Clear Shade Creek
Coldwater Conservation Plan

Prepared by Amanda Deal

March 2010

Funded by a grant from the Coldwater Heritage Partnership

Kiski-Conemaugh Stream Team

COLDWATER HERITAGE PARTNERSHIP

CONEMAUGH VALLEY CONSERVANCY

Acknowledgements

This publication was made possible through a Coldwater Heritage Partnership (CHP) grant awarded to Westsylvania Heritage Corporation and redistributed to the Conemaugh Valley Conservancy's Kiski-Conemaugh Stream Team. The CHP program is a partnership between Pennsylvania Council of Trout Unlimited, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources and the Foundation for Pennsylvania Watersheds. A grant from the Dominion Foundation contributed to this project. The Dominion Foundation is dedicated to the economic, physical and social health of the communities served by Dominion Companies. The Dominion Grant program was administered by the Western Pennsylvania Conservancy in commitment to its core mission of conserving Pennsylvania's diverse ecosystems through science-based strategy, leadership and collaboration. The Richard King Mellon Foundation and Foundation for Pennsylvania Watersheds provided operational support to the Kiski-Conemaugh Stream Team.

We thank the following groups and individuals for their assistance in completing this plan:

Joe Gorden

Windber Area Authority

We also thank the following reviewers for their comments:

- Randy Buchanan, President, Mountain Laurel Chapter Trout Unlimited
- Larry Hutchinson, President, Shade Creek Watershed Association
- Dave Kemp, Watershed Specialist, Somerset Conservation District
- Len Lichvar, District Manager, Somerset Conservation District
- Deb Nardone, Coldwater Resource Specialist, PA Council of Trout Unlimited / Coldwater Heritage Partnership
- Melissa Reckner, Director, Kiski-Conemaugh Stream Team
- Dave Sewak, previously with Westsylvania Heritage Corporation
- Gary Smith, Regional Habitat Biologist, PA Fish and Boat Commission
- Dave Steele, USDA, Southern Alleghenies Resource Conservation and Development Council

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Executive Summary

In an area historically scarred with the lasting effects of the coal mining industry, it is rare to find pristine streams; however, Clear Shade Creek and its tributaries are just that. Streams in the watershed range in classification from High Quality Coldwater Fisheries to Exceptional Value. The watershed is mostly forested and the pristine nature of the area allows for the proliferation of unique and diverse biotic communities.

The Clear Shade Creek watershed is located on the border of the Allegheny Front, in northeastern Somerset County, Pennsylvania. It encompasses over 20,000 acres and contains 53 perennial stream miles. Piney Run and Cub Run are the major tributaries to Clear Shade Creek. Clear Shade Creek itself has the only Catch and Release Fly Fishing Only Special Regulation Area in the Upper Conemaugh River basin. The uppermost headwater reach of Piney Run is classified as a Wilderness Trout Stream. Other stream reaches in the watershed support wild, naturally reproducing trout populations and also provide additional angling opportunities through the Pennsylvania Fish and Boat Commission's (PFBC) trout stocking program.

The Clear Shade Creek watershed provides an opportunity for a wide range of outdoor opportunities including whitewater sports, hiking, fishing, biking, snowmobiling, hunting, picnicking, and camping. It is also home to the Allegheny Front Hawk Watch, which is the western most migration counting station in Pennsylvania.

Residential and industrial development within the watershed have become concerns. Housing development has increased within the last few years, and, more recently, interest in industrial development has grown. Resource extraction, particularly from the Marcellus shale formation, poses serious threats to the health of sensitive natural areas in the watershed. This is a very new threat and concern for the Clear Shade watershed. Perhaps the most talked about concern is the proposed wind energy production facility. Shaffer Mountain Wind, LLC has applied for permits to install 33 wind turbines. Numerous grass-roots groups as well as local organizations have emerged in resistance to the project, because of the potential damage to stream quality and disturbance of rare and pristine habitat. At the time of print, the project is still in the permitting process and opposition groups continue to work against the project implementation.

Introduction

Conservation Plan Objectives

In early 2006, the Coldwater Heritage Partnership awarded Westsylvania Heritage Corporation a grant to create a coldwater conservation plan for Clear Shade Creek with the intent to "conserve and protect the coldwater streams of Pennsylvania." Westsylvania Heritage Corporation dissolved and the Kiski-Conemaugh Stream Team agreed to take over the project.

This grant was used to conduct studies, identify potential threats and prepare a plan to protect and conserve coldwater fisheries in Pennsylvania. It is intended to increase community awareness and support for the protection of areas such as Clear Shade Creek.

Kiski-Conemaugh Stream Team Background

The Kiski-Conemaugh River Basin Alliance formed the Kiski-Conemaugh Stream Team (Stream Team) in 1999 after the Kiski-Conemaugh River Basin Conservation Plan (GAI Consultants, Inc. et al. 1999) identified a need for a basin-wide water monitoring program and more environmental education. The mission of the Stream Team is to educate and engage citizen stewards in maintaining, enhancing, and restoring the natural resources of the Kiski-Conemaugh River Basin. The Stream Team monitors abandoned mine drainage (AMD) discharges, AMD treatment systems and waterways affected by AMD, provides technical assistance as requested, and educates students of all ages about numerous environmental topics.

Together with its citizen volunteers, the Stream Team monitors 152 sites. In 2009, they collected 589 water samples within the five-sub watersheds of the 1,887 square mile Kiski-Conemaugh River Basin. Volunteers are trained to collect water samples from select sites according to Pennsylvania Department of Environmental Protection (PA DEP) protocols, and the PA DEP Bureau of Laboratories analyzes the samples. Stream Team data are used by over 20 local, state, and federal agencies for multiple purposes, including grasping the extent of water quality problems; prioritizing restoration and treatment systems; evaluating restoration and treatment systems; improving treatment technology; gauging the overall health of waterways; and performing case studies for educational purposes.

To ensure that the next generation has good environmental stewards, the Stream Team provides environmental education to schools and communities throughout the Kiski-Conemaugh River Basin. The Stream Team leads in-class activities and hosts "Outdoor Discovery Workshops" that provide hands-on educational experiences in the

field. Activities are tied to Academic Standards set forth by the Pennsylvania Department of Education and may include collecting macroinvertebrates, studying water quality, utilizing resources recovered from AMD sites, and examining various habitats. Additionally, the Stream Team coordinates several local Trout in the Classroom projects (Figure 1) and organizes Outdoor Heritage, a joint initiative aimed at celebrating our natural resources and educating citizens on how to protect these resources. One of the Trout in the Classroom projects is located at Shade-Central City High School, in the Clear Shade Creek watershed.

The Conemaugh Valley Conservancy, Inc. is the fiscal sponsor of the Stream Team, and its board of directors oversees Stream Team functions.

Figure 1. Marjorie Zubek, a teacher from Shade-Central City High School, releases classroom raised trout as part of the Trout in the Classroom Program.
Photo by Melissa Reckner.

Watershed Characteristics

Location, Size, Tributaries

Clear Shade Creek is an exceptional value (EV) stream and high-quality cold-water fishery (HQ-CWF) that drains 32 square miles in northern Somerset County, Pennsylvania. The main stem of Clear Shade Creek runs for 13 miles. Clear Shade's headwaters are located in Gallitzin State Forest near the Allegheny Front that divides the Chesapeake Bay and Mississippi River watersheds. Its two main tributaries are Piney Run and Cub Run. Piney Run, which stretches for 5.6 miles, is classified as an EV stream from its headwaters down to the bridge at township road T816. After T816 the stream is listed as HQ-CWF. Cub Run (2.9 miles) is classified as HQ-CWF. All other unnamed tributaries to Clear Shade Creek below the breached Clear Shade Reservoir are classified as HQ-CWF (Pennsylvania Code 2009).

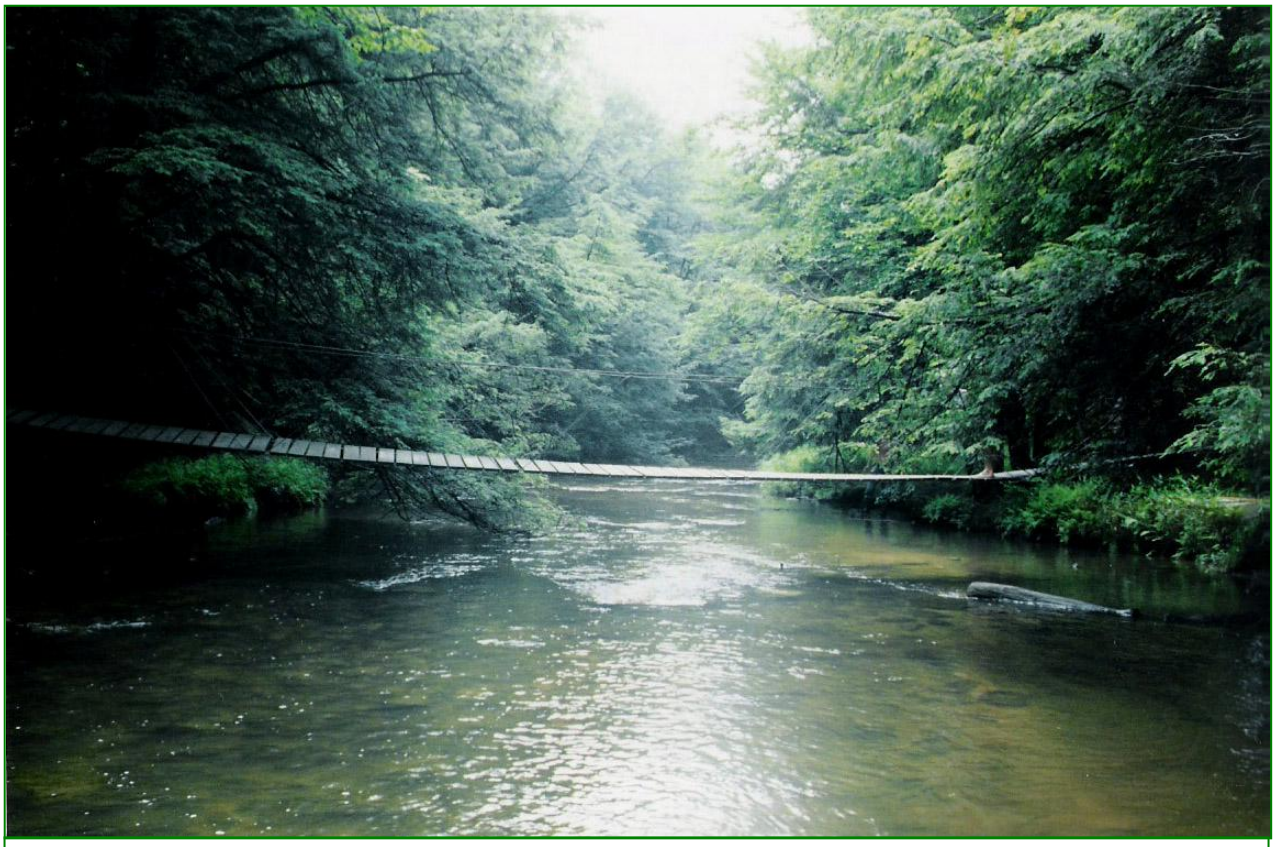

Figure 2. A swinging footbridge over Clear Shade Creek. Photo by Melissa Reckner.

Land Use

Based on the 2006 Somerset County Natural Heritage Inventory, 71.5% of Ogle Township is deciduous forest, 20.5% is mixed forest, and 4.1% is coniferous forest. This mixture of forest cover makes up 96.1% of the land use in Ogle Township. The remaining land is broken down as follows: 2.3% surface mines and/or quarries, 0.9% pastureland, 0.6% woody wetlands, 0.1% each residential space and open water (Western Pennsylvania Conservancy 2006).

Land cover specifically within the watershed shows similar trends (Figure 3). Forested land cover makes up 97.1% of the watershed. Low-intensity residential makes up the next largest land cover encompassing 1.8% of the watershed. Agriculture, surface mines/quarries, water and wetlands each make up significantly less than 1% of the land cover within the watershed.

