, Stadden Road 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- approximately 1 active channel width Right- at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Good Some silting on gravel rubble
9.75-10.00	<ul style="list-style-type: none"> Team II was not able to assess this section. 	<ul style="list-style-type: none"> Team II was not able to assess this section. 	<ul style="list-style-type: none"> Team II was not able to assess this section. 	<ul style="list-style-type: none"> Team II was not able to assess this section.

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Cherry Creek Watershed Conservation Plan

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*Comments in italics are from streamwalk volunteers

Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
10.00-10.25	<ul style="list-style-type: none"> Water is clear, appears clean <i>Cardinal Flower</i> 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Excellent: More than 50% of bottom is rubble, boulder, gravel, submerged logs, and undercut banks. Good variety of riffles and deep pools or runs.
10.25-10.50	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Canopy cover is less than 50% 	<ul style="list-style-type: none"> Excellent
10.50-10.75	<ul style="list-style-type: none"> Water is clear, appears clean Discoloration, <i>suds?</i> 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears excellent Canopy cover is less than 50% 	<ul style="list-style-type: none"> Excellent
10.75-11.00	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Excellent
11.00-11.25	<ul style="list-style-type: none"> Water is clear, appears clean Manmade debris-stone dam 	<ul style="list-style-type: none"> Moderately stable Bridge crossings-<i>Fetherman Road- state bridge</i> 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears excellent Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Good
11.25-11.50	<ul style="list-style-type: none"> Water is clear, appears clean <i>Manmade pools</i> 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-approximately 1 active channel width <i>Wetland area on left behind Hatchery Pond</i> 	<ul style="list-style-type: none"> Fair
11.50-11.75	<ul style="list-style-type: none"> Water is clear, appears clean Drain Pipes- <i>discharge from pond Hatchery</i> 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair
11.75-12.00	<ul style="list-style-type: none"> Water is clear, appears clean Sediment deposits on 75% of segment <i>Dam directing flow at start of hatchery</i> 	<ul style="list-style-type: none"> Moderately unstable Bridge Crossing- <i>narrowing bridge on Cherry Lane</i> 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Fair

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Mile	Attributes of Stream	Bank Stability	Riparian Zone	In-Stream Habitat
12.00-12.25	<ul style="list-style-type: none"> Water is clear, appears clean Discoloration- rust colored residue seeping out of bank & one site of suds Seaweed growth, gravel bottom natural islands 	<ul style="list-style-type: none"> Moderately stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Quality for slowing runoff appears good Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Good
12.25-12.50	<ul style="list-style-type: none"> Water is clear, appears clean Mannmade debris-stone dams to create pools Pine forest on left bank, wetlands on right 	<ul style="list-style-type: none"> Moderately stable Bridge crossing- at Rossi property- no disruption of stream 	<ul style="list-style-type: none"> Left-less than 1/3 active channel width Right-at least 2 or more active channel widths Wetlands on right side 	<ul style="list-style-type: none"> Good, gravel Nice part of stream
12.50-12.75	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Excellent
12.75-13.00	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Excellent Nice part of stream
13.00-13.25	<ul style="list-style-type: none"> Water is clear, appears clean 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Canopy cover is greater than 50% 	<ul style="list-style-type: none"> Excellent
13.25-13.50	<ul style="list-style-type: none"> Water is clear, appears clean Channelization- Road 	<ul style="list-style-type: none"> Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Right-less than 1/3 active channel width- road Quality for slowing runoff appears excellent Canopy cover is greater than 50% 13.25 pumping station 	<ul style="list-style-type: none"> Excellent
13.50-13.75	<ul style="list-style-type: none"> Water is clear, appears clean Channelization- on 50% of segment Drain Pipes- crossing road 2 times 	<ul style="list-style-type: none"> Stable Unstable-where road is will need periodic work by PennDOT Artificial devices- rocks in galvanized baskets 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Left-less than 1/3 active channel width Quality for slowing runoff appears excellent Canopy cover is greater than 50% Road 	<ul style="list-style-type: none"> Excellent
13.75-14.00	<ul style="list-style-type: none"> Water is clear, appears clean Channelization on 40% of segment Drain Pipes- pipe under road, pipe from pond 	<ul style="list-style-type: none"> Stable Moderately Stable 	<ul style="list-style-type: none"> Left- at least 2 or more active channel widths Right-at least 2 or more active channel widths Right-less than 1/3 active channel width, where road crosses Quality for slowing runoff appears excellent Canopy cover is greater than 50% Road on crossover 	<ul style="list-style-type: none"> Excellent

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Appendix H

Greater Cherry Valley Wildlife Initiative

**FRIENDS OF CHERRY VALLEY
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<www.friendsofcherryvalley.com>**

June 2003

Dear Friend,

This letter is an update on the efforts being made to save the scenery, the wildlife, and the rural setting of Cherry Valley, and specifically, one of the strategies--which is to make the valley a significant portion of a proposed National Wildlife Refuge.

This is a complicated subject, and space allows us to touch on only a few topics. However, our website <www.friendsofcherryvalley.com> or a phone call to 570-643-7922 ext.18 should provide answers to your more extensive and detailed questions.

We hope that you will sign up and give us your input to make the "saving of Cherry Valley" a reality.

On the southern border of Monroe County and only a few minutes from Stroudsburg lies a modest rural valley that has been treasured by local residents since it was settled in the eighteenth century. Those lucky enough to live in the fifteen mile-long valley, from Delaware Water Gap to Saylorsburg, know that it is much more than just a scenic drive.

Cherry Valley has a rich history, it is the home of a diversity of important and sometimes rare wildlife, and it supports many types of recreation. Valley friends and residents are working hard to conserve Cherry Creek, its watershed, its numerous and plants and animals, and to help maintain the open fields and forests so they may be enjoyed by future generations. Many organizations are involved, such as the local municipalities, Pocono Heritage Land Trust, The Nature Conservancy, the Monroe County Agricultural Land Preservation Board and the Monroe County Conservation District; but more help is needed.

One of the strategies to be explored is to establish a National Wildlife Refuge, which would allow interested landowners to sell land or conservation easements to the U.S. Fish and Wildlife Service on a strictly voluntary basis. The boundary of this Greater Cherry Valley Wildlife Refuge identifies an area of over 33,000 acres of potential interest. The centerpiece of this is 13,000 acres in the Cherry Valley Watershed, which is the subject of this letter [see map].

A SPECIAL ENVIRONMENT

Cherry Valley is indeed a special place. Its ecology, habitat and ground water are unique to this part of the world, and it is also home to a diverse, seldom-found wildlife community. **The area in the proposed refuge boundary ranks in the top 10% nationally among the more than 500 existing US Fish and Wildlife Refuges.** To date, local landowners have protected nearly 2000 acres in the central part of the valley by working with conservation organizations and agencies. Here are a few of the valley's attributes that make it so special:

- *Cherry Creek Watershed* covers over 20 square miles, with the creek meandering through it for about 15 miles. It is designated a High Quality Cold Water Fishery, according to the PA Dept. of Environmental Protection.
- Cherry Creek is home to *at least 15 species of fish*, and the creek has a *high pH*, making it a special habitat in the Pocono Region.
- There are a *dozen species and habitats found in the watershed that are on the State and Federal lists of Endangered and Threatened Species.*
- Cherry Valley contains several unique habitats, which are considered national threatened or endangered ecosystems.
- Cherry Valley is part of a *major flyway of birds of prey* along the Kittatinny Ridge.
- The proposed refuge area is home to *8 Priority Waterfowl Species and 23 bird species of Management Concern.*

RECREATION AND SCENERY

Cherry Valley has long been a place of beautiful views and varied recreation. Regardless of the season, from the welcome flowers of spring to the bright colors of fall, Cherry Valley offers wonderful opportunities for low-impact, environmentally safe recreation. Here are some of these opportunities:

- The panoramas from Wolf Rocks on the Appalachian Trail to the view east from Cherry Valley Pointe give wonderful overviews of the watershed.
- The road through the Water Company's watershed gives a feeling of the cool, natural atmosphere of the valley.
- The central portion of the valley provides open vistas of rolling farmland.
- Cross-country runners and bicyclists consistently enjoy the valley.
- Hikers travel the Appalachian Trail as well as quiet roads in the valley itself.
- Golf, horseback riding, hunting and fishing are other recreational pastimes actively pursued.

This letter is limited in its scope; the subject is complex, and the various people and organizations involved are numerous.

