PINE CREEK WATERSHED RIVERS CONSERVATION PLAN

OCTOBER 2005

Pine Creek Watershed Rivers Conservation Plan

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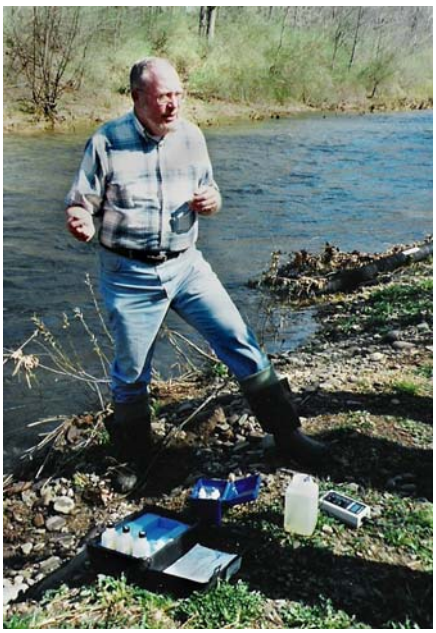
Dedication

Every once is awhile a head pops out of the crowd that sees a completely different view of the world. Every once in awhile the conjunction of community, activism and need occur simultaneously. Every once in awhile the conjunction of circumstances and individual bears fruit. Such was the case with **Phil Stillerman**.

Phil wasn't from around here, but he sure made the Pine Creek Valley his home. A devoted family man, retired fire chief, and active environmentalist, Phil put his dedication to whatever he did. As President of the Pine Creek Headwaters Protection Group he was everywhere. He talked to politicians, advocated for clean water, facilitated consensus on issues throughout the watershed, spent untold hours working on the abandoned mine remediation of Babb Creek and assisted others in getting organized and energized.



Perhaps the most important work he did was with children. There was always time to show the kids how to monitor a stream for water quality, why it was important and how they could get involved. He was an agent against the intergenerational tyranny of abandoned mine drainage, stream erosion, and water quality degradation we are faced with and was prepared to do something about it. His alkalinity kit and pH meter were always on the seat of his truck. Down the bank slipping and sliding ("the way I've gone through life", he'd say, getting back up and dusting off his backside) to get a sample from some tributary of the Pine.

The Pine Creek Watershed Rivers Conservation Plan owes a debt of gratitude to Phil for his support and early interest in the concept of the plan. He saw immediately the value of pulling the potential partners together to initiate the process. Moreover he was confident that we had the spirit, expertise and moxie to do it ourselves. But most importantly, he had the faith in us to be able to pull it off!

Phil was taken from us while going to his daughter's house to care for her cat, but his memory and dedication were, for many of us, the driving force in staying on task and seeing this plan to completion. So, to his vision and desire to see Pine Creek remain and become the crown jewel of the West Branch and the entire Susquehanna Basin: We dedicate this plan to our friend -- Phil Stillerman.

Acknowledgements

Funding for this project came from the Pennsylvania Department of Conservation and Natural Resources' Community Partnership Program's Rivers Conservation Program.

The Steering Committee was developed by considering the organizations and individuals who are familiar with the Pine Creek watershed, interested in the future and willing to donate their time to assist with the project. These individuals were called together to discuss the opportunity and need for a river conservation plan. They felt the time was right and proceeded with the planning process. Since then, other individuals and organizations have been invited to participate on the Steering Committee based on their interest in serving and willingness to work toward the common goal -- developing a plan that reflects the watershed and its opportunities.

Many people have contributed to the success of this plan, from the Steering Committee and those who supported them, to volunteers and the public (through the survey and interviews).

First, thank you to the old guys: Wayne Ray, retired Endless Mountains Resource Conservation and Development Council Coordinator and Jim Mays, DCNR retiree, for bringing the first round of players to the table in August of 2001 for the preliminary discussions on what this might look like and who would participate. Without them this would not have happened. Thanks, also, to Terry Hough, our DCNR grant advisor, for stewarding us through the process.

The Steering Committee is grateful for Jim Weaver's leadership, energy and inspiration as Chairman during the plan process. He did a great job of holding the group together, including creating enthusiasm and inspiration by planning and guiding a visit through the canyon for an "up close" look at Pine Creek.

Special thanks to Steering Committee members: Jerry Walls, for his vision, support and dedication to the plan; Stacy Cromer for her commitment to supporting the work of the RC&D Council and for never saying no to any request made of her during this project; and Renee Carey, for without her we would never have been able to stay on task and complete this project within the grant period.

The members of the Steering Committee have contributed to the outcome and in their own way made this watershed plan unique. The Pine Creek Headwaters Protection Group represented by Phil Stillerman and Ron Comstock, and the Pine Creek Preservation Association represented by George Durrwachter and Toner Hollick provided a grassroots perspective and were helpful in focusing on implementation. The County Planning Commissions represented by Jerry Walls and Kevin McJunkin (Lycoming); Jim Weaver (Tioga); and Mike Kear then Amy Jo McClain (Potter); were instrumental in formulating management options. Municipal officials, represented by Paul Hoffmaster and Toner Hollick, helped us make the plan doable and realistic. The Conservation Districts provided technical assistance through their staff: Jack Fleckenstein and Eric Potter (Potter) and Terra Dillman and Ralph Brugger (Tioga). Jennifer Means was helpful in

providing an alternative to “stovepipe thinking” and provided a cross department view of the plan. Dr. Mel Zimmerman and his interns from Lycoming College were indefatigable in their assistance to the Steering Committee in research, writing and the too numerous to mention tasks that always needed to be done.

Thanks to District Foresters Jeff Prowant and Roy Siefert, from whom we received invaluable help with state forest information, technical assistance and insights into the Bureau of Forestry’s management objectives.

Al Cole, Steve Stone and E. Neal Mack, landowners in the Canyon, deserve recognition for their insightful interviews. Citizen Wayne Scott’s self-appointed task was to keep open space on the table, and to a large extent he succeeded.

And to bring all the hard work to its printed stage, thank you to our editor, Helen Schwarz, for her thorough and tireless blending of the information the committee gathered; and to Charlie Schwarz, who as a forester had “boots on the ground” in the valley for many years was a welcomed fact finder.

And without question we would like to acknowledge *Raven* and *Brook Trout* for the inspiration they provided. Without that inspiration the process would not have been nearly as fruitful. The resources represented in the **Pine Creek watershed** are without doubt the heart of the matter.

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I. INTRODUCTION

The Pine Creek watershed begins in the mountains of Potter and Tioga counties and is characterized by many spring-fed brook trout streams. As it makes its descent toward Lycoming County through the Pennsylvania Grand Canyon, it grows in size and becomes a high quality trout stream, enjoyed by many more that just fishermen.

A few of the activities increasing pressure on the watershed are camping, biking, hiking, trail riding, bird watching, hunting, and an escalation in the number of camps and summer homes. As Americans find more and more leisure time the Pine Creek Valley becomes a Mecca for outdoor enthusiasts of all ages. The increasing popularity of the valley has created many problems which our ancestors never dreamed would occur.

The purpose of this Rivers Conservation Plan is to help protect the very things we find attractive, absorbing and compelling about this area. We feel it is important to understand what this Plan is and what it isn't as well. First and foremost the Plan is a reference and recommendations document. Here, under one cover, you will find much about the watershed; its resources, both natural and human. The land, water, biological, and social aspects of the watershed are cataloged for you. Demographic and economic data can be found. The history of the watershed is covered. And the pages of References alone are good reading. The maps are probably the most eye-catching and information rich; with the advent of GIS (Geographical Information Systems) we are able to "look" at the watershed in new and different ways to organize and present data and information. If you get stuck with an acronym there is a decoder chart on page 110. There are species lists in the appendix for the plants and animals found in the watershed. Contact lists, results from the interview surveys and public meetings document the time and effort we spent in seeking your input, criticisms and dreams. The Management Options located further back in the text will provide some ideas for implementation projects for a wide range of organizations, watershed associations, businesses and governments – municipal, county and state. We include the agencies at the state level because they have provided an overwhelming amount of support for this project: financial, advisory, and as sources of data and information. It is our hope that present and future citizens and public officials will use this plan's information and recommendations to help conserve what so many of us hold dear in the watershed.

The Steering Committee also felt it was important to use this Introduction to dispel several myths about what the plan means; and one way to do that is to outline what the plan isn't. The plan isn't regulatory. The plan does not carry any power to or from government agencies. The plan is not a prescription for what to do in the watershed - it merely points out areas that we felt were worthy of attention - not only the Steering Committee's, but the citizens' of the watershed. And we must be inclusive in this concept of citizen of the watershed. There are those who call the watershed home, from the gateway communities of Jersey Shore, Galeton and Wellsboro, to the interior folk and the wildlife. Then there are many who come here for the absolute quiet, others for the scenery and landscape, others just to soak in the solitude. In addition, the plan was not

meant to stifle our creativity or responsibility for recognizing and acting on some of the most pressing issues in our history. And lastly, the plan cannot restrict our rights as citizens of the Commonwealth to improve our quality of life and the pursuit of happiness.

The history and culture of the Pine Creek Valley is unique in the history of Pennsylvania. The region is rich in natural resources, and the people that settled here were of many diverse ethnic groups. The Swedes came here to log, the Irish came here to build railroads, the Polish came here to mine coal, and the English and Germans to farm. The past was characterized by resource extraction, from the huge white pine that provided lumber to build the nation to the coal that fueled the industrial revolution. The devastation from this extractive economy still lingers in the loss of topsoil and the acid/abandoned mine drainage that pollutes the watershed's streams. Luckily, the double whammy of uncontrolled development has not occurred, due in part to the Commonwealth of Pennsylvania's farsighted policy of purchasing large tracts of forest land in the early 1900s. Those acquisitions and the "gift of geography" (the mountains that made the region relatively inaccessible) kept development to a minimum. All this is changing fast. The area's proximity to major population centers, coupled with construction of Interstate 99 which will pass through the southern and eastern extremities of the watershed, is bringing increased pressure on the watershed.

The Pine Creek Watershed Rivers Conservation Plan is the first step in trying to find and identify problems that do, or could in the future, have a negative impact on the watershed. Having a dedicated group of individuals work on this project was truly humbling. One Steering Committee member said, *"Because I was born and raised in the Valley, I truly am in love with Pine Creek. For other parts of Pennsylvania I have admiration, respect and affection, but for Pine Creek it is love and it is hard to analyze love when you are in it. However, I will do my best to seek solutions to whatever problems we find. In all our deliberations we must put the resource first."*

The biodiversity of the watershed is one of incomparable wealth. The watershed has many unique landscapes and natural areas that are home to many species of plants and animals. Here is where northern and southern flora and fauna mix and intermingle. The number of plants and animals in the watershed is unparalleled in Pennsylvania's natural history. Here are raven, bald eagle, river otter, and bobcat. We have many Exceptional Value and Cold Water streams that provide habitat for the only native salmonid, Pennsylvania's state fish, the brook trout, as well as other species of fish. Our forests grow some of the most outstanding hardwoods on the continent. Babe Ruth came here in the off season to purchase white ash for his baseball bats. And, the white pine which once provided masts and spars for ships are starting to come back strong. There are areas of the watershed that have been designated old growth and we may see climax forests in the Pine Creek Valley once again.

People come here now to relieve the stress of their daily lives and immerse themselves in the natural wildness that the area provides. The quality of life in the watershed is superb. Native Americans came here to hunt, and European settlers found this a noble pastime as well. The region was home to writers influenced by the natural beauty and wilderness.

George Washington Sears, pen name Nessmuk, the first "go light" wilderness traveler and poet, wrote from his home in Wellsboro and used the lightest canoe ever built - at less than 10 pounds - the Sary Gamp. E.N. Woodcock lived, hunted and trapped in the headwaters of Pine Creek on the West Branch and wrote 50 Years a Hunter and Trapper. Phillip Tomb, who settled in the southern portion of the watershed, reportedly captured the last elk in the Pine Creek Valley, brought it home alive, and lived to tell about it in Thirty Years a Hunter. "The Ballad of Elmer Jones", a poem about a mythical hunter who roamed the mountains, speaks to the notion of local traditions and right livelihood. A quote from Nessmuk's Woodcraft and Camping must have been conjured in the watershed in the mid-eighteen hundreds:

For brick and mortar breed filth & crime,
With a pulse of evil that throbs and beats.
And men are withered before their prime,
By the curse paved in with lanes and streets.
And lungs are poisoned and shoulders bowed,
In the smoldering reek of mill and mine.
And death stalks in on the struggling crowd,
But he shuns the shadow of oak and pine.

-- Nessmuk, *Forest Runes*

Standing on the edge of a Grand Canyon overlook, with the warm sun on your face, the smell of drying pine needles in your nostrils, and the only perceptible sounds being that of spring wind blowing in the gorge, the roar of a rain swollen Pine Creek on its dash towards the Chesapeake Bay, and the plaintive calls of a pair of circling acrobatic ravens makes one feel fortunate to still be able to experience an area such as Pine Creek and "Canyon Country." It must be recognized, however, that such a beautiful region cannot continue to be immune to population pressure and development. If we are to preserve the opportunities for ourselves and future generations to enjoy such moments and experiences we must act now to develop and implement a plan for the region; a plan that recognizes the inevitability of growth and change but will direct and regulate such growth and change so as to minimize their impact on the more sensitive and vulnerable areas of our region.

All life and natural resources are both precious and limited. It is our charge to act responsibly and be good stewards of our environment. We have the obligation to our generation and future generations to plan ahead in a responsible manner. "Failing to plan is planning to fail." We all cherish the quality of life that the watershed offers; we all appreciate the unhurried atmosphere and pace of rural life; we all are encouraged by this plan to conserve our resources. It is our sincere hope that the Pine Creek Watershed Rivers Conservation Plan and its implementation will ensure that generations to come will be able to cherish, appreciate, conserve and enjoy ***Tiadaghton***, (translated from the Algonquin) ***"The River of Pines"***.

Members of the Plan Steering Committee

II. ISSUES, CONCERNS, CONSTRAINTS, OPPORTUNITIES

This section is provided for the purpose of addressing those unique and watershed specific issues, concerns, constraints and opportunities which are immediate. They are so important that we gave them the first "working" section of the plan. Because of their important nature we followed the outline for Rivers Conservation Plans for the order of the sections. We were torn with the argument to put it in the back so folks would have the history and characteristics of Pine Creek in focus before they started looking at the Issues, Concerns, Constraints and Opportunities section. The decision to keep it here in front was made so that before too far into the plan you would be interested in the watershed and compelled to read further to learn more.

Some of the following are problem areas, some are concerns, but from the perspective of the majority of the Steering Committee they are opportunities. The ability to single out and address each issue on a unique and individual basis allows for more focused and creative outcomes. Any noteworthy situations not accounted for in other sections of the plan are included here. When we came to the final draft phase we realized that this Section was the place for everything we had revealed during our research, worked on, and in the end, we found these items defied category or held special significance, hence the prominence in the front of the plan. These issues are "on the plate" - out there and in here, where they should and need to be. Section II has special status in the vernacular of the group. Since most of the committee live, work and play in the watershed and have a vested interest in the outcome of this plan (ownership if you will), we felt a special need to include those noteworthy "situations" that the outline called for and honor them with front line status and early implementation projects, strategies and management options. Keep in mind as you read these that they are a work in progress, that there are many facets to them, and that consensus is what we seek.

So herein the reader will find the distillation of four years of chewing, gnashing and tossing around some very controversial topics. We all have had a feeling of frustration and confusion with new and conflicting information. The Steering Committee knew this plan would break new ground. But we didn't understand the new perspective and respect we would have for each other and the resource during the plan's incubation.

It doesn't take an expert in the manipulation of statistics to understand that the survival of the entire human species depends on a sustainable relationship to the local expression of the processes of the biosphere. From everything one can learn through the nearly impenetrable veil of modern history, prehistoric humans acted out this latter assumption for most of our species' time on Earth. The very root of the word indigenous means "of a place." But the seductive social mechanics of the relatively recent Industrial Revolution have been so successful that even as we humans have exhausted our source of sustenance, we have convinced ourselves that there is no other way to act. We have engaged in a process of purposeful and systematic forgetting; we have lost previous

models of a more elegantly balanced life among humans, and we have convinced each other that it is fruitlessly utopian to imagine any other way of life.

--- Freeman House, **Totem Salmon**

A. PA WILDS

The recent development of the PA WILDS initiative, a top-down tourism and economic development program administered by the Department of Conservation and Natural Resources (DCNR) and the Department of Community and Economic Development (DCED), has created a stir within the local tourist promotion agencies, DCNR, and county government and planning departments. The promotion of the elk viewing attractions in the west central mountains of Pennsylvania has increased the focus on outdoor recreation and the potential for increased demands on an inadequate infrastructure. The Pine Creek watershed has been included in PA WILDS due to the Grand Canyon and state forest holdings. Our primary caution: Because of the large expanse of forested state lands there is a feeling of unlimited potential and opportunities for economic development.

As the consultant for the PA WILDS project, Ted Eubanks from Fermata, Inc., has said: "We must be careful not to exceed the physical, biological and social carrying capacity of the resource." His words were well taken. We must remind ourselves that for many years, perhaps centuries, northcentral Pennsylvania has had an extractive economy. First, they came and took the pine; then they came and took the hemlock. Later, they came and took the coal and corn. Now, we are experiencing the loss of our young people and natural beauty. The loss of our resources is not new to this area. In terms of social carrying capacity, these losses are a factor to be considered. The diversity of views on the carrying capacity of the watershed ranges from "they've won" to "it's limitless."

Two major gateway communities have been identified by the PA WILDS consultant. They are Wellsboro in the north and Jersey Shore in the south. These communities have different needs and requirements for the success of the initiative. The most important concept to keep in mind from a watershed perspective is the dynamic unforeseen consequences of our actions. This will require vigilance and monitoring of the factors embedded in the carrying capacity of the physical, biological and social indicators. As we demonstrate later, these initiatives or opportunities must not be taken out of context. Since the effects of PA WILDS will affect all the projects outlined in this plan's management options, we have commented on PA WILDS first.

The Steering Committee spent many hours on this topic, and one of our members has been appointed to the Governors Task Force on PA WILDS. We deliberated and expressed our concerns for the pressure this marketing campaign could have on the watershed and discussed and debated ways to express our concern. The input from the public and municipal officials in the watershed was also sought. The feedback was and has been very interesting, as you might expect, across a wide spectrum of thoughts and feelings on the subject. Unequivocally, the consensus was we must not forget the need for

a careful holistic review and analysis of any promotion of the watershed. PA WILDS has great potential, but we must not be driven by the fast buck or "need to accommodate" attitude that might be expected. The resource and the local communities must come first.

B. Pine Creek Trail

The acquisition of the Conrail Railroad right-of-way through the Pennsylvania Grand Canyon has been another notable development in the watershed. For the last 15 years the Bureau of Forestry has been working on the construction of the trail. Phase 1, the canyon section, was completed early and easily. Phase 2, from Blackwell to Waterville, was next and required construction of the trail on the right-of-way as it passes through private lands. Phase 3, from Waterville to Jersey Shore, is nearly complete with some major infrastructure improvements scheduled as this plan goes to the printer. Phase 4, the Marsh Creek section, is in design and is the last and most contentious section of the trail.

From the beginning the Phase 4 section has been controversial. The early conflict was over ownership. With the passage of time and the education about the exact meaning of a rail bank system the concern has been refocused on the obligations the Bureau of Forestry has assumed with ownership of, or at least responsibility for, the right-of-way. These obligations include the drainage along the railroad due to the past promises and legal commitments of the Pennsylvania Land and Timber Co. These include the maintenance of the culverts and parallel ditching and access to lands on the other side of the right-of-way. We have provided support and information to members of the Pine Creek Rail Trail Advisory Committee, spoken with and listened to the landowners in the Marsh Creek Valley, and assisted them with communicating their concerns to DCNR. The lack of an all-encompassing approach to the completion of the trail has been most apparent in these final months. Attempting to rush the trail to completion has left unresolved issues in the north on Phase 4 and loose ends and reduced infrastructure in the south on Phase 3. Community development concepts were not considered when planning for construction of the trail, and this has resulted in minimal local input to the project and the shortage of funding for the necessary infrastructure improvements. These issues have not been resolved as of this writing. It is the Steering Committee's hope that the concerns of the residents and gateway communities in the PA WILDS initiative can be worked out and the trail can be completed in a win/win fashion.

C. Chesapeake Tributary Strategy

The *2000 Chesapeake Bay Strategy* developed for the protection and restoration of the Bay includes the Susquehanna River watershed. The effect of this strategy will include the Pine Creek drainage. Increased focus on the watershed will result. The primary objectives of this program require the reduction of sediment and nutrient loads to the Bay. Each sub-watershed has load reductions that must be met by 2010. If these load reductions are not met the U.S. Environmental Protection Agency (EPA) is threatening to impose a total maximum daily load (TMDL) for the Chesapeake Bay. This will have

implications for the enforcement of water quality regulations. For the majority of the Pine Creek watershed this will not be an issue. But, in Tioga County's tributaries that are agricultural and currently meet their designation standards, enforcing the TMDL will impact the farmers. With all the regulatory restraints these guys may not be farming in the future. That is not to say that the current production agricultural paradigm is the most environmentally friendly. The difficulty is in changing these production methods AND maintaining a profitable enterprise. Farming is changing, farming must become more sustainable, and this change is important for the success of the Bay Strategy and the future of agriculture. It must not be dismissed as an agriculture problem, unless of course you don't eat!

The Conservation Districts are the lead agency for the implementation of this program but, as identified in the tiers of the Chesapeake Bay Tributary Strategy. The only successful tier is Tier 4 and includes E3 (Everybody, Everything, Everywhere) so this requires the inclusion of the Rivers Conservation Plan to be successful!

D. Emergency Services

In September 2002 the Pennsylvania Emergency Management Agency (PEMA) with the assistance of Governor Schweiker's Fire and Emergency Services Task Force presented, "A Study of Volunteer Fire and Emergency Medical Services in the Commonwealth of Pennsylvania" committees of to the state's House of Representatives Committee on Veterans Affairs and Emergency Preparedness and the Senate's Committee on Communications and High Technology. The task force identified issues within the volunteer fire and emergency medical services community, which if not addressed, may lead to problems within Pennsylvania's rural communities, boroughs, and cities. The issues can be categorized as: membership recruitment and retention, training and education, mutual aid, interoperability (compatibility of equipment between organizations), mergers and consolidations, fire prevention and safety education, and the Volunteer Loan Assistance Program.

In 2001 the National Fire Protection Association released a study showing that 73% of fire departments in the United States are staffed only by volunteers; another 15% of the departments are staffed mostly by volunteers. The number of Pennsylvania citizens willing to volunteer for their local fire department or emergency medical services provider is decreasing, raising concerns. In 1976 "Pennsylvania Burning" estimated the number of volunteers providing these services to be 300,000. The Department of Community and Economic Development estimates the volunteers had decreased to 70,000 in 1995. This dramatic decrease of 230,000 volunteers statewide cannot be ignored.

The 2002 PEMA study cites a change in communities from locally owned businesses to corporate owned businesses as one possible cause for the decline. The report also acknowledges that many families are more involved in their children's activities than before. Pennsylvanians are commuting longer distances to work making them unavailable

to respond in their home community. The threat of litigation is another factor felt to be influencing the decrease in volunteers.

Mutual aid and interoperability are related issues. Mutual aid is fire, emergency medical, hazardous materials, law enforcement, public works, emergency management, and other agencies assisting each other during emergencies and disasters. Interoperability is the ability of equipment from one entity to be compatible with another entity's equipment.

Currently, state law requires mutual aid agreements to be executed by municipal, county, and state government. Individual fire companies cannot legally enter into mutual aid agreements with one another. The report recommends changing the legislation so that mutual aid agreements are entered into at the county level, state level, or by regional counter-terrorism task forces.

Interoperability is problematic from radio frequencies to the ability of one company to share or connect fire hose to another company's equipment. Interoperable standards are being discussed and created at the local and regional level. One example in Lycoming County is the Rescue Task Force, which is developing common training, terminology, equipment, and operational standards.

The PEMA study committee suggested mergers and consolidations to assist in providing better service to the Commonwealth's citizens with less work needed by volunteers. The merger of organizations can eliminate some of the on-going administrative work and fundraising, and would only take place after much discussion and analysis.

How does this state-wide perspective apply to the Pine Creek watershed? The Steering Committee recognized that it is beyond the scope of this plan to study these issues in depth. We can, however, note that for the most part the Pine Creek watershed is very rural in character. There is extensive public land and a fairly low resident population in most municipalities. The volunteer fire companies and emergency medical services are largely volunteer-based. Individuals involved with these organizations have expressed concerns about the ability of emergency responders to deal with an increase in demand from recreational users of the area.

Where cell phone service is available in the watershed, calls are relayed through a number of cell phone towers. Some calls go through towers in southern New York. Some calls to 911, due to the service provider's relay, may go to a 911 call center in a county other than the one from which the call is placed.

The Steering Committee has developed a series of management options to begin the dialogue and discovery needed to address these concerns and issues. Much of the work will need to be done with cooperation from the various volunteer fire companies and emergency medical service providers, hospitals, regional counter-terrorism task force and PEMA; as well as the Bureau of Forestry, Bureau of State Parks, and Pennsylvania Game Commission.

Fortunately, the counties that make up the Pine Creek watershed all belong to the same counter-terrorism task force, so a platform for beginning this dialogue exists and has been functioning for several years. The next step is to gain consensus and support to begin studying these issues and developing solutions.

E. Implementing the Pine Creek Watershed Rivers Conservation Plan

The Growing Greener initiative has created an increasing awareness of the potential for local citizens groups to contribute to healthy communities. The Pine Creek watershed has had the advantage of two watershed associations operating in the region for many years. Due to several constraints, one physical (the Cedar Run Narrows), one political (Tioga/Lycoming County Line) these groups have not often communicated or worked together much in the past. This has changed since August 17, 2001. On that date the groups that would morph into the Steering Committee for this Rivers Conservation Plan met for the first time. Included were representatives from each of the watershed groups. Now these organizations find they are working together for the entire watershed. To date the Steering Committee has had strong representation from both north and south in the watershed. While both groups have had different mission statements in the past, we all realize the unique experience we have had cooperating and joining forces. This new outlook will undoubtedly require new tools and support for the implementation of the Pine Creek Watershed Rivers Conservation Plan. One possible outcome and segue to the Early Implementation Projects listed below would be to empower the Steering Committee to morph, yet again, into an organization to facilitate these and other projects.

F. Conservation Easements

The Pine Creek watershed is at a unique point in its history. While past development occurred because people were needed to remove the natural resources such as lumber and coal, some of the current development in the watershed is based on leaving the natural resources in place and enjoying them for their scenic beauty or the recreation they provide. Today, people are retiring to the watershed or buying a second home because they enjoy the forested hillsides and pastoral landscapes of the watershed. They enjoy the trails, hunting, fishing and floating that the natural resources provide.

How much development can the watershed handle before it loses its unique character? Everyone has their own idea, but no one has quantified it. What can be done now to help retain some of the watershed's character; to help maintain the quality of life the residents and visitors enjoy? There are lots of answers to this question.

One answer is conservation easements. This widely used land protection tool is discussed in more detail in the Land Resources Section. Their importance here relates to the opportunity to use conservation easements to permanently protect land while allowing it to remain in private ownership.

The easement spells out the permitted uses of a property. This includes such things as agriculture, forestry, recreation, habitat improvement, and other open space uses. The easement also spells out the residential, commercial, and industrial uses of the property. This includes such things as where additional houses may be built and the amount of sub-division that will be allowed. Once an easement is in place the landowner can give, sell, or otherwise transfer the property. The easement follows the deed to the property, binding all future owners.

When conservation easements prohibit or limit the amount of sub-division and development that can occur on a property, they are working to keep the scenic quality, the open fields and forests, in place. Conservation easements can be used by a landowner to provide future generations with a farm or forest to manage, or to ensure future generations will have a place to play in woods or along streams.

If several neighboring landowners all place conservation easements on their properties, they begin to protect landscapes and ensure wildlife will have needed habitat. We can begin to define areas that will remain rural, which in turn helps define areas where development should and can occur.

Conservation easements won't work everywhere. It is not the intent to have the entire watershed under conservation easement. The idea is to protect those areas that are important or define the watershed while at the same time providing areas and opportunities for communities to grow.

G. Oral History

Long before written languages and a literate populace, civilizations passed their heritage and culture from one generation to the next through stories. Whether the stories provided an overview on family genealogy or explained how the culture evolved, the stories were told and retold, around campfires, hearths, in fields, at forges.

Anthropologists and archaeologists have relied on these oral histories to lead them in their work to find a lost city, understand a custom, or simply document a people's beliefs. In modern society oral history and storytelling are not the primary sources of data collection or historical documentation of daily life, but are recognized as important in documenting events, usually tragic.

The United States Army's Center of Military History has a manual on how to collect oral histories from soldiers. The Army recognizes that, "oral history is an essential means of preserving the experience of past battles and imparting that experience to young soldiers." These histories will provide future scholars, strategists, and grandchildren with a better understanding of what happened, how people responded, and what they felt.

While these histories are important and serve a purpose, there is also importance and purpose in collecting the stories of everyday life in the Pine Creek watershed. Whether

it's a miner's story about a lunch time prank, a child's adventure along a stream on a summer day, or the story about the day the ginseng buyers came to town on the train. The events held in these stories shaped this watershed and its residents.

Unfortunately, many of the watershed's stories are gone forever. The people who experienced them are no longer here to tell us their stories. Fortunately, there are still many people to talk, and many stories to be heard. The Pine Creek watershed's stories should be gathered, organized, and saved. Because this implementation idea is time sensitive, the Steering Committee decided to make it an early implementation project. We want to hear the stories from the people who experienced them. We want to hear in their voices the excitement, the disappointment, and the laughter.

One of the major ideas discussed over and over again during this process has been the need to share information. A lot of research, documentation, and work have been done to catalog the Pine Creek watershed's acid precipitation, water chemistry, aquatic life, historical structures, history, and industrial uses. This information is not always easily accessible for residents, let alone visitors, and in many cases this information would enhance a resident's sense of pride or a visitor's sense of wonder.

This led to the idea of a Pine Creek Room. This room(s) – virtual or physical - would display, interpret, educate, and interest the general public about the Pine Creek watershed. The displays would cover the spectrum from water quality, geology, geography, flora, fauna, history, and many other topics. The Pine Creek Room may be a stepping off point for a visitor's adventure, a stop on the way to somewhere else, a class field trip, or the place a resident goes for a special program summarizing summer water quality research or to hear a local musician.

The Pine Creek Room might not be limited to a single location. Based on need and support, Pine Creek Rooms would ideally be in several locations throughout the watershed. These rooms could be attached to a DCNR facility, a visitors center, or stand alone. They may be open only seasonally or year 'round. The rooms will evolve over time and provide visitors with an overview of where they are and how unique this watershed is.

Additionally, the reports, books, and information that currently exist, as well as the oral histories that will be collected, would be permanently stored at a local college. Copies of these materials may be available in the Pine Creek Rooms, but the originals would be stored, cataloged, and accessible through the college's library services.

H. Early Implementation (brief list with supporting comments & contact person)

Wilson Creek Management Plan and Demonstration Project. This project is in collaboration with the Babb Creek Watershed Association to develop a watershed management plan for the Wilson Creek watershed, a tributary to Babb Creek. Wilson Creek is the last tributary to complete abandoned mine drainage (AMD) remediation in

the watershed and also has agricultural and development impairments. Plan calls for demonstration projects for grazing and riparian buffer habitat development. Contacts: Bill Beacom and Jim Weaver. *(Currently approved for funding and plans call for grazing and riparian habitat research to start in the spring of 2006)*

Keeping Track. A wildlife monitoring program for ecosystem health. This project is at a standstill at the present due to lack of funding. PROPOSAL DEVELOPED AND SEEKING FUNDING. Contacts: Kerry Gyekis and Tom Murphy.

Marsh Creek Greenway. This project by local partners in Tioga County is in the planning stage. This project would connect the northern terminus of the Pine Creek Trail with the Borough of Wellsboro. *Feasibility grant application anticipated for the fall round of 2005.* Contacts: Grant Cavanaugh and Jim Weaver.

Consistent Signage in the Watershed. This project is currently seeking support of the Tioga County & Lycoming County visitors bureaus and would have the support of the Secretary of DCNR. Contacts: TBD *(as of this writing, the Steering Committee has been informed that this project is already underway. The as yet to be released Outdoor Recreation Plan for PA Wilds has its own set of early implementation projects and the same recommendation was made there.)*

Oral & Literary History Projects. As we interviewed and talked to Pine Creek residents we discovered an amazing diversity of histories residing in the local libraries and the heads of the people that live, work, and play here now, or did in the past. Some can be recorded and documented. Others can be republished. Two that are worthy are Bob Weber from Slate Run and George Washington Sears – Nessmuk- from the 19th Century.

A Pine Creek Action Plan. The Steering Committee is set to continue their work. We realize that this is truly a work in progress. The more we know about the watershed the more we find we don't know, or could include here. To that end we are exploring a structure and strategy for continuance. The projects for immediate action would be to champion and empower local initiatives in the early implementation projects. In addition, we have several projects that would provide a stepping off point for other management options. On the ground we would like to develop a Pine Creek Room. A place for reference on Pine Creek: MAPS, PLANS, DOCUMENTS, PHOTOS, SONGS, ORAL HISTORIES, VIDEOS, ARTIFACTS, AND MULTIMEDIA. As a way to jumpstart this project we are working on a website, a Virtual Pine Creek Room. But our hope would be to house the Pine Creek Room in a museum, historical society, library, visitors' center, district forest headquarters or similar location. In addition the idea of a circuit rider to develop an education forum/programming for municipal officials and the public has been floated. It is the Steering Committee's hope to morph into a permanent vehicle for leadership and coordination with all our partners.

III. LAND RESOURCES

A. Project Area Location

The Pine Creek watershed lies in the heart of northcentral Pennsylvania, encompassing portions of Potter, Tioga, Lycoming and Clinton counties. The boundary of the study area consists of the entire Pine Creek watershed, including the drainage areas of both the West Branch of Pine Creek and Little Pine Creek, to Pine Creek's confluence with the West Branch of the Susquehanna River. Map 1 shows the regional location of the watershed, including the major streams, highways, and municipal boundaries.

B. Size

The drainage of the entire Pine Creek watershed is approximately 981 square miles or 627,840 acres (Water Resources Bulletin No.6 [WRB 6]). Table III-1 shows the percentage of the entire watershed by county. Pine Creek's four largest tributaries have drainage areas in excess of 70 square miles. They are: West Branch of Pine Creek 71.6 square miles, Marsh Creek 81.3 square miles, Babb Creek 130 square miles and Little Pine Creek 180 square miles (WRB 6).

Table III-1. Percentage of Pine Creek Watershed by County

Potter	21.70%
Tioga	43.65%
Lycoming	33.84%
Clinton	0.81%

The watershed's largest tributary, Little Pine Creek, originates near English Center, Lycoming County. Little Pine Creek flows in a southwest direction to its confluence with Pine Creek at Waterville, also in Lycoming County. Additional information about the sub-watersheds of Pine Creek such as course, drainage area, stream length, physiography, and mean annual precipitation can be found in Table A-1. The physiography of the Pine Creek watershed is shown in Map 2. Refer to the Water Resources Section and Table A-7 for more detailed information about the waters of Pine Creek and its tributaries.

C. Topography

The Pine Creek watershed lies entirely within the Appalachian Mountain System topographic region. The Appalachians are comprised of four parallel zones of different geologic and topographic landforms that include the Appalachian Plateau, the Ridge and Valley, New England and Piedmont Provinces. Except for the extreme southern end, the Pine Creek watershed is in the Appalachian Plateau Province, which is characterized by high flat-topped divides, separated by steep-sided valleys and deeply entrenched streams.

The surface topography of the Pine Creek watershed has most recently been sculpted by a succession of three glaciations that occurred from 800,000 to 15,000 years ago. The crests of ridges and mountaintops were lowered by the eroding ice. Valleys were deepened and rounded. When the ice melted and receded, till deposits of clay, silt, sand and gravel remained in the floor of valleys and streambeds. Map 3 shows the glaciation within the Pine Creek watershed.

D. Forests

The original forests that once covered the hills and valleys of the Pine Creek watershed were found throughout the northern Allegheny Plateau. The characteristic species were white pine, hemlock, American chestnut, red maple, mixed oaks, sugar maple, American beech, sweet birch, yellow poplar and black cherry. White pine, the premier tree of this forest, reached its maximum development on the slopes of stream valleys that dissect the region. Studies made in virgin white pine stands indicate that white pine was a sub-climax species and occurred in scattered, well-defined areas usually after some natural catastrophe. Hemlock-beech appears to have been the climax forest in the northern portions of the Allegheny Plateau with some mixed oaks and sugar maple**;** other species present were black cherry, red maple, yellow birch and sweet birch. The southern portions of the watershed were occupied by an oak-chestnut forest with white pine, pitch pine and red maple. Today, the vegetation of the watershed has been so profoundly modified by logging, fire, insects and disease that, for the most part, it bears little resemblance to the original forest. However, in 2005 approximately 68% of the watershed's 981 square miles remain forested.

Virtually all the remaining examples of old growth forest are now preserved on public lands. In the Pine Creek watershed there are small areas of old growth forest in the Pine Creek Gorge Natural Area, Lebo Red Pine Natural Area and the Bark Cabin Natural area.

Old growth forests are considered an endangered habitat in Pennsylvania. However, with care, effort and enough time, forests can recover many of their old growth characteristics. Although they will be different from the old growth of the past, preserving future old growth sites is important. The Department of Conservation and Natural Resources (DCNR) has adopted a policy for State Forest land of preserving and protecting old growth areas and implementing a strategy to promote future old growth areas on a minimum of 20 % of State Forest land. A substantial amount of old growth areas on State Forest land is located within the Pine Creek watershed; primarily in the existing wild and natural areas, but also on the steep slopes bordering both Pine Creek and its tributaries.

The second growth stands following logging and fire fall into two major associations: mixed oak forests containing red maple and some white pine, and those dominated by beech, black cherry, sugar maple and yellow birch. The chief factors influencing the species composition of the second growth were destructive forest fires and excessive logging of the original stand.

1. Biotic and Abiotic Influences

a. Early Major Influences

The original forests of the watershed, the hemlock-pine-hardwood community and the oak-chestnut-pine community, have been subject to many catastrophic events that have severely altered the forest. The first influence to affect the virgin forest was the logging that started in the 1800s and lasted for almost 70 years. White pine, which was the premier wood of the Pennsylvania lumber industry at its peak, was severely decimated. After white pine, hemlock was the next to be cut. Carson W. Butler, now deceased, was a retired fire warden. He recalled that the last of Tioga County's huge hemlock stands were cut for logs and bark in 1902 and 1903. Lycoming County saw the last log drive of hemlock logs bound for the Williamsport sawmills in 1909. After the elimination of white pine and hemlock, hardwoods became established over most of the area.

b. Early Wildfires

The heavy slash resulting from logging operations provided fuel for forest fires that plagued the area for many years. Many areas were burned repeatedly; today the trees in those locations are small and of poor quality. Carson Butler recalled a severe fire in 1908 in which, "All the mountains were burned and all trees and tops were burned. Only the sand and rock were left." Deceased Ranger M. Lee Fish of Blackwell reported "...[the] fire of 1908 burned from Cedar Run north to Ansonia and through the Asaph country." Other forest fires continued to occur, however, none were of the size or severity of the 1908 fire.

Following forest fires, the forest that generally became established in Tioga and Potter counties was the northern hardwood type (sugar maple, beech, black cherry and hemlock) with some mixed oak; while in Lycoming and Clinton counties mixed oak and red maple became established.

c. Chestnut Blight

In the 1920s the fungus causing the chestnut blight, having arrived from Europe, began killing the American chestnut throughout the Pine Creek watershed. Although chestnut was not a major component of the forests in the northern portions of the watershed, the species was important throughout the oak-chestnut forests in the southern areas. Today, while sprouts from the root systems of the original chestnuts still appear, chestnut is but a minor component of the forest.

d. White-tailed Deer

Of considerable importance is the impact of the white-tailed deer on the forest. The deer herd has resulted in a great deal of damage due to overbrowsing. In Pennsylvania, overbrowsing by deer was first documented in the 1920s and 30s and has continued unabated. Many forests exhibit a browse line where all tree, shrub and herbaceous vegetation palatable to deer has been eliminated within their reach. The problem continues even after the introduction of less restrictive deer seasons, and is resulting in a major change in the species composition of the watershed's forests.

e. Insects and Diseases

In more recent years there have been other deleterious influences on the forest. Insects such as the fall cankerworm, oak leaf rollers, and saddled prominent became increasingly numerous throughout the watershed in the 1960s.

In the mid 1970s an outbreak of beech scale insect occurred. This European insect spread westerly and now is entrenched in virtually all the beech stands in the Pine Creek watershed. Following attacks by the beech scale, the weakened trees were infected with nectria and other related decay fungi and by the mid 1980s mortality began to occur. By the early 1990s heavy mortality occurred through the entire watershed. This complex of scale and nectria is commonly known as beech bark disease. Some individual beech trees and some clones are resistant to beech bark disease, so beech will not be eliminated from the forest.

Dieback of the sugar maple, primarily on the mountain tops, became evident in the late 1970s throughout the area. Considerable tree mortality occurred in the early 1980s and is continuing. The exact cause of this dieback or decline is not known, but is thought to be attributed to insect defoliations in the early to mid 1970s combined with other factors such as growing site limitations and droughts.

Gypsy moth (another exotic insect) populations became established in the 1970s with the first noticeable defoliation and tree mortality occurring on State Forest lands in the late 1970s and early 1980s. Gypsy moth populations increased until 1985 when a general collapse occurred. In recent years, combinations of diseases and parasitic insects have held gypsy moth populations in check.

Widespread defoliation by the elm spanworm, a native insect, occurred in 1993 and 1994. These defoliations in conjunction with repeated anthracnose fungus infections in 1994 and droughts in 1991, 1993, 1995, 1997, 1998, and 1999 have resulted in moderate to heavy decline and mortality in the maple and red oak species on thousands of acres throughout the watershed.

E. Geology

An excellent review of the geology, minerals and soils of the Pine Creek watershed appeared in the 1989 Pine Creek Scenic Rivers Study (published by the Department of Environmental Resources – now the Department of Environmental Protection). An excerpt of that is summarized below:

> Four hundred million years ago northcentral Pennsylvania was covered by an extensive inland sea. As these waters repeatedly rose and receded, sand, shale and organic and calcium sediments were deposited in layers which varied in thickness and extent. Later this portion of Pennsylvania was thrust upward by enormous subterranean pressures, and the floor of the ancient basin became an elevated plateau, the Appalachian Plateau.
>
> As the weathering processes began to wear away at the plateau, channels, ravines, and canyons were formed. Then, as today, these eroded materials were carried to the Susquehanna River and the Chesapeake Bay. As a result of these actions, the Appalachian Plateau Province is characterized by high flat-topped divides, separated by steep sided valleys in which deeply entrenched streams flow.
>
> "Old Pine Creek," responding to the geologic structure of the Plateau, developed and enlarged a drainage pattern to the northeast, draining into the Tioga River.
>
> When glaciers then covered the land, and began to melt, they left a dam of gravel, sand, and clay. This created a natural dam, which blocked the northeasterly flow of "Old Pine Creek" and created a chain of lakes across the area. As water levels rose, an outlet in "Old Pine Creek" near Ansonia was established. This overflow was of such intensity that it cut the "Grand Canyon of Pennsylvania".
>
> A second outlet of this lake drained into Babb Creek, whose drainage course to the north was also dammed – reversing its flow. As a result of this action, Babb Creek became a tributary of Pine Creek.
>
> The southern border of the Wisconsinan glacier was near Cedar Pines, thereby actually covering the canyon at one point in time. It should also be noted that the theory of the glacially-induced origin of the canyon was first hypothesized by Enoch Blackwell Jr., son of William Blackwell, who founded the Village of Blackwell in 1817.
>
> With the retreat of the Pleistocene glaciers, about 15,000 years ago, the valleys through which these streams had flowed were blocked, dammed with these glacially deposited materials.
>
> The history of the rocks that crop out in the Pine Creek study area span millions of years from the Upper Devonian Period (350 million years ago) to the Lower Pennsylvanian (300 million years ago).
>
> The oldest rock unit in the study area is the Lock Haven Formation. These marine beds are found near the bottom of the Pine Creek Gorge. The uplift of the

northeast-trending Wellsboro anticline and subsequent downcutting by Pine Creek caused the marine beds to be exposed.

The youngest lithofied strata are of the Pennsylvania Age Pottsville Group. This unit crops out on ridgetops in the southern portion of the study area and are preserved in the structurally low Blossburg syncline.

Table A-2 is a generalized stratigraphy column of the rocks exposed in the Pine Creek area.

1. Soils

Soils are complex mixtures of weathered rock, minerals, organic matter, water and air. Their formation is through the interaction of parent material, plant and animal life, climate, relief and time.

The soils found within the Pine Creek corridor can be divided into the following:

- Those formed from materials carried by water (alluvial).
- Those formed from materials transported by gravity (colluvial).
- Those formed from the miscellaneous drift materials deposited by Wisconsinan Glacier (glacial till). Rocks from different sources are intermingled in this till.

The soils of the valley sides and base are colluvial and are derived from two sources. First, the weathering of the exposed rock outcrops which line the sides of the valley, and second, the down-washing of the glacial till soils from the ridgetops.

Alluvial soils are present on small islands and adjacent to the streams' sides. These soils are formed from sand, silt, clay, gravel, stones and cobblestones, which are transported and deposited by the action of flowing water. These areas are generally long and narrow, and vary from level to gently sloping. A high potential for flooding is the main limitation to use of these areas.

Soils that have similar profiles make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other characteristics.

Table A-3 outlines the characteristics of 12 soil classes for the Pine Creek watershed. These are visibly shown in Map 4. The Hazelton-Dekalb-Buchanan soil type is the largest with 160,939.77 acres.

Soil erodibility, especially on stream banks, is a major influence on Pine Creek and its tributaries.

2. Minerals

All four counties within the Pine Creek watershed are part of what is known as the North-Central Fields of Pennsylvania, containing numerous small beds of bituminous coal. This region is just a small part of the greater Appalachian coal basin, which underlies about 15,000 square miles of the entire state. The Main Bituminous Field, located in the southwest and central parts of the state, contains much larger and more accessible coal beds.

The two main coal mining areas in Tioga County are the Blossburg Coal Basin and the Gaines Coal Basin. Both of these basins began as deep mountain-enclosed troughs which have been slowly washed away by the forces of erosion. The Pine Creek Basin, which at one time contained the largest coal deposit in Lycoming County, is located to the west of Texas Creek. The Blossburg Coal Basin is mostly contained within the neighboring Tioga River watershed to the east, but has many irregular deposits located within the headwaters of the Babb Creek watershed, a tributary of Pine Creek. The Gaines Coal Basin originally stretched from Jackson Township in the northeast corner of Tioga County, southwest to the Potter County line. However, the majority of this coal bed was washed away by erosion, leaving only a few hundred acres in Gaines and Delmar Townships to be mined at the beginning of the 19th Century.

Bituminous coal, like much of what is found within the Pine Creek watershed, is close to ideal for coking, but very little of it is left in the watershed today. Coke is a porous, high-carbon fuel made of purified coal and used primarily in the steel industry. Most coke that is produced today is a mix of several different types of coal from various locations. A few mining companies, including the Gaines Coal and Coke Company, were started and thrived within the watershed during the mid 1800s, but few are still functioning today. More information on the history of coal mining and its influence upon the land and people of the region can be found in the Cultural Resources Section of this plan. The only active mining operations within the watershed today are surface mines, located in Lycoming County (Fisher Mines). This operation has been growing rapidly in recent years.

Several streams are impacted by acid mine drainage, most notably Babb Creek and Otter Run. A coalition of watershed groups, state agencies and volunteers, led by Robert McCullough, has implemented a comprehensive abandoned mine drainage program to clean up Babb Creek and its tributaries. This ongoing project utilizes a number of different remediation techniques and is a model for other such problem areas. For more information, refer to the Water Resources Section of this plan.

The Pine Creek watershed is part of the Appalachian High Plateau Province, which is well known for its bluestone (flagstone) and sandstone. Shale has also been a historically important stone within the watershed. Small operations quarrying sandstone, flagstone, and shale are still scattered throughout the watershed. There are also many inactive flagstone quarries, large ones near Slate Run and below Ramsey, as well as many smaller quarries between Tombs Run and Blackwell. Most were active in the first half of the 20th

Century, with the stone being shipped out of the valley to be used for sidewalks and other outdoor construction.

Ocher is a naturally occurring pigment that has been used since prehistoric times in paints and dyes. This naturally occurring mix of iron oxide and clay can be found throughout the world and varies in color and quality, depending on the origin. Ocher was reportedly obtained in the two small abandoned mines on the second branch of Bohen Run, but signs of ocher are no longer visible in the waste material.

3. Oil and Gas Wells

The majority of gas wells in the Pine Creek watershed are located along the main stem of Pine Creek. There is one active commercial well within the watershed, in McHenry Township, Lycoming County. There are reputedly hundreds of abandoned wells within the watershed. According to a map created by DEP, approximately 39 oil and gas wells have been capped within the watershed.

Over the last few years, a number of companies have been successfully drilling deep, high-pressure gas wells in southern New York and in West Virginia from the Trenton-Black River formation. The Trenton-Black River is a porous rock formation possibly as deep as three miles beneath the surface in Pennsylvania. This formation runs from New York to Kentucky and is thought to be the location of large supplies of natural gas in northcentral Pennsylvania under State Forest lands.

The DCNR Bureau of Forestry has recently leased lands for natural gas exploration in Potter, Tioga, Clinton, Cameron, Lycoming, Huntingdon and Fayette counties. Gas drilling activity is not new to State Forest lands. Since 1947, many hundreds of gas wells have been drilled on State Forest lands, and between 450 and 500 wells are producing today. Over the last 55 years, the total income from gas storage royalties and rentals has reached $129 million.

The General Assembly created the Oil and Gas Lease Fund in 1955 and established a policy of taking the money from the sale of nonrenewable oil and gas resources owned by the state and reinvesting this money into public conservation assets benefiting all Pennsylvanians. Money from this fund has purchased land for many of Pennsylvania's state parks, acquired critical tracts for state forests and helped to maintain the estimated $3 billion parks and forestry infrastructure.

The department has recently updated their oil and gas lease requirements and added stringent safety and environmental protection standards:

- To reduce forest fragmentation, DCNR changed the minimum well spacing requirement from one well in 40 acres to one well for each 640 acres — one square mile.
- DCNR increased the bond requirements to some of the toughest in the nation. Instead of the $2,500 bond per well required by law, DCNR is requiring

companies to secure a $25,000 lease bond as well as a well plugging bond for each well ranging from $5,000 to $100,000 as a minimum depending on the depth of the well.

- Successful bidders must provide the department with a $20 million Drilling-Well Control Insurance Policy for wells anticipated to reach 10,000 feet or deeper.
- The lease prohibits drilling on or within 660 feet of the boundary of any state park, state forest wild area or natural area.
- All drilling sites and access roads are subject to the approval of the DCNR District Forester. Therefore, if the proposed site is in an area unacceptable to the District Forester, he or she has the authority to require the company to move the proposed drill site or access road to a more acceptable location.
- All well drilling must comply with the Department of Environmental Protection's oil and gas well drilling regulations.

Gas and oil drilling exploration has been on the increase within the watershed in recent years. A concern associated with these operations is the potential for brine contamination from drilling and brine impoundments. DCNR has recognized these concerns through the development of environmentally stringent lease requirements. However, gas and oil well drilling also can occur on private holdings, subject to the less stringent DEP regulations.

Private landowners should seek advice from the Penn State Cooperative Extension Service and others before signing leases for exploration.

F. Land Use

1. Public and Private Lands

Over half of the 981 square miles of watershed, approximately 512 square miles, is in public holdings. Those lands include four state forests, eight state parks, and seven tracts of State Game Lands. The majority of the public land is state forest, approximately 410 square miles. Tables VI-1, VI-3 and VI-4 and Map 5 provide a description of the publicly owned lands. These lands are managed and maintained by the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Game Commission (PGC), the Pennsylvania Fish & Boat Commission (PFBC), and various municipal entities. Refer to Water Resources, Biological Resources and Cultural Resources Sections for additional information regarding state forests, parks and game lands.

Public lands provide many recreational amenities and tourism opportunities and contribute greatly to the scenic beauty and rural character of the watershed. However, public use of these lands can also create demands for government services and problems for local residents if not managed properly. Issues identified through the survey and interviews include littering, trespass, damage to municipal roads, fire protection, and emergency services. In addition, local residents are concerned about recreational overuse, which can be more difficult to monitor and

remediate. However, while residents and visitors value the scenic beauty and quality of life that publicly owned open space provides, municipal officials often have a different point of view.

The perception among some municipal officials is that public lands do not generate sufficient revenues to offset increased demands for services, which can be a result of recreational overuse. A number of studies have demonstrated that open space and conservation provide a net fiscal benefit to combined municipal and school taxing districts, primarily as a result of lower educational costs. Although state lands do not pay taxes, DCNR does pay the counties, municipalities and school districts a payment in lieu of taxes which these entities can use to defray their costs. The in-lieu payment provides revenues roughly comparable to private undeveloped land assessed under the Clean & Green program. As of the date of this plan, legislation was being considered to increase the payment-in-lieu rates.

2. State Forests

Portions of four state forests are found in the Pine Creek watershed. The Tiadaghton State Forest is comprised of 215,780 acres (96,214 in the Pine Creek watershed), primarily in Lycoming County. Nestled in the Tiadaghton State Forest is Little Pine State Park. (See Cultural Resources Section regarding state parks.)

The Tioga State Forest, named after the Seneca Indian tribe that once inhabited the area, is comprised of 164,768 acres (117,638 in the Pine Creek watershed), most of which is in Tioga and Bradford counties. It is also the home of the Pine Creek Gorge Natural Area which was designated a National Natural Landmark in 1968.

The Susquehannock State Forest is comprised of 258,936 acres (50,670 in the Pine Creek watershed), most of which is in Potter, Clinton and McKean counties. Denton Hill State Park is in the Susquehannock State Forest.

The Sproul State Forest, named in memory of William C. Sproul, Governor of Pennsylvania from 1919 to 1923, is comprised of 303,990 acres (875 in the Pine Creek watershed). Map 5 shows all state owned forest land within the Pine Creek watershed.

State forests were created "to provide a continuous supply of timber, lumber, wood, and other forest products, protect the watersheds, conserve the waters and regulate the flow of rivers and streams, and to furnish opportunities for healthful recreation for the public."(DCNR). State Forest land provides an abundance of high quality forest products which help to support the area's forest products industry, providing employment for area residents. These forests represent a water treatment plant and air purification system for the watershed. They also provide wildlife habitat, recreational opportunities and an aesthetic setting that

is vital for tourism. The state forests are a combination of resources, uses, and values, as well as a functioning biological system with intrinsic values held in public trust for future generations.

State forests are managed to retain their wild character and maintain biological diversity while providing pure water, opportunities for low-density recreation, habitats for forest plants and animals, sustained yields of quality timber, and environmentally sound utilization of mineral resources. To accomplish these goals requires meeting the resource needs of the present without damaging the area's ecosystem or its ability to meet the resource needs of the future.

The first formal management plans for state forests were written in 1955; they focused primarily on timber and water resources. The plans have changed over time, with major revisions in 1970 and 1985 that incorporated new knowledge and reflected changing management philosophies. The current planning effort, a fourth generation of plans, has evolved to an ecosystem management-based approach, with a goal of forest sustainability in order to provide an array of resources, uses, and values for current and future generations.

Ecosystem management can be defined as an ecological approach to resource management, where all portions of an ecosystem are considered important and the interdependency of biological and non-biological systems and cycles is recognized. Humans are part of the ecosystem and must be taken into consideration when developing management strategies. Ecosystem management does not preclude resource use, such as timber harvesting, hunting, or other recreational activities, but insures they are carried out in a manner that is compatible with the long-term ecological health of the forest.

As part of its resource planning and management strategy, the Bureau of Forestry conducts and maintains many inventories. These inventories provide information on various levels, including statewide, eco-region, individual state forest, landscape, and finally, plant community type, or forest stand level.

Following are excerpts from the current State Forest Resource Management Plan reflecting some of the resources on State Forest land in the Pine Creek watershed.

Land Classification and Management Zoning (Typing)

With guidance from the Resource Planning and Information Division, district staff delineated every acre of State Forest into land classification units (AKA forest stands) based on the primary features of the dominant vegetation. Through a combination of aerial photo interpretation (stereoscopic examination) and field reconnaissance, every acre of State Forest land was assigned a Land Classification and Management Zone code, which provides information on: Management Zone, Plant Community Type, Site Class, Size and Stocking Class, and Commercial Availability.

Total Acres
The Bureau of Forestry manages 262,845 acres of land in the Pine Creek watershed.

Management Zoning

Primary land use and land use capability dictates the management zoning designations for State Forest land. It is the policy of the Bureau of Forestry to zone all State Forest land according to its primary land use and to apply management practices that will protect and enhance the values for which the land was zoned. The following is a brief description of the management zones and the values that determine primary land use.

The **MULTIPLE RESOURCE MANAGEMENT ZONE** is the least restrictive management zone and applies to areas managed for many resources, such as timber, water, recreation, fauna, flora, and minerals. Appropriate forest community types within this zone may be considered part of the commercial forest land base.

The **AESTHETICS / BUFFER MANAGEMENT ZONE** applies to areas where connectivity, aesthetics, and water quality conservation are the primary values. These areas are associated with linear features such as roads, trails, and streams, or encompass a significant feature of State Forest land. Appropriate forest community types within this zone may be considered part of the commercial forest land base, with certain exceptions, such as along National Trails, Wilderness Trout Streams, and National Scenic Trails.

The **LIMITED RESOURCE MANAGEMENT ZONE** was applied to areas where management alternatives are limited due to site quality or topographic constraints. Recreation, aesthetics, water, and soil protection are the primary values. This zone is typically not part of the commercial forest land base, since timber harvesting is usually not practical.

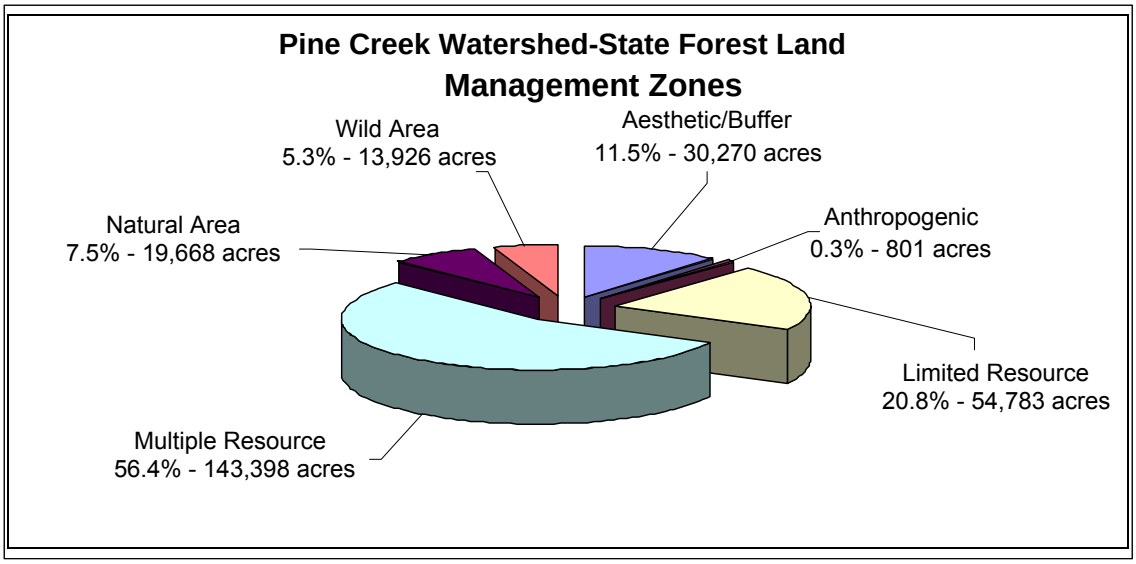
The **NATURAL AREA MANAGEMENT ZONE** applies to areas that have been designated or are pending designation as State Forest Natural Areas which are defined as an area of unique scenic, historic, geologic, or ecological value, and will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. These areas are set aside to provide locations for scientific observation of natural systems, to protect examples of typical and unique plant and animal communities, and to protect outstanding examples of natural interest and beauty.

The **WILD AREA MANAGEMENT ZONE** applies to areas that have been designated or are pending designation as State Forest Wild Areas. A Wild Area is defined as an extensive area which the general public will be permitted to see, use and enjoy for such activities as hiking, hunting, fishing and the pursuit of peace and solitude. No development of a permanent nature will be permitted so as to retain the undeveloped character of the area and conserve ecological resources.

The **SPECIAL RESOURCE MANAGEMENT ZONE** applies to areas that will be managed for specific values such as public wild plant sanctuaries, special wildlife management areas, certain recreation sites, vistas, and reservoirs. These zones will have specific management

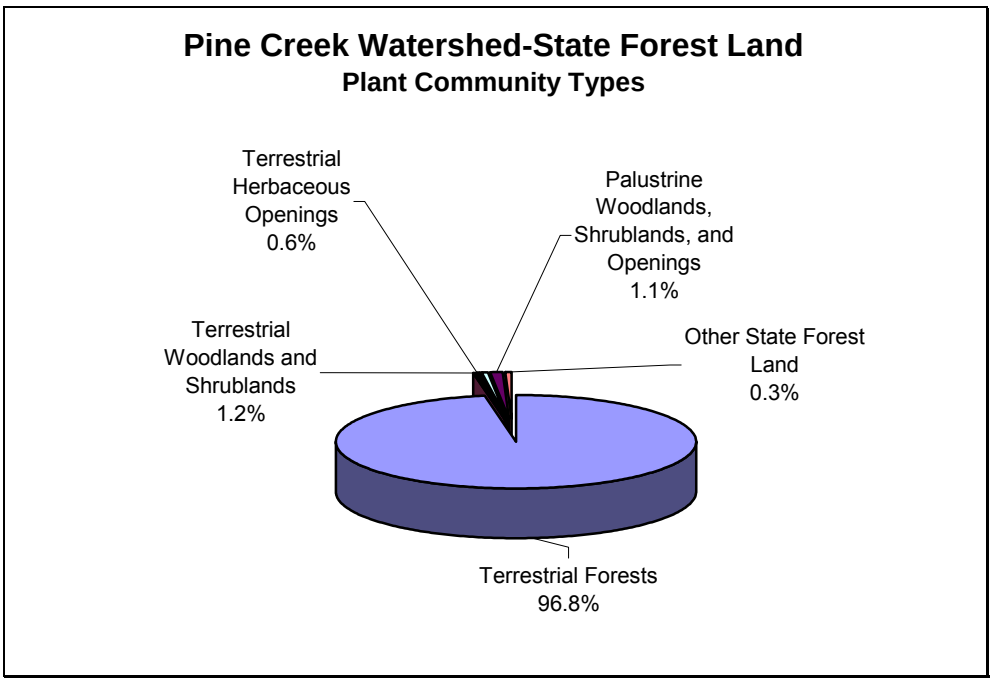
recommendations or plans focusing on the values that are being recognized. Forest community types within this zone are typically not part of the commercial forest land base; however, timber harvesting will be allowed if specific management recommendations recognize timber harvesting as an appropriate management tool.

The **ANTHROPOGENIC SITE MANAGEMENT ZONE** applies to human-made structures or facilities such as roads, rights-of-way, mineral sites, tower sites, leases, buildings, and so forth. The primary value for this zone is human amenities.



Land Classification

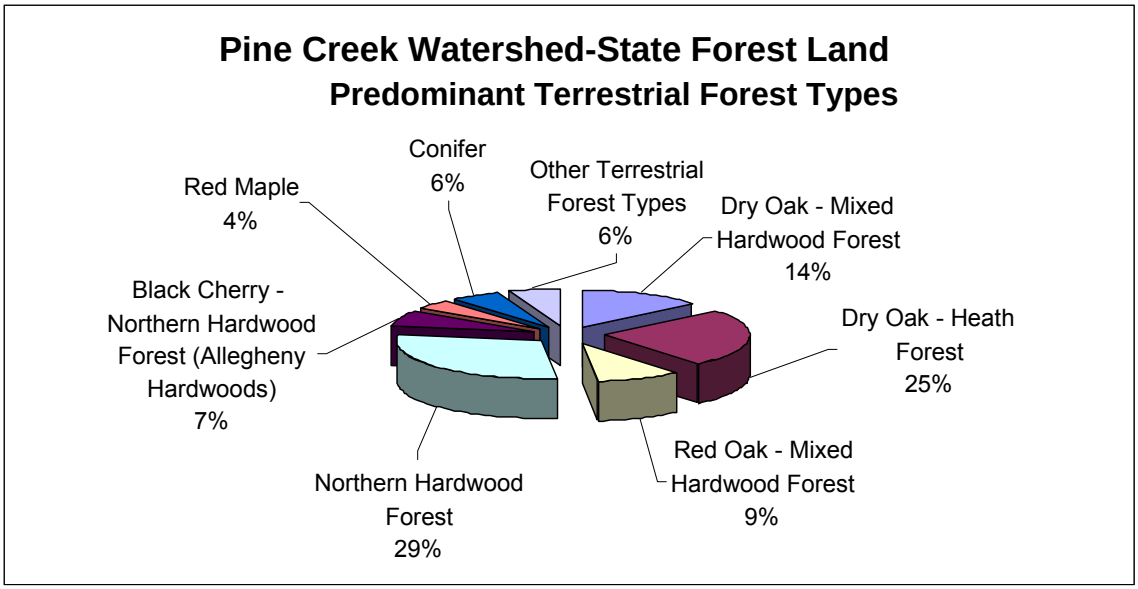
State Forest land was assigned a land classification code (plant community type) based on the dominant vegetation of the area. The land classification unit is the smallest unit of land that was inventoried, and represents some degree of homogeneity. Areas were delineated according to the plant community types recognized in *Pennsylvania's Community Classification (1999)*. Other types were based on specific anthropogenic use or aquatic systems.



Pine Creek Watershed-State Forest - Plant Community Types	Acres	Percentage
Terrestrial Forests	254,380	96.8%
Terrestrial Woodlands and Shrublands	3,164	1.2%
Terrestrial Herbaceous Openings	1,627	0.6%
Palustrine Woodlands, Shrublands, and Openings	2,991	1.1%
Other State Forest land	683	0.3%
Total	262,845	100.0%

Terrestrial Forests

Terrestrial Forests are uplands (non-wetlands) dominated by tree species that form at least 30% of the main tree canopy of the area.



Pine Creek Watershed-State Forest – Terrestrial Forest Type	Acres	Percentage
Dry Oak - Mixed Hardwood Forest	34,386	13.52%
Dry Oak - Heath Forest	64,330	25.29%
Red Oak - Mixed Hardwood Forest	24,100	9.47%
Northern Hardwood Forest	74,258	29.19%
Black Cherry- Northern Hardwood Forest (Allegheny Hardwoods)	18,040	7.09%
Red Maple	10,232	4.02%
Sugar Maple Basswood	1,221	0.48%
Aspen Gray (Paper) Birch	13,463	5.29%
Pitch Pine - Mixed Oak Forest (Oak - Hard Pine)	256	0.10%
Dry White Pine (Hemlock) - Oak Forest	3,585	1.41%
Hemlock (White Pine) - Northern Hardwood Forest	5,618	2.21%
Hemlock (White Pine) Forest	1,096	0.43%
Hemlock (White Pine) - Red Oak - Mixed Hardwood Forest	1,585	0.62%
Hemlock - Tuliptree - Birch Forest	6	0.00%
Mixed Mesophytic Forest	7	0.00%
Pine Plantation	1,026	0.40%
Spruce Plantation	380	0.15%
Miscellaneous / Mixed Species Plantation	769	0.30%
Tuliptree - (Beech) - Maple Forest	23	0.01%
Total	**254,380**	**100.00%**

Palustrine (Floodplain) Forests

Palustrine forest communities are wetlands dominated by tree species that form at least 30% of the main canopy of the area. Floodplain forest communities occur along rivers and streams that are periodically inundated by floodwaters.

Pine Creek Watershed-State Forest - Palustrine Types	Acres	Percentage
Bog / Fen	19	0.64%
Bottomland Oak - Hardwood Palustrine Forest	63	2.10%
Emergent Wetland	487	16.27%
Hemlock - Mixed Hardwood Palustrine Forest	517	17.30%
Hemlock Palustrine Forest	802	26.82%
Miscellaneous Palustrine/Floodplain Forest	8	0.28%
Plaustrine Woodland	491	16.41%
Scrub / Shrub	450	15.03%
Sycamore - (River Birch) - Box Elder Floodplain Forest	154	5.15%
Total	**2,991**	**100.00%**

Terrestrial Woodlands and Shrublands

Terrestrial woodlands and shrublands are upland areas dominated by woody plant communities or by woody species. Woodlands are dominated by trees that form less than 30% of the main canopy of the area. Four types of terrestrial woodlands and shrublands were delineated:

1. **Sweetfern Savannahs** are dominated by grass, fern, and sweetfern and usually contain a shrub component, most often sweetfern. This type is present on the Allegheny Plateau, often a result of massive tree mortality and subsequent timber salvage operations.
2. **Woodlands** are areas that contain naturally-occurring tree species greater than 15 feet in height that are currently less than thirty percent stocked with trees.
3. **Orchards** are planted orchard areas, such as apple and seed orchards.
4. **Scrub/Shrub** areas are dominated by permanent or semi-permanent shrub or brush cover. These areas are sometimes maintained as such for wildlife habitat (e.g., scrub oak).

Pine Creek Watershed-State Forest – Terrestrial Woodlands and Shrublands	Acres	Percentage
Orchards	229	7.23%
Scrub / Shrub	460	14.53%
Sweetfern Savannah	419	13.26%
Woodland	2,056	64.98%
Total	**3,164**	**100.00%**

Terrestrial Herbaceous Openings

Terrestrial herbaceous openings are upland areas dominated by herbaceous plant communities. Four types were delineated:

1. **Natural herbaceous areas** are old fields, upland meadows and other openings dominated by natural herbaceous vegetation.
2. **Cultivated herbaceous areas** are dominated by cultivated herbaceous vegetation, which was usually seeded or planted to improve habitat.
3. **Agricultural herbaceous areas** are dominated by cultivated herbaceous vegetation, which was seeded or planted for agricultural purposes.
4. **Miscellaneous herbaceous areas**: include other herbaceous openings, such as lawns and golf courses.

Pine Creek Watershed-State Forest – Terrestrial Herbaceous Openings	**Acres**	**Percentage**
Agricultural Herbaceous Area	146	8.95%
Cultivated Herbaceous Area	198	12.15%
Miscellaneous Herbaceous Area	694	42.61%
Natural Herbaceous Area	591	36.29%
Total	**1,627**	**100.00%**

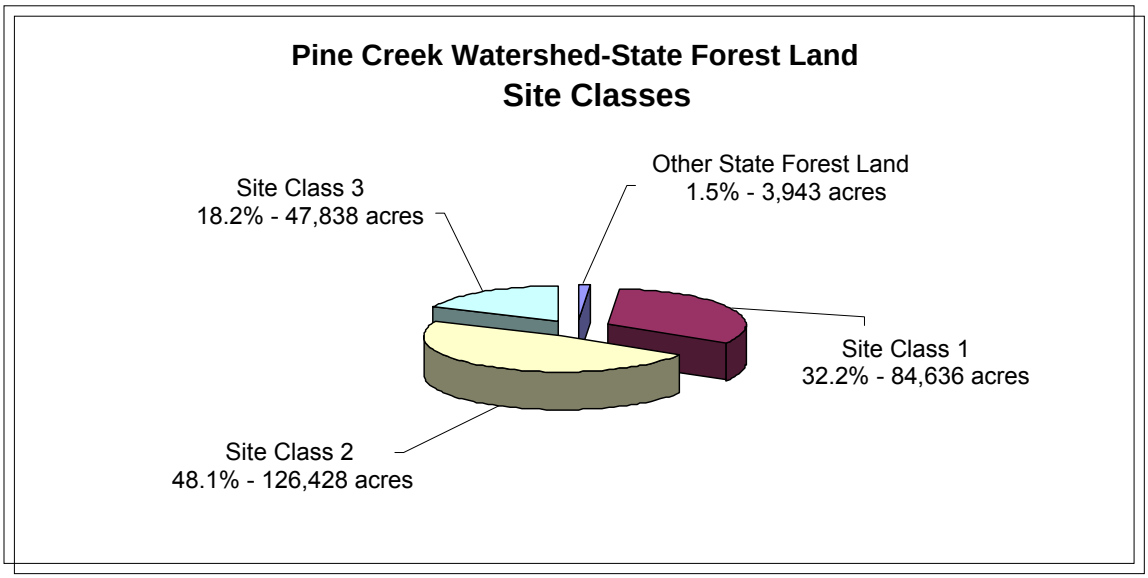
Site Class

Site class denotes the quality of growing sites for trees, from good to medium to poor, from a statewide perspective.