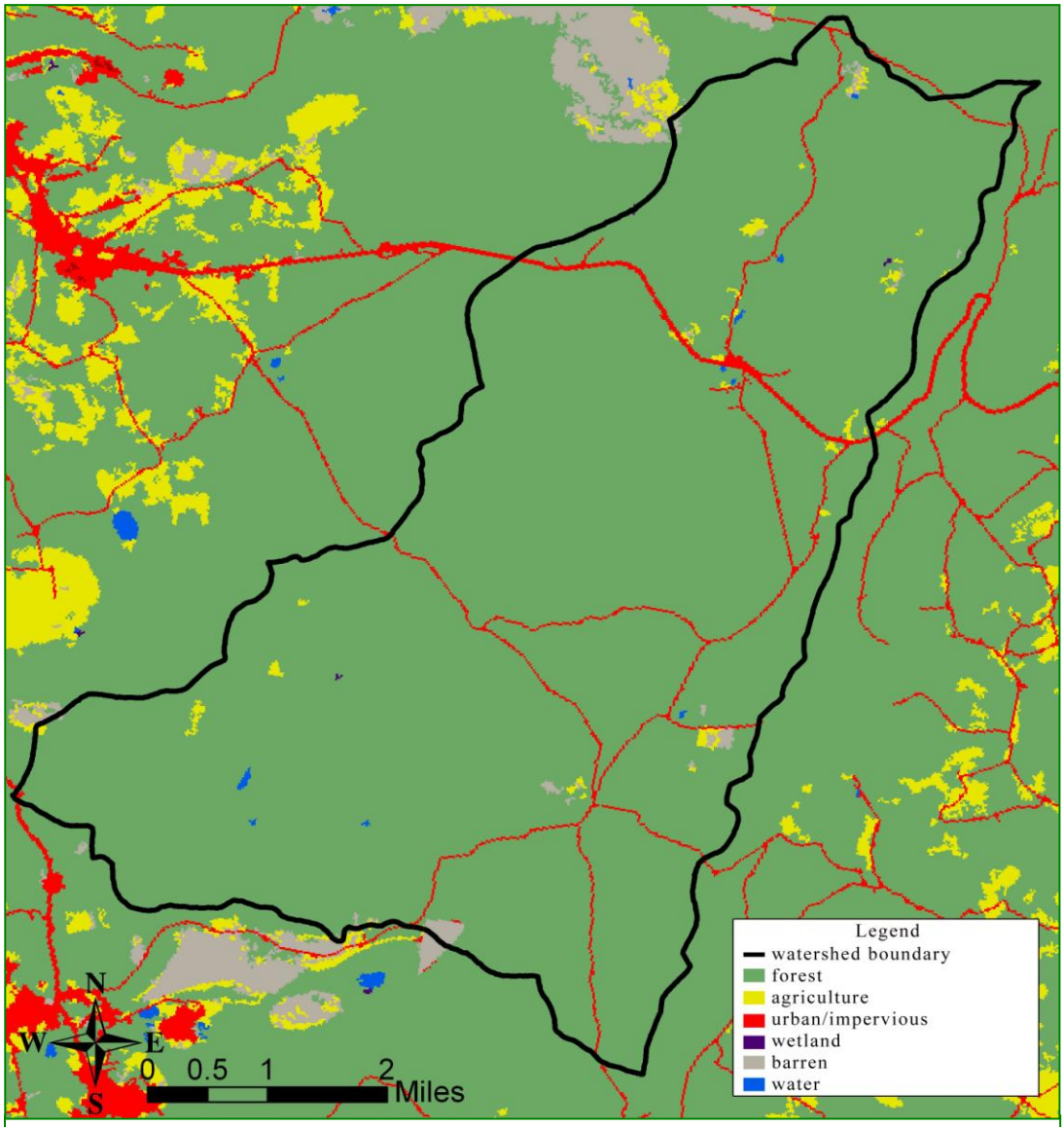

Figure 3. USGS land cover data for the Clear Shade Creek watershed.

Public Lands

Gallitzin State Forest covers approximately 33% (6,740 acres) of the Clear Shade Creek watershed. The forest is located in the northern portion of the watershed and encompasses most of the headwaters and headwater tributaries of Clear Shade Creek. Another state land, State Gamelands #26, barely touches the uppermost portion of the watershed (Figure 4).

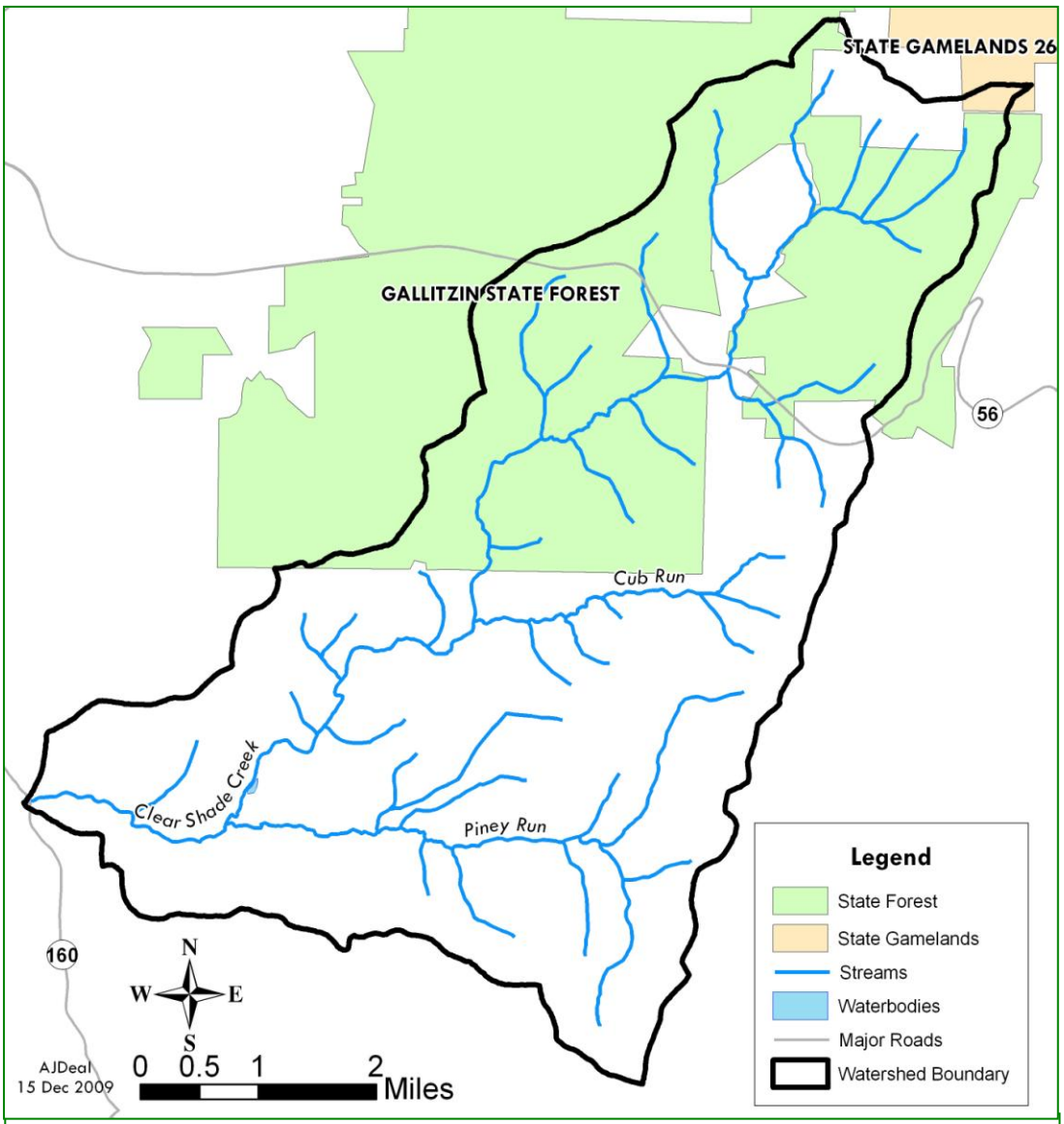

Figure 4. Public lands in the Clear Shade Creek watershed.

Political Boundaries

The majority of the Clear Shade Creek watershed and its associated tributaries lie within Ogle Township (72%) in northern Somerset County (Figure 5). Clear Shade Creek forms a portion of the southern border that Ogle Township shares with Shade Township. Paint Township is to the west of Ogle Township, while Bedford County is to the east and Cambria County borders the northern portion. The entire watershed is located within Pennsylvania House District 72 and Senatorial District 32. The northern portion of the watershed lies in the Windber school district and the southern portion is in the Shade-Central City school district.

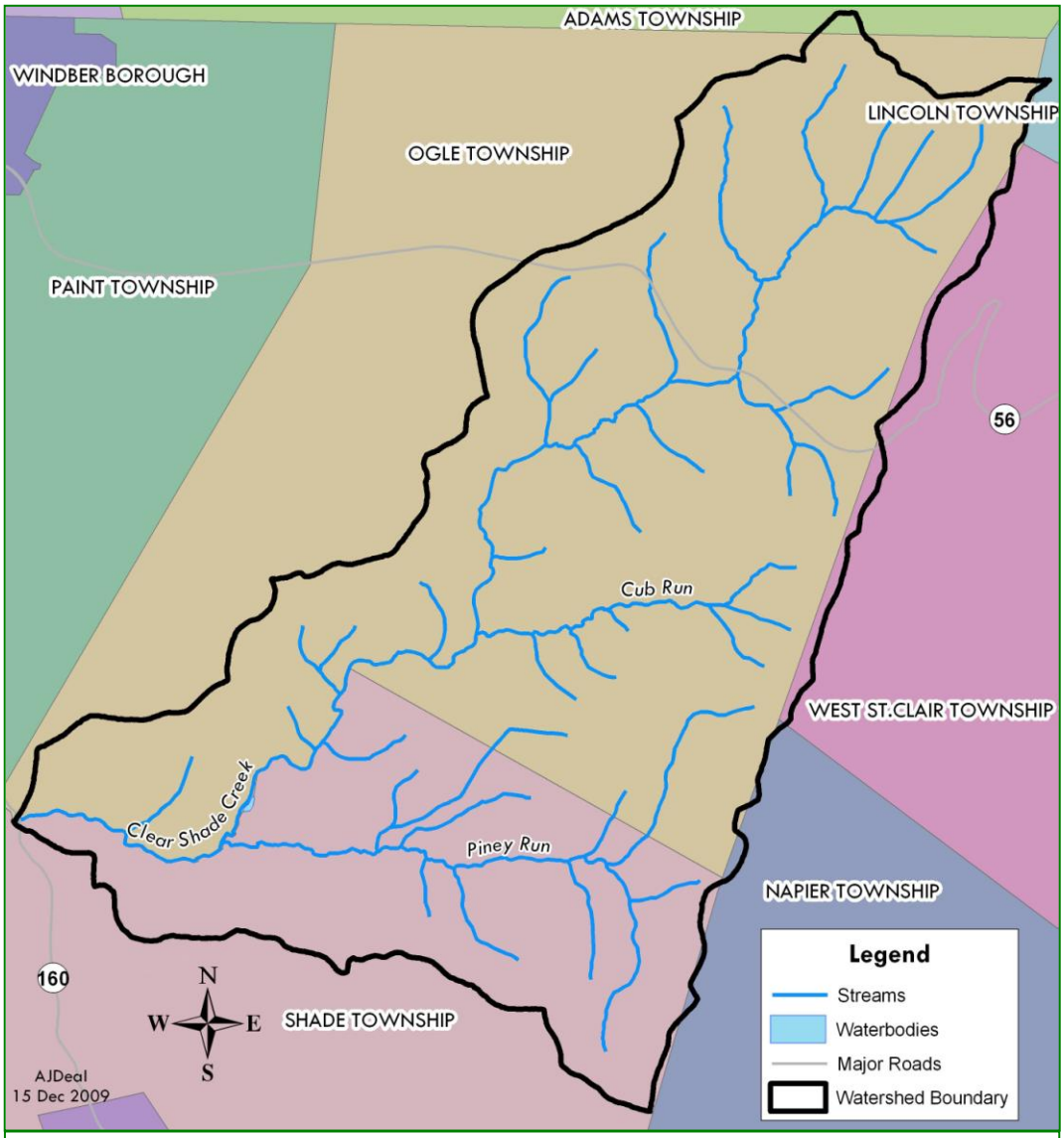

Figure 5. Political boundaries in the Clear Shade Creek watershed.

Demographics/Economics

According to the United States Census, the population of Ogle Township was 588 in the year 2000. Of that, there were 303 males and 285 females with the median age at 39.5 years old. There were a total of 217 housing units in the township, with an average household size (includes non-relatives) of 2.69 occupants. In the 1990 census, the population was a bit higher at 597 residents: 285 males and 312 females. The total number of housing units was only one less at 216, with an average household size of three persons.

Table 1. U.S. Census figures for Ogle and Shade Townships.

	OGLE TWP		SHADE TWP	
	1990 Census	2000 Census	1990 Census	2000 Census
Population	597	588	3,177	2,886
Males	285	303	1,591	1,464
Females	312	285	1,586	1,422
Median Age		39.5 yrs		41.3 yrs
Housing Units	216	217	1,355	1,276
Household Size	3.0	2.7	2.6	2.5

For Shade Township, the 2000 Census showed a population of 2,886; 1,464 males and 1,422 females. The median age was 41.3 years old, with 1,276 housing units in the township. The average household size was 2.5 persons. In the 1990 census, the total population was higher at 3,177 residents, with 1,591 males and 1,586 females. There were 1,355 housing units with an average household size of 2.6 persons.