If you have questions or want to learn more about Cherry Valley, please visit the website at <www.friendsofcherryvalley.com> or call 570-643-7922 ext. 18 with your questions.

Your help and interest are needed to preserve Cherry Valley!

Please fill in and mail to: *Friends of Cherry Valley, RR1 Box 1343A, Stroudsburg PA 18360*

___ I support the effort to establish a National Wildlife Refuge in the Cherry Valley area.

SIGNATURE: _____
We need your signature to influence elected representatives to work to establish a refuge and take other steps to save the valley.

___ I want to know how I can help preserve the rural beauty of Cherry Valley.

NAME: _____

ADDRESS/PHONE/EMAIL: _____

AFFILIATION: _____

(Resident, landowner, frequent visitor, etc.)

Your donation will help defray printing and postage costs! Please make checks payable to "Brodhead Watershed Association" with "Friends of Cherry Valley Education Project" on the memo line. Thank you very much!

Appendix I

*List of Conservation Programs and Projects for
Cherry Valley Landowners*

Conservation Programs and Projects for Cherry Valley Landowners

Below is a list of many of the conservation programs and projects that are underway or available for landowners in Cherry Valley. Please contact the key contact listed for more information.

Cherry Creek Watershed Conservation Plan - Gary Bloss - 992-0899 - blossom@epix.net
The Brodhead Watershed Association is leading an effort to develop a Watershed Conservation Plan for the Cherry Creek Watershed, from the headwaters near Saylorburg to the mouth in Delaware Water Gap. The Watershed Conservation Plan will include an inventory of natural, recreation and cultural resources; an analysis of the current conditions; uses and issues facing the watershed and an action plan for improved conservation and management of the Cherry Creek watershed.

Cherry Creek Stream Watchers - Charlie Baughman - 839-1120 - brodheadwater@enter.net
Two distinct teams of volunteers monitor the streams of the watershed on a monthly basis in measuring thirteen water quality parameters. If measurements beyond safe parameters are confirmed by the team leader, the Department of Environmental Protection is notified for follow-up and action. The results of the monthly data collection can be found at www.cherrycreekwatershed.net/4.htm

Cherry Creek Stream Walkers - Gary Bloss - 992-0899 - blossom@epix.net & Don Baylor - 992-3558 donlb@ptd.net

The Stream Walkers are a group of trained volunteers that conducted an assessment of the Cherry Creek. They walked the creek and visually characterized each quarter mile segment for water quality, stream bank condition, habitat, and man-made intrusions. The assessment was part of the Cherry Creek Watershed Conservation Plan.

The Nature Conservancy - Michael Pressman - 643-7922 ext. 18 - mpressman@tnc.org
Land Conservation - The Nature Conservancy has protected 485 acres in Cherry Valley through land acquisition and conservation easements. The Conservancy continues to talk with interested landowners who are looking for conservation options for their land.

Biological Inventory - The Nature Conservancy is documenting the location, habitat, and conditions of rare species and special natural communities in the Valley.

Land Management - The Nature Conservancy is developing a habitat management and monitoring plan to guide its work to restore and manage wetlands in the Valley.

The Pocono Heritage Land Trust (PHLT) - Michael Pressman - 643-2890 - poconoheritage@yahoo.com

The Pocono Heritage Land Trust has preserved 137 acres in Cherry Valley. PHLT acquires land and/or conservation easements from interested landowners. PHLT continues to talk with landowners in the Valley who are looking for conservation options for their land.

Monroe County Agricultural Land Preservation Program - Laura Baatz - 517-3151 - lbaatz@co.monroe.pa.us

This Program protects and promotes the continued agricultural use of valuable agricultural land by acquiring agricultural conservation easements (purchasing development rights) from willing property owners. An agricultural conservation easement is a perpetual easement. Landowner applications are due in February of each year. To date, this program has protected 310 acres in Cherry Valley and has several additional projects in process.

Agricultural Security Area (ASA) - Laura Baatz - 517-3151 - lbaatz@co.monroe.pa.us
Agricultural Security Areas help protect our quality farmland from urbanization of rural areas. This voluntary program protects farmers from nuisance complaints, local ordinances affecting farming activity, and condemnation. An ASA also can qualify land for consideration under the Monroe County Agricultural Land Preservation Program at the landowner's request. Farmers create an ASA by submitting petitions to township supervisors. A minimum of 250 acres from among all participating farmers is required.

Monroe County Open Space Program – Christine Laytos – 570-517-3153 - claytos@co.monroe.pa.us

Administered by the Monroe County Planning Commission, the Open Space Program works on the allocation of the \$25 million bond that was passed by voter referendum in 1998. Funding is available for land acquisitions, conservation easements, and agricultural easements by municipalities, land trusts, and the County. Several projects in Cherry Valley have been partially funded from the open space bond.

The County Planning Commission is also developing a **Map of Potential Conservation Lands** (Jeff Weed - 517-3341 - jweed@co.monroe.pa.us), identifying those parts of undeveloped properties where the municipalities have preliminarily determined the importance of designing new development in such a way that an interconnected network of conservation land can be protected.

Delaware Water Gap Open Space Committee - Mayor Walter Conway - 421-6664 - insurman01@aol.com

Following up on the recently completed Eastern Monroe Regional Open Space Plan, the Delaware Water Gap Open Space Committee is looking at several properties as potential park sites.

Hamilton, Jackson, Pocono Townships (HJP) Regional Open Space Committee - Dave Fenner - 992-7020 - hamtwp@epix.net

The HJP Open Space and Recreation Plan is a comprehensive Multi-Municipal Plan developed to establish both short- and long-term goals for each township's open space conservation, recreation and resource protection objectives. This Plan is in draft format.

Smithfield Township Open Space Committee - Jackie Ocker - 421-6931 - secsmithfield@noln.com

Following up on the recently completed Eastern Monroe Regional Open Space Plan, the Smithfield Open Space Committee is looking to acquire select park properties for active recreation, passive recreation, and trail links.

Stroud Township Environmental Advisory Committee (EAC) - Ed Cramer - 570-421-3362 - stroudecramer@enter.net

The Stroud Township EAC makes recommendations to the Township Supervisors on the acquisition of land and/or conservation easements. The EAC is currently developing acquisition criteria and program procedures. The program is funded with a 0.25% Earned-Income Tax approved by Township voters in November 2001.

Greater Cherry Valley National Wildlife Refuge Proposal - Michael Pressman - 643-7922 xt. 18 - mpressman@tnc.org

The designation of a Wildlife Refuge in the Greater Cherry Valley Area would allow interested landowners on a volunteer basis to sell land or conservation easements to the US Fish and Wildlife Service. It is envisioned as another potential tool to assist Valley landowners interested in conservation options for their land. (see next entry for more information).

Friends of Cherry Valley - Anne Fetherman - 570-424-8121 - Fethermana@aol.com

The Friends of Cherry Valley are dedicated to the conservation of the region's scenic beauty, wildlife, ecological and environmental resources, and rural character. The Friends strive to maintain these unique resources and to provide a high quality of life for the area's residents and visitors on a long-term basis. Currently, the Friends are working to build support for the National Wildlife Refuge proposal and to get answers to questions and issues raised by the community.

Growing Greener Subdivision Design Review - Meredith Miller - 517-3157 - mmiller@co.monroe.pa.us

These audits provide recommendations on how the conservation subdivision design technique can be incorporated into a municipality's ordinances. Audits were conducted for Delaware Water Gap Borough and Hamilton, Smithfield, and Stroud Townships. Hamilton, Smithfield, and Stroud have been revising their ordinances to promote conservation techniques in the subdivision process.

Municipal Contacts:

Hamilton Township - Alan Everett - 992-7020 - hamtwp@epix.net

Smithfield Township - Jackie Ocker - 421-6931 - secsmithfield@noln.com

Stroud Township - Ross Ruschman - 570-421-3362 stroudplanning@enter.net

Delaware Water Gap Borough - Virginia Boyce - 476-0331

Hamilton, Stroud, Pocono, Stroudsburg Comprehensive Plan Committee - Ed Cramer - 570-421-3362 stroudecramer@enter.net

This Plan will help the municipalities identify and address regional issues such as sewer and water, emergency services, agricultural preservation, transportation, and developments of regional scope. Planning jointly for these issues can eliminate duplication of efforts, encourage communication between municipalities and create opportunities for more efficient use of resources.