Site Class 1 is characterized by moist, well-drained, fairly deep soils that usually occur in protected coves, along streams, or in bottomlands that remain moist throughout the year. Dominant and co-dominant trees have a projected merchantable main stem of > 50 feet at maturity (> three 16-foot logs). Total tree heights average > 80 feet at maturity.

Site Class 2 is characterized by soil intermediate in moisture, depth, drainage and fertility that may dry-out for short periods during the year that usually occur on slopes between the ridge tops and the coves and bottomlands. Dominant and co-dominant trees have a projected merchantable main stem of 30-40 feet at maturity (2-2½ 16-foot logs). Total tree heights average > 65 feet but < 80 feet at maturity.

Site Class 3 is characterized by shallow, rather dry, stony or compact soils that usually occur on ridges or broad flat plateaus. Dominant and co-dominant trees have a projected main stem less than 30 feet at maturity (< two 16-foot logs). Pitch pine and white pine may yield 30+ feet of projected main stem at maturity (two 16-foot logs). Total tree heights average < 65 feet at maturity.



Size and Stocking

Size refers to tree diameter at breast height (DBH). Stocking is used to describe the degree to which growing space in the forest is being occupied by trees. A "fully-stocked" stand occurs when trees on the site fully occupy the available growing space.

Pine Creek Watershed-State Forest— Size and Stocking Classes		**Acres**
Greater than 50 % stocking	< 6 DBH	12,354
	6-12 DBH	51,518
	12-18 DBH	160,598
	> 18 DBH	11,040
Less than 50 % stocking	< 6 DBH	406
	6-12 DBH	5,260
	12-18 DBH	14,719
	> 18 DBH	526
Total		**256,421**

2. Privately-owned Forest Land

The information on the private forest holdings in the watershed is limited and scattered across many agencies and organizations. A DCNR Service Forester provided much of this information. Penn State Cooperative Extension was also helpful in providing some of the data. In addition, the "white paper" (Concept Paper) entitled *Sustaining Pennsylvania's Private Forests* written by Roy Brubaker was used as a major resource. This section should be used as a starting point for a dialog on sustaining the private forests in the Pine Creek watershed. Limitations on the data presented are primarily due to county figures being extrapolated to watershed boundaries. It is obvious that the need for sustainable use of the resource is imperative, but the methods for achieving sustainability will require creative thinking from a variety of partners over a long period of time. Given the diversity of forest lands in the watershed, refer to the forest typing done on the state forests, then extrapolate this to a watershed level. The watershed has a very diverse and productive forest base.

There are 469 square miles of private land in the Pine Creek watershed. Almost half of that private land is forested, about 230 square miles. These forested parcels vary in size from 5 acres to more than 6,000 acres. A total of 21,856 acres, 34 square miles, or 15% of all the private forested land, has written management plans. Most of these actively managed forests are enrolled in two programs. The Tree Farm Program has 18 participants with 8,515 acres enrolled, and The Forest Stewardship Program has 56 management plans for 13,341 acres in the Pine Creek watershed. In addition, there are several large hunting clubs and lumber companies in the watershed that are actively managed by private consulting or staff foresters.

The remaining private forest resources of the watershed have little or no active management. Much of this private forest land is found in isolated blocks in agricultural areas and owned by people who lack an inventory or ecosystem based management approach. Cutting on this forest land often occurs without regard to the future of the resource; high-grading and clearcutting are generally not sustainable practices on fragmented woodlots. There are Forest Land Owners Associations in each county focused through Penn State Cooperative Extension. The number of members is known, but not details on acres, forest types, management objectives or market information. This information would be helpful for watershed wide management and education processes but is currently widely scattered and in the personal and compartmentalized data bases of our partners. Further research, data gathering and synthesis is needed.

The size of the holding, management objectives and length of tenure of private landowners is very diverse. The opportunity to reach consensus on landscape scale issues will require a different level of thinking and new tools for success. The primary issues for private forest landowners have been explored in focus groups and at stakeholder meetings at the state level, but not in the watershed. Due to the broad base of this focus and stakeholder information gathering, the issues in the Pine Creek watershed may be similar and consistent with this statewide perspective. Further research, data gathering and synthesis plus the addition of consensus is necessary.

Private Forest Landowners stakeholder groups have shown that they can successfully articulate issues and concerns for their forests. In a focus group in Northeastern Pennsylvania these issues had four interrelated themes that should be explored in a watershed context for Pine Creek:

1) The need for education
2) Issues of communication
3) Issues of regulation and planning
4) Funding concerns

When the input from stakeholders of the forest industry is compared the issues expand and include a more detailed list of technical and ecosystem functional issues. Statewide there is a surprisingly similar understanding of the critical issues impacting the sustainability of the private forest resource. The most highly prioritized issues identified across stakeholder groups included:

- *Lack of Regeneration*
- *High Grading*
- *Professional Standards*
- *Land-Use Planning*
- *Land Ethic*
- *Invasive Species*
- *Conservation Leadership*
- *Deer Overpopulation*
- *Fragmentation and Parcelization*
- *Landowner Education*
- *Property Taxes*
- *Local Ordinances*
- *Public Education*

(The above data is from Penn State Cooperative Extension, Forest Leaves, Vol. 15 No. 1)

Since 1950, the DCNR Bureau of Forestry has administered a number of federal programs aimed at improving private forestland management. Historically these programs for forest landowners have met with varying success in implementation and funding. They include:

Cooperative Forestry Program
Forest Stewardship Program
Forestry Incentives Program (FIP)
Stewardship Incentives Program (SIP)
Forest Land Enhancement Program (FLEP)
Forest Legacy Program (FLP)

Unfortunately the desired outcome of the programs has not always been met. This can be attributed to a number of factors, but the most obvious and most difficult to attain perhaps is the idea of a shared vision of sustainability. DCNR is currently developing this concept of a shared vision and should be encouraged to take a leadership role in the process. A number of factors have contributed to the lack of involvement with private forest landowners and the skill set for working with lands and landowners that were not in the purview of the Bureau of Forestry. The need for capacity building at the local level is step one. While we are aware of the limitations of developing this capacity, the long time

frame and large area we are working in allows for time to get it right. There are a number of processes that can and should be used to build the concept of a sustainable private forest in concert with the ongoing dialog on the public forests. The Chadwick Consensus Process and Holistic Management™ are two unique tools for working with groups to build the Shared Vision of Sustainability. The following are from Brubaker's concept paper:

Shared Vision of Sustainability

• **Forests provide long-term environmental, economic, and social benefits through maintenance of ecologically sustainable conditions across ownership boundaries.** Most critical of all is the ability to maintain the forest's regenerative and adaptive processes. Therefore, future resource sustainability will depend on understanding, monitoring, and being able to impact forest conditions within the private forest resource as a whole.

• **Individual landowners will need to be both ethically and economically motivated to practice sustainable stewardship.** All of the vision statements reflected some level of understanding of the inherent tension between ethical concerns for the public good and the pursuit of individual economic gain at work in private forest decision making processes. Additionally, all statements expressed a clear understanding that a sustainable private forest depends fundamentally on private landowners understanding that land ownership represents both a right and a responsibility. This fundamental tension of private forest ownership suggests two critically functional facets of human motivation that need to be met if a sustainable forest is to be achieved.

• **A publicly held sustainable land ethic supports and rewards sustainable forest management.** Stakeholders clearly understood that a sustainable private forest resource is dependent on economic and political realities influenced by public opinion and cultural perspectives broadly held in society. Thus, the sustainability of the private forest resource should be recognized, understood, and supported by the public at large and most particularly those with critical decision making roles at municipal, county and state levels of government.

The idea of a shared vision for not only the private forests but also our communities and how they relate to the private forests will be critical in the development of a sustainable perspective. Good information is available; sound management principles can be employed; and land use can be controlled to an extent. But this cannot happen until private forest landowners change the decisions they make from short term into long term. For now and the future, there is a need to develop new tools for monitoring, new tools for communication and new tools for balancing sustainability with economic gain.

This process must be inclusive to be successful. This will include a leadership and capacity building role for DCNR and PDA, a strong link with the partners in education, and technical support from the conservation districts, the Natural Resource Conservation

Service and the U.S. Forest Service. But without landowners who are as Brubaker said, "ethically and economically motivated to practice sustainable stewardship", the circle will not be complete.

4. Agricultural Areas

Historically, the Susquehannock Indians, who were the Native Americans living in the region when European explorers first entered the area, are believed to have implemented the first agricultural practices in the watershed.

Early settlers began clearing land for farms in the early 1800s. In the past, the "Muck" area around Marsh Creek supported celery and lettuce crops. There were many ginseng farms in the Pine Creek Valley during the 1930s which provided a valuable cash crop for the residents. However, today's agriculture is mostly small dairy and cash crop farms.

Runoff from agricultural activities is the primary water quality impact in the watershed (see Water Resources Section of this plan for more information).

Approximately 71 square miles, or 7%, of the Pine Creek watershed is devoted to agricultural production. Although small, this 8% is critical if we want to be sustainable and able to feed ourselves in the future. After the lumbering era, farming increased in the watershed when cleared areas were converted to farmland. A typical farm encompassed 50-80 acres, which was farmable using teams of horses. The majority of the soils were rocky and steep, and farming methods were not conducive to protecting topsoil. So, the soils played out, the farmers moved on, and forests returned over much of the watershed.

Most of the old 80 acre farms were consolidated into 250 acre farms suited to tractors and mechanization. Small subsistence farming is scattered throughout the valley today. The remaining agricultural regions are around Wellsboro and the Middle Ridge as well as Jersey Shore. Here the soils are deep, well drained and fertile. In Tioga County soils are primarily suited for dairy production, while in the lower watershed grain is the principal product. The overall conventional agriculture picture in the northeast is in transition due to a number of factors.

On the Middle Ridge agriculture is alive and well, including an established viable Mennonite community. This religious sect has a strong agricultural history and continues to farm and maintain the farming tradition. Their farms protect open space from development. But, since these farmers do not take advantage of the education, funding,

and technical assistance available for conservation practices, the result is continued degradation of the soil resource and water quality. One of the challenges to sustain farming in the watershed is to improve communication to the farming community about conservation methods to ensure protection of topsoil and water quality.

5. Solid Waste Management

The Pine Creek watershed has solid waste management issues related to its rural character and the volume of public recreation on State owned land.

There is limited collection of municipal waste in the proximity of the gateway communities of Jersey Shore and Wellsboro. Dumpsters are used in outlying areas with low population density and little development, high seasonal population influx, and a large proportion of public land. Dumpsters are a constant maintenance issue as they must be emptied more frequently during peak visitor periods. Refuse can pile up, causing odor and aesthetic problems. Disposal of inappropriate wastes (tires, household hazardous waste, etc.), furniture and white goods (chairs, desks, couches, mattresses, refrigerators, etc.) is a problem at dumpster sites.

The Tiadaghton and Tioga State Forests provide and maintain a limited number of trash facilities. The Pine Creek Trail is managed with a "carry in-carry out" trash policy. No trash collection facilities are provided at trail parking areas. According to municipal officials, there has been an increase in trash concurrent with increased use of the trail, with an increase in municipal waste disposal costs. Some municipalities have limited the hours of use or restricted use of their dumpsters to municipal residents. The Plan's Steering Committee is concerned that visitors will dump their waste at the first available disposal facility, or dispose of it improperly.

Litter cleanup within the watershed is conducted by volunteer groups or organizations on an as-needed basis, but it is a never ending job. PennDOT has an "Adopt-A-Highway" program for volunteers to clean up state routes. PA Cleanways is a resource for cleaning up garbage dumps, a number of which were identified through the Pine Creek watershed survey. The Northcentral Pennsylvania Conservancy administers a DEP grant program to assist watershed organizations in conducting cleanups.

There are currently no permitted municipal waste facilities and one permitted Construction/Demolition Waste Landfill in the Pine Creek watershed. Phoenix Resources, Inc. has a permit for disposal of construction and demolition debris (brick, drywall, plaster, lathe, wood, etc.) on a 135-acre site in Duncan Township, Tioga County. However, historical records indicate there was a total of sixteen landfills that are now inactive. Table A-4 lists the inactive landfills in the watershed.

A number of apparently illegal dump sites were identified from the Pine Creek Watershed Survey (Question #2). Several respondents mentioned a roadside dump along Phoenix Run Road near Sunderlinville. Other areas of concern include the old Galeton

dump and the capped county landfill in Potter County. In addition, a number of people mentioned abandoned vehicles, farm implements and junk on private property.

While numerous inactive and illegal dump sites exist in the watershed, no hazardous waste sites are designated in the Pine Creek watershed. A hazardous waste site has wastes that in sufficient quantities and concentrations are a threat to human life, human health or the environment when they are not stored, transported, treated or disposed of properly. Specific characteristics define a waste as hazardous: ignitable, corrosive, reactive, or toxic. An area containing waste with these characteristics is designated as a hazardous waste site.

6. Public Sanitary Facilities

There are limited public sanitary facilities within the watershed. Additional public sanitary facilities may be needed in the valley, as evidenced by complaints from residents about recreational users. The PA Wilds initiative and associated funding present an opportunity to address this issue. One option would be for private businesses to improve their restroom facilities, with financial assistance from the Commonwealth.

7. Existing Land Use Controls – Zoning & Subdivision

According to statistics available from the Chesapeake Bay Program, the vast majority of the Pine Creek watershed consists of a naturally vegetated, forested land cover. Approximately 0.3% of the lower Pine Creek watershed from Jersey Shore north to Galeton is developed. All of the other sub-watersheds had 0.1% developed area or less. The main difference between the sub-watersheds regarding land cover is the amount of agricultural land, which varies from a high of 20.2% in the Babb Creek watershed to a low of 2.7% in the West Branch of Pine Creek upstream of Galeton.

The majority of municipalities within the Pine Creek watershed do not regulate land use through zoning. There are 36 municipalities in the watershed and only 14, or 39%, have any zoning controls, as shown in Table A-5. Municipalities in Lycoming and Clinton counties are all covered by zoning, as these counties have developed a County Zoning Ordinance that applies to municipalities which do not have their own zoning. Only four of fourteen Tioga County municipalities within the watershed currently have zoning. Tioga County recently enacted a Comprehensive Plan Update and has applied for a grant from the Pennsylvania Department of Community & Economic Development (DCED) to develop a County Zoning Ordinance. There is no zoning in Potter County except for Coudersport Borough, which is outside of the watershed.

Municipal zoning ordinances are enforced by the municipality's zoning officer. Once a county zoning ordinance has been adopted by the Board of County Commissioners, it is enforced by the county zoning administrator and applies to any municipality which does not have its own zoning. A municipality may enter into a zoning partnership with the county by rescinding its adopted zoning ordinance, or it may withdraw from the county

zoning ordinance partnership by enacting a new municipal zoning ordinance. Municipalities thus have the primary control over zoning jurisdiction.

All of the municipalities within the Pine Creek watershed are covered by either county or municipal subdivision and land development ordinances, which afford a measure of protection against land use practices that may cause environmental or safety problems.

The landscape of the Pine Creek watershed is one of its most important assets. The forests have regenerated following the devastating logging of the late nineteenth and early twentieth centuries. Significant public investment has helped restore Babb Creek and other streams ravaged by acid mine drainage. Much state land has been acquired, preserving the scenic qualities of this special watershed. Development on private lands constitutes a major concern threatening the quality, openness and wildness of the Pine Creek watershed, particularly as the area becomes increasingly marketed by the Commonwealth as part of the new PA WILDS tourism initiative. Poorly designed, highway oriented commercial strip development, as in the gateway communities of Gatlinburg or Pigeon Forge outside of Great Smoky Mountain National Park, is not the desired result of new tourism initiatives. Quality low intensity development in PA WILDS "gateway" communities of Wellsboro and Jersey Shore would be compatible with the Pine Creek watershed's community character. Day trips from the gateway communities are an alternative to highly concentrated tourism accommodations in the valley. For more in depth discussion on the PA WILDS initiative, consult Section II, Issues, Concerns, Constraints, and Opportunities.

Noise pollution is a concern in this predominantly rural watershed, as it disturbs the peace and quiet that residents and visitors enjoy. Noise impacts can be addressed through a stand alone ordinance, such as restrictions on the use of engine compression brakes in residential areas, or through the municipal or county zoning ordinance. The Lycoming County Zoning Ordinance, for example, has noise protection standards with maximum permitted sound pressure levels. Certain noise sources are exempted such as agricultural activities, household power tools and lawn mowers between certain hours, etc. There are no noise standards in the PA Motor Vehicle Code that apply to motorcycles or other motor vehicles. However, regulations pertaining to disorderly conduct or disturbing the peace may apply under extreme circumstances. Enforcement of noise standards is difficult and must be carefully considered before enacting any such ordinance.

Subdivision regulations can help to guide current development and that which may occur with additional marketing of the region. Encouragement of development in the most suitable places and alleviation of problems such as improper access, inadequate water supply, septic contamination, poor arrangement of lots, stormwater runoff, excessive clearing of trees, and other environmental concerns can be managed and guided by county and especially municipal subdivision ordinances.

The intent of a zoning ordinance is to establish comprehensive controls for the use of land and structures within the municipality. These regulations are based upon

community development objectives and are enacted to promote and protect the public health, safety and welfare of the current and future residents of the municipality.

A zoning ordinance *can help:*

* coordinate and guide growth to create or maintain an attractive and economically viable community
* control inappropriate development in flood prone areas, on steep slopes, or in other environmentally sensitive areas
* conserve prime farmland and natural resources
* preserve historic features
* manage locally unwanted land uses by controlling their location and reducing their adverse impacts

A zoning ordinance *cannot:*

* intentionally prohibit or exclude specific land uses; (must provide a mechanism for consideration of all activities)
* deny all reasonable use of private property
* be retroactive; (it may not be applied to existing land uses)
* address all types of nuisance activities or solve all of the community's land use problems; (a nuisance ordinance may be the proper mechanism)
* contain building design standards or construction specifications; (a building code is the proper mechanism)

A zoning ordinance *must:*

* accommodate reasonable overall community growth, including population and employment growth, and opportunities for development of a variety of residential dwelling types and nonresidential uses
* apply uniformly throughout various zoning districts and to each class of use. With the exception of county or multi-municipal zoning partnerships, no part of any community enacting a zoning ordinance may be left unzoned.
* be equitably administered and enforced

A Rivers Conservation Plan, such as this one, is different from a land use ordinance. A plan's recommendations do not carry any regulatory weight unless it is formally incorporated into an ordinance by the municipality, or by the county and municipality in a zoning or subdivision partnership arrangement. Any such ordinance adoption requires landowner and public notification, and input through a formal public hearing process. Municipalities are not bound by a plan to adopt an ordinance. Plans may be amended as changing conditions warrant. Adopted plans are important because they provide a rationale and public policy basis for government actions, such as the development of land use ordinances or the approval of grant applications, but they are not regulatory in and of themselves.

8. Conservation Easements

Conservation easements are a widely used land protection tool. Conservation easements permanently protect the land and allow it to remain in private ownership. A conservation easement (or, perhaps more appropriately, conservation agreement) is a perpetual, legally-binding agreement between a landowner and either a non-profit land conservation organization or a governmental unit (such as a county) regarding the use of a property and development allowed on the landowner's property.

The easement spells out the permitted uses of a property. This includes such things as agriculture, forestry, recreation, habitat improvement, and other open space uses. The easement also spells out the residential, commercial, and industrial uses of the property. This includes such things as where additional houses may be built and the amount of sub-division that will be allowed. Once an easement is in place, the landowner can give, sell, or otherwise transfer the property. The easement follows the deed to the property, binding all future owners.

Often property owners donate conservation easements; however there are some programs that provide funding to purchase conservation easements. Two of the most popular programs are the county agricultural preservation programs and the Community Conservation Partnership Program operated by the Department of Conservation and Natural Resources.

Potter, Tioga, Lycoming, and Clinton counties all have active agricultural preservation programs. The programs are operated by the county conservation districts and utilize soil classification and development pressure to rank projects and determine what properties are most important to the program. Potter County's Agricultural Preservation Board has purchased two agricultural conservation easements within the Pine Creek watershed in West Branch Township and Hector Township. The easements prohibit further residential development of the property, conserving the land for agriculture.

The Northcentral Pennsylvania Conservancy has accepted five donated easements within the Pine Creek watershed. The properties under easement total over 640 acres. All five of these easements prohibit further residential development on the property, while allowing the properties to remain active farms and working forests. To date, the Northcentral Pennsylvania Conservancy has not purchased any conservation easements in the Pine Creek watershed.

Conservation easements on properties within the Pine Creek watershed are one tool to help maintain the watershed's aesthetic, rural character; to help maintain or improve water quality; and to provide resource based industries, whether forestry or agricultural, with a sustainable materials supply. When conservation easements prohibit or limit the amount of subdivision and development that can occur on a property, they are working to keep the scenic quality of open fields and forests in place.

The Water Resources Section of this plan, under Water Quality, addresses the factors impairing the watershed's water quality. By limiting development, conservation easements are providing large areas of undeveloped land for groundwater recharge to occur. Properties under easement also provide areas where stormwater runoff may be filtered before entering a stream.

Properties under conservation easement will remain open space, thereby allowing future generations the land base for farming activities as well as forest management. By maintaining larger tracts of land as open space, it is more cost effective to manage those properties.

Some conservation easements also provide for public access. Not all conservation easements have this provision. Often a property owner wants to ensure that future generations have access to a stream, a hiking trail, or a particular area of the property. The conservation easement can be structured to provide this permanent public access.

Although the Northcentral Pennsylvania Conservancy is mentioned in this section, it should be noted that the Western Pennsylvania Conservancy and The Nature Conservancy have also worked with property owners and facilitated fee simple acquisitions within the watershed. The three organizations are separate organizations.

G. Social/Economic Profile

1. Population Projections

According to the Chesapeake Bay Program statistics, populated areas along Pine Creek are expected to encounter both moderate increases and decreases in their population and population densities between the year 2000 and 2020, with most population increases expected to occur in the lower portions of the watershed (Lycoming County) and decreases in the northern parts (Tioga and Potter counties).

The population of the watershed of Pine Creek's West Branch above Galeton is expected to decrease from 689 to 648.

The population of the Pine Creek watershed above Ansonia is expected to decrease from 2,734 to 2,661.

The population of the Babb Creek watershed, including Blackwell, Morris and Antrim, is expected to increase from 2,630 to 2,727.

An increase from 1,883 to 1,990 is expected for the population of the watershed of Little Pine Creek.

A population increase from 5,240 to 5,634 is expected for the corridor portion of the Pine Creek watershed down to and including Jersey Shore. This includes the Canyon corridor and the watershed area draining to Jersey Shore, excluding the Little Pine watershed.

For all five locations, the population number and density increased from 1990 to 2000. Due to continued conversion of seasonal homes (see discussion below) it is quite possible that the population will continue to increase throughout the entire watershed, contrary to the Chesapeake Bay Program projections.

Population changes and population densities at these five locations can be found in Table A-6. Sub-watershed maps are available on the Chesapeake Bay Program website.

2. Seasonal Housing

It has been said that the Potter County population used to triple during hunting season. This is no longer the case, although seasonal housing for recreational use still outnumbers permanent housing in many municipalities. For instance, according to the most recent version of the Tioga County Comprehensive Plan (2005), in Elk Township, Tioga County, seasonal housing comprises 87% of the total. Likewise, 62% of the housing in Gaines Township, Tioga County, is occupied seasonally. Many second homes are being converted into permanent homes, with a potentially significant impact upon demand for municipal and school district services. Hunting camps are also increasingly being used by families, creating a new tourism dynamic and additional municipal service demands. Converted seasonal homes may not have adequate sanitation facilities or road access. Emergency service is problematic to seasonal developments with no road names -- for example: Shinn Hollow in Tioga County.

3. Population Centers

The many small towns and villages are an important part of the rural character of the Pine Creek watershed and provide services for the surrounding rural areas. There are no major metropolitan areas within the Pine Creek watershed. Galeton is a town comprised of 1,362 residents as of the 2000 census. Recognized as the Tioga County Seat in 1806, Wellsboro has 3,320 residents as of 2000. Cummings Township, including Waterville, has a population of 497 residents. Jersey Shore has 4,531 as of 2000, but only the outskirts of the community are in the Pine Creek watershed.

4. Transportation Facilities

a. Roads

Routes 44 and 414 are the major north and south routes within the watershed. Route 220 and Route 6 extend east to west, with Rt. 220 at the southern end and Rt.6 at the northern end of the watershed. Map 6 shows township roads, state roads and U.S. routes for Clinton, Lycoming, Potter, and Tioga counties; the four counties in the Pine Creek watershed

Many of the primary roads pass through scenic and historic corridors and could potentially be designated as a Local, State or Federal Scenic Byway.

Planned development of Interstate 99 by PennDOT is currently on hold. I-99 is designed to pass through the extreme southern and eastern edges of the watershed and has the potential to increase development pressures.

Any transportation project in the Pine Creek watershed should be extremely sensitive in order to minimize environmental impacts. Road improvements should be confined to existing roadway alignment, grade and right-of-way whenever possible to reduce environmental damage and alterations to the valley. Under no circumstance should PennDOT undertake a highway project which would involve extensive amounts of cut and fill. Minor widening of some roads is needed; along with stabilized shoulders, painting of edge lines, improved drainage and a painted centerline.

In prioritizing maintenance improvements, attention should first be given to those projects which will improve safety. Guide rail improvements and surface treatment of the shoulder areas to provide a smooth transition between the shoulder and the cartway should be regarded as top priorities by PennDOT. PennDOT should routinely clean debris out of drains and inlets.

State and county bridges are regularly inspected and are assigned sufficiency ratings between 0 and 100, with 100 denoting a newly constructed bridge and 0 denoting a bridge which may warrant closure to traffic. In addition to sufficiency ratings, special consideration should be given to rehabilitating bridges where there is no advanced deterioration to the substructure. In deciding whether to rehabilitate or replace an existing bridge, consideration should be given to the carrying capacity and functional use. If a bridge provides the only access to properties which require frequent crossing of heavier vehicles and has a weight restriction which cannot be upgraded substantially through rehabilitation, replacement may be the necessary option.

When replacing a bridge, as much of the original alignment should be used as possible. Wide bridges with a sweeping approach and long tangent curves will induce higher traffic speed, and should be avoided. Bridge location and alignment must take stream stability into consideration. The aesthetic appearance of the bridge and its compatibility with the scenic character of the Pine Creek watershed should be carefully considered in

the design process. The stone facing on the Route 414 bridge at Blackwell is an example of a successful aesthetic treatment.

Dirt and gravel roads should be properly maintained to ensure safety and to accommodate delivery of basic public services (such as emergency response) and to reduce the road's environmental impact. Many dirt and gravel roads are not maintained during the winter, but do serve as important secondary accesses to the Pine Creek Valley during emergencies.

Dirt and gravel roads have been identified as sources of dust and sediment pollution. In 1997, Section 9106 was added to the Pennsylvania Motor Vehicle Code, and approximately $4 million has been appropriated on an annual basis, statewide, to fund safe, efficient, and environmentally sound maintenance of dirt and gravel roads. The program goal is to reduce erosion, sediment and dust pollution by using improved maintenance techniques that benefit both dirt and gravel roads and the environment. Benefits include reduced road maintenance costs (grading and resurfacing) and reduced sedimentation in water affecting aquatic life and drinking water sources.

Statewide there are over 18,000 miles of dirt and gravel roads. Many miles can be found within the watershed. Many of these roads have been surveyed and problem areas documented by volunteers from Trout Unlimited and other organizations. Each year, grant money is allocated for environmentally sensitive maintenance of dirt and gravel roads. Examples of successful projects within the watershed include part of Truman Run Road and Dam Run Road, in Lycoming County. Municipalities have the opportunity to apply to their county conservation districts for grant money to improve the quality of their dirt and gravel roads.

b. Rail

A number of railroads have operated in the Pine Creek watershed over the last 150 years. In 1826, the Tioga Navigation Company was chartered to construct a canal along the Tioga River to transport coal to the New York State line. The company received permission to build a railroad instead of a canal, which was completed from Corning to Blossburg in 1840. Several adjoining sections were later built to connect other mines to this major transportation route. In 1873, the Blossburg and Corning Railroad was extended from Lawrenceville through Wellsboro to the Antrim Mines. Owned primarily by the Fall Brook Coal Company, the Blossburg and Corning Railroad eventually became the Corning, Cowanesque and Antrim Railway, and then became the Fall Brook Railway. In 1881 the Arnot and Pine Creek Railroad was constructed to carry coal from the Arnot area to Hoytville near Morris. In 1883 the Jersey Shore, Pine Creek and Buffalo Railway was built to follow Pine Creek through the gorge from Jersey Shore to Stokesdale Junction. This railroad provided the freight outlet that led to construction of large sawmills in Cammal, Slate Run, Leetonia and Tiadaghton. It also provided an outlet to the south for the coal mined in the Arnot and Antrim areas. The final railroad constructed in the watershed was part of the Buffalo and Susquehanna Railroad, built from Keating to Ansonia in 1895, providing an outlet for the large sawmill at Galeton.

Most of the railroads in the watershed went through a succession of owners and names. In 1899, the railroad from Jersey Shore to the New York State line was leased to the New York Central and Hudson River Railroad, then the Penn Central Transportation Company in 1968 and Conrail in 1976. In 1988, Conrail ceased operation of the line between Wellsboro and Jersey Shore, leaving only the line between Wellsboro and Gang Mills in operation. This line was purchased in 1992 by Growth Resources of Wellsboro (GROW) and became the Wellsboro and Corning Railroad in 1994, operating passenger excursion trains. Additional information about this railroad may be found at www.wellsboropa.com/rail. In 1995, construction of the Pine Creek Trail began on the abandoned railroad grade running through the Pine Creek Gorge from Ansonia in Tioga County, 62 miles south to Jersey Shore in Lycoming County. The trail is scheduled for completion in 2006. More information about the Pine Creek Trail is located in the Cultural Resources Section of this plan.

Logging railroads were also built in the watershed. The Slate Run, Cammal and Black Forest, Oregon and Texas, Tiadaghton and Fahnestalk, and Trout Run Railroads along with a number of other unnamed railroads were constructed along many of Pine Creek's tributaries to transport logs to sawmills.

c. Air

The Grand Canyon Airport, which is used for both business and private aircraft, is located six miles southwest of downtown Wellsboro. Formerly a state run airport, it was purchased by the Grand Canyon Airport Authority and now is run by K and W Aviation. The Grand Canyon Airport provides aviation fuel, aircraft parking, hangars, a passenger terminal, and a lounge. On average, there are 25 aircraft operations per day. The airport also has 87% local general aviation, 11% transient general aviation, less than 1% air taxi, and less than 1% military. The airport has implemented innovative environmental standards.

5. Major Employers

The major employers within the four counties in the Pine Creek watershed (Lycoming, Tioga, Potter, and Clinton) are both private businesses and state agencies, primarily located in the Wellsboro and Jersey Shore/Avis areas. These include restaurants and other commercial services, hospitals/clinics in the Jersey Shore/Avis area and Wellsboro, and a limited amount of industry. The other populated areas of the Pine Creek watershed have only a few general stores, taverns, outfitters, and taxidermists, consistent with the rural character of the area.

Resource industries including forestry, agriculture, and to a lesser extent, mineral resources, are important to the local economy. Public ownership of much of the watershed land contributes to open space and helps maintain the viability of these resource industries. Private open lands are often converted to other uses.

Whereas traditional seasonal tourist activities relating to hunting and fishing are still very important to the economy of the Pine Creek watershed, eco-tourism is also becoming an increasingly important part of the rural economy. The watershed falls within the PA Lumber Heritage Region and the PA WILDS area. The Governor's office, in conjunction with DCED, DCNR, and local chambers of commerce, is leading an effort to aggressively promote eco-tourism in the northcentral region of the state, including establishment of a website (http://www.visitpa.com/visitpa/wilds.do).

H. Unique and Outstanding Features

1. Pine Creek Gorge

The Pine Creek Gorge is a special feature of the watershed. There are many recreational opportunities -- hiking, canoeing, and rafting -- available in the gorge. This unique area also provides visitors with opportunities to see diverse wildlife, such as the bald eagle. Several vistas provide spectacular views of the Pine Creek Valley. The Pennsylvania Grand Canyon portion of the gorge between Ansonia and Blackwell has been recognized as a National Natural Landmark.

The Pine Creek Gorge is more than 25 miles in length. At Colton Point, near the northern end of the gorge, the depth is approximately 800 feet, while the width in this area averages 4,000 feet, rim to rim. The gorge becomes deeper and wider near the southern end. At Waterville the canyon reaches its maximum depth of 1,450 feet.

2. Pine Creek Trail

The Pine Creek Trail is an outstanding feature in the Pine Creek watershed. It was once used by the Seneca Indians as a connection between the Great Shamokin Path and the Iroquois settlements along the Genesee River. In 1883 the Jersey Shore, Pine Creek & Buffalo Railroad was constructed in the Pine Creek Gorge. The railway carried millions of tons of lumber from sawmills in the Tiadaghton, Slate Run, and Cammal areas. The abandoned railroad grade was developed into a hiking and biking trail that extends from Ansonia to Jersey Shore, upon completion totaling 62 miles and offering one of the most spectacular natural areas in Pennsylvania. The Rail Trail Advisory Committee provides monitoring and feedback to DCNR and is a good model for similar facilities. For more information about the trail, refer to the Cultural Resources Section of this plan.

3. Scenic River Stretch

A river stretch of 23.25 miles at the upper end of Pine Creek in Tioga County was nominated by the Pine Creek Headwaters Protection Group and accepted into the Pennsylvania Scenic Rivers Program in December of 1992. The designated Scenic River stretch extends from Marsh Creek south to the Tioga/Lycoming County line.

The intent of the Scenic Rivers Program is to encourage the enhancement and conservation of river resources through voluntary local initiatives. The program provides financial and technical assistance to groups carrying out activities consistent with the Scenic River designation. For example, Shippen Township in Tioga County has developed Scenic River regulations through its land development ordinances. State agencies such as PennDOT, as well as utilities, are required to take Scenic River designation into account during construction of facilities and infrastructure, e.g. stone facing on bridges.

Rivers included in the Scenic Rivers program are classified into one of several categories: Wild, Scenic, Pastoral, or Recreational and Modified Recreational. A portion of upper Pine Creek in Tioga County is classified as a Scenic River. The classification criteria are based on the river being free-flowing (no dams) and capable of, or under restoration, to support water-based recreation, fish and aquatic life, the view from the river or its banks is predominately wild, but may reveal some pastoral countryside. In addition, the segment may be intermittently accessible by road, which is the case with accessibility to Pine Creek from the Owasee Road and the Pine Creek Trail.

4. Important Mammal and Bird Areas

The Northern Allegheny Plateau region, which includes part of the Pine Creek watershed, has been designated as an Important Mammal Area (IMA) by the Pennsylvania Wildlife Federation. Criteria for an area to be designated as an IMA is based on mammal diversity, support of high density populations, support of endangered and threatened species listed by the Pennsylvania Biological Survey, and potential for important public education. The main purpose and goal of the Pennsylvania Wildlife Federation is to ensure the future of important mammals and provide people with the opportunity to enjoy them in the mammals' natural environments (refer to Cultural Resources Section of plan).

Two locations in the Pine Creek watershed have been designated by Audubon Pennsylvania as Important Bird Areas: Pine Creek Gorge Natural Area and the Marsh Creek Wetlands – "The Muck". A few other popular birding places include: Little Pine State Park, Lyman Run State Park, and the Tiadaghton State Forest. Almost 200 different species of birds have been found in the watershed. (refer to Cultural Resources Section of plan)

5. Outstanding Scenic Geological Features

According to the Pennsylvania Geological Survey Publication, *Outstanding Scenic Geological Features of Pennsylvania*, the following features are within the Pine Creek corridor:

The Pine Creek Gorge is the primary scenic geologic feature within the watershed. The gorge's maximum depth is 1,450 feet near Waterville. The process that formed the canyon occurred less than 20,000 years ago when glacial debris dammed the ancestral creek, diverting its course to the south, cutting the gorge.

Other scenic geologic features, all on the gorge's rim are:

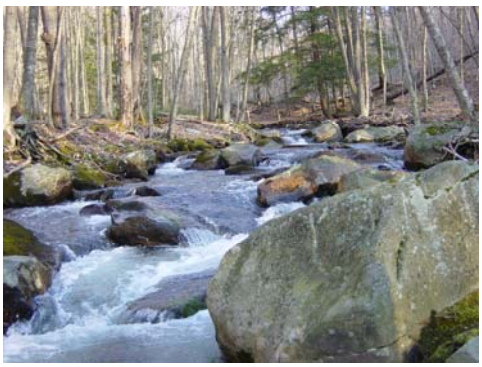
Barbour Rock, located 1.5 miles north of Colton Point State Park, provides spectacular views of the gorge and the adjacent high plateau. These rock outcrops of gray sandstone are noted for their crossbedding.

Colton Point, located within Colton Point State Park; Harrison Lookout, located within Leonard Harrison State Park; and Lebo Vista, west of Cammal. All three offer spectacular views of the gorge.

IV. WATER RESOURCES

A. Watershed Drainage and Major Tributaries

Pine Creek is the second largest tributary to the West Branch of the Susquehanna River, encompassing a watershed of 981 square miles. The Pine Creek watershed has 17 major sub-basins that include such tributaries as Ninemile Run, Genesee Forks, Phoenix Run, Elk Run, Long Run, Marsh Creek, Babb Creek, Cedar Run, Slate Run, and Little Pine Creek. Map 7 is a sub-watershed map that shows all 17 sub-basins. A list of the length and drainage area of the sub-basins is found in Table A-1. The total number of stream miles when added up for the Pine Creek watershed is 1,614 miles. The two largest tributaries are Marsh Creek and Babb Creek. Babb Creek travels a length of 21.5 miles and drains an area of 130 square miles. Marsh Creek travels a length of 21.4 miles and drains an area of 81.3 square miles. These two tributaries of Pine Creek account for 21.6% of the total drainage area of the Pine Creek watershed. However, when you consider that the Texas Creek, Black Creek, and Blockhouse Creek watersheds all empty into Little Pine Creek their combined drainage area is 298 square miles and this accounts for 30.4% of the total drainage area of the Pine Creek watershed. Table A-1 and Map 2 provide physiographic information on the tributaries within the Pine Creek watershed with additional information in Table A-7.



The headwaters of Pine Creek originate at an elevation of 2,420 feet in Ulysses Township, Potter County. This area has a unique geographical distinction and can be considered the starting point, (triple point) of three major U.S. watersheds. The north side of this triple point is where the Genesee River originates and flows north eventually emptying into Lake Ontario, the Saint Lawrence River and Atlantic Ocean. The western slope of this triple point forms the Allegheny River, flowing into the Ohio River in Pittsburgh; which flows to the Mississippi and the Gulf of Mexico. Pine Creek, which flows south of the triple point, drains into the West Branch of the Susquehanna at Jersey Shore at an elevation of 520 feet. The West Branch flows into the Susquehanna River at Sunbury and eventually empties into the Chesapeake Bay, the largest estuary in the United States. From Galeton to Ansonia, the creek drops at a rate of 11.3ft/mile. In the Canyon the creek drops approximately 16.8ft/mile; in the steepest part of the canyon from Owassee to Bear Run the creek drops at a rate of 26ft/mile; and from Blackwell to Jersey Shore the creek flattens and drops at approximately 6.9ft/mile.

There are three main USGS gauging stations in the Pine Creek watershed. Their locations and drainage areas are Pine Creek at Cedar Run, 604 sq mi drainage area; Blockhouse Creek near English Center, 37.7 sq mi drainage area; Pine Creek below Little Pine Creek near Waterville, 944 sq mi drainage area. At Cedar Run, from December 2001 to April 2002 average flow was 976 cubic feet per second, while in May through November 2002 average flow was 618.16 cubic feet per second. At Blockhouse Creek,

average flow was 62.3 cubic feet per second from December 2001 to April 2002 and 327.24 cubic feet per second from May through November 2002. At Pine Creek below Little Pine Creek, from December 2001 through April 2002 average flow was 1555.8 cubic feet per second, and 1113.10 cubic feet per second from May through November 2002.

The Strahler "stream order system" is a general way of describing the stream make-up of a watershed. In this classification system, two first order streams (also called headwater streams) join to form a larger second order stream; two second order streams join to form a third order, and so on. However, when a smaller stream enters a higher-ordered stream, the order number of the higher-ordered stream does not change (i.e. if a first order stream goes into an already designated second order stream, then the second order stream designation does not change). The largest river in the United States, the Mississippi River, is a 12th order stream at its mouth. Applying this system of classification to streams in the Pine Creek watershed, there are 916.3 miles of first order streams, 337.6 miles of second order streams, 191.3 miles of third order streams, 74.2 miles of fourth order streams, 54 miles of fifth order streams, and 40.9 miles of sixth order streams within the watershed, making a total of 1,614 miles. Thus, 73.1% of the streams in the Pine Creek watershed are the smaller first and second order streams and their protection should be a major concern in order to assure the water quality of the area.

B. Lakes

All lakes within the Pine Creek watershed are manmade and provide flood protection and recreation for residents and tourists. Lakes found in the watershed include: Hamilton Lake, Little Pine Lake, Nessmuk Lake, Kelsey Creek Lake, Galeton Lake (also known as Centertown Lake), and Lyman Run Lake.

Hamilton Lake, on Charleston Creek near Wellsboro, was created in 1968 and has a surface area of 40 acres. It contains 200 million gallons of municipal water for local residents and has been known to have a good largemouth bass population. The lake provides recreation for residents and tourists in the form of parks, boating, fishing, and skating. According to the Pennsylvania Summary of Fishing Regulations and Laws, Hamilton Lake, along with Little Pine Lake in Lycoming County, has been selected for the Trout-Stocked Lake Program. This means that when most trout-stocked waters are closed to fishing, these select lakes are stocked early and open for fishing. Nessmuk Lake, on the Morris Branch of Marsh Creek near Wellsboro, has a 60 acre surface area with a depth of 21 feet. It is important for recreation and flood control. The lake has an 847 million gallon flood storage capacity. Kelsey Creek Lake was

completed in 1967 and is located on an abandoned landfill near Wellsboro. It has a six acre surface area with a 15 million gallon flood capacity.

Little Pine Lake was created when a dam was erected on Little Pine Creek in 1949. The lake is located four miles upstream from the mouth of Little Pine Creek and has a 94 acre surface area. It is a flood control reservoir located in the middle of Little Pine State Park near Waterville.

The original Lyman Run Lake, a reservoir in Lyman Run State Park, was built in the early 1950s but was drained in 2003 because of concerns about the dam. Since April 2004 a new dam has been under construction, with a 40 acre reservoir, and is scheduled to be completed by the fall of 2005. The new dam will be 53 feet high and 1000 feet long creating a pool storage capacity of 476 acre/feet.

Centertown Lake at Galeton is a 12 acre stop log construction impoundment. The main purpose of the lake is flood control; it also serves for recreational purposes. But, it is a migration block for trout.

C. Wetlands

Wetlands are defined as transitional areas between terrestrial and aquatic environments where the water table often exists at or near the surface, or where the land is inundated by water. Wetlands perform a variety of environmentally valuable functions. Wetlands function as groundwater discharge/recharge areas as they mitigate the effects of flood and drought by acting as a saturation zone and provide a diverse wildlife and aquatic habitat. Wetlands also play a critical role in sediment/toxicant retention and nutrient removal/transformation.

As described in the Chesapeake Bay Program website (www.chesapeakebay.net), the majority of the wetlands in the Pine Creek watershed are classified as the palustrine type. A palustrine system includes all non-tidal wetlands less than 20 acres wide, and dominated by trees, shrubs, emergents, mosses or lichens. This type of wetland also provides crucial habitat for plants, macroinvertebrates, fish, waterfowl, and several mammal species.

Prominent wetlands in the Pine Creek watershed include areas within Lyman Run State Park, Black Ash Swamp north of Wellsboro, the “Muck” within the Marsh Creek sub-basin, Algerine Bog near Cedar Run and Avis Swamp near Jersey Shore. The Chesapeake Bay website summarizes the number and size of wetlands within five areas along the Pine Creek watershed (Table IV-1). A total of 711 wetlands are less than 3 acres in size and 146 wetlands are greater than 10 acres in size. Black Ash Swamp can be found in Tioga State Forest and makes up a total of 308 acres. Algerine Swamp’s 84 acres have been found to contain black spruce, balsam fir, and pitcher plants. However, these wetlands are small in comparison to the “Muck.”

Table IV-1: Wetlands Within the Pine Creek Watershed *

Location along Pine Creek	# of Wetlands < 3 acres	# of Wetlands 3-10 acres	# of Wetlands > 10 acres
Galeton area	36	8	2
Marsh Creek area	137	21	3
Babb Creek	223	21	74
Waterville area	145	6	38
Jersey Shore area	170	15	29

* From Chesapeake Bay Website (www.chesapeakebay.net)

The "Muck," along Marsh Creek, contains five types (Forested, Scrub/Brush, Emergent Marsh, Aquatic Bed, and Unconsolidated bottom) of palustrine wetlands as defined by the U.S. Fish and Wildlife Service (Table IV-2). These wetlands cover 91.4% of the 3,000 acre valley floor of Marsh Creek and have been cited as an Important Bird Area by the National Audubon Society with sightings of over 150 bird species. The marshes of the Marsh Creek Valley have historically been considered impediments to progress. In the early 1800s settlers perceived their stagnant waters as a serious health risk and began to modify them. The greatest modification of these wetlands (draining and ditching as well as deforestation) was achieved between the 1890s and 1950s to allow for agricultural production of lettuce and celery. The Marsh Creek Valley is an unusual and important natural area in northcentral Pennsylvania and only a few, if any, pristine acres remain. However, since 1950 most of the drainage ditches have been abandoned and are filling in with silt and organic debris, thus reestablishing marsh characteristics.

Table IV-2: Palustrine Wetlands of the Marsh Creek Valley

Type	Major Vegetation	Acres	% of all Wetlands	Acres Drained	% of Total Drained Wetlands
Forested	Example: Hemlock, red maple	87	9.5	18	2.8
Scrub/brush vegetation	Example: Willows, alders	134	14.4	49	7.7
Emergent Marsh Inundated Muck	Example: Cattails, sedges	650	69.9	557	87.9
Aquatic Bed	Example: Water Lilies	7	00.7	5	0.8
Unconsolidated Bottom	Too deep for vegetation	52	5.5	5	0.8
Total		930	100.0	634	100.0

D. Floodplains and Floodplain Management

Undisturbed floodplains serve a variety of ecological functions including retention and release of surface and groundwater, vegetative stabilization of stream banks, sediment and toxicant filtering from surrounding uplands, production of food sources and cover and protection for wildlife living in the plain.

There has been an accelerating demand for stream-front property within the Pine Creek watershed for businesses, homes and camps. The crowding of the floodplain not only endangers human life, but also affects the water quality, groundwater supplies, stability and natural beauty of stream banks. All of these can have significant impact on the biological health of the stream ecosystems.

Flood management and insurance rates are coordinated through the National Flood Insurance Act of 1968, which created the Federal Insurance Administration and made flood insurance available for the first time. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) was given the authority to administer the laws outlined in the Acts. FEMA also conducts routine flood insurance studies throughout the country. The purpose of the studies is to develop risk data that can be used during land use planning and floodplain management. The Department of Environmental Protection also has an established floodplain regulation and management plan outlined in the 25 PA Code Section 106.

Pine Creek's most frequent flooding typically occurs in early spring, after the area has received heavy rainfall on top of deep melting snow. Highest stream flow occurs between March and the beginning of June. Record floods occurred in June 1889, March 1936, May 1946, June 1972, and January 1996. Additional flood information can be found in Table IV-3.

Table IV-3: Flood Damage Centers, State Water Plan: Sub-Basin 9A

Locations	Flood Damages		
	Highest Flood Damages Recorded Prior to 1969		"Agnes" 1972
	Flood Date	Damages* ($1,000)	Damages* ($1,000)
Galeton Boro- Pine Creek	May 1946	1,973	143
Wellsboro Boro-Marsh Creek			912
Morris Township-Wilson Creek & Babb Creek	May 1946	268	
Slate Run- Pine Creek			1,707
Cammal- Pine Creek			255
Jersey Mills- Pine Creek			288
Liberty Boro- Blockhouse Creek			127
English Center- Little Pine Creek			138
Waterville- Pine Creek			1,175
Pine Creek by Jersey Shore- West Branch Susquehanna River	Jan 1959	1,129	

* Damages are times $1000

E. Water Supplies

1. Pubic Water Supplies

There are approximately 50 regulated public water supply systems within the Pine Creek watershed. Of those 50, six are community water supplies (residential communities) and four are non-transient non-community water supplies (routinely serve the same individuals, but not residential communities). The community water supplies are: Wellsboro Municipal Authority, Duncan Township Municipal Authority, Waterville Water Association, Galeton Borough Water Authority, Jersey Shore Area Joint Water Authority, and Country Living Mobile Home Park. The non-transient non-community systems are: Liberty Elementary School, Liberty High School, SMC Powder Metallurgy, and Wellsboro Industrial Park. All of these systems have groundwater sources; however, Galeton Borough Water Authority, Wellsboro Municipal Authority, and Jersey Shore Area Joint Water Authority also have surface water sources within the Pine Creek watershed. These surface water intakes are not necessarily on the main stem of Pine Creek, but in some cases are on one of the tributaries to Pine Creek. Jersey Shore's surface water intake is a backup source and is only used once about every ten years. The remaining approximately 40 regulated public water supplies are transient groundwater systems. These systems do not serve the same individuals on a regular basis and include largely restaurants, campgrounds, and stores not connected to a community water supply.

2. Private Water Supplies

The remainder of the residents and camp owners within the Pine Creek watershed are dependent on private water supplies which may be springs, streams, or wells. However, most of these are probably groundwater wells. These systems are not regulated in any way and there are no records regarding the quality of these supplies.

F. Protected Uses

1. Chapter 93 Classification

The Pennsylvania Department of Environmental Protection (DEP) has established a system classifying each Commonwealth waterway according to its water quality and the quality of its aquatic ecological communities. There are four protected use designations pertaining to aquatic life, described as below. (Refer to Map 8) The classification system and criteria set forth in Chapter 93 of the Pennsylvania Codes are:

CWF *Cold Water Fishes*—Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.

WWF *Warm Water Fishes*—Maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

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

TSF *Trout Stocking*—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.

In addition, waterways or watersheds can be given special protection, either as Exceptional Value (EV) or High-Quality Cold Water Fisheries (HQ-CWF). These designations are based upon the following criteria:

(a) *Qualifying as a High Quality Water*. A surface water that meets one or more of the following conditions is a High Quality Water.

(1) *Chemistry*.

(i) The water has long-term water quality, based on at least 1 year of data which exceeds levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water by being better than the water quality criteria in § 93.7, Table 3 (relating to specific water quality criteria) or otherwise authorized by § 93.8a(b) (relating to toxic substances), at least 99% of the time for the following parameters:

- Dissolved oxygen
- Aluminum
- Iron
- Dissolved Nickel
- Dissolved Copper

- Dissolved Cadmium
- Temperature
- pH
- Dissolved Arsenic
- Ammonia Nitrogen
- Dissolved Lead
- Dissolved Zinc

(ii) The Department may consider additional chemical and toxicity information, which characterizes or indicates the quality of a water, in making its determination.

(2) *Biology*. One or more of the following shall exist:

(i) *Biological assessment qualifier.*

(A) The surface water supports a high quality aquatic community based upon information gathered using peer-reviewed biological assessment procedures that consider physical habitat, benthic macroinvertebrates or fishes based on *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*, Plafkin, et al., (EPA/444/4-89-001), as updated and amended. The surface water is compared to a reference stream or watershed, and an integrated benthic macroinvertebrate score of at least 83% shall be attained by the referenced stream or watershed.

(B) The surface water supports a high quality aquatic community based upon information gathered using other widely accepted and published peer-reviewed biological assessment procedures that the Department may approve to determine the condition of the aquatic community of a surface water.

(C) The Department may consider additional biological information which characterizes or indicates the quality of water in making its determination.

(ii) *Class A wild trout stream qualifier*. The surface water has been designated a Class A wild trout stream by the Fish and Boat Commission following public notice and comment.

(b) *Qualifying as an Exceptional Value Water*. A surface water that meets one or more of the following conditions is an Exceptional Value Water:

(1) The water meets the requirement of subsection (a) and one or more of the following:

(i) The water is located in a National wildlife refuge or a State game propagation and protection area.

(ii) The water is located in a designated State park natural area or State forest natural area, National natural landmark, Federal or State wild river, Federal wilderness area or National recreational area.

(iii) The water is an outstanding National, State, regional or local resource water.

(iv) The water is a surface water of exceptional recreational significance.

(v) The water achieves a score of at least 92% (or its equivalent) using the methods and procedures described in subsection (a) (2) (i) (A) or (B).

(vi) The water is designated as a "wilderness trout stream" by the Fish and Boat Commission following public notice and comment.

(2) The water is a surface water of exceptional ecological significance.

a. Pine Creek Fisheries Designation under Chapter 93

There are a total of 1623.3 miles of stream in the Pine Creek watershed. Of those, 980.1 miles (60.3%) are classified as High-Quality Cold Water Fisheries (HQ-CWF). Another 529.2 miles (32.6%) are designated as Cold Water Fisheries (CWF). There are 56.6 miles (3.5%) designated Exceptional Value. In addition, a 57.9-mile stretch of Pine Creek is designated as a High Quality-Trout Stocked Fishery. These 57.9 miles account for 3.6% of the total stream miles in the Pine Creek watershed. Pine Creek tributaries and their fisheries designations are listed in Table IV-4.

Table IV-4: Fisheries Designations of Major Tributaries in the Pine Creek Watershed

Stream	Fisheries Designation
Elk Run	HQ-CWF
Long Run	EV-CWF
Marsh Creek	CWF
Babb Creek	CWF
Wilson Creek	CWF
Stony Fork	CWF
Cedar Run	EV
Slate Run	EV
Blockhouse Creek	CWF

Legend:
(HQ-CWF) High-Quality Cold Water Fisheries
(EV-CWF) Exceptional Value Cold Water Fisheries
(CWF) Cold Water Fisheries
(EV) Exceptional Value

2. Fish Habitat Designation by the PA Fish and Boat Commission

The Pennsylvania Fish and Boat Commission (PFBC), on their website (http://www.fish.state.pa.us), annually shows the designated number of streams in the Pine Creek watershed as Class A Wild Trout water, Natural Trout Reproduction and Wilderness Trout Streams based on the following criteria:

DEFINITION OF CLASS A WATERS:

Streams that support a population of naturally produced trout of sufficient size and abundance to support a long-term and rewarding sport fishery. In the process of

designating a Class A water the Fish and Boat Commission also documents Total Alkalinity in mg/l during the time of their fish surveys.

DEFINITION OF NATURAL TROUT REPRODUCTION:

Evidence of native trout reproduction.

DEFINITION OF WILDERNESS TROUT STREAMS:

Wilderness trout stream management is based upon the provision of a wild trout fishing experience in a remote, natural and unspoiled environment where man's disruptive activities are minimized. Established in 1969, this option was designed to protect and promote native (brook trout) fisheries, the ecological requirements necessary for natural reproduction of trout and wilderness aesthetics. The superior quality of these watersheds is considered an important part of the overall angling experience on wilderness trout streams. Therefore, all stream sections included in this program qualify for the Exceptional Value (EV) special protected water use classification, which represents the highest protection status provided by the Department of Environmental Protection (DEP), Chapter 93 referenced above.

a. Pine Creek Fisheries Designation Based on Supporting Trout

In the Pine Creek watershed there are 143.1 miles of stream that have been designated as Class A Wild Trout water. A listing for 2004 Class A Wild Trout can be found in Table A-8. Additionally, due to the overall excellent water quality conditions in the watershed, as well as the limited influences of humans, a number of streams in the watershed support natural reproducing populations of trout, primarily brook trout (Salvelinus fontinalis) and brown trout (Salmo trutta). A listing of natural reproduction for 2004 can be found in Table A-9. There are a total of 76 streams in Potter County, 160 streams in Tioga County, and 125 streams in Lycoming County that contain natural trout reproduction. Therefore, Potter County makes up 21.5% of Pine Creek's natural trout reproduction, Tioga County makes up 44.3% and Lycoming County makes up 34.6%. The PA Fish and Boat Commission has also set aside sections of streams which fall under the jurisdiction of "Wilderness Trout Streams" protection. A listing of the 2004 Wilderness Trout stream segments designated in the Pine Creek watershed can be found in Table A-10.

G. Water Quality

Several water quality surveys have been conducted in the Pine Creek watershed, all of which indicate that, generally speaking, water quality in the watershed is quite good. Tables A-11a and A-11b show recent water quality data based on water chemistry surveys from the summers of 2003 and 2004, as completed by Clean Water Institute/Lycoming College interns. Table A-11c shows a brief coliform summary from the summer of 2003. Water sampling data from DEP validates Pine Creek's high quality description. However, some water quality issues continue. These issues can be broken

down into two categories, Point Source and Non-Point Source**.** Point Sources occupy a very small area and have a concentrated output, discharging pollution or radiation. Non-Point Sources can be further broken down to Abandoned Mine Drainage (AMD), Acid Precipitation, Nutrients and Sediment, and Storm Water.

1. Point Sources

a. Sewage

As is typical of most free-flowing streams in temperate areas, Pine Creek maintains dissolved oxygen (DO) levels high enough to support all forms of aquatic life. High DO levels also aid in the assimilation of waste products which might enter the stream. These wastes enter the stream primarily through the sewage treatment plants (STPs) at the Boroughs of Galeton and Wellsboro. Before being upgraded to advanced secondary treatment, these two STPs were major sources of ammonia and organic substances that resulted in a high biological oxygen demand (BOD) in Pine Creek. Galeton STP was upgraded to advanced secondary treatment in July of 1986 and Wellsboro in June of 1988.

Under normal circumstances these two discharges are continuously disinfected. However, perhaps the greatest water quality problem associated with these two STPs is the discharge of untreated wastewater directly to the stream in the event of a combined sewage overflow (CSO). CSOs are discharges of untreated wastewater from a combined sewage and storm water system as a result of high precipitation or snow melt. During these periods of increased surface water flows, CSOs result when combined sewage and storm flows exceed the capacity of their respective sewage system or treatment plant. These surplus flows are discharged as raw sewage into adjacent streams before reaching the treatment plant, thus creating environmental and health problems. Both Galeton and Wellsboro do have combined sewage and storm water systems. However, both plants have greatly reduced the occurrence of these discharges over the last several years and both are planning to eliminate them entirely in the future.

Another sewage problem is malfunctioning and/or inappropriately sized private residential septic systems. Between the 1974 and 1996 there were 492 applications approved for on-lot septic systems. Malfunctioning on-lot septic systems are a significant source of the fecal coliform that enters Pine Creek. To limit contamination, tanks should be pumped on a more frequent basis (recommended every two years), and if necessary new or larger on-lot systems with appropriately sized leach fields should be installed.

In spite of these malfunctioning/inappropriately sized on-lot septic systems and occasional CSOs, Pine Creek maintains a relatively high water quality and consistently meets water quality standards. However, increasing development pressure and installation of more on-lot systems, particularly if they malfunction, may result in further degradation to Pine Creek.

b. Toxic Release Inventory (TRI)

Toxic Release Inventory is a reported listing of any toxic chemicals released by facilities or industries. Any chemicals released into the watershed could degrade the fitness of the stream, polluting it and harming the inhabiting wildlife. In the Pine Creek watershed there are six industries that have to report their TRI to the U.S. Environmental Protection Agency (EPA) (www.epa.gov/tri/). These industries are required to report their annual production, disposal, and any emissions to air, soil, and water. This allows the EPA to keep track of anything harmful that these industries are releasing into the environment. The last release year reported on the web is for 2002 and contains information on such contaminants as lead, ammonia, copper, and chromium, etc.

2. Non-Point Sources

a. Overview of Abandoned Mine Drainage in Watershed

Abandoned mine drainage (AMD), which in most cases results in acid mine drainage, involves a complex set of chemical reactions and begins by exposing sulfide-bearing rock to oxygen during the mining process. Sulfides usually occur as pyritic rock material found in conjunction with bituminous and anthracite coal seams, often as rocks and clays surrounding the seams or within roof shale. When sulfides are exposed to oxygen and water, then sulfate ions, dissolved iron, and acidity are produced. When exposed to stream water with a higher pH, acid/base reactions result, causing the metals to precipitate from solution. The most common precipitates are iron hydroxide, a yellow-orange precipitate, aluminum hydroxide, a white precipitate, and manganese hydroxide, a dark brown/black precipitate.

Low pH water and dissolved metals, particularly aluminum, can be lethal to aquatic organisms. Dissolved aluminum affects the gills of aquatic organisms. The sediments produced by acid mine drainage are also environmentally destructive. Precipitated sediments cover the stream substrate, choking out the smaller organisms which constitute the foundation of the aquatic food chain.

Significant discharges of mine drainage occur at various points within the Pine Creek watershed. Areas include multiple sites along Babb Creek, Lick Creek, Wilson Creek, and Otter Run. Babb Creek has been a major source of concern because of the multiple abandoned mine sites along the creek and its tributaries. Underground mining for bituminous coal began in the headwaters of Babb Creek before the Civil War and continued through World War II. Several coal seams underlie the watershed and at least six abandoned major mine complexes exist within the watershed. Some surface mining was done as well. Antrim Mining had the last active mine of any kind in the watershed. Studies conducted between 1970 and the late 1990s all showed Babb Creek's impaired condition, with slight-moderate impairment at the confluence point with Pine Creek.

Within the Pine Creek watershed, Total Maximum Daily Loads (TMDLs) have been established on Babb Creek and some of its tributaries -- Lick Creek, Wilson Creek, and Stony Fork Creek -- as a result of degradation resulting from AMD. TMDLs for these streams dictate daily allowable loading rates for Iron (Fe), Aluminum (Al), Manganese (Mn), and Acidity in order for the stream to attain its designated use.

The Pine Creek Headwaters Protection Group began monitoring the water at a total of 47 different sites in various parts of the watershed in the summer of 1990. The number of sites monitored on a monthly, quarterly, or yearly basis is now about 25. Water samples are taken to a certified laboratory to verify the findings of streamside testing done by the volunteers. This data provides an excellent baseline that can be used to show any improvements to, or degradation of, the water quality within the Pine Creek watershed.

AMD Remediation and Reclamation Projects in Watershed

AMD remediation and reclamation technology is constantly evolving, but the most recent methods to treat abandoned mine drainage can be lumped into two categories: active or passive treatment. Active treatment is accomplished through a treatment plant similar to treatment plants used to treat sewage, only in this case the water is treated by lime dosing to raise the pH and increase alkalinity, and settling of the metal precipitates. This can be very expensive and requires high maintenance. Passive systems require less maintenance and have become the preferred treatment method where the site-specific water quality allows. Passive treatment systems allow the naturally occurring chemical and biological reactions to take place in a controlled environment and not in the receiving body of water. Some examples of passive treatment systems used in the Babb Creek watershed include: diversion wells, anoxic limestone drains (ALD), and vertical flow wetlands.

Diversion wells are constructed along streams impacted by AMD and contain crushed limestone aggregate. Acidic water from the stream is piped to the well where the hydraulic force of the water causes the limestone to turbulently mix and add alkalinity to the water, which is then piped back to the stream.

ALDs intercept mine flows and prevent contact with oxygen. They also contain a limestone bed that generates alkalinity transforming the acid water into alkaline water. The water can then be transferred to an aerobic wetland to precipitate out metals before being released into the receiving water body.

Vertical flow wetlands are ponds that contain an under-drain system, a layer of crushed limestone, and a layer of compost. Alkalinity is increased through bacterial sulfate reduction and limestone dissolution as the water percolates down through this system. The vertical flow wetland is typically followed by a settling basin and aerobic wetland where metals are oxidized and precipitated.

AMD remediation in the Babb Creek watershed started in 1989, when the Pennsylvania Environmental Defense Foundation filed a complaint accusing Antrim Mining Company of increasing acid mine drainage in Babb Creek by breaking into deep mines underlying its stripping operations. Antrim incurred liability for the long-term treatment of acid mine drainage from the abandoned mine discharges in Duncan Township, Tioga County, after it surface mined much of the remaining coal in the area.

The Babb Creek Reclamation Task Force formed in 1990 to address the acid mine drainage problems in the stream. It grew out of an informal cooperative effort of the Pennsylvania Environmental Defense Foundation, Tioga State Forest officials, Arnot Sportsmens' Club, the Pennsylvania Fish and Boat Commission, and local anglers. The Task Force partnered with DEP, the Department of Conservation and Natural Resources (DCNR), Antrim Mining Co. and others to construct treatment systems to deal with the acid mine drainage in streams in the Pine Creek watershed. These treatment systems have played a major role in raising the pH of the water by neutralizing the acidity and removing the toxic metals entering the creeks. The Babb Creek Reclamation Task Force evolved into the Babb Creek Watershed Association (BCWA), which was officially created in 1998 as a nonprofit corporation whose goal was to restore water quality in Babb Creek.

The Babb Creek Reclamation Task Force and its successor, the Babb Creek Watershed Association, have been the driving force behind the installation of a series of treatment systems in the watershed starting with the construction of their first remediation project -- two limestone diversion wells on Lick Creek in 1990. Lick Creek is the farthest upstream tributary to Babb Creek that has been affected by mining and resultant acid mine drainage. A series of increasingly complex, and often more expensive, treatment systems were installed between 1990 and 2004/05 as described in Table A-12. These projects have been made possible by contributions from multiple funding sources too numerous to mention but including: the Babb Creek Watershed Association, EPA grants, Federal Office of Surface Mining (OSM) funding, DCNR, PA Game Commission, DEP Growing Greener funds, Antrim Mining Company funds, and other private mining company funds or in-kind services.

One of the biggest steps forward in the reclamation of Babb Creek was the construction of an acid mine drainage treatment plan at the Antrim mine discharge to Wilson Creek in 1991. This was accomplished as part of a settlement agreement between DEP and Antrim Mining. This plant treats nearly 50 percent of the acid load flowing down Wilson Creek into Babb Creek and had almost an immediate effect on Pine Creek.

Success on Babb Creek results in removal of a section of Pine Creek from Impaired Streams List

In February 2000, DEP removed a 5.2 mile section of Pine Creek in Tioga County from its list of impaired streams because the water quality had improved. DEP's 1998 stream survey data showed a significant increase in aquatic life and a decrease in metals like aluminum, iron, and manganese, all of which can be toxic to fish. This success story demonstrates that projects similar to Babb Creek restoration should be encouraged for continued improvement of the water quality of the watershed.

An updated study done by DEP in February 2002 on the Babb Creek watershed showed net alkalinity and pH both markedly increased following the installation of systems to that point. According to the study, these treatment projects resulted in noticeable improvement in habitat quality and the biological community. The study in 2002 surveyed Pine Creek from Blackwell to Cedar Run, and also areas at the mouth of Babb Creek. The results show that the biological conditions on all of the Pine Creek sites were unimpaired, and the Creek also met all water quality standards. Babb Creek received a moderately impaired score on the biological test, and although sulfate and manganese levels were slightly elevated, they did not exceed the state standards.

The water monitoring results of the Pine Creek Headwaters Protection Group also shows improvement to the waters of Babb Creek. The pH has increased to more acceptable levels, but, more importantly, the alkalinity has increased from the zero level to some values in the hundreds of parts per million. This additional alkalinity allows the stream to counteract any naturally occurring acid, such as from acid rain.

b. Acid Precipitation

Acid Precipitation is defined as any precipitation (wet or dry) that has a pH of less than or equal to 5.6. Wet and dry depositions are two types of precipitation. Wet deposition includes rain, snow, and any other form of wet precipitation. Dry deposition includes particles in the air which after collection are wet down to determine their composition.

Studies have shown that Pennsylvania receives the most acid rain of any state in the nation and the average pH over the last 10 years is between 4.0 and 4.3. Acid rain is caused by sulfur dioxide and nitrogen oxides, which mainly come from coal burning power plants and mobile sources. Acid deposition is the result of human made emissions from burning fossil fuels, automotive exhaust, and other industrial processes which emit sulfur dioxide and nitrogen oxide gases. These chemicals in the atmosphere are deposited as either wet acid in sleet, rain or snow (wet deposition), or as dry sulfate and nitrate particles (dry deposition). The buffering ability of the creek to neutralize the acidity of the deposition depends on the dissolved mineral content in the water, and the composition of the soils and bedrock. If soils and waters of Pine Creek continue to receive acid deposition, their neutralizing capacity will decrease and may be completely used up. With no neutralizing capacity, the water will gradually acidify and fish and other aquatic forms will be adversely affected.

An acid precipitation gauging station exists at Little Pine in the Pine Creek watershed at 41º 22' 48" latitude and 77 º 22' 28" longitude. The station is maintained by DCNR and The Pennsylvania State University. Historical and weekly data was recorded as far back as 1982. Each week, the station at Little Pine measures and records deposition and concentration levels of calcium, magnesium, potassium, sodium, nitrate, ammonium, chloride, sulfate, and hydrogen. Annual concentrations of each pollutant were recorded from 1982 to 2003. Potassium concentrations experienced a significant increase over approximately 20 years. Ammonium, calcium, magnesium, sodium, and chloride concentrations were fairly constant, while sulfate and nitrate concentrations decreased over the last 20 years. In the early 1980s hydrogen ion levels, also known as pH, were around 4.0, however, 4.3 is the average level that has been currently measured. Annual wet depositions of each pollutant were also recorded by DEP from 1982 to 2003. Hydrogen ion, sulfate, and nitrate depositions decreased over the last 20 years, while magnesium experienced only a slight decrease. Potassium and sodium increased over the last 20 years, while chloride increased, but then started to decrease over the last 10 years. Calcium and ammonium deposition has remained fairly constant each year since 1982 (refer to http://www.dep.state.pa.us/dep/deputate/airwaste/aq/acidrain/sites/littlepine.htm for more information).

c. Agricultural Impacts

Current agricultural practices create frequent disturbances to waterways. First, during high rainfall, snowmelt, or flood events, the fertilizers, manure, pesticides, and silt from agricultural lands can be transported via overland flow into streams within the watershed. This can create heavy siltation, nutrient accumulation, and suspended solids washing into stream systems, disrupting both the chemical and biotic health of the watershed. Additionally, increasing the abundance and size of silt entering into the stream channel will result in alterations to the stream's structure and flow characteristics.

Nutrients from agricultural runoff can also leach into soils and contaminate groundwater supplies. The material leached into groundwater can affect drinking water supplies and can eventually feed into stream channels.

Finally, unrestricted access of livestock into streams also creates numerous problems. Along with increasing peril to the livestock, i.e. creating an increased capacity for bone fractures, and herd contamination, livestock can accelerate stream bank erosion, sedimentation, and surface water nutrient enrichment through excrement entering the streams.

Agricultural land cover along Pine Creek was evaluated at five locations, by the Chesapeake Bay Foundation, breaking the watershed up into sections. The combined square miles at the five locations were 71.

Along Wilson Creek, the land use is predominantly agriculture. The ecological impacts of agriculture witnessed on Wilson Creek include suspended sediment releases, loss of

habitat, reduced dissolved oxygen, and high water temperature due to the loss of riparian habitat.

Best management practices are practical means of reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals. Stream bank fencing is an example of a best management practice. It deters cows from entering the stream and has the potential to decrease pollution in the stream by 565 million fecal coliform bacteria per cow per day (Dawes, 1996). Fencing also allows a vegetative buffer to develop in the riparian area, which reduces erosion and nutrient deposition caused by livestock, and results in a lower creek temperature. Primary pollution in the Chesapeake Bay is caused by nutrient runoff from agricultural lands. Nutrients cause excessive algae growth which limits oxygen to aquatic life in the bay. The DEP helps with stream bank fencing by offering 100% cost-share to install stream bank fencing and stabilized stream crossings.