The percent of high school graduates for Ogle Township in 2000 was higher than the national average; 86.5% of the 386 adults over age 25 have completed at least high school or more advanced education, compared to 80.4% for the nation. From the 1990 census, 70.1 percent of residents age 25 and over have a high school diploma or higher—less than the national average at the time of 75.2 percent.

In the 2000 Census, Shade Township had 70.3 percent of its residents with at least a high school diploma or higher. For Shade Township in 1990, the percent of adults with a high school diploma or higher was only 57% of the population over age 25 (2,180 persons).

Of the 588 residents of the township, 447 were of working age (16 and over), but only 285 are in the work force, with 270 actively employed. From the 1990 census, there were 407 of working age, with 239 in the labor force, 221 employed, and 168 individuals not in the labor force at all.

Of those 270 employed, the majority (25.6%) were in sales or office-based occupations, with management and professional occupations second with 24.1%. The

average commute time to work for those in Ogle Township was 26 minutes, in line with the national average. In comparison to the 1990 census, the results are different. Eighteen percent of people employed held the occupation of precision production, craft, and repair occupations, followed by machine operators, assemblers, and inspectors.

The Southern Alleghenies Region is known for its history of steelmaking and coal mining and the reputation of poor air and water quality that goes along with these industries. In the 1970s and 1980s, however, these industries declined rapidly as the abundance of coal diminished, leaving thousands of people unemployed.

The effects of such past industries remain in many people's thoughts through the remnants of brownfields and abandoned industrial sites. With the Information Age in full swing, most people employed in the area work in the healthcare, service, retail, and manufacturing sectors. Very few are employed in agriculture and mining.

The median household income for Ogle Township in the year 2000 was $43,438 based on 208 household units; this was slightly higher than the national average of $41,994. The median income for 143 family units (only related household members) was somewhat higher at $48,625 in the same year, but lower than that of the nation at $50,046. On a per capita basis, Ogle Township residents have an average of $18,005, which is lower than that of the nation at $21,587 (U.S. Census 2000).

Recreational Opportunities

Many opportunities abound for recreation in the Clear Shade Creek area. The Clear Shade Wild Area is part of Gallitzin State Forest, open to the public, and available for hiking, fishing, biking, snowmobiling, hunting, picnicking, and camping. A one-mile segment of Clear Shade Creek is designated as a fly-fishing catch and release only section. Within Gallitzin State Forest are the John P. Saylor Trail in the Clear Shade Wild area and the Lost Turkey Trail, which extends northward to Blue Knob State Park. The Southern Alleghenies Region is home to many state parks including Laurel Ridge State Park, which boasts the 70-mile Laurel Ridge Hiking Trail from Ohiopyle State Park in Fayette County to Johnstown.

Kayaking and whitewater rafting are popular in this part of the state, with many rivers and streams offering some of the best whitewater opportunities on this side of the Mississippi River. Clear Shade Creek itself from Crumb Road to its confluence with Shade Creek is classified as Class III according to American Whitewater. Covering a distance of 5.5 miles, this section is suitable for an afternoon trip and the beautiful scenery attracts visitors from outside of the local area (RiverFacts 2009). Other streams throughout the area also have high-quality whitewater paddling stretches. The

Figure 6. Kayakers gather at Whitewater Park on the Stonycreek River. Photo courtesy PA DCNR.

Stonycreek River, the eventual receiving stream of Clear Shade Creek and Shade Creek, has multiple whitewater opportunities ranging from Class II to Class IV. The recently constructed Whitewater Park (Figure 6) is a man-made whitewater recreation park located in the Stonycreek River adjacent to Greenhouse Park in Conemaugh Township. Completed in late 2007, this park is attracting even more outdoor enthusiasts to the area, bringing more tourism and business to the region.

Clear Shade Creek itself at the State Route 160 crossing is a popular summer destination for kids. Locally, the area is known as "Swingy," and children gather there to play in the stream to beat the summer heat.

Also of note is the Allegheny Front Hawk Watch (Figure 7), a unique portion of land that is a divide of the Mississippi River Basin and the Chesapeake Bay Watershed. The mountaintop is privately owned and overlooks Bedford County, with spectacular views of the valley. Because of the height and its location, the Hawk Watch attracts many different species of birds during the spring and fall. The Allegheny Plateau Audubon Society manages the site and bands and tracks birds in their migration patterns.

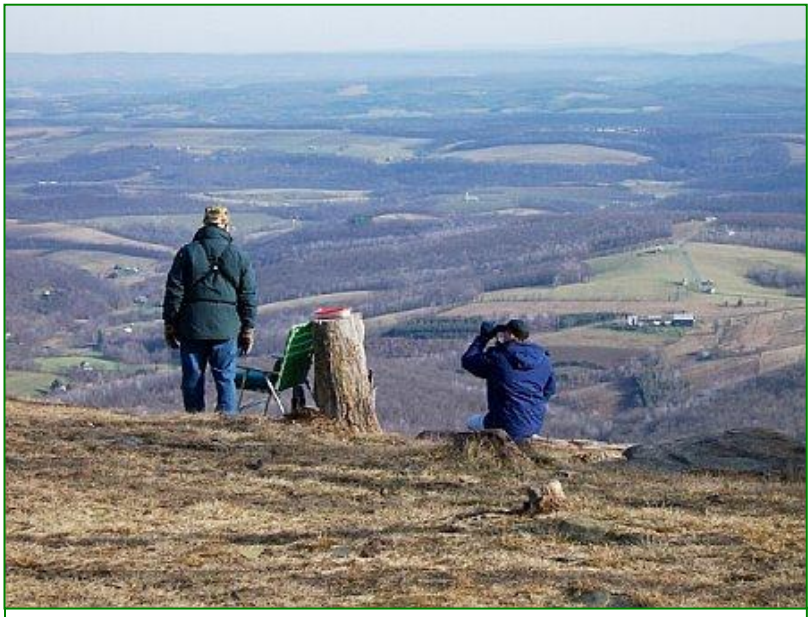

Figure 7. Ornithologists and amateurs alike observe migrating birds at the Allegheny Front Hawk Watch. Photo courtesy Allegheny Plateau Audubon Society.

Figure 8. Johnstown's Inclined Plane. Public domain photo.

There are other recreational opportunities outside of the Clear Shade area to attract tourists. Johnstown, famous for its historic floods, has a flood museum and a nearby National Park Service Flood Memorial, the world's steepest vehicular incline (Figure 8), the Johnstown Area Heritage Association, and various other cultural resources. The nearby town of Windber is home to the Windber Coal Heritage Center, which is a tribute to the area's historic coal industry and houses items from the famous Que Creek Miners rescue. Also nearby, in the town of Shanksville, the National Park Service is building a permanent National memorial in honor of the United Flight 93 crash on 9/11/2001. A temporary memorial is currently in place that attracts approximately 130,000 people per year.

Fishing

Clear Shade Creek has been called "one of the most picturesque and secluded trout streams in southwestern Pennsylvania" (McIntosh 1998). A large portion of the stream is located within Gallitzin State Forest, making access limited. Because of the limited access, anglers often experience a sense of solitude when fishing Clear Shade Creek. The only Catch and Release Fly Fishing Only Special Regulation Area in the Upper Conemaugh River basin is located on Clear Shade Creek and is a popular destination for fly rod anglers. The late Mike Sanja, a noted Pittsburgh area outdoor writer and author of multiple

Figure 9. These bucktail streamers, tied by the late Glen Shaulis, are typical of the flies anglers have used for decades in the Clear Shade Creek watershed. Shaulis was a deputy PFBC Waterways Conservation Officer for many years and knew both the fish and fishermen of Clear Shade Creek as well as anyone could. Photo by Brian Whipkey.

books on fishing in Pennsylvania, describes the Fly Fishing Only Area as "one of the most splendidly isolated special regulation waters in the state" (Sanja 1988). Because of its isolation, the "fly project" offers some of the best angling in the watershed; however, anglers should not overlook stream segments both above and below the special regulation water. Clear Shade Creek is stocked regularly, but also offers angling for wild brook and brown trout in its upper reaches.

Two, small, sensitive tributaries to Clear Shade Creek, Cub Run and Piney Run also offer excellent fishing opportunities in the watershed. Both streams hold wild reproducing brook and brown trout and the insect life is diverse and bounteous.

The PFBC stocks trout throughout the watershed, providing additional angling opportunities. A total of 4,500 trout were stocked in 2009 on Clear Shade Creek in sections 02, 03 and 04. The PFBC stocks brown and brook trout twice in the spring at the Ogletown bridge, State Route 56 bridge and at four locations below the Iron Bridge. MLTU and sportsmen volunteers assist in float stocking the Catch and Release Fly Fishing Only Section. The PFBC also makes seven stops below the special regulation area down to the mouth. Piney Run is stocked twice in the spring in section 02 with brook trout. Cub Run section 02 is stocked once each spring by the PFBC with brook trout only.

Numerous sportsmen's groups, including the Windber Sportsmen's Association, Beaverdam Trout Club and Shade Sportsmen's Club also stock regulation size adult trout in Clear Shade Creek, Piney Run and Cub Run in April. In 2009, the Sportsmen's Clubs stocked a total of 2,650 trout in three different locations: Ogletown, the Iron Bridge and the Catch and Release Fly Fishing Only Section.

History

General History

No permanent American Indian settlements were present in Somerset County (Blackburn and Welfley 1906). Any remnant of their presence is in the form of flint arrowheads, which indicates that the area was used primarily as a migratory hunting ground.

In 1745, Edmund Cartlidge, a trader, built a trading post in the watershed in the swampy area known as Edmund's Swamp. In advance of General Forbes' expedition, Colonel Bouquet's forces built a small fort here

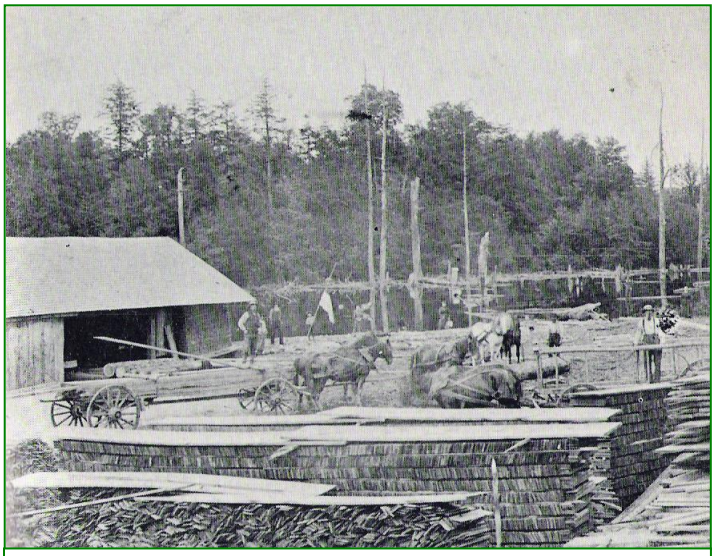

Figure 10. McGregor Sawmill, built in 1856 near the Village of Cairnbrook (Baldwin 1964).

in 1758. The fort became one of the most important posts along the Forbes Road between Fort Bedford and Fort Ligonier. Cartlidge had a thriving business selling supplies to the military forces and civilian travelers (Shade Creek Restoration Plan).

The biggest industry around the turn of the century was timbering. Most of Ogle Township is forested, thereby providing much lumber and jobs for early settlers. The Babcock Lumber Company had a large presence in the area in the late 1800s to early 1900s. They logged in Ogle, Paint, and Shade Townships, cutting down more than 20,000 acres of virgin timber forest. Babcock stopped lumbering in the area in 1914, and eventually sold most of the land to the state of Pennsylvania in 1949 and 1950 (State Forest Resource Management Plan 2007).

With the Allegheny Mountains bordering in the east and the Laurel Mountains to the west, the bituminous coal industry thrived on the vast rocks that lay beneath the surface. In 1872, the first coal mine was opened by the Keystone Coal and Manufacturing company. By 1874, eleven local companies produced 6,500 tons annually. Berwind-White Mines opened the majority of the pits while the Windber Area Mines churned out peak production. They produced four million tons annually from 1910 to 1913. By this time, Pennsylvania led all states in production and Somerset County was in the top six bituminous coal regions in the state. Almost half of the coal production was used in Pennsylvania Coke. This heated the new blast furnaces of the growing steel industry that began to make its mark on the local map in the 1900s (Laplaca 2003).

Today coal mining is still prevalent in the local area. The largest deep mine within the Shade Creek watershed is Reitz No. 4. The mine was carved out of the Kittanning coal seam throughout the 1940's and is estimated to be 12 miles long and 6 miles wide. A majority of the Shade Creek watershed is underlain by abandoned deep mines, the present day sources of AMD discharges (Shade Creek Watershed Restoration Plan).