Kittatinny Ridge Coalition - Paul Zeph - 717-213-6880 xt. 18 - pzeph@audubon.org

The Kittatinny Ridge Project is a collaborative effort of local, regional, and state organizations and agencies to focus public attention on the importance of Blue Mountain (Kittatinny Ridge); and to help foster good stewardship of the Ridge for future generations. Input from landowners, local officials, community leaders, businesses, and the general public will help determine the conservation vision and future of the Ridge. Landowner participation is strictly voluntary. A "conservation toolbox" will be developed to help landowners and local governments conserve the ridge's important natural resources. A comprehensive Geographic Information System (GIS) for the entire Ridge corridor will be developed by September 2003 and will be available via CD and the Internet.

Appendix J

Relevant Newspaper Clippings

◆ Editorial

Kanjorski is key to creating refuge

How encouraging to see wide public support for a plan to establish a national wildlife refuge in Cherry Valley.

The proposed refuge would protect some of Monroe County's most scenic and valuable open space. This beautiful farm valley holds a unique mix of plants, animals and wetland systems, which scientists have been documenting for a decade. The refuge plan calls for the federal government to buy land from willing property owners within a 30,000-acre boundary. A refuge would keep this land open and available to wildlife in perpetuity. The plan would also benefit wildlife that use the Kittatinny Ridge, which borders the valley and is a major flyway for birds of prey.

Protecting Cherry Valley is an attractive idea from a human standpoint as well, because development has encroached on so much of fast-growing Monroe County in recent years. The vistas of Cherry Valley have a much better chance of remaining unblemished if federal money is funneled toward purchasing land within the boundary for a refuge.

This bottoms-up effort depends on landowner participation — and an act of Congress. Last week U.S. Rep. Paul Kanjorski, D-11, toured the valley and met with more than 100 residents at a public meeting. He has indicated he will get behind the refuge proposal, but he should receive concrete direction from interested parties. It's incumbent on supporters to write or telephone Kanjorski encouraging him to introduce a bill to create the wildlife refuge.

In 1998 Monroe County voters approved a \$25 million bond issue to protect fast-disappearing open space. Residential and commercial development continue apace, and those who appreciate the still-rural landscape are seeking other ways to preserve it. There are 538 wildlife refuges in the United States, including two in Pennsylvania. A Cherry Valley wildlife refuge would be another good way to preserve Monroe County's unique and valuable natural resources.

To contact U.S. Rep. Paul Kanjorski, write: 2429 Rayburn House Office Building, Washington, D.C. 20515. Or telephone (202) 225-6511. E-mail: paul.kanjorski@mail.house.gov.

Kanjorski backs Cherry Valley wildlife refuge

By AARON APPLGATE *Pocono Record* Writer
aaplegate@poconorecord.com



U.S. Rep. Paul Kanjorski, D-11, toured Cherry Valley on Wednesday to voice his support for a national wildlife refuge.
Jason Farmer/Pocono Record

KEMMERTOWN — The effort to create a National Wildlife Refuge in Cherry Valley got a boost Wednesday night when U.S. Congressman Paul Kanjorski, D-11, told a packed house at the Cherry Valley United Methodist Church that he thought the refuge was a good idea.

Kanjorski, who toured the valley earlier in afternoon, said to more than 100 people, most of whom were wearing stickers and pins that said "Preserve Cherry Valley," that it's important to protect the land from he called "opportunistic development."

"If this place is left alone, it is going to be chopped up for McMansions like you won't believe," he said.

The congressman didn't attempt to hide his bias in favor of the refuge idea. "I want to hear arguments pro and con but I must plead guilty to a tendency to want to do this," he said to applause at the start of the meeting.

Many residents stood up to speak in favor of the plan which would free up federal money to buy land from willing sellers inside a 30,000-acre boundary that would form the refuge.

"There's an ample amount of building around this area. Let's keep Cherry Valley green," said Cherry Valley resident Red Fetherman, whose comment was typical of those who support the refuge idea.

A handful of people spoke out against the plan. Most mentioned the federal Tocks Island Dam project in the 1970s which displaced thousands of people in what is now the Delaware Water Gap National Recreation Area for a dam that was never built. Residents also expressed concerns about the refuge attracting people who they feared would trespass on their land.

Unlike the Tocks Island project in which the federal government used eminent domain, national wildlife refuges are made up of land only acquired from willing sellers.

Cherry Valley resident Pat Bixler was against the plan because she's concerned developers would use the refuge status to sell homes at higher prices and then sell the open space to the federal government to be part of the refuge.

Local elected officials, including state Rep. Mario Scavello, R-176, County Commissioner Suzanne McCool, Stroud Township Supervisor Ed Cramer and Hamilton Township Supervisor Alan Everett, turned out to support the wildlife refuge idea.

"This is some of the finest land in the county. Hopefully you'll be convinced you need to do this," Scavello told Kanjorski.

The next step in the lengthy process would be for Kanjorski, if he decides to fully support the project, to introduce a bill in Congress to create the refuge. He said that could take six to eight months and then the legislative process to pass the bill could take a year.

Kanjorski, who has never sponsored a bill to create a wildlife refuge, said he's ready to try. "This will be some of heaviest lifting I will undertake," he said. "It's going to be a challenge to me and I don't mind undertaking it."

More than a decade of research on the valley's unique plants, animals and wetlands has established the science needed to qualify Cherry Valley for the refuge designation. Cherry Valley includes land that drains into Cherry Creek, which flows from Saylorsburg to Delaware Water Gap, where it joins the Delaware River.

There are 538 wildlife refuges in the United States. Two are in Pennsylvania.

Before his tour of the valley, Kanjorski spent the day on an economic development tour of Monroe County. He visited the Pocono Mountains Municipal Airport, Weiler Corporation, Skytop Lodge, Aventis Pasteur, the Wal-Mart Distribution Center and Pocono Mountains Corporate Center East and West.
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Want to preserve Cherry Valley? Act now

Editor, the Record:

This is an urgent message to residents of the Cherry Valley. Now that the proposed Cherry Valley National Wildlife Refuge might move on for Congressional consideration, I suggest residents take an active role in land management decisions.

According to a Pocono Record article on the community meeting with Rep. Kanjorski, it could take one year plus six to eight months until bill approval. I heard Rep. Kanjorski state that three to eight years could be expected until approval IF accepted by Congress. No matter how long it takes, 90 days are all that is needed to complete a land development plan in Hamilton Township if the plan follows all regulations. In other words, a great deal of land could be lost to development before a wildlife refuge meant for protection ever gets here. What can you do?

As a taxpayer to a commonwealth, you have the privilege to help make the decisions about land use in your municipality. Go to your municipal office and purchase the Subdivision and Land Development Ordinance plus zoning ordinance books. Read and study them. Write a letter to township and county government officials in support of the proposed Stormwater Management Plan that includes the 150 foot buffer around all wetlands. Go to township planning commission and supervisors' meetings to listen and participate in discussions that could improve preservation efforts on a local level. Be aware of what is going on in your neighborhood. If you don't understand something, ask questions. Now is the time for vigilance, complacency in these days ahead could jeopardize the natural resource treasures of the Cherry Valley.

PATBIXLER Saylorsburg

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Wildlife refuge plan needs willing sellers

Editor, the Record:

Your recent front page article about Friends of Cherry Valley and our efforts to have a National Wildlife Refuge established in Cherry Valley brought our organization many positive comments.

I would like to address some concerns and reinforce and expand upon some of the points made in that article.

Friends of Cherry Valley encourages landowners to seek conservation easements and government and private organizations to purchase them. That is why we want U.S. Fish and Wildlife Service to be a "player" through the creation of a National Wildlife Refuge. We do not purchase conservation easements ourselves.

If enacted, the Cherry Valley National Wildlife Refuge would establish the area (roughly 30,000 contiguous acres) within which the U.S. Fish and

Wildlife Service could purchase land for the actual refuge. Since there would be no land condemnation and purchases could be made only from willing sellers, the resulting refuge would likely to be a series of non-connected land plots. The Cape May, N.J., National Wildlife Refuge is a perfect example of a refuge comprising several non-connected plots of land, not all of which are open to public access for bird watching and other activities.

Landowners within the defined refuge boundaries who chose not to sell to the U.S. Fish and Wildlife Service keep all the property rights they currently have. They may pursue conservation easements offered by other public and private groups.

The U.S. Fish and Wildlife Service makes annual payments to local governments in lieu of taxes on the properties they purchase. The taxpayers benefit from the money and the slowing of development, which means slowing the demand for schools and other services.

National wildlife refuges generally allow fishing and hunting for species that are not endangered; for instance, deer. Maintaining proper ecological balances is an important part refuge management.

