

### 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 Wisconsin 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 lithified 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 Wisconsin 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 19<sup>th</sup> 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 20<sup>th</sup>

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 Bohem 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.

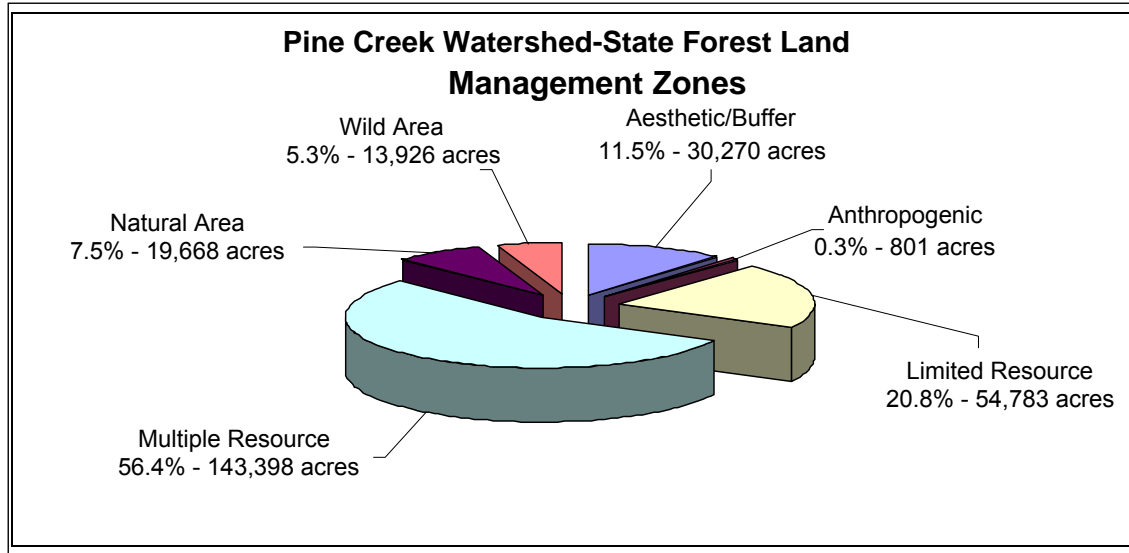
The **NATURAL AREA MANAGEMENT ZONE** applies to areas that have been designated or are pending designation as State Forest Natural Areas which are defined as an area of unique scenic, historic, geologic, or ecological value, and will be maintained in a natural condition by allowing physical and biological 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

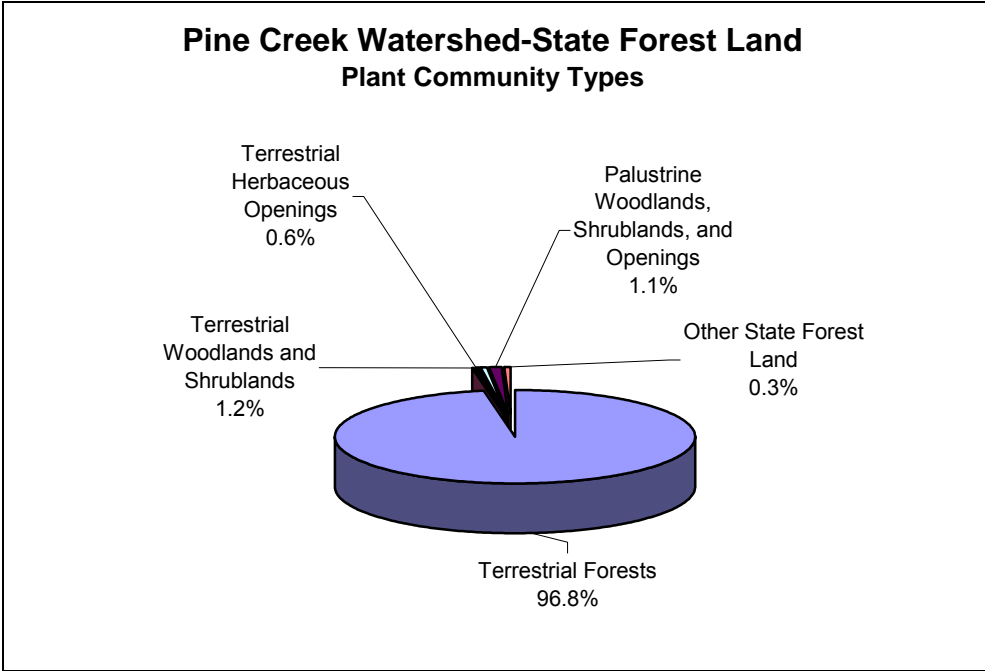
recommendations or plans focusing on the values that are being recognized. Forest community types within this zone are typically not part of the commercial forest land base; however, timber harvesting will be allowed if specific management recommendations recognize timber harvesting as an appropriate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