Archeological Features

No formal, comprehensive survey of important prehistoric or significant archeological features has been conducted in the Clear Shade Creek watershed. However, America's Industrial Heritage Project and the National Park Service has compiled a list of historic features in the area from which the following list has been extracted (Table 2) (Brown et al. 1994).

Figure 11. Shade Furnace. Photo by Jet Lowe.

Table 2. Historic features in or near the Clear Shade Creek watershed.		
Feature	Year Built	Description
Border Dam	circa 1900	The dam is 9 feet tall and was constructed from timber cribbing partly because of the growing need for water.
Stonycreek Viaduct	1901	Constructed by the PA Railroad, the viaduct is a 540 feet, single track, deck plate girder structure resting on five steel towers.
Shade Furnace	1807	Currently owned by the Historical & Genealogical Society of Somerset County, only the stone foundations, ore pit mines and piles of ore remain.
Foust Mill	1812	Located in the village of Seanor in Paint Township.
Daley Family Cemetery	circa late 1700s	The cemetery is located on State Game Lands 228 and is maintained by the PGC.

Topographic & Geologic Features

The topography of the Clear Shade watershed is characteristic of Western Pennsylvania; many hills and valleys shape the landscape. Clear Shade Creek flows through these features with elevations ranging from almost 2,800 feet to 2,100 feet (Figure 12). In Gallitzin State Forest it begins its journey at 2,160 feet, it then flows through Ogletown at 2,320 feet, through the Windber Reservoir at 2,200 feet and it enters Dark Shade Creek at 2,160 feet completing its travel. It encounters a difference of 620 feet overall.

The watershed is located within the Appalachian Plateau physiographic province. It consists

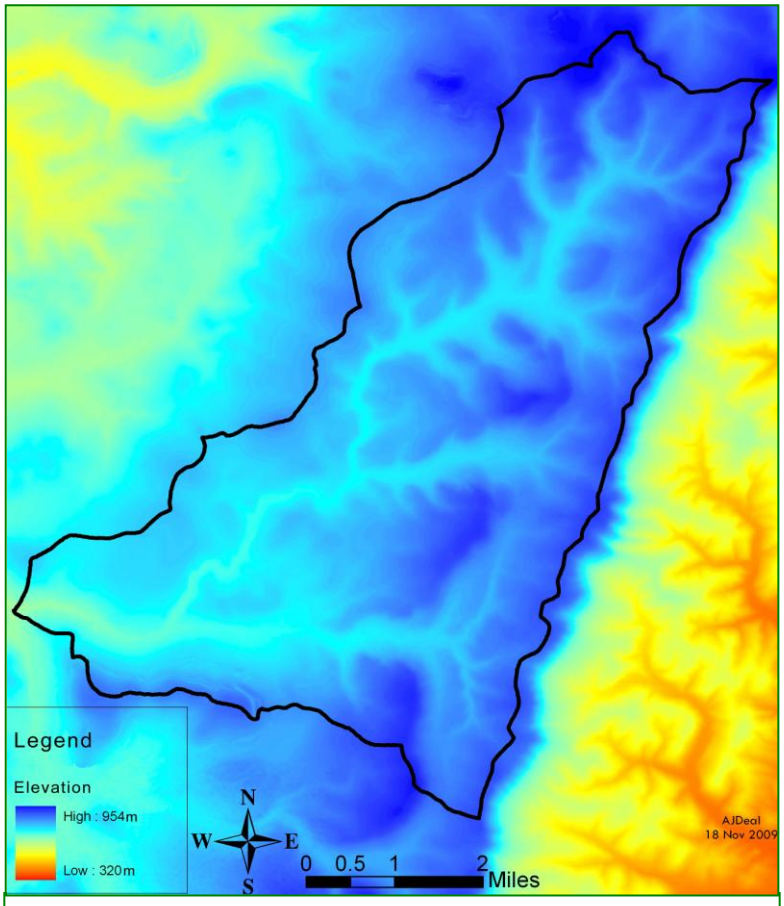

Figure 12. Elevation in the Clear Shade Creek watershed.

of six different geologic features: Allegheny Formation, Burgoon Sandstone, Glenshaw Formation, Mauch Chunk Formation, Pottsville Formation and Rockwell Formation (Figure 13). The Allegheny Front is a steep ridge that climbs from 1,000 feet near the Stonycreek River to Mount Davis, its highest peak, at 3,213 feet. This feature is unique due to the fact it was never pressurized under glaciers, explaining the high, mountainous peaks. As a result, the Allegheny Mountains produce some of the best whitewater boating opportunities in the east, and if not polluted, generate some of the finest native trout streams due to the cold, highly oxygenated waters flowing from the high ridges (Shade Creek Watershed Restoration Plan). This front is found in the southwestern corner of Clear Shade Creek watershed.

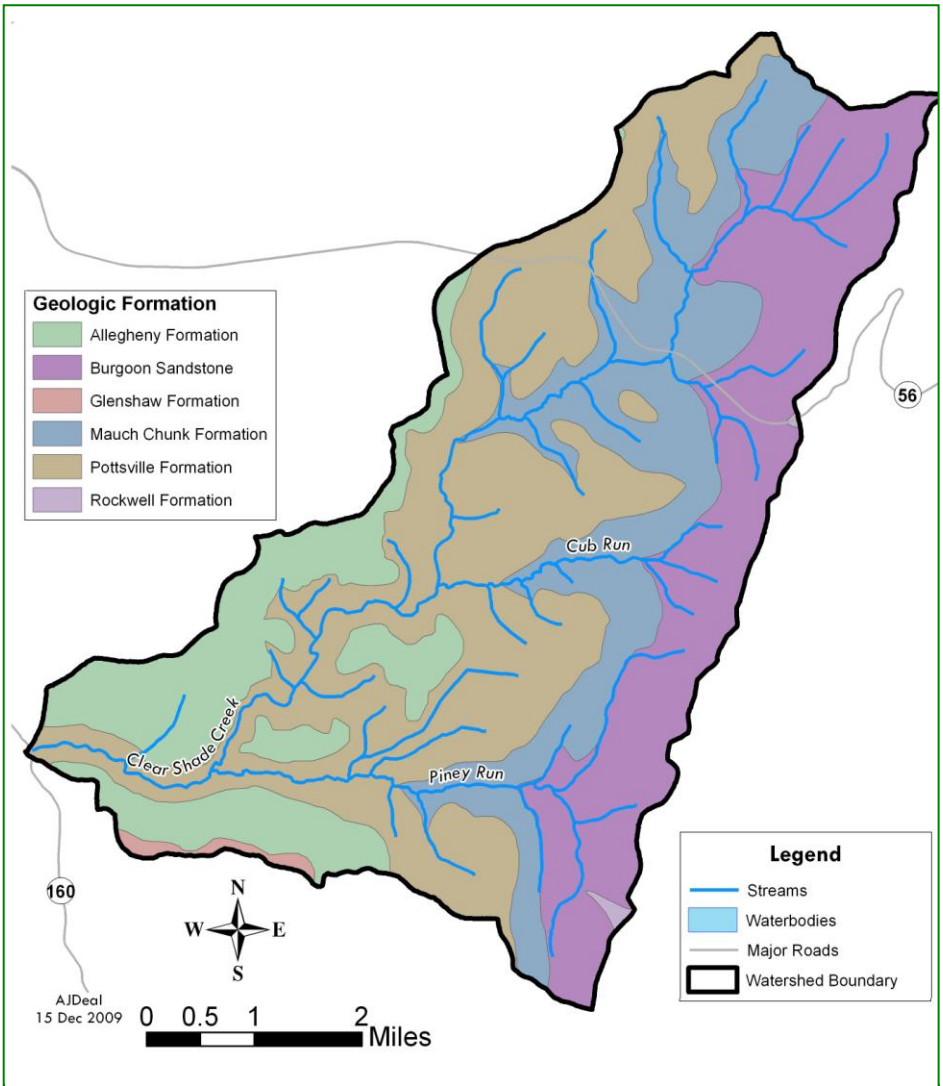

Figure 13. Geologic formations in the Clear Shade Creek watershed.

The Burgoon Sandstone, found on the eastern border of Clear Shade Creek watershed is of Mississippian age. This type of sandstone is buff colored, medium grained and cross-bedded. It includes conglomerate at its base with shale and coal overlying. This is the formation where Clear Shade Creek originates (USGS 2010). Burgoon Sandstone also has poor buffering capacity and can not easily assimilate acid rain.

The Glenshaw formation occupies a small area on the southern border of the Clear Shade Creek watershed, approximately 2,000 feet away from the stream at its closest point. Abandoned mine lands run through much of the landform, which is surrounded

by the Allegheny Formation. It consists of sandstone, mudrocks, limesones and coals. These accumulated in alluvial, deltaic and shallow marine environments (Peavy et al. 2007).

The Mauch Chunk Formation borders the Burgoon Sandstone to the west. It runs the entire length of the Clear Shade Creek watershed from north to south. This formation occurred in the late Mississippian age and includes a conglomerate with red siltstone (Opdyke and DiVenere 2004).

The Pottsville Formation runs from north to south in the middle of the watershed. This formation accounts for the most space in the watershed and Clear Shade Creek flows along its contour for most of its journey. It consists of sandstone, siltstone, claystone, shale, coal and many heavy minerals (Peavy et al. 2007).

The Rockwell Formation is of lesser importance because it only occupies a very small section of the watershed in the southeastern corner, far away from Clear Shade Creek. None of its tributaries flow over the formation either.

The underlying rocks in the watershed and under the stream consist of conglomerate, sandstone and shale. From the Pocono Group's Mississippian age come the oldest dated strata. These are found in the eastern portion of the watershed. The youngest strata come from the Pennsylvanian Age and are spread throughout the region.

The Clear Shade Creek watershed is underlain in coal. The southern half of Cambria County and the northern half of Somerset County contain low-volatile bituminous coal (PA DCNR 2008). This commonly banded or layered form is the most abundant type of coal. Low volatile bituminous coal is classified based on the percentage of fixed carbon present on a dry, ash-free basis. This ranges from 78 to 86% to be classified as low-volatile. This form of coal also has a calorific value around 35 megajoules per kilogram.

The soil series in the Clear Shade Creek watershed are too numerous to list. They range from Algrights to Chavies and from Hazelton to Wharton. Approximately half of the watershed contains either hydric soils or soils with hydric inclusions. The stream itself flows through almost all hydric soils. Focusing on the soils that Clear Shade Creek actually flows over and through will provide insight with the watershed.

At the head of the stream, the soil series is Cookport with very stony loam. It is found on gently sloping, three to eight percent slopes. This soil is moderately well drained and has a moderately slow permeability. Runoff is considered medium and therefore, erosion hazards are minimal. Cookport series has excellent potential to support tree growth; however, surface stones limit crop and farmland ability.

Clear Shade Creek then flows through an Atkins series of silt loam. This high water table soil is poorly drained and has a slow to moderate permeability. Runoff is

slow causing little to no erosion risks. Atkins series soils are typically used for pasture and farmland.

Marcellus Shale Drilling

Approximately 2/3 of Pennsylvania, including the Clear Shade Creek watershed, is underlain by Marcellus shale at a depth of 5,000 to 8,000 feet. This formation is thought to hold trillions of cubic feet of natural gas, but until recently has been cost prohibitive to access. Recent advances in drilling technology and rising gas prices have garnered new interest in the formation.

Both vertical and horizontal drilling methods are generally required to extract natural gas from the Marcellus shale along with a process called hydraulic fracturing, or "fracking." After the well is drilled, large amounts of water mixed with sand and other substances are pumped into the shale formation under high pressure to fracture the shale around the well, allowing the natural gas to flow freely to the well bore. The amount of water typically required for fracking ranges from one million to five million gallons per well. After the fracking process, the used water, "frack water," must be reused in the next well or treated at an approved facility (Pennsylvania Department of Environmental Protection 2009).