Marsh Creek is the second tributary that deals with agricultural runoff and multiple impairments. In the Marsh Creek watershed agricultural runoff downstream has been reduced since the installation of three dams located on each of the three major tributaries above Wellsboro.

d. Storm Water Management

Storm water management involves controlling water runoff from various sources, typically through the use of detention/retention and infiltration facilities. Another best management practice is to reduce the amount of impervious surfaces, which are any buildings, pavement, or any other structure that replaces vegetation and effectively prevents infiltration. Impervious surfaces can do two major things: increase the volume of storm water runoff and increase the energy of the storm water runoff. By impeding infiltration, impervious surfaces can also reduce groundwater levels and base flow to a stream during low flow periods. A stormwater management plan was adopted by Lycoming County, and Tioga County is currently in the process of creating a storm water management plan.

e. Long Term Stream Dynamics

Residents, anglers, conservationists, and other users of Pine Creek are concerned about changes they have noticed in the form and function of Pine Creek and its tributaries over the years. Observers note that the stream seems to be filling in with silt in many areas, including backwater channels that used to be accessible via canoe but no longer are. Others state that Pine Creek seems to turn muddy much more quickly in response to a rainfall event than it did in the past and that eroding stream banks are much more obvious throughout the watershed.

These changes are not uncommon in Pennsylvania streams and are usually the result of many cumulative impacts. Specifically, higher volumes of storm water runoff from increased impervious surfaces in the form of buildings, roads, etc. can overwhelm the

stream channel and cause erosion during storm events. Soil and gravel eroded from upstream creek banks are deposited downstream, filling in parts of the channel. Development within the floodplain constricts flow during storm events, which can also lead to increased water velocities in the channel and stream bank erosion. Woody vegetation with deep root systems such as trees and shrubs along the stream banks helps to resist erosion. However, this riparian vegetation is often removed in favor of lawns or agricultural fields. Grasses and crops do not have as much root depth and therefore do not provide as much bank protection as woody vegetation. Wetlands that naturally act as sumps to absorb storm water are filled in as development pressure increases, causing more storm water to run off the land instead of infiltrate.

All of these factors and probably a few others cumulatively cause the form of a stream to change over time. Some areas may show increased erosion of stream banks while other areas show heavy deposition in the form of silt and gravel bars. History has shown that simply trying to address these problems with a band-aid approach at the site by installing rip-rap or dredging a gravel bar does not solve the problem for the long term and, in some cases, may actually make it worse. In order to fully understand the problem and restore the long-term dynamics of Pine Creek, a comprehensive watershed effort is needed to identify and address the specific factors, such as those mentioned above, affecting stream stability within the Pine Creek watershed. Some of these efforts have already been initiated on a sub-watershed basis.

f. Other Tributary Studies in the Pine Creek Watershed

Sub-watershed Projects – Tioga County

Impaired Tributaries: Wilson, Stony Fork, Charleston and Marsh Creeks

The impaired tributaries of Pine Creek have been studied, monitored, and had restoration work designed and completed with varying degrees of success. The restoration of a large section of Babb Creek, from acid mine drainage, is perhaps the best example of a community working together for a long period of time to restore an impaired tributary. While the Babb Creek story is an interesting one that can be found in other sections of this plan, the remaining tributaries to Pine Creek are only now coming under some type of assessment and planning for restoration. The three organizations that are active in these watersheds are: Pine Creek Headwaters Protection Group, Babb Creek Watershed Association, and the Charleston Creek Watershed Association with the assistance of the Tioga County Conservation District. A review of the projects underway or just completed is included here to document their efforts and to address their concerns, issues, and needs.

Wilson Creek

Wilson Creek is the last link in the Babb Creek Watershed Association (BWCA) acid mine drainage restoration project. With the anticipated completion of the Rattler Mine treatment systems the BWCA contracted with the Tioga County Conservation District

(TCCD) and Grand Canyon Ecological Services to assess the watershed for other sources of impairments. This study was completed in May of 2003 and included recommendations for improving conditions in the watershed. Portions of Wilson Creek are on the Clean Water Act Section 303(d) list of impaired waters in the watershed.

The BWCA again approached the Conservation District to partner on some of these recommendations; specifically, working with the farmers and residents in the watershed to improve water quality and fish habitat. Several meetings with farmers and a public meeting to explore the potential for restoration work where held. As a result of these meetings a proposal to develop a watershed management plan and several demonstration projects were planned and funding is currently being sought.

Charleston Creek

Charleston Creek is one of three headwater streams that join in the Borough of Wellsboro to form Marsh Creek, a major tributary to Pine Creek. This stream is on the Clean Water Act Section 303(d) list of impaired waters in the watershed. This section of the Act requires states to list impaired waters that do not support uses even after appropriate and required water pollution control technologies have been applied. It is a significant percentage of the drinking water supply for the Borough of Wellsboro. Drinking water is supplied to the Borough of Wellsboro through a combination of sources. There is a well field in Brownlee, three surface water intakes along Charleston Creek and its tributaries and an intake in Hamilton Lake.

Because of the presence of surface water in the supply, slow sand filtration is used to remove Giardia cysts and other harmful organisms. The presence of high levels of suspended solids severely impacts filter efficiency and increases maintenance. In addition, sediments deposited in Hamilton Lake reduce storage volume and impact water quality.

Based on this knowledge the borough received a Growing Greener grant to assess the watershed in 2001. The results of that assessment included recommendations, one of which was to support the startup of a watershed association. This was done and there is now a startup grant for the Charleston Creek Watershed Association. The CCWA is meeting on a regular basis, has elected officers, and has approved by-laws. They are moving forward with planning several stream projects including assessment of the tributaries and stream channel stability work, which includes Adopt-A-Stream projects. Stability in the watershed will benefit not only the watershed residents and customers of the borough water system, but also recreational users of Lake Hamilton, residents of the Marsh Creek/Pine Creek watershed, and ultimately the Chesapeake Bay

Stony Fork and Marsh Creek

In 2004, the Pine Creek Headwaters Protection Group (PCHPG) began a study of the impaired waters (nutrient and sediment loading) of Stony Fork and Marsh Creek. The PCHPG has a long history of water monitoring in the headwaters of Pine Creek. This is

the first time, however, that they have undertaken the assessment of impaired streams at this level of detail. The current study design includes high school seniors working on their senior project. The students are assisting the group in sediment and nutrient loading and routine water quality analysis of eight impaired tributaries. The project has the potential to expand with the addition of land use analysis, macroinvertebrate surveys and erosion assessment.

Otter Run

Otter Run in Lycoming County is a tributary to Little Pine Creek and receives discharge from abandoned coal mines. The mine drainage flows directly from Buckeye Run, which is a tributary of Otter Run. Mine water is now treated for iron and acidity. Future hope is to treat the manganese and help rid the stream of this coal mine discharge. (Zimmerman, 2000).

While these projects are relevant to the scope of the Rivers Conservation Plan, the detail of study and analysis that is occurring in each of them would not be possible under this plan. We mention them here as points of reference and in the way of support for future funding assistance and opportunities.

g. Summary of Current Water Quality

Pine Creek is a stream of very high quality. This is supported by data found in a survey completed by the Susquehanna River Basin Commission (SRBC) in 2003. SRBC has worked up a general water quality summary of the Pine Creek watershed, which can be found in their West Branch Susquehanna Subbasin Survey (LeFevre 2003). The survey was conducted from July to November 2002, and includes comparisons of data collected from the current survey to data collected from a previous survey in 1994. Four sampling sites along Pine Creek were used to determine water quality. The locations of the sites are as follows: near Jersey Shore upstream from Tiadaghton Drive bridge (Clinton/Lycoming County line), near Waterville upstream of Little Pine Creek at the Route 44 bridge (Lycoming County), in Blackwell at the Route 414 bridge (Tioga County), and in Ansonia upstream of Marsh Creek and the Colton Road bridge (Tioga County). All of the sampling sites which were on the main stem of Pine Creek were rated as “higher” water quality. The sampling site upstream from Marsh Creek, and the section of the stream in the headwaters that encompasses this site, was designated as Exceptional Value.

The SRBC also sampled several tributaries in the Pine Creek watershed. West Branch Pine Creek was non-impaired and rated as “higher” quality. Marsh Creek was rated “middle” quality and was found to be slightly impaired. The slight impairment of this low gradient stream was due to exceeding levels of nitrogen, nitrate, phosphate, and orthophosphate. Two sampling sites on Little Pine Creek were rated “higher” quality and were non-impaired or very slightly impaired. The survey proposes that the slight impairment at the mouth of Little Pine Creek may have been due to abandoned mine drainage on a tributary, Otter Run. Wilson Creek was rated “lower” quality due to

exceeding limits of various metals, high hardness, and high total suspended solids. Wilson Creek was impacted by abandoned mine drainage, which contributed to the low quality. A site on Babb Creek, which was located below where Wilson Creek empties into Babb Creek, was slightly impaired and found to have low alkalinity. Impairment in Wilson Creek from abandoned mine drainage may have impacted the water quality in Babb Creek, contributing to its slight impairment.

Water quality assessment for Wilson Creek was completed in 2003 by Grand Canyon Ecological Services. Wilson Creek is a tributary to Babb Creek and is impacted by agriculture. Six water chemistry sites were established along the creek from north to south. Results of water chemistry show the headwater first and second order tributaries are each impacted, to some degree, by pollution from runoff and sources that cannot be directly identified.

The loss of riparian habitat (vegetation and tree cover) along the banks of the creek results in a loss of shade, which in turn causes excess sun exposure, increasing water temperature during the warm months. As water temperature increases, less oxygen is dissolved and retained in the water, which in turn affects the survival of the aquatic life in the creek. The impact from loss of riparian habitat can be seen in the water temperature data collected from Pine Creek. From February to August 2003, the water temperature at the second station (where the first major tributary enters the creek) increased from 3ºC to 25ºC. The temperature then decreased back to 3ºC by November 2003. Phosphate levels ranged from 0.00mg/l to 0.30mg/l among all of the six sites. The second site recorded the highest phosphate level (0.30mg/l) in August 2003.

Three macroinvertebrate and fish sampling sites were selected along the creek. Two of the sites were at major tributaries and the third was in the midsection of the main stem of Wilson Creek. The data collected showed which sites were in good condition and which may have been affected by pollution or other contaminants. The condition of each section was decided based on the number and types of macroinvertebrates found at each location. Macroinvertebrate data results showed the two sites at the tributaries to be impaired, while the third on the main stem was in good condition.

Water quality assessment for Charleston Creek was completed from the summer of 2001 to summer of 2002 by William S. Brey in accordance with groups including the Pine Creek Headwaters Protection Group and the Borough of Wellsboro. Data was collected and analyzed monthly at six sampling points. Overall water quality was determined to be good and was evaluated based on nine parameters: temperature, pH, alkalinity, turbidity, nitrates, phosphates, conductivity, total dissolved solids, and suspended solids. The following data was collected at each site in July 2001 and June 2002. Temperature at the six sites in July 2001 ranged from 22ºC to 29ºC, while in June 2002 the range was from 15ºC to 17ºC. The pH ranged from 7.3 to 9.2 in 2001, and in 2002 the range was from 7.46 to 7.99. Nitrates for the six sites in 2001 was 0.00mg/l to 0.24mg/l and in 2002 0.00mg/l to 0.31mg/l. Phosphate ranged from 0.02mg/l to 0.15mg/l in 2001 and 0.08mg/l to 0.12mg/l in 2002. Total suspended solids ranged from 0.00mg/l to 10.0mg/l in August 2001 to 4.0mg/l to 12.0mg/l in 2002.

In the summer of 2003 and 2004, water chemistry data was collected and compiled for sampling sites along Pine Creek. Clean Water Institute/Lycoming College Intern Amy Curry collected samples in 2003 from 22 sites along the Creek. In 2004, Clean Water Institute/Lycoming College Interns Kristen Colgan and Kristina Kleintop collected samples from 18 sites within the watershed. Water chemistry data from 2003 can be found in Table A-11a, and 2004 data can be found in Table A-11b. In the summer of 2003, Amy Curry also completed a preliminary survey for coliform bacteria at six sites in the Pine Creek watershed. This data, found in Table A-11c, suggests that a more comprehensive survey be done, especially during peak tourist seasons.

In conclusion, except where abandoned mine drainage impacts the Creek, overall water quality is good in the Pine Creek watershed.

V. BIOLOGICAL RESOURCES

A. Terrestrial Wildlife

Before settlement and the logging industry boom, Pine Creek was home to many species including elk, timber wolves, cougars, bald eagles, osprey, otters, and black bears. The bobcat, a protected Pennsylvania species, is also a resident of the Pine Creek corridor. Many birds and mammals have experienced decreases in population within the watershed over the years; however, reestablishing natural habitat is bringing many species back to the area. According to the Pennsylvania Fish and Wildlife database, in 1996 there were ten birds and one mammal on the endangered/threatened species list breeding in the Pine Creek area. These species include the American bittern, least bittern, osprey, short-eared owl, king rail, upland sandpiper, black tern, sedge wren, and the small-footed myotis. Many species of birds, mammals, reptiles and amphibians call Pine Creek their own, and a list of these can be seen on Tables A-13, A-14 and A-15. There was found to be a total of 20 different amphibian species, 18 reptile species, about 50 species of mammals, and almost 200 bird species within the Pine Creek watershed.

There has been an increase in the bald eagle (Haliaeetus leucocephalus) population over the past 20 years within the Pine Creek watershed. In 1967, there were fewer than 500 nests in the country, which placed the bald eagle on the national endangered species list. It was upgraded to the threatened list in 1995 after the number of nesting pairs increased. The bald eagle has been on the Pennsylvania state endangered species list since 1978, but upgrading it to the threatened list is a possibility for the near future due to its recent increase in population. In 2004 and 2005, four nests were recorded in the Pine Creek watershed. These nests are located at Little Pine State Park, below Slate Run, Cedar Run, and above Blackwell. White pine seem to be the nesting tree of choice for the eagles due to their widely spread branches and protection from all weather types. Bald eagles are affected by human activity; however, this is not a significant problem in the Pine Creek watershed due to the rural area. Observations show an increase in the number of bald eagles and their offspring that tend to remain in the watershed each year.

River Otters (*Lutra canadensis*) once flourished in Pennsylvania (including the Pine Creek watershed), however they practically vanished from most of the state by the middle of the 20th century. In 1952, with otter populations remaining only in the Poconos, otters received protection by the state. In an attempt to increase otter populations, the Pennsylvania River Otter Reintroduction Project was organized in 1982, and Kettle Creek, Potter County, became the first release site. Other release areas included Loyalsock Creek, Tionesta Creek, Allegheny River, Susquehanna River, Juniata River, Laurel Hill Creek, and the Youghiogheny River. Between 1980 and 1983, 21 otters were released along Pine Creek and monitoring has shown that reproduction has been successful. Their typical habitats include the edges of lakes, rivers, and streams. To further protect the otter population, the Pennsylvania Game Commission has established trapping restrictions along Pine Creek from the Susquehanna River to Galeton. The restricted trapping zone makes it unlawful to set traps with a jaw spread larger than 4.5

inches, or within 25 feet of Pine Creek. A furtaker license is required to hunt, trap, or kill any furbearer.

Eastern elk (Cervus elaphus) once roamed throughout Pennsylvania, including the Pine Creek watershed. Settlement and human activity forced elk out of the area and completely eliminated them from Pennsylvania in 1867. The Pennsylvania Game Commission (PGC) introduced and released Rocky Mountain elk in nine counties in Pennsylvania from 1913 to 1926. The most successful releases were in Cameron and Elk counties, where the last native elk in Pennsylvania had previously made their stand. The elk habitat is mainly on public land where they graze on a variety of plants. The PGC, conservation groups, public landowners, and other organizations, are responsible for management of the elk population. With their cooperation, elk numbers have increased over the years. Although the Pine Creek watershed is not yet considered an elk viewing area, it is a serious possibility for the future due to expected expansions of high elk populations from nearby counties.

Fishers (*Martes pennanti*) also flourished throughout Pennsylvania, including the Pine Creek area, but disappeared from the state in the late 1800s and early 1900s as a result of deforestation and unregulated trapping. Between 1994 and 1998 there was an effort partnered by the Pennsylvania Game Commission, Frostburg State University and Pennsylvania State University to reintroduce fishers in Pennsylvania. Release sites included the Pine Creek watershed, Quehanna Wild Area, Allegheny National Forest and the Pocono Mountains. The fishers have made great progress expanding their range from release sites and can now be found around Pennsylvania, including the Pine Creek area.

B. Aquatic Wildlife

An extensive fish study was performed by Edwin Cooper and Charles Wagner in 1971. The study was done at four locations: above Galeton, Blackwell, Cammal, and the Route 220 bridge near Jersey Shore. A diverse population of 14 to 23 species was found at each site with 12 common species found at all four locations. Pine Creek harbors at least 48 species of fish, including the rare sightings of banded killfish, swallowtail shiner, bowfin and yellow perch. From Ansonia to the mouth, the Commonwealth designated Pine Creek as a “high quality trout stream fishery.” Reproducing brown and brook trout populations are distributed widely throughout the watershed. The Pennsylvania Fish and Boat Commission (PFBC) continues to periodically survey different sections of the watershed.

A general analysis of fish species present, and their widespread abundance, indicates that Pine Creek is subjected to very little degradation from organic wastes, industrial effluents, or acid mine drainage. The only negative effect on Pine Creek is where Babb Creek enters the main stream at Blackwell. A compiled list of fish found in Pine Creek can be seen on Table A-16.

Over the last 30 years, various benthic macroinvertebrate surveys have occurred in the Pine Creek watershed by agency/organizations such as Department of Environmental Protection (DEP), Grand Canyon Ecological Services, Pine Creek Headwaters Protection Group and Lycoming College's Clean Water Institute. One of the most comprehensive benthic studies along the main stem of Pine Creek was completed by DEP in 1992 by Ronald Hughey (DEP). This study consisted of sampling and analysis from 21 sites on the main stem of Pine Creek ranging from stream mile 80 in Potter County to stream mile 1.5 in Lycoming County. Table A-17 is a compiled list of species from all 21 sites in Pine Creek. There was found to be a total of 57 different benthic species.

C. Native Vegetation

It is estimated that approximately 68% of the Pine Creek watershed is woodland. Almost a century has passed since the intense logging of the virgin forests of the Pine Creek watershed. Before then, early settlers marveled at the white pine and hemlock forests which covered much of the area. A 40 acre stand of old growth hemlock still borders Four Mile Run on the west side of the canyon. Understory species include, but are not limited to, rhododendron, mountain laurel, azaleas, striped maple, dogwood, witch hazel, viburnum, sassafras, 13 species of ferns, and 137 species of wildflowers.

The five largest forest types in the Pine Creek corridor are: Northern Hardwood Forest at approximately 76,000 acres, Dry Oak - Heath Forest at approximately 62,000 acres, Dry Oak - Mixed Hardwood Forest at approximately 35,000 acres, Red Oak - Mixed Hardwood at approximately 24,000 acres, and Black Cherry - Northern Hardwood at approximately 17,000 acres.

Northern Hardwood dominant trees include American beech, red maple, sugar maple, and black cherry. Common shrubs to this type include rhododendron, witch hazel, striped maple, hobble bush, mountain holly and shadbush. The herbacious layer is generally sparse and reflects a northern affinity including Canada mayflower, starflower, Christmas fern, teaberry and wild sarsaparilla.

Dry Oak - Heath forest is a broadly defined type of forest found on moderately dry acidic sites, sandy soils and steep slopes. Trees found in this forest type include chestnut oak, black oak, scarlet oak, and white oak. Total cover by conifers is less than 25%. American chestnut stump sprouts are common, and the shrub layer is dominantly ericaceous. The herbacious layer is sparse due to the thick decay resistant leaf litter.

Dry Oak - Mixed Hardwood is similar to the above forest type, but occurs on less acidic and less dry sites, and does not have an overwhelming dominance of heaths in the shrub layer. Along with the dominant trees of Dry Oak – Heath type, sweet birch, various hickories, red maple, and northern red oak are also found.

Red Oak - Mixed Hardwood is another broadly defined forest type and includes much of Pennsylvania's hardwood-dominated forests. Northern red oak and red maple are the most commonly found, along with black oak, white oak, mockernut hickory, shagbark hickory, sweet birch, yellow birch, and white ash. The herbacious layer is highly variable supporting a number of common species.

Black Cherry – Northern Hardwood is characterized by at least 40% black cherry along with other species such as red maple, sugar maple, sweet birch, yellow birch, American beech, and northern red oak.

A complete listing of all forest types and definitions can be seen in the attatched Table A-18 and are shown in Map 9.

D. Invasive Vegetation

Exotic and invasive species typically interact with native vegetation and compete for resources through a process called interspecific competition. As the name implies, this process occurs when an exotic/invasive species interferes with a native species' access to a particular resource. Interference might include the consumption of a nutrient limited in availability, the modification of environmental conditions, a lack of natural enemies, the release of toxins, or the ability to reproduce rapidly enough to prevent the population increase of another species and cause it to become extinct or excluded from the area.

Purple loosestrife (*Lythrum salicaria)* is the most rapidly advancing invasive species in Pennsylvania. This flowering plant was introduced to the United States from Eurasia. Purple loosestrife prefers wet meadows and moist terrace floodplains where it can grow up to six feet tall. Purple loosestrife invades by rapid reproduction through seeding and adventitious roots, and is not easily controlled. Mechanical pulling is recommended for small populations. Chemical treatment with glysophate is recommended around the edge of populations to prevent spreading. Three host-specific insect species have been approved and used in several spots across the United States and were found to be successful for control of purple loosestrife.

Although purple loosestrife is the most rapidly advancing invasive plant species in the state, Japanese knotweed (*Polygonum cuspidatum)* appears to be the most rapidly spreading in the Pine Creek watershed. Originating in Japan, this knotweed was introduced in America in the late 1800s. It is commonly found along river and creek banks, wetlands and along roads. Individual stems of knotweed reach a height of three to nine feet. While its extensive root system protects banks against erosion, the Japanese knotweed excludes other plant species, limiting biodiversity at the site of its invasion.

Mechanical cutting of the stems is recommended for controlling small populations of the species.

The reed canary grass (*Phalaris arundinacea)*, a wetland grass, is especially abundant in the "Muck" along Marsh Creek. In the spring, it is one of the first grasses to appear and flourish. The reed canary grass can grow to a height of nine feet and spreads by elongation and fragmentation of rhizomes. Cutting and flooding of the species may work if done for multiple years.

The other invasive species listed by the Department of Conservation and Natural Resources (DCNR) as the most serious or worst offenders to native ecosystems in northcentral Pennsylvania include three thistles (musk, Canada and bull) (*Cirsium arvense/Cirsium vulgare)*, Morrow's honeysuckle (*Lonicera morrowii)*, and multiflora rose (*Rosa multiflora)*. A total of 17 different invasive species were found in the Pine Creek watershed. Of the 17, eight are serious threats, while the other nine are deserving of vigilance. The eight threatening invasive species are often referred to as Pennsylvania's noxious weeds. A noxious weed is defined as a plant that causes injury to crops, agricultural land, livestock, public health, or other property, as determined by Pennsylvania law.

E. Threatened and Endangered Species – (PNDI)

The Pennsylvania Natural Diversity Inventory (PNDI) is a comprehensive, site-specific database that describes significant natural resources occurring in Pennsylvania. The system includes information on threatened, endangered, and species of special concern, as well as unique ecological communities and habitats. The Department of Conservation and Natural Resources (DCNR) Bureau of Forestry is responsible for plant species, the Pennsylvania Fish and Boat Commission (PFBC) is in charge of tracking reptiles, amphibians, fish and aquatic macroinvertebrates, and the Pennsylvania Game Commission (PGC) tracks mammal and bird species. Table A-19 references the classifications of PNDI organisms.

According to the PNDI, threatened species are defined as flora and fauna that may become endangered within the foreseeable future throughout their region in Pennsylvania. Endangered species are those organisms in imminent danger of becoming extinct or extirpated (locally extinct) throughout their region in Pennsylvania. A compiled list of all PNDI species and habitats listed for Pine Creek is shown in Table A-20a. A total of 35 PNDI species were found with plants being the most numerous. The Tables A-20b-j list species and ecological communities tracked by PNDI for Pine Creek and its tributaries found throughout the watershed.

F. Important Habitat

1. Important Bird Areas

Two locations in the Pine Creek watershed have been designated by Audubon Pennsylvania as Important Bird Areas: Pine Creek Gorge Natural Area and the Marsh Creek Wetlands –"The Muck". A few other popular birding places include: Little Pine State Park, Lyman Run State Park, and the Tiadaghton State Forest. The 62-mile Pine Creek Trail passes through one of the most extensively forested regions of the state, which supports significant populations of forest interior birds. The trail also passes through active and abandoned cropland, brushy areas, and wetlands offering opportunities to view birds found in those habitats. Almost 200 different species of birds have been found in the watershed. Of special interest are warblers, raven, owls, and bald eagle.

2. Important Mammal Areas

The Northern Allegheny Plateau region, which includes part of the Pine Creek watershed, has been designated as an Important Mammal Area (IMA) by the Pennsylvania Wildlife Federation. Criteria for an area to be designated as an IMA is based on the mammal diversity, support of high density populations, support of endangered and threatened species listed by the Pennsylvania Biological Survey, and potential for important public education. The goal of the Pennsylvania Wildlife Federation is to ensure the future of important mammals and provide people with the opportunity to enjoy them in the mammals' natural environments.

3. Riparian Buffer Zones

Riparian buffers, as defined by the Chesapeake Bay Program's website, are areas of land adjacent to a stream, river, marsh or shoreline which form the transition between land and water environments. The buffers improve water quality while providing habitat for wildlife and fish. They are the key to controlling non-point source pollution and also help reduce the impact of upland sources of pollution by trapping, filtering, and converting sediments, nutrients and other chemicals. The riparian buffers provide canopy and shade for the stream, slow and filter runoff from the adjacent land, and provide a diverse habitat for organisms.

The Chesapeake Bay Program has information on forested and non-forested streamside buffers. They present the information based on sub-areas within the watershed. According to their information there are only 1,340.1 stream miles with a forested riparian buffer at least 100 feet wide. The other 1,749.8 stream miles either have a non-

forested buffer or are forested, but less than 100 feet wide. Table A-21 provides a breakdown by Bay Program sub-area.

4. Natural Heritage Inventory Areas

Natural Heritage Inventories present information for residents about their heritage which can be used in planning the future of their area. Inventories assess the biological resources of an area, which are then considered during development and conservation efforts. Specific habitats and species, along with endangered resources, can be monitored closely by the use of the inventories. Information collected from inventories is used during planning and permitting processes. Almost half of the counties in Pennsylvania have been inventoried, and the goal is to inventory every county by 2006. Of the four counties that make up the Pine Creek watershed, Lycoming and Clinton counties have completed Natural Heritage Inventories. Potter County is committed to an inventory, which will soon be underway.

The Tioga County Commissioners have authorized the Science Office of The Nature Conservancy and the Pennsylvania Natural Heritage Program to inventory the natural areas in Tioga County. This study will take two years to complete and the data will not be available for this plan. The information on the natural areas in the Pine Creek watershed will be important information, however, and the documents and maps generated for the inventory should be an important step in any future planning and/or management decisions on the resources in the watershed. The Tioga County Planning Commission is one of the partners on this project and readers are advised to contact the Tioga County Planner for more information on the Natural Areas Inventory for the county and the Pine Creek watershed.

5. DCNR Natural and Wild Areas

DCNR has established natural and wild areas within the Pine Creek watershed.

A natural area is a place where there has been minimal human influence to the biotic communities and processes. In the Tiadaghton State Forest there are five natural areas. The Torbert Island Natural Area is an 18 acre island located in the lower part of Pine Creek, just above Jersey Shore. Miller Run Natural Area consists of 4,000 acres of both oak and northern hardwood forests. It contains four complete watersheds of tributaries to Pine Creek. Algerine Swamp Natural Area consists of 84 acres. The natural habitat of the Algerine Swamp is perfect for rarely found black spruce, balsam fir, and other northern species. In fact, the Algerine Swamp has been called an outstanding example of a Boreal Conifer Swamp in Pennsylvania. Another remarkable aspect of this wetland is the carpet of sphagnum moss and sedges, which include four Pennsylvania rare or threatened species. Bark Cabin Natural Area (73 acres) contains old growth hemlock, and Lebo Red Pine Natural Area (124 acres) consists of old growth red pine. In the Tioga State Forest there are three natural areas. The most scenic is the Pine Creek Gorge Natural Area (12,100+ acres) containing numerous waterfalls. Black Ash Swamp Natural Area (308 acres) is within the Asaph Wild Area and is an excellent example of

second growth cherry and maple. The Reynolds Spring Natural Area (1,302 acres) contains a variety of vegetative types including an open pine swamp and several oak and aspen stands.

Along with the abundance of natural areas on State Forest land there are also wild areas. A wild area is an extensive tract managed to protect the undeveloped character of the area and allow for public recreation. The wild areas in the watershed include Wolf Run Wild Area (6,900 acres), and Algerine Wild Area (3,700 acres) in the Tiadaghton State Forest and the Asaph Wild Area (2,070 acres) in the Tioga State Forest.

The 2,158 acre Little Pine State Park is virtually surrounded by the Tiadaghton State Forest. During established seasons, 1,700 acres of the Park are open to hunting, trapping, and training of dogs. The wildlife found in Little Pine State Park during the year include: bald eagle, osprey, waterfowl, deer, songbirds, herons, otter, raccoon, mink, fox, bear, and turkey.

Map 5 shows all state forests, state parks and State Game Lands located in the Pine Creek watershed.

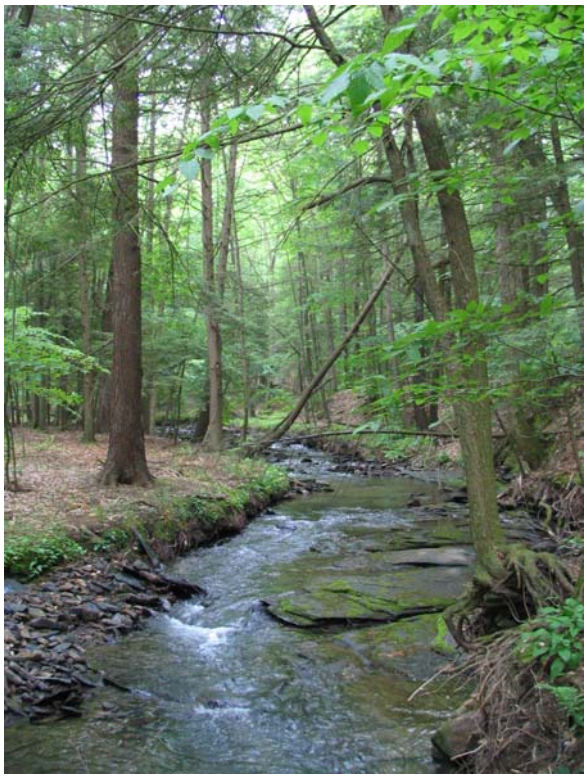
VI. CULTURAL RESOURCES

A. Recreation Resources

The Pine Creek watershed is blessed with an abundance of natural resources in the form of public lands, which support recreation and tourism. It is home to several state forests, state parks, State Game Lands, lakes, and more than 1,600 miles of streams. There are also local parks and recreation facilities in a number of boroughs and townships. Although private land in the watershed is generally not open to the public, this land provides the owners and their guests with cabin sites and supports many of the same activities that can be pursued on public land: hunting, fishing, hiking, and ATV and snowmobiling. This section summarizes the recreation resources in the watershed.

1. State Forest Lands

Portions of the Tiadaghton, Tioga, Susquehannock and Sproul State Forests are within the watershed and provide over 262,000 acres of land for outdoor recreation. See Table VI-1 (PA DCNR, 2004). While being managed under an ecosystem approach by the Pennsylvania Department of Conservation and Natural Resources (DCNR) Bureau of Forestry, these lands provide opportunities for camping, fishing, hunting, hiking, horseback riding, mountain biking, cross-country skiing, sightseeing, snowmobiling, and nature study. State forests are primitive, largely undeveloped, and generally do not offer any conveniences.



These forests are also home to eight specially designated and managed natural areas and three wild areas. Some of this land is rugged terrain and quite remote. There are over 18,000 acres in natural areas with the largest and most recognized being the Pine Creek Gorge (Pennsylvania Grand Canyon) at 12,163 acres. This natural area extends along both sides of Pine Creek for 18 miles from Ansonia to Blackwell and was designated as a National Natural Landmark in 1968. The Asaph, Algerine and Wolf Run wild areas account for 12,670 acres of the state forest. Refer to Table VI-2 for more details on the natural and wild areas (PA DCNR, 2004).

Table VI-1: Pine Creek Watershed State Forests				
State Forest District	**Sproul**	**Susquehannock**	**Tiadaghton**	**Tioga**
Total Acres	303,990	258,936	215,780	164,768
Acres Within Watershed	867	50,183	95,290	116,509
Natural & Wild Areas in watershed	No	No	Yes	Yes
Fishing (Cold or Warm Water)	Cold Water	Cold Water	Cold Water	Cold Water
Hunting	Permitted	Permitted	Permitted	Permitted
Primitive Camping	Permitted	Permitted	Permitted	Permitted
Hiking Trails (Miles)	135	83	145	30
X-Country Ski Trails (Miles)	14	30	60	9
Mountain Biking	Permitted	Permitted	Permitted	Permitted
Picnic Areas	1	0	0	3
Snowmobile Trails (Miles)	204	236	302	179
Horseback Riding	Permitted	Permitted	Permitted	Permitted
ATV Trails (Miles)	65	43	17	0

Table VI-2: Pine Creek Watershed Natural and Wild Areas			
Site Name	**Acres**	**State Forest District**	**Unique Features**
Torbert Island Natural Area	18	Tiadaghton	Birding Area
Miller Run Natural Area	4,000	Tiadaghton	Second growth oak hardwood forest
Algerine Swamp Natural Area	84	Tiadaghton	Glacial bog
Bark Cabin Natural Area	73	Tiadaghton	7 acres old growth hemlock
Lebo Red Pine Natural Area	124	Tiadaghton	Old growth red pine
Pine Creek Gorge Natural Area	12,163	Tioga	PA Grand Canyon
Reynolds Spring Natural Area	1,302	Tioga	Open pine swamp
Black Ash Swamp Natural Area	308	Tioga	Old beaver dam and second growth cherry and maple
Wolf Run Wild Area	6,900	Tiadaghton	Remote, Golden Eagle Trail
Algerine Wild Area	3,700	Tiadaghton	Black Forest Trail traverses
Asaph Wild Area	2,070	Tioga	Rugged forest.
TOTAL	**30,742**		

2. State Parks

The Pine Creek watershed is also home to seven state parks totaling just over 4,600 acres that are managed by DCNR Bureau of State Parks. See Table VI-3 for the location of these parks and for a description of what is available at each (PA DCNR, 2004). Little Pine State Park is the largest, with 2,158 acres in Lycoming County along Little Pine Creek. Little Pine offers modern camping sites, showers, cottages, cross-country skiing, sledding and tobogganing, hiking on miles of trails, picnicking, and swimming, fishing and ice fishing on the 94 acre Little Pine Lake. Denton Hill State Park in Potter County offers downhill skiing and rental cabins on its 839 acres. Cherry Springs State Park, also in Potter County, is known for its unique dark sky and stargazing opportunities, and is a destination for astronomers. Leonard Harrison and Colton Point State Parks flank the eastern and western rims of the Pennsylvania Grand Canyon in Tioga County. The primary attractions at both parks are the vistas that provide views of the Pine Creek Gorge and the 800-foot vertical drop to the canyon floor.

Table VI-3: Pine Creek Watershed State Parks

State Park	County	Acres	Number Campsites	Available Activities
Denton Hill	Potter	700	Cabins	Picnicking, fishing, downhill skiing, cabin rental, hunting
Lyman Run	Potter	595	35	Picnicking, camping, playground, fishing, hiking, hunting, mountain biking, lake
Cherry Springs	Potter	83	30	Picnicking, camping, playfield, mountain biking, stargazing field
Colton Point	Tioga	368	25	Natural area, picnicking, camping, hiking, fishing, hunting, x-country skiing, Pine Creek Gorge
Leonard Harrison	Tioga	585	30	Natural area, picnicking, camping, hiking, fishing, hunting, playground, education programs, Pine Creek Gorge
Upper Pine Bottom	Lycoming	6	0	Picnicking and fishing
Little Pine	Lycoming	2,158	104	Picnicking, camping, playground, fishing, hiking, mountain biking, x-country skiing, hunting, education programs, sledding, lake, swimming

Note: Lyman Run, Cherry Springs, Colton Point, and Little Pine provide access to snowmobile trails. Lyman Run and Little Pine offer canoeing and boats restricted to electric motors.

3. State Game Lands

The Pennsylvania Game Commission owns and manages approximately 50,000 acres in six State Game Lands in the watershed. These properties are primarily for the use of hunters and trappers, and are managed for wildlife habitat. See Table VI-4 for more information on the individual State Game Lands and their location in the watershed (PGC, 2004). There are a limited number of designated routes for horses and bicycles on these lands; however, due to a rule that took effect in 2003, during hunting season such use is limited to Sundays or to roads open to the public. State Game Land 75 in Lycoming County contains three of these designated trails, the Mid-State Trail, Birchstill Trail, and the Donald E. Watson Trail. While State Game Lands are primarily for hunting, hunting is also permitted on State Forest land and in restricted areas in some state parks. It should be noted that hunting is very popular in the Pine Creek watershed as hunters take to the field each year looking to bag black bear, white-tailed deer, wild turkey, and small game species. Hunting is more than recreation; it is a tradition, rite of passage, and part of the culture of many residents, camp and cabin owners, their families, and friends.

Table VI-4: State Game Lands

State Game Land #	Location	Acreage	Road Systems
64	Potter County	8,021	Trails, Light Duty Roads, Parking Area
68	Lycoming County	3,397	Trails, Light Duty Roads, Parking Area
75	Lycoming County	27,400	Trails, Light Duty Roads, Parking Area
89	Clinton County	2	Trails, Light Duty Roads, Parking Area
208	Tioga County	8,862	Trails, Light Duty Roads & Primary Highway, Parking Area
268	Tioga County	2,394	Light Duty Road
313	Tioga County	140	Light Duty Road
	Total	**50,214**	

4. Local Parks and Recreation Facilities

Although it is easy to focus on the abundance of nature's bounty and availability of state-owned lands, the importance of recreation and park opportunities available to local residents in their communities should not be overlooked. Over emphasis on the needs of tourists and weekend transients at the expense of full-time residents will be counterproductive to long-term community and economic vitality and resource protection.

High paying jobs are not particularly abundant in the watershed and the tax base for many smaller local governments provides only enough income to cover basic services. Therefore, the greatest concentration of recreational facilities is in larger communities such as Wellsboro, Galeton and Jersey Shore. Centertown Park in Galeton borders Pine Creek above the Berger Dam and provides green space, a pavilion and picnic tables, and is the site of a public library that is currently under construction. Downstream of the Centertown Park is a levee that continues the ribbon of green behind the basketball court, tennis courts and school facilities. Wellsboro has a Parks and Recreation Department and maintains six parks totaling 497 acres, including the following:

> Packer Pool & Park – Tennis Courts, basketball court, picnic pavilion, playground, community center, volleyball courts, fitness court, and an Olympic outdoor swimming pool.
>
> Woodland Park – Picnic pavilions, walking trails, playground, basketball court, and shuffleboard courts along with a quiet wooded setting.
>
> Nessmuk Lake – Fishing, boating, picnic pavilions, group barbecue pit, and archery range alongside the lake.
>
> Hamilton Lake – Fishing and boating.
>
> Upper Meade Street Recreation Area – Softball complex, Little League field, and police training pistol range.
>
> Charleston Street Little League Complex – Little League baseball and softball field complex.
>
> The Department also maintains the Wynken, Blynken & Nod statue "On the Green" in the center of Wellsboro across from the county courthouse. The "green" features a fountain, benches and downtown greenspace. (Wellsboro P&R)

The Borough of Jersey Shore has the 11-acre Jersey Shore Recreation Area which includes a picnic area, gazebo, playground, tennis courts, baseball and softball fields, soccer fields and basketball courts. The park is also home to the Jersey Shore Community Swimming Pool which has recently undergone extensive modifications and renovations (Lycoming Co., 2004). A YMCA serves the Jersey Shore region, and the Jersey Shore High School has an indoor swimming pool.

In smaller, less populated municipalities there are limited recreation and park resources. Cummings Township has a small park that includes a playground, picnic area, sand volleyball court, and green space in Waterville near the confluence of Little Pine Creek with Pine Creek. Watson Township has the Durrwachter Memorial Field that features 7.2 acres with two baseball fields, pavilion and playground equipment.

There are a number of public elementary, intermediate and high schools in the watershed. Many of them have playgrounds, athletic fields, courts and open spaces that are important community recreation facilities.

5. Trails

A component of the land resource is the trail system in the watershed. There are a number of trails in the watershed and they range from very easy to navigate to those that are difficult and best suited for the well-conditioned and more serious hiker. While the Pine Creek Trail is probably the most heavily used trail there are plenty of others. There are hundreds of miles of trails within the state forests and state parks. Many of these trails, particularly in the state forests, are more basic, not as well marked and maintained, and not as easily accessible as the Pine Creek Trail. Some might be former logging roads. A few of the more notable trails are summarized here. Due to the volume of primitive trails that exist they were not all listed and can be located by referring to the Public Use Maps for the individual state forests.

Pine Creek Trail

The Pine Creek Valley's most popular and well-known trail is the Pine Creek Trail, which when finished will travel 62 miles and connect Wellsboro Junction in Tioga County to Jersey Shore in Lycoming County. The Pine Creek Trail is a multi-use facility that is surfaced with compacted limestone fines and is approximately fifteen-feet wide. The trail is level and is suitable for people of all ages and abilities and follows Pine Creek through the valley. Use is primarily intended for walkers and bicyclists, although horseback riding is permitted on an immediately adjacent trail from the Ansonia trailhead south into the Pine Creek canyon to Tiadaghton – 8 miles. The trail has been developed by the DCNR Bureau of Forestry on a former railroad grade that once was vital to the timber and coal industries and to passengers. Presently 55 miles of the trail are completed. The remaining seven miles are in engineering design, and a construction/completion schedule is dependent upon a number of factors. The trail landscape provides users with breathtaking views along the way and traverses the floor of the Pine Creek Gorge between Ansonia and Waterville. See Table VI-5 for a listing of access points for the Pine Creek Trail.

Table VI-5: Pine Creek and Pine Creek Trail Access Points			
Site Name/Location	Access Type		Amenities
	Canoe	Trail	
Rexford	x		
Watrous	x		
Gaines	x		
Ansonia Access	x	x	Parking, equestrian access
Big Meadows Access	x	x	Parking, rest rooms
Darling Run Access		x	Parking, rest rooms
Tiadaghton Access	x	x	Parking, rest rooms, camping
Blackwell Access	x	x	Parking, rest room, food, lodging, water, phone
Rattlesnake Rock Access	x	x	Parking, rest rooms, phone
Gamble Run Access	x		Limited parking
Slate Run Access	x	x	Parking
Black Walnut Bottom Access	x	x	Parking, rest rooms, camping
Clark Farm/Utceter Stat. Access	x	x	Parking
Ross Run Access	x	x	Parking
Hamilton Bottom Access	x		Parking
Waterville Access	x	x	Parking, picnic facilities, water, phone, lodging
White-tail Access		x	Parking, water, DCNR Office

Mid-State Trail

A segment of the Mid-State Trail winds its way through the watershed entering the Tiadaghton State Forest in the southern portion north of Jersey Shore. It then makes its way up over Houselander Mountain and into Little Pine State Park. From there it continues into the Bark Cabin Natural Area, through State Game Lands 75, into Wolf Run Wild Area, and the Tioga State Forest before ending at Blackwell. In total, the trail is the second longest in the state and is recognized as the wildest trail in Pennsylvania.

Black Forest Trail

A majority of the 42-mile Black Forest Trail lies in the watershed. This trail, uses old railroad grades, logging trails and foot trails. As the trail loops around it traverses the Algerine Wild Area and offers a glimpse at incredible scenery. A number of cross-country ski trails are nearby and overlap some of the Black Forest Trail: Sientiero di Shay, George Will, Ruth Will, Pine Bog Loop and F.X. Kennedy.

Golden Eagle Hiking Trail

The Golden Eagle Hiking Trail in the Tiadaghton State Forest is thought by some to be one of the best day hikes in all of Pennsylvania. It is a 9-mile loop trail that originates at a trailhead along State Route 414 north of Cammal (Thwaites, 1992). The trail offers several scenic vistas, traverses the Wolf Run Wild Area and State Game Lands 68, and features a waterfall.

Pitch Pine Loop Ski Touring Trail

The Pitch Pine Loop Ski Touring Trail in the Tiadaghton State Forest is an easy 2.4 mile cross-country ski trail adjacent to the Miller Run Natural Area that begins at a parking area along State Route 44 about nine and a half miles above Waterville.

West Rim Trail

The West Rim Trail is approximately 30 miles in length and, as the name implies, follows the western canyon rim from Ansonia to Blackwell. There are more than a dozen vistas that offer hikers awesome views of the Pine Creek Gorge and surrounding area.

Susquehannock Trail System

A 29-mile portion of the 85-mile Susquehannock Trail System, also referred to as STS, is in the watershed and routed on CCC fire trails, abandoned railroad grades, and old logging roads. The loop trail originates at the Susquehannock State Forest office on US Route 6 just west of Denton Hill State Park and heads east toward Lyman Run State Park. On the route south from the trailhead it passes through Patterson State Park after seven miles. In this area the trail comes within a quarter mile of the eastern continental divide. The trail is described as a challenging wilderness experience that traverses a variety of terrain and environments (Dillon, 1990).

Keystone Mountain Country Shared Use Trail System

The Sproul, Susquehannock, Tiadaghton and Tioga State Forests offer the Keystone Mountain Country Shared Use Trail System designed to give hikers, equestrians, and mountain bikers better access to the state forest system. The trails are routed along gravel forest roads, unimproved woods roads and hiking trails.

Snowmobile and ATV Trails

In addition to providing trails for non-motorized travelers, the state forests have hundreds of miles of joint use roads open to snowmobiles and a lesser number of snowmobile-only trails in the watershed. For identification of the specific routes one should refer to the Northcentral Snowmobile Trails brochure published by DCNR Bureau of Forestry. Increasing in popularity is the ownership and use of all terrain vehicles (ATVs). Hence the state forests are now providing a limited number of trails for ATV use. The Haneyville ATV Trail, with a trailhead off State Route 44 south of Haneyville, consists of nearly 17 miles of wooded trails. Lyman Run State Park in Potter County features a trailhead for the 43-mile ATV trail in the Susquehannock State Forest.

6. Campgrounds & Camping Areas

Camping is a popular activity in the watershed. Camping can be classified in various ways such as motorized or non-motorized and primitive or modern. There are numerous locations in the watershed for people to place a tent, or pull in a camper or larger recreational vehicle. Camping is allowed within the state forests and at state parks with appropriate permits, but it is prohibited on State Game Lands.

With the exception of Upper Pine Bottom and Denton Hill, the state parks offer both primitive and modern camping opportunities. Denton Hill does have cabin rentals available. Primitive camping in the Tiadaghton State Forest is allowed in areas that are not posted otherwise, but only at designated areas in the Pine Creek Valley. However, in the Tioga State Forest camping is permitted along Pine Creek and campers can choose their site, as the activity is not restricted to designated locations. This has been identified as a problem since users are not aware of the different policies from one forest district to the next and may assume that since they could camp anywhere to their liking in the upper portions of the Pine Creek Valley that the same is true in the lower reaches. In addition, campers generally cannot distinguish between public land and private property when not required to be in restricted areas.

Private campgrounds typically provide more modern sites and amenities, and there are plenty located in the study area. Several concerns have been reported with private campgrounds, particularly where recreational vehicles are parked for extended periods of time. There are safety issues during periods of high water when camper owners are not in the immediate vicinity to move their trailers out of the flood zone. This creates a serious safety problem downstream. Additionally, this type of development, which often occurs right on the banks of Pine Creek, not only causes negative environmental impacts but also detracts from the recreational experience of those fishing, canoeing and otherwise utilizing the resource. Refer to Table VI-6 for a listing of the campgrounds and camping areas in the Pine Creek watershed. Note that not all camping areas within the state forests were listed due to the number of areas that exist.

Table VI-6: Pine Creek Watershed Campgrounds & Camping Areas			
Name	**Location**	**Number Sites**	**Amenities**
Black Walnut Bottom	Off Rte. 414 between Cammal and Slate Run	18	Primitive sites, restrooms, water pump, no vehicle access
Canyon Country Campground	East rim of PA Grand Canyon	72	Laundry, bath house, store, cabins, electric, water, sewer, recreation hall
Grand Canyon Motel & Resort Campground	Wellsboro		Hookups, bath facilities, modern and primitive camping
Stony Fork Campground	Wellsboro	215	Full hookups, electricity, water, dump station, bath house, playground, RV access, tent sites
Little Pine Campground	Little Pine State Park	104	Bath house, dump station, electricity, lake
Cherry Springs Campground	Cherry Springs State Park	30	Dump station, rustic sites
Colton Point Campground	Colton Point State Park	25	Dump station, rustic sites
Lyman Run Campground	Lyman Run State Park	35	RV access, tent and rustic sites, electricity, dump station
Leonard Harrison Campground	Leonard Harrison State Park	30	Dump station, rustic sites, some electric hookups
Bonnell Flats Camping Area	2 miles below Ramsey	NA	Primitive sites, restrooms, mostly for canoe campers, no vehicle access
7 Mile Camping Area	Along Francis Road near Slate Run	NA	Primitive sites
Pettecoat Junction	Rte. 414 at Cedar Run	140	Electric, water, dump station, cabins, primitive sites
Pine Creek Valley Camping Court	Slate Run		
Black Forest Campground	Rte. 44 in Brown Township		
Happy Acres Campground	Adjacent to Little Pine State Park		
Bit of Heaven Campground	Cammal		
Kenshire Campground	Off US Rte. 6 near Gaines	134	Showers, electric, water, laundry, recreation hall
Twin Streams Campground	Off Route 287 at Morris	150	Electric, water, sewer, laundry, recreation hall
Kearse Campground	Off US Rte. 6 at Gaines		
Pine Creek Vista Campground	Off US Rte. 6 at Gaines		Tent and trailer sites, electric, water, laundry, recreation hall

7. Water

To complement the land available in the watershed there is a plethora of water resources in the form of streams and lakes that support fishing, canoeing, kayaking, and swimming. The watershed has 1,612 miles of streams and 243 acres of lake surface area. The most apparent and heavily used of these resources is Pine Creek.

a. Streams

Pine Creek is a Pennsylvania Fish and Boat Commission (PAFBC) approved trout water in Potter and Tioga Counties and in Lycoming County downstream to Waterville. The West Branch of Pine Creek in Potter County is also approved trout water. Interestingly, Pine Creek is primarily a stocked trout stream and is presently not managed under any special regulations. It is considered a High Quality Trout Stocked Fishery for a 57.9-mile stretch. Anglers flock to the banks of Pine Creek to cast baits, lures and flies for brown and brook trout.

Many other streams in the watershed offer plenty of opportunity to fish for trout as well. For the number of stream miles in the watershed, relatively few are managed under special regulations by the PAFBC. Four miles of Lyman Run are under the Selective Harvest Program; 7 miles of Slate Run and 1.2 miles of Francis Branch tributary to Slate Run are Heritage Trout Angling Waters; 7.2 miles of Cedar Run are Trophy Trout; and 1.1 miles of Little Pine Creek are managed as Delayed Harvest Artificial Lures Only (PFBC, 2004). See Section IV and Tables A-8, A-9 & A-10 for a description of fisheries management designations, a listing of trout waters, wild trout streams, wilderness trout streams, and streams with natural trout reproduction.

Pine Creek is more than just a fishery; it is a tremendous resource for people taking float trips and looking for whitewater adventure and 23.25 miles of the upper portion is designated as a scenic river. In a typical year the best time to experience whitewater is during the high flow period from April to May. Generally, the creek is floatable from mid March to mid June and then again from late September through November. The minimum water level reading on the Cedar Run gauge for a trip through the canyon is 1.8 feet for canoes and 2.3 for rafts. Between 2.5 feet and 3.5 feet is considered good by most rafters and intermediate level canoeists. Above these levels is considered even better for rafting but requires more skill for those in canoes and kayaks. At 6.0 feet Pine Creek is very full and at 6.5 feet is reaching flood stage.

The 10 miles of Upper Pine Creek from Watrous to Ansonia is a scenic trip that is easy to navigate with Class I/II water. It is ideal for the inexperienced canoeist. This section has

three access points above Ansonia at Rexford, Gaines, and Watrous (Pine Creek Outfitters, 2004). Refer to Table VI-5 for a listing of Pine Creek public access areas. Private campgrounds along Pine Creek provide access for canoeists that are patrons or to the general public for a fee.

The 17 miles from Ansonia to Blackwell is listed by local outfitters as Class II/III water with frequent rapids and swift flowing water, not an area for the novice kayaker or canoeist and is best suited for intermediate whitewater canoeing proficiency. This run is very scenic and access is limited to Ansonia and Blackwell.

From Blackwell to Slate Run a distance of 12 miles is Class II water and can be accessed at Blackwell, Rattlesnake Rock, Gamble Run, and Slate Run. The 15 miles from Slate Run to Waterville is also Class I/II water, with easy rapids. Access is available at Slate Run, Black Walnut Bottom, Clark Farm, Ross Run, and Hamilton Bottom.

The lower Pine Creek from Waterville to the West Branch of the Susquehanna River is the least challenging to maneuver and is Class I difficulty with an occasional easy riffle. Access is via a walk-in easement in Waterville at the confluence of Little Pine Creek and at the DCNR Torbert launch north of the State Route 44 Bridge over the West Branch of the Susquehanna River, which is just south of the White-tail access to the Pine Creek Trail.

b. Lakes

In addition to miles of streams, the lakes listed below are available for public recreation in the watershed. All of these impoundments support fishing, and Hamilton Lake and Little Pine Lake are stocked with trout by the PAFBC. Hamilton, Nessmuk, Little Pine, and Lyman Run support canoes and boats restricted to electric motors. Lyman Run and Little Pine have beach and swimming areas.

- Hamilton Lake – 40 acres near Wellsboro;
- Nessmuk Lake – 60 acres near Wellsboro;
- Kelsey Creek Lake – 6 acres near Wellsboro;
- Little Pine Lake – 94 acres in Little Pine State Park;
- Centertown Lake – 12 acres formed behind Berger Dam on West Branch of Pine Creek in Galeton
- Lyman Run Lake – 40 acres in Lyman Run State Park when finished in 2005.

In addition to the state, municipal, and school lands, private property in the region provides important areas for hunting, fishing, and other opportunities such as camping at

private campgrounds. Some businesses are based on providing recreation such as Ski Sawmill near Morris that offers downhill skiing and snowboarding and the Tyoga Country Club at Wellsboro that caters to golfers out to enjoy a round of 18-hole championship golf. Other facilities such as the Pennsylvania Lumber Museum and historical and cultural resources provide additional attractions and recreation. Even travel on roads like Route 6, 44 and 414 offer people a chance to take in the picturesque landscape while never leaving their automobiles.

B. Recreation Demand

Estimating the demand for recreation and park facilities and activities across such a large and diverse watershed is problematic for a number of reasons. There is limited data available to quantify how many people currently seek and have historically sought recreation in the Pine Creek watershed on a daily or annual basis. Given the data limitations, demand estimates are extremely difficult and a high degree of accuracy is nearly impossible. Only broad and general assumptions can be made based on statewide and national trends along with the limited local information and knowledge. Even then there is risk due to changing preferences of recreationists. It is safe to assume that for the foreseeable future recreational demand in the Pine Creek watershed will continue to increase, but there will likely be shifts in the type and frequency of activities.

According to the Sporting Goods Manufacturing Association, nationally activities like pilates training, squash and shooting clays participation increased by 102.7%, 56.6%, and 28.2% respectively from 2002 to 2003 and were the top percentage gainers during that period (Sports Participation Topline Report, 2004). On the other hand volleyball, skateboarding, bow hunting, scooter riding and inline skating were top decliners during the same time frame (Sports Participation Topline Report, 2004). Over the 16 year period of 1987 to 2003 pilates training, yoga, treadmill exercise, stair climbing, in-line skating, mountain biking, kayaking, paintball, snowshoeing and snowboarding participation increased the most, while significant decreases occurred in high impact aerobics, shotgun/rifle hunting, fly fishing, cross-country skiing, downhill skiing and racquetball. See Table A-22 for a more detailed list of reported change in sports participation trends from 1987 to 2003.

Also on a national level the United States Forest Service 2000 National Survey on Recreation and the Environment (NSRE) shows that the five most popular recreational activities are: walking, family gathering, viewing natural scenery, visiting a nature center, trail or zoo and picnicking. Another recent study on outdoor recreation estimates that nine in ten people participate in outdoor recreational activity during a year (Roper, 2004). This same report indicates that participation overall in outdoor recreation has been on a downward trend since 2001and frequency of participation by individuals is decreasing as well, particularly among young adults age 18-29.

Within Pennsylvania respondents to a survey conducted as part of the state recreation plan most frequently mentioned reading and writing, spending time with family,

gardening, crafts, hunting, fishing and walking as favorite activities (PA Statewide Comprehensive Outdoor Recreation Plan, 2003). Almost four out of five, or 8.9 million, residents claimed to have engaged in some form of outdoor recreation during the year prior to the survey. The largest growth has been seen in the number of people engaged in bird and wildlife watching, playing golf, off-road motor sports and camping; while picnicking, bicycling, mountain biking and swimming each showed significant loss since 1990. The Pine Creek watershed lies within the DCNR Study Regions 4, 5 and 8. Within these three regions walking, sightseeing and viewing nature were the activities participated in most frequently. Picnicking, swimming, visiting wild areas, nature walks, hiking, fishing and camping were also popular. Even though picnicking and swimming lost popularity statewide it is still a top choice in the northcentral region.

The Pennsylvania Recreation Plan states the following regarding the changing recreation needs over the past several decades:

> "In 1980, Pennsylvania's Recreation Plan indicated that street hockey, horseback riding and snow skiing were the most needed activities. Later these needs centered on less developed facilities like bicycle paths, picnic areas and hiking trails. In 2003, the greatest needs have swung to a new set of developed facilities: sledding and ice skating areas, indoor pools and skateboarding and rollerblading areas."

The plan also notes that residents felt cabin rentals, community centers and environmental education areas need to be increased.

While these trends are based on national and statewide analyses they clearly communicate several important messages. Recreational use is not static and changes based on personal choices made by the user. What was popular one year or ten years ago may not be the activity of choice today, and what is popular today may not be the "in" thing next year or five years from now. Other trends that influence demand include population growth, cultural diversity, household characteristics, population age, economic conditions and the emergence of new activities. For example, population statewide and in this planning area is aging. The sheer number of Baby Boomers moving into retirement age over the next decade will have a definite impact on recreation needs and demand.

Resource managers and community recreation providers must be able to adapt to the evolving recreation climate and changing clientele expectations. Within the established boroughs and villages demand for traditional parks, playgrounds and athletic fields could lessen and more emphasis could be placed on community/senior centers and other facilities to serve adults. The trends also show that recreation demand will fluctuate based on many factors. Any downward trends that might exist are likely temporary as three-quarters of state residents feel outdoor recreation is important to their lives and quality of life and is of greater importance than indoor recreation. Plus, there are a number of elements in the mix to encourage people to be more active for improved health; and tourism promotion continues to emphasize the natural beauty and recreation opportunities in the region.

In the Pine Creek watershed attractions like the Pine Creek Trail will remain a popular destination for bicyclists, walkers and horseback riders just as Pine Creek will continue to entice canoeists, rafters, kayakers, campers and anglers. According to levels of use and the results of local recreation and parks surveys around the state, trails are the most preferred recreation facility (Abele & Toole, 2003). Once the trail is completed in its entirety from Jersey Shore in Lycoming County to Wellsboro Junction in Tioga County usage could significantly increase. Surveys of Allegheny Trail Users in western Pennsylvania indicated they would increase their usage by 2.75 trips per person if that trail were completed (Farber, 1999).

C. Community Activities

The communities within the watershed may not be large urban areas, but they do house a variety of cultural entities and organizations. The community of Wellsboro not only has an art and cultural center (Gmeiner Art and Cultural Center), but also a community theatre league, children's concert choirs and a community concert association. One of the community's parks has a statue (community art) that, according to the Wellsboro Department of Parks and Recreation, is one of the most photographed sites in the town.

Although there are not a lot of art galleries within the watershed, there are many artists and craftsmen at work. Their works can be found in local stores and at festivals, such as Dickens of a Christmas, and on exhibit at the Gmeiner Art and Cultural Center. Additionally, the watershed provides inspiration for countless artists and craftsmen who travel to or through the region.

The **Gmeiner Art & Cultural Center** located in Wellsboro opened in 1969. The Center serves not only as a meeting place for various organizations such as the local quilt guild, but also provides exhibit space, a concert series, readings, lecture series and art classes. Exhibits change monthly with the first Sunday being the opening reception. All of the organizations that utilize the facility for meeting space take turns organizing exhibits, whether it's samples of work by the local embroidery guild, or an exhibit by a regional or national artist.

Although they are separate organizations with separate finances, the Gmeiner and Green Free Library share a board. The Gmeiner is located on the library property just behind and to the side of the library building. The common board and cooperation allow the organizations to work together to provide for the intellectual and cultural needs of the communities they serve.

The **Green Free Library** opened in 1917. It is the largest library in Tioga and Potter counties. In addition to its collection of circulating books and videos, the library houses a genealogy collection, and a local history and rare book section. The library conducts various programs, such as summer reading programs and pre-school story hours. During the Laurel Festival in June the library holds its greatly anticipated annual book sale.

Hamilton Gibson Productions is a private, non-profit community organization that stages theatrical productions, coordinates a youth choir and provides community programming, such as theatre workshops and readings. In its theatre function, the group conducts eight productions a year for a total of 60 performances a year. The performances are held at various locations throughout the community since the group does not have a theatre of its own. The group not only produces local, original plays, such as *Tioga* by Thomas Putnam, but also more well-known plays.

The children's concert choir organized by Hamilton Gibson Productions was formed in 1995. The choir consists of 70 to 80 students from throughout the region. The students range from second grade to twelfth grade.

The **Wellsboro Community Concert Association** formed in 1947. The organization's board represents Potter and Tioga counties. Using various facilities, the association holds events showcasing a variety of musical styles. Performances vary from Broadway show tunes to classical piano performances and gospel.

Community festivals abound in the region. These gatherings provide an opportunity to not only eat some good food, but also to see some of the area's artists, learn about traditional crafts, and hear local and regional musicians. Some of the events provide insight into the community's heritage or celebrate a community milestone.

The festivals vary in season and focus. During the summer the Laurel Festival in Wellsboro is a weeklong celebration. The event provides the community and visitors with a variety of opportunities. In addition to the pet parade, "people" parade, and the Laurel Queen contest, the event also highlights the recreational opportunities in the area with a mountain bike race and road race. The event was first organized by the Wellsboro Lions Club in 1938.

Morris is home to the Rattlesnake Roundup. Held at the volunteer fire company's grounds, the event began in 1956. Participants catch rattlesnakes and bring them to the grounds to be measured. The reptiles are then to be returned to their original location.

The Galeton Rotary sponsors the Woodsmen's Show in August. The event is held at Cherry Springs State Park and features competitions for professional lumberjacks.

Another event that highlights the region's lumbering heritage is the Barkpeeler's Convention held every July at the Pennsylvania Lumber Museum. This event provides living history demonstrations of life during the lumbering era.

During the summer other small community events take place, some official and some unofficial. You can officially enter the Black Forest Fire Company's chili cook-off. If you live in Cammal you can participate in the unofficial 4th of July parade.

Fall brings Germania's Olde Home Day. In addition to food and music, local fire companies compete and greased pig chases are held.

Another event that provides insight into the region's heritage is Wellsboro Rail Days. The region's rail line provides transportation for goods extracted from the watershed, as well as goods needed within the watershed. More information relating to the rail heritage can be found above in the recreation section and below in the history section.

The Holiday season is a time for local communities to show off their finery. Wellsboro's Dickens of a Christmas provides an opportunity to see many local artists and their works, as well as food vendors, and costumed carolers. Galeton also holds a holiday event, the Galeton BPS Holly Trail House Tour.

D. Historical

The information in this section is based on "Season's Along the Tiadaghton," "History of Lycoming County," "History of Morris Township," "Sunset on Susquehanna Waters," and state park websites.

Pine Creek's watershed is far changed from the landscape that Native Americans and early European settlers faced. The climax forest that developed after the ice age was made up of trees so large that in 1745 Bishop Spangenberg wrote that, "This is a wilderness where one does not see the sun all day long." (Owlett) The size of the trees, the closeness of the canyon walls, and the lack of sunlight caused the Native Americans to believe that evil spirits lived in the upper gorge.

This difficult terrain left the area mostly unexplored until after the Revolutionary War. The creek had too many rapids and trees across it to make exploration easy or safe. These hazards forced early explorers to use the Native American's paths. One path, the Pine Creek Path, connected the West Branch Susquehanna River with the Genesee River. This path is presumed to have been used by the Iroquois, but the exact course of the trail is a matter of debate.

Although Native Americans did not frequent the canyon, the other areas of the watershed were used for hunting and travel. The Pennsylvania Historical and Museum Commission provided data on the pre-historic and historic sites within the watershed. They provided this information on August 4, 2004, using the state watershed plan code for the watershed, 9A.

Sites in watershed	37
Datable prehistoric sites	23
Upland datable sites	2
Prehistoric sites with features	9
Stratified datable prehistoric sites	1
Historic sites	7

In conveying the data, the Bureau for Historic Preservation noted that the "watershed is not very well known. There has been very little survey in this portion of the state. That means that we would be likely to recommend survey in any area that has the characteristics of a likely place to have [a] site (high probability areas)."

The Pine Creek watershed is part of the Pennsylvania Lumber Heritage Region and is home to the Pennsylvania Lumber Museum. The museum, located outside of Galeton, provides visitors with an opportunity to see a variety of structures relating to tree felling and processing, as well as supporting industries, such as blacksmithing.

The museum grounds are also home to a CCC cabin. The Civilian Conservation Corps was instrumental in creating or improving many of the roads and recreational facilities currently found in state parks and state forests

During the lumbering era, loggers would float log rafts, and later just logs, down the creek in the spring. The rafts would often arrive at Jersey Shore or Williamsport and the loggers would walk back home. It is thought that the path along the creek they traveled may be the Pine Creek Path used by the Native Americans. Sometimes the rafts would go as far as Columbia, Pennsylvania.

A by-product of lumbering was the tanneries. Before the 1870s there were many small tanneries in the area. Eventually these tanneries merged to create some of the largest tanneries in the world. At one time The Union Tanning Company operated tanneries on Pine Creek, Cedar Run and Babb Creek. The facility on Babb Creek, known as Hoytville was the largest in the world (Owlett).

Tanneries used the bark from hemlock trees to produce tannin. The tannin was then used to treat leather. The industry needed a lot of bark and created a lot of waste. Newspapers covered the chemical spills from the tanneries and their impacts on the local waterways, such as Pine Creek.

Once the hemlock was gone, the tanneries shut down. Leetonia, Manhattan, and Hoytville quickly became ghost towns.

The boys and men of the Civilian Conservation Corps shaped the Pine Creek watershed and created many of the trails and facilities used today for recreation in the area. The CCC, originally named the Emergency Conservation Work, provided unmarried, unemployed men between the ages of 18 and 25 (later this was changed to 17 to 23, or a WWI veteran) with uniforms and three meals a day in exchange for work.

The US Army ran the camps, with local "experienced" men acting as foremen to the crews. The men fought forest fires, planted trees, built roads, buildings, picnic areas, swimming areas and created state parks. Pennsylvania had 113 camps, second only to California in the total number of camps. Each camp averaged about 200 men.

In 1935 a similar program was created for local people who would continue to live at home. The Works Progress Administration (WPA) continued the CCC work of building roads, buildings, retaining walls and bridges. Many of the facilities built by the WPA and CCC are found in Pennsylvania's state parks.

A little more information was available specifically about Camp S-124, Company 365. The camp published a newsletter known as "The Cammal's Hump." The camp was located one-quarter mile up Trout Run, a tributary to Pine Creek at the village of Cammal. According to their newsletter, the 365th Company was organized with about 200 men at Fort Washington, Maryland in May 1933. Most of the company's men were from the coal regions of Pennsylvania.

The men reached their camp via Slate Run since there was no bridge across Pine Creek at Cammal. They arrived at Slate Run at 4:00am on Memorial Day, May 30, 1933. From Slate Run they traveled to the Coudersport Pike, and then down Trout Run to their new home. When they arrived the camp was made up of tents, and the men eventually constructed the buildings.

Camp S-124 received a radiogram on Friday, October 18, 1935 that ended their stay at The Cammal's Hump. They were to abandon the camp and move to the eastern shore of Maryland on or about October 31.

The men in the group photograph are the foremen of CCC Camp Cammal, S-124, Co. 365. The bottom row (left to right): Captain Lovelace, Harold Coolidge, Duke Wellington Elliott, Truman Campbell and Bruce Campbell. The top row standing (left to right): George Durrwachter, Charles M. Thompson, Grover Stradley, Ernest Ross, and Bill Watt. (The photograph is provided courtesy of Dr. George and Shirley Durrwachter, son and daughter-in-law of the George Durrwachter in the photo.)

During World War II many residents of the watershed served in the armed forces. Many more did what they could to support the war effort at home. During the time a soldier who was born and raised in the watershed served and was held as a prisoner of war in the Philippines, German prisoners of war were held in the watershed.

Lieutenant Michael Wolf was born in Waterville in 1919. After graduating from Jersey Shore High School and Susquehanna University he joined the Army Air Corps and was attached to the 91st Bombardment Squadron in the Philippines. With the Japanese invasion of the islands, he became a prisoner of war. He survived the Bataan Death March to become a prisoner at Imperial Japanese Philippine Prison Camp Number 1. On

December 13, 1944 he was loaded onto the *Oryoku Maru*. The next day the ship, bound for Japan, was sunk by the United States in Subic Bay. The ship was not marked to indicate it was carrying prisoners of war. Fifty-seven years later, the Lieutenant Michael Wolf Bridge over Little Pine Creek was dedicated in his hometown, the village of Waterville.

At the same time Lieutenant Wolf was being held by the Japanese, German prisoners of war were being sent to Lyman Run. The current maintenance area of Lyman Run State Park served as the prison camp. This area had been part of the CCC camp and was converted to a camp for prisoners of war. The Potter County Historical Society lists the dates the camp was used as 1942 to 1944.

1. Timeline

The following timeline is not comprehensive. It is intended to capture as many key dates as possible to the watershed's history…

1672
King Charles II gives the Colony of Connecticut a charter for the area of what is now the Pine Creek watershed.

1691
William Penn is given a charter for Pennsylvania. Part of which covers the land given to Connecticut in 1672.

1754
Native Americans sell the Pine Creek watershed to Connecticut.

1768
"The New Purchase" treaty is signed, selling the land across northern Pennsylvania as far as the "Tiadaghton" to Pennsylvania. This later causes a bitter dispute when the Native Americans claim that the Tiadaghton refers to Lycoming Creek, not Pine Creek.

1773
Squatters began settling the north side of the river west of Lycoming Creek in 1768. These squatters were outside the enforcement powers of the legal system which was in place. They established their own system of justice, The Fair Play System. A committee of three elected commissioners was known as the Fair Play Men.

James Alexander settles at the mouth of Tomb's Run. He flees in 1778 during the Great Runaway, but returns in 1784.

1778
All of the settlers in the West Branch Valley flee to Fort Augusta in Sunbury. The British and Iroquois forces destroy the settlements and fields after the settlers leave. The evacuation becomes known as The Great Runaway.

1782
The Decree of Trenton settles the land dispute between Pennsylvania and Connecticut over what is now the northern tier of Pennsylvania.

1784
With the Treaty of Fort Stanwix, Pennsylvania purchases the remaining lands west of the Tiadaghton from the Native Americans. Keep in mind that this land was previously sold to Connecticut

John English, an Aide-de-Camp to General Washington, settles at English Island (now Sugar Island). This is 12 miles up the creek from its mouth.

1785
The Fair Play System, established in 1773 is disbanded.

Lycoming Township and Pine Creek Township are formed. The two townships were very large. Over the next 100 years many other townships are formed out of these original townships.

1792
William Bingham, a United States Senator from Philadelphia, purchases one million acres. The property is entrusted to Benjamin Wistar Morris to be sold through the Pine Creek Land Company.

The first sawmill in Cummings Township is constructed three-quarters of a mile up Little Pine Creek.

1793
A crude sawmill is constructed at the mouth of what is known as Gamble or Vicker's Run. This is the first sawmill in what is now Watson Township.

1794
James King and a Mr. Manning discover Big Meadows (the area where Pine Creek turns south and Marsh Creek enters Pine Creek).

1795
Benjamin Lamb is born to Jacob and Jane Lamb. Benjamin was born at the family's cabin at the mouth of Slate Run. He is the first baby of European descent born in the valley

1796
Jacob Lamb constructs a grist and saw mill at Slate Run.

Lycoming County is formed out of Northumberland County. The area that makes up present day Tioga County was named Submission Township at the time of Lycoming County's creation. Shortly afterward, it is renamed Tioga Township.