CATHERINE LAWSON
Stroud Township

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Wildlife refuge group taking its cause to Washington lawmakers

By AARON APPLIGATE
Pocono Record Writer
aappligate@poconorecord.com

Supporters of the proposed National Wildlife Refuge in Cherry Valley are gearing up to take their conservation message to Washington.

Friends of Cherry Valley, the group behind the movement to create the 30,000-acre refuge, are preparing to approach federal lawmakers who represent Pennsylvania to get support for the project.

"The community seems to support it, the local governments feel it's a good idea and it's time to start talking to our representatives in Washington," said Michael Pressman of the Nature Conservancy which has been working with the friends group to preserve Cherry Valley.

Friends of Cherry Valley has endorsements on the project from Hamilton, Chestnuthill and Stroud townships, the Monroe County Conservation District and the Cherry Valley Trout Hatchery. The group is planning to ask Delaware Water Gap Borough, Smithfield and Ross townships and the Monroe County commissioners for endorsements.

Anne Fetherman, president of the friends group, said that based on the 1,200 petition signatures collected, support for the refuge appears to be strong

"It's not unusual to pick up my mail to have a sheet of 10 signatures that people took to work or their garden club," she said. "This is an idea whose time has come." Fetherman said she plans to hand deliver the proposal for the refuge to U.S. Rep. Paul Kanjorski, D-11, in the spring. The group will also approach U.S. Rep. Don Sherwood, R-10, and U.S. Sens. Rick Santorum, and Arlen Specter, both Republicans from Pennsylvania.

Kanjorski said he's heard about the refuge.

"I'm basically waiting to see what the formal request is," Kanjorski said.

Cherry Valley includes land that drains into Cherry Creek, which flows from Saylorsburg to Delaware Water Gap, where it joins the Delaware River.

National Wildlife Refuges are formed from land sold by willing landowners and do not involve condemning land.

In the proposed Cherry Valley Wildlife Refuge, all property owners within the 30,000-acre boundary would have the option of selling their land to the U.S. Fish and Wildlife Service.

The purchased land would make up the refuge. Land within the boundary area that is not purchased would not be part of the refuge and would be subject to state and local law just as it is now.

An act of Congress would be needed to establish a refuge, and the U.S. Fish and Wildlife Service would manage it. The designation would free up federal money to buy land in Cherry Valley.

More than a decade of research on the valley's unique plants, animals and wetlands has established the science needed to qualify Cherry Valley for the refuge designation.

There are 538 wildlife refuges in the United States. Two of those are in Pennsylvania.

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C-hill approval brings wildlife refuge closer to reality

By MEG ELDRIDGE
For the Pocono Record

BRODHEADSVILLE — Cherry Valley Wildlife Refuge doesn't exist yet, but supporters of the proposed project brought it one step closer Tuesday evening.

With approval at both Stroud and Chestnuthill township supervisor meetings, the project is moving from possible to plausible, according to Michael Pressman of the Friends of Cherry Valley.

"When this whole thing started, it was a long shot, an idea being thrown around. But two years later, after lots of public meetings, a lot of grass-roots support, it seems that the community thinks this is a good idea," he said.

The plan initially came from a desire to protect natural elements unique to Cherry Valley.

Chestnuthill supervisor Maureen Tatu endorsed the refuge first. "It seems to me the preservation of our pristine watersheds is only in our best interests," she said.

Three hundred signatures were needed to start the project in motion. More than 1,200 names have been collected so far.

The proposed "acquisition area" of the refuge includes some 33,000 acres stretching from Delaware Water Gap borough to Chestnuthill Township.

Though the refuge would not necessarily incorporate the whole area, the acquisition area

identified would allow U.S. Fish and Wildlife representatives to enter the area and begin initial work, studying land they may want to acquire.

Pressman stressed that this would be a voluntary option for landowners, but the refuge would give them a chance to sell their naturally appealing properties to someone other than developers. "It's just an option. No one will come in and take anyone's land. It will just give them a choice," he said.

Though support from the municipalities affected is not essential, Friends of Cherry Valley are pleased with any endorsements received.

"Washington needs to see people behind it. It is clear that the community is supporting it, and it is good to see that the political leaders are endorsing it as well," Pressman said. It may be years before there is actually any wildlife refuge.

"The Friends of Cherry Valley are currently putting together a packet containing the petitions with the signatures and any municipal endorsements received," Pressman said.

Though headway is occurring, it could take years for the process to really take hold, and moneys to reach the Cherry Valley area to make the refuge a reality.

For more information on the proposed wildlife refuge or the Friends of Cherry Valley, visit the organization's website at <http://www.friendsofcherryvalley.com>, or call (570)424-8121.

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Preservationists drum up support for Cherry Valley

By AARON APPLGATE
Pocono Record Writer
aapplegate@poconorecord.com

Seeking to broaden support for a National Wildlife Refuge in the Cherry Valley area, a nonprofit group is gearing a meeting tonight to a new batch of residents living within the proposed 30,000-acre refuge.

Friends of Cherry Valley is targeting the meeting — its first in a year — at residents living west of Cherry Valley in 17,000 acres in Ross, Hamilton and Chestnuthill townships. Those people, about 1,600 landowners, live outside of Cherry Valley but within the proposed refuge boundary.

About 370 mailings about the refuge meeting were sent to people living in this area who own five acres or more.

Tonight's meeting is at 7 at the Christ Hamilton Church gymnasium on Bossards-ville Road.

Initial outreach efforts by the Friends last year focused mainly on the 950 landowners living in the 13,000-acre Cherry Valley.

"This is a meeting that is targeting a new group of people," said Anne Fetherman, president of the group.

Fetherman said her group is trying to build local support for the wildlife refuge to push Pennsylvania U.S. Sens. Arlen Specter and Rick Santorum and U.S. Reps. Paul Kanjorski and Don Sherwood to take action.

"They've already indicated interest, but they haven't indicated it's very high on their list," Fetherman said. "We're trying to get them to realize that the development pressures are enormous, and this isn't something you can let go."

Cherry Valley includes land that drains into Cherry Creek, which flows from Saylorsburg to Delaware Water Gap, where it joins the Delaware River.

National Wildlife Refuges are formed from land sold by willing landowners, and do not involve condemning land.

In the proposed Cherry Valley Wildlife Refuge, all property owners within the 30,000-acre boundary would have the option of selling their land to the U.S. Fish and Wildlife Service.

The purchased land would make up the refuge. Land within the boundary area that is not purchased would not be part of the refuge and would be subject to state and local law just as it is now.

An act of Congress would be needed to establish a refuge, and the U.S. Fish and Wildlife Service would manage it. The designation would free up federal money to buy land in Cherry Valley.

More than a decade of research on the valley's unique plants, animals and wetlands has

established the science needed to qualify Cherry Valley for the refuge designation.

Three species on the federal endangered species list — the bog turtle, Indiana bat and the dwarf wedge mussel — have been found in Cherry Valley.

Rare plants found in the valley include spreading globe flower and grass of Parnassus. The valley also has rare limestone fens, which are groundwater-fed, high-pH wetlands that create habitat for rare plants and animals.

The valley is bordered on one side by Kittatinny Ridge, a prime flyway for birds of prey on the East Coast.

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Cherry Valley may be next in list of wildlife refuges

This year, our nation celebrates the 100th anniversary of a system that originated with a unique idea back in 1903. That's when President Teddy Roosevelt set aside our country's first National Wildlife Refuge — tiny, 5½-acre Pelican Island in Florida, the habitat of hundreds of herons, egrets and other wading birds that were being decimated by hunters throughout Florida for their beautiful feathers, used in women's hats.

What made this protective measure so unique was that it was done strictly for wildlife, not recreation or any other human use. With the stroke of his pen, Roosevelt started the National Wildlife Refuge System, and then added more than 50 other units by the time his presidency ended.

Today, there are 540 National Wildlife Refuges throughout our country. They exist in all 50 states and total 95 million acres, more than all of the land in the National Park System. These refuges protect 700 species of birds, 200 mammals, 250 reptiles and amphibians, 200 fish and countless invertebrates, plants and natural communities. Scores of these species are considered rare, endangered or threatened and quite possibly wouldn't have survived until 2003 were it not for the refuges that protect and manage them.

More than 35 million people visit these refuges every year. It may seem strange that millions of these visitors hunt and fish within the protected

borders of the refuges, but — mainly because of the lack of natural predators — hunting and fishing are not only compatible but necessary as tools in managing many wildlife populations. Just think of our own problems with white-tailed deer in Pennsylvania, and it becomes very obvious how much more devastating these animals would be to our forests if hunting were eliminated.