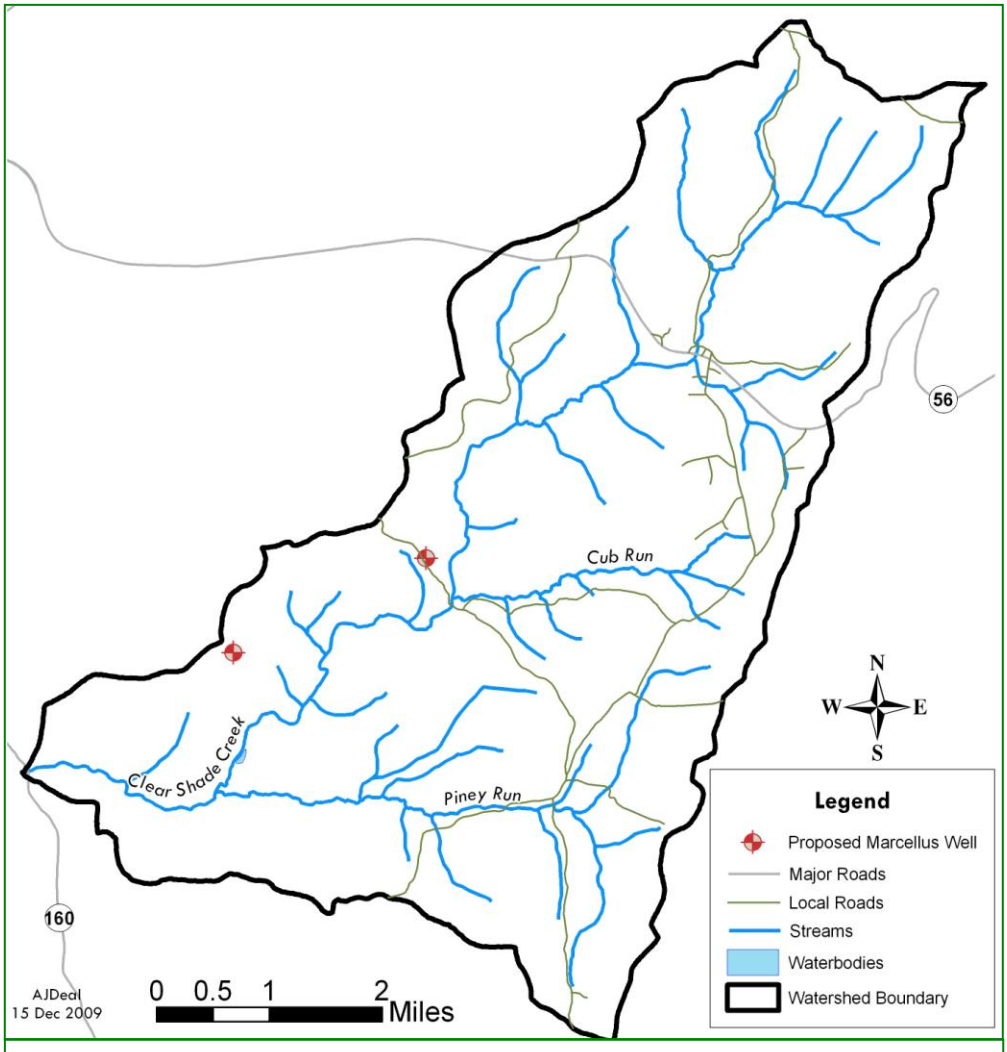

Figure 14. Locations of Marcellus shale wells in the Clear Shade Creek watershed.

Two proposed and approved Marcellus shale wells exist in the Clear Shade Creek watershed. Both wells are located on land owned by Berwind Corporation and the operator is Chesapeake Appalachia, LLC from Oklahoma City, OK. The wells are located in the southwestern portion of the watershed (Figure 14).

Water Resources

Water Supplies/Groundwater

Piney Run Reservoir (Figure 15) is the only major reservoir in the Clear Shade Creek watershed. It is owned by the Windber Area Authority (WAA) and is maintained as a backup water supply. The Clear Shade Reservoir was once used as the main water supply for the area, but the dam was breeched in August 1998. After the dam was breeched, the WAA drilled groundwater wells to supply its customers. Currently, the WAA serves a population of 9,454 from seven wells and 4,339 water meters. The average production is approximately 1,000,000 GPD (gallons per day), and the well network has a design capacity of 3,000,000 GPD (Dennis Mash, Personal Communication, 12 Dec 2009).

Figure 15. Piney Run Reservoir. Photo by Melissa Reckner.

The Somerset County Drought Monitoring Network also has a groundwater monitoring well located in the Clear Shade Creek watershed. The Drought Monitoring Network consists of a series of 18 wells where groundwater levels are measured on a monthly basis and results are reported to the Somerset County Drought Task Force, which makes conservation recommendations. Data have been collected at the well in Clear Shade Creek watershed monthly since October 2001. The water level in the well has ranged from 37.6 feet to 42.2 feet with an average water level of 39.6 feet below land

surface. The water level is generally highest in April and lowest in September (Figure 16).

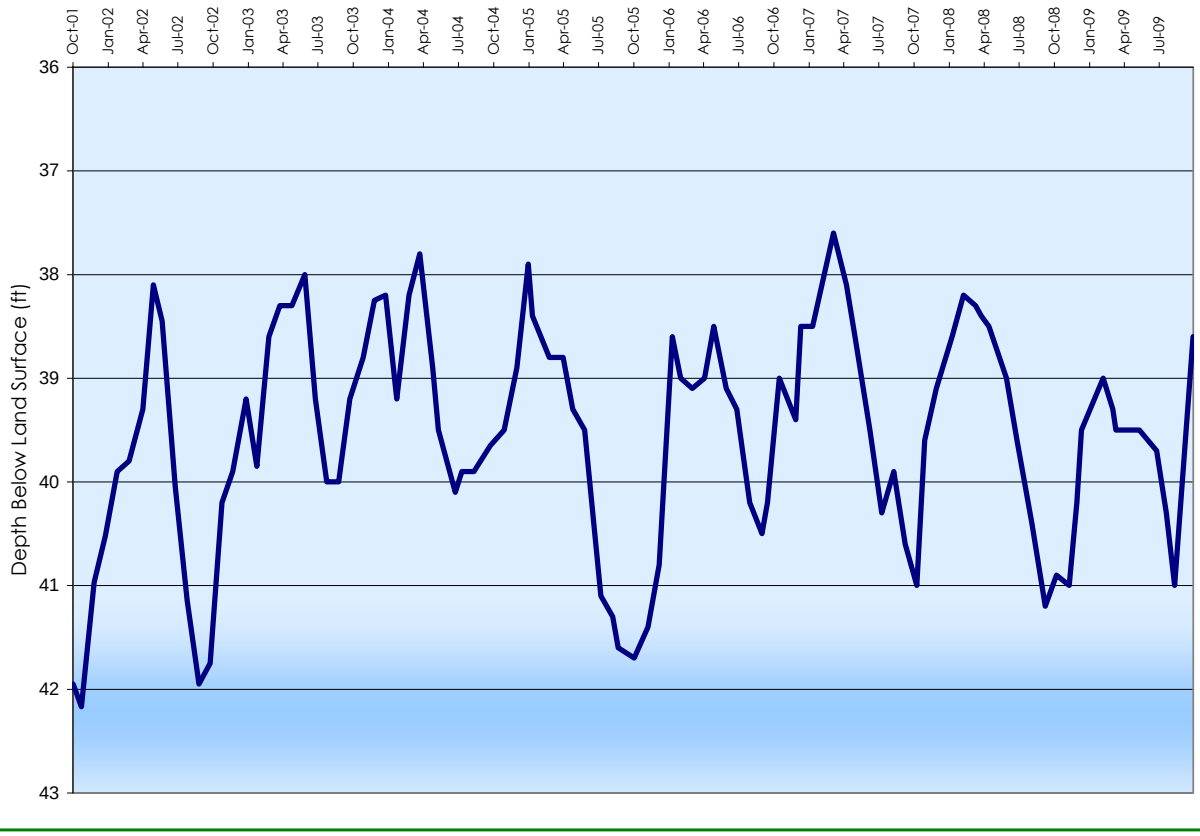

Figure 16. Clear Shade Creek drought monitoring well depths below the ground's surface, 2001-2009.

Wetlands

The Clear Shade Creek watershed includes many wetland communities of importance. The Clear Shade Creek Headwater Wetlands Biological Diversity Area (BDA) is located in Gallitzin State Forest, west of the Windber Reservoir in the southwest corner of Ogle Township. A BDA is an area that contains plants or animals of special concern at the state or federal level. BDAs can also be areas with exemplary natural communities or native diversity (Western Pennsylvania Conservancy 2006). Although the BDA designation does not provide any legal protection for the resource, it does increase awareness of the importance of the area. County planners, environmental consultants and developers should use the knowledge of these features in comprehensive planning. County, state and federal agencies can use these areas to focus attention on resources or as a reference in encouraging good management practices.

Figure 17. One of the many wetland plant species found in the Clear Shade Creek watershed. Photo by Melissa Reckner.

There are three non-glacial bog areas within the Clear Shade Creek Headwater Wetlands BDA. This area was cut for timber in the 1920s or 1930s and never regenerated to its previous state as a hemlock forest. Attempts were made to restore it to a coniferous forest with the use of non-native Scotch Pine, but proved unsuccessful.

Aside from some old Jeep trails in the area, Clear Shade Creek Headwater Wetlands BDA is devoid of human structures and formal roads. Future attempts at development should be avoided in order to protect this sensitive area.

Mile Run Headwaters BDA is also located in the Clear Shade Creek watershed, and consists of a non-glacial bog community within a wetland complex. The wetland is large and open and dominated by graminoid species. It also supports a few shrub mounds. Dominant species are sedges (*Carex* sp.), tawny cotton grass (*Eriophorum virginicum*), rushes (*Juncus* sp.) and moss (*Sphagnum* sp.) that form a dense mat across the wetland (Western Pennsylvania Conservancy 2006).

Conservation Efforts

The Shade Creek Watershed Association (SCWA) is an active watershed group that encompasses Clear Shade Creek as well. The group meets monthly to plan and carry out conservation and reclamation activities throughout the greater Shade Creek Watershed. The SCWA has compiled the *Shade Creek Watershed Restoration Plan* and is continually working to implement the plan to restore and protect the watershed. The SCWA has been active in implementing three abandoned mine discharge (AMD) abatement projects, including a treatment system on Reitz #1, which is the 4th largest discharge in the watershed. Currently, the group is constructing an interpretive trail around Reitz #1 treatment system to educate visitors about the process of AMD treatment. The SCWA also spearheaded a limestone sand dosing project on Shingle Run to increase stream pH and restore a wild brook trout population.

The SCWA has plans to implement two additional AMD treatment projects once funding becomes available. They plan to construct a system to join and treat multiple seeps on Coal Run that is currently a major polluter of Dark Shade Creek. They also plan to install a limestone drain to treat another AMD discharge in the watershed.

In addition to the SCWA, other conservation groups play active roles in the watershed. The Mountain Laurel Chapter of Trout Unlimited (MLTU) conducts annual litter clean-up days on Clear Shade Creek itself in the Fly Fishing Only section. The Somerset Conservation District (SCD) along with the USGS and Stream Team are implementing a "Water Quality Monitoring Joint Venture," which is a cooperative effort to better understand and monitor stream water quality throughout Somerset County. Clear Shade Creek is included in that project and a permanent monitoring point has been established on the main stem of Clear Shade Creek below its confluence with Piney Run.

In 2006, while conducting field work, members of Westsylvania encountered iron seeps at the mouth of Piney Run. The Stream Team and the SCD investigated the seeps and determined that they were the result of the local soil types and not the result of previous mining activities. It was inferred that the seeps pose no immediate threat to the overall stream health.

The SCD also surveyed and gathered data in the watershed as part of its Stonycreek Reassessment Project in 2007. Data collected through that project is a key component of this report.

Chemistry

The chemical make-up of water in a stream can directly affect the organisms that reside within the watershed. Aquatic organisms are surrounded by water for a significant portion of their lives, making water chemistry a vital determinant of biological health. If water in a stream is too warm, too acidic, or too turbid, the stream's biota may be unable to survive. Numerous factors can influence in-stream water chemistry. The physical and geologic setting plays a large role in influencing water chemistry parameters. Because of underlying bedrock or surrounding soil types, some streams have natural influences that generate a certain set of conditions that could be considered atypical or unhealthy in a different location or situation. In addition to natural influences, water chemistry is affected by human activities. Because water runs over land and carries substances with it that may eventually be deposited in the stream, activities that occur anywhere in the watershed can have an impact on in-stream water chemistry.