1798
The General Assembly declares Pine Creek a public highway on March 16.

1799
John Norris settles and builds a mill at the mouth of Little Pine Creek. This sawmill was built as Norris acted as an agent for the Pine Creek Land Company

1800
Sampson Babb begins operating a small sawmill on Babb Creek (near Morris).

John Norris settles 19 miles above the mouth of Little Pine Creek.

1803
John Norris builds a sawmill approximately 19 miles above the mouth of Little Pine Creek.

1804
Tioga County is formed out of Lycoming.

Potter County is formed out of Lycoming.

Josiah Furman is the first permanent settler at present day Ansonia.

William Furman settles on Pine Creek in Gaines Township. The location becomes known as Furmantown.

1805
A colony of about 40 English families settles between the first and second forks of Pine Creek. The group settles on an area of approximately 110,859 acres. (Note: some sources have the date of 1806, not 1805)

The village of Shippen (present day Ansonia) is formed.

1806
Wellsboro is decided on for the county seat. The plan was to lay the town out in the same manner as Philadelphia.

Sampson Babb begins operating a flutter-wheel sawmill on Babb Creek.

School sessions begin at Black Walnut Bottom.

John Norris and his wife open a women's seminary, the Norris Seminary, in a house they lease from Philip Moore. The seminary is located approximately 19 miles above the mouth of Pine Creek.

1808
Joseph Williams lays out a road from Tioga County to McKean County, following Pine Creek through part of Potter County.

1809
James Steele builds a cabin at Big Meadows.

1810
The only township in Potter County with population is Eulalia Township which is outside the study area.

1811
Enoch Blackwell and his son move from their original site on Oregon Hill to the banks of Pine Creek. Blackwell was part of the English Settlement, arriving in the area in 1805 or 1806. He formed the village of Blackwell.

1812
The Pine Creek Road is laid out.

Samuel M. Losey moves into Pike Township, Potter County. He is the first resident of the township.

1813
The Tioga County court system begins operating.

1814
A pig iron furnace is constructed at Upper Pine Bottom. The furnace lasted until 1817 when the owners gave up. It was taking one to two days to transport the ore from the Coudersport Pike to the furnace.

1815
Brown Township is formed from Mifflin and Pine Creek Townships.

1817
An iron furnace is built on Furnace Run. In 1820 or 1821 the furnace is moved.

1818
The first hotel is built in Cherry Springs.

1823
David Kilbourne builds a sawmill in Pike Township about 80 rods from the Tioga County line.

1824
Morris Township is organized out of Delmar Township.

1825
Mary Landis constructs a mill on Babb Creek just above Blackwell.

1828
The first school house in Cummings Township is built one and one-quarter miles below Waterville, along the creek.

1832
A large flood hits the area, damaging many of the sawmills and taking some out of production.

Cummings Township is formed out of Mifflin and Brown Townships.

1833
A sawmill is constructed opposite Robinson's Island.

1837
Gaines Township is formed out of Shippen Township.

1840
Over 452 log rafts, containing twenty-two million board feet of timber from Tioga County, float the creek.

Potter County begins to gain a reputation as "Horse Thief Heaven." Horses were stolen along Pine Creek, taken further into the county, and painted to avoid detection.

Porter Township is created out of Mifflin Township.

1844
A group of Mormons settle just over the county line from Oregon Hill. Their settlement is named Nauvoo.

1845
Watson Township is formed out of Cummings and Porter townships.

1852
Potter County votes its own prohibition of alcohol

1856
Pine Township is formed out of Brown, Cummings, and Cogan House Townships.

1857
Furmantown is renamed Gaines. This is in honor of the Gaines Coal and Coke Company.

1859
Lemuel Sherman and William Ansley built a gristmill on the north bank of Pine Creek in Galeton. During the first four months, the mill ground over 6,000 bushels of grain.

1861
McHenry Township is formed out of Cummings and Porter Townships.

1870
The Pine Creek Railroad Bill passes both houses of the state legislature.

1871
The General Assembly passed an Act on March 28 that allowed the building of dams, "the removal of rocks, logs and driftwood and tree bars, the widening and deepening of the channel and the general improvements for the purpose of floating timber thereon." This allowed loggers who 'improved' the stream to charge a fee to those upstream of them who used the improved stream

1878
The Tidewater Pipeline is laid. This is the first pipeline in the United States to pump crude oil overland. The Pipeline ran through part of the study area.

1879
The last log raft floats down Babb Creek

A massive tannery is built along Pine Creek in Galeton - the Gale Tanning Company.

1882
Nearly 700 tons of coal was mined daily at the Antrim mines.

1883
A railroad from Arnot to Hoytville, the Arnot & Pine Creek Railroad, is completed.

1884
The Pine Creek Railroad is completed.

R.W. Clinton builds the first big hemlock sawmill in Galeton.

1886
The last log raft from Galeton goes down Pine Creek

Paducohi is built. This is perhaps the first summer camp built in the valley. The camp was built above Waterville by four families from Williamsport.

James B. Weed & Co. builds its sawmill in Slate Run, having a capacity of 100,000 board feet of logs per day – it ceased operation in 1910.

1888
The log driving season of 1888-1889 had over ninety million board feet of logs entering Pine Creek above Galeton.

1889
A flood on the river destroys many of the mills and the log boom at Williamsport, the destination for much of the timber floated down Pine Creek.

1891
Following is a count of schools in the Pine Creek Valley

Brown Township	6
Cummings Township	5
McHenry Township	4
Watson Township	3

1893
The Elk, Union, Wellsboro and Penn Tanning companies merge to form the United States Leather Company.

The Fish Commission decides to stock a limited number of European or brown trout in Morris Township streams.

1894
Wellsboro Electric is established under state charter.

1895
The old Clinton hemlock mill is converted into a planing mill. A huge 3-story, steam powered sawmill is also built in Galeton. The mill was the only one in Pennsylvania with three bandsaws capable of turning out 360,000 feet of lumber a day using two shifts of 11 hours.

The Penn Wood Company of Williamsport builds a kindling factory in Galeton. A tramway carried the small pieces of lumber from the big sawmill across the creek to the factory. At the factory more than 100 workers and children, known as “splinter pickers” cut the wood into two inch lengths and bound them into a circular bundle about 12 inches in diameter. This was then tied with waxed string which could serve as a wick. The bundles were shipped to New York City and other markets.

Wood & Childs Lumber Co. opens a sawmill in Cammal, supplied with logs by their Cammal and Black Forest Railway. Cammal was also the site of another logging railroad, the Oregon & Texas Railroad (1892-1900).

1896
Galeton is incorporated out of Pike Township.

1898
E.L. Dieffenbacher builds a barrel factory in Galeton.

R.M. Whitney Company, a wagon wheel hub factory, opens.

1899
An oil well at Gaines shoots oil 200 feet in the air, causing pollution in Pine Creek.

1900
The United States Leather Company now controls most of the hemlock lands in the Commonwealth.

900 acres along Cedar Run is purchased by the Commonwealth for what will become the Tioga State Forest.

1902
The Schwarzenbach Brewing Company moves to Galeton from Germania, Pennsylvania. While Potter County was legally dry by local law, the brewery had a special manufacturer's license permitting sale of beer in gallon or larger quantities for distribution outside the county.

Along with the brewery came its employees who made up the Germania Band. Marcus J. Handwerk combined this band with several other groups in town to form the Galeton Band.

1903
Tioga Coal Company is formed to mine Rattler Mountain.

1904
A large log jam forms on June 14. The jam on Pine Creek was over two miles in length.

Pennsylvania Joint Land & Lumber Co. sells 100,000 acres (including land in the Pine Creek watershed) to the Commonwealth of Pennsylvania.

1905
The last log drive on Pine Creek is held in the spring.

1908
The Laurel Hotel in Galeton is "Carrie Nationalized" on June 3, when a group of temperance women threw stones and broke three windows.

1909
Tioga Coal Company closes the Rattler Mine.

The last log drive goes down Little Pine Creek.

1910
Galeton reaches its peak population of 4,027 residents. During the 2000 census, the population was 1,325. This is the only town in the county to reach a population above 4,000.

1915
The Galeton mill that once produced 360,000 feet of lumber a day is closed.

1916
John Dunlap's Silk Mill opens in Galeton. By the end of the year, the mill is running 24 hours a day with about 50 employees.

The Great Galeton Fire breaks out on January 19. Due to strong winds, the fire spreads throughout the business district. A total of 27 structures were destroyed.

1919
Prohibition becomes law nationally and the Schwarzenbach Brewing Company closes.

Early 1920s
The octagon-shaped Band House in Galeton's Park is built by Handwerk and Henry W. Lush.

1921
The Schwarzenbach Brewing Company reopens to produce carbonated sodas, ice cream, near-beer and ice. Illegal beer continued to be brewed and shipped twice a week in boxcars marked "POTATOES." Railroad crews were paid to move the barrels at night.

1922
Leonard Harrison donates 140 acres to the Commonwealth of Pennsylvania. This land, known as "The Lookout", forms the basis for the Leonard Harrison State Park on the Pine Creek gorge.

The State Forest Commission turns down the application by Morris Run Coal Company to mine State Forest lands in Tioga County.

1923
Tioga Wood Products Company, also known as the Acid Factory, opens in Morris Township.

1924
The Rattler Mine re-opens.

1926
Route 6, the Roosevelt Highway, is built.

1927
The Penn Leather Company, formerly the Gale Tanning Company, closes.

1928
Federal agents raid the brewery (formerly the Schwarzenbach Brewing Company) in Galeton. The beer found is siphoned into Pine Creek. It's said that many happy residents filled containers with the illegal beverage by standing along the stream bank.

1932
An effort is made to re-open the Penn Leather Company, but fails. There is overwhelming opposition for fear it will further pollute Pine Creek.

1933
Civilian Conservation Corps Camps established:

Camp Number	Closest Railroad	Possible Camp Name
S-82**,** Company 312 & 1357	Waterville	Waterville
S-90, Company 328 & 3308	Cedar Run	Tioga
S-88, Company 342	Galeton	Lyman Run
S-81, Company 364	Slate Run	Francis
S-124, Company 365	Slate Run	Cammal
S-138, Company 384	Blackwell	Dixie Run
S-129, Company 386, 5456 &1357	Waterville	Little Pine
S-129, Company 1357	Waterville	Little Pine
S-91, Company 1384 & 5486	Galeton	Watrus

The Civilian Conservation Corps starts developing areas near the Pine Creek Gorge for the state park system.

CCC Camps on what is now the Tioga State Forest are established at Asaph, Watrus, Leetonia, and Dixie Run.

CCC Camp 138 at Dixie Run is established. The men worked on many projects, including building Love Hollow Road, Clay Mine Road and Mine Hole Road.

CCC Camp S-129 is built. The crew worked that year to build a small picnic area along Little Pine Creek.

CCC Camp S-88 is built in what is now the maintenance area of Lyman Run State Park.

1935
Civilian Conservation Corps Camps established:

Camp Number	Closest Railroad	Possible Camp Name
S-155, company 1354	Ansonia	Darling Run

Note: this company came from Camp S-92 near Marsh Creek

Camp Elliott, at Cherry Springs, constructs a 40-acre airfield. The camp was not part of the CCC System, but served the same function.

1936
Civilian Conservation Corps Camps established:

Camp Number	Closest Railroad	Possible Camp Name
S-136, company 5437	Galeton	Cherry Springs

1937
CCC Camp S-129 is closed. The land eventually becomes part of what is now Little Pine State Park.

1940s
The area that had once served as CCC Camp S-88 at Lyman Run is used as an internment camp for German prisoners of war during World War II.

Birch stills are operated on the Tioga State Forest.

1942
The Galeton Production Company opens in November. The company is a defense industry manufacturing proximity fuses, TV tuners and some 30,000 electronic tubes daily.

1950
The flood control dam at Little Pine State Park is built. The dam is dual purpose, not only for flood control, but also for recreation.

1952
The Galeton VFW Post's crack rifle drill team wins the VFW national championship for the second year in a row. They also march in President Dwight D. Eisenhower's inauguration parade.

1959
The First Woodsmen's Carnival is held at Cherry Springs.

The Rattler Mines close the deep mines.

1967
The Susquehannock Trail System is created by the Susquehannock Trail Club. Fire trails built by the CCC in the 1930s make up 85% of the trail system.

1968
The Pine Creek Gorge is designated as a registered National Natural Landmark.

1977
The Robinson House at 120 Main Street, Wellsboro, is listed on the National Register of Historic Places.

1978
The suspension bridge over Little Pine Creek at English Center is listed on the National Register of Historic Places.

1979
The Tioga-Hammond Dam is completed.

1987
The CCC built facilities at Colton Point State Park and the Cherry Springs Picnic Pavilion are added to the National Register of Historic Places.

1988
The bridge over Pine Creek, north of Slate Run, is listed on the National Register of Historic Places. The bridge was built in 1890 by the Berlin Iron Bridge Company of East Berlin, Connecticut.

Another bridge over Pine Creek, this one near Jersey Shore and the Tiadaghton Elm, is also added to the National Register.

The railroad along Pine Creek from Jersey Shore to Wellsboro Junction is abandoned.

1991
The Robinson-Jesse House at 141 Main Street, Wellsboro and the Wellsboro Armory at 2 Central Avenue, are listed on the National Register of Historic Places.

MANAGEMENT OPTIONS

Introduction to Management Options

Management options are suggestions to improve the quality of life within the watershed. They are non-regulatory in nature and may be used by any citizen, group, or agency. Potential partners are groups with the resources best suited to assist in meeting the objectives. Potential funding sources identify avenues through which the objectives may be financed. The groups listed as potential partners or potential funding sources are suggestions and should not be limited to the identified groups due to ever-changing circumstances.

The options were derived from correspondence, comments, issues, and concerns identified by local citizens throughout the planning process. The watershed community, through comments, interviews, and the completion of surveys, has provided the basis for the management options. This matrix of options includes recommended approaches, potential partners, and potential funding sources.

This section of the plan is intended to be used by communities in the Pine Creek watershed including the public, municipal officials, watershed associations, businesses and other groups of citizens coming together to solve particular problems and working on community development. It can be used to not only identify potential sources of funding but as a source of support for grants and other funding. We hope in some small way these management options can be used to help citizens explore the potential for improving the Pine Creek watershed.

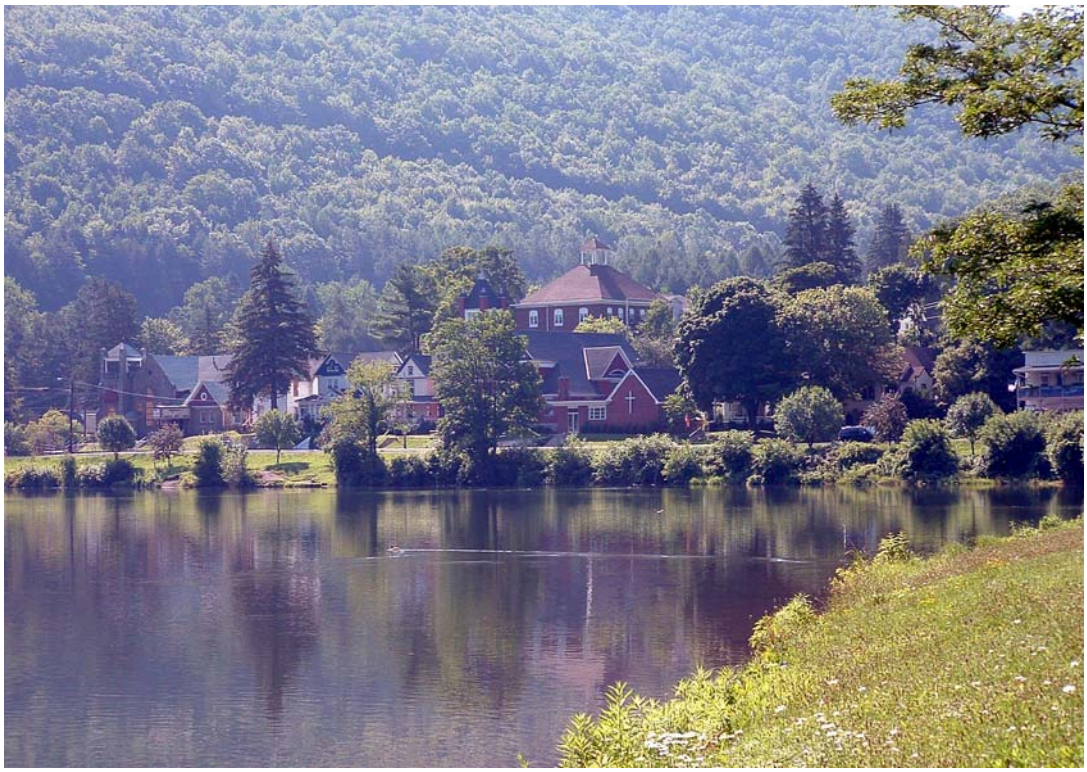
As we all are painfully aware, the devil in any plan is in the details of implementation. The Pine Creek Watershed Rivers Conservation Plan is no different. The Steering Committee labored for many hours developing as comprehensive a list as we could to address many of the issues identified during the two years we worked on the various sections of the plan. Each subcommittee was charged with including as many options as possible under their specific category of Land, Water, Biological, Cultural and Recreation. Keep in mind they are not complete, not conclusive and may overlap somewhat.

We attempted to sort these management options according to the major sections of the plan. In addition, we tried to “fit” them into broad topics of Conservation and Natural Resources, Economic Development, Education, Flooding and Floodplain Management, Historic Preservation, Planning and Zoning, Sports and Recreation, Viewscapes, Water Resources and Water Safety. So if you are working on land use issues and want to find out what we felt was important, based on our research and public comment, navigate to the section on land resources and identify some of the topics pertinent to your project. In addition you will find suggestions on what was identified as important, including the specifics of what steps are necessary to address the issue and potential source of partners and funding. This list is by no means exhaustive but we hope it is useful as a starting point.

ACRONYMS Used in Management Options for Pine Creek Watershed Rivers Conservation Plan

BMP	Best Management Practices
CBF	Chesapeake Bay Foundation
CCPP	Community Conservation Partnership Program
CD	Conservation Districts
CNHI	County Natural Heritage Inventory
CREP	Conservation Reserve Enhancement Project
CVI	Canaan Valley Institute
DAR	Daughters of the American Revolution
DCED	Pennsylvania Department of Community and Economic Development
DCNR	Pennsylvania Department of Conservation and Natural Resources
DEP	Pennsylvania Department of Environmental Protection
EMRC&D	Endless Mountains Resource Conservation and Development
EPA	U.S. Environmental Protection Agency
EPCAMR	Eastern Pennsylvania Coalition of Abandoned Mine Reclamation
FEMA	Federal Emergency Management Act
LUPTAP	Land Use Planning and Technical Assistance Program
N/D	Not dependent upon funding
NFIP	National Flood Insurance Program
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NPC	Northcentral Pennsylvania Conservancy
NPS	National Park Service
NRCS	United States Department of Agriculture Natural Resource Conservation Services
ORV	Off-Road Vehicles
OSM	Office of Surface Mining
PABS	Pennsylvania Biological Survey
PACD	Pennsylvania Association of Conservation Districts
PA Green	Susquehanna Greenway Partnership
PANA	Pennsylvania Advocates for Nutrition and Activity
PASA	Pennsylvania Association for Sustainable Agriculture
PASDA	Pennsylvania Spatial Data Access
PCHPG	Pine Creek Headwaters Protection Group
PCPA	Pine Creek Preservation Association
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PENNTAP	Pennsylvania Technical Assistance Program
PENNVEST	Pennsylvania Infrastructure Investment Authority
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PHFA	Pennsylvania Housing Finance Agency
PHMC	Pennsylvania Historical and Museum Commission
PMPEI	Pennsylvania Municipal Planning Education Institute
PNDI	Pennsylvania Natural Diversity Inventory
PSATS	Pennsylvania State Association of Township Supervisors

RUS	United States Department of Agriculture Rural Utility Service
SMART	Students Monitoring Aquatic Resources Together
TNC	The Nature Conservancy
TDR	Transfer Development Rights
TU	Trout Unlimited
UCC	Unified Construction Code
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WREN	League of Women Voters Watershed Resources Education Network



Management Options for Pine Creek Watershed Rivers Conservation Plan

Issues, Concerns, Constraints, Opportunities

(Refer to text in Section II of Pine Creek Conservation Plan; numbers are not meant to signify any rank)

PA WILDS

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Integrate analysis and implementation of management options from other sections of the plan from a regional and state perspective	**A.** Develop consensus and adopt and develop a holistic approach to capacity building and support of gateway communities **B.** Use GIS and Internet to develop interactive maps of the region **C.** Link to infrastructure planning of county and state **D.** Discuss & consider unforeseen consequences of our actions **E.** Carefully study any proposed marketing campaign to: a. target appropriate audiences, b. determine impacts on communities, c. focus on gateway communities	PASDA, USGS, DEP, DCNR, County Planning Commissions & Municipalities	LUPTAP, USGS, DEP, DCNR, County Planning Commissions & Municipalities
2. Develop and monitor indicators of carrying capacity of the watershed	**A.** Provide support and funding to planning commissions - regional, county and multi-municipal **B.** Explore methods for low impact development` and best management practices in the watershed	Colleges and Universities, DCNR, DEP, PASA, PACD, CCPP, CD, DCED, LUPTAP,	DCNR, DEP, PASA, PACD, CCPP, DCED, LUPTAP, SEDA-COG, PENNVEST, PennDOT

C. Assist communities in developing a vision of their future and that of the watershed to foster development and protection of community character and enhance and create appropriate infrastructure	SEDA-COG, PENNVEST, Reg. Planning & Development Commissions, Co Planning Commissions	

Pine Creek Trail (Rail-Trail)

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Frame Pine Creek Trail in the state forest management and greenway plans	**A.** Develop timeline and identify funding to support DCNR design, construction and operation of the trail	DCNR, PA Green, PennDOT	DCNR
2. Coordinate Pine Creek Trail with PA WILDS initiative	**A.** Bring ALL agencies: county, municipal, state resource, and PennDOT to consensus on the process, money and effort expended **B.** Insert terminus (north and south) into gateway communities **C.** Address issues and opportunities with community leaders	DCNR, PA Green, PA WILDS	DCNR

Chesapeake Bay Tributary Strategy

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Partner with Conservation Districts on strategy development and implementation	**A**. Educate the public and clarify goal of the strategy **B.** Identify and coordinate efforts to avoid duplication and redundancy **C.** Clarify costs and benefits and share responsibility	CD, CBF, DCNR, DEP, EMRC&D	CBF, DCNR, DEP

	D. Improve on best management practices concept to set the stage for sediment and nutrient reductions **E.** Explore links of tributary strategies and community development		

Pine Creek Valley Emergency Services

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Determine if the emergency services available in the Pine Creek Valley are adequate.	**A**. Track the usage of emergency services **B**. Research how emergency services respond in similar areas **C.** Assess those areas' solutions to their problems	Emergency Mgt Agencies, County Planning Commissions, PEMA, Local Colleges	PEMA, Municipalities, PA WILDS
2. Provide residents and visitors with appropriate levels of emergency service.	**A.** Study the ability of volunteer emergency responders to address the public needs for services in the watershed. **B.** Work to cooperatively implement recommendations from the study. **C.** Determine what mutual aid agreements exist and what agreements are needed. **D.** Discuss and assess the interoperability of the emergency responders in the watershed. **E.** If needed develop an interoperability plan that outlines specifications and standards, as well as a timetable for reaching full	Fire companies, Hospitals, Emergency Management Agencies, County Planning Commissions, PEMA	PEMA, Municipalities, PA WILDS

	interoperability. **F.** Discuss the recommendations from the Senate Resolution 60 Task Force with local legislators and encourage them to work toward implementing the recommendations.		
3. Educate the public about the relative lack of services and delay in response time they may encounter in rural areas	**A.** Encourage that signage and literature (brochures, websites, etc.) which advertise the area and its attractions include information about this issue.	DCNR, PA WILDS, PEMA, Municipalities, Fire companies	DCNR, PA WILDS

Implementing the Plan

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Establish a Pine Creek organization to coordinate programs in the watershed	**A.** Implement the Pine Creek Watershed Rivers Conservation Plan **B.** Use the structure of the Pine Creek organization to facilitate, coordinate, communicate and collaborate on current and future opportunities and issues in the watershed **C.** Act as clearinghouse for strategies or partners and communities in the watershed **D.** Enable municipalities to improve infrastructure and protect natural resources simultaneously	DCNR, DEP, State and local municipalities, CD, PCHPG, PCPA, watershed groups, TNC, NPC, EMRC&D	DCNR, DEP, CD
2. Provide local officials and municipal staff with training	**A.** Develop training on topics and skills needed to implement the plan **B.** Communicate and share	DCNR, DEP, DCED, PSATS, Municipalities	DCNR, DEP, DCED

opportunities to assist in implementing this plan	information on training offered by other groups		

Conservation Easements

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Educate residents, visitors, public officials, landowners and non-landowners about conservation easements	**A.** Public education campaign **B.** Specific education of property owners in key areas	TNC, NPC, CD, County Planning Commissions & Municipalities, Community and Economic Development Entities, Chambers of Commerce, EMRC&D, DCNR, DEP, PGC, NRCS	LUPTAP (DCED), Land Trust Reimbursement Grant Program (PA Dept. of Agriculture), Wetlands Reserve Program (NRCS, USDA), DCNR, PGC, DEP, NRCS
2. Coordinate efforts of the various organizations working to conserve the watershed	**A.** Establish communication network **B.** Schedule yearly meetings to discuss projects underway **C.** Create a network of help and funding sources for landowners to contact to assist with conservation projects **D.** Focus on securing easements in critical areas as identified by studies such as the Natural Areas Inventory		
3. Secure conservation easements on important properties	**A.** Secure funding to assist with transaction costs **B.** Establish endowment to cover the long-term monitoring and legal costs		

Oral History

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Collect oral histories from Pine Creek residents and visitors	**A.** Develop a scope of work that outlines how people would be chosen how their stories would be collected and the format in which the stories would be stored **B.** Create programs that would immediately begin to utilize the histories in educating residents and visitors about the watershed **C.** Store the stories in a way that allows them to be used but also protects them and ensures they can be used for generations	DCNR, Local Colleges, PA WILDS, Senior Citizens Centers, Historical Societies, Libraries	DCNR, PHMC, PA WILDS
2. Develop Pine Creek rooms to display and interpret information about the watershed to educate residents and visitors	**A.** Create a plan for locating Pine Creek Room(s) in the watershed **B.** Look for immediate opportunities to display and interpret information about the watershed, such as in local libraries, in hotel lobbies, at community events **C.** Generate displays and posters that can be used in local businesses, possibly utilizing college students in communication and education programs **D.** Continue to update and upgrade information as new research is done or new opportunities arise	DCNR, Local Colleges, Historical Societies, PA WILDS	DCNR, PA WILDS

Land Resources

(Refer to text in Section III of Pine Creek Conservation Plan; numbers are not meant to signify any rank)

Economic Development

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Ensure that tourism promotion is consistent with county and municipal comprehensive plans and Rivers Conservation Plan (Nature tourism/sustainable tourism)	**A.** Develop a regional marketing plan to assure that tourism occurs at sustainable levels and appropriate locations, and is coordinated with the Rivers Conservation Plan. A low volume, high yield tourism approach is preferable, as recommended by the FERMATA study. **B.** Encourage downtown revitalization for communities. **C.** Create, publish and distribute maps of watershed points of interest, such as the water trail, Pine Creek Trail, greenway, trailhead access points, boating access and campgrounds. **D.** Revive special events such as canoe races and tube floats.	Visitors Bureaus & County and Municipal Planning Commissions, EMRC&D	Regional Marketing Initiative Grant (DCED), New Communities Grant Program (DCED), CCPP (DCNR), Business/Corporate Sponsorships
2. Encourage revitalization that is conducive to maintaining quality communities	**A.** Encourage zoning that protects scenic areas. **B.** Encourage protection of scenic vista areas. **C.** Encourage enhancement of the natural character of the watershed **D.** Encourage appropriate use of floodplain. **E.** Encourage and maintain continued sound agriculture land uses. **F.** Encourage ridgetop conservation within the	County Planning Commissions & Municipalities, Community and Economic Development Entities, Chambers of Commerce, EMRC&D, DCNR, DEP, PGC, NRCS, CD, Penn State	LUPTAP (DCED), Land Trust Reimbursement Grant Program (PA Dept. of Agriculture), Wetlands Reserve Program (NRCS, USDA), DCNR, PGC, DEP, NRCS

	watershed. **G.** Encourage landowners to work with professionals to manage their lands to ensure their sustainability and reduce impacts to the watershed that are inconsistent with the plan **H.** Encourage and assist conservation districts and cooperative extension in working with Mennonite communities to understand the importance of sustainable farming practices	Extension	
3. Adapt to new hospitality needs for nature tourism (i.e. business practices and training)	**A.** Encourage the continued communication and cooperation among visitors bureaus. **B.** Develop an incubator program to assist developing businesses to meet nature tourism needs. **C.** Promote continued cooperation between chambers of commerce, existing businesses, and new nature tourism businesses.	Chambers of Commerce, DCED, Visitors Bureaus, EMRC&D	USDA, Pennsylvania Dept. of Agriculture, DCED, First Industries
4. Local and County officials need to work closely with State officials to ensure that tourism-related development is carried out properly and does not cause adverse impacts on local	**A.** Coordinate communication between local, county and state officials on state programs and state initiatives **B.** Work to ensure all levels of government understand and discuss potential adverse impacts	PGC, Municipalities and Counties, DCNR, DEP, PennDOT, DCED, State officials	N/D

infrastructure and services.			

Planning and Zoning

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Develop resource protection ordinances and amendments	**A.** Encourage municipalities to consider conservation zoning to promote and conserve open space and riparian buffers. **B.** Include natural resource professionals when considering zoning ordinances so landowners can use their natural resources in ways that are consistent with the plan **C.** Encourage conservation of environmentally sensitive areas: mountainsides, steep slopes, wetlands, floodplains, and riparian buffers.	County Planning Commissions & Municipalities, DCNR	LUPTAP, DCED, DCNR
2. Form county and municipal comprehensive plan partnership	**A.** Protect and enhanced the natural, cultural, historical and recreational resources by providing incentives and utilizing multi-municipal, county and regional planning partnerships. For example, a joint municipal zoning ordinance with professional administration. **B.** Encourage growth and development in appropriate areas.	PFBC, DCNR, County Planning Commissions & Municipalities	LUPTAP (DCED)
3. Review and upgrade existing	**A.** Develop land use controls as needed for new	Counties and Municipalities	

zoning ordinances for consistency with this watershed plan and other land use plans.	development. **B.** Provide municipalities with the education, assistance, and resources they need in creating, maintaining, implementing, and enforcing land use regulations and ordinances. **C.** Consider controls for potentially intensive land uses like CAFOs, resort development, oil/gas wells, wind farms and cell towers. **D.** Encourage counties and municipalities to address those creek lots that are in violation of codes or ordinances. **E.** Limit further development in areas designated as "Exceptional Value Watershed". **F.** Educate the public on how to report health and safety violations. **G.** To promote consistent zoning administration through training of zoning officers, permit officers and municipal officials. **H.** Develop a model noise ordinance for use by municipalities, as needed. **I.** Visitors should be made aware that they are entering a special place and asked to respect the rights of residents and visitors to enjoy the peace and quiet of the valley. Signage and website posting are examples of ways to convey this	County Planning Offices, Municipalities PCPA, PCHPG, Municipalities, Visitors Bureaus

	message.		
4. Promote open space easements (including working farms, woodlots, and other natural resource industries)	**A.** Educate landowners within the watershed on the benefits of conservation easements. **B.** Encourage the use of different county funding programs for conservation easement acquisition. **C.** County funding	County Conservation Districts & Land Trusts	Environmental Education Grants (EPA)
5. Explore the use of county bonds and other funding methods for open space, greenway and recreational facilities	**A.** Discuss process and benefits of open space and recreational bonds with county commissioners. **B.** Encourage counties to use open space and recreational bonds.	County Planning Commissions & County Commissioners	N/D

Viewscapes

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Delineate and secure consensus on important viewscapes	**A.** Map all areas of important scenic viewsheds and vistas. **B.** Ask for public input to verify identification of important scenic viewsheds.	County Planning Commissions & Municipalities	Updating County Natural Area Inventories and County Comprehensive plans
2. Recognize viewscapes in official plans and land use control ordinances	**A.** Delineate and secure consensus on important viewscapes **B.** Develop zoning that promotes the protection of scenic areas	County Planning Commissions & Municipalities	

	C. Encourage methods such as conservation design and low impact development, site regulations, and landscape requirements with an emphasis on natural vegetation. **D.** Consider scenic byways designation.		
3. Work to remove litter and illegal dumps from the watershed	**A.** Organize annual clean-up days in each watershed community to promote neighborhood and community pride. **B.** Promote recycling activities.	PA Cleanways & Municipalities	N/D
4. Secure voluntary easements of important viewscapes	**A.** Encourage landowners with key open space properties in the watershed to place their land under a conservation easement.	Land Trusts, County Conservation Districts & Ag Preservation Boards	N/D

Waste Management

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Evaluate the effectiveness of the "carry in-carry out" trash policy and impacts of litter and other solid waste disposal.	**A.** Manage joint use solid waste facilities on a cost-share basis with the state	Rail-trail Advisory Committee, DCNR	DCNR, DCED, PennDOT, Municipalities
2. Develop and update existing solid waste mgt ordinances	**A**. Prosecute violations **B.** Encourage use of county solid waste ordinances **C**. Encourage recycling **D.** Provide education	County Planning Commissions, Municipalities, DCNR, PGC, PFBC, PennDOT	

	about litter and waste regulations		
3. Increase refuse collection	**A.** Consider joint management of dumpsters **B.** Consider buffers around dumpsters **C.** Collect white goods periodically	Municipalities	
4. Evaluate need for additional public sanitary facilities	**A.** Provide as needed **B.** Improve restroom facilities at private businesses	Municipalities, Visitors Bureaus, DCNR, DCED, PennDOT Pvt businesses	DCNR,DCED, Municipalities, Private interests

Privately-owned Forest Land

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Facilitate consensus on management of natural resources	**A.** Develop program for use in beginning the dialog	DCNR, Conservation Districts, Forest Landowner Assns	U.S. Forest Service, Hardwood Development Council
2. Develop watershed based data on private forests	**A.** Intensify inventory and analysis of data to a watershed basis	U.S. Forest Service, DCNR, Hardwood Development Council	U.S. Forest Service, DCNR, Hardwood Development Council
3. Convene a Forest Summit	**A.** Align partners, identify needs, develop programs and policy	Forest Landowner Associations, PA Forestry Association	Hardwood Development Council, PA Forestry Association

Water Resources

(Refer to text in Section IV of Pine Creek Conservation Plan; numbers are not meant to signify any rank)

Water Resources

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*

1. Implement better storm water management practices	**A.** Encourage development of a multi-county Act 167 approved storm water management plan for the Pine Creek watershed. **B.** Revise storm water management ordinances to reflect DEP's current policy for groundwater recharge and post-construction stormwater management. **C.** Require new developments to implement best management practices for groundwater recharge where appropriate, including use of pervious surfaces and ground water infiltration techniques.	County Planning Commissions, DEP & Municipalities	LUPTAP (DCED), DEP
2. Identify/reduce the effects of abandoned mine drainage within the watershed	**A.** Continue restoration efforts within the Babb Creek sub-watershed and expand to other impacted sites in the watershed, for example Otter Run **B.** Seek funding sources for continued operation, maintenance, and replacement of AMD treatment systems as their lifespan is exceeded. **C.** Continue monitoring within the Babb Creek sub-watershed to document effectiveness of treatment facilities. **D.** Explore re-mining to improve the quality of AMD discharges where appropriate.	Babb Creek Watershed Association, DEP, PCHPG, PFBC, Mining Companies, EPCAMR	Growing Greener (DEP), EPA-319, OSM, EPCAMR, TU Coldwater Heritage Program

3. Reduce impacts from other non-point sources of pollution in the watershed, including sediment, nutrients, acid deposition, others	**A.** Conduct assessments to identify all non-point pollution sources in the watershed, including all major sub-watersheds. **B.** Develop restoration plans to address identified problems. **C.** Encourage the installation of practices or projects to reduce negative impacts from non-point pollution sources through participation in grant and conservation programs, and regulations. Examples include but are not limited to: practices to reduce sediment and nutrient runoff from agricultural operations, improvements to dirt and gravel roads, stream bank stabilization projects, participation in sustainable forestry initiatives, etc. **D.** Continue efforts to address pollution impacts from abandoned oil and gas wells.	DEP, DCNR, Local Colleges, Watershed Associations, CD, Municipal Governments, CBF, EMRC&D	Growing Greener (DEP), CBF, TU Coldwater Heritage Program, USDA, NRCS, DCNR, Pennsylvania Dept of Agriculture (DECD)
4. Evaluate, protect, and restore riparian buffers and wetlands throughout the watershed	**A.** Establish riparian conservation zones throughout the watershed such as by overlay mapping. **B.** Identify areas that need riparian buffer improvement throughout the watershed and encourage landowners to install buffers. **C.** Identify and map current wetlands within	County Planning Commissions, CD, Watershed Associations, NRCS, NPC, Private Landowners, EMRC&D, CBF, USDA	

	the watershed using a standard classification system. **D.** Identify wetlands that could use enhancement or restoration. **E.** Special consideration should be given to restoration and protection efforts of the "Muck" (Marsh Creek), while still allowing/encouraging agricultural use of the areas **F.** Encourage the development of permanent easements or participation in programs such as CREP to protect riparian areas and wetlands. **G.** Encourage landowners to participate in stream bank fencing programs where livestock is present near the stream.		
5. Promote improved management of point source pollutants through regulatory and permit requirements	**A.** Encourage improvements and upgrades to municipal and industrial waste water treatment facilities where needed or as innovative technologies become available for better treatment. **B.** Evaluate the problem of combined sewer systems and determine the most appropriate solution, one alternative being separate storm water and sanitary sewers.	Municipal Governments, Waste Water Authorities, Industries, DEP	
6. Protect, monitor,	**A.** Develop a monitoring	Public Water	WREN grant,

and maintain drinking water supplies	program for private well owners to test at least once annually for bacteria. **B.** Educate the public on the causes of potable water supply contamination and symptoms of infection with waterborne pathogens. **C.** Encourage wellhead and source water protection measures to protect the quality and quantity of public water supplies. **D.** Encourage water treatment system upgrades where needed and as new technologies become available. **E.** Encourage efforts to address the problem of the improper location and construction of private wells, which can lead to contamination of water supplies	Supplies, Municipal Governments, PA Rural Water Association, CD, Well Drillers, DEP, DCNR	PENN VEST
7. Determine if current on-lot sewage systems are effective and consider new or alternative treatments	**A.** Investigate failure of on-lot septic systems. **B.** Promote innovative and affordable sewage treatment options. **C.** Encourage through education and agency cooperation, maintenance and upgrade of failing septic systems.	Sewage Enforcement Officers, DEP,	National Small Flow Clearing House
8. Balance water needs within the watershed and protect critical uses	**A.** Work with the Upper/Middle Susquehanna Water Resources Regional	Upper Middle Susquehanna Water Resource	

during droughts	Committee in development of the regional component of the ACT 220 State Water Plan, specifically to include areas of special protection within the watershed and in determination of a water budget. **B.** Create a drought water use plan and encourage enforcement of drought regulations. **C.** Establish a drought and/or flood trigger system in which appropriate emergency measures will be activated. **D.** Develop minimum and optimum flow criteria, upgrade and improve stream flow monitoring. **E.** Determine if enough water level gauges exist within the watershed and if not, work to add additional gauges.	Regional Committee, Emergency Management Agencies, Public Water Suppliers, USGS, Private Businesses, Counties	
9. Evaluate and upgrade the Water Quality Classification of Pine Creek between Blackwell and Waterville	**A.** Upgrade the State Water Quality Classifications within the watershed as merited. **B.** Refer to the successful cleanup of Babb Creek.	DEP, PCHPG, PCPA, County Planning Commissions, PFBC	DEP

Flooding & Floodplain Management

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*

1. Identify flood prone areas	**A.** Complete detailed floodplain studies along tributaries in the Pine Creek corridor that have had no previous flood studies completed. **B.** Create floodway and floodplain maps that show parcel and building locations. **C.** Update FEMA maps	FEMA, PEMA, Municipalities	Ongoing studies such as USACE engineering studies or local mapping initiatives may be used to cost-share a FEMA flood study, which is prioritized on the basis of need NFIP, PEMA, Cooperative Technical Partners Program (FEMA)
2. Update and enforce zoning and subdivision regulations and floodplain ordinances	**A.** Discourage new development for permanent or temporary residences or other structures in the corridor within the 100-year floodplain **B.** Prohibit further development in areas designated as "Flood Way" **C.** Encourage counties and municipalities to create, implement and enforce floodplain management ordinances if they have not already done so.	Counties & Municipalities	N/D
3. Allow flood prone areas to revert to open space	**A.** Encourage municipalities to rezone flood prone areas as open space/conservation. **B.** Purchase flood prone properties from willing landowners.	FEMA, Counties & Municipalities	Hazard Mitigation Grant Program (PEMA), Flood Mitigation Assistance Program (PEMA)
4. Study how upstream	**A.** Educate the public on the consequences of	Counties & Municipalities,	Growing Greener (DEP)

development impacts downstream areas (stormwater management plan)	developing lands in upstream areas. **B.** Encourage conservation of streamside riparian buffers and forested steep slopes. **C.** Promote and encourage the use of stormwater management, floodplain management, and stream restoration practices on all tributaries.	Watershed Associations, EMRC&D	
5. Encourage voluntary conservation easements to protect floodplains	**A.** Develop and promote program for landowners to place floodplains and riparian areas into permanent conservation easements. **B.** Encourage landowners to consider other conservation easement programs	Counties & Land Trust, USDA Farmland Preservation Program	DCNR
6. Educate/ support municipalities with the use of Transfer of Development Rights (TDRs) in floodplain areas	**A.** Amend municipal zoning and subdivision ordinances to include transfer of development rights in floodplains. **B.** Education about TDR **C.** Encourage education about FEMA and PEMA	FEMA, PEMA, Legislature, Municipalities, Planning Commissions	LUPTAP (DCED)
7. Educate residents on their rights to remove flood debris		Conservation Districts, DEP, Municipalities	NPC, Growing Greener (DEP), SRBC

Biological Resources

(Refer to text in Section V of Pine Creek Conservation Plan; numbers are not meant to signify any rank)

Conservation and Natural Resources

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Inventory biological diversity and natural features	**A.** Review the counties' Pennsylvania Natural Diversity Inventories and further inventory the watershed to identify plant, animal and aquatic species that are important to the unique habitats of the area.	PGC, PFBC, DCNR Bureau of Forestry & Local Colleges	Community Conservation Partnerships Program (DCNR), Growing Greener Program (DEP)
2. Increase awareness of the natural resources as the foundation for comprehensive planning, zoning and enforcement	**A.** Encourage regional planning efforts to update county and municipal comprehensive plans that reflect the objectives of the Rivers Conservation Plan. **B.** Discourage development in environmentally sensitive areas such as steep slopes, wetlands, and floodplains. **C.** Encourage local environmental organizations, like watershed groups, to pursue upgrades in stream designation, where applicable, to further protect natural resources.	DEP, DCNR, PFBC, Counties & Municipalities, Conservation Districts	LUPTAP (DCED)
3. Evaluate the impact of invasive and noxious species to Pine Creek Watershed and recommend methods to control	**A.** Identify methods to control the spread of non-native invasive species. **B.** Encourage property owners to landscape with native species. **C.** Review the different methods of invasive species removal and determine the resulting impact on wildlife and the environment. Choose management techniques to be used in each area. **D.** Develop a list of appropriate species for	PFBC, PA Dept. of Agriculture, DCNR Bureau of Forestry, County Conservation Districts & Local Colleges	Pulling Together Initiative (NFWF), Growing Greener Program (DEP), CCPP (DCNR)

	landowner use		
4. Evaluate, improve and protect important habitats	**A.** Identify and map important habitat areas. **B.** Use a standard system to evaluate the quality of the habitat. **C.** Encourage the use of buffers around important habitats. **D.** Educate landowners on funding and partnership opportunities to protect habitats. **E.** Increase awareness and support of native species restoration to river and streams. **F.** Encourage conservation of important wildlife habitat areas. **G.** Encourage wildlife habitat improvement through conservation planning	Land Trusts, County Conservation Districts, PNDI, Sportsmen's and Watershed organizations, PGC, Audubon of PA, USDA, NRCS, PFBC, EMRC&D	Wildlife Habitat Incentives Program (NRCS, USDA) Growing Greener Program (DEP), CCPP (DCNR), Bring Back the Natives (NFWF), Coastal Waters Program (TNC in partnership with NOAA)
5. Manage the fishery to maintain the resource	**A.** Work with PFBC to review the status of fisheries management plan for Pine Creek watershed and further develop or update as needed **B.** Determine the need for fish ladders on dams within the watershed and consider the use of multi-use structures (fish ladder, portage channel, kayak course) where appropriate **C.** Encourage the use of public participation and involvement on any proposed changes to fishing regulations **D.** Protect the Trout resource in Pine Creek watershed	PFBC, Counties, Sportsmen's Organizations, DEP, USACE	Habitat Restoration Partnership (American Rivers/NOAA), Growing Greener Program (DEP), CCPP (DCNR)

	especially during drought and warm water conditions at the mouth of tributaries **E.** Continue to explore options to protect the wild Brook Trout populations in the Pine Creek watershed (such as consideration of seasonal and size limits).		

Cultural Resources

(Refer to text in Section VI of Pine Creek Conservation Plan; numbers are not meant to signify any rank)

Recreation

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Upgrade, improve and maintain existing municipal recreational facilities	**A.** Develop maintenance plans for recreational facilities in the watershed **B.** Utilize interpretive trails/heritage trails in parks and recreational facilities **C.** Develop safety signage standards for walkways/trails/bikeways throughout the watershed **D.** Design and develop a more formalized trail in Galeton Borough at Berger Lake Park **E.** Municipalities should expand or create new park and recreation resources as population increases and/or user demographics change	County & Municipal Recreation Authorities & DCNR Bureau of State Parks; Galeton Borough, Potter County Planning, CCPP	Community Conservation Partnerships Program (DCNR)
2. Improve and maintain the Pine Creek Trail, other trails, and state land	**A.** Increase funding from the Commonwealth to State Forests and State Parks so that staffing levels are sufficient and maintenance can be properly conducted. The maintenance backlog is a	PA General Assembly, Governor, DCNR Administration PGC, CD	

	serious problem due to a lack of resources. Tiadaghton and Tioga State Forests were not provided increased manpower or funding for the Pine Creek Trail **B.** Prior to building any new facilities the Commonwealth should explore the feasibility of rehabilitating existing amenities at State Parks and on State Forests **C.** Complete the Pine Creek Trail from the US Route 220 bridge into Jersey Shore Borough and construct a trail head at Jersey Shore **D.** Finish engineering design and construction of Pine Creek Trail from Ansonia to Wellsboro Junction **E.** Direct mountain bikers off the Pine Creek Trail into the highlands where suitable trails are more abundant **F.** Address erosion problems where Pine Creek threatens infrastructure. For example, erosion at Blackwell access left unchecked will jeopardize integrity and stability of the parking area **G.** Include Conservation District support for resource management due to the potential for increased use of our local resources.	
3. Improve signage related to the Pine Creek Trail	**A.** Replace kiosks at trailheads/parking areas on the Pine Creek Trail. Current kiosks are in poor condition. New kiosks should be designed, developed and installed to last longer, be	DCNR Bureau of Forestry, NPS, USFS

	more informative and blend in with the surroundings. The NPS manual may assist in developing consistent and appropriate signage systems; it should be used in this project **B.** Develop a consistent signage system used along the entire Pine Creek Trail **C.** Utilize pictures and graphics to convey rules and other messages **D.** Design signage to be appropriate for the setting, blending with the natural setting and consistent in content and placement. Sky blue mileage signs at parking areas are not complimentary to the context **E.** Ensure signage is kept to a minimum		
4. Create linkages between recreational facilities and natural and cultural resources	**A.** Design greenways that link recreational uses to the many natural, historical and cultural areas **B.** Develop pedestrian access that connects communities to parks and recreation facilities **C.** Identify and locate the important wildlife observation areas, unique wetlands, and scenic mountain views **D.** Develop public access points from each community to the Pine Creek Trail and the creek **E.** Create kiosks at each access area that depict other access areas, stores, restaurants, and other recreational facilities	NPC, Land Trusts & County Planning Commissions, DCNR, PennDOT, Tioga County Planning, GROW, Wellsboro Borough, Clinton County Planning, Lycoming County Planning, Avis Borough, SEDA-COG Joint Rail	CCPP (DCNR), Rivers, Trails and Conservation Assistance (National Park Service, U.S. Dept. of the Interior), Wildlife Conservation & Restoration Program (U.S. Fish and Wildlife Service), Pathways to Nature Conservation Fund (NFWF), Growing Greener, Private Foundations

	F. Link Pine Creek Trail to the south with the proposed Susquehanna River Trail **G.** Connect Pine Creek Trail from Wellsboro Junction to Wellsboro Borough. Possible alignments include along the GROW railroad right-of-way and US Route 6. **H.** Evaluate the feasibility of developing a connector from Avis to the Pine Creek Trail **I.** Evaluate the feasibility of developing a connector from the proposed Pine Creek Trail parking area in Jersey Shore to other points in the community. One possibility may be a trail along the River Road.	Authority	
5. Review the role of recreation professionals in the watershed	**A.** Develop and implement comprehensive recreation management plans **B.** Review and update the roles of existing Recreation Authorities or Recreation Boards **C.** Communities and municipalities that do not have authorities or boards should consider working together and working with recreation professionals in developing, maintaining and programming their facilities **D.** Examine the need for State Forest personnel at the local district level who have recreation management education background. If needed, new positions could be created or a relationships with the Bureau of State Parks could be established	County and Municipal Recreation Authorities, DCNR, State Civil Service Commission	Community Conservation Partnerships Program (DCNR)

6. Prepare, adopt and implement a Greenway Plan for the watershed	**A.** Encourage each county to work with the other counties in the watershed when preparing county open space and greenway plans **B.** Work with municipalities and private property owners in greenway implementation **C.** Utilize existing public lands as appropriate in the greenway plan **D.** Raise the public's awareness of the watershed's many natural, cultural, historical and recreational resources and encourage people to use and enjoy those resources **E.** Prepare a greenway maintenance plan, roles and responsibilities **F.** Acquire grants and funding to implement the proposed greenway plan and associated projects	Land Trusts, County Planning Commissions & County and Municipal Recreational Authorities	Growing Greener Program (DEP), CCPP (DCNR)
7. Assess use of whitewater courses and multi-use structures	**A.** Determine the feasibility of adding a multi-use recreational structure, fish ladder and kayak course.	County Planning Commissions	Continuing Authorities Program (USACE)
8. Identify signage needs for access, portage and water hazards (required by PFBC law)	**A.** Create a map showing access areas, navigation routes, portage trails, obstructions and danger areas. **B.** Install signage and buoys for areas where boaters and canoeists need to pay special attention.	Lumber Heritage Region	

9. Develop watershed recreation maps	**A.** Create, publish and distribute maps of watershed recreation features and a new trail brochure and/or trail guide with a map identifying trailheads, canoe access points, camping areas, restroom locations, and other pertinent user information. **B.** Prepare maps so they can be easily posted to websites and downloaded **C.** Develop a Pine Creek Water Trail brochure and pocket guide, detailing canoe access, camping areas and other amenities **D.** Examine the impact of implementing fees for State Forest brochures and maps, with the revenue staying within the forest district in which it is generated	County Planning Commissions, Visitors Bureaus, DCED, Local Businesses, NPC, DCNR, PFBC, Penn College Technology's Graphic Arts Dept.	Regional Marketing Initiative Grant Program (DCED), Business/Corporate Sponsorships, County Tourism funds, NPS Chesapeake Gateways program, CCPP, and private sector
10. Encourage those entities marketing the Pine Creek Valley and Pine Creek Trail to conduct their marketing in a consistent and appropriate manner	**A.** Develop a logo to identify the Pine Creek Valley and the Pine Creek Trail that would consistently appear on all brochures, kiosks, and signs	DCNR, Counties, Visitors Bureaus, Penn. College of Technology's Graphic Arts Dept.	PANA
	B. Conduct user surveys on Pine Creek Trail to research and gather valuable data on use, attitudes, spending and economic impact. Carl Knoch has done some studies through PSU.		
	C. Include information about no trace camping, carry-in-carry-out recreation, respect for private property, and other issues on marketing material	Outfitters	

	D. Partner with Pennsylvania Advocates for Nutrition and Activity to help educate and motivate local residents to utilize the recreation facilities in their community to improve and maintain their health	Counties, health care agencies, local hospitals, Visitors Bureaus, PANA
	E. Provide training for visitor bureau staff and volunteers about the region's recreational assets	DCNR, PGC, Watershed Associations
11. Improve and maintain access to Pine Creek	**A.** Obtain Pine Creek Water Trail Designation **B.** Stabilize canoe access areas to prevent erosion (examples at Hamilton Bottom and Blackwell). Guidelines for canoe launches can be found in Logical Lasting Launches: Design Guidelines for Canoe and Kayak Launches (Spring 2004) by the National Park Service and applicable U.S. Forest Service guidelines **C.** Establish a canoe access/take out and parking area at the southern end of Pine Creek. One possibility may be the Tiadaghton Elm **D.** Identify areas for public canoe access points between Ansonia and Galeton, as wells as other locations deemed necessary based on user demands. Between Galeton and Ansonia the PennDOT rest area near Gaines is one possible location	Clinton County, Pine Creek Twp, DCNR, NPS Chesapeake Gateways Program

	E. Canoe access points would be established where landowner welcomes the facility, or where properties can be acquired from willing owners	
12. Ensure camping facilities on state land in the watershed are appropriate to the area	**A.** Develop a consistent camping policy in the Pine Creek Valley between the Tiadaghton and Tioga State Forests **B.** Camping should be limited to designated sites only, in order to limit impacts of camping on the natural resources, reduce trespassing on private property and for safety purposes **C.** Consider implementing fees for campers in the State Forest Districts, particularly those camping in the Pine Creek Valley **D.** If fees are implemented, revenue should remain in the Forest District's facilities **E.** Consider developing the former Eliot Wagner Property (now part of the Tiadaghton State Forest) north of Cammal for canoe camping and as an equestrian destination for riders using Holt Trail and Big Trail Road. This would take some pressure off Black Walnut Bottom **F.** Acquire properties from willing sellers to provide additional camping areas if such areas are needed **G.** Prohibit the location of camping trailers/recreational	DCNR

	vehicles and associated paraphernalia in areas designated as floodway. **H.** Develop and enforce ordinance provisions for campgrounds, including evacuation plans, appearance standards, and public health and safety measures.	
13. Ensure that the recreational pursuits in the watershed are not having a negative impact on the natural resources	**A**. Provide information to recreationists on the appropriate use of the recreation resources **B.** Monitor the impacts of recreation on the resources (land and water) over time. Utilizing college and university biology departments to assist would be one way to conduct the research in a cost-effective way while involving the community **C.** Evaluate the impact/potential impact of proposed new ATV trails **D.** If necessary limit development of new ATV trails and riding areas in the Pine Creek watershed	DCNR, Counties
14. Maintain the hunting and fishing heritage of the Pine Creek Watershed	**A.** Work with the PGC and PFBC to manage fish and game populations in a way that maintains the resource base and attempts to meet the recreational need **B.** Inform private hunting clubs and sportsmen's groups of progress with the plan and solicit their help in implementing it	PGC, PFBC, Sportsmen's Organizations, Guides

Archeological/Historical Preservation

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*
1. Inventory the watershed's historic structures and features	**A.** Identify the historical properties, features and districts eligible for the National Register of Historic Places within the watershed and the state inventory. **B.** Prioritize efforts to preserve and restore the symbols of the lumber, mining and agricultural heritages of the watershed. **C.** Document the watershed's historic structures and features **D.** Nominate specific sites and historical districts to the National Register of Historic Places and to the state program **E.** Continue to update the list of historic structures, to track structures that are being torn down, and to add structures as time passes and "new" historic structures are created	County Historical Societies, PHMC	PHMC
2. Determine which historic markers from PHMC's program are still in place, missing, in poor repair, or not visible to the public	**A.** Maintain and update record of historic markers from 1994 for the watershed **B.** Create a plan to replace, repair, or improve visibility as appropriate **C.** Determine if there are events, figures, structures, or features not appropriately recognized, and seek	Historical Societies, PHMC, County Planning, Local Businesses	

	recognition for them **D.** Develop tools to provide residents and visitors with more information about the historic markers in the watershed - such as brochures, maps, books, websites or exhibits.		
3. Document the watershed's history (in its entirety and in interest areas)	**A.** Develop an oral history program to capture the region's history, folk lore, folk music, and culture. **B.** Work with local historical societies, school districts, colleges and universities to document and collect history **C.** Include historic interpretation as appropriate in public parks and public recreation areas	Local Colleges, CVI and Grange, Tioga County Agricultural Heritage Association	CVI
4. Ensure information relating to the watershed's history is stored in such a way that public can access and benefit from the information	**A.** Create a system for information sharing between historical societies, museums and libraries that serve the watershed and the counties that make up the watershed **B.** Work with local genealogy and historical societies to hold programs for the general public on what information is available and how to access that information **C.** Encourage internships (high school, college and graduate students) to catalogue and develop user friendly forms of access to information that also retains the integrity of the documents.	Local Colleges, CVI, DAR, Genealogy Society, Bucktail's civil war re-enactment	CVI
5. Enhance	**A.** Support existing museums	Historical	General

museums' interpretation of Pine Creek's role in the region's development	**B.** Support the lumber heritage region in their efforts to document and interpret the region's lumbering past	Societies & Visitors Bureaus, PHMC, PA Lumber Museum	Operating Support Grants (PHMC), DCNR
6. Restore maintain, and recreate historical features of the lumbering and industrial era	**A.** Document the communities that are shrinking or gone which were based on an industrial enterprise (examples may include Antrim) **B.** Restore where appropriate into a nature/history trail **C.** Restore, repair and maintain features and facilities, such as logging railroad beds, small rock quarry areas, coal mining facilities, features related to tanneries, etc. **D.** Develop a wide variety of facilities to portray the heritage of the watershed **E.** Develop a local historical marker system. **F.** Document the location and condition of remaining historical features relating to industry **G.** Create museum exhibits that document the industrial influences the creek had on its communities	Historical Societies, Chamber of Commerce, County Planning Commissions, PHMC	Historical Marker Grants, PHMC, DCNR, Capital Redevelopment Assistance, Capital Budget (PA General Assembly), Private Foundations
7. Conduct an archeological survey of the watershed	**A.** Work with PHMC and local colleges to determine the probable locations of Native American sites **B.** Categorize the sites as to treat the site's integrity, likelihood exploration would result in improved understanding and other criteria **C.** Establish an appropriate program of exploration and	PHMC, Local Colleges, Tribal Groups & Historical Societies, Local citizens	Private Foundations, PHMC

	reporting **D.** Educate the public on archeological practices and the importance of these studies **E.** Work with existing local historical societies to expand, update, and improve existing displays on Native American heritage		
8. Provide historic interpretation of the watershed in an appropriate manner	**A.** Historic themes should be developed (such themes may include early settlement, logging, tanneries, railroads, CCC, and flood events) **B.** Historic interpretation of each community's history would be of importance as well **C.** Interpretation may include walking tours, brochures, websites, local newspapers running a series of historic pieces, creating maintaining and updating displays at existing historical societies and museums within the watershed, local historic marker programs, developing and executing a program for school children, developing and orchestrating programs for the general public, and panels for local businesses that provide an overview of the community's history or a segment/person/event in the community history	Historical Societies, Chamber of Commerce, Visitors Bureaus	Private Foundations, PHMC, DCED

Education

Management Options	*Specific Implementation Project*	*Partners*	*Funding Sources*

1. Get more citizens involved	**A.** Inform key property owners, municipal officials, businesses, residents, schools, and scouting groups about public demonstration workshops and presentations on natural resource conservation and restoration project initiatives. **B.** Keep individuals and groups informed of conservation, restoration, and enhancement projects, including the volunteer opportunities available. **C.** Hold outdoor environmental education events such as fishing derbies, guided hikes and watershed cleanups.	Watershed and Sportsmen's Organizations, Woodland Owners Association, CD, DEP, DCNR, NRCS, Pennsylvania Conservation Corps, EMRC&D and others	N/D
2. Pursue environmental education funding with students and adults as target audiences	**A.** Create Environmental Education Coordinators position for the watershed **B.** Explore how to share information between environmental education providers, and develop materials for use in schools and for presentations to civic and environmental organizations such as the Lions Club, Rotary, and watershed groups **C.** Develop materials for use in schools. **D.** Develop programs for adults on the watershed's natural history.	PACD, County Conservation Districts, Colleges and School Districts	Circuit Rider Program (DCNR)
3. Strengthen individuals' natural resource ethic and officially adopt policy statement	**A.** Promote a natural resource ethic for the watershed. **B.** Identify and utilize talents of local environmental educators and outdoor enthusiasts as spokespersons and future program entertainers. **C.** Encourage municipalities, counties, and other interest	PACD, Land Trusts, County Conservation Districts & County Planning Commissions	Regional Marketing Initiative Grant Program, Heritage Parks Program (DCED)

	groups to promote natural resource ethics		
4. Expand water safety education programs with PFBC	**A.** Provide regulations, warning signs, and educational materials at access areas. **B.** Provide water safety workshops at public facilities throughout the watershed	PFBC & Local Boating Groups	N/D
5. Support development of recreational opportunities along the water that includes hands-on experience to allow an understanding of the environmental function, importance and historical significance of the watershed	**A.** Organize and sponsor annual outdoor events within the watershed that tie the creek to its present and future potentials including canoe and kayak trips, guided hikes, birding, tubing and swimming outings. **B.** Provide workshops on such things as watershed history, watershed impacts, recycling, riparian land management, and environmental ethics. **C.** Develop a centrally located or traveling environmental education exhibit. **D.** Develop educational curriculum and projects to learn about aquatic biology, riparian restoration and the Native American, lumber and canal history of Pine Creek **E.** Continue and expand Pine Creek Watershed Awareness program	CD, Visitors Bureau, Watersheds, Guide services and Outfitters, Colleges and School Districts, Land Trusts, PCPA, PCHPG, Babb Creek Watershed Association	Corporate Sponsorship, Economic Development Initiative (VA/HUD), Circuit Rider Program (DCNR), Challenge Grants (NFWF), SMART (ALARM), PHMC
6. Provide education to encourage public awareness about available programs that provide technical	**A.** Provide opportunities for technical assistance providers to interact with property owners and the general public	CD, DEP, DCNR, PFBC, EMRC&D and others	

assistance or funding for conservation practices.			
7. Support and build capacity of watershed and other conservation organizations within the watershed		CD, DEP, EMRC&D	GROW, Chesapeake Bay Coldwater Heritage (NFWF)
8. Promote the skills and talents of local and regional artists.	**A.** Develop tools to direct residents and visitors to local/regional artists and craftsmen **B.** Study the feasibility and need for a permanent outlet for local artists and craftsmen to display and sell their work **C.** Support the work of the Gmeiner Center to provide exhibit space for local artists, as well as exhibits of regional, national, and international artists' work. **D.** Encourage communities with public areas to use local artists and local themes if acquiring public art	Arts Councils, PA Guild of Craftsmen, Visitors Bureaus, Local Municipalities	PA Council on the Arts, PA WILDS, Lumber Heritage Region, Foundations
9. Support the work of cultural organizations and events in the watershed	**A.** Encourage the Green Free Library, Galeton Free Library, and the North Central Library Division to continue their efforts to provide residents with quality service **B.** Support the Hamilton Gibson Productions in their effort to sustain a theatre	Visitors Bureaus, Local Municipalities	PA WILDS, Lumber Heritage Region, DCED, Foundations

	C. Support community events that celebrate the region's heritage, history, and resources - such as Red Suspenders and the Laurel Festival		
10. Promote the skills and talents of local and regional artists.	**A.** Develop tools to direct residents and visitors to local/regional artists and craftsmen **B.** Study the feasibility and need for a permanent outlet for local artists and craftsmen to display and sell their work. **C.** Support the work of the Gmeiner Center to provide exhibit space for local artists, as well as exhibits of regional, national and international artists' work. **D.** Encourage communities with public areas to use local artists and local themes if acquiring public art.	Arts councils, PA Guild of Craftsmen, Visitors Bureaus, local municipalities	PA Council of the Arts, PA WILDS, Lumber Heritage Region, foundations

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Table A-1: Physiographic Description of Pine Creek and Major Tributaries

Tributary	Tributary To	County	Source	Mouth	Course	Drainage Area (sq. miles)	Length (miles)	Mean Annual Precipitation (inches)
Main Stem								
Pine Creek	West Branch Susquehanna River	Potter, Tioga, Lycoming, & Clinton	Near Gold, Potter County	At Jersey Shore, Lycoming & Clinton counties	Southeast 16 miles East 12 miles South 16 miles Southwest 14 miles Southwest 28 miles	979	86.5	36-42
Tributaries								
West Branch Pine Creek	Pine Creek	Potter	Near Patterson Park, Potter County	At Galeton, Potter County	East	71.6	17.2	40-42
Marsh Creek *Charleston Creek*	Pine Creek	Tioga	Near Maple Hill, Tioga County	At Ansonia, Tioga County	Northwest 12 miles West 5 miles Southwest 4 miles	81.3	21.4	36-40
Stony Fork *East Branch Stony Fork*	Babb Creek	Tioga	Near Wellsboro, Tioga County	Near Morris, Tioga County	South	37.7	12.8	37-40
Babb Creek	Pine Creek	Tioga & Lycoming	Near Cherry Flats, Tioga County	At Blackwell, Tioga County	Southwest	130	21.5	38-40
Cedar Run	Pine Creek	Tioga & Lycoming	Near Marshlands, Tioga County	At Cedar Run, Lycoming County	Southeast	37.7	11.2	40-42
Slate Run *Francis Branch*	Pine Creek	Potter, Tioga, & Lycoming	Near Oleona, Potter County	At Slate Run, Lycoming County	Southeast	45	12.7	40-42

Table A-1 (Continued)

Blockhouse Creek	Little Pine Creek	Tioga & Lycoming	Near Liberty, Tioga County	Near English Center, Lycoming County	Southwest	58.6	17.6	40-42
Texas Creek *Zimmerman Creek*	Little Pine Creek	Tioga & Lycoming	Near Hartfield, Tioga County	Near English Center, Lycoming County	Southwest 9 miles South 6 miles	39.1	15.7	40-42
Little Pine Creek	Pine Creek	Tioga & Lycoming	Near English Center, Lycoming County	At Waterville, Lycoming County	Southwest	180	15.6	40-42

Table A-2: Generalized Stratigraphy Column of the Rocks Exposed in the Pine Creek Watershed

Age	Formation	Lithology
Quaternary		
Recent	Stream Deposits	Silt, sand and gravel
Pleistocene	Glacial Drift	Till (unsorted rock material deposited directly by the glacier). Outwash (rock material carried by glacial melt water and deposited at some distance from the ice edge).
Pennsylvanian	Pottsville Group	Predominately sandstones and conglomerates with thin shales and coals.
Mississippian/Devonian Undivided	Huntley Mountain Formation	Greenish-gray and light olive-gray, flaggy, fine-grained sandstone and a few red shale interbeds; includes lower "Pocono" plus "Oswago" of earlier workers.
Devonian	Catskill Formation	Grayish-red sandstone, siltstone, and shale; units of gray sandstone occur in the upper part; lithologies in the upper part arranged in fining upward cycles.
	Lock Haven Formation	Interbedded olive-gray sandstone, siltstone, claystone, and thin conglomerate; marine fossils throughout; "Chemung" of earlier workers.

Table A-3: Descriptions of the 12 Combinations of Soil Series Found in the Pine Creek Watershed

Soil Series	Acres	Soil Type
Wellsboro-Oquaga-Morris	61632.26	Shallow to very deep; Nearly level to steep; loamy-skeletal, course-loamy, fine-loamy; well drained soils; found on broad ridges and hillsides; formed from shale, siltstone and sandstone in residuum or glacial till.
(WOM)	13576.74	
	13514.42	
Total	88723.42	

Volusia-Mardin-Morris	8480.84	Deep and very deep; loamy-skeletal, fine-loamy; well drained soils; found on side slopes and low hills and ridges; formed from sandstone, shale and siltstone; dominated by soils which formed in residuum or glacial till.
(VMN)	922.42	
Total	9403.26	

Volusia-Mardin-Lordstown	46202.64	Deep and very deep; loamy-skeletal, course-loamy, and fine-loamy; very poorly drained to well drained soils; formed in alluvium or glacial outwash.
(VML)	21621.19	
	46085.88	
	906.02	
	858.93	
Total	115674.66	

Oquaga-Lordstown-Wurtboro	283.80	Deep and very deep; loamy-skeletal, and fine loamy; moderately well drained to well drained soils; formed in colluvium, residuum or glacial till.
(OLW)	2122.45	
	1702.93	
	80717.99	
	541.39	
Total	85368.56	

Leck Kill-Hartleton-Albrights	28479.97	Moderately deep, deep, and very deep; loamy-skeletal and fine-loamy; moderately well drained to well drained; found on mountain sides and ridges; formed in residuum or glacial till.
(LHA)	4090.43	
	10343.31	
Total	42913.71	

Leck Kill-Calvin-Klinesville	9649.63	Moderately deep, to very deep; course-loamy; well drained soils found on mostly glaciated mountain tops; derived from sandstone, siltstone and shale; formed in glacial till.
(LCK)	881.17	
	6987.77	
	6708.64	
Total	24227.21	

Table A-3 Continued

Lackawanna-Bath-Lordstown (LBL)	36187.65	Shallow, moderately deep, and deep; loamy-skeletal, and fine loamy; well drained soils; found on hillslopes, ridges and convex hillsides; derived from shale, siltstone and sandstone; formed in residuum or glacial till.
Total	36187.65	

Hazelton-Dekalb-Buchanan	817.18	Deep; loamy-skeletal and fine-loamy; moderately well drained to well drained soils; found on low hills, ridges and convex hillsides; derived from sandstone, siltstone and shale; formed in residuum or glacial till.
(HDB)	160122.59	
Total	160936.77	

Hazelton-Cookport-Ernest	2924.02	Moderately deep to deep; loamy-skeletal, course-loamy, and fine-loamy; moderately well drained soils; found on glaciated mountain tops; derived from sandstone, siltstone, shale, conglomerate, and quartzite; formed in glacial till.
(HCE)	15877.31	
	1853.85	
	8908.19	
	658.00	
Total	30221.37	

Chenango-Pope-Holly	11170.60	Moderately deep to very deep; course-loamy and fine-loamy; somewhat poorly drained to moderately well drained to well drained soils; found on glaciated uplands; derived from sandstone, siltstone and shale; formed in glacial and heavy-loamy till.
(CPH)	1915.31	
Total	13085.91	

Buchanan-Hartleton-Hazelton	12253.30	Deep to very deep; loamy-skeletal, and fine-loamy; poorly drained to somewhat poorly drained to moderately well drained soils; found on glaciated uplands and broad ridge tops; derived from reddish sandstone, siltstone, and shale; formed in glacial and loamy till.
(BHH)	2091.20	
	340.27	
Total	14684.77	

Berks-Weikert-Bedington (BWB)	6301.90	Moderately deep to deep; loamy-skeletal, and course loamy; somewhat poorly drained, moderately well drained to well drained soils; found on glaciated mountaintops and broad ridge tops; derived from reddish sandstone, siltstone and shale; formed in glacial and Wisconsinan glacial till.