However, some of the other activities that are permitted on refuges are controversial. Snowmobiling, livestock grazing, water diversion and drilling for oil are all allowed on several refuges, and these are certainly incompatible with the welfare of the plants, animals and natural communities that the refuges were designed to protect.

In recent years, the most infamous proposal, of course, has been the attempt by the Bush administration to begin drilling for oil in the pristine Arctic National Wildlife Refuge, often considered the system's "crown jewel." Several attempts have been voted down since 1988, but this administration keeps trying to convince Congress that the potential oil reserves (possibly equal to the total amount our country uses in six months) are worth the pollution and habitat degradation that this wilderness would be forced to endure.

There are other threats to our wildlife refuges that originate from outside their boundaries: air pollution, water pollution, urban sprawl, invasive species, mining and water diversion. But the biggest problem facing the Refuge System today is lack of money. Hundreds of millions of dollars are needed to maintain the buildings, roads and other structures; to continue important scientific research and education; and to pay staff. It's encouraging that the present administration has promised to increase funding for many of these functions.

Pennsylvania has just two small National Wildlife Refuges — Erie, in the northwest corner of the state, and Tinicum, near Philadelphia. That's why it's so exciting to consider the prospect of establishing a third refuge right here in Cherry Valley of the Poconos. With its rich diversity of plants and animals; its proximity to Kittatinny Ridge, a major migratory flyway for hawks and other birds; the presence of several types of wetlands, including limestone fens; its aesthetic beauty; and its assemblage of many rare and endangered plants and animals, Cherry Valley is a very worthy candidate for this designation. If approved by an act of Congress (an action which might take years), the 30,000-acre Cherry Valley area (from Saylorburg to Delaware Water Gap) would be eligible for federal funds to purchase lands from willing sellers.

Hunting and fishing would still be permitted, and local zoning ordinances wouldn't be affected. Most

importantly, anyone within this area who doesn't want to sell private property would retain all the same rights and be subject to the same property laws that existed before the refuge was created. A federal program would also reimburse municipalities for the taxes lost when protected lands are removed from local tax rolls.

A "Friends of Cherry Valley" group has been formed to help make this proposal a reality and link our region to this unique system of refuges created a century ago for the protection of our nation's natural heritage. Call Michael Pressman at The Nature Conservancy — (570) 643-7922 — or Anne Fetherman at (570) 424-8121 for information.

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Preservation plan for Cherry Valley picks up steam

By AARON APPLGATE
Pocono Record Writer
aapplegate@poconorecord.com

BARTONSVILLE — A plan to create a National Wildlife Refuge in ecologically rich Cherry Valley is gathering momentum.

A meeting at the Monroe County Environmental Education Center in Bartonsville on Thursday brought together local officials and landowners to discuss asking Congress to authorize the special designation. No decision was made.

Cherry Valley includes land that drains into Cherry Creek, which flows from Saylorburg to Delaware Water Gap, where it joins the Delaware River.

Future meetings on the proposed wildlife refuge will be on Dec. 3 and Dec. 9 from 7 to 9 p.m. at the Monroe County Environmental Education Center on Running Valley Road near Bartonsville.

National Wildlife Refuges are formed from land sold by willing landowners, and do not involve condemning land.

Here's how it would work: A 30,000-acre acquisition boundary would be drawn around the Cherry Creek watershed and some nearby areas. All property

owners within that boundary would have the option of selling their land to the U.S. Fish and Wildlife Service.

The purchased land would make up the refuge. Land within the boundary area that is not purchased would not be part of the refuge and would be subject to state and local law just as it is now. An act of Congress would be needed to establish it, and the U.S. Fish and Wildlife Service would manage it. The designation would free up federal money to buy land in Cherry Valley.

More than a decade of research on the valley's unique plants, animals and wetlands has established the science needed to qualify Cherry Valley for the refuge designation. "Cherry Valley is an important resource in Pennsylvania and nationally," said Jared Brandwein, project leader for the U.S. Fish and Wildlife's eastern Pennsylvania field office. "It supports all the raptors found along the Atlantic flyway, wetlands, federally and state listed endangered species. It's definitely worthy of National Refuge status."

Three species on the federal endangered species list — the bog turtle, Indiana bat, and the dwarf wedge mussel — have been found in Cherry Valley.

Rare plants found in the valley include spreading globe flower and grass of Parnassus. The valley also has rare limestone fens, which are groundwater-fed, high-pH wetlands that create habitat for rare plants and animals.

The valley is bordered on one side by Kittatinny Ridge, a prime flyway for birds of prey on the East Coast. "This place belongs to the people who own it, but we should all feel some sense of stewardship because it's such an unusual place," said Bud Cook, director of the Nature Conservancy's northeast Pennsylvania office.

"This area is just so significant, that in my mind it's a treasure, and it's not a question of whether it ought to be protected but how," said Craig Todd, manager of the Monroe County Conservation District. "This is really a national resource and therefore it deserves national support."

There are 538 National Wildlife Refuges in the United States and two in Pennsylvania.

The next step for the Cherry Valley effort is to create a local group to support the refuge. The refuge area would include parts of Stroud, Smithfield and Hamilton townships and Delaware Water Gap. Former Monroe County Commissioner Janet Weidensaul of Saylorsburg, one of the organizers of the refuge effort, described it as a win-win situation. "There is no downside to this opportunity," she said.

The Last Word Anna Quindlen

Put 'Em in a Tree Museum

SEEING A BALD EAGLE IN ONE OF YOUR TREES IS like running into a movie star on the street. After years of viewing two-dimensional images, there's a conspicuous shock in encountering the thing in the flesh, looking just like its pictures. Or like the back of a quarter. Majestic white head, curved beak, a wingspan to die for: yep, that's the national bird eating one of those

trout bought and paid for at the hatchery. It's so thrilling you want to ask for an autograph, perhaps a scrawled "E Pluribus Unum."

The slow but sure reappearance of the bald eagle in this part of Pennsylvania is both a tribute to environmentally sound decisions of the past and a cautionary tale of what the future holds. The eagle's disappearance had to do with the presence of the pesticide DDT in native waters, which built up in the birds' bodies and weakened eggshells so perniciously that few chicks were ever hatched.

The bald eagle was named an endangered species, DDT was banned in 1972, and little by little the eagle began to reappear. But whether the national bird, which is by nature skittish, can continue to thrive may hinge on one of the greatest crises facing America at the beginning of the century: its unending, unthinking and environmentally blind overdevelopment and all the mess that goes with it.

In the area surrounding the tree where the eagle perched and polished off his dinner, new homes are being built at an astonishing rate for city dwellers seeking peace and quiet. They seem curiously unaware of the fact that the old-growth trees and animals of which they are so enamored are being shoved aside by the homes they are building on former farm or forest land. Not far from here a major developer clear-cut 100 acres, causing an erosion problem so severe that streams and wetlands were full of mud and one homeowner arrived at a township meeting with a jar of brown water he said had come from his well.

It is easy to blame such developers, and the officials who have given them a pass. But neither group proceeds with stealth. In state after state, town after town, their actions have made their mandate clear: it's not the long view of the

natural world that motivates them, but the short-term goal of cash. It's the mindset of ordinary people that is harder to countenance. Many have the attitude toward development that we once had toward smoking: sure it's bad, but it won't be a problem for me.

The tobacco analogy is instructive because it speaks to how a critical mass of public education, group agitation and advertising can lead to marked changes in behavior. When the war against smoking was in its early stages in 1965, 41 percent of Americans had the lethal habit and the

Many have the attitude toward development that we once had toward smoking: sure it's bad, but it won't be a problem for me

companies that manufactured cigarettes routinely lied and denied the health effects. Today Philip Morris can't wait to tell you its product is addictive and dangerous (which makes you wonder why it's still manufactured), and only 22 percent of adults smoke, many of them relegated to regulatory leper colonies, huddled outside the doors of office buildings and restaurants.

The unchecked development that's earned the suitably ugly name of sprawl isn't regulated by one government group and doesn't surface often as a national issue. It takes place town by town, building by building, overseen by state and local authorities and driven by the profit motive.

And its net effect is usually noticed when it is already out of hand, when the wells run brown with mud.