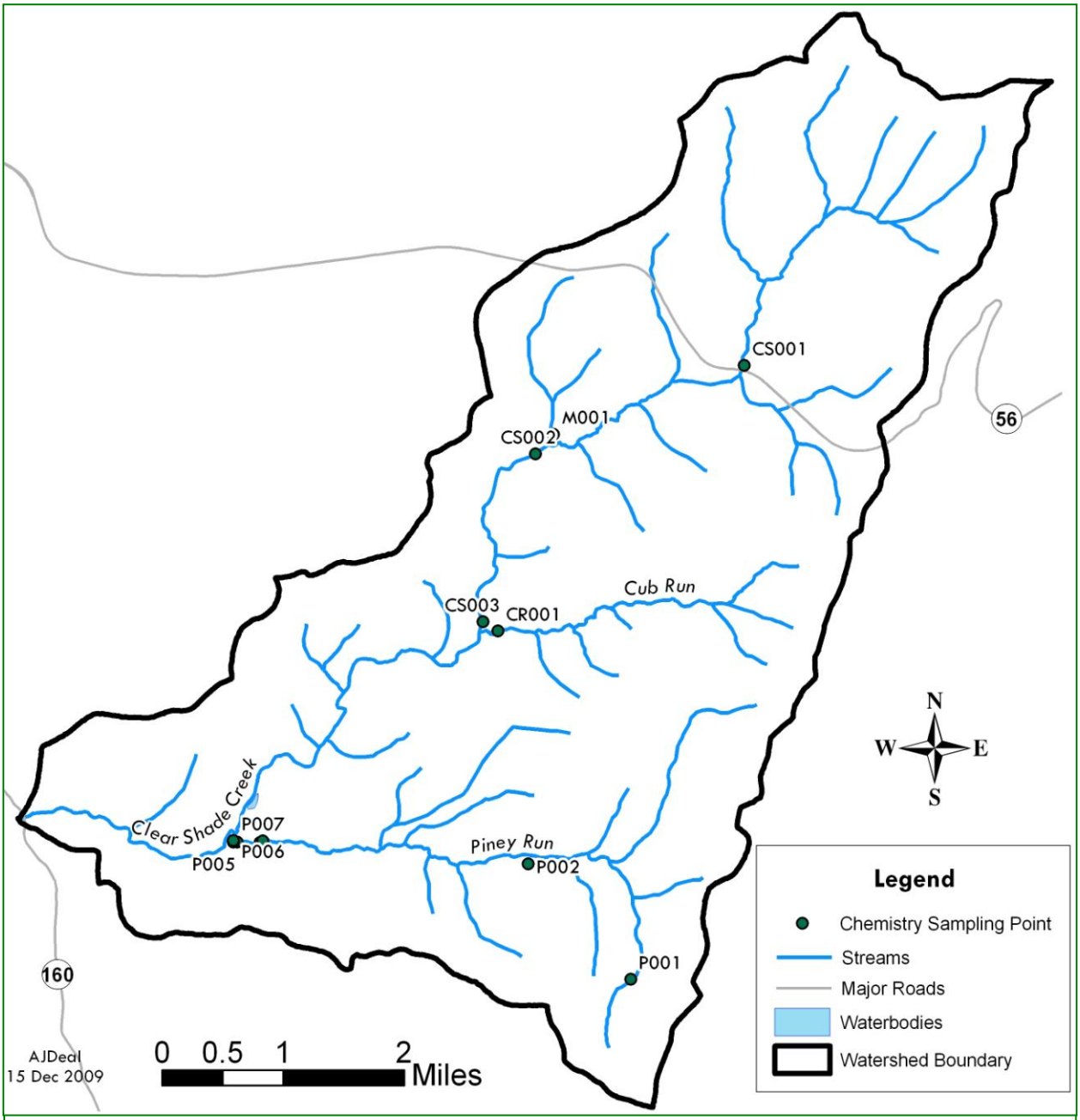

Figure 18. Water chemistry sampling locations.

Water chemistry throughout the watershed has been evaluated by the PFBC during their fish sampling studies and additionally by the Stream Team in 2006 and 2007 (Figure 18). In 2006, two parameters were measured with a Hanna All-in-One meter, five parameters were measured with a LaMotte field kit and iron was measured with a Hach Kit. In 2007, seven parameters were measured in the field and included pH, temperature, conductivity, total dissolved solids, total hardness, dissolved oxygen and nitrate. Complete data tables are located in Appendix 1, 2 and 3. In general, the most recent water chemistry results show a typical high quality coldwater stream.

Conductivity and TDS values are relatively low and range from 10 to 88µs and 5 to 44ppm with averages of 43 µs and 21ppm respectively. The average stream temperature during the sampling period was 15.4°C and pH averaged 6.6. The lowest pH value measured was on Mile Run (4.67) and the pH at the mouth of Cub Run (5.92) was also below 6.0. All other sites had pH values in the 6 and 7 range.

The National Atmospheric Deposition Network (NADN) has a monitoring station in nearby Portage, Cambria County. The site is part of the Mercury Deposition Network, which is the only network that provides long-term records of total mercury concentration and deposition in precipitation in the United States and Canada. Mercury has been used throughout history in numerous industrial and manufacturing processes. Unfortunately, an understanding of mercury's adverse health effects has only recently come into focus. Mercury is classified as a persistent bioaccumulative toxin. It persists in the environment for long time periods and is never completely removed, but is rather transferred to other locations or buried under soils and sediments. Mercury accumulates in biological tissue and concentrations increase with trophic level, eventually magnifying itself in the tissues of fish. When humans consume these fish, they also take on the mercury, leading to fish consumption advisories. Mercury has been shown to be a neurotoxin as well as possible carcinogen in humans (National Atmospheric Deposition Program 2009).

The Mercury Deposition Network allows officials the scientific and regulatory communities to know where mercury is being deposited, at what rates, in what concentrations and by what routes. The graph below (Figure 19) shows mercury deposition at the Portage site since 1997.

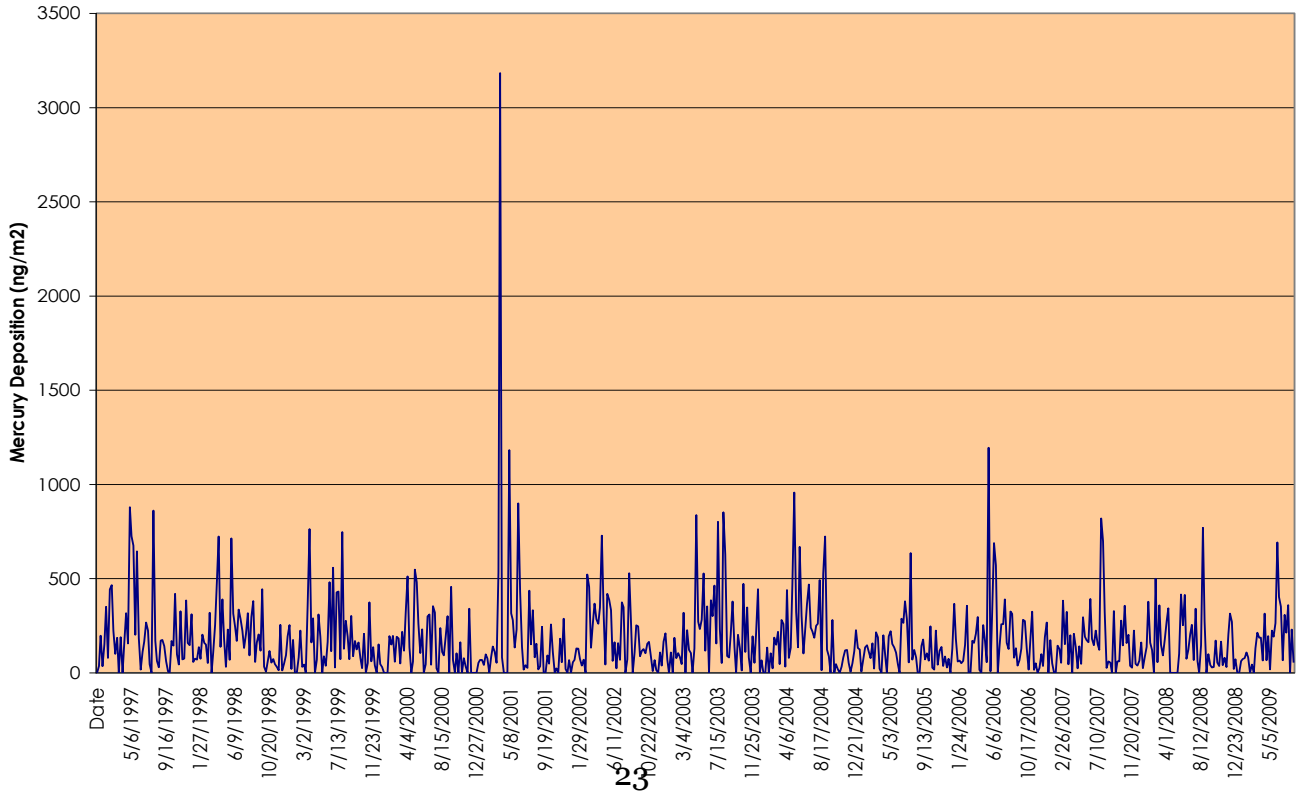

Figure 19. Mercury deposition values from the NADN's Portage site.

Biology

PNDI

The Pennsylvania Natural Heritage Program (PNHP) is designed to inventory important species and ecological areas throughout the state. It is a joint effort between the DCNR, the PFBC, the Pennsylvania Game Commission (PGC) and WPC. In 2006, the County Natural Heritage Inventory for Somerset County was completed (Western Pennsylvania Conservancy 2006). The inventory is broken down by township and identifies important areas in each. Areas of significance in the Clear Shade Creek watershed are discussed under Ogle Township and Shade Township. The inventory for Ogle and Shade Township identified four significant biological diversity areas (BDA) and one landscape conservation area (LCA).

Clear Shade Creek LCA is listed as exceptionally significant and has a state ranking of S3, meaning it is "rare or uncommon in the state." The PNDI identifies LCAs as large areas of the landscape that are of higher ecological quality than other areas of similar size in the county. The unfragmented forest within the LCA represents a high percentage of interior forest relative to edge habitat. There is no formal protection for LCAs, but they do increase awareness of their importance among planners on all levels. Of the intact forest remaining in Pennsylvania, 70% is found in patches of 5,000 acres or less (Goodrich et al. 2003). Clear Shade Creek LCA is 8,616 contiguous acres and encompasses specialized plant community types that are identified as Clear Shade Creek BDA and Crumb Bog BDA.

A BDA is an area that contains plants or animals of special concern at the state or federal level or exemplary natural communities or native diversity (Western Pennsylvania Conservancy 2006). Although the BDA designation does not provide any legal protection for the resource, it does increase awareness of the importance of the area. County planners, environmental consultants and developers should use the knowledge of these features in comprehensive planning. County, state and federal agencies can use these areas to focus attention on resources or as a reference in encouraging good management practices.

Clear Shade Creek BDA contains a series of bog-like wetlands that occupy the gently sloping saddles along the eastern edge of the Allegheny Front. It contains the EV stream, Clear Shade Creek. The surrounding landscape is mostly contiguous forest with some surface mining to the west and south.

Crumb Bog LCA is a sphagnum bog that supports several plant species of special concern, including blunt manna-grass (*Glyceria obtusa*) (Figure 20) and fall dropseed muhly (*Muhlenbergia uniflora*) (Figure 21), both of which are listed as endangered in Pennsylvania. Blunt manna-grass is generally found near the Atlantic coast and extends inland to the Catskills and eastern Pennsylvania south to South Carolina. It is

considered widespread over its entire range, but is critically imperiled in Pennsylvania; this population in Somerset County is the only recorded occurrence in the western part of the state. The plant prefers swamps, wet woods, shores and bogs with moist sandy peaty soils and shallow waters.

Figure 20. Blunt manna grass.
Image courtesy USDA.

Fall dropseed muhly ranges from the northeastern U.S. and southeastern Canada and reaches the southern extent of its range in Pennsylvania. The community at Crumb Bog BDA is the only recorded occurrence in the western part of Pennsylvania. It is considered common globally, but endangered in Pennsylvania. This species prefers habitat consisting of open areas like marshes, bogs, moist sandy roadsides, wet shores and beaver meadows.

Several additional plant species of interest are also found in the Clear Shade Creek watershed. Strawberry goosefoot (*Chenopodium capitatum*) is listed as state endangered under the PA Biological Survey, while drooping bluegrass (*Poa languida*) and yellow-fringed orchid (*Platanthera ciliaris*) are listed as Pennsylvania threatened. Meadow willow (*Salix petiolaris*) is listed as a species of special concern.

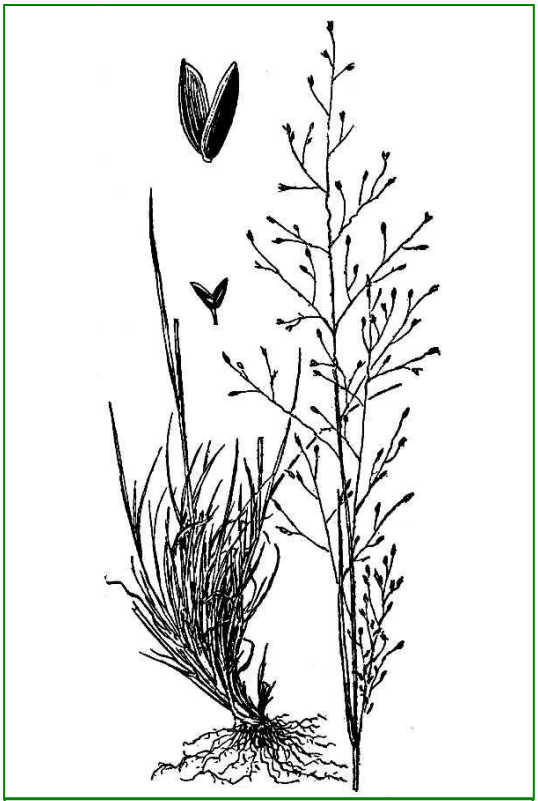

Figure 21. Fall dropseed muhly.
Image courtesy USDA.