Table A-4: Inactive Landfills Found in the Pine Creek Watershed

Location	County	Municipality	Facility
Sherman St	Potter	Pike	Galeton Boro Landfill
SR 2016, Blossburg	Tioga	Bloss	Bloss Twp Disposal Site
RD #2, Wellsboro	Tioga	Delmar	Charleston Twp Landfill
Rt 815, Wellsboro	Tioga	Delmar	Delmar Twp Disposal Site
RD #1, Wellsboro	Tioga	Duncan	Duncan Twp Landfill
Lick Run Rd., Watrous	Tioga	Gaines	Gaines Twp Landfill
Rt 414, Morris	Tioga	Morris	Morris Twp Landfill
Rt 58019, Marsh Creek	Tioga	Shippen	Shippen Twp Landfill
Meade St. Wellsboro	Tioga	Delmar	Wellsboro Landfill
Charleston St. Wellsboro	Tioga	Wellsboro	Corning Glass Works
Slate Run Road	Lycoming	Brown	Brown Twp Dump
Route 414, Jersey Mills	Lycoming	McHenry	Jersey Mills Dump
Truman Run Road	Lycoming	McHenry	Truman Run Dump
English Run Rd. English Center	Lycoming	Pine	Pine Twp Landfill
Clay Mine	Lycoming	Brown	Clay Mine Dump
Ramsey Road	Lycoming	Cummings	1972 flood debris dump

Table A-5: Land Use Controls

Municipality	County Zoning	Municipal Zoning	County SLDO*	Municipal SLDO*
Lycoming Co.				
Jersey Shore		X		x
Porter		X	x	
Watson		X	x	
Cummings		X	x	
McHenry	x		x	
Brown	x		x	
Tioga County				
Elk			x	
Morris			x	
Liberty			x	
Gaines			x	
Shippen		X		x
Delmar		X		x
Wellsboro		X		x
Charleston		X		x
Duncan			x	
Bloss			x	
Putnam			x	
Clymer			x	
Chatham			x	
Middlebury			x	
Potter County				
Stewardson			x	
Abbott			x	
West Branch			x	
Summit			x	
Sweden			x	
Allegany			x	
Ulysses			x	
Pike			x	
Galeton			x	
Hector			x	
Harrison			x	
Bingham			x	
Clinton County				
Chapman		X	x	
Grugan	x		x	
Gallagher	x		x	
Pine Creek		x		x

*SLDO = Subdivision and Land Development Ordinance

Table A-6 Population Numbers and Density for Five Designated Areas Along Pine Creek*

Basin	Population Projections for 1990 – 2000 – 2010 – 2020	Population Density 1990 - 2000-2010-2020 (#/sq mi)
West Branch Pine Creek above Galeton	682 – 689 – 666 – 648	9.5 - 9.6 - 9.3 - 9.0
Pine Creek watershed above Ansonia	2681 – 2734 – 2712 – 2661	12.8 - 13.1 - 13.0 - 12.7
Babb Creek watershed	2527 – 2630 – 2737 – 2727	19.5 - 20.3 - 21.1 - 21.0
Little Pine Creek watershed	1809 – 1883 – 1960 – 1990	10.0 - 10.4 - 10.9 - 11.0
Pine Creek corridor above Jersey Shore	5050 – 5240 – 5441 – 5634	16.3 - 16.9 - 17.6 - 18.2

* Taken from the Chesapeake Bay Program statistics.

Table A-7: Physiographic Description of Pine Creek and Major Tributaries

Main Branch

PINE CREEK

Province.—Appalachian Plateau and Valley and Ridge
Headwaters.—Allegheny High Plateaus Section
Mouth.—Appalachian Mountain Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Irregular
Main Channel:
Upper Reach.—Hills, mountains, narrow valley, steep to moderate slopes
Middle Reach.—Hills, mountains, ridges, gorge, V-shaped valley, steep slopes
Lower Reach.—Hills, mountains, narrow flat bottom valley, steep slopes

Tributaries

WEST BRANCH PINE CREEK

Province.—Appalachian Plateau
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, and conglomerates
Drainage Pattern.—Dendritic
Channel Pattern.—Regular
Main Channel:
High hills, narrow to small flat bottom valley, steep to moderate slopes

MARSH CREEK

CHARLESTON CREEK

Province.—Appalachian Plateau
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shales, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic

Table A-7 (Continued)

Channel Pattern.—Regular
Main Channel:
Swamps, mountains to hills, narrow to moderately wide, flat bottom valley, moderate slopes

STONY FORK

EAST BRANCH STONY FORK

Province.—Appalachian Plateau
Headwaters.—Glaciated Low Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Transitional
Main Channel:
Upper Reach.—Hills, open valley, moderate slopes
Lower Reach.—Mountains, V-shaped valley, steep slopes

BABB CREEK

Province.—Appalachian Plateau
Headwaters.—Glaciated Low Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Regular
Main Channel:
Swamps, hills, U-shaped valley, steep to moderate slopes

CEDAR RUN

Province.—Appalachian Plateau
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, and conglomerates
Drainage Pattern.—Dendritic
Channel Pattern.—Regular
Main Channel:
Mountains, narrow valley, steep slopes

Table A-7 (Contiuned)

SLATE RUN

FRANCIS BRANCH

Province.—Appalachian Plateau
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Transitional
Main Channel:
Mountains, V-shaped valley, steep slopes

BLOCKHOUSE CREEK

Province.—Appalachian Plateau
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Regular
Main Channel:
Small lakes, swamps, hills, mountains, open to narrow valley, moderate to steep slopes

TEXAS CREEK

ZIMMERMAN CREEK

Province.—Appalachian Plateaus
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.--Dendritic
Channel Pattern.—Transitional
Main Channel:
Swamps, hills to mountain, open to narrow valley, moderate to steep slopes

Table A-7 (Continued)

LITTLE PINE CREEK

Province.—Appalachian Plateaus
Headwaters.—Allegheny High Plateaus Section
Mouth.—Allegheny High Plateaus Section
Rock Units.—Sandstone, shale, conglomerates, limestone, and coal
Drainage Pattern.—Dendritic
Channel Pattern.—Regular
Main Channel:
Mountains, narrow valley, steep slopes

MAJOR IMPOUNDMENT.—Little Pine Dam

Table A-8: Class A Wild Trout Waters in the Pine Creek Watershed for 2004 *

Potter County

Commissioner Run

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 2.7 km; 1.7 mi. Total Alkalinity: 5
Owner: 100% Public Nearest Town: Denton Hill

Genesee Forks

Mixed Wild Brook/Brown Trout

Limits: From confluence of Baldwin & Lehman Headwaters downstream to mouth
Length: 12.6 km; 7.8 mi. Total Alkalinity: 20
Owner: 100% Private Open Nearest Town: West Pike

Johnson Brook

Wild Brook Trout

Limits: From headwaters downstream to SGL boundary above Thunder Run
Length: 5.6 km; 3.5 mi. Total Alkalinity: 9
Owner: 100% Public Nearest Town: Galeton

Lyman Run

Wild Brook Trout

Limits: From headwaters downstream to confluence with Splash Dam Headwaters
Length: 2.4 km; 1.5 mi. Total Alkalinity: 10
Owner: 100% Public Nearest Town: Germania Station

Lyman Run

Mixed Wild Brook/Brown Trout

Limits: From confluence with Splash Dam Headwaters downstream to Lyman Lake
Length: 6.2 km; 3.8 mi. Total Alkalinity: 12
Owner: 100% Public Nearest Town: Germania Station

Ninemile Run

Wild Brown Trout

Limits: From headwaters downstream to confluence with Commissioner Run
Length: 3.5 km; 2.2 mi. Total Alkalinity: 8
Owner: 88% Public Nearest Town: Walton
12% Private Open

Table A-8 (Continued)

Ninemile Run

Wild Brown Trout
Limits: From confluence with Commissioner Run downstream to mouth
Length: 6.3 km; 3.9 mi. Total Alkalinity: 7
Owner: 44% Public Nearest Town: Walton
53% Private Open; 3% Private Closed

Phoenix Run

Mixed Wild Brook/Brown Trout
Limits: From confluence of Little Phoenix Run downstream to mouth
Length: 8.5 km; 5.3 mi. Total Alkalinity: 35
Owner: 100% Public Nearest Town: Watrous

Pine Creek

Mixed Wild Brook/Brown Trout
Limits: From headwaters downstream to confluence with Buckseller Run
Length: 6.0 km; 3.7 mi. Total Alkalinity: 17
Owner: 82% Private Open Nearest Town: Brookland
18% Private Closed

Pine Creek

Wild Brown Trout
Limits: From confluence with Buckseller Run downstream to confluence with Genesee Forks
Length: 7.8 km; 4.8 mi. Total Alkalinity: 14
Owner: 19% Public Nearest Town: West Pike
61% Private Open; 20% Private Closed

Splash Dam Headwaters

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 4.4 km; 2.7 mi. Total Alkalinity: 7
Owner: 100% Public Nearest Town: Sweden Valley

Tioga County

Apple Tree Headwaters

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 3.9 km; 2.4 mi. Total Alkalinity: 12
Owner: 100% Public Nearest Town: Leetonia

Table A-8 (Continued)

Baker Branch

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 6.3 km; 3.9 mi. Total Alkalinity: 12
Owner: 24% Public Nearest Town: Marsh Creek
76% Private Open

Baldwin Run

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 7.6 km; 4.7 mi. Total Alkalinity: 19
Owner: 53% Public Nearest Town: Marsh Creek
47% Private Open

Billings Branch

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 4.0 km; 2.5 mi. Total Alkalinity: 5
Owner: 100% Public Nearest Town: Leetonia

Bohen Run

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 2.1 km; 1.3 mi. Total Alkalinity: 12
Owner: 100% Public Nearest Town: Blackwell

Buck Run

Mixed Wild Brook/Brown Trout

Limits: From headwaters downstream to mouth
Length: 3.9 km; 2.4 mi. Total Alkalinity: 18
Owner: 82% Public Nearest Town: Leetonia
18% Private Open

Canada Run

Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 5.2 km; 3.2 mi. Total Alkalinity: 26
Owner: 75% Public Nearest Town: Marsh Creek
25% Private Open

Table A-8 (Continued)

Cedar Run

Mixed Wild Brook/Brown Trout

Limits: From headwaters downstream to confluence with Buck Run

Length: 5.8 km; 3.6 mi. Total Alkalinity: 12

Owner: 100% Public Nearest Town: Leetonia

Cedar Run

Wild Brown Trout

Limits: From confluence with Buck Run downstream to confluence with Fahnestock Run

Length: 4.5 km; 2.8 mi. Total Alkalinity: 16

Owner: 76% Public Nearest Town: Cedar Run

24% Private Open

Cushman Branch

Mixed Wild Brook/Brown Trout

Limits: From headwaters downstream to confluence with Bear Run

Length: 6.0 km; 3.7 mi. Total Alkalinity: 17

Owner: 00% Public Nearest Town: Slate Run

Cushman Branch

Wild Brown Trout

Limits: From confluence with Bear Run downstream to mouth

Length: 1.0 km; 0.6 mi. Total Alkalinity: 18

Owner: 00% Public Nearest Town: Slate Run

Dixie Run

Wild Brook Trout

Limits: From headwaters downstream to mouth

Length: 6.0 km; 3.7 mi. Total Alkalinity: 43

Owner: 15% Public Nearest Town: Morris

85% Private Open

Elk Run

Wild Brook Trout

Limits: From headwaters downstream to Thompson headwaters

Length: 1.8 km; 1.1 mi. Total Alkalinity: 12

Owner: 100% Public Nearest Town: Watrous

Elk Run

Mixed Wild Brook/Brown Trout

Limits: From confluence with Thompson headwaters downstream to mouth

Length: 8.7 km; 5.4 mi. Total Alkalinity: 26

Owner: 93% Private Open Nearest Town: Watrous

7% Private Closed

Table A-8 (Continued)

Fahnestock Run

Mixed Wild Brook/Brown Trout

Limits: From headwaters downstream to mouth

Length: 7.2 km; 4.5 mi. Total Alkalinity: 17

Owner: 95% Public Nearest Town: Leetonia

5% Private Open

Fourmile Run

Wild Brook Trout

Limits: From headwaters downstream to mouth

Length: 3.2 km; 2.0 mi. Total Alkalinity: 34

Owner: 96% Public Nearest Town: Tiadaghton

4% Private Open

Francis Branch

Mixed Wild Brook/Brown Trout

Limits: From Francis Road bridge at the confluence with Kramer headwaters downstream to the mouth

Length: 2.8 km; 1.7 mi. Total Alkalinity: 18

Owner: 100% Public Nearest Town: Slate Run

Mill Run

Wild Brook Trout

Limits: From headwaters downstream to mouth

Length: 4.3 km; 2.7 mi. Total Alkalinity: 12

Owner: 100% Public Nearest Town: Gaines

Nickle Run

Wild Brook Trout

Limits: From headwaters downstream to mouth

Length: 6.6 km; 4.1 mi. Total Alkalinity: 2

Owner: 73% Public Nearest Town: Morris

27% Private Open

Right Asaph Run

Wild Brook Trout

Limits: Confluence with Bear Wallow Branch downstream to mouth

Length: 2.7 km; 1.7 mi. Total Alkalinity: 8

Owner: 100% Public Nearest Town: Marsh Creek

Table A-8 (Continued)

Straight Run
Right Branch

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 6.1 km; 3.8 mi. Total Alkalinity: 17
Owner: 100% Public Nearest Town: Marsh Creek

Tioga/Lycoming

Cedar Run

Wild Brown Trout
Limits: From confluence with Fahnestock Run downstream to mouth
Length: 7.4 km; 4.6 mi. Total Alkalinity: 14
Owner: 93% Public Nearest Town: Cedar Run
7% Private Open

Lycoming County

Bear Run

Mixed Wild Brook/Brown Trout
Limits: From headwaters downstream to mouth
Length: 7.5 km; 4.7 mi. Total Alkalinity: 22
Owner: 100% Public Nearest Town: English Center

Callahan Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 3.0 km; 1.9 mi. Total Alkalinity: 10
Owner: 100% Private Nearest Town: Jersey Mills

Dog Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 1.5 km; 0.9 mi. Total Alkalinity: 3
Owner: 100% Private Closed Nearest Town: Salladasburg

Flicks Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 5.1 km; 3.2 mi. Total Alkalinity:
Owner: 50% Public Nearest Town: Buttonwood
50% Private

Table A-8 (Continued)

Mill Run

Wild Brown Trout
Limits: From headwaters downstream to mouth
Length: 6.2 km; 3.8 mi. Total Alkalinity: 10
Owner: 100% Public Nearest Town: Cammal

Miller Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 6.3 km; 3.9 mi. Total Alkalinity: 8
Owner: 100% Public Nearest Town: Cammal

Ramsey Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 4.3 km; 2.7 mi. Total Alkalinity: 4
Owner: 49% Public Nearest Town: Ramsey
51% Private Open

Slate Run

Wild Brown Trout
Limits: From confluence with Francis Branch and Cushman Branch downstream to mouth
Length: 11.5 km; 7.1 mi. Total Alkalinity: 11
Owner: 92% Public Nearest Town: Slate Run
8% Private Open

Trout Run

Mixed Wild Brook/Brown Trout
Limits: From headwaters downstream to mouth
Length: 11.1 km; 6.9 mi. Total Alkalinity: 16
Owner: 59% Public Nearest Town: Cedar Run
32% Private Open; 9% Private Closed

Truman Run

Wild Brook Trout
Limits: From headwaters downstream to mouth
Length: 3.5 km; 2.2 mi. Total Alkalinity: 14
Owner: 78% Public Nearest Town: Jersey Mills
22% Private Open

*Fish and Boat Commission

Table A-9: Streams in the Pine Creek Watershed Supporting Natural Trout Reproduction in 2004*

Potter County

STREAM	TRIBUTARY TO	SECTION LIMITS
Barn Brook	Pine Creek	Headwaters downstream to mouth
Beech Flats Run	West Branch Pine Creek	Headwaters downstream to mouth
Buckseller Run	Pine Creek	Headwaters downstream to mouth
Cabin Run	Pine Creek	Headwaters downstream to mouth
California Creek	Genesee Forks	Headwaters downstream to mouth
Commissioner Run	Ninemile Run	Headwaters downstream to mouth
Crippen Run	West Branch Pine Creek	Headwaters downstream to mouth
Darling Run	"Road Hollow"	Headwaters downstream to mouth
Dry Run	Ninemile Run	Headwaters downstream to mouth
Dry Run	Genesee Forks	Headwaters downstream to mouth
Dry Run	Trout Run	Headwaters downstream to mouth
Genesee Forks	Pine Creek	Headwaters downstream to mouth
Indian Run	West Branch Pine Creek	Headwaters downstream to mouth
Johnson Brook	Pine Creek	Headwaters downstream to mouth
Jones Run	Pine Creek	Headwaters downstream to mouth
Laurel Run	Phoenix Run	Headwaters downstream to mouth
Little Phoenix Run	Phoenix Run	Headwaters downstream to mouth
Losey Run	Pine Creek	Headwaters downstream to mouth
Lyman Run	West Branch Pine Creek	Headwaters downstream to mouth
Ninemile Run	Pine Creek	Headwaters downstream to mouth
Rock Run	Lyman Run	Headwaters downstream to mouth
Stonylick Run	Phoenix Run	Headwaters downstream to mouth
Sugar Bush Run	West Branch Pine Creek	Headwaters downstream to mouth
Sunken Branch	West Branch Pine Creek	Headwaters downstream to mouth
Thunder Run	Johnson Brook	Headwaters downstream to mouth
West Branch Pine Creek	Pine Creek	Headwaters downstream to mouth

Table A-9 (Continued)		
Wetmore Run	West Branch Pine Creek	Headwaters downstream to mouth
Ansley Hollow"	Pine Creek	Headwaters downstream to mouth
"Baldwin Hollow"	Genesee Forks	Headwaters downstream to mouth
"Barnes Hollow"	Sunken Branch	Headwaters downstream to mouth
"Beech Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Big Fill Hollow"	Ninemile Run	Headwaters downstream to mouth
"Binky Hollow"	Lyman Run	Headwaters downstream to mouth
"Brown Hollow"	Lyman Run	Headwaters downstream to mouth
"Burdock Hollow"	Lyman Run	Headwaters downstream to mouth
"Crandall Hollow"	Pine Creek	Headwaters downstream to mouth
"Crippen Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Crowell Hollow"	Ninemile Run	Headwaters downstream to mouth
"Cushing Hollow"	Genesee Forks	Headwaters downstream to mouth
"Daggett Hollow"	Lyman Run	Headwaters downstream to mouth
"Egler Hollow"	Pine Creek	Headwaters downstream to mouth
"Elm Hollow"	Ninemile Run	Headwaters downstream to mouth
"Falling Springs Hollow"	Pine Creek	Headwaters downstream to mouth
"Fay Hollow"	"Baldwin Hollow"	Headwaters downstream to mouth
"Flynn Hollow"	Genesee Forks	Headwaters downstream to mouth
"Hardscrabble Hollow"	Genesee Forks	Headwaters downstream to mouth
"Hartle Hollow"	Genesee Forks	Headwaters downstream to mouth
"Healey Hollow"	"Brown Hollow"	Headwaters downstream to mouth
"Hopper House Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Hults Hollow"	Crippen Run	Headwaters downstream to mouth
"Jacob Hollow"	Lyman Run	Headwaters downstream to mouth
"Johnson Hollow"	Pine Creek	Headwaters downstream to mouth
"Jordan Hollow"	Little Lyman Run	Headwaters downstream to mouth
"Judson Hollow"	Genesee Forks	Headwaters downstream to mouth
"Kilbourne Hollow"	Pine Creek	Headwaters downstream to mouth
"Lehman Hollow"	Genesee Forks	Headwaters downstream to mouth

Table A-9 (Continued)		
"Louis Main Hollow"	Crippen Run	Headwaters downstream to mouth
"Lower Dry Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Main Lot Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Martin Hollow"	Pine Creek	Headwaters downstream to mouth
"McCarlin Hollow"	Genesee Forks	Headwaters downstream to mouth
"Meeker Hollow"	Pine Creek	Headwaters downstream to mouth
"Mill Hollow"	Pine Creek	Headwaters downstream to mouth
"Osgood Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Palmatier Hollow"	"Splash Dam Hollow"	Headwaters downstream to mouth
Schoolhouse Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Schoolhouse Hollow"	Francis Branch Slate Run	Headwaters downstream to mouth
"Scott Hollow"	Phoenix Run	Headwaters downstream to mouth
Slaughterhouse Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Splash Dam Hollow"	Lyman Run	Headwaters downstream to mouth
"Tom Cabin Hollow"	Pine Creek	Headwaters downstream to mouth
"Tubbs Hollow"	Genesee Forks	Headwaters downstream to mouth
"Upper Dry Hollow"	West Branch Pine Creek	Headwaters downstream to mouth
"Water Tank Hollow"	"Upper Dry Hollow"	Headwaters downstream to mouth
"Wenzel Hollow"	Lyman Run	Headwaters downstream to mouth
"Wheaton Hollow"	Pine Creek	Headwaters downstream to mouth

Tioga County

Asaph Run	Marsh Creek	Headwaters downstream to mouth
Babb Creek	Pine Creek	Benchmark 1698 upstream of Sand Run to Lick Creek
Baker Branch	Left Asaph Run	Headwaters downstream to mouth
Baldwin Run	Marsh Creek	Headwaters downstream to mouth
Bear Run	Pine Creek	Headwaters downstream to mouth
Bear Run	Cushman Branch Slate Run	Headwaters downstream to mouth

Table A-9 (Continued)		
Bear Wallow Branch	Right Asaph Run	Headwaters downstream to mouth
Bellman Run	Johnson Creek	Headwaters downstream to mouth
Big Run	Pine Creek	Headwaters downstream to mouth
Bend Gully Run	Long Run	Headwaters downstream to mouth
Bloody Run	Elk Run	Headwaters downstream to mouth
Blue Run	Long Run	Headwaters downstream to mouth
Bohen Run	Pine Creek	Headwaters downstream to mouth
Buck Run	Cedar Run	Headwaters downstream to mouth
Burdic Run	Pine Creek	Headwaters downstream to mouth
Campbells Run	Pine Creek	Headwaters downstream to mouth
Canada Run	Marsh Creek	Headwaters downstream to mouth
Chaffee Run	Elk Run	Headwaters downstream to mouth
Clay Mine Run	Pine Creek	Headwaters downstream to mouth
Coon Creek	South Creek	Headwaters downstream to mouth
Cushman Branch Slate Run	Slate Run	Headwaters downstream to mouth
Custard Run	Long Run	Headwaters downstream to mouth
Dantz Run	Marsh Creek	Headwaters downstream to mouth
Darling Run	Pine Creek	Headwaters downstream to mouth
Deer Lick Run	Baker Branch	Headwaters downstream to mouth
Dixie Run	Babb Creek	Headwaters downstream to mouth
Dyke Creek	Sand Run	Headwaters downstream to mouth
East Branch Canada Run	Canada Run	Headwaters downstream to mouth
East Branch Cedar Run	Cedar Run	Headwaters downstream to mouth
East Mine Hole Run	Mine Hole Run	Headwaters downstream to mouth
Elk Run	Pine Creek	Headwaters downstream to mouth
Fahnestock Run	Cedar Run	Headwaters downstream to mouth
Fall Run	Cedar Run	Headwaters downstream to mouth
Fourmile Run	Pine Creek	Headwaters downstream to mouth

Table A-9 (Continued)		
Francis Branch Slate Run	Slate Run	Headwaters downstream to mouth
Fourmile Run	Pine Creek	Headwaters downstream to mouth
Francis Branch Slate Run	Slate Run	Headwaters downstream to mouth
Fry Fork	Dixie Run	Headwaters downstream to mouth
Frying Pan Run	Cedar Run	Headwaters downstream to mouth
Gal Run	Long Run	Headwaters downstream to mouth
Gilbert Run	East Branch Cedar Run	Headwaters downstream to mouth
Gormania Branch Elk Run	Elk Run	Headwaters downstream to mouth
Harrison Run	Babb Creek	Headwaters downstream to mouth
Horse Run	Canada Run	Headwaters downstream to mouth
Horse Run	Pine Creek	Headwaters downstream to mouth
Ice Break Run	Pine Creek	Headwaters downstream to mouth
Jerry Run	Pine Creek	Headwaters downstream to mouth
Left Asaph Run	Asaph Run	Headwaters downstream to mouth
Left Branch Fourmile Run	Fourmile Run	Headwaters downstream to mouth
Left Straight Run	Straight Run	Headwaters downstream to mouth
Lewis Run	Elk Run	Headwaters downstream to mouth
Lick Creek	Babb Creek	Headwaters downstream to mouth
Lick Run	Pine Creek	Headwaters downstream to mouth
Little Fall Creek	Zimmerman Creek	Headwaters downstream to mouth
Little Fourmile Run	Pine Creek	Headwaters downstream to mouth
Little Slate Run	Pine Creek	Headwaters downstream to mouth
Long Branch	Cedar Run	Headwaters downstream to mouth
Long Run	Pine Creek	Headwaters downstream to mouth
Long Run	Babb Creek	Headwaters downstream to mouth
Mill Run	Elk Run	Headwaters downstream to mouth
Mill Run	Pine Creek	Headwaters downstream to mouth

Table A-9 (Continued)		
Mine Hole Run	Cedar Run	Headwaters downstream to mouth
Nickel Run	Babb Creek	Headwaters downstream to mouth
O'Connor Branch	Left Branch Fourmile Run	Headwaters downstream to mouth
Orchard Spring	Rexford Branch	Headwaters downstream to mouth
Owassee Slide Run	Pine Creek	Headwaters downstream to mouth
Paint Run	Stony Fork	Headwaters to 600m downstream Rattler Mine Rd.
Painter Run	Pine Creek	Headwaters downstream to mouth
Phoenix Run	Pine Creek	Headwaters downstream to mouth
Pinafore Run	Pine Creek	Headwaters downstream to mouth
Pine Island Run	Pine Creek	Headwaters downstream to mouth
Rail Island Run	Pine Creek	Headwaters downstream to mouth
Red Rock Run	Cedar Run	Headwaters downstream to mouth
Rexford Branch	Fourmile Run	Headwaters downstream to mouth
Rice Branch	Left Asaph Run	Headwaters downstream to mouth
Right Asaph Run	Asaph Run	Headwaters downstream to mouth
Right Branch Fourmile Run	Fourmile Run	Headwaters downstream to mouth
Right Straight Run	Straight Run	Headwaters downstream to mouth
Roberts Branch	Right Asaph Run	Headwaters downstream to mouth
Rock Run	Texas Creek	Headwaters downstream to mouth
Rocky Run	Francis Branch Slate Run	Headwaters downstream to mouth
Sand Run	Right Asaph Run	Headwaters downstream to mouth
Sand Run	Babb Creek	Headwaters downstream to mouth
Sand Run	Wilson Creek	Headwaters downstream to mouth
Spinning Wheel Branch	Fahnestock Run	Headwaters downstream to mouth
Steele Run	Pine Creek	Headwaters downstream to mouth
Stone Quarry Run	Pine Creek	Headwaters downstream to mouth
Stony Valley Run	Cushman Br. Slate Run	Headwaters downstream to mouth

Table A-9 (Continued)		
Stowell Run	Pine Creek	Headwaters downstream to mouth
Straight Creek	Pine Creek	Headwaters downstream to mouth
Straight Run	Marsh Creek	Headwaters downstream to mouth
Straight Run	Cedar Run	Headwaters downstream to mouth
Three Springs Run	Zimmerman Creek	Headwaters downstream to mouth
Tumbling Run	Pine Creek	Headwaters downstream to mouth
Tumbling Run	Cedar Run	Headwaters downstream to mouth
Water Tank Run	Pine Creek	Headwaters downstream to mouth
Wattles Run	Long Run	Headwaters downstream to mouth
West Branch Cedar Run	Cedar Run	Headwaters downstream to mouth
West Mine Hole Run	Mine Hole Run	Headwaters downstream to mouth
Wetmore Run	Elk Run	Headwaters downstream to mouth
"Apple Tree Hollow"	Cushman Branch Slate Run	Headwaters downstream to mouth
"Beaver Hollow"	Frying Pan Run	Headwaters downstream to mouth
"Bee Tree Hollow"	Pine Creek	Headwaters downstream to mouth
"Benaur Hollow"	Pine Creek	Headwaters downstream to mouth
"Benjamin Hollow"	Pine Creek	Headwaters downstream to mouth
"Big Bridge Hollow"	Pine Creek	Headwaters downstream to mouth
"Big Hollow"	Germania Branch Elk Run	Headwaters downstream to mouth
"Birch Hollow"	Bear Run	Headwaters downstream to mouth
"Boose Hollow"	Wilson Creek	Headwaters downstream to mouth
"Brackman Hollow"	"Apple Tree Hollow"	Headwaters downstream to mouth
"Brill Hollow"	Big Run	Headwaters downstream to mouth
"Camp Hollow"	Cushman Branch Slate Run	Headwaters downstream to mouth
"Compound Hollow"	Asaph Run	Headwaters downstream to mouth
"Dam Hollow"	Cedar Run	Headwaters downstream to mouth
"Dark Hollow"	"Dry Hollow"	Headwaters downstream to mouth
"Dead Horse Hollow"	Mill Run	Headwaters downstream to mouth

Table A-9 (Continued)		
"Deadman Hollow"	Painter Run	Headwaters downstream to mouth
"Deer Lick Hollow"	Lick Run	Headwaters downstream to mouth
"Dewey Hollow"	Elk Run	Headwaters downstream to mouth
"Dillon Hollow"	Pine Creek	Headwaters downstream to mouth
"Dixon Hollow"	Buck Run	Headwaters downstream to mouth
"Farmer Shanty Hollow"	Cushman Branch Slate Run	Headwaters downstream to mouth
"Filmore Hollow"	Buck Run	Headwaters downstream to mouth
"Frying Pan Hollow"	Left Asaph Run	Headwaters downstream to mouth
"Gas Well Hollow"	Cushman Branch Slate Run	Headwaters downstream to mouth
"Gleason Hollow"	Cedar Run	Headwaters downstream to mouth
"Good Spring Hollow"	Pine Creek	Headwaters downstream to mouth
"Goodall Hollow"	Asaph Run	Headwaters downstream to mouth
"Grim Hollow"	Germania Branch Elk Run	Headwaters downstream to mouth
"Hamilton Hollow"	Cedar Run	Headwaters downstream to mouth
"Herrington Hollow"	Pine Creek	Headwaters downstream to mouth
"Hoadley Hollow"	Asaph Run	Headwaters downstream to mouth
"Indian Bill Hollow"	Frying Pan Run	Headwaters downstream to mouth
"Jenkins Hollow"	Frying Pan Run	Headwaters downstream to mouth
"John Smith Hollow"	Elk Run	Headwaters downstream to mouth
"Kinney Hollow"	Marsh Creek	Headwaters downstream to mouth
"Kramer Hollow"	Francis Branch Slate Run	Headwaters downstream to mouth
"Left Frying Pan Hollow"	"Frying Pan Hollow"	Headwaters downstream to mouth
"Love Hollow"	Dixie Run	Headwaters downstream to mouth
"Madison Hollow"	Elk Run	Headwaters downstream to mouth
"Madison Hollow"	Lick Run	Headwaters downstream to mouth
"Maynard Hollow"	Germania Branch Elk Run	Headwaters downstream to mouth

Table A-9 (Continued)		
"McCracken Hollow"	Elk Run	Headwaters downstream to mouth
"Mitchell Hollow"	Elk Run	Headwaters downstream to mouth
"Randall Hollow"	Francis Branch Slate Run	Headwaters downstream to mouth
"Schanbacher Hollow"	Pine Creek	Headwaters downstream to mouth
"Schoonover Hollow"	Elk Run	Headwaters downstream to mouth
"Scotch Pine Hollow"	Asaph Run	Headwaters downstream to mouth
"Shin Hollow"	Pine Creek	Headwaters downstream to mouth
"Skunk Hollow"	Dixie Run	Headwaters downstream to mouth
"Slide Island Draft"	Cedar Run	Headwaters downstream to mouth
"Straitz Hollow"	Elk Run	Headwaters downstream to mouth
"Swope Hollow"	"Big Hollow"	Headwaters downstream to mouth
"Thompson Hollow"	Elk Run	Headwaters downstream to mouth
"Walker Hollow"	Left Straight Run	Headwaters downstream to mouth
"Water Trough Hollow"	Elk Run	Headwaters downstream to mouth
"Whitney Hollow"	Lick Run	Headwaters downstream to mouth
"Wildcat Hollow"	Left Straight Run	Headwaters downstream to mouth
"Winnie Hollow"	Bear Run	Headwaters downstream to mouth
"Woodruff Hollow"	Pine Creek	Headwaters downstream to mouth

Lycoming County

Bark Cabin Run	Otter Run	Headwaters downstream to mouth
Bear Run	Little Pine Creek	Headwaters downstream to mouth
Bennys Run	Bark Cabin Run	Headwaters downstream to mouth
Blacks Creek	Blockhouse Creek	Headwaters downstream to mouth
Blockhouse Creek	Little Pine Creek	Headwaters downstream to mouth
Bluestone Run	Pine Creek	Headwaters downstream to mouth
Bonnell Run	Pine Creek	Headwaters downstream to mouth
Bonnell Run	Little Pine Creek	Headwaters downstream to mouth
Bonnell Run	Pine Creek	Headwaters downstream to mouth

Table A-9 (Continued)		
Boone Run	Little Pine Creek	Headwaters downstream to mouth
Brown Fork	Trout Run	Headwaters downstream to mouth
Browns Run	Pine Creek	Headwaters downstream to mouth
Bull Run	Mill Run	Headwaters downstream to mouth
Bull Run	Pine Creek	Headwaters downstream to mouth
Burnt Shanty Run	Trout Run	Headwaters downstream to mouth
Bush Run	Little Pine Creek	Headwaters downstream to mouth
Callahan Run	Pine Creek	Headwaters downstream to mouth
Callahan Run	Pine Creek	Headwaters downstream to mouth
Carson Run	English Run	Headwaters downstream to mouth
Carsons Run	Little Pine Creek	Headwaters downstream to mouth
Cedar Run	Pine Creek	Headwaters downstream to mouth
Dam Run	Little Pine Creek	Headwaters downstream to mouth
Daugherty Branch	Manor Fork	Headwaters downstream to mouth
Elk Run	Pine Creek	Headwaters downstream to mouth
English Run	Browns Run	Headwaters downstream to mouth
English Run	Little Pine Creek	Headwaters downstream to mouth
English Run	Little Pine Creek	Headwaters downstream to mouth
First Big Fork	Trout Run	Headwaters downstream to mouth
First Branch Ott Fork	Ott Fork	Headwaters downstream to mouth
Flicks Run	Blockhouse Creek	Headwaters downstream to mouth
Fourmile Run	Texas Creek	Headwaters downstream to mouth
Furnace Run	Pine Creek	Headwaters downstream to mouth
Gamble Fork	Gamble Run	Headwaters downstream to mouth
Gamble Run	Pine Creek	Headwaters downstream to mouth
Gamble Run	Pine Creek	Headwaters downstream to mouth
Hackett Fork	Otter Run	Headwaters downstream to mouth
Hilborn Run	Pine Creek	Headwaters downstream to mouth
Hughes Run	Texas Creek	Headwaters downstream to mouth
Jack Cammals Camp Run	Buckeye Run	Headwaters downstream to mouth

Table A-9 (Continued)		
Jacobs Run	Pine Creek	Headwaters downstream to mouth
Left Fork Mill Run	Mill Run	Headwaters downstream to mouth
Left Fork Miller Run	Miller Run	Headwaters downstream to mouth
Left Fork Otter Run	Otter Run	Headwaters downstream to mouth
Lick Run	Little Pine Creek	Headwaters downstream to mouth
Little Daugherty Run	Daugherty Branch	Headwaters downstream to mouth
Little Morris Run	Morris Run	Headwaters downstream to mouth
Little Pine Creek	Pine Creek	Headwaters downstream to mouth
Little Slate Run	Pine Creek	Headwaters downstream to mouth
Lloyd Run	Pine Creek	Headwaters downstream to mouth
Love Run	Little Pine Creek	Headwaters downstream to mouth
Lower Pine Bottom Run	Pine Creek	Headwaters downstream to mouth
Manor Fork	Slate Run	Headwaters downstream to mouth
McClure Run	Pine Creek	Headwaters downstream to mouth
Mill Run	Pine Creek	Headwaters downstream to mouth
Miller Run	Pine Creek	Headwaters downstream to mouth
Morris Run	Slate Run	Headwaters downstream to mouth
Mullen Run	Callahan Run	Headwaters downstream to mouth
Naval Run	Pine Creek	Headwaters downstream to mouth
Naval Run	Little Pine Creek	Headwaters downstream to mouth
Nepley Fork	Gamble Run	Headwaters downstream to mouth
North Fork Tombs Run	Tombs Run	Headwaters downstream to mouth
Opossum Run	Zimmerman Creek	Headwaters downstream to mouth
Ott Fork	Upper Pine Bottom Run	Headwaters downstream to mouth
Ott Fork	Bark Cabin Run	Headwaters downstream to mouth
Otter Run	Little Pine Creek	Headwaters downstream to mouth
Packhorse Creek	Steam Valley Run	Headwaters downstream to mouth
Panther Run	Little Pine Creek	Headwaters downstream to mouth
Pine Run	English Run	Headwaters downstream to mouth
Ramsey Run	Pine Creek	Headwaters downstream to mouth

Table A-9 (Continued)		
Red Run	Slate Run	Headwaters downstream to mouth
Right Fork Mill Run	Mill Run	Headwaters downstream to mouth
Right Fork Otter Run	Otter Run	Headwaters downstream to mouth
Rogers Run	Little Pine Creek	Headwaters downstream to mouth
Schoolhouse Run	Pine Creek	Headwaters downstream to mouth
Schoolhouse Run	Blockhouse Creek	Headwaters downstream to mouth
Schultz Fork	Gamble Run	Headwaters downstream to mouth
Sebring Branch	Mill Run	Headwaters downstream to mouth
Second Big Fork	Trout Run	Headwaters downstream to mouth
Second Branch Ott Fork	Ott Fork	Headwaters downstream to mouth
Shanty Run	Pine Creek	Headwaters downstream to mouth
Sherman Fork	Trout Run	Headwaters downstream to mouth
Silver Branch	Otter Run	Headwaters downstream to mouth
Slate Run	Pine Creek	Headwaters downstream to mouth
Smith Run	Texas Creek	Headwaters downstream to mouth
Solomon Run	Pine Creek	Headwaters downstream to mouth
Steam Valley Run	Blockhouse Creek	Headwaters downstream to mouth
Texas Creek	Little Pine Creek	Headwaters downstream to mouth
Tombs Run	Pine Creek	Headwaters downstream to mouth
Trout Run	Pine Creek	Headwaters downstream to mouth
Trout Run	Pine Creek	Headwaters downstream to mouth
Truman Run	Pine Creek	Headwaters downstream to mouth
Upper Pine Bottom Run	Pine Creek	Headwaters downstream to mouth
Veley Fork	Upper Pine Bottom Run	Headwaters downstream to mouth
Wilcox Run	Trout Run	Headwaters downstream to mouth
Wolf Run	Texas Creek	Headwaters downstream to mouth
Woodhouse Run	Pine Creek	Headwaters downstream to mouth
Zimmerman Creek	Texas Creek	Headwaters downstream to mouth
Zinck Fork	Upper Pine Bottom Run	Headwaters downstream to mouth
"Appletree Hollow"	Elk Run	Headwaters downstream to mouth

Table A-9 (Continued)		
"Basswood Hollow"	Mill Run	Headwaters downstream to mouth
"Bear Hollow"	Blockhouse Creek	Headwaters downstream to mouth
"Big Dam Hollow"	Slate Run	Headwaters downstream to mouth
"Broughton Hollow"	English Run	Headwaters downstream to mouth
"Campbell Hollow"	Big Run	Headwaters downstream to mouth
"Cannon Hole Hollow"	Trout Run	Headwaters downstream to mouth
"Gibson Hollow"	Mill Run	Headwaters downstream to mouth
"Gorman Draft"	Lower Pine Bottom Run	Headwaters downstream to mouth
"Hoyt Hollow"	Trout Run	Headwaters downstream to mouth
"Jug Hollow"	"Big Dam Hollow"	Headwaters downstream to mouth
"La Porte Hollow"	English Run	Headwaters downstream to mouth
"Layton Draft"	Otter Run	Headwaters downstream to mouth
"Monks Hollow"	Elk Run	Headwaters downstream to mouth
"Number Three Hollow"	Trout Run	Headwaters downstream to mouth
"O'Brian Hollow"	Mill Run	Headwaters downstream to mouth
"Parker Hollow"	Little Pine Creek	Headwaters downstream to mouth
"Peachtree Hollow"	Sebring Branch	Headwaters downstream to mouth
”Pine Hollow"	Lower Pine Bottom Run	Headwaters downstream to mouth
"Putt Hollow"	Slate Run	Headwaters downstream to mouth
"Schoolhouse Hollow"	Little Pine Creek	Headwaters downstream to mouth
"Shadrach Draft"	Lick Run	Headwaters downstream to mouth
"Stradley Hollow"	Left Fork Mill Run	Headwaters downstream to mouth
"Sunny Hollow"	Dam Run	Headwaters downstream to mouth
"Thurston Draft"	Bear Run	Headwaters downstream to mouth
"Watt Hollow"	Mill Run	Headwaters downstream to mouth
"Wheatfield Hollow"	Trout Run	Headwaters downstream to mouth

*Fish and Boat Commission
“local name” - Streams with quotations are not official stream names and will not be found on most maps.

Table A-10: Listing of Streams in the Pine Creek Watershed Designated as Wilderness Trout Streams in 2004*

Potter County

Johnson Brook Wild Brook Trout

Limits: From headwaters downstream to SGL boundary above Thunder Run
Length: 5.6 km; 3.5 mi. DER WQ Class: EV
Biomass Class: A ST = 35.19 kg/ha
Surveyed: 1987

Stony Lick Run Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 5.2 km; 3.2 mi. DER WQ Class: EV
Biomass Class: A BT = 1.79 kg/ha
Surveyed: 1986 ST = 33.06 kg/ha

Tioga County

Cushman Branch Mixed Wild Brook/Brown Trout

Limits: From headwaters downstream to confluence with Bear Run
Length: 6.0 km; 3.7 mi. DER WQ Class: EV
Biomass Class: A BT = 14.36 kg/ha
Surveyed: 1986 ST = 31.66 kg/ha

Long Run Wild Brook Trout

Limits: From headwaters downstream to confluence with Custard Run
Length: 7.4 km; 4.6 mi. DER WQ Class: EV
Biomass Class: B ST = 26.15 kg/ha
Surveyed: 1987

Nickel Run Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 6.6 km; 4.1 mi. DER WQ Class: EV
Biomass Class: A ST = 35.16 kg/ha
Surveyed: 1984

Pine Island Run Wild Brook Trout

Limits: From headwaters downstream to mouth
Length: 4.1 km; 2.5 mi. DER WQ Class: EV
Biomass Class: D ST = 0.25 kg/ha
Surveyed: 1983

Table A-10 (Continued)

Lycoming County

Mill Run Wild Brown Trout

Limits: From headwaters downstream to mouth
Length: 6.2 km; 3.8 mi. DER WQ Class: EV
Biomass Class: A BT = 54.43 kg/ha
Surveyed: 1987 ST = 5.61 kg/ha

*Fish and Boat Commission

Table A-11a: Water Quality Data from 2003

The water quality data presented is from a study completed in the summer of 2003 by Clean Water Institute/Lycoming College interns Jen Shaffer and Drew Zimmerman.

Parameters	Site 1	Site 1	Site 2	Site 2	Site 3	Site 3
	Jersey Shore	Standard Dev	Ramsey	Standard Dev	Waterville	Standard Dev
Date	6/19/03		6/19/03		6/19/03	
Lat/ Long	N41° 12.037'		N41° 17.064		N41° 18.685	
	W77° 17.825'		W77° 19.260'		W77° 22.650	
pH	6.66	0.034	6.63	0.025	6.84	0.023
Conductivity (µs/cm)	79.1	0.484	87.5	0.324	79.2	0.487
Alkalinity (ppm)	18	2.83	15	1.23	17	0.5
Orthophosphate (ppm)	0.15	0.044	0.06	0.029	0.17	0.032
Phosphorous (ppm)	0	0.007	0.01	0.015	0	0
Nitrate (ppm)	0.1	0	0.1	0.014	0.1	
Nitrite (ppm)	0.006	0.0007	0.007	0.002	0.006	0.003
DO (ppm)	6.64		10.63		9.63	
Temp (°C)	15.9		11.9		15.6	

Parameters	Site 4	Site 4	Site 5	Site 5	Site 6	Site 6
	Jersey Mills	Standard Dev	Slate Run	Standard Dev	Cedar Run	Standard Dev
Date	6/18/03		6/18/03		6/18/03	
Lat/ Long	N41° 21.381’		N41° 28.276’		N41° 31.424’	
	W77° 24.323		W77° 30.159”		W77° 26.878’	
pH	6.67	0.042	6.85	0.0725	6.83	0.354
Conductivity (µs/cm)	76.5	0.285	83.7	0.367	88.3	0.263
Alkalinity (ppm)	15	0.12	17	0.16	18	0.14
Orthophosphate(ppm)	0.08	0.026	0.16	0.037	0.15	0.053
Phosphorous (ppm)	0.01	0	0.01	0	0	0
Nitrate (ppm)	0.1	0.014	0.3	0.0125	0.2	0.141
Nitrite (ppm)	0.005	0.0007	0.005	0.0012	0.005	0.0007
DO (ppm)	9.62		10.05		9.95	
Temp (°C)	15.2		14.8		14.6	
Turbidity	3	0	2	0	4	0.05

Table A-11a (Continued)

Parameters	Site 7	Site 7	Site 8		Site 9	Site 9
	Blackwell	Standard Dev	Ansonia	Standard Dev	Gains	Standard Dev
Date	6/19/03				6/26/03	
Lat/ Long						
pH	6.7	0.435	6.5	0.03	6.47	0.043
Conductivity (µs/cm)	78.7	0.378	66.1	1.1	65.9	1.13
Alkalinity (ppm)	20	0.12	15.2	0.5	10.5	0.577
Orthophosphate(ppm)	0.09	0.063	0.21	0.01	0.28	0.021
Phosphorous (ppm)	0.005	0.003	0.02	0.006	0.02	0.007
Nitrate (ppm)	0.8	0.132	0.9	0	0.9	0
Nitrite (ppm)	0.005	0.0007	0.005	0	0.005	0
DO (ppm)	9.82		9.8		9.85	
Temp (°C)	15.8		15.4		14.3	
Turbidity	0.3	0.05	0.2		0.2	0.05

Parameters	Site 10	Site 10	Site 11 A	Site 11A	Site 11 B	Site 11B
	Galeton	Standard Dev	Waterville	Standard Dev	Little Pine	Standard Dev
Date	6/26/03		6/19/03		6/19/03	
Lat/ Long			N41° 18.597'		N41° 18.477	
			W77° 21.731'		W77° 21.856	
pH	6.16	0.03	6.9	0.042	6.78	0.071
Conductivity (µs/cm)	71.2	0.14	79.5	0.12	88.7	0.49
Alkalinity (ppm)	10.75	0.957	15	0.625	20	1.5
Orthophosphate(ppm)	0.26	0.042	0.08	0.035	0.18	0.0296
Phosphorous (ppm)	0.02	0.042	0	0.007	0	0.024
Nitrate (ppm)	1.1	0.014	0.2	0.015	0.2	0
Nitrite (ppm)	0.005	0	0.005	0	0.005	0.002
DO (ppm)	10.25		9.68		9.68	
Temp (°C)	13		15.7		15.7	
Turbidity	0.2	0.05	0.4	0.05	0.4	0

Table A-11a (Continued)

Parameters	Site 12	Site 12	Site 13	Site 13	Site 14 A	Site 14 A
	Little Pine State Park	Standard Dev	Otter Run	Standard Dev	English Center	Standard Dev
Date	6/19/03		6/19/03		6/19/03	
Lat/ Long						
pH	6.24	0.035	5.99	0.035	6.63	0.148
Conductivity (µs/cm)	90.4	0.566	154.1	0.424	87.3	0.919
Alkalinity (ppm)	13	0	3.5	0.5	17.5	1.5
Orthophosphate(ppm)	0.14	0.028	0.13	0.064	0.09	0.049
Phosphorous (ppm)	0.01	0	0.01	0	0.01	0.014
Nitrate (ppm)	0.7	0	0.5	0	1	0
Nitrite (ppm)	0.006	0	0.008	0.002	0.006	0.0007
DO (ppm)	9.21		10.55		9.95	
Temp (°C)	15.1		1108		14	
Turbidity	0.3	0.05	0.2	0	0.4	0.05

Parameters	Site 15	Site 15	Site 16	Site 16	Site 17	Site 17
	Nauvoo	Standard Dev	Blackwell	Standard Dev	Babb Creek	Standard Dev
Date	7/10/03		6/19/03		6/26/03	
Lat/ Long						
pH	6.85	0.046	6.67	0.0532	6.2	0.12
Conductivity (µs/cm)	178	1.44	160.7	0.392	79.4	0.424
Alkalinity (ppm)	44.5	2.65	10	1.325	6	0
Orthophosphate (ppm)	1.17	0.06	0.09	0.034	0.09	0
Phosphorous (ppm)	0.003	0	0.01	0.007	0.01	0.007
Nitrate (ppm)	0.005	0	0.7	0	0.7	0
Nitrite (ppm)	3	0.05	0.005	0.0007	0.007	0
DO (ppm)	9.06		9.89		9.96	
Temp (°C)	14.5		15.9		13.3	
Turbidity	0.4	0.05	0.5	0.05	0.3	0.05

Table A-11a (Continued)

Parameters	Site 19	Site 19	Site 20	Site 20	Site 21A	Site 21 A
	Germania Station	Standard Dev	Lyman Run	Standard Dev	West Pike	Standard Dev
Date	6/26/03		6/26/03		6/26/03	
Lat/ Long						
pH	6.23	0.016	6.28	0.084	6.47	0.04
Conductivity (µs/cm)	44.7	0.88	49.9	1.25	71.1	0.37
Alkalinity (ppm)	16	0.816	8.5	0.577	12.3	0.957
Orthophosphate(ppm)	0.44	0.021	0.33	0.042	0.37	0.007
Phosphorous (ppm)	0.01	0.014	0.01	0	0.02	0
Nitrate (ppm)	0.9	0	0.9	0.05	1.2	0
Nitrite (ppm)	0.005	0	0.005	0	0.005	0
DO (ppm)	10.46		10.21		10.61	
Temp (°C)	12.4		11.9		11.8	
Turbidity	0.3	0.05	0.3	0	0.2	0

Parameters	Site 21 B	Site 21 B
	Genesee Fork	Standard Dev
Date	6/26/03	
Lat Long		
pH	6.42	0.053
Conductivity (µs/cm)	75	0.37
Alkalinity (ppm)	12.5	1.29
Orthophosphate	0.34	0.028
Phosphorous (ppm)	0.03	0
Nitrate (ppm)	1.3	0
Nitrite (ppm)	0.005	0
DO (ppm)	10.43	
Temp (°C)	12.8	
Turbidity	0.3	0.05

Stream flow at Cedar Run 6/19/03 ~ 1,583 ft per second
Stream flow at Waterville 6/19/03 ~ 1,455 ft per second
Stream flow at Cedar Run 6/26/03 ~ 2,232 ft per second

Table A-11b: Water Quality Based on Chemical and Biological Factors from 2004

The water quality data presented is from a study completed in the summer of 2004 by Clean Water Institute/Lycoming College interns Kristen Colgan and Kristina Kleintop.

Location	Date	pH	Conductivity (µs/cm)	Alkalinity (ppm)	Orthophosphate (ppm)	Phosphorus (ppm)	Nitrate (ppm)	Nitrite (ppm)	DO (ppm)	Temp (ºC)
Galeton A	6/17/2004	7.475	54.2	20	0.07	0.14	1.2	0.0145	8.46	18.8
Galeton B	6/17/2004	7.485	54.4	21	0.07	0.17	1.1	0.0094		
Gaines A	6/17/2004	7.31	51.3	18.5	0.07	0.13	1	0.0097	8.91	19.9
Gaines B	6/17/2004	7.295	51.3	17.5	0.14	0.1	1.1	0.0116		
Ansonia A	6/17/2004	8.08	50.0	20	0.06	0.08	0.9	0.0361	8.99	22.2
Ansonia B	6/17/2004	8.135	50.2	21	0.1	0.09	0.9	0.0118		
Blackwell A	6/8/2004	9.03	46.3	22	0.05	0	1.2	0.0125	10.4	21.2
Blackwell B	6/8/2004	9.15	46	22	0.06	0	1.1	0.0124		
Cedar Run A	6/8/2004	8.97	54.6	22.5	0.06	0	1.3	0.0113	10.4	20.1
Cedar Run B	6/8/2004	9.1	54.4	29	0.08	0	1.5	0.0107		
Slate Run A	6/8/2004	8.82	53.4	22	0.05	0	0.9	0.0121	10.2	20.3
Slate Run B	6/8/2004	8.85	52.4	22	0.04	0	1.1	0.0256		
Ramsey A	6/8/2004	7.62	43.4	16.5	0.06	0	0.8	0.0108	10.4	21.1
Ramsey B	6/8/2004	7.64	43.3	16	0.08	0	0.4	0.0098		
Jersey Mills A	6/8/2004	7.96	45.5	17	0.01	0	0.5	0.0222	10.5	21.2
Jersey Mills B	6/8/2004	7.99	45.5	18	0.02	0	1	0.0059		
Jersey Shore A	6/8/2004	7.21	54	19.5	0.09	0	0.7	0.0108	10.3	22.4
Jersey Shore B	6/8/2004	7.25	54.5	20	0.08	0	0.7	0.0098		

Table A-11c: Coliform Data from 2003

The water quality data presented is from a study completed in the summer of 2003 by Clean Water Institute/Lycoming College interns Jen Shaffer and Drew Zimmerman.

Parameters	Site 1	Site 1	Site 2	Site 2	Site 3	Site 3
	Jersey Shore	Standard Dev	Ramsey	Standard Dev	Waterville	Standard Dev
Date	7/10/03		7/10/03		7/10/03	
E.coli (#/100mL)	14	5.65	5.5	3.54	9.5	2.12
Coliforms (#/100mL)	77.5	14.85	31	1.41	73.5	4.95

Parameters	Site 4	Site 4	Site 5	Site 5	Site 6	Site 6
	Jersey Mills	Standard Dev	Slate Run	Standard Dev	Cedar Run	Standard Dev
Date	7/10/03		7/10/03		7/10/03	
E.coli (#/100mL)	4.5	0.71	23	5.66	8	0
Coliforms (#/100mL)	172.5	99.7	142	86.28	61	35.36

Stream flow at Cedar Run 7/14/03 ~ 188 ft per second
Stream flow at Waterville 7/14/03 ~ 348 ft per second

Table A-12: Treatment Systems Installed in Babb Creek

Project Name	Project Type	Location	Means Accomplished	Date Completed (or Planned)
Lick Creek Diversion Wells	Diversion Wells (2)	Lick Creek	BCWA Funding, volunteer labor, academia design	1990
Klondike Diversion Well	Diversion Well	Lick Creek	BCWA Funding, DEP design	1994
Red Run Diversion Wells	Diversion Wells (2)	Lick Creek	BCWA Funding, DEP design	1995
Arnot Passive Treatment System	SAPS-ALD	Lick Creek	EPA 104(b)3 Grant, DEP design	1995
Klondike Passive Treatment System	SAPS	Lick Creek	EPA 104(b)3 Grant, DEP design, DEP excavation, contracted construction	1998
Antrim Treatment Plant Reconstruction and Perpetual Treatment Trust	Lime Treatment Plant	Wilson Creek	Antrim Mining Company with funds added to trust by BCWA	1998
Klondike Refuse Pile	Surface Regrading and Revegetation	Lick Creek	DCNR Design, BCWA Funding for Construction	1999
State Yard Diversion Well	Diversion Well	Lick Creek	Signor Bros. Contracting	1999
Babb Creek Coal Refuse Railroad Grade Removal	Removal of coal refuse	Along main stem of Babb Creek	Signor Brothers Contracting through Mining Permit	2000
Bear Run Treatment Systems (2)	SAPS (2)	Main stem of Babb Creek	Stott Mining Company through Consent Order	2000
State Yard Treatment System	SAPS, Settling Basin, Manganese Oxidation Pond	Lick Creek	Growing Greener	2002
Rattler Mine Reclamation	90 Acres of Reclamation and Revegetation	Stony Fork Creek	OSM Grant, PGC, and BCWA funding	2003
Rattler Mine Passive Treatment Systems (3)	SAPS, Settling Basins, Wetlands, limestone ponds	Stony Fork Creek	Growing Greener, OSM Grant, BCWA funding	2003
Rattler Mine Limestone Injection	Limestone Sand Slurry injection into Underground Mine	Stony Fork Creek	Growing Greener, OSM Grant	2003
Anna S and Hunters Drift Treatment Systems	8 SAPS, flush ponds, wetlands	Wilson Creek	Growing Greener, OSM Grant, BCWA funding	2004
Mitchell Mine Treatment System	Self Flushing Limestone Treatment Ponds	Wilson Creek	OSM Grant, BCWA funding	2004-2005

Table A-13: Birds Found in the Pine Creek Watershed

COMMON NAME	SCIENTIFIC NAME		COMMON NAME	SCIENTIFIC NAME
Bittern, American	Botaurus lentiginosus		Grouse, Ruffed	Bonasa umbellus
Bittern, Least	Ixobrychus exilis		Goose, Canada	Branta canadensis
Blackbird, Red-winged	Agelaius phoeniceus		Gull, Bonaparte's	Larus philadelphia
Blackbird, Rusty	Euphagus carolinus		Gull, Ring-billed	Larus delawarensis
Blackbird, Eastern	Sialia sialis		Heron, Great Blue	Ardea herodias
Bluebird, Eastern	Sialia sialis		Heron, Green -backed	Butorides striatus
Bobolink	Dolichonyx oryzivorus		Hawk, Broad-winged	Buteo platypterus
Bobwhite	Colinus virginianus		Hawk, Cooper's	Accipiter cooperii
Bufflehead	Bucephala albeola		Hawk, Marsh (Nor. Harrier)	Circus cyaneus
Bunting, Indigo	Passerina cyanea		Hawk, Red-shouldered	Buteo lineatus
Bunting, Snow	Plectrophenax nivalis		Hawk, Red -tailed	Buteo jamaicensis
Canvasback	Aythya valisineria		Hawk, Rough-legged	Buteo lagopus
Cardinal, Common	Cardinalis cardinalis		Hawk, Sharp-shinned	Accipiter striatus
Catbird, Gray	Dumetella carolinensis		Hummingbird, Ruby -throated	Archilochus colubris
Chat, Yellow-breasted	Icteria virens		Jay, Blue	Cyanocitta cristata
Chickadee, Black-capped	Poecile atricapillus		Junco, Dark-eyed	Junco hyemalis
Cowbird, Brown-headed	Molothrus ater		Kestrel, American	Falco sparverius
Creeper, Brown	Certhia americana		Killdeer	Charadrius vociferus
Crow, American	Corvus brachyrhynchos		Kingbird, Eastern	Tyrannus tyrannus
Cuckoo, Black-billed	Coccyzus erythropthalmus		Kingfisher, Belted	Ceryle alcyon
Cuckoo, Yellow-billed	Coccyzus americanus		Kinglet, Golden-crowned	Regulus satrapa
Dove, Mourning	Zenaida macroura		Kinglet, Ruby-crowned	Regulus calendula
Dove, Rock	Columba livia		Lark, Horned	Eremophila alpestris
Duck, American Black	Anas rubripes		Longspur, Lapland	Calcarius lapponicus
Duck, Ring-necked	Aythya collaris		Mallard	Anas platyrhynchos
Duck, Wood	Aix sponsa		Martin, Purple	Progne subis
Eagle, Bald	Haliaeetus leucocephalus		Meadowlark, Eastern	Sturnella magna
Egret, Cattle	Bubulcus ibis		Merganser, Common	Mergus merganser
Finch, House	Carpodacus mexicanus		Merganser, Hooded	Lophodytes cucullatus
Finch, Purple	Carpodacus purpureus		Merganser, Red-breasted	Mergus serrator
Flicker, Northern	Colaptes auratus		Merlin	Falco columbarius
Flycatcher, Acadian	Empidonax virescens		Mockingbird, Northern	Mimus polyglottos
Flycatcher, Alder	Empidonax alnorum		Nighthawk, Common	Chordeiles minor
Flycatcher, Great Crested	Myiarchus crinitus		Nuthatch, Red-breasted	Sitta canadensis
Flycather, Least	Empidonax minimus		Nuthatch, White-breasted	Sitta carolinensis
Flycatcher, Willow	Empidonax traillii		Oldsquaw	Clangula hyemalis
Gnatcatcher, Blue-grey	Polioptila caerulea		Oriole, Northern	Icterus galbula
Goldfinch, American	Carduelis tristis		Oriole, Orchard	Icterus spurius
Grackle, Common	Quiscalus quiscula		Ovenbird	Seiurus aurocapillus
Grebe, Pied-billed	Podilymbus podiceps		Osprey	Pandion haliaetus
Grosbeack, Evening	Hesperiphona vespertina		Owl, Barn	Tyto alba
Grosbeak, Rose-breasted	Pheucticus ludovicianus		Owl, Barred	Strix varia

Table A-13 (Continued)

Owl, Great Horned	Bubo virginianus		Sparrow, Song	Melospiza melodia
Owl, Long-eared	Asio otus		Sparrow, Swamp	Melospiza georgiana
Owl, Northern Screech	Otus asio		Sparrow, Tree	Spizella arborea
Owl, Saw-whet	Aegolius acadicus		Sparrow, Vesper	Pooecetes gramineus
Owl, Short-eared	Asio flammeus		Sparrow, White-crowned	Zonotrichia leucophrys
Owl, Snowy	Nyctea scandiaca		Sparrow, White-throated	Zonotrichia albicollis
Peewee, Eastern	Contopus virens		Starling, Common	Sturnus vulgaris
Pheasant, Ring-necked	Phasianus colchicus		Swallow, Bank	Riparia riparia
Phoebe, Eastern	Sayornis phoebe		Swallow, Barn	Hirundo rustica
Pintail, Northern	Anas acuta		Swallow, Cliff	Petrochelidon pyrrhonota
Pipit, Water	Anthus spinoletta		Swallow, Rough-winged	Stelgidopteryx serripennis
Plover, Black-bellied	Pluvialis squatarola		Swallow, Tree	Tachycineta bicolor
Plover, Semipalmated	Charadrius semipalmatus		Swan, Tundra	Olor columbianus
Rail, King	Rallus elegans		Swan, Whistling	Cygnus columbianua
Rail, Virginia	Rallus limicola		Swift, Chimney	Chaetura pelagica
Raven, Northern	Corvus corax		Tanager, Scarlet	Piranga olivacea
Redhead	Aythya americana		Teal, Blue-winged	Anas discors
Redpoll, Common	Carduelis flammea		Teal, Green-winged	Anas crecca
Redstart, American	Setophaga ruticilla		Tern, Black	Chidonias niger
Robin, American	Turdus migratorius		Tern, Caspian	Sterna caspia
Sandpiper, Least	Calidris minutilla		Tern, Common	Sterna hirundo
Sandpiper, Pectoral	Calidris melanotos		Thrasher, Brown	Toxostoma rufum
Sandpiper, Semipalmated	Calidris pusilla		Thrush, Hermit	Catharus guttatus
Sandpiper, Solitary	Tringa solitaria		Thrush, Swainson's	Catharus ustulatus
Sandpiper, Spotted	Actitis macularia		Thrush, Wood	Hylocichla mustelina
Sandpiper, Upland	Bartramia longicauda		Titmouse, Tufted	Baeolophus bicolor
Sapsucker, Yellow-bellied	Sphyrapicus varius		Towhee, Rufous-sided	Pipilo erythrophthalmus
Scaup, Greater	Aythya marila		Turkey	Meleagris gallopavo
Scaup, Lesser	Aythya affinis		Turnstone, Ruddy	Arenaria interpres
Scoter, Black	Melanitta nigra		Veery	Catharus fuscescens
Scoter, White-winged	Melanitta fusca		Vireo, Red-eyed	Vireo olivaceus
Shoveler, Northern	Anas clypeata		Vireo, Solitary	Vireo solitarius
Shrike, Loggerhead	Lanius ludovicianus		Vireo, Warbling	Vireo gilvus
Siskin, Pine	Carduelis pinus		Vireo, White-eyed	Vireo griseus
Snipe, Common	Gallinago gallinago		Vireo, Yellow-throated	Vireo flavifrons
Sora	Porzana carolina		Vulture, Black	Coragyups atratus
Sparrow, Chipping	Spizella passerina		Vulture, Turkey	Cathartes aura
Sparrow, Field	Spizella pusilla		Warbler, Bay-breasted	Dendroica castanea
Sparrow, Fox	Passerella iliaca		Warbler, Blackburnian	Dendroica fusca
Sparrow, Grasshopper	Ammodramus savannarum		Warbler, Blackpoll	Dendroica striata
Sparrow, Henslow's	Ammodramus henslowii		Warbler, Black-and-white	Mniotilta varia
Sparrow, House	Passer domesticus		Warbler, Black-throated Blue	Dendroica caerulescens
Sparrow, Lincoln's	Melospiza lincolnii		Warbler, Black-throated Green	Dendroica higrescens
Sparrow, Savannah	Passerculus sandwichensis		Warbler, Blue-winged	Vermivora pinus

Table A-13 (Continued)

Warbler, Canada	Wilsonia canadensis		Woodpecker, Downy	Picoides pubescens
Warbler, Cape May	Dendroica tigrina		Woodpecker, Hairy	Picoides villosus
Warbler, Cerulean	Dendroica cerulea		Woodpecker, Pileated	Dryocopus pileatus
Warbler, Chestnut-sided	Dendroica pensylvanica		Woodpecker, Red-bellied	Melanerpes carolinus
Warbler, Golden-winged	Vermivora chrysoptera		Woodpecker, Red-headed	Melanerpes erythrocephalus
Warbler, Hooded	Wilsonia citrina		Wren, Carolina	Thryothorus ludovicianus
Warbler, Magnolia	Dendroica magnolia		Wren, House	Troglodytes aedon
Warbler, Mourning	Oporornis philadelphia		Wren, Marsh	Cistothorus palustris
Warbler, Nashville	Vermivora ruficapilla		Wren, Sedge	Cistothorus platensis
Warbler, Pine	Dendroica pinus		Wren, Winter	Troglodytes troglodytes
Warbler, Prairie	Dendroica discolor		Yellowlegs, Greater	Tringa melanoleuca
Warbler, Wilson's	Wilsonia pusilla		Yellowlegs, Lesser	Tringa flavipes
Warbler, Tennessee	Vermivora peregrina		Yellowthroat, Common	Geothlypis trichas
Warbler, Worm-eating	Helmitheros vermivorous			
Warbler, Yellow	Dendroica petechia			
Warbler, Yellow-rumped	Dendroica coronata			
Waterthrush, Louisiana	Seiurus motacilla			
Waterthrush, Northern	Seiurus noveboracensis			
Waxwing, Cedar	Bombycilla cedrorum			
Whip-poor-will	Caprimulgus vociferus			
Widgeon, American	Anas americana			
Woodcock, American	Scolopax minor			

Table A-14: Mammals Found in the Pine Creek Watershed

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Bat, Big Brown	Eptesicus fuscus	Myotis, Keen's	Myotis keenii
Bat, Hoary	Lasiurus cinereus	Myotis, Little Brown	Myotis lucifungus
Bat, Red	Lasiurus borealis	Myotis, Small-footed	Myotis leibii
Bat, Silver Haired	Lasionycteris noctivagans	Otter, River	Lutra canadensis
Bear, Black	Ursus americanus	Oppossom, Virginia	Didelphis virginiana
Beaver	Castor canadensis	Pipistrelle, Eastern	Pipistrellus subflavus
Chipmunk, Eastern	Tamias striatus	Porcupine	Erethizon dorsatum
Cottontail, Eastern	Sylvilagus floridanus	Raccoon	Procyon lotor
Cottontail, New England	Sylvilagus transitionalis	Rat, Norway	Rattus norvegicus
Coyote	Canis latrans	Shrew, Long Tailed or Rock	Srex dispar
Deer, White-tailed	Odocoileus virginianus	Shrew, Masked	Sores cinereus
Elk	Cervus elaphus	Shrew, Short-tailed	Blarina brevicauda
Ermine	Mustela erminea	Shrew, Smokey	Sorex fumeus
Fisher	Martes pennanti	Shrew, Water	Sorex palustris
Fox, Gray	Urocyon cinereoargenteus	Skunk, Striped	Mephitis mephitis
Fox, Red	Vulpes vulpes	Squirrel, Flying Northern	Glaucomys sabrinus
Lemming, Southern Bog	Synaptomys cooperi	Squirrel, Flying Southern	Glaucomys volans
Mink	Mustela vison	Squirrel, Gray	Sciurus carolinensis
Mole, Hairy-tailed	Parascalops breweri	Squirrel, Red	Tamiasciurus hudsonicus
Mole, Star-nosed	Condylura cristata	Vole, Meadow	Microtus pennsylvanicus
Mouse, Deer	Peromyscus maniculatus	Vole, Southern Red-backed	Clethionomys gapperi
Mouse, House	Mus musculus	Vole, Woodland	Microtus pinetorun
Mouse, Meadow Jumping	Zapus hudsonius	Weasel, Least	Mustela nivalis
Mouse, White-footed	Permyscus leucopus	Weasel, Long-tailed	Mustela frenata
Mouse, Woodland Jumping	Napaeozapus insignis	Woodchuck	Marmota monax
Muskrat	Ondatra zibethicus		

Table A-15: Amphibians & Reptiles Found in the Pine Creek Watershed

Amphibians	
COMMON NAME	SCIENTIFIC NAME
Frog, Bull	Rana catesbeiana
Frog, Gray Tree	Hyla versicolor
Frog, Green	Rana clamitans melanota
Frog, Pickerel	Rana palustris
Frog, Wood	Rana sylvatica
Newt, Red-spotted	Notophthalmus viridescens viridescens
Peeper, Northern Spring	Pseudacris crucifer crucifer
Salamander, Four-toed	Hemidactylium scutatum
Salamander, Jefferson	Ambystoma jeffersonianum
Salamander, Longtail	Eurycea longicauda longicauda
Salamander, Mountain Dusky	Desmognathus ochrophaeus
Salamander, Northern Dusky	Desmognathus fuscus fuscus
Salamander, Northern Red	Pseudotriton ruber ruber
Salamander, Northern Spring	Gyrinophilus porphyriticus porphyriticus
Salamander, Northern Two-lined	Eurycea bislineata bislineata
Salamander, Redback	Plethodon cinereus
Salamander, Slimy	Plethodon glutinosus glutinosus
Salamander, Spotted	Ambystoma maculatum
Toad, American	Bufo americanus americanus
Toad, Fowler's	Bufo woodhousii fowleri
Reptiles	
COMMON NAME	SCIENTIFIC NAME
Racer, Northern Black	Coluber constrictor constrictor
Skink, Northern Coal	Eumeces anthracinus anthracinus
Snake, Black Rat	Elaphe obsoleta obsoleta
Snake, Eastern Garter	Thamnophis sirtalis sirtalis
Snake, Eastern Milk	Lampropeltis triangulum triangulum
Snake, Eastern Smooth Green	Opheodrys vernalis vernalis
Snake, Northern Brown	Storeria dekayi dekayi
Snake, Northern Redbelly	Storeria O. Occipitomaculata
Snake, Northern Ribbon	Thamnophis sauritus septentrionalis
Snake Northern Water	Nerodia sipedon sipedon
Snake, Ringneck	Diadophis punctatus edwardsii
Snake, Timber Rattle	Crotalus horridus
Stinkpot	Sternotherus odoratus
Turtle, Eastern Box	Terrapene carolina carolina
Turtle, Midland Painted	Chrysemys picta marginata
Turtle, Northern Snapping	Chelydra serpentina serpentina
Turtle, Spotted	Clemmys guttata
Turtle, Wood	Clemmys inscuplta

Table A-16: Fish Found in the Pine Creek Watershed

List Comprised of Multiple Sources:

1. Cooper and Wagner 1971
2. PA Scenic Rivers Study 1989
3. PA Fish and Boat Database 1994

Common Name	Scientific Name	Citation
Bass, Largemouth	Micropterus salmoides	1,2
Bass, Rock	Ambloplites rupestris	1,2,3
Bass, Smallmouth*	Micropterus dolomieu	1,2,3
Bluegill	Lepomis macrochirus	3
Bullhead, Brown	Ictalurus nebulosus	1,2,3
Bullhead, Yellow	Ameiurus natalis	3
Carp, Common*	Cyprinus carpio	1,2
Chub, Creek	Semotilus atromaculatus	1,2,3
Chub, River	Nocomis micropogon	1,2,3
Chubsucker, Creek	Erimyzon oblongus	1
Crappie, Black	Pomoxis nigromaculatus	3
Dace, Blacknose	Rhinichthys atratulus	1,2,3
Dace, Longnose	Rhinichthys cataractae	1,2,3
Dace, Pearl	Semotilus Margarita	1
Darter, Banded*	Etheostoma zonale	1,2,3
Darter, Shield	Percina peltata	1,2,3
Darter, Tessellated	Etheostoma olmstedi	1,2,3
Eel, American	Anguilla rostrata	1
Fallfish	Semotilus corporalis	1,2,3
Killifish, Banded	Fundulus diaphanus	1,2,3
Madtom, Margined	Notorus insignis	1,2,3
Minnow, Bluntnose	Pimephales notatus	1,2,3
Minnow, Cutlips	Exoglossum maxillingua	1,2,3
Minnow, Fathead	Pimephales promelas	2,3
Muskellunge*	Esox masquinongy	3
Perch, Yellow	Perca flavescens	2,3
Pickerel, Chain	Esox niger	1,2,3
Pumpkinseed	Lepomis gibbosus	1,2,3
Sculpin, Mottled	Cottus bairdi	1,2,3
Sculpin, Slimy	Cottus cognatus	1,2,3
Shiner, Comely	Notropis amoenus	2,3
Shiner, Common	Luxilus cornutus	1,2,3
Shiner, Golden	Notemignus crysoleucas	1
Shiner, Rosyface	Notropis rubellus	1,2,3
Shiner, Satinfin	Cyprinella analostana	2,3
Shiner, Spotfin	Cyprinella spiloptera	1,2,3
Shiner, Spottail	Notropis hudsonius	1,2,3
Shiner, Swallowtail	Notropis procne	1,2,3