Only when a substantial number of ordinary citizens decide that it's a critical national issue and follow conservation groups into battle will the destructive effects of sprawl move to the forefront of the national agenda. Sensible and ecologically sound development is possible, but people have to seek and support it. Otherwise the hideous stretches of superstores and supermarkets that turn downtowns into ghost towns will begin to meet across the great suburban plain, and every former cornfield in America will have a name like Fox Run. Without the fox.

In this election season the two presidential contenders will talk of the war and the economy. Any discussion of conservation will likely focus on drilling for oil in Alaska or decreasing our reliance on fossil fuels. But if you asked many Americans what is most devaluing the quality of their lives, I suspect the answer would be that their surroundings look like Monopoly boards at the very end of a hectic game.

If that doesn't change, our kids will wind up in an unlovely and unlivable place, sitting in endless traffic because the exurbs have moved still farther out, drinking degraded water because the water table has been polluted, taking pictures on vacation to prove that forests still exist. As Joni Mitchell once sang, "They took all the trees, put 'em in a tree museum." If the eagle vanishes once more, it could be because every tree downed to create a so-called colonial will be one fewer place to build a nest unmolested by humans. Or maybe the majestic national bird will adapt, becoming one of those tame wild animals that eat out of the garbage. It's hard to decide which would be worse.



PHOTOGRAPH BY CHARLES OHLHAUSEN FOR NEWSWEEK

FAMOUS AUTHOR & COLUMNIST LIVES IN CHERRY VALLEY!

Editorial Page Editor Paula C. Heeschen**IN OUR OPINION***Wildlife refuge an exciting prospect*

We are excited about the discussion among area landowners and conservation officials about creating a National Wildlife Refuge in Cherry Valley.

This is a bottoms-up effort that depends on landowner participation. If successful, the refuge effort could dramatically improve land protection efforts in this picturesque farm valley.

Stakeholders met Tuesday night at the Monroe County Environmental Education Center in Bartonsville and will meet again next Monday to discuss the process. It would involve the drawing of a 30,000-acre boundary around the Cherry Creek watershed. Property owners inside the designated area would have the option to sell their land to the U.S. Fish and Wildlife Service and would constitute a wildlife refuge. Property owners who opted not to sell would remain independent, subject to existing state and local law as it applies to property.

Why Cherry Valley? A combination of conservation experts and landowners recognize its aesthetic and biological value.

Extensive research has identified a number of unique plants, animals and wetland systems, providing the data Congress would need to authorize the area as a National Wildlife Refuge.

The Kittatinny Ridge that borders Cherry Valley serves as a prime flyway

for birds of prey on the East Coast.

At the same time, Monroe County's population has skyrocketed in recent years. New houses, stores, schools and businesses are sprouting like mushrooms across the formerly rural hillsides. Proponents of the refuge idea strongly believe the area deserves protection. Many conservation-minded people, including a number of large landowners, have been working hard to make sure some of the county's undeveloped areas remain open both to protect animal and plant species and to manage the adverse tax and aesthetic effects of population growth. The national

wildlife refuge idea offers another arrow in the protection quiver.

Some 538 such refuges exist in the United States, including two in Pennsylvania.

Congress would have to establish the proposed Cherry Valley refuge by act; Fish and Wildlife would manage it. Achieving the national wildlife refuge designation would free up federal money to buy land.

We encourage any property owners in the proposed refuge area to attend the Dec. 9 meeting to learn more about the plan and how it might affect them. It's their decision.

We think the refuge could be another good way to preserve Monroe County's unique and valuable natural resources.

Cherry Val. preservation effort wins \$100G grant

By AARON APPEGATE
Pocono Record Writer

KEMMERTOWN — Almost 100 acres in Cherry Valley is a step closer to being preserved after the state awarded a \$100,000 grant to a local land trust to buy the property.

The Pocono Heritage Land Trust is finalizing an agreement with two landowners to acquire one 27-acre tract and purchase a conservation easement on another 67-acre property in the scenic valley.

Both properties are on Lower Cherry Valley Road in Hamilton Township.

"Cherry Valley is still relatively undeveloped," said Bill Leonard, president of the Pocono Pines-based trust and civil engineer for the National Park Service. "Now is the time to act before we get development all over the place."

The names of the sellers and the price are being withheld by the trust until the deal is final.

The nonprofit trust is hoping to match the \$100,000, which came from the state Department of Conservation and Natural Resources, with a matching amount from county open space funds.

Monroe County voters approved a \$25 million bond issue in 1998 for open space preservation. Of that \$25 million, \$2.5 million is allotted for land purchases by nonprofit conservancies.

The 14-member Pocono Heritage Land Trust, which has protected 1,015 acres in Monroe and Lackawanna counties, already owns 110 acres in Cherry Valley.

Cherry Valley is considered high priority preservation area in the county's open space plan.

Appendix K

List of Key Interviewees

Cherry Creek Watershed Conservation Plan

Submitted to the Delaware Department of Natural Resources and Environmental Control
in fulfillment of the requirements of the Delaware Water Gap National Recreation Area
Management Plan

Key Person Interviews

Interviews were conducted in person or as phone conversations. The project was explained and the geographic extent of the watershed was described to each interviewee as a means to focus comments to the watershed area. The following interview questions were developed as a guide and starting point to help draw out relevant information from each identified individual to determine their ideas regarding issues, opportunities, concerns and potential threats in the watershed.

Interview questions:

- ✓ What specific opportunities or concerns are you aware of that might help or hinder the development of a watershed management plan?
- ✓ What special places are you aware of in the corridor (natural, historic, cultural, etc.)?
- ✓ Do you have any specific ideas for the protection of lands within the watershed? If so where?
- ✓ Are you aware of any special needs that should be addressed in the planning process?
- ✓ How do you envision the implementation of a successful watershed management plan next 3-5 years?

Persons Interviewed:

Dominic and Mary Sorenti, Owners Cherry Valley Vineyards
Royce, Anne and Red Fetherman, Owners Eagles Rest Tree Plantation
Gary Reddinger, Cherry Valley Trout Hatchery
Elmer D. Christine, Esq., Cherry Valley Road landowner and historic family ties to the valley
Herb David, Citizen and homeowner in the Valley for 55 years
Charles Cooper, Owner Village Farmer in Delaware Water Gap
David George, Chairman Delaware Water Gap Municipal Authority
Fay Lehr, former Owner of the Deer Head Inn and Delaware Water Gap resident
Bruce Weidenbaum, Home Builder living in the Valley
John Raisley, Laird Technology Management
James Silverthorne, Biodynamic Farmer and land owner in the Valley
Guy Findon, Representative Pennsylvania American Water Company
Nancy Sharp, Representative Pennsylvania American Water Company
Paul Zeph, Kittatinny Ridge Project Director
Candice McGreevey, Executive Director Monroe County Historical Association
Jeanette Groner, Cherry Valley Road landowner

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
2700 N. MARKET STREET
DOVER, DE 19901
410-326-7000

2003-01-01 10:00 AM

Appendix L

Watershed Funding Sources



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

POTENTIAL FUNDING SOURCES FOR WATERSHED GROUPS

Many watershed groups have volunteers to work on numerous projects within their watershed boundaries. They try to resolve or remediate current problems by giving many hours of service, and they may help in the prevention of future water quality problems as well.

However, to perform these services, groups need money for the purchase of equipment and supplies. This funding is not always easy to find. The following is a list of potential funding sources and references for use by watershed groups. This is not all-inclusive, and you may find other sources not currently on the list. Make sure you are aware of the administrative requirements for any grant that you pursue.

In addition to the funding sources available for watershed groups, watershed groups should consider funding sources for individual landowners. Funding sources for landowners are included in the further references section of this publication.

The Pa. Department of Environmental Protection (DEP) does not endorse the use of any specific group from the list and is supplying names for informational purposes only.