In addition to rare plants, the Clear Shade Creek watershed also hosts impaired and vulnerable insect species. Two dragonflies were identified in 2004 that are of special concern. The ocellated darner (*Boyeria grafiana*) has a state heritage rank of vulnerable and the zebra clubtail (*Stylurus scudderi*) has a state rank of critically impaired. The global heritage rank for the ocellated darner is secure and for the zebra clubtail is apparently secure (Western Pennsylvania Conservancy 2006).

Visual Assessment/ Riparian Areas

Natural Biodiversity conducted a riparian health survey in July and August of 2006 on Clear Shade Creek and two of its tributaries, Piney Run and Cub Run. Three sites along Clear Shade Creek were assessed, two along Piney Run, and two along Cub Run. The purpose of the riparian health assessment was to gather information about this high quality coldwater ecosystem and to identify potential threats to the health of Clear Shade Creek and its tributaries.

The location of each site within the watershed was recorded along with date, time, and water stage conditions. GPS coordinates were recorded for most sites and hand drawn maps of the area assessed were provided. For each site, 100 yards of the stream was assessed according to the protocol developed by Melissa Schnier, a graduate student at Pennsylvania State University. The study focused on the riparian area, or the area alongside the stream. The riparian area is very important to overall stream health. It performs a variety of services such as filtering pollutants, nutrients and sediments contained in runoff from the uplands, as well as providing habitat for birds and other wildlife. The riparian area also provides food and habitat for fish, macroinvertebrates, and other stream life.

The health of the riparian area, bank, and channel of each site were rated according to 12 parameters including riparian vegetation type, riparian vegetation thickness and riparian buffer, bank vegetation, bank thickness, bank stability, water pathways, channel modification, canopy cover, instream cover, embeddedness and aquatic vegetation. The vegetation along the 100-yard assessment area was identified and recorded. An overall score for each site was calculated, from 0% to 100%, based on the rating of each parameter included in the survey. The score was converted to an overall riparian health rating of poor, marginal, good, or excellent.

Table 3. Visual assessment results.

Site	Stream Name	Score	Riparian Rating
CS - Ogletown Bridge	Clear Shade Creek	53%	Marginal
CS - Swinging Bridge	Clear Shade Creek	74%	Good
CS - Downstream of Crumb Road Bridge	Clear Shade Creek	79%	Good
Piney Run 1	Piney Run	84%	Good
Cub Run 2	Cub Run	88%	Excellent
CS - below dam	Clear Shade Creek	88%	Excellent
Piney Run 2	Piney Run	90%	Excellent
Cub Run 1	Cub Run	91%	Excellent

Figure 22. Clear Shade Creek near State Route 56 bridge with a marginal riparian rating. Photo by Melissa Reckner.

The results of the survey were as expected and showed Clear Shade Creek and its tributaries to be high quality coldwater ecosystems (Table 3). Five out of eight of the sites assessed received a rating of excellent; two were rated as good; and one was rated as marginal. The site rated as marginal was in the headwaters of Clear Shade Creek near the Ogletown Bridge. The score of 53% was lower, by far, than the other areas assessed. The lower ranking of this site is likely the result of dominant land use outside of the buffer area; in every other site it was forested, while this site was lawn or residential. The parameters receiving the lowest scores in this site included vegetation type, bank stability, shading, in-stream cover, and embeddedness.

The sites rated good were located in the middle of the watershed. They were near the Swinging Bridge and downstream of Crumb Road Bridge. Four of the five sites rated as excellent were located along the smaller tributaries to Clear Shade Creek, Piney Run and Cub Run. The other site rated as excellent was located downstream along Clear Shade Creek, below the dam.

Invasive Species

While assessing the stream and surrounding riparian areas, Natural Biodiversity noted any non-native plant species present. With a significant amount of the land area within the Clear Shade Creek watershed owned by the State of Pennsylvania as state forests, much of the land remains undisturbed by development and introduction of invasive plant species.

From the visual assessment conducted in the summer of 2006, three non-native species were found at three of the eight sites studied. The site at Clear Shade Creek below the reservoir had Colorado Blue Spruce, a non-native tree species present. This tree species is native to the Rocky Mountains and is the Colorado state tree. Sites Cub

Run 1 and Cub Run 2 both had ground ivy (*Glechoma hederacea*) present. Cub Run 2 had coltsfoot (Tussilago farfara) present as well.

Ground ivy is not native to the United States at all, let alone Pennsylvania. It is originally from Europe, and is considered an invasive plant species in twelve states other than Pennsylvania, although it is found in forty-six of the fifty U.S. states. Ground ivy is toxic in large quantities for most vertebrates. It is found in a range of environments, tolerating much shade, and slightly acidic soils; it blooms from March until May (USDA 2010).

Coltsfoot (Figure 23) is an herbaceous plant native to Europe that was most likely intentionally introduced for medicinal purposes. It can be found along stream banks and roads, and does not endure shade but can tolerate poor soils and disturbed areas. The small yellow flowers resemble those associated with the weed dandelions. Its range is over twenty-two states in the northeast corner of the U.S., and can easily invade and choke out native species (USDA 2010).

Figure 23. Coltsfoot, an invasive species found in the Clear Shade Creek watershed. Photo by Melissa Reckner.

Although these three species were the only invasives documented on the day of the visual assessment, four years have gone by since the study. It is possible that some species could be present in areas not assessed or new species have since moved in after the assessment. Two of the most common invasive species for this region are Japanese knotweed and garlic mustard. As with most invasive species, areas that are disturbed or have poor diversity and weak native plant communities are the most vulnerable to invasion. The best course of action in regards to non-native species is to periodically assess the area and note any newly introduced species that may pose a threat to biodiversity.

Wildlife

One mammal of special concern has been identified in the Clear Shade Creek watershed. A bat, the northern myotis (*Myotis septentrionalis*) (Figure 24) also known as the northern long-eared myotis, was found in the watershed in 2007. The PNHP

classifies the species as vulnerable on the state level and apparently secure on the global level.

Figure 24. A Northern myotis captured in Pennsylvania.

In the northern part of its range, the northern myotis is associated with boreal forests, but in Pennsylvania, the bat is found in various forests throughout the state in relatively low numbers. Northern myotis hunt at night over small ponds, in forest clearings, at tree tops and along forest edges. They eat a variety of night-flying insects including caddisflies, moths, beetles, flies and leafhoppers. The species uses caves and underground mines for hibernation and an individual may travel up to 35 miles from their summer habitat for hibernation. Maternity roosts are located in tree cavities under exfoliating tree bark and in buildings.

Although not identified in the natural heritage inventory, Indiana Bats (*Myotis sodalist*) were recently found in the Clear Shade Creek watershed during a U.S. Fish and Wildlife Service study. The Indiana bat population has declined 56% in the past 40 years and, in 1967, the species was listed for protection under the Endangered Species Act. These bats hibernate in large clusters in caves and occasionally abandoned mines. Because Indiana bats generally hibernate in large numbers in only a few caves, they are extremely vulnerable to disturbance (USFWS 2004).

Avian

The eastern border of the Clear Shade Creek watershed straddles the Somerset-Bedford County line, which is the Allegheny Front. This border divides the Ohio River Basin and the Chesapeake Bay watershed and is a very important migration route for many species of birds and bats.

The Allegheny Plateau Audubon Society manages the

Figure 25. A red-tailed hawk observed at Hawk Mountain.
Photo courtesy Allegheny Plateau Audubon Society.

Allegheny Front Hawk watch near Central City. The watch sits about 800 feet above the valley and gives nearly a 180° view of the area on the NNE to SSW axis. This site is the western-most migration counting point in Pennsylvania. Volunteers and staff at the watch identify and count the number of birds that fly through the area as they make their way through the spine of the Appalachians.

Data has officially been collected for the past eight years during both the spring and fall migration seasons (Appendix 4). The fall season generally has higher raptor counts than in the spring season. The most common fall species observed at the watch is the broad-winged hawk (*Buteo platypterus*), with an average of 4,700 being identified each season. In 2006, nearly 14,000 broad-winged hawks were counted at the watch. Another common species observed in the fall is the red-tailed hawk (*Buteo jamaicensis*) with an average annual count of 1,947 individuals. Red-tailed hawks are also the most common spring species as well. Both bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) have been observed in significant numbers at the Allegheny Front Hawk watch as well.

The BDAs located in Clear Shade Creek watershed also support diverse bird life. Species observed at Crumb Bog BDA are listed in Table 4 (Western Pennsylvania Conservancy 2006).

Table 4. Birds observed at Crumb Bog BDA.

Common Name	Scientific Name
Red-shouldered Hawk	*Buteo lineatus*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Pileated Woodpecker	*Dryocopus pileatus*
Red-eyed Vireo	*Vireo olivaceus*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Black-capped Chickadee	*Poecile atricapillus*
Brown Creeper	*Certhia Americana*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Magnolia Warbler	*Dendroica magnolia*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Green Warbler	*Dendorica virens*
Cerulean Warbler	*Dendorica cerulean*
Ovenbird	*Seiurus aurocapillus*
Common Yellowthroat	*Geothlypis trichas*
Scarlet Tanager	*Piranga olivacea*
Eastern Towhee	*Pipilo erythrophthalmus*

Macroinvertebrates

Macroinvertebrate studies were conducted as a part of the Stonycreek River Watershed Reassessment completed by the Somerset Conservation District from May through August of 2007. Many different types of macroinvertebrate species were represented due to the excellent water quality within the Clear Shade Creek watershed. Complete macroinvertebrate sampling charts are located in Appendix 5.

Overall, there were ten sites for the macroinvertebrate studies (Figure 26). Clear Shade Creek mainstem and Piney Run were sampled for macroinvertebrates at three locations each. The tributaries Cub Run and Mile Run were also evaluated for macroinvertebrates.

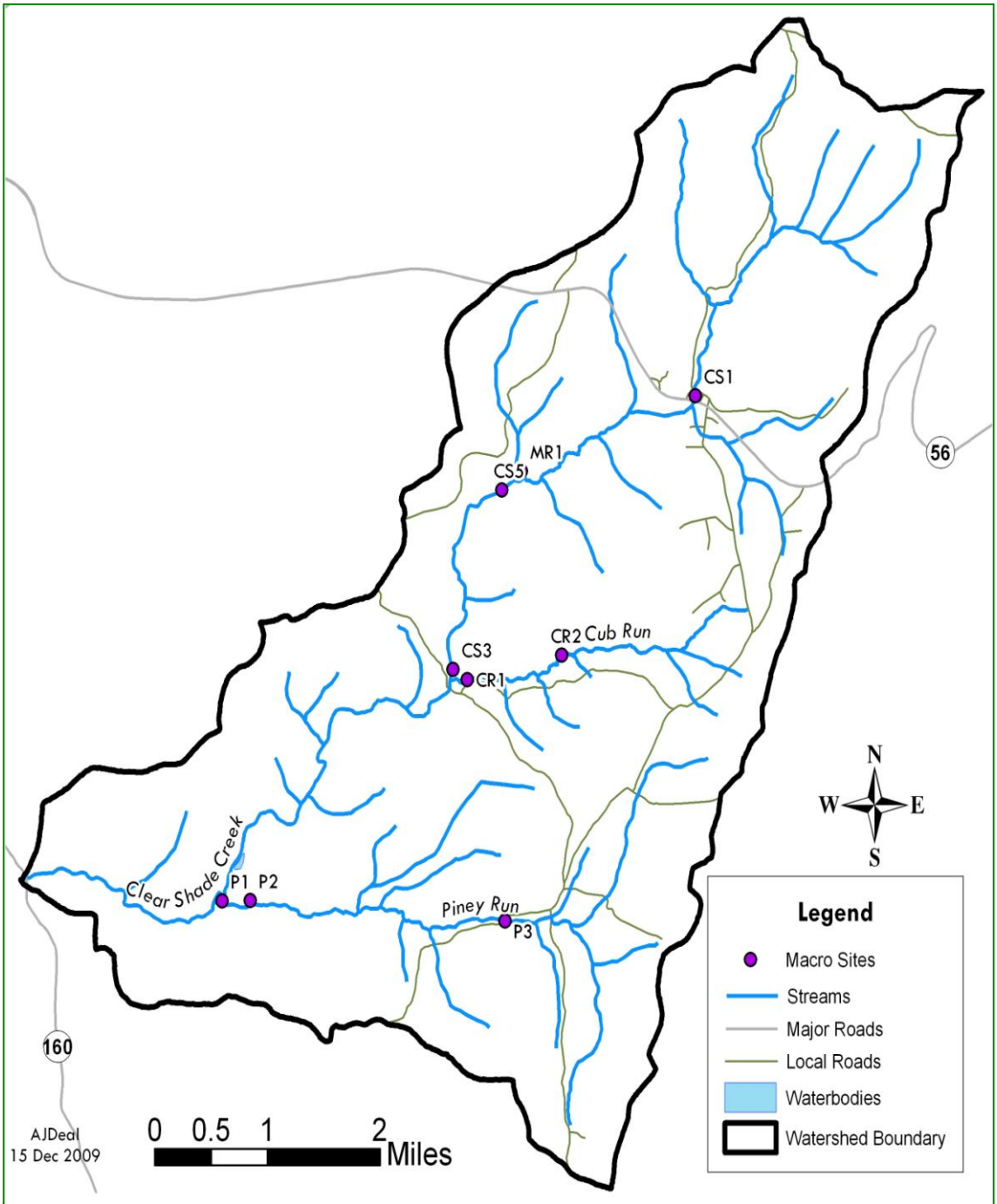

Figure 26. Macroinvertebrate sampling locations.