Table A-16 (Continued)		
Stoneroller, Central	Campostoma anomalum	1,2,3
Sucker, Northern Hog	Hypentelium nigricans	1,2,3
Sucker, White	Catostomus commersoni	1,2,3
Sunfish, Green*	Lepomis cyanellus	3
Sunfish, Redbreast	Lepomis auritus	1,2,3
Trout, Brook	Salvelinus fontinalis	1,2,3
Trout, Brown*	Salmo trutta	1,2,3
Trout, Palomino	Oncoryhnchus mykiss	2,3
Trout, Rainbow*	Salmo gairdneri	3
Walleye*	Stizostedion vitreum	3

Table A-17: Summary Taxa of Macrobenthos for the Main Branch of Pine Creek

Order	Family	Genus
Amphipoda		
(Scuds)	Talitridae	
		Hyallela
	Gammaridae [6]	
		Gammarus [6]
Annelida		
(Earthworms, Leeches)		
	Oligocheata	
	Hirudinea [6]	
		Hirudidae [6]
Coleoptera		
(Beetles)	Dytiscidae [7]	
	Elmidae	
		Dubiraphia
		Gonielmis [2]
		Microcylloepus [3]
		Optioservus
		Oulimnias [3]
		Promoresia
		Stenelmis
	Gyrinidae	
		Dineutus
	Hydrophilidae	
		Berosus
	Psephenidae	
		Ectopria [2]
		Psenphenus
	Ptilodactylidae [2]	
		Anchytarsus [2]
Decopoda		
(Crayfish)	Astacidae [6]	
	Cambaridae [2]	
		Cambarus [2]
		Orconectes [2]
Diptera		
(Midges, Flies)	Amnicolidae [7]	
	Athericidae	
		Atherix [2]

Table A-17 (Continued)		
	Ceratopogonidae	
	Chironomidae	
		Brilla
		Cardiocladius
		Chironomus
		Cladotanytarsus
		Cricotopus
		Cryptochironomus
		Diamesa
		Dicrotendipes
		Endochironomus
		Epiocladius [10]
		Eukiefferiella
		Glyptotendipes
		Micropsectra
		Microtendipes
		Nanocladius
		Nilotanypus
		Parametriocnemus
		Paratendipes
		Polypedilum
		Pseudochironomus
		Pseudodiamesa
		Rheocricotopus
		Rheotanytarsus
		Sympotthastia
		Tanypodinae
		Tanytarsini
		Tanytarsus
		Thienemanniella
		Thienemannimyia
		Tribelos
		Xenochironomus
		Zavrelia
	Cratopogonidae	
	Empididae	
		Chelifera [4]
		Clinocera [4]
		Hemerodromia [4]
	Psychodidae [7]	
	Rhagionidae [6]	
		Atherix [6]
	Simuliidae	
		Prosimulium [4]
		Simulium
	Stratiomyiidae [6]	

Table A-17 (Continued)		
		Stratiomyia [6]
	Tabanidae [6]	
		Tabanus [6]
		Chrysops [4]
	Tendipedidae [6]	
	Taetanoceriadae [7]	
	Tipulidae	
		Antocha
		Dicranota [4]
		Hexatoma
		Pseudolimnophila [4]
		Tipula
Ephemeroptera		
(Mayflies)	Baetiscidae [4]	
		Baetisca [4]
	Baetidae	
		Acerpenna [2]
		Acentrella [2]
		Baetis
		Cloeon [9]
		Callibaetis [9]
		Ephemerella [6]
		Heterocleon
		Isonychia [6]
		Pseudocleon
	Caenidae	
		Caenis
	Ephemerellidae	
		Attenella [3]
		Dannella
		Drunella
		Ephemerella
		Eurylophella
		Serratella
	Ephemeridae	
		Ephemera
	Heptageniidae	
		Cinygmula [3]
		Epeorus
		Heptagenia [4]
		Leucrocuta
		Macdunnoa [3]
		Rhithrogena [4]
		Stenacron
		Stenonema

Table A-17 (Continued)		
	Isonychiidae [5]	
		Isonychia [5]
	Leptophlebiidae	
		Choroterpes [3]
		Habrophlebiodes [3]
		Habrophlebia
		Leptophlebia
		Paraleptophlebia
	Oligoneuridae	
		Isonychia
	Polymitarcidae	
		Ephoron
	Siplonuridae	
		Siplonurus
	Tricorythidae	
		Tricorythodes
Gastropoda		
(Snails and Limpets)	Amnicolidae [6]	
		Gillia [6]
	Ancylidae	
		Ferrissia [4]
	Lymnaeidae [4]	
		Lymnaea [6]
	Physidae	
		Physa [6]
	Planorbidae [6]	
		Planorbula [6]
	Pleuroceridae [6]	
		Pleurocera [6]
		Lyogyrus [6]
	Viviparidae	
		Viviparus [6]
Isopoda		
(Snowbugs)	Asellidae	
		Asellus
		Lirceus
Megaloptera		
(Alderflies, Dobsonflies, Fishflies)	Corydalidae	
		Chauliodes [3]
		Corydalus
		Nigronia
	Leptoceridae [7]	
	Phryganeidae [7]	

Table A-17 (Continued)		
	Sialidae	
		Sialis
Nematoda		
(Roundworms)		
Odonata		
(Dragonflies and Damselflies)	Anisoptera [6]	
		Boyeria [4]
		Gomphaeschna [6]
		Coryphaeschna [9]
	Aeschnidae	
	Calopterygidae [4]	
		Calopteryx [4]
	Coenagrionidae	
		Argia
	Cordulegastridae	
	Gomphidae	
		Lanthus [4]
		Ophiogomphus [2]
		Stylogomphus [4]
	Libellulidae	
		Somatochlora
	Zygoptera [6]	
Pelecypoda		
(Clams)	Sphaeridae	
		Pisidium [6]
		Musculium [6]
		Sphaerium [6]
Plecoptera		
(Stoneflies)	Capniidae [4]	
		Paracapnia [4]
	Chloroperlidae [4]	
		Sweltsa [4]
		Suwallia [8]
		Utaperla [9]
	Leuctridae	
		Leuctra
		Zealeuctrus [3]
	Nemouridae	
		Amphinemura
		Nemoura [3]
		Prostoia [4]
	Perlidae	

Table A-17 (Continued)		
		Acroneuria
		Agnetina [2]
		Eccoptera [4]
		Neoperia
		Neophasganophora [6]
		Paragnetina
		Perlesta
		Phasganophora
	Perlodidae	
		Diploperla [4]
		Isogenoides [4]
		Isoperia
	Pertoperlidae [9]	
	Pteronarcidae	
		Pteronarcys
	Taeniopterygidae [4]	
		Strophopteryx [4]
		Taeniopteryx [4]
Trichoptera		
(Caddisflies)	Brachycentridae	
		Brachycentrus
		Micrasema
	Glossosomatidae	
		Glossosoma
		Protoptila [2]
	Goeridae [7]	
	Helicopsychidae	
		Helicopsyche
	Hydropsychidae	
		Ceratopsyche [5]
		Cheumatopsyche
		Cheumatopsycho
		Diplectrona [4]
		Hydropsyche
		Hydropsycho
		Macronema
		Parapsyche [9]
		Symphitopsyche [9]
	Hydroptilidae	
		Hydroptila [4]
		Leucotrichia
		Palaegapetus [3]
	Hydrotilidae	
		Ochrotrichia
	Lepidostomatidae	

Table A-17 (Continued)		
		Lepidostoma
	Leptoceridae	
		Ceraclea
		Ocecetis [2]
		Setodes
	Limnephilidae	
		Apatania
		Goera [4]
		Hydatophylax
		Neophylax
		Pycnopsyche [2]
	Odontoceridae	
		Marilia
		Psilotreta [2]
	Philopotamiidae	
		Chimarra
		Dolophilodes
		Wormaldia [4]
	Phryganeidae [9]	
		Ptilostomis [9]
	Polycentropidae	
		Cernotina [3]
		Neureclipsis
		Polycentropus
	Psychomyiidae	
		Lype [4]
		Psychomyia
	Rhyacophilidae	
		Rhyacophila
	Uenoidea [2]	
		Neophylax [2]
Turbellaria		
(Flatworms)	Planariidae [7]	

References:

Data Compiled by Clean Water Institute Interns

*Numbers by the organisms in this report match up to the study in which they were found.
(All unnumbered classifications/organisms are from Hughey's 1992 Bethos report)

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Table A-18: LAND CLASSIFICATIONS

All acreage of State Forest land will be assigned a land classification code. The land classification describes the dominant feature of an area. The land classification is the smallest unit of land that will be inventoried and represents some degree of homogeneity. Subclasses have been established for forested land classes to better describe the unit of land. The following are the complete descriptions and codes for the land classifications. Many land classification units are based on plant community types recognized in *Pennsylvania's Community Classification* (1999). Scientific names are those used in the *Vascular Flora of Pennsylvania: Annotated Checklist and Atlas* (1993). Other types are based on specific anthropogenic use or aquatic systems. The land classifications by category are:

Plant Community Types

Terrestrial Forests:

AD	Dry Oak – Mixed Hardwood Forest
AH	Dry Oak – Heath Forest
AR	Red Oak – Mixed Hardwood Forest
BB	Northern Hardwood Forest
BC	Black Cherry – Northern Hardwood Forest (Allegheny Hardwoods)
CC	Red Maple Forest
CS	Sugar Maple – Basswood Forest
DD	Aspen / Grey (Paper) Birch
EO	Pitch Pine – Mixed Oak Forest (Oak – Hard Pine)
EV	Virginia Pine – Mixed Hardwood Forest
FF	Hemlock (White Pine) Forest
FA	Dry White Pine (Hemlock) – Oak Forest
FB	Hemlock (White Pine) – Northern Hardwood Forest
FR	Hemlock (White Pine) – Red Oak – Mixed Hardwood Forest
FT	Hemlock - Tuliptree - Birch Forest
FM	Hemlock - Rich Mesic Hardwood Forest
GB	Black Gum Ridgetop Forest
LB	Black Locust Forest
MM	Mixed Mesophytic Forest
TM	Tuliptree – (Beech) – Maple Forest
PR	Red Pine – Mixed Hardwood
PP	Pine Plantation
PS	Spruce Plantation
PH	Hardwood Plantation
PX	Miscellaneous / Mixed Species Plantation
MX	Miscellaneous Forest Community Types
	Serpentine Pitch Pine - Oak Forest
	Serpentine Virginia Pine – Oak Forest
	Sweet Gum – Oak Coastal Plain Forest
	Others

Palustrine Forests (includes Floodplain Forests)**:**

UT	Black Spruce - Tamarack Peatland Forest
UK	Red Spruce Palustrine Forest
UF	Hemlock Palustrine Forest
UB	Hemlock – Mixed Hardwood Palustrine Forest
UH	Red Spruce – Mixed Hardwood Palustrine Forest
UA	Bottomland Oak – Hardwood Palustrine Forest
UC	Red Maple – Black Ash Palustrine Forest
UG	Red Maple – Black Gum Palustrine Forest
SC	Red Maple – Elm – Willow Floodplain Swamp
SE	Sycamore – (River Birch) – Box Elder Floodplain Forest
SM	Silver Maple Floodplain Forest
SX	Miscellaneous Palustrine/Floodplain Forest

Terrestrial Woodlands / Shrublands:

O4	Sweetfern Savannah
O5	Woodland
O6	Orchards
O7	Scrub / Shrub

Palustrine Woodlands / Shrublands:

U2	Scrub / Shrub
UX	Palustrine Woodland

Terrestrial Herbaceous Openings:

O1	Natural Herbaceous Area
O2	Cultivated Herbaceous Area
O3	Agriculture Herbaceous Area
OM	Miscellaneous Herbaceous Area

Palustrine Herbaceous Openings:

U4	Emergent Wetland

Palustrine Complex:

U3	Bog / Fen

Non-Vegetated Openings:

O9	Rubble Land
OX	Miscellaneous Non-Vegetated Opening

Aquatic System Types

Lake or Pond:

P1	Human-made Impoundment/Pond
P2	Natural Lake or Pond

Watercourse:

S1	Exceptional value waters
S2	High quality waters
S3	Perennial cold water streams
S4	Wilderness trout streams
S5	Warm water streams
S6	Wild rivers
S7	Scenic rivers
S8	Recreational rivers
S9	Modified recreational rivers
S0	Pastoral rivers

Anthropogenic Types

Roads:

Z1	Public-Use Road
Z2	Drivable Trails
Z3	Administrative Road

Rights-of-Way (R/W):

Q1	Pipeline
Q2	Poleline
Q5	Underground Cable
Q6	Antenna / Tower Site

Leased Areas:

L1	Special Lease Areas

Mineral Sites:

M1	Shale Pit, Borrow Pit, Quarry, Strip-mine, Spoils (not vegetated)
M5	Compressor Site / Pump Station
M6	Well Site (gas, oil, water)
MX	Miscellaneous Mineral Site

Recreational/Cultural Sites:

Y1	State Forest Facility: Forest Headquarters, District Office, Fire Tower, etc.
Y2	Picnic Area
Y3	Vista
Y4	Historical / Archeological Site
Y6	Designated Camping Area
Y7	Access and/or Parking Area
Y8	Miscellaneous
Y9	Leased Camp Site
Y0	Leased Camp Site Colony

Trails:

T0	Designated National Scenic Trail
T9	Designated State Forest Hiking Trail
T8	Designated Local District Trail (Multi-Use)
T7	Designated Local District Trail (Specific-Use)

PLANT COMMUNITY TYPES

TERRESTRIAL FORESTS

Terrestrial Forests are uplands (non-wetlands) dominated by tree species that form at least 30% of the main tree canopy of the area. Terrestrial Forest communities will be classified using the following two-digit alphabetical system for forest community type, followed by a numerical digit for site, then a numerical digit for size and stocking class, followed by a alphabetical digit for commercial/noncommercial availability. Terrestrial forest communities should be a minimum of five acres or larger for delineation. Unique forest communities, less than five acres, may be delineated.

CODE FOREST COMMUNITY TYPE

AD Dry Oak - Mixed Hardwood Forest: This type occurs on less acidic to somewhat calcareous, moderately dry soils. It is most often found on south and southwest-facing slopes. Common trees include *Quercus alba* (white oak), *Betula lenta* (sweet birch), *Carya cordiformis* (shellbark hickory), *Celtis occidentalis* (hackberry), *Acer rubrum* (red maple), *A. saccharum* (sugar maple), *Q. montana* (chestnut oak), *Q. velutina* (black oak), *Q. rubra* (northern red oak), *Carya glabra* (pignut hickory), *Fraxinus americana* (white ash), and *Tilia americana* (basswood). The shrub layer is perhaps more diagnostic. Characteristic shrubs include *Cornus florida* (flowering dogwood), *Carpinus caroliniana* (hornbeam), *Corylus cornuta* (beaked hazelnut), *Amelanchier arborea* (shadbush), *Cercis canadensis* (redbud), and *Ostrya virginiana* (hop-hornbeam). Ericaceous shrubs are uncommon, although *Kalmia latifolia* (mountain laurel) does occur on some sites. This type usually contains a somewhat richer herbaceous flora than the “Dry oak - heath forest”type (although restricted by moisture availability). Herbaceous species include *Smilacina racemosa* (false Solomon’s-seal), *Uvularia sessilifolia* (wild oats), *Polygonatum biflorum* (Solomon’s seal), *Asplenium platyneuron* (ebony spleenwort), *Desmodium* spp. (tick-trefoil), *Hieracium venosum* (rattlesnake weed), *Aralia nudicaulis* (wild sarsaparilla), *Carex pensylvanica* (a sedge), *Carex communis* (a sedge), and *Lysimachia quadrifolia* (whorled loosestrife).
Related types: The “Virginia pine - mixed hardwood forest” type sometimes occurs in association with this type (especially on calcareous shales) and is distinguished by the presence of a substantial conifer component (at least 25% relative cover). The “Dry oak - heath forest” occurs on more acidic sites and is distinguished from this by a clear dominance of ericaceous shrubs in the understory. The “Yellow oak - redbud woodland” type is more strongly calciphilic, with a clear dominance of calciphiles, is much more restricted in distribution and generally has an open canopy.
Range: Entire state except Coastal Plain.

AH Dry Oak - Heath Forest: This is a broadly defined type. These forests occur on xeric to moderately dry, acidic sites, often on shallow or sandy soils and/or steep slopes. The most characteristic tree species for this type is *Quercus montana* (chestnut oak), usually occurring with a mix of *Q. velutina* (black oak), *Q. coccinea* (scarlet oak), and/or *Q. alba* (white oak). Other tree species include *Sassafras albidum* (sassafras), *Nyssa sylvatica* (black-gum), *Betula lenta* (sweet birch), *Acer rubrum* (red maple), *Carya glabra* (pignut hickory), *Pinus rigida* (pitch pine), *P. virginiana* (Virginia pine), and *P. strobus* (eastern white pine). Total cover by conifers generally does not exceed 25% of the canopy. *Castanea dentata* (American chestnut) stump sprouts are not uncommon. The shrub layer is dominantly ericaceous; common species include *Kalmia latifolia* (mountain laurel), *Gaylussacia baccata* (black huckleberry), *Vaccinium pallidum* (lowbush blueberry), *V. angustifolium* (low sweet blueberry), *Viburnum acerifolium* (maple-leaved viburnum), and in more open areas, *Comptonia perigrina* (sweetfern). Owing largely to the thick, resistant oak/ericad leaf litter, the herbaceous layer is generally sparse. Common constituents include *Maianthemum canadense* (Canada mayflower), *Carex pensylvanica* (Pennsylvania sedge), *Carex communis* (a sedge), *Chimaphila maculata* (pipissewa), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (teaberry), *Aralia nudicaulis* (wild sarsaparilla), *Pteridium aquilinum* (bracken fern), and *Cypripedium acaule* (pink lady's-slipper).
Related types: The "Dry oak - mixed hardwood forest" type is similar but occurs on less acidic (and often less dry) sites and does not have an overwhelming dominance of heaths in the shrub layer. As one moves up-slope or toward a drier exposure, the evergreen component may increase and this type may grade into the "Pitch pine - mixed hardwood forest" type. Where the canopy becomes open, with trees over five meters high covering less than 60% of the site overall, this becomes the "Dry oak-heath woodland" type.
Range: Entire state.
AR Red Oak - Mixed Hardwood Forest: This broadly defined type includes much of Pennsylvania's hardwood-dominated forests occurring on fairly mesic sites and, therefore, is quite variable in composition. *Quercus rubra* (northern red oak) is usually present, often dominant/codominant, most often with *Acer rubrum* (red maple), *Quercus velutina* (black oak), *Q. alba* (white oak), *Carya tomentosa* (mockernut hickory), *C. ovata* (shagbark hickory), *Betula lenta* (sweet birch), *B. alleghaniensis* (yellow birch), *Fraxinus americana* (white ash), *Fagus grandifolia* (American beech), and/or *Liriodendron tulipifera* (tuliptree). Shrubs include *Viburnum recognitum* (northern arrow-wood), *V. dentatum* (southern arrow-wood), *V. acerifolium* (maple-leaved viburnum), *Amelanchier laevis* (smooth serviceberry), *A. arborea* (shadbush), *Kalmia latifolia* (mountain laurel), *Carpinus caroliniana* (hornbeam), *Ostrya virginiana* (hophornbeam), *Hamamelis virginiana* (witch-hazel), and *Lindera benzoin* (spicebush). The herbaceous layer is highly variable. Representative species include *Uvularia sessilifolia* (wild-oats), *Smilacina racemosa* (false Solomon's-seal), *Podophyllum peltatum* (May-apple), *Chimaphila maculata* (pipissewa), *Gaultheria procumbens* (teaberry), *Medeola virginiana* (Indian cucumber-root), *Caulophyllum thalictroides* (blue cohosh)-on richer sites, *Dryopteris* spp. (wood ferns), and *Dennstaedtia punctilobula* (hay-scented fern).

Related types: The “Hemlock (white pine) - red oak - mixed hardwood forest” type is distinguished from this by the presence of at least 25% relative cover by hemlock and/or white pine. The “Northern hardwood forest” is distinguished by a greater percentage of birches, maples, and beech, and less oak.
Range: Entire state, although less common on the Unglaciated Allegheny Plateau.

BB Northern Hardwood Forest: Dominant trees usually include *Fagus grandifolia* (American beech), *Acer rubrum* (red maple), *A. saccharum* (sugar maple), *Prunus serotina* (black cherry)-at less than 40% relative cover, *Betula lenta* (sweet birch), *B. alleghaniensis* (yellow birch), *B. papyrifera* (paper birch), *Q. rubra* (northern red oak), and *Fraxinus americana* (white ash). This type may contain scattered *Pinus strobes* (eastern white pine) and/or *Tsuga canadensis* (eastern hemlock), but combined conifer cover does not exceed 25% of the canopy. *Rhododendron maximum* (rosebay) may be locally abundant. Other common shrubs include *Hamamelis virginiana* (witch-hazel), *Acer pensylvanicum* (striped maple), *Viburnum lantanoides* (witch-hobble), *Ilex montana* (mountain holly), *Amelanchier laevis* (smooth serviceberry), *A. arborea* (shadbush), and *Carpinus caroliniana* (hornbeam). The herbaceous layer is generally sparse and reflects a northern affinity; common components include *Maianthemum canadense* (Canada mayflower), *Trientalis borealis* (starflower), *Thelypteris novaboracensis* (New York fern), *Dryopteris carthusiana* (fancy fern), *Lycopodium lucidulum* (shining clubmoss), *Gaultheria procumbens* (teaberry), *Mitchella repens* (partridge-berry), *Aralia nudicaulis* (wild sarsaparilla), *Medeola virginiana* (Indian cucumber-root), and *Maianthemum canadense* (Canada mayflower).
Related types: If combined relative cover by conifers approaches or exceeds 25%, please read description for the “Hemlock (white pine) - northern hardwood forest.” If cover by *Prunus serotina* (black cherry) approaches or exceeds 40% of canopy, please read description for the “Black cherry - northern hardwood forest” type.
Range: Glaciated NE, Glaciated NW, Pocono Plateau, Unglaciated Allegheny Plateau.

BC Black Cherry - Northern Hardwood Forest: (Allegheny Hardwoods). This type is characterized by at least 40% *Prunus serotina* (black cherry) and is most characteristic of the Unglaciated Allegheny Plateau. Common associates are *Acer rubrum* (red maple), *A. saccharum* (sugar maple), *Betula lenta* (sweet birch), *B. alleghaniensis* (yellow birch), *Fagus grandifolia* (American beech), and *Quercus* spp. (oaks), usually *Q. rubra* (northern red oak). *Pinus strobus* (eastern white pine) and/or *Tsuga canadensis* (eastern hemlock) may be present (at less than 25% relative cover). Shrubs include *Viburnum lantanoides* (witch hobble), *Acer pensylvanicum* (striped maple), *Rubus allegheniensis* (Allegheny blackberry), *Ilex montana* (mountain holly), *Hamamelis virginiana* (witchhazel), and *Amelanchier arborea* (shadbush). Common herbaceous species include *Dennstaedtia punctilobula* (hay-scented fern), *Thelypteris novaboracensis* (New York fern), *Dryopteris intermedia* (common wood fern), *Lycopodium* spp. (ground pine), *Aster acuminatus* (wood aster), *Viola* spp. (violets), *Medeola virginiana* (Indian cucumber-root),
Uvularia sessilifolia (wild-oats), *Brachyelytrum erectum* (brachyelytrum),

Maianthemum canadense (Canada mayflower), and *Oxalis acetosella* (common wood-sorrel).
Related types: The "Northern hardwood forest" may contain *Prunus serotina* (black cherry) as a component, but it generally does not exceed 40% relative cover. This type is most characteristic of the Unglaciated Allegheny Plateau.
Range: Glaciated NE, Glaciated NW, Unglaciated Allegheny Plateau.

CC Red Maple Forest: This is generally an early to mid-successional type that is becoming increasingly common as red maple increases in Pennsylvania's forests. This type is seldom pure, but *Acer rubrum* (red maple) dominates the tree stratum. Associated species include *Quercus* spp. (oaks), *Betula lenta* (sweet birch), *Liriodendron tulipifera* (tuliptree), *Carya* spp. (hickories), *Fraxinus americana* (white ash), *Prunus serotina* (black cherry), and other hardwoods. Because *Acer rubrum* (red maple) has such wide ecological amplitude, this type may occur from the upper through the lower slope. Accordingly, the associated species vary greatly. Some shrubs commonly present include *Viburnum acerifolium* (maple-leaved viburnum), *Lindera benzoin* (spicebush), *Hamamelis virginiana* (witch-hazel), *Kalmia latifolia* (mountain laurel), *Gaylussacia baccata* (black huckleberry), and *Cornus florida* (flowering dogwood). More information is needed regarding the ecology and species composition of this community type.
Related types: The "Northern hardwood forest" type may contain a substantial amount of *Acer rubrum* (red maple), especially in younger stands. This type is not intended to include very young successional stands of northern hardwoods.
Range: Entire state.

CS Sugar Maple - Basswood Forest: In eastern Pennsylvania, this type occurs on rich rocky slopes (although it may have occurred on less steep sites previous to extensive logging that left these inaccessible remnants as our only remaining examples). In western Pennsylvania, this type occurs on a wide range of sites. Aside from *Acer saccharum* (sugar maple) and *Tilia americana* (basswood), other trees typically present include *Quercus rubra* (northern red oak) *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Betula alleghaniensis* (yellow birch), and *B. lenta* (sweet birch). Shrubs include *Lindera benzoin* (spicebush), *Hamamelis virginiana* (witch-hazel), and on richer sites *Asimina triloba* (pawpaw) and *Staphylea trifolia* (bladdernut). There is generally a rich vernal flora; species include *Anemone quinquefolia* (wood anemone), *Cimicifuga racemosa* (black snakeroot), *Geranium maculatum* (wood geranium), *Caulophyllum thalictroides* (blue cohosh), *Allium tricoccum* (wild leek), *Hepatica nobilis* (liverleaf), *Sanguinaria canadensis* (bloodroot), *Erythronium americanum* (trout-lily), *Claytonia virginica* (spring-beauty), *Arisaema triphyllum* (jack-in-the-pulpit), *Mitella diphylla* (bishop's-cap), *Cardamine concatenata* (cut-leaved toothwort), and *Asarum canadense* (wild ginger). Other herbaceous species include *Smilacina racemosa* (false Solomon's-seal), *Dryopteris marginalis* (evergreen wood fern), and *Botrychium virginianum* (rattlesnake fern).
Related types: The "Red oak - mixed hardwood forest" is usually dominated by oaks and hickories, and more often has heaths like *Kalmia latifolia* (mountain laurel) and

Gaultheria procumbens (teaberry) in the understory. The "Tuliptree - (beech) - maple forest" type generally lacks *Tilia americana* (basswood) and occurs on gentle toeslopes rather than rocky slopes. In western Pennsylvania, this type may resemble depauperate examples of the "Mixed mesophytic forest" type.
Range: Glaciated NE, Great Lakes Region, Piedmont, Pittsburgh Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

DD Aspen/Gray (Paper) Birch: This type is frequently mixed, but sometimes occurs in nearly pure stands of one of the named species. The birch may be *Betula papyrifera* (paper birch) on more northern sites, or *B. populifolia* (gray birch) and occasionally *B. lenta* (sweet birch). The aspen may be *Populus grandidentata* (large-toothed aspen), or *P. tremuloides* (quaking aspen). Associates include *Sassafras albidum* (sassafras), *Acer* spp. (maples), and *Prunus* spp. (cherry). This is an early successional forest type commonly found on former agricultural land, in areas of ice scour along stream banks, and where there has been major disturbance resulting in areas of exposed mineral soil. This type may also result from forestry practices that maintain an early successional stage.
Related types: The "Northern hardwood forest" type may contain a substantial birch component. Many forest types may contain patches of aspen or birch in former canopy gaps; this community type is not intended to describe such small patches.
Range: Entire state.

EO Pitch Pine – Mixed Oak Forest: (Formerly Oak-Hard Pine) This community type generally occurs on acidic, sandy soils, often on ridgetops and dry southern exposures. Fire is an important factor in the establishment and persistence of pitch pine. In the absence of fire, pine is likely to decrease in favor of hardwood species. *Pinus rigida* (pitch pine), sometimes with a mixture of other pines, e.g. *P. strobus* (eastern white pine), *P. pungens* (table-mountain pine), *P. virginiana* (Virginia pine), and less often *P. echinata* (short-leaf pine) or *P. resinosa* (red pine), contribute over 25% of the overstory. Hardwood associates may include any of the dry-site oaks including *Quercus montana* (chestnut oak), *Q. coccinea* (scarlet oak), *Q. velutina* (black oak), and *Q. alba* (white oak). Other tree species include *Nyssa sylvatica* (black-gum), *Acer rubrum* (red maple), *Betula lenta* (sweet birch), and *Carya glabra* (pignut hickory). *Quercus ilicifolia* (scrub oak) may occur in more open areas; other shrubs include *Smilax* spp. (greenbrier), *Kalmia latifolia* (mountain laurel), *Gaylussacia baccata* (black huckleberry), *Parthenocissus quinquefolia* (Virginia creeper), and *Vaccinium angustifolium, V. pallidum* and *V. stamineum* (low-bush blueberries). The forest type sometimes grades into an open-canopy type, or contains gaps with an open canopy. The herbaceous layer is sparse, often with *Pteridium aquilinum* (bracken fern), *Aralia nudicaulis* (wild sarsaparilla), *Gaultheria procumbens* (teaberry), *Cypripedium acaule* (pink lady's-slipper), and various graminoids, including *Danthonia spicata* (poverty grass), *Deschampsia flexuosa* (common hairgrass), *Carex pensylvanica* (Pennsylvania sedge), *Carex communis* (a sedge), and *C. rosea* (a sedge).
Related types: The "Dry oak - heath forest" is distinguished from this type in that it has less than 25% relative cover by conifers. The "Pitch pine - mixed hardwood woodland"

has an open canopy; the woodland type may occur up-slope adjacent to this type. The "Serpentine pitch pine-oak forest" differs from this type in ecology and species composition. The serpentine type occurs only on serpentinite-derived soils. *Q. stellata* (post oak) and *Q. marilandica* (blackjack oak), which are not characteristic of the more common type, are found in the serpentine forest type. The understory of the serpentine type is generally dominated by *Smilax rotundifolia* (greenbrier) and/or *S. glauca* (catbrier).
Range: Glaciated NE, Piedmont, Pittsburgh Plateau, Pocono Plateau, Ridge and Valley, South Mountain.

EV Virginia Pine – Mixed Hardwood Forest: This community type most often occurs as a post-agricultural forest type on sand or silt loams. It may also occur on cleared and/or burned-over areas. *Pinus virginiana* (Virginia pine), sometimes with a mixture of other pines, e.g. *P. strobus* (eastern white pine), *P. rigida* (pitch pine), *P. pungens* (tablemountain pine), and less often *P. echinata* (short-leaf pine) contribute at least 25% of the overstory. Although this is typically a mixed type, some areas may be strongly dominated by pine (nearly pure stands). Hardwood associates vary; common associates include *Quercus rubra* (red oak), *Q. velutina* (black oak), *Q. coccinea* (scarlet oak), *Q. alba* (white oak), *Prunus serotina* (black cherry), *Acer rubrum* (red maple), *Betula lenta* (sweet birch), *Carya* spp. (hickory), *Sassafras albidum* (sassafras), and *Fraxinus americana* (white ash). Shrubs include *Smilax* spp. (greenbrier), *Juniperus virginiana* (red-cedar), *Rhus copallina* (shining sumac), *Rubus allegheniensis* (Allegheny blackberry), *Toxicodendron radicans* (poison-ivy), and *Parthenocissus quinquefolia* (Virginia creeper). Due to the thick litter, the herbaceous layer is usually sparse, often with *Chimaphila maculata* (pipsissewa), *Pteridium aquilinum* (bracken fern), *Aralia nudicaulis* (wild sarsaparilla), *Gaultheria procumbens* (teaberry), *Desmodium* spp. (tick-trefoil), *Galium* spp. (cleavers), and various graminoids.
Related types: The "Virginia pine - mixed hardwood shale woodland" has an open canopy and is found on dry shale slopes. The "Serpentine Virginia pine - oak forest" differs from this type in ecology and species composition. The serpentine type occurs only on serpentinite-derived soils. *Q. stellata* (post oak) and *Q. marilandica* (blackjack oak), which are not characteristic of the more common type, are frequently found in the serpentine forest type.
Range: Piedmont, Ridge and Valley.

FF Hemlock (White Pine) Forest: *Tsuga canadensis* (eastern hemlock), *Pinus strobus* (eastern white pine), or more often a combination of the two dominates these forests. Conifer cover generally exceeds 75% of the canopy. Associated species include a variety of northern hardwoods and oaks. Typical representatives include *Betula lenta* (black birch), *B. alleghaniensis* (yellow birch), *Acer saccharum* (sugar maple), *A. rubrum* (red maple), *Quercus rubra* (red oak), *Q. velutina* (black oak), *Fagus grandifolia* (American beech), and *Liriodendron tulipifera* (tuliptree). Representative shrubs include *Rhododendron maximum* (rosebay), *Viburnum lantanoides* (witch-hobble), *V. acerifolium* (maple-leaved viburnum), and *Hamamelis virginiana* (witch-hazel). Typical herbs and creeping shrubs include *Maianthemum canadense* (Canada mayflower), *Mitchella repens*

(partridge-berry), *Lycopodium* spp. (ground pine), *Gaultheria procumbens* (teaberry), *Thelypteris novaboracensis* (New York fern), *Medeola virginiana* (Indian cucumber-root), and *Polystichum acrostichoides* (Christmas fern).
Related types: If the conifer component is less than 75% relative cover, review the mixed conifer-broadleaf terrestrial forests.
Range: Glaciated NE, Glaciated NW, Pocono Plateau, Unglaciated Allegheny Plateau.

FA Dry White Pine (Hemlock) - Oak Forest: This type occurs on fairly dry sites, often
with 25% or more of the forest floor covered by rocks, boulders and/or exposed bedrock. The canopy may be somewhat open and tree growth somewhat suppressed. The tree stratum is dominated by a mixture of *Pinus strobus* (eastern white pine), or occasionally *Tsuga canadensis* (eastern hemlock), and a mixture of dry-site hardwoods, predominantly oaks. On most sites, the conifer and the hardwood components both range between 25% and 75% of the canopy. The oak species most often associated with this type are *Quercus montana* (chestnut oak), and *Q. alba* (white oak), although *Q. velutina* (black oak), *Q. coccinea* (scarlet oak), or *Q. rubra* (northern red oak) may also occur. Other associated trees include *Nyssa sylvatica* (black-gum), *Betula lenta* (sweet birch), *Fraxinus americana* (white ash), *Prunus serotina* (black cherry), and *Castanea dentata* (American chestnut) sprouts. There is often a heath-dominated shrub layer with *Kalmia latifolia* (mountain laurel) being especially important; *Gaylussacia baccata* (black huckleberry), *Vaccinium* spp. (blueberries), and *Kalmia angustifolia* (sheep laurel) are also common. Other shrubs, like *Cornus florida* (flowering dogwood), *Hamamelis virginiana* (witch-hazel), *Viburnum acerifolium* (maple-leaved viburnum) may also occur on less acidic sites. There is typically a sparse herbaceous layer with a northern affinity; *Aralia nudicaulis* (wild sarsaparilla), *Pteridium aquilinum* (bracken fern), *Maianthemum canadense* (Canada mayflower), *Gaultheria procumbens* (teaberry), *Trientalis borealis* (starflower), and *Medeola virginiana* (Indian cucumber-root) are typical. The successional status of this type seems variable. In some cases, especially on harsher sites, it appears relatively stable; in other cases it appears to be transitional.
Related types: If the total conifer cover is less than 25%, see the “Broadleaf terrestrial forests” types. This forest type shares several species with the “Hemlock (white pine) - red oak - mixed hardwood” forest type. The latter is more mesic; *Q. montana* (chestnut oak), *Pteridium aquilinum* (bracken fern) and *Aralia nudicaulis* (wild sarsaparilla) are more often associated with the dry type, while *Q. rubra* (red oak), *Podophyllum peltatum* (May-apple) and *Smilacina racemosa* (false Solomon’s-seal) are more characteristic of the mesic type.
Range: Most typical of the Ridge and Valley, also occurs on South Mountain, Glaciated NE, Glaciated NW, Pittsburgh Plateau.

FB Hemlock (White Pine) - Northern Hardwood Forest: Any of the three named components may be dominant; at least two are present in some amount. Conifers and hardwoods each contribute between 25% and 75% of the canopy. Characteristic hardwood species include *Fagus grandifolia* (American beech), *Acer saccharum* (sugar maple), *A. rubrum* (red maple), *Betula lenta* (sweet birch), and *B. alleghaniensis* (yellow

birch). The conifer component may be *Pinus strobus* (eastern white pine), *Tsuga canadensis* (eastern hemlock), or a combination of the two. These forests occur mostly on mesic sites, often north-facing, sometimes rocky and steep. This type is fairly widespread in northern Pennsylvania. *Rhododendron maximum* (rosebay) may be locally abundant. Other common shrubs include *Hamamelis virginiana* (witch-hazel), *Acer pensylvanicum* (striped maple), and Viburnums (*Viburnum* spp.). The herbaceous layer is generally sparse and reflects a northern affinity; common components include *Maianthemum canadense* (Canada mayflower), *Trientalis borealis* (star-flower), *Thelypteris novaboracensis* (New York fern), *Medeola virginiana* (Indian cucumber-root),
Lycopodium lucidulum (shining clubmoss), *Mitchella repens* (partridge-berry), and *Clintonia borealis* (bluebead lily). There is often a rich bryophyte layer.
Related types: The "Northern hardwood forest" type has less than 25% combined relative cover by conifers. The "Hemlock (white pine) - red oak - mixed hardwood forest" type is generally dominated by a combination of various oaks - characteristically *Quercus rubra* (red oak), and *Tsuga canadensis* (eastern hemlock) and/or *Pinus strobus* (white pine). In the type being described here, the same conifers usually share dominance with *Fagus grandifolia* (American beech), *Betula* spp. (birches), and *Acer saccharum* (sugar maple). The understory species associated with this type are likewise more northern in affinity.
Range: Entire state except the Coastal Plain, Piedmont, and South Mountain.

FR Hemlock (White Pine) - Red Oak - Mixed Hardwood Forest: This type is similar to the "Red oak-mixed hardwood forest" type but with *Tsuga canadensis* (eastern hemlock) and/or *Pinus strobus* (eastern white pine) contributing more than 25% relative cover. Conifers may be scattered, locally abundant, may dominate the subcanopy, or may occur as a relict supra-canopy (*Pinus strobus*), or in large former canopy gaps (*Pinus strobus*). *Quercus rubra* (northern red oak) is usually present, often dominant/codominant, most often with *Acer rubrum* (red maple), *Quercus velutina* (black oak), *Q. alba* (white oak), *Carya tomentosa* (mockernut hickory), *Betula lenta* (black birch), *Fraxinus americana* (white ash), *Fagus grandifolia* (American beech), and/or *Liriodendron tulipifera* (tuliptree). Shrubs include *Viburnum acerifolium* (maple-leaved viburnum), *Rhododendron periclymenoides* (pinxter-flower), *Amelanchier laevis* (smooth serviceberry), *A. arborea* (shadbush), *Carpinus caroliniana* (hornbeam), *Ostrya virginiana* (hop-hornbeam), *Hamamelis virginiana* (witch-hazel), and *Lindera benzoin* (spicebush). Herbaceous species include *Smilacina racemosa* (false Solomon's-seal), *Polygonatum biflorum* (Solomon's-seal), *Gaultheria procumbens* (teaberry), *Maianthemum canadense* (Canada mayflower), and *Podophyllum peltatum* (May-apple).
Related types: The "Red oak - mixed hardwood forest" type has less than 25% combined relative cover by conifers. The type described here is generally dominated by a combination of various oaks—characteristically *Quercus rubra* (red oak), and *Tsuga canadensis* (eastern hemlock) and/or *Pinus strobus* (eastern white pine). In the "Hemlock (white pine) - northern hardwood forest," the same conifers usually share dominance with *Fagus grandifolia* (American beech), *Betula* spp. (birches), and *Acer saccharum* (sugar maple). The understory species associated with the "Hemlock (white pine) - northern hardwood forest" type are likewise more northern in affinity.

Range: Entire state except the Coastal Plain.

FT Hemlock - Tuliptree - Birch Forest: The presence of tuliptree and a mix of somewhat more southern species distinguish this type from the "Hemlock/white pine – northern hardwood" type. This is generally a lower slope or cove type. *Tsuga canadensis* (eastern hemlock) usually contributes at least 25% of the canopy. *Liriodendron tulipifera* (tuliptree), *Betula alleghaniensis* (yellow birch), and *B. lenta* (black birch) are the most characteristic hardwood species. Other tree species commonly found on these sites are *Acer rubrum* (red maple), *A. saccharum* (sugar maple), *Quercus* spp. (oaks) – usually *Q. rubra* (northern red oak), as well as *Fagus grandifolia* (American beech), *Fraxinus americana* (white ash), *Prunus serotina* (black cherry), *Tilia americana* (basswood), *Pinus strobus* (eastern white pine), and in western Pennsylvania, *Magnolia acuminata* (cucumber-tree). Shrubs include *Hamamelis virginiana* (witch-hazel), *Rhododendron maximum* (rosebay) and others. The herbaceous layer is highly variable; characteristic species include *Maianthemum canadense* (Canada mayflower) – especially under hemlock, *Podophyllum peltatum* (may-apple), *Dryopteris marginalis* (evergreen wood fern), *Botrychium virginianum* (rattlesnake fern), *Arisaema triphyllum* (jack-in-the-pulpit), *Aster divaricatus* (white wood aster), and *Polystichum acrostichoides* (Christmas fern).
Related types: If hemlock contributes less than 25% of the canopy cover, read the description of the "Tuliptree - (beech) - maple forest." This type is in some ways intermediate between the "Hemlock (white pine) - northern hardwoods forest," which has a more northern species composition and range, and the "Hemlock - rich mesic hardwood forest," which has a richer, more southern species composition and a more southerly range. This type is also closely related to the "Hemlock (white pine) - red oak forest," which usually occurs on dryer sites, and generally has *Quercus rubra* (red oak) as a major canopy component.
Range: Piedmont, Pittsburgh Plateau, Ridge and Valley.

FM Hemlock - Rich Mesic Hardwood Forest: These are species-rich, lower slope forests, reminiscent of the "Mixed mesophytic forest" type in the southwestern part of the state, but usually with a strong *Tsuga canadensis* (eastern hemlock) component. The hardwood species vary; typical representatives include *Liriodendron tulipifera* (tuliptree), *Fagus grandifolia* (American beech), *Quercus rubra* (northern red oak), *Acer rubrum* (red maple), *A. saccharum* (sugar maple), *Betula lenta* (sweet birch), *B. alleghaniensis* (yellow birch), *Fraxinus americana* (white ash), *Tilia americana* (basswood) and *Carya ovata* (shagbark hickory). Hemlock cover is often patchy. Under hardwood cover, the herbaceous diversity approaches that of the richer "Mixed mesophytic" type, while under dense hemlock cover, the herbaceous stratum reflects a more northern flora. *Magnolia tripetala* s (umbrella magnolia) is not uncommon. Other southern shrubs such as *Asimina triloba* (pawpaw) and *Staphylea trifolia* (bladdernut) may also occur, although *Rhododendron maximum* (rosebay), *Hamamelis virginiana* (witch-hazel), and *Lindera benzoin* (spicebush) are more abundant on most sites. Herbaceous species include *Adiantum pedatum* (maidenhair fern), *Erythronium americanum* (trout-lily), *Anemone quinquefolia* (wood anemone), *Dicentra canadensis* (squirrel-corn), *D. cucullaria*

(dutchman's-breeches), *Cimicifuga racemosa* (black snakeroot), *Geranium maculatum* (wood geranium), *Caulophyllum thalictroides* (blue cohosh), *Hepatica nobilis* (liverleaf), *Arisaema triphyllum* (jack-in-the-pulpit), *Allium tricoccum* (wild leek), *Sanguinaria canadensis* (bloodroot), *Corydalis flavula* (yellow fumewort), *Asplenium* spp. (spleenworts), *Botrychium virginianum* (rattlesnake fern), *Claytonia virginica* (spring-beauty), *Cardamine concatenata* (cut-leaved toothwort), *Mitella diphylla* (bishop's-cap), and *Asarum canadense* (wild ginger). In areas without a strong *Tsuga Canadensis* (eastern hemlock) component, there may be complete annual litter turnover. This type may occur in a variety of lower slope/ravine situations, including some moist, often north-facing slopes in the Ridge and Valley.
Related types: This community type resembles a somewhat depauperate version of the "Mixed mesophytic forest" type, with the addition of *Tsuga canadensis* (eastern hemlock) usually with at least 25% relative cover. It is much richer in species composition than the most closely related mixed conifer/broadleaf forest type, the "Hemlock – tuliptree - birch forest." Species like *Magnolia tripetala* s (umbrella magnolia), *Asimina triloba* (pawpaw), *Staphylea trifolia* (bladdernut), *Corydalis flavula* (yellow fumewort), *Sanguinaria canadensis* (bloodroot), and *Dicentra* spp. (dutchman's breeches and squirrel corn) are more typical of this richer, more southern type.
Range: Piedmont, Pittsburgh Plateau, southeastern portion of Ridge and Valley.

GB Black Gum Ridgetop Forest: This type occurs on fairly dry ridgetops. The canopy may be somewhat open; tree growth is somewhat suppressed. These ridgetops may have been exposed to repeated fires. *Nyssa sylvatica* (black gum) is the dominant species; *Betula lenta* (black birch), *Sassafras albidum* (sassafras), *Acer rubrum* (red maple), *Quercus montana* (chestnut oak), *Q. velutina* (black oak), and *Q. rubra* (red oak) are often present. The shrub layer is dominantly ericaceous; common species include *Kalmia latifolia* (mountain laurel), *Gaylussacia baccata* (black huckleberry), *Vaccinium* spp. (blueberry), and *Hamamelis virginiana* (witch-hazel). The herbaceous layer is generally sparse. Common constituents include *Carex pensylvanica* (Pennsylvania sedge), *Carex communis* (a sedge), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (teaberry), *Aralia nudicaulis* (wild sarsaparilla), and *Pteridium aquilinum* (bracken fern).
Related types: This type is fairly uniform in composition and is restricted to ridgetops and high shoulders. The "Birch (black-gum) rocky slope woodland" occurs on talus or scree slopes and boulderfields, has an open canopy, and has a fairly wide range of possible associates depending on aspect and location.
Range: Ridge and Valley.

LB Black Locust Forest: This community type usually occurs on highly disturbed sites or in small woodlots in an agricultural or suburban matrix. *Robinia pseudoacacia* (black locust) is usually the dominant tree. *Betula lenta* (black birch) is frequently codominant. Other associates vary; typical representatives include *Acer rubrum* (red maple), the exotic *Acer platanoides* (Norway maple), *Sassafras albidum* (sassafras), various oaks (*Quercus* spp.), or *Prunus serotina* (black cherry). There is generally a dense graminoid understory due to the light penetration through the canopy. *Toxicodendron radicans* (poison ivy) is commonly abundant. Exotic species usually predominate; common representatives

include *Lonicera japonica* (Japanese honeysuckle), *Ailanthus altissima* (tree-of-heaven), *L. morrowii* (Morrow's honeysuckle), *Berberis thunbergii* (Japanese barberry), *Alliaria petiolata* (garlic-mustard), *Polygonum perfoliatum* (mile-a-minute), *Microstegium vimineum*, (stilt grass), *Poa pratensis* (Kentucky bluegrass), *Dactylis glomerata* (orchard grass), and *Holcus lanatus* (velvet grass).
Related types: Other forest types may contain *Robinia pseudoacacia* (black locust), this type refers to sites where it is clearly dominant.
Range: Piedmont, Pittsburgh Plateau, Ridge and Valley.

MM Mixed Mesophytic Forest: This is specific to the southwestern part of the state and includes several species that find their northern and eastern limits in Pennsylvania. This is an extremely rich community type, which typically occurs on deep soils at a lower slope position. Dominant trees include *Liriodendron tulipifera* (tuliptree), *Acer saccharum* (sugar maple), *Fagus grandifolia* (American beech), *Tilia americana* (basswood), *Quercus rubra* (northern red oak), *Magnolia acuminata* (cucumber-tree), *Prunus serotina* (black cherry), *Fraxinus americana* (white ash), *Juglans nigra* (black walnut), *Carya ovata* (shagbark hickory), *Aesculus glabra* (Ohio buckeye), and *A. flava* (yellow buckeye). *Tsuga canadensis* (eastern hemlock) may occur in these forests, but is not characteristically a dominant. Shrubs include *Asimina triloba* (pawpaw), *Staphylea trifolia* (bladdernut), *Rhododendron maximum* (rosebay), *Magnolia tripetala* s (umbrella magnolia), *Cercis canadensis* (redbud), *Lindera benzoin* (spicebush), *Hydrangea arborescens* (wild hydrangea), and *Hamamelis virginiana* (witch-hazel). The herbaceous flora is extremely rich and includes such species as *Trillium grandiflorum* (white trillium), *T. erectum* (purple trillium), *T. sessile* (toadshade), *Erythronium americanum* (trout-lily), *Phlox divaricata* (wild blue phlox), *Anemone quinquefolia* (wood anemone), *Dicentra canadensis* (squirrel-corn), *D. cucullaria* (dutchman's-breeches), *Clintonia umbellulata* (speckled wood-lily), *Cimicifuga racemosa* (black snakeroot), *Geranium maculatum* (wood geranium), *Caulophyllum thalictroides* (blue cohosh), *Tiarella cordifolia* (foamflower), *Hepatica nobilis* (liverleaf), *Allium tricoccum* (wild leek), *Sanguinaria canadensis* (bloodroot), *Corydalis flavula* (yellow fumewort), *Botrychium virginianum* (rattlesnake fern), *Claytonia virginica* (spring-beauty), *Cardamine concatenata* (cut-leaved toothwort), *Mitella diphylla* (bishop's-cap), and *Asarum canadense* (wild ginger). Most of these systems have a complete, or nearly complete, annual litter turnover.
Related types: The "Hemlock - mesic hardwood forest" type usually has 25% or more relative cover by *Tsuga canadensis* (eastern hemlock), but is otherwise similar in ecology and species composition. The "Sugar maple - basswood forest" type is less species-rich than this type, often occurs on rocky slopes, and generally lacks the complete annual litter turnover that characterizes this type. The range of this community type is restricted to the Pittsburgh Plateau. Similar sites in other parts of the state most likely belong to either the "Sugar maple - basswood forest" type or the "Tuliptree – (beech) - maple forest" type.
Range: Pittsburgh Plateau.

TM Tuliptree - (Beech) - Maple Forest: These woods occur on fairly deep, not strongly acidic soils, at a mid-slope to lower-slope position. The most consistent tree

species for this often very mixed type are *Acer rubrum* (red maple) and *Liriodendron tulipifera* (tuliptree). *Fagus grandifolia* (American beech) is often present and, when present, is often codominant. In successional, lower slope situations, *Liriodendron tulipifera* (tuliptree) may occur in nearly pure stands. The long list of possible associates includes various oaks, mostly *Quercus rubra* (red oak), as well as *Nyssa sylvatica* (black-gum), *Acer saccharum* (sugar maple), *Carya tomentosa* (mockernut hickory), *C. ovata* (shagbark hickory), *Betula lenta* (sweet birch), *Tsuga canadensis* (easternhemlock)—less than 25% relative cover—and in western Pennsylvania, *Magnolia acuminata* (cucumber-tree). Common shrubs include various viburnums, *Carpinus caroliniana* (hornbeam), *Cornus florida* (flowering dogwood), *Ostrya virginiana* (hophornbeam), *Hamamelis virginiana* (witch-hazel), and *Lindera benzoin* (spicebush). This type has different expressions in different parts of the state as well as according to disturbance history etc. There may be a rich herbaceous layer, especially in the vernal flora. On richer sites that are not over-browsed, this may include species like *Podophyllum peltatum* (May-apple), *Sanguinaria canadensis* (bloodroot), *Botrychium virginianum* (rattlesnake fern), *Dicentra cucullaria* (dutchman's-breeches), *D. canadensis* (squirrel corn), *Allium tricoccum* (wild leek), *Claytonia virginica* (spring-beauty) etc.
Related types: This type is closely related to the "Red oak - mixed hardwood forest" type. They share many species in common. The "Red oak - mixed hardwood forest" type is much more widespread, occurs across a broader ecological range, and is usually dominated by oaks and hickories. This type is much more restricted, generally occurring on toeslopes, or north-facing lower and mid-slopes. The dominance of beech, tulip, and maple and the near absence of heaths, such as *Gaultheria procumbens* (teaberry) and *Kalmia latifolia* (mountain laurel), distinguish these forests from the oak-dominated type.
Range: Piedmont, Pittsburgh Plateau, Ridge and Valley.

PR Red Pine – Mixed Hardwood Forest: Remnant native *Pinus resinosa (*red pine) usually in association with northern hardwoods.
Range: Glaciated Northeast

PP Pine Plantations: Pine plantations (>50% pines). Plantings that are more than fifty-percent hardwood, or over-topped by hardwoods will be considered one of the above types.

PS Spruce Plantations: *Picea spp.* (spruce) or *Larix spp.* (larch) plantations (>50% spruce or larch). Plantings that are more than fifty-percent hardwood, or overtopped by hardwoods will be considered one of the above types.

PH Hardwood Plantations: Hardwood plantations (>50% hardwoods). Plantings must be pure; if mixed with other hardwoods the stand will be considered one of the above types.

PX Mixed Species Plantations: Mixed species plantations. Plantings can be any combination or percentage. However it must be a pure plantation; if mixed with other hardwoods the stand will be considered one of the above types.

MX Miscellaneous Forest Community Types: This code is intended to cover a variety of forest community types. It should be used for forest communities whose composition is such that they do not qualify for any other forest community type. However, most upland forest communities on State Forest lands will fall into one of the forest community types described above. This classification, as with any classification system, is an artificial scheme to categorize vegetative patterns in the landscape. Forests (unfortunately or fortunately) do not adhere to our attempts to classify them. Following are some examples of forest community types covered by this code.

Serpentine Pitch Pine - Oak Forest: This community type is part of the "Serpentine barren complex." It occurs in areas underlain by serpentine bedrock where soil development has proceeded far enough to support forest vegetation, but not so far as to override the influence of serpentine chemistry on species composition. Fire is an important factor in the establishment and persistence of *Pinus rigida* (pitch pine). In the absence of fire, pine is likely to decrease in favor of hardwood species. Characteristic overstory species include *Quercus stellata* (post oak), *Q. marilandica* (blackjack oak), *Pinus rigida* (pitch pine), *Sassafras albidum* (sassafras), *Juniperus virginiana* (red-cedar), *Nyssa sylvatica* (black-gum), *Populus grandidentata* (large-toothed aspen), and *Robinia pseudoacacia* (black locust) – which is generally invasive in these systems. The shrub layer is often dominated by an impenetrable tangle of *Smilax rotundifolia* (greenbrier) and *S. glauca* (catbrier). *Q. prinoides* (chinquapin oak) occurs in the understory and in openings; *Quercus ilicifolia* (scrub oak) is also present in openings. Low shrub species include *Vaccinium pallidum* (low-bush blueberry), *V. stamineum* (deerberry), and *Gaylussacia baccata* (black huckleberry). Herbaceous species include *Pteridium aquilinum* (bracken fern), *Aralia nudicaulis* (wild sarsaparilla), and a variety of graminoids.
Related types: The "Serpentine Virginia pine - oak forest" type also occurs on serpentinite-derived soils and shares many species with this type. The Virginia pine type is dominated by a mixture of *Pinus virginiana* (Virginia pine) and various *Quercus spp.* (oaks). *Pinus virginiana* produces denser shade and thicker litter than does *P. rigida.* Herbaceous and shrub growth under *P. virginiana* is generally sparse. The fire ecology of the two species is also vastly different. For a more detailed explanation of the ecology of serpentine barrens, see the description of the "Serpentine barren complex."
Range: Piedmont.

Serpentine Virginia Pine - Oak Forest: This community type is part of the "Serpentine barren complex." It occurs in areas underlain by serpentine bedrock, where soil development has proceeded far enough to support forest vegetation, but not so far as to override the influence of serpentine chemistry on species composition. Characteristic overstory species include *Quercus stellata* (post oak), *Q. marilandica* (blackjack oak), *Pinus virginiana* (Virginia pine), *Sassafras albidum* (sassafras), *Prunus serotina* (black cherry), *Juniperus virginiana* (red-cedar), *Nyssa sylvatica* (black-gum), *Robinia pseudoacacia* (black locust), and *Acer rubrum* (red maple). The shrub layer may be quite sparse under the dense shade and heavy litter of *Pinus virginiana* (Virginia pine), where

the canopy is more open there may be an impenetrable tangle of *Smilax rotundifolia* (greenbrier) and *S. glauca* (catbrier). Other shrub species include *Vaccinium pallidum* (lowbush blueberry), *V. stamineum* (deerberry), and *Gaylussacia baccata* (black huckleberry). *Q. prinoides* (chinquapin oak) may be present in the understory or in openings. *Q. ilicifolia* (scrub oak) may also occur in openings. Herbaceous cover is also low; species include *Pteridium aquilinum* (bracken fern) and *Aralia nudicaulis* (wild sarsaparilla).
Related types: The "Serpentine pitch pine - oak forest" type also occurs on serpentinite derived soils and shares many species with this type. The pitch pine type is dominated by a mixture of *Pinus rigida* (pitch pine) and various *Quercus spp.* (oaks). *Pinus virginiana* (Virginia pine) produces denser shade and thicker litter than does *P. rigida.* Herbaceous and shrub growth under *P. virginiana* is generally sparse. The fire ecology of the two species is also vastly different. For a more detailed explanation of the ecology of serpentine barrens, see the description of the "Serpentine barren complex."
Range: Piedmont.

Sweet Gum/Oak Coastal Plain Forest: This type is restricted to the level, sandy soils of the Coastal Plain the adjacent Piedmont; characteristic species include, *Liquidambar styraciflua* (sweet-gum)—usually a dominant, *Quercus falcata*s (southern red oak), *Q. phellos*s (willow oak), *Q. alba* (white oak), *Fagus grandifolia* (American beech), *Acer rubrum* (red maple), *Smilax rotundifolia* (greenbrier), *Leucothoe racemosa*s (fetterbush), *Lyonia mariana*s (stagger-bush), *Clethra alnifolia* (sweet pepper-bush), *Kalmia latifolia* (mountain laurel), and sometimes *Ilex opaca*s (American holly). Not much of this type remains in Pennsylvania, and what there is tends to be badly degraded.
Related types: The predominance of *Liquidambar styraciflua* (sweet gum), *Quercus phellos* (willow oak), *Lyonia mariana* (stagger-bush), and other coastal plain species makes this community type easily distinguishable from other terrestrial forest types in Pennsylvania. The "Red maple - magnolia Coastal Plain palustrine forest" is a palustrin forest type also characteristic of Pennsylvania's Coastal Plain. The difference in hydrology and associated species clearly differentiates the two.
Range: Coastal Plain, Piedmont.

Others: Many other minor forest community types exist in Pennsylvania. If a type exists that is extensive and should be recognized and delineated, it should be brought to the attention of the Resource Planning Section for inclusion in the Manual.

PALUSTRINE (FLOODPLAIN) FORESTS
Palustrine Forest Communities are wetlands that are dominated by tree species that form at least 30% of the main canopy of the area. Floodplain Forest Communities occur along rivers and streams that are periodically inundated by floodwaters. These communities are dominated by tree species that form at least 30% of the main canopy of the area. Palustrine and floodplain forest communities will be classified using the following two digit alphabetical system for forest community type, followed by a numerical digit for site, then a numerical digit for size and stocking class, followed by a alphabetical digit for

commercial/noncommercial availability. Palustrine and floodplain forest communities should be a minimum of one acre or larger for delineation.

CODE FOREST COMMUNITY TYPE

UT Black Spruce - Tamarack Peatland Forest : *Picea mariana* (black spruce) and/or *Larix laricina* (tamarack) dominate this type. Other trees that may occur include *Betula populifolia* (gray birch), *Acer rubrum* (red maple), *Tsuga canadensis* (eastern hemlock), *Pinus strobus* (eastern white pine), and *Populus tremuloides* (quaking aspen). Shrub species include *Rhododendron viscosum* (swamp azalea), *Nemopanthus mucronatus* (mountain-holly), *Ilex verticillata* (winterberry), and *Vaccinium corymbosum* (highbush blueberry). Herbaceous species include *Carex trisperma* (a sedge), *C. dispermas* (a sedge), *Trientalis borealis* (starflower), *Osmunda cinnamomea* (cinnamon fern), *O. regalis* (royal fern), *Viola* spp. (violets), *Gaultheria hispidulas* (creeping snowberry) and *Coptis trifolia* (goldthread). Sphagnum occurs throughout. This community type may occur as part of the "Acidic glacial peatland complex."
Related types: Where canopy closure is less than 60%, this type becomes the "Black spruce - tamarack palustrine woodland." The open canopy of the woodland type allows for a much more extensive shrub layer – usually dominated by *Chamaedaphne calyculata* (leatherleaf) – and a herbaceous layer more typical of open bogs.
Range: Glaciated NE, Glaciated NW, Pocono Plateau.

UK Red Spruce Palustrine Forest: This type occurs on shallow organic soils or mineral soils with a substantial accumulation of organic matter. *Picea rubens* (red spruce) is always present, usually dominant or codominant. Other tree species include *Pinus strobus* (eastern white pine), *Tsuga canadensis* (eastern hemlock), *Acer rubrum* (red maple), *Betula populifolia* (gray birch), *B. alleghaniensis* (yellow birch), *Nyssa sylvatica* (black-gum), and occasionally *Abies balsamea* (balsam fir). *Rhododendron maximum* (rosebay) is common and often forms a dense understory. Other shrub species that may be present include *Viburnum cassinoides* (withe-rod), *Ilex verticillata* (winterberry), *Vaccinium corymbosum* (highbush blueberry), and *Nemopanthus mucronatus* (mountain holly). There is usually a pronounced mound and pool microtopography. Characteristic herbs occurring on mounds include *Osmunda cinnamomea* (cinnamon fern), *Viola* spp. (violets), *Mitchella repens* (partridge-berry), *Maianthemum canadense* (Canada mayflower), *Coptis trifolia* (goldthread), *Cornus canadensis* (bunchberry), *Carex trisperma*, and other sedge species. The bryophyte layer is usually well developed and dominated by sphagnum.
Related types: Where canopy closure is less than 60%, this type becomes the "Red spruce palustrine woodland," where dominance is shared with hardwoods (where total conifer cover is less than 75% of the canopy) this becomes the "Red spruce - mixed hardwood palustrine forest."
Range: Glaciated NE, Pocono Plateau.

UF Hemlock Palustrine Forest: These are wetland forests dominated or codominated by *Tsuga canadensis* (eastern hemlock). The canopy may also contain a mixture of other

conifers, e.g. *Picea rubens* (red spruce), *Larix laricina* (tamarack), and *Pinus strobus* (eastern white pine). Hardwoods may contribute up to 25% of the tree stratum; common species include *Acer rubrum* (red maple), *Betula alleghaniensis* (yellow birch), and *Fraxinus nigra* (black ash). There is generally a pronounced mound and pool topography. This community type may occur as a zone around a wetter community type of a more northern affinity. It may also occur in basins or on slopes fed by groundwater seepage. *Rhododendron maximum* (rosebay) is often present, sometimes quite dense. *Viburnum cassinoides* (withe-rod), *Rhododendron viscosum* (swamp azalea), *Ilex verticillata* (winterberry), and *Vaccinium corymbosum* (highbush blueberry) are also commonly associated with this type. Herbs include *Osmunda cinnamomea* (cinnamon fern), *Symplocarpus foetidus* (skunk-cabbage), *Onoclea sensibilis* (sensitive fern), *Mitchella repens* (partridge-berry), *Maianthemum canadense* (Canada mayflower), *Coptis trifolia* (goldthread), *Viola* spp. (violets), *Dalibarda repens* (false-violet), *Trientalis borealis* (star-flower), and various grasses and sedges. There may be a strong bryophyte component, usually dominated by sphagnum.
Related types: Where total conifer cover is less than 75% of the canopy, this type becomes the "Hemlock - mixed hardwood palustrine forest."
Range: Great Lakes Region, Glaciated NE, Glaciated NW, Pittsburgh Plateau, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

UB Hemlock – Mixed Hardwood Palustrine Forest: This describes a group of wetland
forests that are dominated by a mixture of conifers and hardwood species. The substrate is usually mineral soil or muck over mineral soil. There is generally some groundwater enrichment in these systems. *Tsuga canadensis* (eastern hemlock) contributes between 25% and 75% of the canopy. Other conifer species that may occur with hemlock include *Pinus strobus* (eastern white pine), *Picea rubens* (red spruce), and *Larix laricina* (tamarack). The most common hardwood species are *Betula alleghaniensis* (yellow birch), *Acer rubrum* (red maple), *Fraxinus nigra* (black ash), *Nyssa sylvatica* (blackgum), and *Betula populifolia* (gray birch). *Rhododendron maximum* (rosebay) often forms a dense understory; other shrubs include *Vaccinium corymbosum* (highbush blueberry), *Ilex verticillata* (winterberry), *Rhododendron viscosum* (swamp azalea) and *Viburnum cassinoides* (withe-rod). Herbaceous species include *Osmunda cinnamomea* (cinnamon fern), *Carex folliculata* (a sedge), *Viola* spp. (violets), *C. trisperma* (a sedge), *Symplocarpus foetidus* (skunk-cabbage), *Veratrum viride* (false hellebore), *Onoclea sensibilis* (sensitive fern), and *Aster puniceus* (purple-stemmed aster). The bryophyte layer is usually well developed and dominated by sphagnum.
Related types: Where the conifer component is less than 25% of the canopy, see the "Broadleaf palustrine forests" section, and where the conifer component is greater than 75%, see the "Hemlock palustrine forest" type under "Coniferous palustrine forests."
Range: Glaciated NE, Glaciated NW, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

UH Red Spruce - Mixed Hardwood Palustrine Forest: This describes a group of wetland forests that are dominated by a mixture of conifers and hardwood species. This

community type is most typical of the Unglaciated Allegheny Plateau, although isolated occurrences may be found elsewhere. The substrate is usually shallow organic matter over mineral soil. There is generally some groundwater enrichment in these systems. *Picea rubens* (red spruce), sometimes in combination with other conifers, contributes between 25% and 75% of the canopy. Other conifer species that may occur include *Tsuga canadensis* (eastern hemlock) *Pinus strobus* (eastern white pine), and *Larix laricina* (tamarack). The most common hardwood species are *Betula alleghaniensis* (yellow birch), *Acer rubrum* (red maple), *Fraxinus nigra* (black ash), *Nyssa sylvatica* (black-gum), and *Betula populifolia* (gray birch). Shrubs include *Nemopanthus mucronatus* (mountain holly), *Vaccinium corymbosum* (highbush blueberry), *Ilex verticillata* (winterberry), *Rhododendron viscosum* (swamp azalea) and *Viburnum cassinoides* (withe-rod). Herbaceous and creeping shrub species include *Coptis trifolia* (goldthread), *Osmunda cinnamomea* (cinnamon fern), *Onoclea sensibilis* (sensitive fern), *Carex folliculata* (a sedge), *C. trisperma* (a sedge), *Viola* spp. (violets), *Gaultheria hispidula* (creeping snowberry), and *C. dispermas* (soft-leaved sedge). The bryophyte layer is usually well developed and dominated by sphagnum.
Related types: Where the conifer component is less than 25% of the canopy, see the "Broadleaf palustrine forests" section, and where the conifer component is greater than 75%, see the "Red spruce palustrine forest" type under "Coniferous palustrine forests."
Range: Glaciated NE, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

UA Bottomland Oak - Hardwood Palustrine Forest: These are palustrine forests characterized by the presence of *Quercus palustris* (pin oak) and/or *Q. bicolor* (swamp white oak), often with *Acer rubrum* (red maple), *Ulmus americana* (American elm), *Nyssa sylvatica* (black-gum), and *Fraxinus nigra* (black ash). Shrubs include *Lindera benzoin* (spicebush), *Vaccinium corymbosum* (highbush blueberry), *Dirca palustris* (leatherwood), *Viburnum recognitum* (northern arrow-wood), and *V. dentatum* (southern arrow-wood). Herbs include *Impatiens* spp. (jewelweed), *Thelypteris palustris* (marsh fern), *Polygonum sagittatum* (arrow-leaved tearthumb), *P. arifolium* (halberd-leaved tearthumb), and *Agrimonia parviflora* (southern agrimony).
Related types: This community type is distinguished from the various red maple palustrine forest types by a dominance of *Quercus palustris* (pin oak), and/or *Q. bicolor* (swamp white oak).
Range: Piedmont, Pittsburgh Plateau, Ridge and Valley.

UC Red Maple - Black Ash Palustrine Forest: These are palustrine forests enriched by base-rich groundwater. The substrate is usually mineral soil with a thin layer of organic matter. Calciphiles characterize this community type. The dominant trees are usually *Acer rubrum* (red maple) and *Fraxinus nigra* (black ash). Associates include *Quercus bicolor* (swamp white oak), *Nyssa sylvatica* (blackgum), and *Ulmus americana* (American elm). Common understory species include *Rhamnus alnifolia* (alder-leaved buckthorn), *Physocarpus opulifolius* (ninebark), *Spiraea latifolia* (meadowsweet), *Ilex verticillata* (winterberry), *Alnus serrulata* (smooth alder), *Vaccinium corymbosum* (highbush blueberry), and

Rhododendron viscosum (swamp azalea). Common herbs include *Osmunda regalis* (royal fern), *Carex stricta* (tussock sedge), *C. lacustris* (lakebank sedge), *Symplocarpus foetidus* (skunk cabbage), *Viola* spp. (violets), and *Onoclea sensibilis* (sensitive fern). Most calciphilic species associated with this type have moderate to high light requirements, and thus are found in openings. These species include *Conioselinum chinense*s (hemlock parsley), *Trollius laxus*s (spreading globeflower), *Carex interior* (inland sedge), *C. flavas* (yellow sedge), *C. leptalea* (bristly-stalked sedge), *Cypripedium calceolus* var. *parviflorum*s (small yellow lady's-slipper), *C. reginae*s (showy lady's-slipper), *Geum rivale* (water avens), and *Epilobium strictum*s (downy willow-herb).
Related types: The much more common "Red maple - black-gum palustrine forest" is not generally influenced by calcareous waters, and lacks the *Fraxinus nigra* (black ash) and herbaceous calciphiles that characterize this type.
Range: Glaciated NE, Glaciated NW, Piedmont, Ridge and Valley.

UG Red Maple - Black Gum Palustrine Forest: The canopy is dominated by *Acer rubrum* (red maple) and/or *Nyssa sylvatica* (black-gum). Other trees, e.g. *Betula alleghaniensis* (yellow birch), *Pinus strobus* (eastern white pine), *Tsuga canadensis* (eastern hemlock), *Quercus bicolor* (swamp white oak) *Q. palustris* (pin oak), or *Salix nigra* (black willow), may also occur. The shrub layer is variable and may include *Vaccinium corymbosum* (highbush blueberry), *Ilex verticillata* (winterberry), *Alnus* spp. (alder), and *Cornus* spp. (dogwoods). Herbs include *Symplocarpus foetidus* (skunk-cabbage), *Viola* spp. (violets), *Osmunda cinnamomea* (cinnamon fern), *Carex* spp. (various sedges), and *Onoclea sensibilis* (sensitive fern).
Related types: The "Red maple - black ash palustrine forest" occurs under the influence of more calcareous waters, and is characterized by the presence of *Fraxinus nigra* (black ash) on most sites and herbaceous calciphiles on some sites.
Range: Entire state.