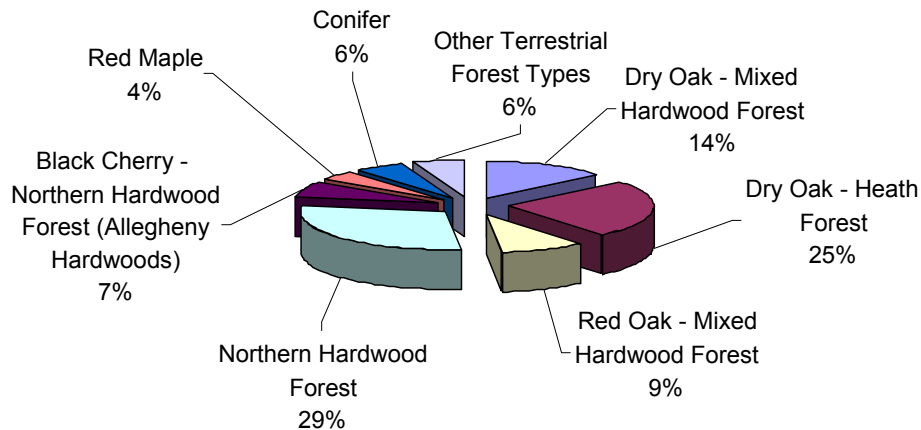


<b>Pine Creek Watershed-State Forest - Plant Community Types</b>		
	<b>Acres</b>	<b>Percentage</b>
Terrestrial Forests	254,380	96.8%
Terrestrial Woodlands and Shrublands	3,164	1.2%
Terrestrial Herbaceous Openings	1,627	0.6%
Palustrine Woodlands, Shrublands, and Openings	2,991	1.1%
Other State Forest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

**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 Land Predominant Terrestrial Forest Types



<b>Pine Creek Watershed-State Forest – Terrestrial Forest Type</b>	<b>Acres</b>	<b>Percentage</b>
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%
<b>Total</b>	<b>254,380</b>	<b>100.00%</b>

### **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.

<b>Pine Creek Watershed-State Forest - Palustrine Types</b>	<b>Acres</b>	<b>Percentage</b>
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%
<b>Total</b>	<b>2,991</b>	<b>100.00%</b>

### **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).

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

**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.

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

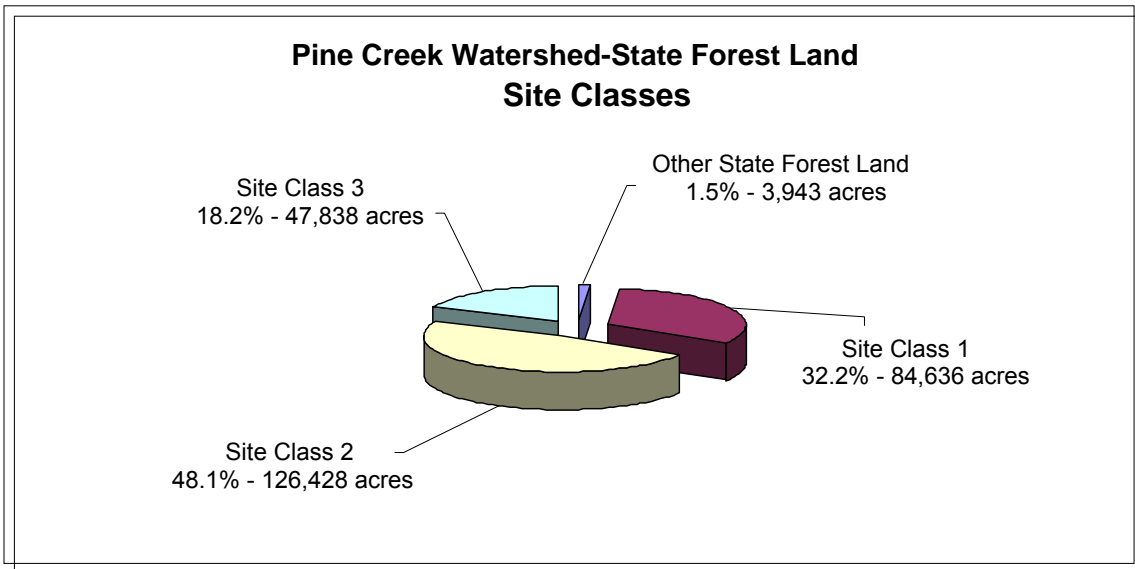
**Site Class**

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.

<b>Pine Creek Watershed-State Forest— Size and Stocking Classes</b>		
		<b>Acres</b>
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
<b>Total</b>		<b>256,421</b>

## 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 subdivision 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](http://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.