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
American Canoe Association Springfield, VA	703-451-0141	May provide funding for various watershed-related projects including starting groups and lobbying.	X	X		X
Canaan Valley Institute, West Virginia	304-463-4739 800-922-3601	Promotes the development and growth of local associations committed to improving or maintaining the natural resources of their watersheds, in the Mid-Atlantic Highlands portions of PA, MD, VA and all of WV.	X	X	X	X
Chesapeake Bay Program National Fish and Wildlife Foundation 1120 Connecticut Avenue, Suite 900 Washington, DC 20036	202-857-0166	Support and development of local watershed management plans that address water quality or promote locally-based protection and restoration efforts.	X	X	X	
Chesapeake Bay Small Watershed Grants Program National Fish and Wildlife Foundation 1120 Connecticut Avenue, Suite 900 Washington, DC 20036	202-857-0166	This program supports communities undertaking small-scale watershed projects. Grants range from \$1,000 to \$35,000 to local governments and community groups for education and demonstration projects to protect watersheds.	X	X	X	X
Coldwater Heritage Partnership Harrisburg, PA	717-787-2316	Grants for prioritizing watersheds in need of protection, for assessment of coldwater ecosystems and for the development of watershed conservation plans.	X	X	X	X

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
County Conservation District Offices	See Local Listings	The Agriculture-Linked Investment Program (AgriLink) is a low interest loan program established by the state Treasury to assist operators in the implementation of approved nutrient management plans. Low interest loan funds are provided for the implementation of Best Management Practices (BMP's) identified in an approved nutrient management plan.		X	X	
DCNR Pennsylvania Forest Stewardship/Stream ReLeaf Program	717-787-2106	Cost-Share (75%) assistance for riparian zone protection or improvement projects: streambank restoration, fencing and crossings.		X	X	
DCNR Rivers Conservation Program Harrisburg, PA	717-787-2316	Conserve and enhance river resources by offering planning grants, technical assistance, implementation grants, development grants, and acquisition grants.	X	X	X	
DEP Chesapeake Bay Financial Assistance Funding Program Grants	717-783-7577	Farmers that voluntarily agree to implement a nutrient management program and owns land within all or parts of 41 counties comprising the Bay watershed in Pennsylvania.		X	X	
DEP Coastal Zone Management Program Harrisburg, PA	717-787-5259	Grants for planning and construction in the Lake Erie and the Delaware Estuary Coastal Zones.		X	X	
DEP Environmental Stewardship and Watershed Protection Grant Program Harrisburg, PA	717-787-5259	Grants focus on nonpoint source pollution and watersheds: acid mine drainage abatement, mine cleanup efforts, well plugging, planning and implementing local watershed-based conservation efforts (formerly WRAP+WRPA).		X	X	X
DEP Great Lakes Protection Fund Northwest Regional Office Meadville, PA	814-332-6816 For regional (Great Lakes Basin) projects call 312-201-0660 and local (specific to Great Lakes area of Pennsylvania) projects call 814-332-6816.	Small planning grants and natural resource grants for regional and local efforts.		X	X	
DEP Nonpoint Source Management (EPA 319) Program Harrisburg, PA	717-787-5259	Grants for planning and nonpoint source pollution control projects.	X	X	X	X

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
DEP PA Environmental Education Grants Program	717-772-1828	Provides financial support for projects that design, demonstrate or disseminate environmental education practices, methods or techniques.		X	X	X
DEP Pennsylvania Wetland Replacement Project Harrisburg, PA	717-787-6827	Grants for restoring wetlands, riparian corridors and other aquatic systems within the Commonwealth.		X	X	
DEP Stormwater Management Program Harrisburg, PA	717-772-4048	Watershed planning for stormwater control (counties) and implementation of programs at local levels (municipalities).	X	X	X	
DEP Stream Bank Fencing Program	717-783-7577	To improve water quality and reduce soil erosion by constructing one or two strand fences to limit livestock access streams.			X	
DEP Stream Improvement Program (SIP)	717-787-3411	Assistance through the construction of small projects to prevent flooding, restore natural stream channels and to stabilize banks.		X	X	
DEP Watershed Assessment Grant Harrisburg, PA	717-787-7007	Grant(s) to assess the impacts to a watershed from abandoned mine drainage.	X			X
Dirt and Gravel Road Maintenance Program	Your Local County Conservation District	For maintenance of dirt and gravel roads - to minimize the impacts of erosion and sedimentation pollution and fugitive dust on Pennsylvania's streams.		X	X	X
Ducks Unlimited Inc.	Western PA Eastern PA	The PA Habitat Stewardship Program assists applicants with stream bank and wetland fencing projects.		X	X	
Fish America Foundation Alexandria, VA	703-548-6338	Grants awarded for: streambank stabilization materials, instream habitat improvements, contracted heavy equipment, and stream morphology work.			X	
Headquarters: U.S. Department of Agriculture Farm Service Agency Conservation Reserve Program Stop 0513 Washington, DC 20250-0513	202-720-6221	(CRP) is a voluntary program that offers long-term rental payments and cost-share assistance to establish long-term, resource-conserving cover on environmentally sensitive cropland or, in some cases, marginal pastureland.				X
LWV of Pennsylvania Mini Grant Harrisburg, PA	800-692-7281	Grants for community oriented educational projects (watershed or drinking water supply), e.g. web site design, signage, workshops, development of publications, printing, etc.				X

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
National Park Service Rivers, Trails and Conservation Assistance Program Philadelphia, PA	215-597-1581	The National Park Service works with communities to conserve land and river resources and provides funding for various projects dealing with the conservation of these resources including the development of trails and greenways.		X	X	
PA Chesapeake Bay Foundation	717-737-8622	The Stream Bank Fencing Program provides funding for installation of fencing along streams.		X	X	
PACD Nonpoint Source Pollution Education Mini Project Grant	717-238-7223	Small grants for Pennsylvania-based, grassroots educational projects that address nonpoint source watershed concepts.		X	X	X
PACD Pennsylvania Chesapeake Bay Educational Mini Projects Grant Harrisburg, PA	717-238-7223	Grants for workshops, displays/exhibits, visual aids; development of publications, fact sheets; and events, e.g. water studies (monitoring) and stream reclamation projects for groups working in the Chesapeake Bay Watershed.	X	X	X	X
Pennsylvania Department of Community and Economic Development	888-223-6837	Financial assistance may include: preparing environmental protection or physical development strategies or special studies that will support comprehensive land use planning. The application of advanced technology such as Geographic Information Systems (GIS).		X	X	
The Greater Harrisburg Foundation Harrisburg, PA	717-236-5040	Grants awarded to groups for environmental projects. Special foundation grants set up for specific environmental projects by specific donors. The foundation serves southcentral Pennsylvania.		X	X	
The William Penn Foundation Philadelphia, PA	215-988-1830	Grants to preserve natural areas, including environmental education and planning within the foundation's geographic area (primarily southeastern Pennsylvania).		X	X	X
U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service Ag Box 2201 Washington, DC 20250-22021	202-401-5971	This program is targeted directly to the identification and resolution of agriculture-related degradation of water quality.		X	X	

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
U.S. Department of Agriculture Natural Resource Conservation Service P.O. Box 2890 Washington, DC 20013-9770	202-720-3534	Technical assistance and cost sharing for implementation of NRCS-authorized watershed plans. Technical assistance on watershed surveys and planning.	X	X	X	
U.S. Department of Agriculture Natural Resource Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2238	Non-profit public/private partnership involving local community members working voluntarily on a multi-county basis to resolve environmental issues and develop opportunities for rural development. Technical and financial assistance is available in the form of grants, loans, and other funding.		X	X	
U.S. Department of Agriculture Natural Resource Conservation Service PO Box 2890 Washington, DC 20013-9770	202-720-1873	The Environmental Quality Incentives Program (EQIP) was established to provide a single, voluntary conservation program for farmers and ranchers to address significant natural resource needs and objectives.		X	X	X
U.S. Department of Agriculture Natural Resource Conservation Service P.O. Box 2890 Washington, DC 20013-9770	202-720-8851	This program provides technical and financial assistance to address resources and related economic problems on a watershed basis. Projects related to watershed protection, flood prevention, water supply, water quality, erosion and sediment control, wetland creation and restoration, fish and wildlife habitat enhancement, and public recreation are eligible for assistance.		X	X	
U.S. Department of Agriculture Natural Resources Conservation Service One Credit Union place Suite 340 Harrisburg, PA 17110-2993	717-237-2210	This voluntary program provides Wetlands Reserve Program landowners with financial incentives to restore and protect wetlands in exchange for retiring marginal agricultural land. Landowners voluntarily limit future use of the land, but retain private ownership.			X	