SC Red Maple - Elm - Willow Floodplain Swamp: This palustrine forest type is primarily associated with major rivers, often located in old oxbows along the floodplain, or in depressions behind natural levees. These systems are subject to periodic flooding, may stay inundated for substantial periods of time, and may also receive groundwater enrichment and/or surface water from adjacent uplands. Characteristic species include *Acer rubrum* (red maple), *Fraxinus pennsylvanica* (red ash), *Ulmus americana* (American elm), *U. rubra* (red elm), *Quercus palustris* (pin oak), *Q. bicolor* (swamp white oak), *Carya cordiformis* (bitternut hickory), *Salix nigra* (black willow), *S. sericea* (silky willow), *Viburnum recognitum* (northern arrow-wood), *Cornus amomum* (redwillow), *Lindera benzoin* (spicebush), *Vitis riparia* (frost grape), *Sambucus Canadensis* (American elder), *Onoclea sensibilis* (sensitive fern), *Matteuccia struthiopteris* (ostrich fern), and *Polygonum* spp. This community type is part of the "River bed-bank-floodplain complex."
Related types: The other floodplain forest types, "Sycamore - (river birch) - boxelder floodplain forest" and "Silver maple floodplain forest" generally occur in areas that respond more quickly to changes in river level, and do not hold water

for substantial periods of time following flooding.
Range: Entire state.

SE Sycamore - (River Birch) - Box Elder Floodplain Forest: This community type occurs along the floodplains of our midsize river systems that receive periodic or seasonal flooding. Although this is typically a palustrine community type, there may be examples that are terrestrial. The most characteristic tree species of this type are *Platanus occidentalis* (sycamore) and *Acer negundo* (box-elder), often with *Acer rubrum* (red maple), *A. saccharinum* (silver maple), *Ulmus americana* (American elm), *Ulmus rubra* (red elm), *Fraxinus pennsylvanica* (red ash), and *Salix nigra* (black willow). *Betula nigra* (river birch) is a common component of these sites in eastern Pennsylvania, but rarely occurs in the Ohio River drainage. Common shrubs include *Salix sericea* (silky willow), *Cornus amomum* (red-willow), *C. racemosa* (swamp dogwood), *Vitis riparia* (frost grape), *Lindera benzoin* (spicebush), and *Toxicodendron radicans* (poison-ivy). Exotic shrubs such as *Rosa multiflora*I (multiflora rose), *Lonicera japonica*I (Japanese honeysuckle), and *Lonicera morrowii*I (Morrow's honeysuckle) are common. Herbs include *Impatiens capensis* (jewelweed), *I. pallida* (pale jewelweed), *Pilea pumila* (clearweed), *Laportea canadensis* (wood-nettle), *Polygonum hydropiper*I (common smartweed), *Urtica dioica* (great nettle), *P. virginianum* (jumpseed), *Microstegium vimineum*I (stilt grass), *Polygonum cuspidatum*I (Japanese knotweed), and *Alliaria petiolata*I (garlic mustard). This community type is part of the "River bed - bank-floodplain complex."
Related types: The "Silver maple floodplain forest" occurs in a similar setting, but is distinguished by *Acer saccharinum* (silver maple) dominance. In backwater areas with standing water through much of the year, the "Red maple - elm - willow floodplain swamp" often occurs. Where the canopy becomes open, usually on islands or gravel bars, this type may grade into the "River birch - sycamore floodplain scrub."
Range: Entire state.

SM Silver Maple Floodplain Forest: These forests occur along larger rivers with a well developed floodplain. Although this is typically a palustrine community type, there are examples that are terrestrial. Aside from *Acer saccharinum* (silver maple), which is usually dominant, other trees include *A. rubrum* (red maple), *Salix nigra* (black willow), *Betula nigra* (river birch), *Acer negundo* (box-elder), *Ulmus Americana* (American elm), and *U. rubra* (red elm). Shrubs include *Cornus amomum* (red-willow), *C. racemosa* (swamp dogwood), *Toxicodendron radicans* (poison-ivy), *Lindera benzoin* (spicebush), *Sambucus canadensis* (American elder), *Viburnum recognitum* (northern arrow-wood). Exotic shrubs, such as *Rosa multiflora*I (multiflora rose), *Lonicera japonica*I (Japanese honeysuckle), and *Lonicera morrowii*I (Morrow's honeysuckle), are common. Herbs include *Impatiens capensis* (jewelweed), *I. pallida* (pale jewelweed), *Pilea pumila* (clearweed), *Polygonum hydropiper*I (common smartweed), *P. virginianum* (jumpseed), *Microstegium vimineum*I (stilt grass), *Polygonum cuspidatum*I (Japanese knotweed), and often *Alliaria petiolata*I (garlic mustard). This community type is part of the "River bed-bank-floodplain complex."
Related types: The "Sycamore - (river birch) - box-elder floodplain forest" occurs in a

similar setting, but is dominated by a mix of species, rather than by *Acer saccharinum* (silver maple). In backwater areas with standing water throughout much of the year, the "Red maple-elm-willow floodplain swamp" often occurs. Where the canopy becomes open, usually on islands or gravel bars, this type may grade into the "River birch-sycamore floodplain scrub."
Range: Entire state – major river systems, main stem.

SX Miscellaneous Palustrine/Floodplain Forest: This code is intended to cover a variety of palustrine/floodplain forest community types. It should be used for forest communities whose composition is such that they do not qualify for any other forest community type. However, most palustrine/floodplain forest communities on State Forest land will fall into one of the forest community types described above. This classification, as with any classification system, is an artificial scheme to categorize vegetative patterns in the landscape. Forests (unfortunately or fortunately) do not adhere to our attempts to classify them. Following are some examples of forest community types covered by this code.

Red maple - Magnolia Coastal Plain Palustrine Forest: This community type is largely restricted to low-lying areas of the Coastal Plain, with outliers occurring in the Piedmont and South Mountain sections. The dominant trees are *Acer rubrum* (red maple), *Magnolia virginiana*s (sweet-bay magnolia), *Nyssa sylvatica*, (black-gum), *Liquidambar styraciflua* (sweet-gum), and *Quercus bicolor* (swamp white oak). Shrubs include *Clethra alnifolia* (sweet pepperbush), *Leucothoe racemosa*s (fetter-bush), *Ilex verticillata* (winterberry), *I. laevigata* (smooth winterberry), *Vaccinium corymbosum* (highbush blueberry), *Rhododendron viscosum* (swamp azalea), and *Viburnum nudum* (possum-haw). The herbaceous layer is often sparse; species include *Triadenum virginicum* (marsh St.-John'swort) —in openings, *Viola* spp. (violets), *Osmunda regalis* (royal fern), *O. cinnamomea* (cinnamon fern), and other ferns, sedges, and sphagnum.
Related Types: The upland forest type often associated with this is the "Sweet gum - oak Coastal Plain forest." In Pennsylvania, both of these types are specific to the Coastal Plain. The presence of *Magnolia virginiana*s (sweet-bay magnolia), *Liquidambar styraciflua* (sweet-gum), and other coastal plain species distinguish this type from other red maple palustrine forests.
Range: Coastal Plain, Piedmont, South Mountain.

Others: Many other minor forest community types exist in Pennsylvania. If a type exists that is extensive and should be recognized and delineated, it should be brought to the attention of the Resource Planning Section for inclusion in the Manual.

Note: Superscript "I" next to the scientific name indicates that the species is not native to Pennsylvania. Superscript "S" next to the scientific name indicates a species of concern.

Table A-19: PNDI Species and Habitat Key

Pennsylvania State Rank Codes and Definitions

S1 **Critically 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.

S2 **Imperiled** - 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.

S3 **Vulnerable** - 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.

S4 **Apparently Secure** - Uncommon but not rare, and usually widespread in the state. Usually more than 100 occurrences.

S5 **Secure** - Demonstrably widespread, abundant, and secure in the state, and essentially ineradicable under present conditions.

S? **Unranked** - State rank is not yet assessed.

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).

Breeding State Qualifiers

B **Breeding** - Basic rank refers to the breeding population of the Element in the state.

N **Non-breeding** - Basic rank refers to the non-breeding population of the Element in the state.

Note A 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@).

Pennsylvania State Status Definitions

Native Plant Status Codes and Definitions

PE **Pennsylvania 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.

PR **Pennsylvania 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.

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 taxanomic 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 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.

PT **Pennsylvania 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".

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

Fish, Amphibians, Reptiles, and Aquatic Organisms State Rank and Definitons

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.

PT **Pennsylvania 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.

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

Global Rank Definitions

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.

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

G? Unranked - Global rank not yet assessed.

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

T Infraspecific Taxon (trinomial) - The status of infraspecific 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 infraspecific 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.

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.

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

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

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

PEPT **Proposed Endangered** in part of range; proposed **Threatened** in the remaining part.

C **Candidate** for listing.

Table A-20a: PNDI Species listed for the Pine Creek Watershed

	Species	State Rank	Global Rank	Federal Status	State Status
Birds	Great Blue Heron	Vulnerable/Apparently Secure		Secure	
	Bald Eagle	Imperiled	Apparently Secure	Listed Threatened	PA Endangered
	Northern Goshawk	Imperiled/ Vulnerable		Secure	
Mammals	Water Shrew	Vulnerable	Secure		Candidate Rare
	Alegheny Woodrat	Vulnerable	Vulnerable		PA Threatened
Reptiles	Coal Shink	Vulnerable	Secure		May Become Threatened
	Timber Rattlesnake	Vulnerable/Apparently Secure	Apparently Secure		Candidate at Risk
Terrestrial Inverts	Sedge Skipper	Critically Imperiled	Apparently Secure		
	Bog Cooper	Imperiled	Secure		
	Anoctoid Moth	Imperiled	Apparently Secure		
	Ski-tailed emerald	Imperiled	Secure		
Aquatic Inverts	Brook Floater	Imperiled	Vulnerable		PA Endangered
	Green Floater	Imperiled	Vulnerable		Condition Undetermined
Plants	Hemlock Parsley	Critically Imperiled	Secure		PA Endangered
	Bog Aster	Critically Imperiled	Secure		PA Endangered
	Downy Lettuce	Vulnerable	Secure		Tentative Undetermined

Table A-20a (Continued)

	Canada Buffalo-Berry	Critically Imperiled	Secure		PA Endangered
	Creeping Snowberry	Vulnerable	Secure		PA Rare
	Canadian Milkvetch	Imperiled	Secure		Tentative Undetermined
	Wild-Pea	Critically Imperiled	Secure		PA Threatened
	Danny Willow-Herb	Vulnerable	Secure		PA Endangered
	Evening-Primrose	Imperiled	Secure		Tentative Undetermined
	Roundleaf Serviceberry	Critically Imperiled	Secure		Tentative Undetermined
	Common Juniper	Imperiled	Secure		Tentative Undetermined
	Broad-leaved Sedge	Critically Imperiled	Secure		PA Endangered
	Soft-leaved Sedge	Vulnerable	Secure		PA Rare
	Ebony Sedge	Critically Imperiled	Secure		PA Endangered
	Few-seeded Sedge	Imperiled	Secure		PA Threatened
	Backward Sedge	Vulnerable	Secure		PA Endangered
	Sedge Skipper	Vulnerable	Secure		PA Rare
	Bog Sedge	Vulnerable	Secure		PA Threatened
	Slender Wheatgrass	Vulnerable	Secure		Tentative Undetermined
	Illinois Pondweed	Vulnerable	Secure		Tentative Undetermined
	Red-head Pondweed	Vulnerable	Secure		PA Threatened
	Slender Rock-brake	Critically Imperiled	Secure		PA Endangered

Table A-20a (Continued)					
Habitat	Ephemeral/Fluctuating Natural Pool	Vulnerable			
	Boreal Conifer Swamp	Vulnerable			
	Graminoid Marsh	Vulnerable			
	Mixed Graminoid-Robust Emergent	Vulnerable/Imperiled			
	Glacial Bog	Vulnerable			
	Nonglacial Bog	Vulnerable			
	North Hardwood Forest	Vulnerable/Apparently Secure			
	Xericcentral Hardwood Conifer Forest	Vulnerable			
Geological Features	Erosional Remnant	?			

Table A-20b: Species and Ecological Communities Tracked by PNDI within the Pine Creek Watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Birds	ARDEA HERODIAS	GREAT BLUE HERON	S3S4B	S4N	G5		
	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	S2B	G4	(PS:LT	PDL)	PE
	ACCIPITER GENTILIS	NORTHERN GOSHAWK	S2S3B	S3N	G5		
Mammals	SOREX PALUSTRIS ALBIBARBIS	WATER SHREW	S3	G5T5			CR
	NEOTOMA MAGISTER	ALLEGHENY WOODRAT	S3	G3G4		PT	PT
Reptiles	EUMECES ANTHRACINUS	COAL SKINK	S3	G5			
	CROTALUS HORRIDUS	TIMBER RATTLESNAKE	S3S4	G4		PC	CA
Geologic							
Features	EROSIONAL REMNANT	EROSIONAL REMNANT	S?	G?			
Habitats	EPHEMERAL/FLUCTUATING NATURAL POOL	EPHEMERAL/FLUCTUATING NATURAL POOL	S3	G?			
	BOREAL CONIFER SWAMP	BOREAL CONIFER SWAMP	S3	G?			
	GRAMINOID MARSH	GRAMINOID MARSH	S3	G?			
	MIXED GRAMINOID-ROBUST EMERGENT MARSH	MIXED GRAMINOID-ROBUST EMERGENT MARSH	S2S3	G?			
	OLIGOTROPHIC GLACIAL KETTLEHOLE BOG	GLACIAL BOG	S3	G?			
	NONGLACIAL BOG	NONGLACIAL BOG	S3	G?			
	NORTHERN HARDWOOD FOREST	NORTHERN HARDWOOD FOREST	S3S4	G?			
	XERIC CENTRAL HARDWOOD-CONIFER FOREST	XERIC CENTRAL HARDWOOD-CONIFER FOREST	S3	G?			

Table A-20b (Continued)							
Terrestrial	EUPHYES DION	SEDGE SKIPPER	S1	G4			
Invertebrates	LYCAENA EPIXANTHE	BOG COPPER	S2	G4G5			
	APHARETRA PURPUREA	A NOCTUID MOTH	S2	G4			
	SOMATOCHLORA ELONGATA	SKI-TAILED EMERALD	S2	G5			
Aquatic	ALASMIDONTA VARICOSA	BROOK FLOATER	S2	G3			PE
Invertebrates	LASMIGONA SUBVIRIDIS	GREEN FLOATER	S2	G3			CU
Plants	CONIOSELINUM CHINENSE	HEMLOCK-PARSLEY	S1	G5		PE	PE
	ASTER NEMORALIS	BOG ASTER	S1	G5		PE	PE
	LACTUCA HIRSUTA	DOWNY LETTUCE	S3	G5?		N	TU
	SHEPHERDIA CANADENSIS	CANADA BUFFALO-BERRY	S1	G5		PE	PE
	GAULTHERIA HISPIDULA	CREEPING SNOWBERRY	S3	G5		PR	PR
	ASTRAGALUS CANADENSIS	CANADIAN MILKVETCH	S2	G5		N	TU
	LATHYRUS OCHROLEUCUS	WILD-PEA	S1	G4G5		PT	PT
	EPILOBIUM STRICTUM	DOWNY WILLOW-HERB	S3	G5?		PE	PR
	OENOTHERA OAKESIANA	EVENING-PRIMROSE	S2	G4G5Q		N	TU
	AMELANCHIER SANGUINEA	ROUNDLEAF SERVICEBERRY	S1	G5		TU	PE
	JUNIPERUS COMMUNIS	COMMON JUNIPER	S2	G5		N	TU
	ALISMA TRIVIALE	BROAD-LEAVED WATER-PLANTAIN	S1	G5		PE	PE
	CAREX DISPERMA	SOFT-LEAVED SEDGE	S3	G5		PR	PR
	CAREX EBURNEA	EBONY SEDGE	S1	G5		PE	PE
	CAREX OLIGOSPERMA	FEW-SEEDED SEDGE	S2	G4		PT	PT
	CAREX RETRORSA	BACKWARD SEDGE	S1	G5		PE	PE
	CAREX SPRENGELII	SEDGE	S3	G5?		N	PR
	CAREX PAUPERCULA	BOG SEDGE	S3	G5		PT	PR
	ELYMUS TRACHYCAULUS	SLENDER WHEATGRASS	S3	G5		N	TU
	POTAMOGETON ILLINOENSIS	ILLINOIS PONDWEED	S3S4	G5		TU	PR
	POTAMOGETON RICHARDSONII	RED-HEAD PONDWEED	S3	G5		PT	PR
	CRYPTOGRAMMA STELLERI	SLENDER ROCK-BRAKE	S1	G5		PE	PE

Table A-20c: Species and Ecological Communities Tracked by PNDI within the Babb Creek Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Terrestrial Invertebrates	Euphyes dion	Sedge Skipper	S1	G4			
Plants	Carex paupercula	Bog Sedge	S3	G5		PT	PR

Table A-20d: Species and Ecological Communities Tracked by PNDI within the Cedar Run Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Mammals	NEOTOMA MAGISTER	ALLEGHENY WOODRAT	S3	G3G4		PT	PT

Table A-20e: Species and Ecological Communities Tracked by PNDI within the Little Pine Creek Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Habitats	EPHEMERAL/FLUCTUATING	EPHEMERAL/FLUCTUATING	S3	G?			
	NATURAL POOL	NATURAL POOL					

Table A-20f: Species and Ecological Communities Tracked by PNDI within the Marsh Creek Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Birds	ARDEA HERODIAS	GREAT BLUE HERON	S3S4B	S4N	G5		
Habitats	GRAMINOID MARSH	GRAMINOID MARSH	S3	G?			
	MIXED GRAMINOID-ROBUST	MIXED GRAMINOID-ROBUST	S2S3	G?			
	EMERGENT MARSH	EMERGENT MARSH					
	OLIGOTROPHIC GLACIAL KETTLEHOLE BOG	GLACIAL BOG	S3	G?			
Plants	CAREX DISPERMA	SOFT-LEAVED SEDGE	S3	G5		PR	PR
	CAREX OLIGOSPERMA	FEW-SEEDED SEDGE	S2	G4		PT	PT

Table A-20g: Species and Ecological Communities Tracked by PNDI within Pine Creek Sub-Watershed

This sub-watershed includes the drainage of Pine Creek between Marsh Creek and West Branch Pine Creek

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Plants	ALISMA TRIVIALE	BROAD-LEAVED WATER-PLANTAIN	S1	G5		PE	PE
	CAREX PAUPERCULA	BOG SEDGE	S3	G5		PT	PR

Table A-20h: Species and Ecological Communities Tracked by PNDI within the Slate Run Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Mammals	NEOTOMA MAGISTER	ALLEGHENY WOODRAT	S3	G3G4		PT	PT
Habitats	BOREAL CONIFER SWAMP	BOREAL CONIFER SWAMP	S3	G?			
	NONGLACIAL BOG	NONGLACIAL BOG	S3	G?			
Terrestrial	LYCAENA EPIXANTHE	BOG COPPER	S2	G4G5			
Invertebrates	APHARETRA PURPUREA	A NOCTUID MOTH	S2	G4			
	SOMATOCHLORA FORCIPATA	FORCIPATE BOG SKIMMER	S2	G5			
	SOMATOCHLORA INCURVATA	MICHIGAN BOG SKIMMER	S1	G4			
Plants	ASTER NEMORALIS	BOG ASTER	S1	G5		PE	PE
	GAULTHERIA HISPIDULA	CREEPING SNOWBERRY	S3	G5		PR	PR
	CAREX PAUPERCULA	BOG SEDGE	S3	G5		PT	PR
	CRYPTOGRAMMA STELLERI	SLENDER ROCK-BRAKE	S1	G5		PE	PE

Table A-20i: Species and Ecological Communities Tracked by PNDI within the West Branch Sub-watershed

	Scientific Name	Common Name	State Rank	Global Rank	Federal Status	State Status	Proposed State Status
Plants	CAREX RETRORSA	BACKWARD SEDGE	S1	G5		PE	PE

Table A-20j: Sub-watersheds that Contain No Records of PNDI Tracked Species and Ecological Communities

Stream
Blacks Creek
Blockhouse Creek
Genessee Forks

Table A-21: Streamside Forest Buffer for Stream Miles within the Pine Creek Watershed

Location along Pine Creek	Stream Miles with 100' Streamside Buffer	Stream Miles without 100' Streamside Buffer
Galeton	140.1	156
Marsh Creek	343.8	426.4
Babb Creek	154.9	229.8
Jersey Shore	436.1	581.9
Waterville	265.2	352.7

Table A-22: National Recreation Participation Trends

Activity	% Change 2002-2003	% Change 1987-2003
Archery	6.9	-16.9
Artificial Wall Climbing	20.2	83.9[4]
Baseball	4.6	-27.1
Bow Hunting	-12.6	-12.0[4]
Bowling	3.5	15.1
Canoeing	6.4	-14.6[4]
Cross Country Skiing	2.2	-50.0
Day Hiking	6.3	1.2[4]
Downhill Skiing	-4.3	-22.9
Fitness Walking	-0.1	39.7
Fly Fishing	0	-46.9
Freshwater Fishing – non fly	2.8	-13.2
Handgun Target Shooting	25.1	14.3[4]
Home Gym Exercise	3.8	137.1
Horseback Riding	9.3	-3.1[4]
Ice Skating	17.3	-8.9[4]
In-line Skating	-10.8	309.6[1]
Kayaking	13.7	80.6[4]
Mountain Biking	3.3	359.0
Overnight Hiking	6.4	8.9
Paintball	13.3	66.0[4]
Pilates Training	102.7	444.5[6]
Racquetball	0.7	-53.1
Rafting	2.8	-18.3[4]
Recreational Bicycling	0.3	-1.6[4]

Table A-22 (Continued)		
Recreational Vehicle Camping	1.5	-16.0
Recreational Walking	4.5	9.8[4]
Rifle/Shotgun Hunting	-7.5	-39.7
Shooting (sporting) Clays	28.2	31.9[1]
Snowboarding	1.7	269.5[1]
Snowmobiling	22.0	-15.1[4]
Snowshoeing	23.6	44.0[4]
Softball	0.3	-25.7[4]
Stair Climbing	0.5	575.2
Swimming	4.1	2.2[4]
Tennis	5.9	-18.1
Tent Camping	3.9	18.9
Trail Running	8.6	16.4[4]
Treadmill Exercise	4.9	936.7
Yoga/Tai Chi	20.4	134.3[4]

Adapted from Statistical Highlights from the Superstudy of Sports Participation

[1] 13-year change; [4] 5-year change; [6] 3-year change

Table A-23: TRAFFIC STUDY– Lycoming County Portion of Pine Creek Watershed

Annually, since 1996, 24-hour traffic volumes have been measured within the Pine Creek Valley during each Memorial Day weekend at nine sites, from south of Torbert to south of Morris. The information gathered will be used to assess traffic impacts on the major roads within the Pine Creek Valley resulting from the construction of the Pine Creek Trail.

Count Locations

From Friday, May 28th, through Monday, May 31st, 2004 (Memorial Day) traffic counters were installed at the following sites:

Site No.	Location
1.	PA 44 South of Torbert
2.	PA 44 Waterville
3.	PA 44 1000' west of PA 414
4.	SR 4001 400' north of PA 44
5.	SR 4001 near Carsontown
6.	PA 414 Cammal
7.	PA 414 .25 mile south of Cedar Run
8.	PA 414 North of Cedar Run
9.	PA 414 South of Morris

Results

The findings at each site shown in the following table: (The 24 hour volume total [both directions], peak hour and peak hour volume are indicated)

MEMORIAL DAY HOLIDAY WEEKEND
(Friday, May 28, 2004)

Site No.	Total 24 hr. Volume	Peak Hour	Peak Hour Volume
1	5300	6PM-7PM	435
2	3075	6PM-7PM	276
3	1262	9PM-10 PM	126
4	823	3 PM – 4 PM	80
5	251	8PM-9PM	106
6	1202	3PM-4PM	88
7	682	7PM-8PM	71
8	418	4PM-5PM	46
9	803	4PM-5PM	69

(Saturday May 29, 2004)

Site No.	Total 24 hr. Volume	Peak Hour	Peak Hour Volume
1	5798	11AM-12PM	518
2	3628	10AM-11AM	331
3	1554	10AM-11AM	146
4	1599	1PM-2PM	154
5	522	11AM-12PM	46
6	1618	4PM-5PM	140
7	1149	1PM-2PM	103
8	856	4PM-5PM	110
9	1362	4PM-5PM	127

(Sunday, May 30, 2004)

Site No.	Total 24 hr. Volume	Peak Hour	Peak Hour Volume
1	6093	12PM-1PM	675
2	3666	12PM-1PM	357
3	1483	2 PM – 3 PM	165
4	1738	2PM-3PM	181
5	536	11AM-12PM	58
6	1715	3PM-4PM	165
7	1240	3PM-4PM	129
8	959	12PM-1PM	98
9	1350	3PM-4PM	143

(Monday, May 31, 2004)

Site No.	Total 24 hr. Volume	Peak Hour	Peak Hour Volume
1	4357	11AM-12PM	641
2	2849	11AM-12PM	450
3	1168	11AM-12PM	191
4	822	11AM-12PM	120
5	196	10AM-11AM	23
6	1186	10AM-11AM	198
7	542	10AM – 11 AM	92
8	301	10AM-11AM	47
9	654	11AM-12PM	88

2004 Data Observations

- The highest recorded 24-hour traffic volumes for seven sites (#1,2,4,5,6,7,8) occurred on Sunday; the highest 24-hour traffic volumes at Sites 3 & 9 occurred on Saturday.
- The highest 24-hour volume during the four-day period occurred at Site #1 on Sunday, with 6,093 vehicles recorded.
- The highest recorded peak one-hour traffic volumes for four sites (1,4,7,9) occurred on Sunday, three sites (2,3,6) occurred on Monday; one site (5) on Friday and one site (8) on Saturday .
- The highest peak one-hour volume during the four-day period occurred at Site # 1 on Sunday (12PM-1PM), with 675 vehicles recorded.

Nine Year Data Comparisons

To compare 2004 Memorial Day weekend traffic levels with previous Memorial Day holiday periods, Lycoming County Economic Development and Planning Services (EDPS) staff reviewed 1996, 1997, 1998, 1999, 2000, 2001, 2002 and 2003 Memorial Day weekend data. EDPS staff compared the four-day totals from each holiday period at each site (where data was available) to determine differences in traffic levels among each of these holiday weekends. The results are shown on the following table:

MEMORIAL DAY WEEKEND TRAFFIC COUNT COMPARISON
PINE CREEK VALLEY

Site No.	1996	1997	1998	1999	2000	2001	2002	2003	2004
1	14,051	24,504	23,234	23,154	20,366	18,306	20,507	18,647	21,548
2	13,956	15,626	14,034	14,177	12,353	11,088	13,306	11,524	13,218
3	5,593	8,267	5,835	6,356	5,091	4,456	5,217	4,479	5,467
4	7,606	7,357	7,540	7,281	7,884	4,286	5,498	3,938	4,982
5	2,627	2,286	2,394	No data	2,727	1,555	1,917	1,494	1,505
6	7,722	6,396	7,050	5,865	7,248	4,891	6,009	4,966	5,721
7	3,632	3,554	No data	3,996	4,655	3,125	3,840	3,105	3,613
8	2,351	2,405	2,508	No data	2,335	2,187	2,839	2,070	2,534
9	6,179	4,631	5,823	4,019	3,728	3,680	4,737	3,481	4,169

Note: Chart represents 4 day cumulative total volume at each site.

The highest four-day total volumes at two of the sites (6,9) occurred during the 1996 Memorial Day weekend. Sites 1,2,3 highest volumes occurred during the 1997 Memorial Day weekend when PA Route 44 was used as the detour for PA Route 120 during PennDOT's Ice Mine Cut project in Clinton County. The highest volumes for Site 8 occurred in 2002. The highest volumes for sites 4,5,7 occurred in 2000.

Comparison of Holiday Weekend Traffic to Weekday Traffic

In prior years, traffic counts were performed on the Tuesday following the Memorial Day Holiday at four sites to compare holiday traffic with average daily traffic. In 2004 the weekday average daily traffic count was taken on Thursday, May 27th. The comparison of 2004 Memorial Day weekend traffic volumes with 2004 average daily traffic (ADT) volumes are shown on the following table:

Site	5/28/04	5/29/2004	5/30/2004	5/31/2004	*2004 ADT
1	5300	5798	6093	4357	3620
2	3075	3628	3666	2849	1630
3	1262	1554	1483	1168	566
4	823	1599	1738	822	483
5	251	522	536	196	142
6	1202	1618	1715	1186	632
7	682	1149	1240	542	372
8	418	856	959	301	197
9	803	1362	1350	654	536

* 5/27/04 traffic count

Weekend traffic volume increases over the average weekday:

- Site 1……. from 20% to 68%
- Site 2……. from 75% to 124%
- Site 3……. from 106% to 174%
- Site 4……. from 70% to 260%
- Site 5……. from 38% to 277%
- Site 6……. from 90% to 171%
- Site 7……. from 45% to 233%
- Site 8……. from 52% to 386%
- Site 9……. from 22% to 154%

Traffic volumes were substantially higher along PA 44, PA 414 and SR 4001 during the 2004 Memorial Day holiday period compared to an average weekday. The increase ranged from 20% to as much as 386% depending on the location where the count was taken. This finding is consistent with previous findings.

PA 44

Total traffic volumes over the 2004 holiday period at the three PA 44 sites ranged from the fourth highest to sixth highest recorded over the past nine years. When comparing the 2003 count with 2004 count, sites 1 and 2 showed a 15% increase while site 3 had a 22% increase. Peak hour levels of service continue to be acceptable along PA 44.

SR 4001

The 2004 holiday total traffic volumes were the seventh highest recorded during the past nine years at both sites. When comparing 2003 with the 2004 count, site 4 had a 26% increase while site 5 only experienced a 1% increase. Peak hour levels of service were acceptable along SR 4001.

PA 414

The total traffic volumes for the PA 414 sites ranged from second highest to seventh highest during the nine year period. When comparing the 2003 count with the 2004 count, site 6 showed a 15% increase; site 7 experienced a 16% increase; site 8 had a 22 % increase and site 9 displayed a 20% increase. Peak hour levels of service throughout PA 414 are acceptable.

It appears the overall increase in traffic along major roadways in the lower Pine Creek Valley during the 2004 Memorial Day holiday, as compared to the 2003 holiday period, were likely due to better weather conditions in the Pine Creek Valley and the opening of the Phase 3 "rail trail" section between Waterville and the US 220 bridge overpass. Monday was the only day during the holiday weekend that received measurable amounts of precipitation.

The full traffic impacts of the Pine Creek Trail will not be known until Phases 3 and 4 are completed between Jersey Shore and Wellsboro Junction. Therefore, the traffic count monitoring program should be continued to enable this comparison to be conducted.

Appendix B - Questionnaire

PINE CREEK WATERSHED CONSERVATION PLAN

The Endless Mountains Resource Conservation and Development Council (EMRCD) a regional conservation organization, is leading the multi-county effort to develop a Watershed Conservation Plan for the 981 square mile Pine Creek watershed. The study encompasses the entire watershed beginning at its headwaters in Potter County and ending at the confluence of Pine Creek and the West Branch of the Susquehanna River in Lycoming County near Jersey Shore.

Meetings were held in May to gather the public's input, ideas, and strategies on how to conserve, maintain, and improve the Pine Creek Watershed. People who attended the meetings were given the opportunity to talk about what they feel are the special places in the watershed, to discuss what recreational activities they enjoy, and what concerns they may have about the watershed.

The attached questionnaire is a follow-up to the initial public meetings. The Steering Committee wants to gather input from you and as many other interested stakeholders as possible in order to develop a plan that reflects the needs of the watershed.

After this initial public input phase is complete, EMRCD staff will work to take all the information gathered and draft a watershed conservation plan. Once a draft of this plan is complete, sometime in late 2003 or early 2004, a second round of public meetings will be held to present a draft Watershed Conservation Plan and receive feedback on that plan.

The Pennsylvania Rivers and Watersheds Conservation Program works to conserve and enhance river resources through preparation and accomplishment of locally initiated plans. The Program's purpose is to develop River and Watershed Conservation Plans identifying significant natural, recreational, and cultural resources. The plan also includes recommendations for how to maintain, enhance, and restore the watershed.

The Watershed Conservation Plan provides local communities and watershed stakeholders an opportunity to develop a plan based on their needs and desires. The program emphasizes community involvement and cooperation. Public input will be used to develop recommendations for the Watershed and will help to establish an implementation plan for those recommendations.

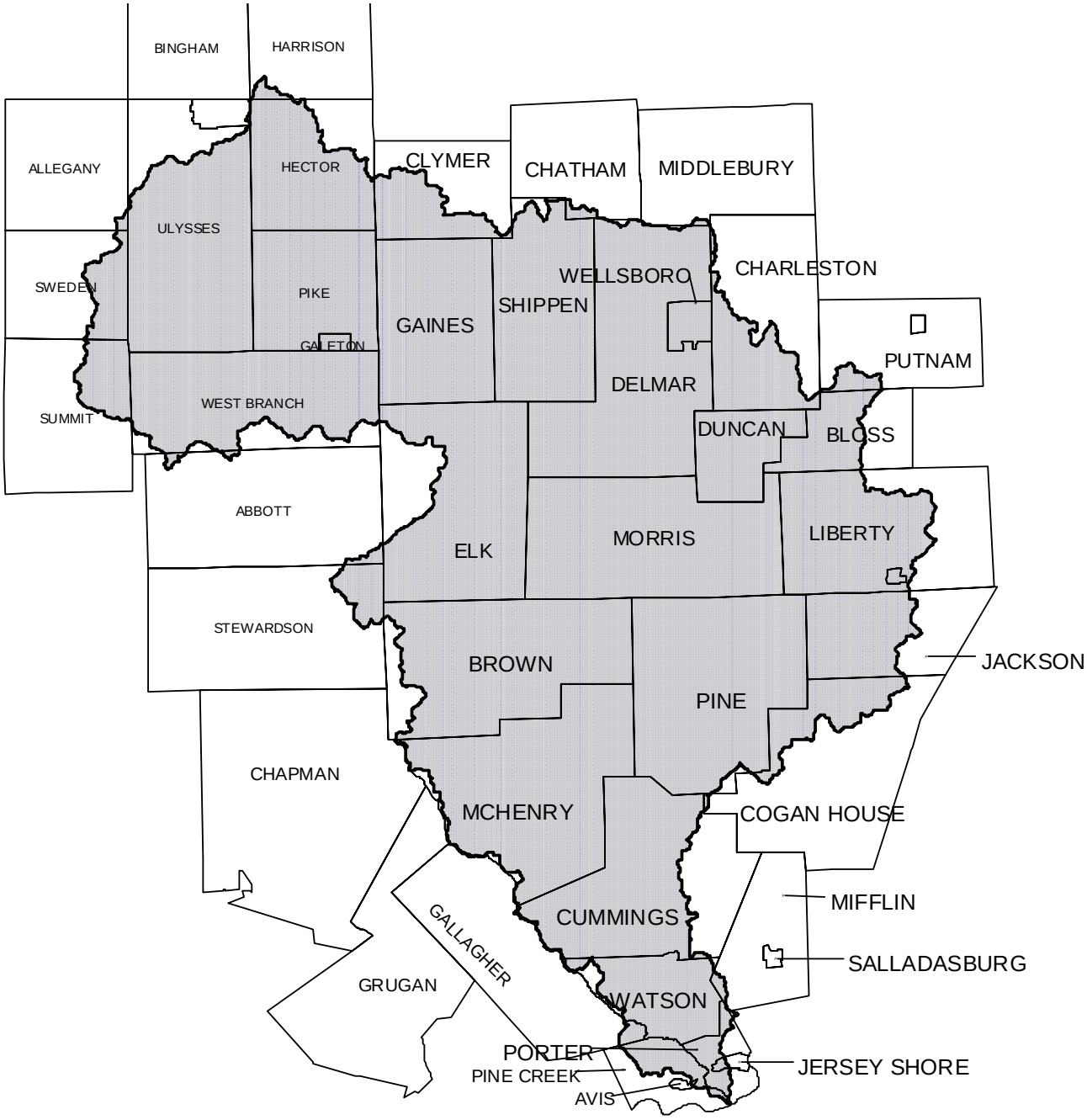
THIS PROGRAM HAS NO REGULARTORY COMPONENT. A WATERSHED CONSERVATION PLAN DOES NOT TRIGGER ANY STATE OR FEDERAL REGULATIONS BECAUSE OF THE EXISTANCE OF THE PLAN.

Please complete and return the questionnaire so we can incorporate your ideas into the Pine Creek Watershed Conservation Plan. Your comments are very important to us.

For more information on the Endless Mountains Resource Conservation and Development Council, the Watershed Conservation Plan, or the public meetings, please call the EMRCD office, 570-265-3409 ext.5 or e-mail robert.parker@pa.usda.gov

The Pine Creek Watershed Conservation Plan is being funded by a grant from the Pennsylvania Department of Conservation and Natural Resources.

Pine Creek Watershed



Pine Creek Watershed Conservation Plan Questionnaire

Please complete this document at your convenience. Feel free to skip any questions you do not have knowledge of or do not have an opinion on. Please return the questionnaire to the Endless Mountains RC&D

1. What Natural Resources within the Pine Creek Watershed are *m*ost important to you?

   _____ _____ ____.

2. Are you aware of any illegal landfills or dumps in the Pine Creek *w*atershed?
   Yes No
   If Yes, where?
   _____
   _____
   _____
   _____.

3. Local municipalities are responsible for adopting ordinances that protect the health and welfare of the local residents. How would you rate the effectiveness of your municipality's land use ordinances as tools for watershed protection?
   Excellent Good Needs Improvement

4. Are local ordinances regulating construction in floodplains: Adequate Inadequate

5. Is the infrastructure (green, gray) in the Pine Creek watershed: Adequate Inadequate

6. Do you feel improving the following infrastructure components would improve or degrade the watershed.

Roads	IMPROVE	DEGRADE
Emergency Services	IMPROVE	DEGRADE
Utilities	IMPROVE	DEGRADE
Solid Waste Disposal	IMPROVE	DEGRADE
River Access	IMPROVE	DEGRADE

7. Do you feel the Pine Creek valley's heritage or history should be interpreted and communicated to visitors and residents of the valley? Yes No

8. Do you favor the Pine Creek watershed's municipalities working together along with county officials,

landowners, businesses, industry, and the watershed organizations to improve the quality of the watershed? Yes No

9. What do you believe are the most important issues facing the watershed and should be included in a plan for conservation and protection of the Pine Creek Watershed?

Please provide any additional comments:

Are you a Municipal Official? _____Yes _____No
If yes what Municipality? _____

In what county do you reside or own property?

_____Potter _____Tioga _____Lycoming
_____Visitor From

Optional:

Name:_____
_____
Address:_____
_____
_____State_____Zip_____
_____
Phone : (_____)_____E-
mail_____

Return this form to:

Attention Pine Creek
Endless Mountains RC&D
Stoll Natural Resource Center
RR 5 Box 5030D
Towanda. PA 18848

Additional information may be obtained by contacting:
Rob Parker, (570) 265-3409 ext. 5 or e-mail Robert.Parker@pa.usda.gov

Questionnaire Results

Tally	QUESTION #1
	What Natural Resources within the Pine Creek Watershed are most important to you
18	Abundant Public Land
1	Access to Open Hunting Land
3	Adequate water supply
	Agriculture
	Aquatic Animals
	Aquatic Resources
16	All of Them, What God has given us
	Amenities (Food, Lodging, Service)
	Areas Set Aside for Non-Hunters

	(Fall)
	Asaph Wild Area
	Babb Creek
	Beaver Dam Locations
4	Bicycle Trail
3	Biking
	Blockhouse Creek
2	Boating
2	Camping
4	Canoeing
13	Clean Air
7	Clean Forests
107	Clean Water
	Conservation of Ecological Habitat
8	Creeks
2	Cross Country Skiing
	Dark Sky
	Diversity of Forests
	Driving Jeep on Back Dirt Roads
2	Environment
2	Farmland
	Feeder Streams to Pine Creek
9	Fish
5	Fish Habitat
	Fishery
34	Fishing
14	Flora/Fauna
	Forested Mountains
	Four Mile Run
	Fowl
	Free of Towers
	Game and Hunting Access
8	Gorge
	Green space
	Hamilton Lake
13	Hiking
4	Hiking trails w/ no motor vehicles
	Hills Creek
	Horseback Riding
17	Hunting
	Integrity of Pine Ck Streambed
	Keeping External Contaminates Away
	Kettle Creek
	Lake Nesmuck
	Land Usage

	Limited Traffic
4	Little Pine Creek
2	Low Population Density
	Lyman Lake
	Marshes
	Minerals
3	Mountains
	Native Trout
12	Natural Beauty
	Natural Clean Environment
	Natural Resources
	Non-Motorized Recreation
7	Open Space
	Outdoor Activities
3	PA Grand Canyon
	Parks
	People
45	Pine Creek / Tributaries
6	Preservation of the Land and Water
	Privacy
	Protection of Flood Plain from Development
	Protecting the Water Supply
	Public Access
	Public Land
	Quality of Life
4	Rail to Trail
3	Recreation
	Respect for Private Owners
	River Otters
2	Rivers
6	Scenic Beauty
3	Serenity / Quiet
	Skyline
6	Soils
9	State Lands
	State Forest Land surrounding the canyon
	State Parks
	Staying Out of Dead End Roads & Lanes
	Stony Fork Creek
5	Streams
	Sunken Branch
3	Swimming
	Texas Creek

5	Timber Management
4	Trails
	Trails, snowmobiling
	Trapping
57	Trees / Forests
	Trout Water
	Undeveloped Buffers Along Creek
3	Undeveloped Character
6	Undeveloped Forest Lands
4	Undeveloped land
	Unspoiled Wooded Floodplain
	Waterfowl
	Wastewater
	Watershed
5	Waterways
	Well Water
	West Branch Creek
	Wetland Protection
	Whitewater Rafting
2	Wild Areas
4	Wilderness
48	Wildlife
2	Wildlife Food
6	Wildlife Habitat
	Wild Trout
	4 wheelers on highway

Question #2 Are you aware of any illegal landfills or dumps in the watershed?

Erosion on old Galeton dump
Where Furnace Run & Hiller Rd meet, about 1/4 mile up the hill on Hiller hill someone has been
dumping garbage & deer remains in the watershed. It smells like an outside butchering plant.
Antrim !!
Alleged dump south of Watrus-demolition waist from Galeton school roof replacement
Approx. half way up Truman Run Rd, on left
Abandoned vehicles, farm implements & scrap littering the landscape
On the neighbors farms - most have them, just look in the ravines

Antrim dump, should have never been issued a permit
If you fish Pine Creek, you know there are numerous places where people throw trash over banks
and trash that is washed into Pine Creek from residences along the creek during high water.
Duncan-Round Top Rd-on the "no maintenance" side road between Brown Lee and Antrim
(left side of the road going toward Antrim)
Pike Twp. / Potter Co.
* See article attached
Antrim-"B" Street-There is a junkyard on one of the properties, of old cars, metal and anything else.
I am sure this is not licensed or legal.
Near pipeline off Shin Hollow Rd, Laines
Along certain cabins at Pine Creek
They are out there. Just go into the local watering hole and mention you've go some bulky junk you
want to dump. Somebody knows somebody.
Antrim
No, but the operation in Antrim has me concerned as I see tractor trailers by the bunch heading out
414 at midnight, are they really checked out.
No, but there are lots of junk cars in Antrim
Yes, Wellsboro Sewer Plant empties raw sewage every so often in
March Creek
Yes, An old dump along Rt 414 near Morris.I could use help cleaning up trash in the median of Rt
15, a beautiful stream flows through surrounded by trash
Yes, South of Galeton on Rt 144
Yes, Get rid of all dumps, because they are screwing our water up at the camps, springs and wells
waste managing because they are world wide. They can do anything because of money, pay
off and the rest suffer.
Yes, Between Avis & McElhatten along present I99
Yes, On Parker Hill Rd (Hector Twp/Potter Co.) on right behind a large black barn, you can see the
peak of it from the road
Yes, hog farms, milk plants, dumps as in Antrim
There are many old twp. Dumps and Boro dumps
There are many "legal" farm dumps. Many abandoned twp. & Boro.
Dumps.
Yes, Phoenix Run
Yes, In a sense, the sewage outflows from 2 large camping grounds are inadequately treated. A
number of on-lot systems are also inadequate

I have personally detected brown oily streaks in Pine Creek that indicate raw sewage dumping. I
have reported it twice, one violator was fined.
Yes, Big Run Rd - Morris Twp., approx. 2 miles from Rt 414. A few people illegally dumping down
steep bank close to tributary of Pine/Babb Creek
Yes, Phoenix Run Road, Sunderlinville
Yes, Homes along Pine Creek, sewage
Yes, They are small, old farm dumps on private property
Yes, I'm aware of several-the info has been provided to Pa Cleanways for clean-up
Yes, dumping is continuing in the Truman Run Canyon along the Truman Road
Yes, In the gully south along Ritter Rd., stream goes into blacks creek. (Northern Lycoming Co.,
Pine Twp., adjacent to Tioga Co./Liberty Twp.) These streams all go into Pine Creek.

Question #3

Local municipalities are responsible for adopting ordinances that protect the health and welfare of residents.
How would you rate the effectiveness of your municipality's land use ordinances as tools for water protection?

Excellent	Good	Needs Improvement
26	113	119

Question #4

Are local ordinances regulating construction in floodplains?

Adequate	Inadequate
134	88

Question #5

Is the infrastructure (green, gray) in the Pine Creek watershed

Adequate	Inadequate
144	66

Question #6

Do you feel improving the following infrastructure components would improve or degrade the watershed?

Roads	**Improve**	**Degrade**
	144	**128**
Emergency Services	**Improve**	**Degrade**
	204	**27**
Utilities	**Improve**	**Degrade**
	138	**103**
Solid Waste Disposal	**Improve**	**Degrade**
	197	**68**
River Access	**Improve**	**Degrade**
	126	**133**

Question #7

Do you feel the Pine Creek valley's heritage or history should be interpreted and communicated to visitors
and residents of the valley?

YES	**No**
276	**21**

Question #8

Do you favor the Pine Creek watershed's municipalities working together along with county officials,
landowners, businesses, industry, and the watershed organizations to improve the quality of the watershed?

YES	**No**
295	**9**

Are you a Municipal Official?

YES	**No**
16	**291**

What County do you reside or own property in?

Potter	**Tioga**	**Lycoming**	**Other**
30	**170**	**117**	**8**

QUESTION #9
What do you believe are the most important issues facing the watershed
and should be included in a plan for conservation and protection of the Pine Creek Watershed

Erosion control on state & private land (have DEP work with landowners on E&S control, not against them, use some state monies)
Fish Ladder @ Galeton damn, Fish habitat, Controlled access
Set backs for buildings and construction

High Priority- Improve inadequate emergency services and solid waste disposal.
Solicit assistance from state in solving above issues since it cannot be corrected by the local municipalities alone! This watershed is a state "treasure" and state officials must recognize their responsibility to assist substantially in its infrastructure improvement.

Solid waste disposal

Preservation of existing natural qualities (both quantity & quality).
Control of development in the
Contingencies for campgrounds during flooding.
Need for watershed common zoning.

Keeping our streams cleared.
Allowing landowners to help clear streams on their property for the sole purpose of protecting banks and fields from washout due to storm and/or flood waters.
Fining those polluting the streams with careless debris.

Provide action/resources to improve water quality which was damaged by mining coal- Similar to Babb's Creek Project.
Require deforestation permits any time 1/4 acre or more is to be deforested (cleared). Limit Deforestation in the watershed.
Facilitate cooperation with & between the watershed conservation, PA Game Commission and DCNR.

Factory Farms, Chemical Agriculture & lawn treatments
Lack of zoning ordinances & uniform codes within the area.

Pollution-all owners & visitors need to be aware of consequence, the drinking water as well as streams can be contaminated easily. People should not be afraid to confront family,

friends or
visitors of such offenses. (Cans, bottles, and garbage discarded in the woods or along the road
is the same as throwing such garbage into the water).
Clear cutting of woodland tracts causes run-off and disturbs wildlife habitat.

Acid mine water

Pollution of the water and land. I have seen people throwing garbage and styrofoam cups, etc. in
the creek. More people, more garbage.

I am in the dark about this business, can't give you any issues facing the watershed.
Pine Creek is very important to the people around it.

Checking all septic systems

Pollution from industries
Do more re-stocking of fish in some of the streams
Add a age limit to off-road vehicle, watch that ATVs don't destroy the land

Water quality and environmental protection.

To reach a balance between "natural protection" of the environment and human's "right to use" the
resources is a difficult place to obtain. Good Luck! So far, I use, enjoy and appreciate what has
been done.

Clean streams of trash.

Improving solid waste disposal

The most critical issue is having ordinances in place to protect against inappropriate development,
whether it is commercial or residential or land fill. Educating municipal leaders about developing
and enforcing ordinances is critical also.

I am aware of Babb Creek. I understand there is a plan in effect now to clean up this stream. I
believe we should do everything possible to make this a viable trout stream. There is approx.
8 miles of water going to waste & also diminishing the quality of Pine Creek waters. If we can
put a man on the moon, we can clean up this stream.

To much land being used for housing developments, too many trees being cut, too much land being cleared, too much land being sold for fly-by-night-get-rich-quick schemes (pig farms, etc.) Too much of the land in the watershed area being lost, plowed, raped. Local residence not given enough voice in happenings.

Landowner's rights (some of which date back to the 1870's or even earlier) need to be protected over the desires of the state.

Parked autos along our creek beds, downed trees laying in the waterways, bridges that are too old & should be replaced (wider). More dumpsters at parks/rest stops. Bear control in/near towns.

Liter in and along streams.

Getting the fallen trees out of the water by my house. This has caused a lot of damage to my property. This also has caused a lot of problem for those that raft down Pine Creek. Neighbors dam up the creek to feed their ponds, when high water comes, it gets washed out & then the fisherman get their lines caught in the plastic. I hope you people will get this information to the right people. This is happening on old Rt 6, Ulysses.

Increased pressure on the watershed's natural resources due to over population and tourism.
Marketing of the valley, such as Rail to Trail.
Loss of access to state hunting lands due to road frontage being bought and posted, cutting off access in a lot of places. Creating private hunting grounds behind these road frontages at taxpayer expense. In a lot of cases, caused by selfish out-of-state parties.

Agriculture is important. Too often, municipalities forget about the fact farmers are trying to protect the land and want to do a good job. The public blames agriculture for problems sometimes caused by chemical or lawns, etc.

Curtail development, residential & commercial.

Enforce Rails to Trails rules & regulations for use.

Dumping of NYC garbage in surrounding mountains.

Prohibition on new development of homes, farms and industries.

Mine acid runoff, mining in the watershed
Timber operation destroying roads and highways, large trucks on the roadways.

Preserving the waterways for recreational purposes as well as the trees for the stability of the
land areas.
The marsh areas provide much needed habitat for much of the wildlife in our area. Monitoring of
the various areas would help to keep these areas safe for the above mentioned activities.

Flooding, water quality, preservation of fish & game habitats

Babb Creek (including it's tributaries)-clean up of mine acid water drainage. Addressing acid
rain impact.
Inclusion of entire watershed, except Pine Creek itself, in a year-round catch and release, any
bait, trout fishing program.

Over development
Better on-site single family sewage systems

Rampant uncontrolled development that would partially pocono-ize this area is our biggest threat.
Infusion of big money and building of wood palaces is not great either. Place is heading toward
a yuppi-ed up ski resort which is counter the long term mountain camp trend we have had for
70+ years. We should absolutely stop any new or expansions of trailer parks. They are
packing people into flood plains where sewage is probably uncontrolled. They really degrade the
aesthetics of the area.

Logging practices
Stream usage and maintenance
Rural & residential development, farming (esp. dairy and cattle) practices
Landfill & waste disposal practices

Stop importing out of state waste

Ban or severely restrict rampant use of ATV's & snowmobiles on public & private land.

Clean up of mine run off to streams.
Less clear cutting of state forest land.
Urban Sprawl

Controlling development to maintain the wildness of the shed.

No more development! Too much has been developed already

Controlling existing & new concentrated animal feed lots
DCNR needs to give construction a higher priority than timber sales
Increased efforts on protection on drinking water areas

Manure Disposal
Lot septic management

Organization of participants. Babb Creek Watershed Assoc. set the precedence for the future of
our watersheds (excellent job). I have attended Tioga River watershed meetings and too much
time & energy is being wasted on who wants to be chief. None of the important issues facing
this watershed will be achieved without first organizing the backbone of this organization.
Erosion control is a major issue in the headwaters of Pine Creek-streambank fencing, riparian
plantings, etc.

Inadequate roads - overuse by visitors

Find areas of Pollution and make corrections

Restrict residential building in the area

Preventing cell telephone towers from being built on every mountain, thereby destroying our
scenic beauty.

Overdevelopment by large scale interests, both housing and commercial. These interest groups,
if unchecked or permitted to override the natural state and beauty, could impair the natural
integrity of our area.

Failure by municipals to encourage (through tax benefits) property owners to remove external
garbage/abandoned cars. Municipals should not base changes or penalties, but on rewards or
assistance grants to improve visual and health hazards.

The importance of retaining natural conditions by properly managing woodlands, monitoring
water quality, and very importantly - not overusing.

Future development, increased overall use, posting of property.

Pollution

Keep the water & land clean & free of all contaminants. Enforce existing laws and/or new laws
to accomplish the this.

Controlling pollution and development

Dealing with sediment.
Preserve scenic & natural beauty, in short, leave it alone.

Stop the spraying along the roads, under the power lines & everywhere. I have a small property
with natural spring for my water. The state sprays so much that it makes you sick to your
stomach when you mow & breath it in from grass along the road. The spring runs under the
road right into Blockhouse Creek (lovely stream), does not need any spray.
Rail to Trails is fine but the roads we travel on also needs attention because of the added traffic.

CAFO's

Protection of forest species and plants and protect water quality of streams and improve it.

Incentives not to develop land
Promote the area as is and discourage pandering to tourism with undesirable attractions
Recognize people who enhance the area and contribute in a non-selfish way to the overall best
interests of the area.

Proposed oil/gas exploration in state forests would degrade water quality.
Public should be made more aware of how invasive plant species can affect

environment.
Preserving the quality of the air and water

Mine acid runoff into Babb Creek, Otter Run & Little pine Creek.
Campground without adequate septic systems.
A forest plan to remove dead trees & brush to prevent forest fires.
Keeping Pine Creek wild & natural.

Land use / zoning - this would address runoff
Water treatment - separation of sanitary & storm sewers

Soil erosion - uncontrolled pasturing stream bands, plowing (not on contour strips)
Ag Chemicals - increased use, runoff & infiltration. Liquid manure application (surface runoff)
Dirt road erosion, logging erosion
Poor Boro sewage facilities. Alternate on lot sewage systems (filter beds, wetlands)
Accessible disposal for household, hazardous waste, oil, etc

Farming by products
Back-filling of swamp areas
Acid rain

Get rid of the Antrim dump! It is the biggest threat to the health & welfare of Tioga County. No
more dumps for NY & NJ in Tioga County.

Drainage from mtn. Roads & coal mines
More policing of the trail

Rebuild Lyman Lake dam
Restrict timbering of natural resources

Better controls instituted to eliminate unauthorized or illegal dumping of solid or liquid wastes
As a resident of Watrous, we have experienced neighbors who continue to discharge liquid
waste from their home that drain through our property and eventually into Pine Creek. We have
notified township officials as well as County sewer authorities, several times, but to no avail.
Issues such as these definitely need to be addressed if this conserv. effort is to be successful

Expansion - housing, commerce, etc.

Over or poor cultivation of forests, runoff from farms, roadways, poorly managed or

constructed
septic systems.

Keeping Pine Creek clean for swimming & fishing
#Preserving the diversity of wildlife
Continued existence of hotels, restaurants and general stores to provide services for visitors
Maintenance and control of the bike trail
Maintaining hiking trails in state forest lands. Black Forest Trail and Golden Eagle Trail are two
excellent examples that come to mind.
Historical information so residents and visitors alike can appreciate the watershed as an
important piece of our history. There was a series of booklets about the area - I have an orange
- covered one about Cammal area - and it's fascinating.

Correcting mine water runoff
Solid Waste
Stream Improvements

I believe that more attention should be given to the effect that pig farms have on the watershed.
Truckloads of bi-products from the processing plants are trucked into Tioga County and spread
Impact studies are needed, if they haven't already been done. Also, follow up! Studies are
needed to measure the build-up of pollutants as these bi-products are dumped year after year
in our county.

Keeping waste water from sewer plants clean (Wellsboro & Galeton).
Fish ladder needed at the Dam in Galeton

Commercial us of areas in and near green spaces must be controlled & regulated more.
Funding or guidance for current landowners who would like to remedy problems (i.e. Failing septic
systems) but can't due to monetary constraints.
Outreach and education.

The potential for overdevelopment. Most of the watershed is made of rural townships with either
no zoning or inadequate zoning. Moreover, some of the township supervisors in the watershed
are, surprisingly, against open space protection and land conservation. This needs to be
addressed if the rural character of the watershed is going to be maintained. Need to

talk about
the costs of development (emergency services, roads, schools, etc.) vs. the perceived value of
tax revenue from more homes.

Do not allow any more campgrounds within the watershed and possibly eliminating or cutting
back on some.

Keep the waters clean.

The most important issue for conservation and protection of the watershed is to keep state and
federal regulations out of the planning. Any regulation, if any, should come from a meeting with
local residents, businesses and industry. Over regulations which state & federal agencies tend
to lean to are a determent to all involved.

Control of agricultural runoff into the watershed. Industrial pollution into the watershed. Pollution
from human use of the watershed areas.
Regulation of building in the area adjacent to Pine Creek and its tributaries.
Maintenance of the natural beauty and integrity of the watershed while being able to utilize the
watershed to promote tourism, etc. Also, being able to use the watershed for education.

****See Survey

Preserving the natural ecosystem for all generation plus for the current populations economical
future in such areas as fishing & tourism that some people depend on to survive and make this
area special.

Ban more trailer parks. Lot size 1011 or more within 500 ft. of stream.

Water pollution
Land development

Elimination of mine acid runoffs.

Agricultural runoff (i.e. Large production of animals, pig & veal farms).
Adequate sewer systems in municipalities and on housing sites.

Access to the canyon should be limited. Trail rides to rafts should be stopped or heavily controlled by permits. To many tax dollars are spent to maintain the rail to trail and access water. Let those who Play - do the Pay.

The elimination of out-of-state dumping
#The continual cleanup of acid min runoff
Strict regulations of on-lot sewage disposal
Proper trash pickup / disposal

I think cleaning out Pine Creek, removing sand bars, which keep getting bigger and getting trees on them which during high water or ice flood, end up coming down the creek and can cause all kinds of trouble. Should push creek stone up on banks and seed them.

Adequate trash disposal.
Making sure septic systems are to code.
Ways to avoid forest fire disasters.
Game / fish management.
The us of motor vehicles or ATV's through or near waterways.

There is no need for a Pine Creek Watershed Conservation Plan.

CAFO's & land us planning.

Actual water level, that seems to be lowering as time passes. It may be global warming. In the summer, the water move slowly or not at all. Trout struggle to survive.
Strict adherence to residential sewer permits
Stricter penalties for trash for visitors to the area and improved
Policing of Rail Trail and parking facilities

"Local Services" - Law enforcement, emergency services & waste disposal are inadequate for the increased recreational use & tourism!

Consistency throughout the watershed in development regulations. Strict guidelines for trailer courts / campgrounds.

Better regulations & enforcement on building and development within the Pine Creek flood way and flood plan.

Galeton Borough needs to be fined a lot more than 1,000 for dumping 127,000 gallons in

Pine
Creek. That’s not even a "slap on the wrist". As a trout fisherman, I only caught two trout in
Pine Creek this year. I fish from Galeton to Ansonia. Pretty sad. I live here year-round.

Maybe the big issue is of people who have their own agendas & faulty knowledge that hasn't
been proven in the long term suddenly becoming the experts and imposing their wishes and
agendas on others! Any more regulations that push any more farmers out of business will only
add to your problems. A farmer's 20 acre field, regardless of his use, will not be nearly as "bad"
as that same field growing 20 houses with all their water use, pollution & spray use & built
according to all ordinances.

Stop commercial use of Pine Creek.
Educate farmers with regard to manure runoff and pismire
Cleanup Marsh Creek. It is presently an open sewer
Stop acid runoff into Tioga River. When I cross at route 660 & Route 15, All I see is orange water
and a very stained stream.

Water - improvement (old mines, sewage disposal)

Conduct seasonal water quality samples of 3 to 5 mile intervals to guard against polluters.
Restrict lumbering or cutting of large trees along Pine Creek's perimeter.

Horses are eroding the trails very badly in the Ansonia and Colton Point areas. I have seen small
springs and creeks change course because of horses crossing them. Every place you look,
you see horse manure or campfire rings. You aren't allowed motorized vehicles on nearly all
the trails, but the horses can go anywhere they want, example: rails to trails, gated roads.

Waste disposal
Land fills
Acid mine runoff, strip mine areas

Erosion - balance between man and nature

Pollution, Solid Waste, public dumping

Roads
Clean water, no pig or lg. Animal farms near water
River road access

Since I only get to our Tioga house one or twice a year, I do not know anything about watershed conservation plans.

I would like to see the "wildness" of the area maintained or increased. Maintain road access but do not improve it. Limit off-road access to non-motorized vehicles except snowmobiles in winter, snowmobile access maintained but not expanded. I would like to see some areas maintained as "walk in wilderness" areas with permit type overnight (one or two) camping - a place to walk into for a weekend and get away from civilization. It would be nice to see more streams returned to their natural state and trout fishing controlled similar to "delayed harvest" area of Little Pine Creek.

Waste water or seepage from camps that get into the creek.
A fish ladder at Galeton Center Town Lake to let trout come up to colder waters.

Water quality

Wastewater discharge
#Comprehensive county planning / long term management plan & goals

I think the most important issues are water runoff & drainage along with sewage making it's way into Pine Creek.

Build a new bridge or crossing over Babb Creek on Stony Fork Rd. This will stop cars, trucks, etc. crossing the water. This will also improve or reduce emergency services response time in the Stony Fork area.

The municipalities must enforce the ordinances in place - e.g. the discharge of raw sewage; no septic systems in flood plain areas, etc.

Waste disposal
River Access
Dumping of garbage along Pine Creek

Visitors use of area

Increasing Pollution

Utilize the mature trees for timber/pulp etc. for wood products. A healthy forest is superior to
over-mature or decaying.
Water generation for turbines could be accomplished with litter disturbance and pollution $ to use.
Not stop usage - usage to create tourism to help local tax base.
Nature is cruel-man should utilize the regeneration that nature provides to it's ultimate use.

How to conserve, preserve and improve the existing watershed without burdening landowners,
municipalities and business with new rules, laws and regulations that discourage landownership
and growth.

Discharges of sewage into waterways
Road - highway run off into waterways
Mine run off / discharge

Land use restrictions. We need to protect our natural resources but not at the expense of
landowner's and taxpayer's rights & freedom. The taxpayers of the commonwealth own this
property and must have the use of it.

Protection from Pollution

The most important thing is to cut down on the development of homes, businesses and roads in
the area. Also, keep on working on improving the areas where there is acid mine drainage
coming into the Pine Creek. Improve all dirt & gravel roads by lime stoning them. Do more
bank stabilization of Pine Creek and tributaries to Pine Creek.

Pollution to the streams, acid rain, mine drainage

Water quality, protection of scenic beauty
I would like to see al unregistered campers and older mobile homes which people use for camps
removed as they are an eye sore and pose a threat to property when they are located in

the
flood plain which could move in a flood and cause damage to other homes. These campers and
mobile homes are just ugly!

Finish cleanup of acid mine drainage
Continue to oppose new waste land fills
Encourage headwater landowners to allow re-forestation where possible, promote stream buffer
zones and fencing of livestock away from streams
Rebuild bridges where "Fording" creek is now required to keep vehicles out of streams (example:
Stony Fork Rd. across Babb)
Pave or otherwise treat dirt roads along wild trout streams such as Slate and Cedar Runs, 4 mi
Run etc. to reduce sedimentation during rains.
Monitor Forestry Dept./DER's maintenance practices along Pine Creek Rail Trail. I am starting
to see excessive tree & brush cutting between creek and bike trail.

Protection of fisheries. I have annually fished for trout in Potter & Tioga counties for 30 years.
Your streams are magnificent and need to be preserved as a first class trout fishery. The
EMRCD should support measures to prevent erosion along the banks of the Pine and its
tributaries. Encourage buffers between streams and agriculture or pastures. Discourage
excavation or unpaved roads close to streams.

We need to attract tourists without damaging the environment.

Lack of evergreen shading of the creeks
Cattle encroachment / manure storage
Access / parking
Private property rights, easements
Stream improvements, structures, water bars, bank protection, etc.
Fish ladders on lower end

I like it the way it is.
Building the Rail to Trail was a beautiful major accomplishment for more people to enjoy the area.

Enforcement of existing pollution laws, particularly for those trailer parks in the flood plane.
Covering & maintaining the dirt roads along the streams with crushed limestone to

reduce the
affects of acid runoff.
Maintain & improve access to Pine Creek for fishing.
NO highways through the area.

Public education and appreciation
Restoration & protection of water quality
Zoning & protection from residential development and piece-mealing into littler lots.
Identify & protection of wildlands, wildlife habitat & unique natural features
Prevention of truck traffic & RVs on Rt 414 Pine Cree.
Phase out trailers, trailer parks and unsightly shacks stuck out in the woods
Support & start a land acquisition & conservation easement program to acquire critical lands and
protect critical resources (Incentives)
Enforce septic/sewage requirements (clean water laws)
Getting state land & resource management agencies & the general public in tune with the need,
purpose and direction for conservation & protection of natural resources on Pine Creek.
Protection of wetlands & free-flowing creeks & rivers (no more dams & bridges on Pine Creek.)

I was never in favor of the landfill at Antrim & never knew anyone who was. It probably brings in
big revenue for the county, but is the future risk of contaminated water worth it?
I never received information about this landfill & never had a chance to ask questions or receive
answers about the possibility of contaminating our precious environment.
It's probably too late to be concerned about this landfill or is it?
We have huge landfill here in Seneca County, NYS & the water under the ground is undrinkable
for miles around. Water Conservation? - I hope so !

Toxic chemical runoff / seepage from agricultural and abandoned mining operations
Potential development of new sites for low to medium grade toxic or nuclear waste landfills

Private over-development or campground occupancy exceeding septic or waste disposal facilities
are concerns related to water quality.
Road maintenance for safety purposed is important, but construction of 4 lane roads or
superhighways would detract from the character of the Pine Creek valley. Also, contractors
should be accountable for a time table on awarded projects. Two recent bridge construction
projects closed road for far longer than the original projections we were told that a project on the

Cushman branch (bridge) would be completed in late April. Road closed signs were still there in October.

Camping restriction by permit & enforcement of same. (DCNR seems to be doing a much better job than in the past).

Public access is very limited in the Tioga State Forest.

Overdevelopment of vacant land

Limiting the use of watercraft, 4 wheelers and dirt bikes
Keep construction away from river.

Eliminate clear cutting without clearing and replanting. Case in point, 1 mile west of Blackwell bridge, right side, Ludwig property clear-cut 5 years ago and till looks like tornado devastation. Camp road 1 mile from bridge on right for about a mile up top and you'll see my point. Deer used to bed and breed here. Clear-cut drove them higher up past the PC trail. Our deer traffic through our area dropped off significantly afterwards. Since 9/11 more people have been looking for outlying and quick access from NYC (3 hrs) homes and Brown Twp has several hew new larger scale homes on the west side of 414. I myself have had several offers for my place with notes left on my door and hunters stopping by was well. I've been a resident here for 13 yrs and I've seen a lot of changes, some good, many not so good. The rail trail has brought a ton of people in on weekends who leave nothing behind but their trash.

Pollution

Measures to keep the valley serene & pristine.
Campgrounds and campers are not contributors in this regard.

Using sport hunting to control deer population.
Protecting water supply from spills & timber harvest runoff.
Protect forest from wildfires by using controlled burns.
Make timber harvesters clean up the cut areas when they finish cutting.

Acid Rain
Mine acid drainage

Clean Water
Clean Air
Why are we a dumping ground for the cities?

Farm waste, i.e. animal waste, erosion, fertilizer runoff. Uncontrolled dumping, hazardous waste.

Lets start with common sense! Then lets not have the organization with the most money and the biggest lobby have the last say. Lets not cater to tourism, but lets encourage to tourism. Case in point, fisherman are important in the local economy, but they destroy a lot and leave a lot of trash. Lets make them follow the rules without alienating them. Lets not treat families using the natural resources like a threat, and then turn a blind eye to the fisherman who are trashing the place. Control development. Protect our natural resources over the lure of development money!

Illegal dumping, runoff from new construction or runoff from commercial/industrial companies.

Controlled development, zoning restrictions

Pollution from Antrim dump and new pig farms polluting the Babb Creek and Pine Creek.
Removing supporting infrastructure (Babb Creek bridge, No maintenance on Stony Fork Rd, Poor drainage and road maintenance).
Stop allowing large commercial pig farms that pollute ground surface waters like Pine Creek.

Development of any kind.

To continue to monitor the potential of polluted streams in the watershed

Correct the flooding - iron out of water

The constant duping of "municipal waste" via the string of tractor trailers exiting Rt 15 onto 414 at Liberty from 10 or 11 o'clock at night, cannot be that good for the watershed as #1 the smell of those trucks tell me it's not good land fill, plus, it's dumped uphill from Babb Creek & Pine Creek. When the heavy rains come, what happens to runoff?

I know a lot of people are against dredging but, there are several place that islands and such
disrupt the flow of Pine Creek and these need to be opened up so the flow is unimpeded.
Also, there are shallow and deep places that are a hazard for swimming and fishermen. One
man has already stepped in a hole while fishing and died because of a hole.

The increased development along the watershed is a concern. If not properly managed, this could
become the next Poconos. Once developed, you can never change what was done, if not done
properly. We need to maintain the open spaces.

Mine runoff / acidity
The Phoenix landfill near Antrim needs close watching, too many trucks.

The passage of comprehensive zoning ordinances with proper penalties, strict enforcement, no
variances unless a compensative environmental enhancement

Construct a dam

Litter, outsiders visiting not following good common sense

Although it is probably the most serene site, there should be no building of anything within 100
yards of any creek, river, pond, lake, reservoir or any other water areas. It should be lift in trees
to filter rain and control erosion

Continue to locate and improve drainage areas like the clean up that was recently done to the
Babb Creek area.
Aid landowners in improving on-lot septic systems that are old or non-working. Much of the land
is partially used (hunting & fishing) and systems are not we maintained

Water pollution

Overuse! Limit or halt additional houses, etc. Cut back on the number of hunting camps

Acid rain
Over browsing of tree seedlings by deer

Improve drainage on some roads which are affected by wash out
Police area for potential illegal dump sites

Overdeveloping for use by day visitors. They don't park where there supposed to and clog the
limited access

Improving roads, emergency services as utilities provides a temporary improvement but usually
leads to more development pressure and an ultimate degradation
Dirt & gravel roads and development impacts on water quality

Increased use, as the bike trail finished completion from Waterville to Jersey Shore
Pollution from landfills and increased vehicle traffic, noise pollution from traffic

Traffic in the valley increasing, better roads
Improving fire & EMS in the valley - population on weekends is on the increase & more
recreational properties are being constructed

Baby boomers retiring to area or purchasing get-away homes will overwhelm current facilities.
Planning for their arrival and the type of uses they enjoy (walking, biking, dining, outdoor activities
of every nature) will be necessary. Education program for people who are not used to
taking care of nature would probably also be helpful. Since many of these people are upper-
middle class, tapping into this flow of money to improve current facilities should be planned for.
I'm not talking taxes, but rather user fees, events with paid admission, etc.

Increasing development

Over crowding - too many folks; overuse of resources
Any development of trailer parks - permanent/seasonal
Water quality

Poorly controlled and excessive development

Leave it wild!! (Re: Question 7) - Are you suggesting a ranger station in Wellsboro & Jersey
Shore or tour buses with balloons & T-shirts for sale? Please do not try to make this area the
Poconos!!! We also do not need gambling and "big name" stars!

No housing developments, enforce environmental and litter laws on the books. This is

beautiful
country, we would like to keep it that way. Thank You.