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
U.S. Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service 1305 East-West Highway Silver Spring, MD 20910	301-713-3155	This program assists states in implementing and enhancing Coastal Zone Management (CZM) programs that have been approved by the Secretary of Commerce. Funds are available in areas such as coastal wetlands management and protection, natural hazards management, public access improvements, reduction of marine debris, assessment of impacts of coastal growth and development, special area management planning, regional management issues, and demonstration projects with potential to improve coastal zone management.	X	X	X	X
U.S. Department of Commerce National Oceanic and Atmospheric Administration National Sea Grant College Program 1315 East-West Highway Silver Spring, MD 20910	301-713-2448	The National Sea Grant College Program encourages the wise use and stewardship of our marine resources and coastal environment through research, education, outreach, and technology transfer.				X
U.S. Department of the Interior Office of Surface Mining Division of Reclamation Support 1951 Constitution Avenue, NW Washington DC 20240	202-208-5365	The Abandoned Mine Land Reclamation (AMLR) Program is designed to protect and correct environmental damage caused by coal and, to a limited extent, noncoal practices that occurred prior to August 3, 1977. AMLR provides for the restoration of eligible lands and waters mined and abandoned or left inadequately restored.			X	
U.S. Department of the Interior U.S. Fish and Wildlife Service North America Waterfowl and Wetlands Office (NAWWO) 4401 North Fairfax Drive, Room 110 Arlington, VA 22203	703-358-1784	The North American Wetlands Conservation Act of 1989 provides matching grants to carry out wetlands conservation projects in the United States, Canada, and Mexico. Both the Standard and Small Grants Programs help deliver funding to on-the-ground projects through protection, restoration, or enhancement of an array of wetland habitats.			X	

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
U.S. Environmental Protection Agency Chesapeake Bay Program Office Region III 410 Severn Avenue, Suite 109 Annapolis, MD 21403	800-968-7229	The Chesapeake Bay Program (CBP) awards grants to reduce and prevent pollution and improve the living resources in the Chesapeake Bay. Grants are awarded for implementation projects, as well as for research, monitoring, and other related activities.	X	X	X	X
U.S. Environmental Protection Agency Chesapeake Bay Program Office Region III 410 Severn Avenue, Suite 109 Annapolis, MD 21403	800-968-7229 410-267-5700	This program supports communities undertaking small-scale watershed projects for the benefit of the Chesapeake Bay and its rivers.		X	X	
U.S. Environmental Protection Agency Office of Wetlands, Oceans, and Watersheds (4501F) Ariel Rios Building 1200 Pennsylvania Avenue NW Washington, DC 20460	202-260-4538	EPA establishes a cooperative agreement with one or more nonprofit organization(s) or other eligible entities to support watershed partnership organizational development and long-term effectiveness. Funding supports organizational development and capacity building for watershed partnerships with diverse membership.		X	X	
U.S. Environmental Protection Agency Office of Wetlands, Oceans, and Watersheds (4502F) Ariel Rios Building 1200 Pennsylvania Avenue NW Washington, DC 20460	202-260-8076	This Five-Star Program seeks to support restoration projects in 500 watersheds by 2005, a key action of the Clean Water Action Plan. Competitive projects will have a strong on-the-ground habitat restoration component that provides long-term ecological, educational, and/or socioeconomic benefits to the people and their community.	X	X	X	
U.S. EPA Sustainable Development Challenge Grants (SDCG)	206-553-2634	Grants to support communities in establishing partnerships to encourage environmentally and economically sustainable practices.				X
U.S. Watershed Protection and Flood Prevention Program "Small Watershed Program"	Your local NRCS Office	This program provides technical assistance and cost sharing for implementation of NRCS-authorized watershed plans, as well as watershed surveys and planning.		X		X

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
USDA – Farm Service Agency One Credit Union Place, Suite 320 Harrisburg, PA 17110-2994	717-237-2113	The Conservation Reserve Enhancement Program (CREP) is a state/federal conservation partnership program targeted to address specific state and nationally significant water quality, soil erosion and wildlife habitat issues related to agricultural use. The program uses financial incentives to encourage farmers to remove lands from agricultural production.		X	X	
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	Soil and Water Conservation Assistance is a voluntary effort for farmers and ranchers that provides cost share and incentive payments to address threats to soil, water and related natural resources.				X
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	The Emergency Watershed Protection Program provides assistance to owners, managers and users of public, private or tribal lands if their watershed has been damaged by a natural disaster.			X	X
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	The Resource Conservation and Development Program (RC&D) program provides a way for local residents to actively solve economic, environmental and social problems. Assistance is available for planning and installation of approved projects.		X	X	
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	The Wildlife Habitat Incentive Program (WHIP) is a voluntary program for people who want to develop and improve wildlife habitat on private lands.		X		
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	The Rural Abandoned Mine Program (RAMP) was established to protect people and the environment from past coal mining practices.		X	X	

SOURCE OF ASSISTANCE	CONTACT PHONE NUMBER	BRIEF DESCRIPTION OF PROGRAM	ASSESSMENT	PLANNING	IMPLEMENTATION	OTHER *
U.S.D.A. Natural Resources Conservation Service One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993	717-237-2210	The Conservation Technical Assistance Program (CTA) assists land owners, communities, units of state and local government in planning and implementing conservation systems.		X	X	
University of Vermont	802-656-0471	Grants to promote sustainable agriculture practices.	X	X	X	X
Watershed Assistance Grants U.S.E.P.A. Office of Wetlands, Oceans, and Watersheds (4501F) Ariel Rios Building Pennsylvania Avenue NW Washington, DC 20460	202-260-4538	Grants to support cooperative agreements with one or more non-profit organization(s) or other eligible entities for watershed partnership organizational development.		X		
Western PA Conservancy Watershed Program 246 South Walnut Street, Blairsville, PA. 15717	724-459-0953	Provides funds to the Western Pennsylvania Watershed Protection Program to implement comprehensive ecosystem management programs in selected western Pennsylvania watersheds. In addition, small matching grants are provided to DCNR for the Coldwater Heritage Program.	X	X	X	X

Further references:

1. A Guidebook of Financial Tools. Produced by the EPA Environmental Financial Advisory Board and the Environmental Finance Center. Web address: <http://www.epa.gov/efinpage/guidebk/guindex.htm>.
Go to Media Projects & Programs, then General Interest, then Financial Program.
2. Catalog of Federal Domestic Assistance. U.S. General Services Administration. Web address: <http://www.gsa.gov/fdac.htm>.
3. Wetland and Riparian Stewardship in PA - A Guide to Voluntary Options for Landowners, Local Governments and Organizations. The guide lists various technical and financial assistance programs available to reduce impacts from nonpoint source pollution. Contact the Alliance for the Chesapeake Bay at 717-236-8825.
4. 1997 Directory of Funding Sources for Grassroots River and Watershed Groups. This is a directory of foundations and others that fund watershed efforts. Available for \$35 from River Network at 800-423-6747 or e-mail rivernet2@aol.com.
5. Consideration of performance of a Community Environmental Project (CEP) instead of civil penalties in certain cases where the alleged violator has suggested a CEP. The DEP will coordinate with local government and groups to identify appropriate projects. Contact your local DEP regional office for more information.
6. For information about training regarding grant proposal writing and winning grants contact the Nonprofit Management Development Center, LaSalle University, Philadelphia at 215-951-1701. A cost is associated with the training.
7. Your local library has information about grants including the Environmental Grant Making Foundations Book. Some libraries, including the Dauphin County Library System with several branches in Harrisburg, have a computer database that can be searched by subject for funding sources pertaining to watersheds or streams.
8. The United Environment Fund fosters growth of environmental organizations throughout the United States by helping them develop a stronger, more diversified funding base. Web address: <http://www.uef.org>
9. The Foundation Center is an independent, nonprofit information clearinghouse that collects, organizes, analyzes and disseminates information about foundations, corporate giving, etc. They maintain five foundation libraries throughout the United States, and they have cooperating collections of information located in public libraries including some in Pennsylvania. In addition to publications and supplementary materials, some libraries provide other services for grant seekers. For information about these cooperating collections call 1-800-424-9836. Foundation web address: <http://www.fdncenter.org>
10. Catalog of Federal Funding Sources for Watershed Protection. USEPA. 1997. Provides information on federal funding programs for watershed protection and local-level watershed projects. Call the National Center for Environmental Publications and Information at 513-489-8190 or 800-490-9198, ask for EPA Document 841-B-97-008.
11. Resource Conservation and Development (RC&D) is a non-profit public-private partnership involving local community members working voluntarily on a multi-county basis to resolve issues and develop opportunities for rural development. RC&D encourages local units of government and non-profit organizations to develop programs to improve their resources. RC&D's can help secure technical and financial assistance in the form of grants, loans, and other funding. Contact your local RC&D Council (or NRCS at 717-237-2203) for the specific application procedures of the program in your area.

* "Other" category includes research, education, publication, etc.

For more information, please visit the PA PowerPort at www.state.pa.us, Keyword: "Watersheds".