Keep the water and Pine Creek area untouched by commercial enterprises. Leave area like
nature developed it before human population degraded it.

Clean Marsh Creek out - remove all dead trees & other garbage that has been thrown in it- make
room for water to flow free

Over development is a threat

Parking areas and roads are not adequate for all the people using it on weekends but don't want
a lot of development done in the area to accommodate everyone. Not sure what the answer is!!

Closer monitoring of farm operations and other commercial operations currently active, as well as
those no longer operating (mines and abandoned dumps)

Soft soil erosion
Farming wash off

Lax enforcement of regulations designed to control erosion entering streams of the Pine Ck. WS.
Acid mine drainage entering the watershed untreated
Cross country races cause too much litter & increase erosion run off into the many small tribs.
that eventually enter Pine Creek.

Asaph - I'm told by land owners there that their septic runs directly into Pine Creek. That’s Gross!

I'll try to keep this short and relevant. In the 7 yrs that I have lived in a beachside community in
Fl, I have seen tremendous effort put forth to promote tourism and development here. During
that time, the growth of the area has been phenomenal…at great cost. What was once a quiet,
peaceful community with many small, local retailers and green spaces with endangered species
in residence within the city limits has become a mass of huge homes with irrigated lawns, pools
and 4 car garages; traffic on inadequate roadways and the "superstore" every 5-10

miles. Too
many people, cars and too few jobs locally that will support a local lifestyle. Endangered species
100 yr old trees and homes that have been in families for generations fall by the wayside. It
frightens me that I see this trend beginning in Tioga County. I've lived in Tioga County for most
of my life. I plan to return there within the next year. While I realize that change is inevitable,
restraint and foresight are invaluable. I don't think that it is in anyone's best interests to
exchange the quality of this environment for the "quantity" of extensive development.

Zoning to restrict & monitor development - also to protect wetland and open space.

Riparian Buffer Preservation & restoration
Illegal dumping of solid waste and clean up of those areas
Land uses & development that concentrate runoff & create soil erosion
Gravel & dirt road maintenance & the need to educate the maintenance personal on best maint.
practices
Elimination of invasive plant species

Monitoring septic systems of existing campground alongside of creek. Most have been construc-
ted years ago and probably need upgrading.

Just all the above things, because I need water ways cleaned out now. Babb and Wilson Creek
and Cowanesque River which I was working on, they better do something to put it back.
Washing all good soil down in Cowanesque Lake which is 1/2 full over mud now. Get with it,
I am pissed.

Growth in Pine Creek at Jersey Mills bridge. When new bridge is installed, this should be removed

Zoning - Land use - subdivision
Drinking water quality

Flooding
Land value
Good drinking water

When the state of Pa will issue a permit to a septic pumping company to dump 38,000 gallons

of sludge from septic tanks to the acre on a down slope list thru 100 yards from Pine Creek you
are talking to the wrong people about keeping Pine Creek pure

**** SEE ATTACHED LETTER

Pollution
Managing ground
Phone lines should be underground

Manufacturing & mine runoff old or new leaching into the watershed

Pine Creek itself is becoming too overrun by careless tourists, rafters and canoes. In my opinion,
it is overused by these and abused. Too much littering and disturbing the wildlife. Most are
respectful and considerate of the environment. However, as more people use this resource,
more people are spoiling what was unspoiled 40-50 years ago. I prefer it the way it was then.
Selfish maybe.

Keeping the wetlands along the creek. Not to much development by the creek.

Sewage, garbage, washing car motors in ditches by their garage & oil etc. running into Pine Ck

Protect the forests and wildlife
Control hunting, fishing, hiking/biking trails, camping, snowmobiling, trail biking.
Maintenance - cleanliness trash management etc, security patrols
Information-promotions-maps, location of services, distances, parking

The people in the area really have no say, its what the money wants to do. The hog farmers told
us they are working to cut out the smell. The landfill owners said they would not dump
hazardous waste. The milk plants use acid to clean their tanks.

Stop out of state trash
tougher sewer requirements & inspections

The lack of planning, period
The lack of local awareness / local input
Incoming landowners with no respect for nature, I would call them "users" of the land
The tendency to "commercialize" natural settings, the need to "pave nature" to make access
simple

What do you want it to be? Define ultimate goals. Do you want a 100% accessible site tour for
bus/rv? Do you need to build major highways through our woods?
I hope not. Let nature be a little rough. Focus on providing the needs of those that respect
nature - hiking, camping, rafting, photography, hunting, research, appreciation.

We oppose the strip mines being used for land fills and waste being brought in from other states.
We are afraid that these landfills will one day seep in ground water and become another love
canal.

Having property on the bank of Pine Creek, I can say, I liked it a lot better 15 years ago then
today. Railroad instead of Rails to Trails on Rt 44 share the road. Yea I guess, floods I get
through them, I am sure, County officials will help, like they did in "96"! Ride through,
Cummings, and McHenry, see all the trailers along the creek.
Remember "72", conservation
& natural resource dept.

Water quality big Pine Creek - limit further development of campgrounds and businesses along
Pine Creek
Restore deer herd to pre 1990 levels

Closing he Antrim dumpsite

Improve stream (Pine Creek) water quality - Galeton waste treatment, Galeton damn, lack of game
fish reproduction, stream bank stabilization of upper Pine Creek, over development along
Pine Creek
Increased truck traffic on Rt 6
Inadequate trout stockings from fish com to generate interest in fishing in Pine Creek. No
special regulation areas for fishing (delayed harvest, etc)

Over development - need a strict subdivision law-esp. Potter Co.
More fishing opportunities, what happened to upper pines smallmouth bass
How about conservation easements along Pine Creek proper both Upper Pine and Lower Pine
Farm runoff - don't let the hog farms pollute Pine Ck like they have ruined the water in Lancaster

Game commission is running the hunting in Tioga Co. and on State forest land - I have hunted
here for 20 yrs and many of my friends no longer come up because there are so few deer. We
sold our hunting club last year and at least 2 of my friends have their camps for sale in Tioga Co

Population growth and development are the two surest ways to degrade the watershed. Keeping
infrastructure improvements minimal can help control growth, runoff pollution maintain the
watershed resources.

Minimize human traffic
Wilderness enjoyment is for seekers not tourists
Tourists bring litter, noise, road kill, trampling of vegetation, I know, I live in FL

Enforcing & policing to prevent & punish any pollutions or contamination of water or land.

Limit tourism
Avoid over-population

Stream pollution of Pine Ck both upper and lower by sewage treatment plants in Galeton,
Wellsboro and farming operations
Upper Pine Ck water temps (Galeton dam)-stream width to wide? Lack of tree plantings along
stream banks - stream bank erosion
Lack of game fish reproduction trout & smallmouth bass
need to stimulate fishing in Upper Pine (more trout stocking
Upper Pine - stream bank stabilization
Non-native plants
Potential for over development
Upper Pine Ck fishing derby (too many people during low water conditions fishing in too limited
an area. Many non-game fish caught/killed
Both fish and game commission need to recognize that proper mgt. Of fish and game isn't just
for residents leisure activities but represent an economic force within the county as an important
link for tourism

Need rest room facilities
Need trash control
Need adequate patrol & enforcement of above

Growth & population - impacts on land use

Development of motorized recreational use - snowmobiles & lack of law impact
Recreation - hiking & skiing

Proper timbering, using selective methods

Clean out over-growth for new feeding & old dead stuff

We have seen a dramatic decline in wildlife, natural food sources for wildlife, i.e. mast crops,
browse in the higher elevations. Clear cutting is not helping either. The replanting/growth in the
areas is poorly managed

Maintaining good water quality within the Pine Ck WS. Improvement and promotion of the Dirt &
Gravel roads program with local municipalities. Education and maintenance on the importance
of maintaining on-lot septic systems and to ensure they are functioning properly. More hiking
and biking trails throughout the watershed.

Better timber management on State Forest land for wildlife habitat

Better land use ordinances with local municipalities to prevent development and keep the WS
relatively undeveloped and pristine.

Better timber management-creating better wildlife habitat management

Cummins Twp municipal workers-when replacing road cross drains, throw old pipes over bank
visible along dam run road.

Improving wildlife habitat in Cummings Twp for fish & game

Stop acid mine runoff
Enforce onsite sewage disposal regulations to stop polluting streams
Top commercial use of Pine Creek

Poor soil conservation practices in Tioga Co. are damaging to the flora and fauna of the creek.
Human sewage waste needs to be improved in treatment.
Improvements in mine acid treatment needs to be pursued.
The creek itself could be a higher quality fishery if fishing pressure were more controlled. We are
not taking advantage of fishery tourist dollars that could be gained from across the

country if
some easy changes were made and implemented. Fishing at trib outlets in summer when fish
are schooled in cooler water.
Points of public access are steadily being restricted.

Serious and systematic monitoring of pollution of Pine Creek water, both bacterial and chemical
Zoning restrictions to prevent tourist based commercialism and industrial development.
Full-time policing of the Rail-to-Trail path
Initiate lawsuits to force installations of fish ladders on Susquehanna Dams

Discharge of sewage/drainage from roads, malfunctioning sewage systems
Agriculture runoff

Protection of riparian

Water quality protection, floodplain construction, solid waste disposal (ease,cost)

I am curious to see if the massive build-up of mass algae is present in Pine Creek this spring
like last year. I observed a tremendous amount of moss in Pine Creek during early trout season
in Cummings & McHenry Twp. It seemed to die around the middle of May.
I question the effectiveness of the septic systems of the large campground located alongside
Pine Creek from start to end.

Preservation of natural animal & vegetation

Use of livestock excrement as a fertilizer
Recreational use of the "rails to trails" pathways along the Pine-need to evaluate impact & ensure
prudent conduct of visitors
Oiling of dirt roads
Pre-regulated sewage system
Restoration of mine drainage areas
Incentives for sound ecological practices (CREP program)

Building and zoning codes are generally inadequate for long-term protection of the watershed
Improving municipal sewage facilities
Replacement of outdated and inadequate waste disposal systems in rural areas of the WS
Lack of stream bank fencing and stream buffers in agricultural areas of the WS
Better enforcement of regulations pertaining to logging

Tougher regulations and better enforcement concerning the rampant misuse of ATV's on state & private property in the watershed

Before RV's, hikers, bikers, there were fisherman and hunters, lets not forget them
Continue to clean up Babb
I think the valley should be untouched

Refuse disposal-increasing use by more people illegal camping next to streams (Slate Run)
Alcohol abuse while boating, rafting, canoeing

Acid mine drainage, sewage pollution, commercial overuse and crowds using Pine Creek

Litter control, Emergency services, sanitary facilities for visitors

Development, Riparian protection, Runoff form dirt/gravel roads

Clearing of woodland for second home development, particularly clearing of streamside vegetation

Please not I have been a frequent visitor to Lycoming and Potter Co's for 18 yrs so the following observations are made in that context.
Potter & Tioga Co's seem to have very loose zoning & subdivision laws. We refused to purchase property in the Gurnee Subdivision (what a horrible layout)(poor access roads, no deed restrict-ions etc)
Every year more and more Pine Creek frontage seems to be developed and in many cases stream access is denied.
Is fishing being harmed on Upper Pine Creek by the Galeton Dam and the Galeton Solid Waste Treatment Plant?
Control of invasive weeds along the stream. I do not believe the bamboo was introduced on purpose was it?

Rising population (as with the rest of the country) will lead to overuse, overbuilding and septic pollution, trash disposal, increased consumption of resources with little regard for conservation

Intrusion of developments on the land decreasing the agricultural potential of the land & creating

more "waste problems"
Need to control strip mining & if allowed, proper reclamation at the expense of the company
doing the mining
Control of "people". Too much promotion of the "scenic area" results in an influx of people, most
of whom have no desire to preserve what the mature land has to offer. I realize this is a rub
between "business" and "naturalists" but a compromise must be drawn on how much is
allowed without it intruding on the natural beauty of the area

Restrict developments

More stringent regulations of whitewater rafting - canoeing activity. Need control of when rafting
not be allowed because of hazardous conditions. Vehicle off roads in severe weather conditions
dangerous of rescue units etc. Overturned vehicles have polluted several areas along roads -
vehicles upset because of traveling on roads marked "no maintenance" - should be extra fines
placed on these people.

Acid rain, mine acid, not to much development near creek, or access development will ruin
natural state of area

Enforcement of existing laws, election of pro-conservation minded politicians (local/state)

Cleaning up all the illegal landfills

Because of overuse and some how regular campgrounds in the flood plain

If still occurring, acid runoff from coal mines.
Continual monitoring to prevent pollutants from entering Pine Ck & it's tribs.
Prohibit the establishment of industries in this watershed
Perhaps, if the numbers keep increasing, limit the no. of rafters during fishing season

Maintain natural beauty of the area
Eliminate home sewage from entering water

Continued monitoring of acid mine drainage and keep Pine Ck watershed water save. This
protects human and all wildlife survival in the area.
I am not qualified to answer questions 4,5,6 but a very important issue is not to overuse any

of these things. To keep Pine Ck wilderness but accessible.

We have our cabin on Elk Run creek. This creek flows north so I am not sure if we are in the
Pine Creek watershed. In any event, we are concerned about clean water is a major interest.
We do believe also that the local government could do a much much better job.

Pollution from increased use of the area as the Pine Ck bike/hike path is completed
Noise pollution from increased traffic as more visitors use the scenic pathway and creek
Destruction of wildlife habitat as more people use and move into the area

The abandoned mine and current dumpsite at Antrim, the rt 6 corridor has changed too much.
There are too many residence and businesses located close to the creek. I understand all
areas are growing, but this area is too pristine to change. Expansion takes away from the
natural beauty of the area and the quality of the watershed.

We should be protecting and managing flood plain development. We should be careful in our
promoting of the valley that we do not cause overuse and "love pine creek to death". Find ways
to control invasive species that are crowding out the native plants and providing better protection
to our natural resources both plant and animal and when possible try to acquire land that ?? Be
developed that could have a negative impact on the valley. Also try to acquire conservation
easements to maintain more open space and prevent over developments and special viewsheds

Abandoned mine reclamation
Illegal garbage dumping and littering, out-of-state garbage brought to northern/rural PA landfills
malfunctioning on-lot sewage systems
Influx of people with no connection to the land or appreciation for the land, its value or history -
preservation of open space
Keeping farm families in business - sustainable agriculture
Prevention of sprawl and sprawl - marts driving mom & pop stores out of business
Wetland preservation and restoration
Preservation of scenic views

Too many people will find out about this area, meaning more traffic

Stop development.
Improved roads, subdivision of land, expansion of utilities, and community sewage systems all increase pollution and congestion and change the rural atmosphere which should be preserved and protected

Too many people not understanding value of watershed leading to littering and deterioration of the watershed

Too much development will impact the natural resources including ?? Ridges and esp the surface waters. New development should be prohibited in the flood plain. Water quality in Pine Ck, esp below Babb Ck's confluence, while improved, still needs improvement

The presence and future sighting of CAFO's--the ones we now have are situated in the uppermost spring heads of the watershed and more are planned….It is a disastrous potential for the surface and ground waters of the watershed with the potential leaching and runoff concentrated nitrogen compounds and phosphates etc. There are many private septic systems that are running directly into the small streams.

Poor location of many of the dirt & gravel roads throughout the watershed, many of them should be closed or relocated away for waterways
Poor on-lot sewage disposal
Continued construction of second homes, esp in flood fringe areas

Overdevelopment of vacation cabins in Pine Creek valley
Algae bloom occurring in the canyon immediately below rt 6

Establish a statute that requires a permit from the state or receptive counties, for any deforestation of more than 1/4 acre, even on private property, permits to be granted only after review by DCNR, which would include a mandatory inspection of the proposed site and signoffs by authorized officials. Approved permit information to be published in regional/local daily newspapers. Environmental impact study mandatory)

Adequate management of silt from farms in the upper Pine Creek area

Water pollution from overuse and cabin latrines. Mine acid and Dumps

Continue monitoring tribs. Stream pollution

Pollution of environment every where. Consumerism using up resources without paying attention to the environment. Lack of education about the environment.

Development within the Pine Creek Watershed. Properly managing drilling, mining, landfill operations in the watershed.

Pollution from farming methods and fertilizer. Trash in streams. Septic systems discharging into streams.

Urban development; pollution control; soon the 50 million people that live within 6 hrs. from here might soon be changing things. Let's be ready. Visit but don't pollute it.

How people affect the area. Sewage disposal. Runoff from roads.

Stop commercialization of area. Stop development. Stop increasing access.

Housing development threatens not only the environment but also the character of the area. Suburban sprawl is real in the Wellsboro to Mansfield area and will only grow worse. I am not optimistic in this regard because, as usual in the end, economic interests will prevail.

NONE - Many of these things are to expensive and don't do that much good. We don't need more roads. The roads we have should be kept in better repair. I believe many of these so called improvements will come out of tax payers pockets which is far to much now.

Over development by means of sub-division. Promotion by Tourist groups (i.e. T.C.D.C, T.A.R.T) and rails to trails. Sad but true we can't have development and large numbers of people over using resources without permanent damage to watershed and Pine Creek Corridor. If this trend continues the day will come when Pine Creek will succumb to over use and over exposure from to many people. We can't have it both ways!

ADDITIONAL COMMENTS

#Have projects available to landowners that own waters of Pine Creek Watershed to improve their erosion & fish habitat

Thanks for the bike trail !!

Information on the "plans" development must be available to the public…after attending one of the meetings & hearing the paranoia of some of those present-only good info will deal w/ this issue

Some other issues include overdevelopment of land, loosing areas previously open to wildlife, excess sewage & trash.

Public awareness by media, road signs and pamphlets are needed to protect the infrastructure (the Pine Creek Rails to Trails is monitored well at this time, hopefully this continues). Our property is close to this trail.

As to question 6 concerning river access-having proper access to creeks or rivers will take pressure off landowners. It would improve infrastructure if built & monitored/maintained properly. It would degrade if too many are left unmonitored. Having, maybe requiring, an infrastructure message on all brochures about our business & places of interest would encourage/remind tourists/visitors/general public to do their part to help keep the area clean.

I think "Rails to Trails" is an excellent way for people to enjoy the Pine Creek area. I think as much effort as possible should be put into this to make it one of the best in the world.

Private property owners need help keeping visitors off their land. I lived and owned a property in Waterville. People in boats think they can use private property as they wish, such as a boat w/

2 adults and one small child used our boat landing to let their child urinate. Kids upon one occasion put firecrackers in fish's mouths, then lit the firecrackers. We were afraid to say anything because of retaliation. We no longer live up Pine Creek.

I am not very knowledgeable about the Pine Creek watershed, but my sense is that many municipalities do not have appropriate ordinances for protections. I think local "dump" development reinforces that.
I am interested in more information so I can be more involved, Thanks.

If there is anything I can do to assist in this program, feel free to give me a call or email me.

"Some towns" have septic systems that are way too old & leaking! Years ago, they came to our town & put chemicals in our systems, 1/2 showed the dye in the waterway. We have no sewage codes. No dumpsters, "rats" a problem, no local trash pickup.
This is 2003 way to long for a "healthy environment"!
Old wells, quite a few cancer cases? Lumber storage to close to water in town. Cows to close to the waterways.

More attention needs to be paid to the very small streams that people dump their used goods by (such as the one on Knipe Rd, Liberty).

Any improvements to infrastructure should be weighed against cost. Especially to seasonal use cabins and camps or you force the very people out that have helped keep Pine Creek Valley the way it was when they first found it and came to love the area.

Forest lands should be absolutely off limits to commercial development.

Many have wanted rte 414 upgraded to modern standards. 414 above Slate Run

is a treasure
with the several narrows and old bridges that basically keep out big trucks and a flood of motor
homes. This road is a throw back to earlier times. Few roads remain in this condition. It adds
to the remote "back in time" atmosphere of this
valley.

Perhaps the best "improvement" would be nothing at all. The easier a natural resource is to
access, the more it is abused and
overused.

Local residents are not "educated" to the value of the natural resources and the positive things
they can do to preserve and improve. Although, many, even most, love the natural conditions
They are unaware of its frail state. If human activity is present without thought. It is the
responsibility of government & community groups, even schools, to assist in helping residents
gain this knowledge. Penalties, permits often do not achieve the desired end-plus actions do.

Road improvement as DCNR-Bureau of Forestry is doing it with limestone topping and culverts
improves sediment erosion. That is good, but adding roads and/or blacktopping brings more
people with more access - that's not good.

Keep up the good work!

If you want to be a friend to nature & preserve its beauty, you need to do
the following:
No development, do you best not to bring in a lot of
people.

I have been selling air & water purifiers for the last nine years. (Our water everywhere is in big
trouble & our air in our buildings have been in big trouble. You only have to remember what you
were taught in health class & by your parents. Rachael Carson's book "The Silent Spring" is
right on. NO SPRAY. We should get rid of our garbage by some other means than dumping
on our beautiful land. We will pay for it!!!

Reduce the deer herd do our forests can re-
propagate naturally.

Push for tighter regulation of ATV's and snowmobiles,
etc.
Make sure all state lease camps are in compliance with sewage
regulations.

Do you have an informational website? Didn't know about public
meetings in may.
Since many landowners in the watershed do not live in their properties full time,
there needs to be
a way to efficiently disseminate pertinent information
to them.
Policing of natural areas needs to be better, more effective and
constant.

Without regional cooperation on land use and development on it. There
efforts will fail!

As a farmer, land stewardship needs to be forefront. It is possible to operate in a
way the projects
and fosters the natural ecosystems. Most of our current industrial farming
practices ignore this
I depend on clean water, air & soil for my livelihood and want it for the next
generations. The
flush it away mentality is not responsible.

Because we only own a camp and don't live there, it is hard for us to answer. We
have no
knowledge of any of your
questions.

My wife and I both love the Pine Creek area, not just Pine Creek itself, but it's
tributaries, forests,
mountains, abundant wildlife and it's meadows and pastures. Unfortunately, the
very things that
make it beautiful also work against it if not properly managed and
respected.

Keep it natural so fish can
reproduce.

PA DCNR, the counties and other concerned organizations and citizens, should
develop: a) an

open space protection plan for the watershed, b) a steady funding source to address the open space needs, and c) a conservation easement program for those landowners who do not want to sell their land.

Disabled people cannot use the bike & horse trail along Pine Creek with a battery operated wheelchair to go fishing, only horses & bikes. Disabled people help pay for it. I am disabled, how can I fish Pine Creek. You also don't have hunting trails. You should have more than you have. I live there in Spring, Summer & Fall.

I believe it is very important to preserve and protect Pine Creek and its natural beauty for future generations. The area is an excellent way to draw tourism to our area, but needs to be maintained as natural habitat for our flora and fauna. The Pine Creek flows into the Susquehanna which is a part of the Chesapeake Bay watershed and we need to maintain the integrity of the entire system. Agricultural practices and building practices need to be monitored and education done to make people aware of problems & solutions. I am an educator and would be interested in any info/educational material that I could use in my 4th grade classroom to get my students involved. I have taken a Chesapeake Bay Foundation workshop and have become interested in maintaining and preserving our watersheds. I would like any curriculum materials available etc. How could my classroom become involved?

***See Survey

I have lived in this watershed for 73 years.

If there is any need, I am retired and would gladly serve on a committee for this study.

My husband and I love the outdoors, whether it includes hiking, biking, canoeing or fishing. So

any plan that would help maintain these activities will be supported by us. We are not familiar
with the EMRC&D, but understand the importance of your Mission. I would also like to see a
plaque/sign signifying any historical places/events that are along the watershed areas.

I think the roads to lookouts over-looking valley needs to be kept in good condition, so they can
drive cars not only 4x4's. The lookouts need to be kept
trimmed.

The Pine Creek watershed could be the most beautiful area in our state. Let's do all we can to
preserve it.

The elected local officials in each of the townships are taking the responsibility of overseeing the
activities in their own municipality. The necessary ordinances are adopted by each municipality
County officials & the watershed organization should not be interfering with the local official's
responsibilities. Let each township be run by their own
elected officials.

Do you have any publications or brochures? Exhibit?
I can have T-shirts made at cost.

Major water quality issues that should be addressed in the plan include: agricultural & residential
runoff, acid mine drainage & improved regulation of streamside on-lot sewage systems!

In regard to #2 - A "Growing Greener" grant application to remove the Pike Twp. Dump was
submitted and rejected by DCNR in 2001. Your organization would not support this project.

Tourism is dying in this
area.
No one is catching fish in Pine Creek like they used
to.

Whatever influence you may have to get a bridge, once again, over Babb Creek on Stony Fork
Rd. would be appreciated. So we may all have easier access to enjoy the

watershed, as we
are already there and taxpayers. Is driving thru the creek good for the watershed?
I see you got a grant from the PA DCNR. Lets put the money to good use and build a bridge.

Sorry to be so negative, but we who have lived here 50-60 years get tired of people who "know".
Plan to maintain, enhance & restore the watershed - and run over anyone who owns or lives
there! We live here & love the area and would no way do anything to contribute to any problems
& have spent our lifetime trying to improve our environment. We've just seen too many "experts"
come & go to be comfortable with A PLAN!

Prohibit the operation of municipal dump sites within the
watershed.

My concern is the potential threat that the solid waste disposal site in the NE section of the
watershed has on the Pine Creek water
quality.

Access to different areas (by trail) for snowmobiling. Snowmobiles deserve that right to be able
to tour these areas during their winter beauty! Also by helping out the economy of these
areas with their revenues from
snowmobiling.

I think we have enough laws to deal with any watershed problems that exist or may exist in the
future.

Officials, organizations and agencies always favor tourists and tourism over Pine Creek residents
whose families have been here for
generations.
There has been more litter along Rt 44 & Rt 414 this year than
past years.
Don't advertise a welcome to motorcycle gangs, bikers on trail DO NOT obey stop signs.

Would you send me a copy of the draft plan and meeting dates. I have no email access. Thanks.

Utilization of all assets to be used not to be stored or left to decay. With utilizing, will benefit
for jobs, business and commerce.

Limited recreational access to Blockhouse and Little Pine Creeks due to poster private property.

Development of this areas needs to be discouraged. The area is already over populated due to
business & commonwealth marketing. The more people that visit the area, the more problems
we will have protecting this area.

I am a landowner but not a resident of Tioga Co. I live too far away to comment on several of your
questions.

This may sound strange. I just joined the "Clean and Green" plan. It reduced my taxes by more
than half. I would think a reduction of 25% +/- would be sufficient and landowners would still join
the plan. I'm thinking the townships need the money for their services. Most landowners would
maintain their property per "Clean and Green" specs without and reduction in taxes. I know I
would.

It seems to me that the trailer park below Slate Run is over-crowded and I have strong doubts it
is meeting current pollution standards. If any of these parks come up for sale, I would hope the
State or NC Conservancy could purchase them & keep them as access areas. I would hope,
however, that any new access areas would be kept simple & natural and not like the overkill
on the Rattlesnake Rock access. These access areas should be limited, but strategically
placed where there are long stretches where there is no access over land. These areas do not
need to be developed and preferably be walk-in only. Pine Creek's charm lies in its natural
beauty and uncrowded
conditions.

Pine Creek has always been an island of wildlands, a hidden refuge gem in the

otherwise urban
and megalopolis east, let's keep it that
way.
I grew up on Pine Creek in the 1940s & 50s and have witnessed a lot of changes. Unfortunately
the locals have never seemed to recognize what they have had until it is/was too late. Large
properties were subdivided for shacks, habitat cleared and made into residential areas, flood
plain built on, access improved, trailer parks developed, water quality ex. Nature fisheries
degraded, the establishment of Pine Creek under the Federal Wild & Scenic Rivers Act defeated,
etc. What's left of Pine Creek is still precious and important, but desperately needs recognition
and protection. The resources that make Pine Creek special are the things which in the past
were little recognized or were exploited. Not its down to the wire to protect what little remains.
Good luck with your planning. Please keep me on your mailing list. Thank you for the
opportunity to comment.

We've been enjoying Pine Creek valley for 37 years; fishing, walking, enjoying nature. We are not
property owners but my wife & I vacation for the equivalent of 2 weeks per year at the Cedar
Run Inn. From early April until nearly mid-June I am a guest of a friend at Cammal, so we spend
a lot of time in the valley. It is our "home away from
home"!

I would like to see pond construction for public fishing with handicap access. Pheasant stocking
in the Gaines area is in mountainous and almost inaccessible terrain. I am handicapped and
it is very difficult to hunt this
terrain.

Don't believe in building wetlands. Could use the money they cost to enhance the streams for
better habitat. Should control the predators that feed on fish so they do not kill off the natural
living things in the watershed of Pine
Creek.

Sorry I missed your first meeting. I was not aware of it. Please keep me posted.

Pine Creek Headwaters Protection group has been making great strides to improve the watershed

Why all the trash from NY & NJ? The pig farm runoff
?

My family loves the Pine Creek valley and want to see it protected. We want the residents to feel
that this special place is truly theirs and that visitors are welcome. And most importantly, we
don't want officials to get "heady" with authority! Common sense and preserving will win the day.

Please leave the watershed alone except for any acid mine drainage
that may exist.

Should we wait until it's too late or should all dumping be stopped now? I live in a state where it's
too late already! When I move to my permanent home in PA, I would like my children & grand-
children to at least see how nature is supposed to
be.

I wish PA would stop importing New Jersey garbage to the landfill in
Antrim.
I also wish they would tighten up on folks with junk and derelict cars in their yards, in Antrim.

Don't change nature! Leave well enough alone, enforce the rules we
have now!

How to foster interest in the area, yet limit the effects that increased traffic many have on the
natural beauty of the watershed

The thing that stands out in my viewpoint is how the roads (414 & 44) have remained virtually
unchanged from Jersey Shore to Morris in the 50 years that we have been visiting the area.
I've always felt that this is a good thing and hope they will never change. I believe this factor has
helped keep the very rural character of the valley
intact

This area is destined to become the next Pocono's. Checking into how the Pocono areas is
dealing with their problems may give us a headstart

As time passes, it is essential for the citizens of the community to maintain pressure that pre-
serves natural
resources.

I am a former birth resident of Jersey Shore, PA - born and raised there. Currently own a cottage
in the Waterville area that is used about 6 months of each year. Protection of the quality of air
and water is most
critical.

Oct. of 2002, I picked up trash on a 2-1/2 mile section of Rt 15 - I got 169 bags of trash & tires etc.
I continue to clean this section which is headwaters to Little Pine Creek. I also do 4-1/2 miles
of rt 287 and 6 miles of Rt 414. I do them 4 times a year. People continue to throw trash along
our roads.

We're not in favor of any big government regulation or loss of liberty or freedom - but we're in favor
of clean water and environmental responsibility. Save the bay!! What kind of help do you need?

The Pine Creek watershed is one of the most scenic areas east of the Rockies. Hopefully future
programs will be designed to protect & conserve, rather than develop & exploit. Littering laws
should be strictly enforced & very costly to
offenders.

There are many examples of what happens without adequate zoning. Take how the Poconos are
trashed.

It would be very productive to provide a free, no penality, drop off area for solid waste rather than
seeing it being thrown "over the bank". Existing regulations should be enforced as they relate
to the clean streams and solid waste disposal and sediment & erosion controls.

Public educa-
tion of simple common sense approaches to environmental protection my be beneficial

What caused the excessive amount of algae (moss) in Pine Creek last spring. It was terrible
around Cammal & State Run. I did not fish above Slate Run so cannot reflect on areas north
of State Run. It was worse during first month of trout season, then it seemed to die

Salt should not be used on roads. Roads should be left dirt roads. More damns to build water up
with levis to keep
running.

Improve roads & recreational facilities throughout the
area

A concerned citizen

Suggest - do development slowly and well
I am a member of a hunting cabin in Waterville, Lycoming Co. I live in southern York Co. and
near a hike/bike trail in northern Baltimore Co, MD. Both trails are well managed & heavily used

Since I am relatively new to the area, I am not familiar with all these issues at this time.
However, since I do enjoy the outdoors, I am active in camping, hunting, fishing and hiking.
It does concern me that this environment continues to be maintained and left as wild as poss.

Farmer's tons of manure spread on top of the ground. Hogs are sprayed with water 20 minutes,
goes right into the
creek.

Thank you for caring!
This project is critically important, and cannot be
delayed!

PCHPG is perhaps the most important organization in northcentral Pa, even though most locals
do not express appreciation. Thank you for all you do, from current residents &

future generation

Who is watching them. You can't look out the window without seeing them. What do the do
nothing except act like they own the land. Like I said, it was l lot better
15 yrs ago.

Please preserve on entire natural area. I've seen many guided horse groups deficate on hiking
trails. Allowing individuals to exploit a publicly owned
resource is unfair.
Any commercial enterprise should be highly restricted and pay a proportionate land area
maintenance up keep
fee.

In Cummings Twp. I have noticed when drain pipes along the mountains roads are replaced, this
old pipes are just left / dumped in the area instead of
removing them

DCNR needs to manage it's State Forest Land for wildlife
habitat.

Tioga River needs attention. Marsh Creek, Asaph to Ansonia needs
attention

We own creek frontage on Naval Run road at Slate Run. It's land that goes back to my tomb
ancestors. We are very interested in seeing the resources of this watershed enhanced,
protected and managed well. Being educated in Biology & Aquatic Ecology, I would be happy
to assist in this effort if needed.

It is the unspoiled natural beauty of Pine Creek valley that makes it the national treasurer that it
has always been. It is as unique to the east as Yosemite is to the west. It is also as fragile &
as subject to pollution, over-population and commercial exploration. If Yosemite can be
preserved, then Pine Creek must be as well. This is the last chance to preserve this beauty for
our grandchildren

Current access to Pine Creek is good, but would be improved by information

about access sites
I think access sight should be known by public and published in local press, visitors information
centers, etc.

So long as services such as solid waste disposal are not provided at reasonable cost, there is
little chane that accumulation of trash and illegal disposal can be controlled.

I question the obvious increase in the size of private campgrounds located alongside Pine Creek

I don't like landfills in the
watershed area

I have always liked education as a means of proliferating good
ecological practices.
Tell people the right things to do to protect the land & waters and most
will do them

I think the RV parks at Cedar Run and Slate Run are not in the best interest of the valley

Could consider name change from "Pine Creek" to Tiadaghton
River

Trout fishing with fly rod has become very frustrating in the last 10 years due to rafts & canoes on
the Pine Creek. Esp. in the area of Tiadaghton to
Cedar Run!

The most important element to any plan is preserving this natural treasure from overuse and dev.

I have spent many years doing Pine Creek clean ups with the Pine Creek Headwaters Protection
Group and find the wilderness character of the Pine Creek Canyon a most unique experience.
It is that wilderness value that I am most concerned with protecting and of course water quality
is part of that concern

Over population-both permanent res. And
visitors
Overuse of Gorge-summer weekends with rafters, canoers, bikers and fishermen

now remind me
of a weekend at the mall in Washington
DC
Are there still trout in Upper Pine? I don't see fishermen there
anymore.

As our government continues to encourage the population growth (esp. immigration) under the
guise of economic prosperity, few people recognize the impact which this increase is having on
our quality of life. We cannot sustain this growth unless we want to become used to shortages
of natural resources and wild areas and increased problems in
urbanized areas.

I'm very pleased that the people living in the Pine Creek Watershed area are interested in
preserving their history and natural beauty. A study such as this should establish some para-
meters for the future of the area. Thank you on my
behalf.

There needs to be cooperation with local businesses as well. With declining hunting activity (no
game), businesses need the snowmobilers for winter income - need to improve this relationship
between local municipalities and
businesses
Fees for Rails/Trails permits? Why
not?

Also, keeping feeder creeks protected from pollution, silt runoff,
sewer, etc

I enjoy hiking and camping and fishing, my interest is to see Pine Ck kept in as good of
condition as possible so we can continue to enjoy the area in
the future.

Youth education and empowerment of citizens groups like watershed organizations and sports-
men’s clubs and granges is the key to preserving environmental quality and quality of life in rural
Pa

This area is beautiful as it is, it does not need "improvements". Just maintain

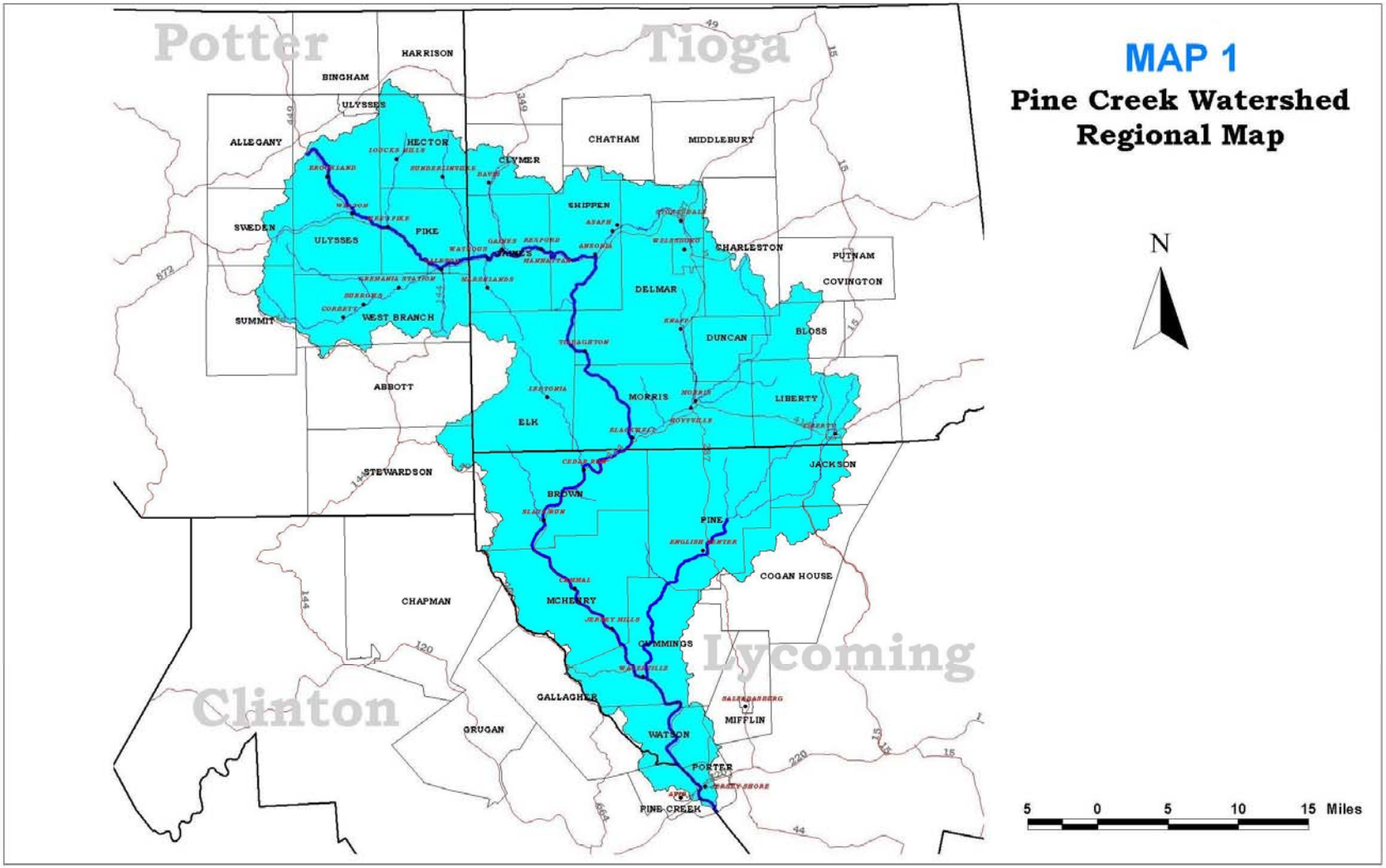
what is already
here and that's it.
Look at preserving the Rock Ranch in Cammal, it belongs to the State and rumors around here
are they want to
demolish it.

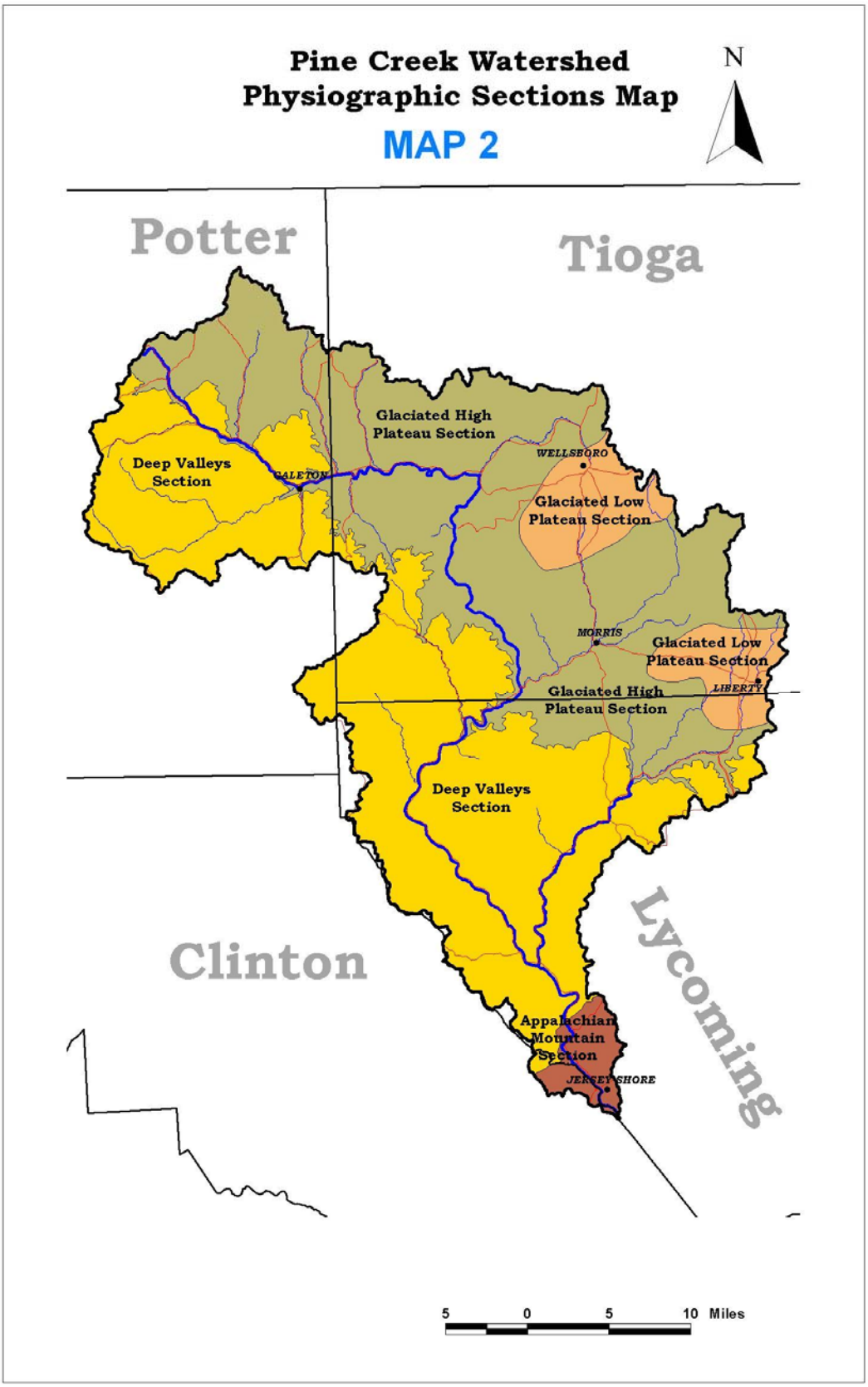
The Pine Ck valley is a treasure. As much of it as possible should be protected from development

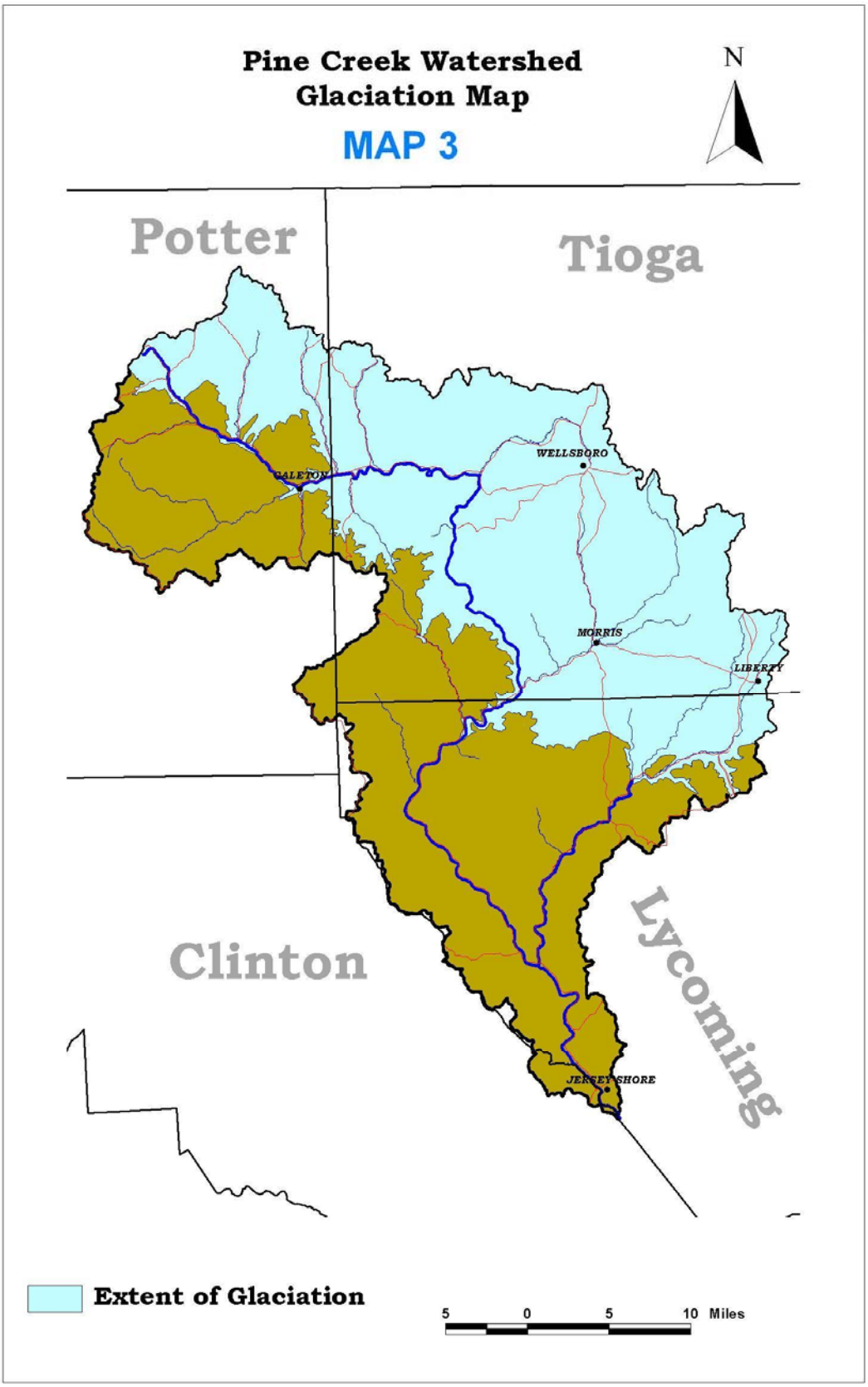
Lack of adequate public access to Pine Ck below Waterville limits use. Completion of the rail-
trail below Waterville without adequate public parking will result in conflicts between visitors and
landowners.

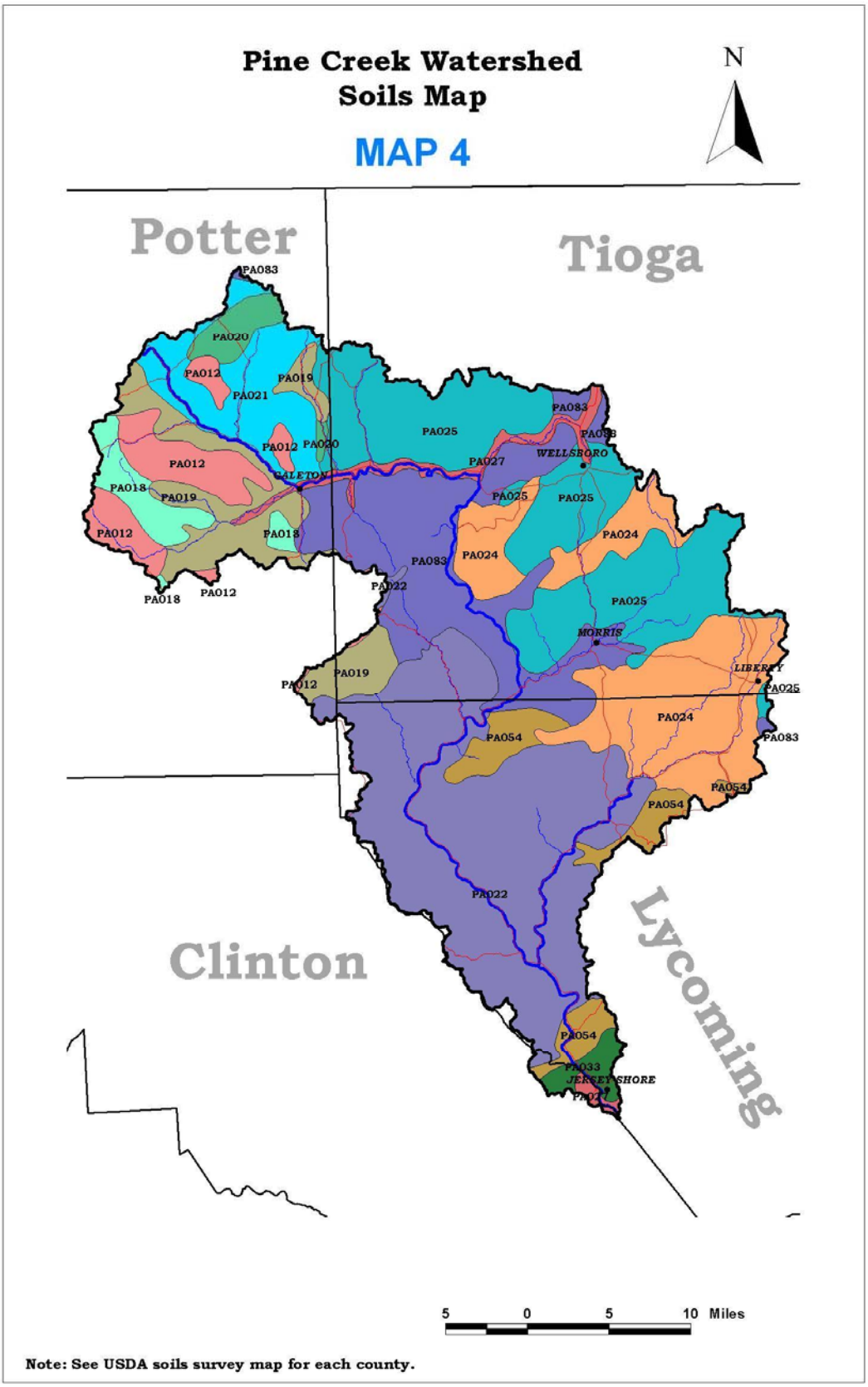
Open more roads & trails to the people for vehicles, motorcycles, ATV's and snowmobiles

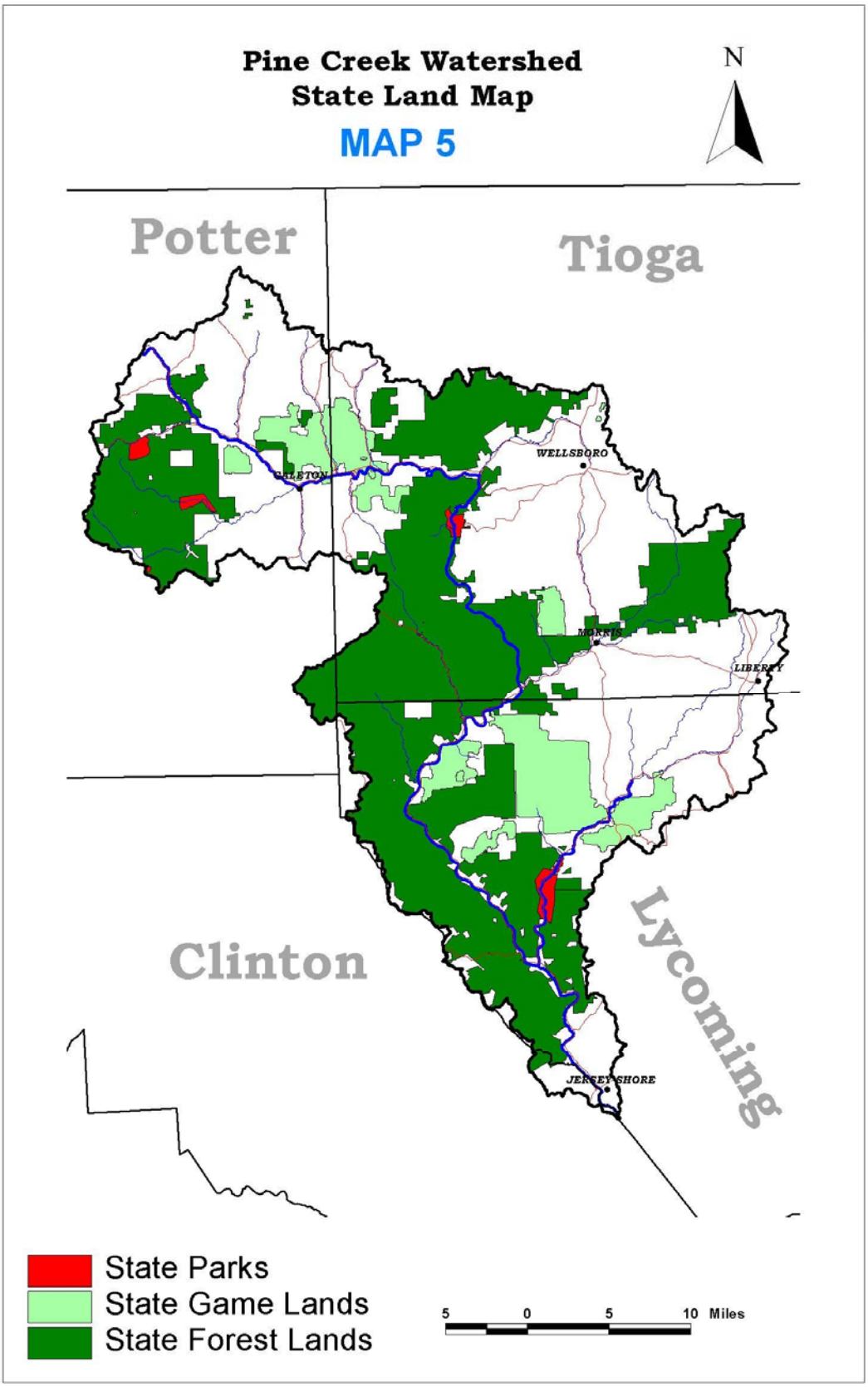
Make available for minimal cost "no dumping" signs, establish violation of "no dumping" signs as
subject to fines and/or
imprisonment.

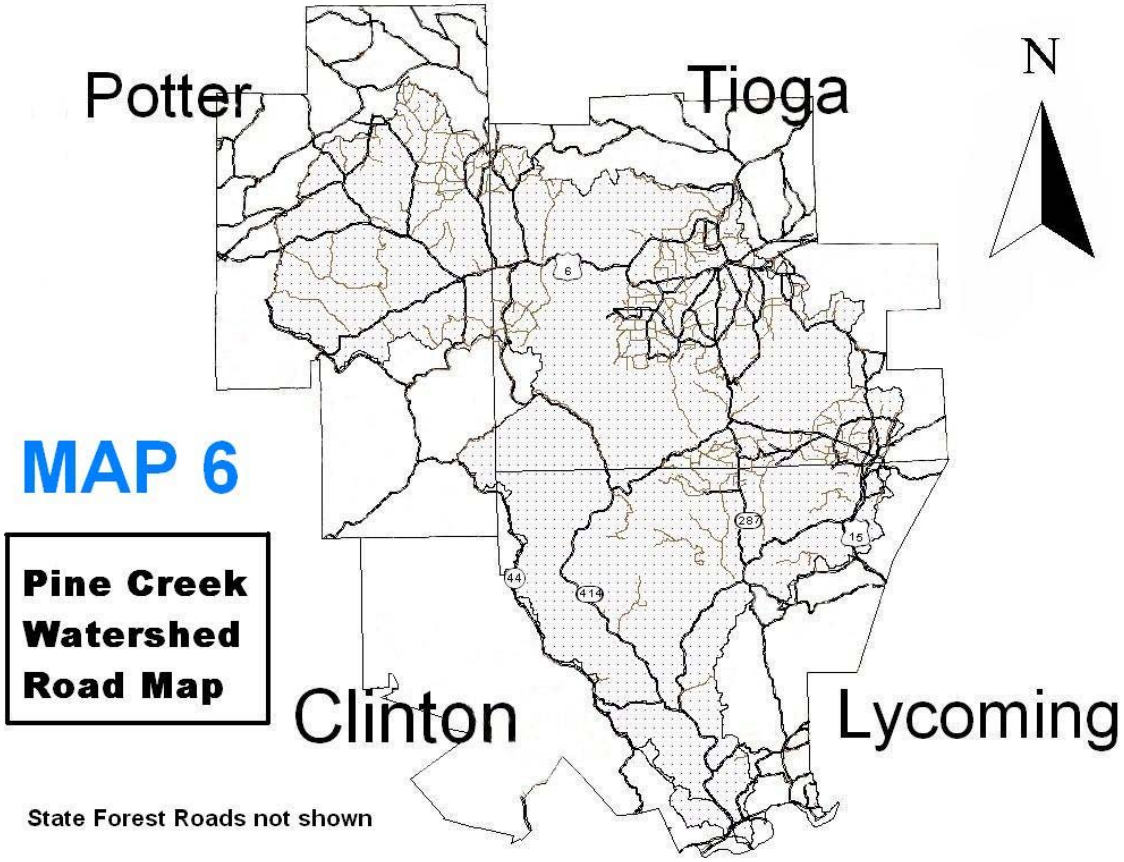

MAP 1
Pine Creek Watershed
Regional Map
N
5 0 5 10 15 Miles
Potter
Tioga
Lycoming
Clinton
HARRISON
BINGHAM
ULYSSES
ALLEGANY
HECTOR
CLYMER
CHATHAM
MIDDLEBURY
SHIPPEN
SWEDEN
ULYSSES
PIKE
CHARLESTON
PUTNAM
COVINGTON
DELMAR
SUMMIT
WEST BRANCH
DUNCAN
BLOSS
ABBOTT
MORRIS
LIBERTY
ELK
JACKSON
STEWARDSON
BROWN
PINE
COGAN HOUSE
CHAPMAN
MCHENRY
CUMMINGS
GALLAGHER
MIFFLIN
GRUGAN
WATSON
PORTER
PINE CREEK

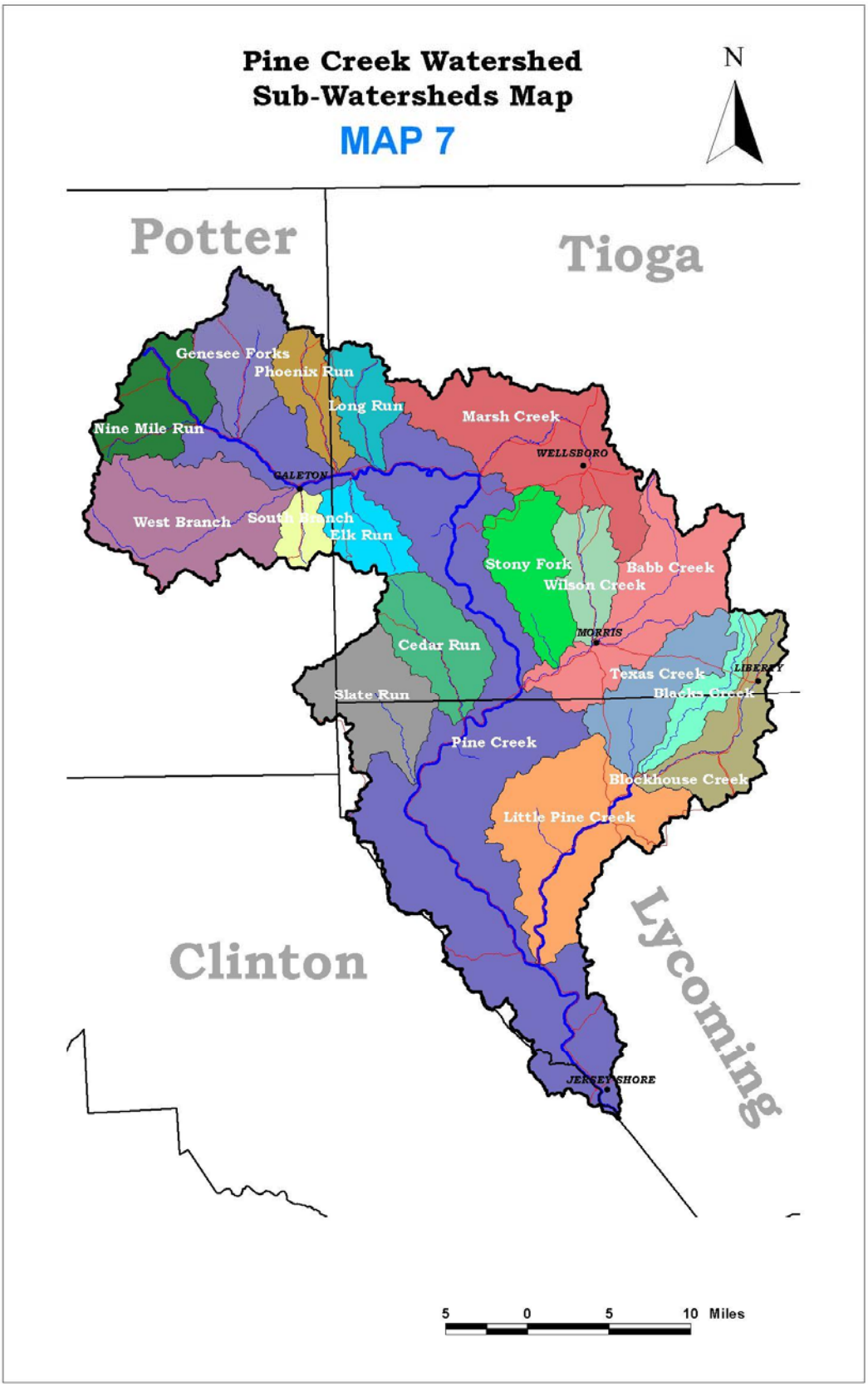

Pine Creek Watershed
Physiographic Sections Map
MAP 2
N
Potter
Tioga
Clinton
Lycoming
Glaciated High
Plateau Section
Deep Valleys
Section
GALETON
WELLSBORO
Glaciated Low
Plateau Section
MORRIS
Glaciated Low
Plateau Section
LIBERTY
Glaciated High
Plateau Section
Deep Valleys
Section
Appalachian
Mountain
Section
JERSEY SHORE
5 0 5 10 Miles

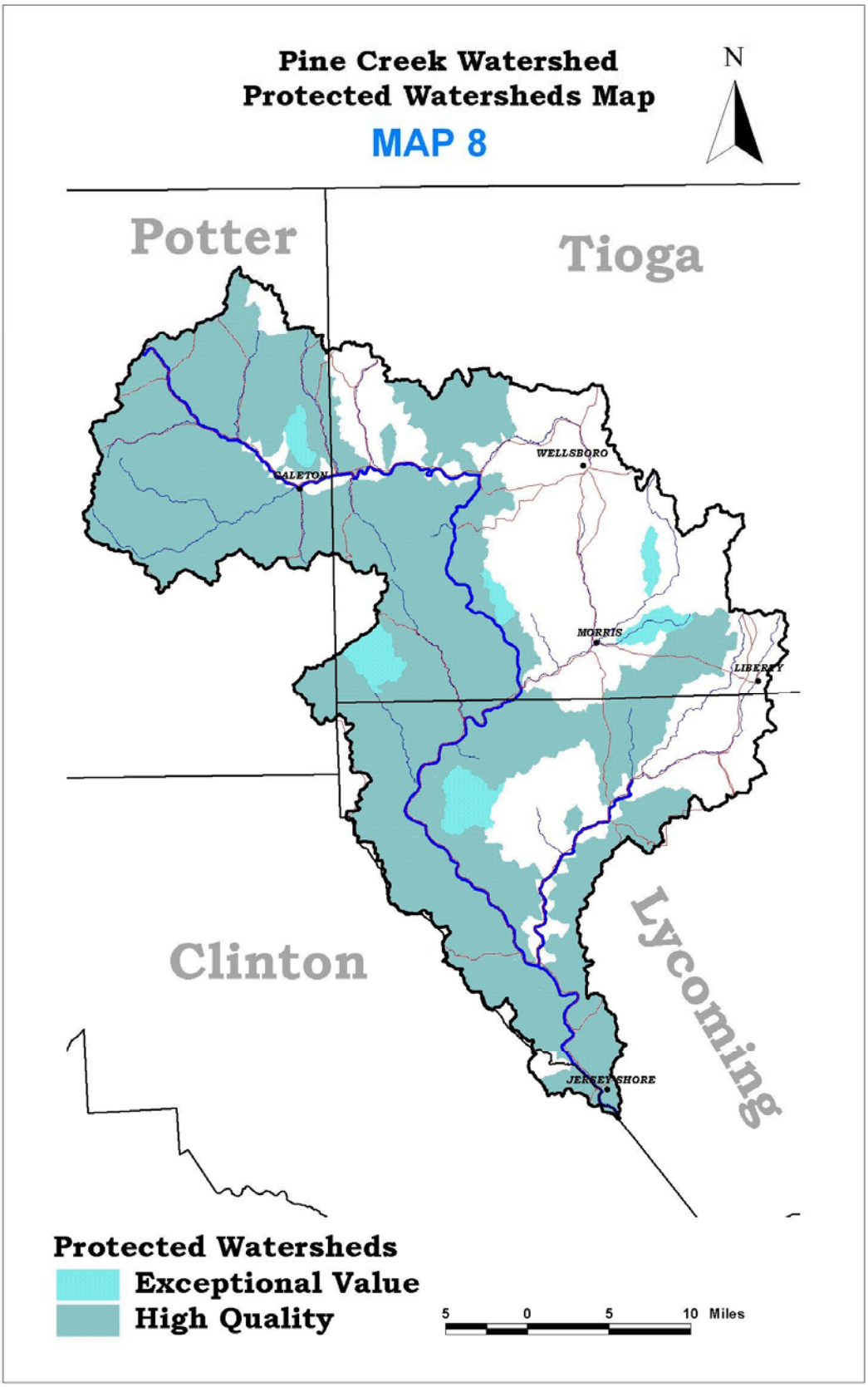

Pine Creek Watershed
Glaciation Map
MAP 3
N
Potter
Tioga
WELLSBORO
GALETON
MORRIS
LIBERTY
Clinton
Lycoming
JERSEY SHORE
Extent of Glaciation
5 0 5 10 Miles

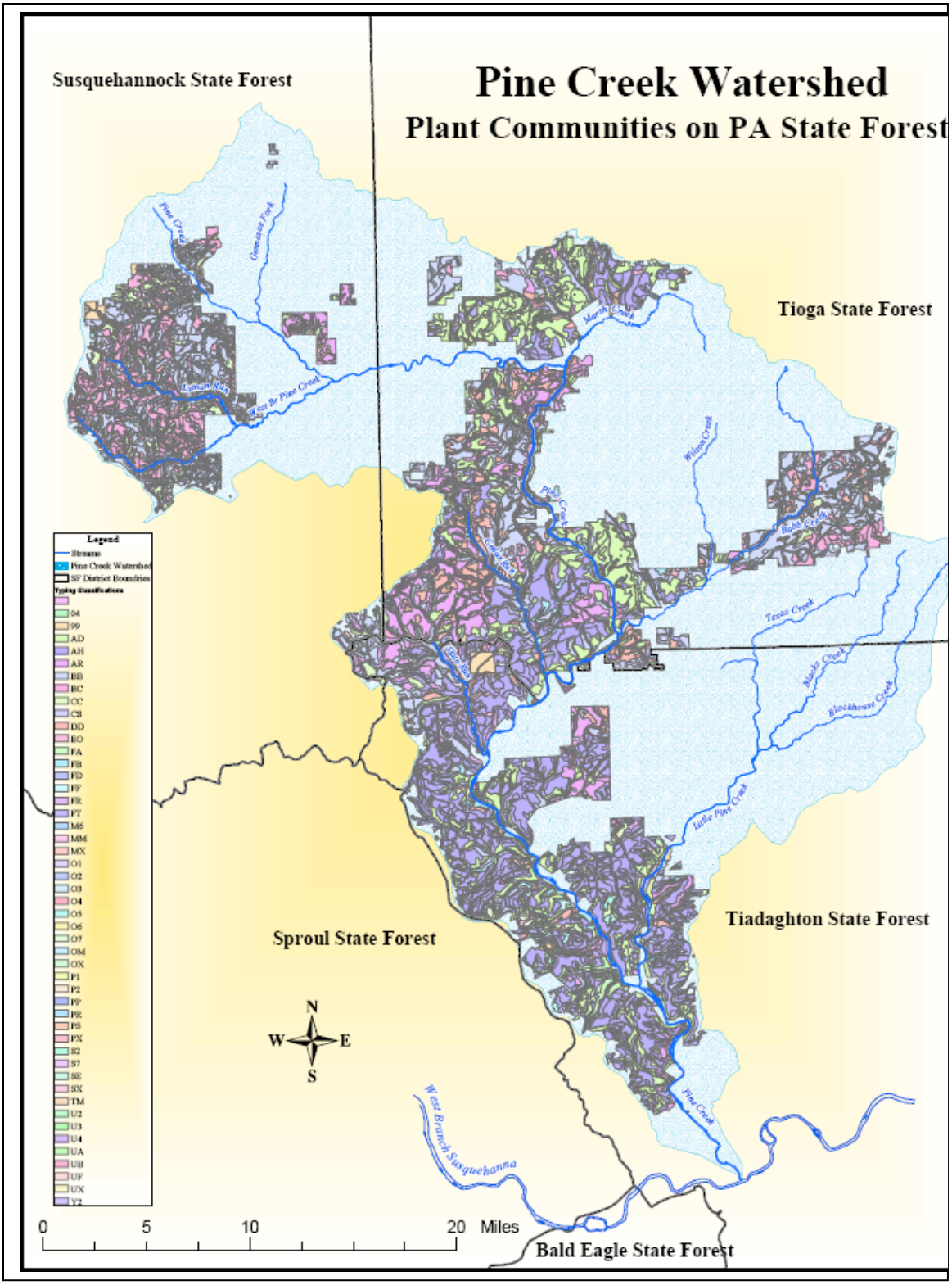

Pine Creek Watershed
Soils Map
MAP 4
N
Potter
Tioga
Clinton
Lycoming
PA083
PA020
PA012
PA019
PA021
PA025
PA027
PA018
PA024
PA022
PA054
PA033
WELLSBORO
GALETON
MORRIS
LIBERTY
JERSEY SHORE
5 0 5 10 Miles
Note: See USDA soils survey map for each county.


Pine Creek Watershed
State Land Map
MAP 5
N
Potter
Tioga
Clinton
Lycoming
WELLSBORO
GILETON
MANSFIELD
LIBERTY
JERSEY SHORE
State Parks
State Game Lands
State Forest Lands
5 0 5 10 Miles


Potter
Tioga
N
MAP 6
Pine Creek
Watershed
Road Map
Clinton
Lycoming
State Forest Roads not shown
6
287
15
44
414


Pine Creek Watershed
Sub-Watersheds Map
MAP 7
N
Potter
Tioga
Clinton
Lycoming
Genesee Forks
Phoenix Run
Long Run
Marsh Creek
Nine Mile Run
WELLSBORO
GALETON
West Branch
South Branch
Elk Run
Stony Fork
Babb Creek
Wilson Creek
MORRIS
Cedar Run
Texas Creek
LIBERTY
Slate Run
Blacks Creek
Pine Creek
Blockhouse Creek
Little Pine Creek
JERSEY SHORE
5 0 5 10 Miles


Pine Creek Watershed
Protected Watersheds Map
MAP 8
N
Potter
Tioga
Clinton
Lycoming
GALETON
WELLSBORO
MORRIS
LIBERTY
JERSEY SHORE
Protected Watersheds
Exceptional Value
High Quality
5
0
5
10 Miles


Pine Creek Watershed
Plant Communities on PA State Forest
Susquehannock State Forest
Tioga State Forest
Sproul State Forest
Tiadaghton State Forest
Bald Eagle State Forest
West Branch Susquehanna
Legend
Streams
Pine Creek Watershed
SF District Boundries
Typing Classifications
N
W
E
S
0
5
10
20
Miles

MAP 9