The number of species represented and total number of organisms present in each sample show that some sites have a much greater biological diversity than others. Because of the time of year, water levels were low and therefore macroinvertebrate diversity may not be as high as possible. The Clear Shade Creek at Swinging Bridge site (CS3) had the most macroinvertebrates with 142 specimens, followed by the site at Cub Run (CS2) with 109 specimens. The area with the least number of specimens was Piney Run above Piney Run Reservoir (P2), with only 8 specimens collected.

Table 5. Macroinvertebrate calculated metrics.

	CS1	***CS2***	***CS3***	***P1***	***P2***	***P3***	***CR1***	***CR2***	***HR***	***MR***
Richness	17	8	16	9	7	11	10	22	11	14
Evenness	0.81	0.82	0.71	0.93	0.98	0.83	0.59	0.83	0.74	0.65
Total Individuals	93	24	142	16	8	40	47	109	79	95
Shannon Weiner Diversity	2.29	1.70	1.96	2.05	1.91	2.00	1.37	2.55	1.78	1.71
% EPT	58.1	29.2	36.6	18.8	62.5	72.5	59.6	31.2	17.7	85.3
% Chironomidae	7.5	16.7	3.5	25.0	0.0	0.0	2.1	5.5	44.3	7.4
# Intolerant Taxa	1	0	2	1	0	2	1	5	1	4

The most biologically diverse site was Cub Run (CR2), with twenty-two different scientific taxa represented. This location also had the most species intolerant of pollution (5), which consisted mainly of stoneflies. The high level of diversity confirms that water chemistry is of high quality and can support healthy aquatic communities.

Fishes

Numerous fish studies have been performed within the Clear Shade Creek watershed. PFBC fish studies were conducted in the watershed in 1976, 1977, 1978, 1980, 1982, 1986, 1991, 1993, 1996, 2000 and 2009. In the summer of 2007, the United States Fish and Wildlife Service (USFWS), along with Stream Team staff, Shade Creek Watershed Association members and other volunteers shocked four sites—one on Clear Shade Creek, two on Piney Run, and one site on Cub Run. Figure 28 shows all fish sampling locations.

Figure 27. The USFWS electrofishing crew. Photo by Dave Sewak.

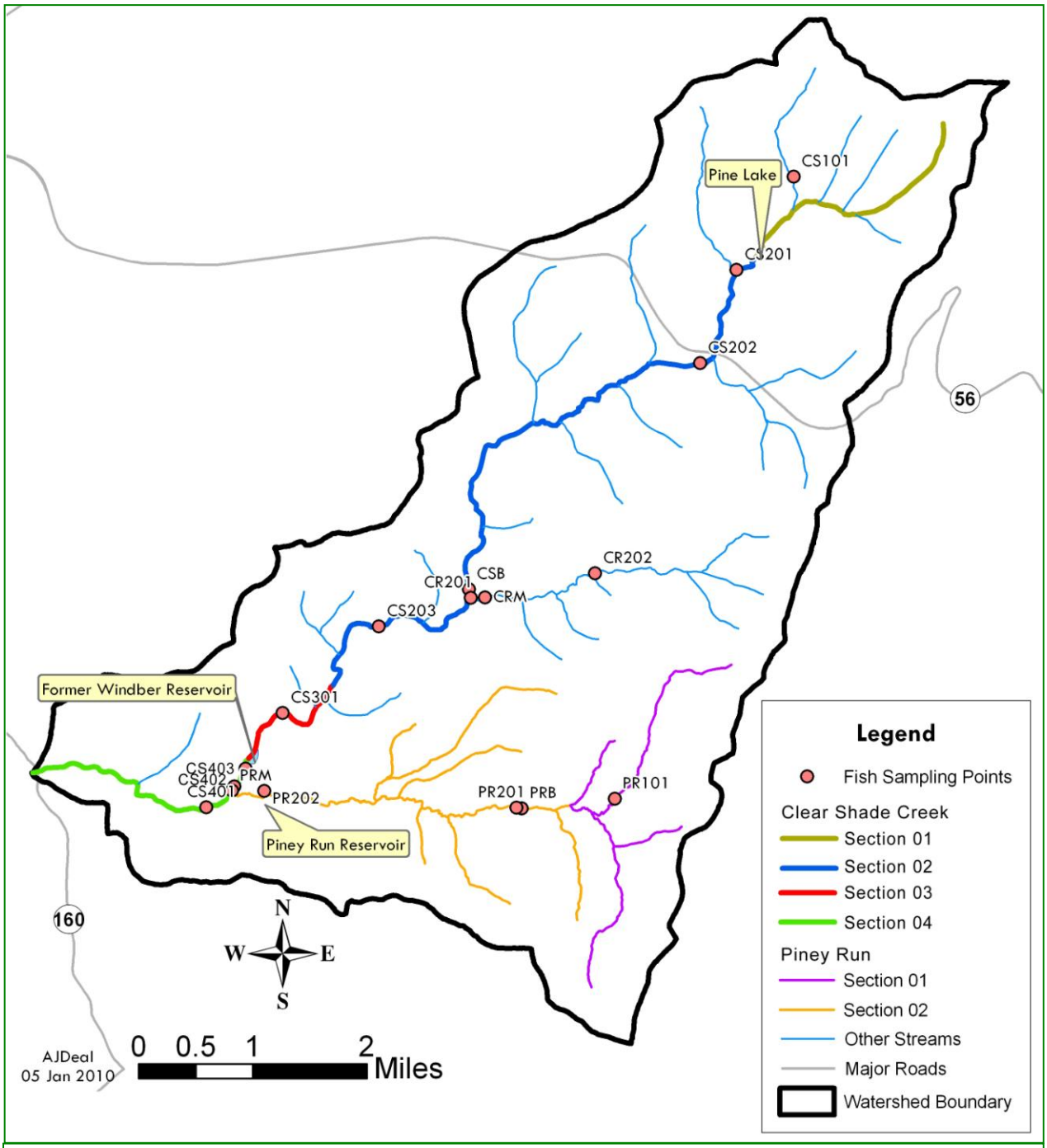

Figure 28. Fish sampling locations in the Clear Shade Creek watershed.

The main stem of Clear Shade Creek is managed in four sections by the PFBC. Section 01 begins 400 meters upstream of Hollow Road (T-820) and extends 1.7 km to Pine Lake. Section 02 originates at the outflow of Pine Lake and extends 11km downstream. This section is characterized as a small, infertile coldwater stream. Section 03 begins at the end of section 02, 1.6km upstream of the former Windber Reservoir. This section is managed as a Catch and Release Fly Fishing Only Area.

Section 04 begins at the end of section 03 and extends to the confluence with Dark Shade Creek.

Section 01 has only been sampled one time at one site in 1996. Brook trout and brown trout were the only species collected.

Four fish species have consistently been collected at all sites in section 02 during all sampling years and include brown trout, brook trout, blacknose dace and mottled sculpin. Creek chubs and white suckers are also common throughout section 02 over multiple sampling years. Pumpkinseeds have only recently been collected and likely originate from the upstream Pine Lake outflow (Lorson et al. 1995). Four new species (rainbow trout, longnose dace, Johnny darter and fantail darter) were collected in 1991, but were not present in the next sampling round (Table 6).

Trout biomass and abundances vary among species and sampling year. Brown trout biomass and abundance was higher than brook trout biomass and abundance in all sampling years. The highest biomass and abundance for both brook trout (biomass 5.84 kg/ha; abundance 79 fish/km) and brown trout (biomass 50.49 kg/ha; abundance 370 fish/ km) was in 1991 (Figure 29). Brown trout biomass was lowest in 1976 (19.74 kg/ha) and abundance was lowest in 1993 (143 fish/km). Brook trout biomass was lowest in 1976 (1.08 kg/ha) and abundance was lowest in 1986 (13 fish/km). Abundance and biomass values for all PFBC sampling locations are listed in Appendix 6.

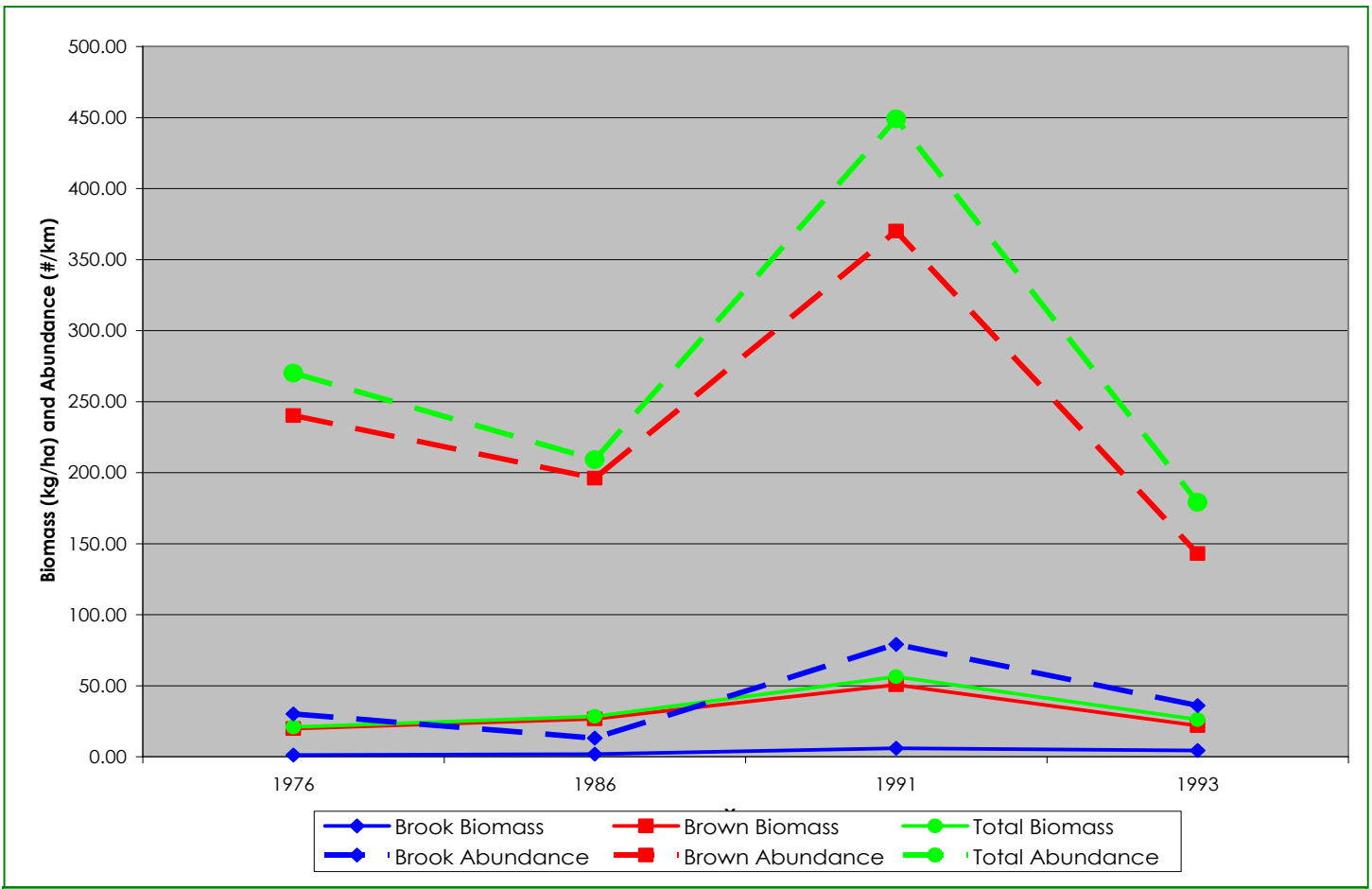

Figure 29. Trout biomass and abundance values for Clear Shade Creek, Section 02.

Table 6. PFBC fish data for Clear Shade Creek, Section 02.										
		Site 201			Site 202			Site 203		
Common Name	Scientific Name	1986	1991	1993	1986	1991	1993	1986	1991	1993
Brown trout	*Salvelinus fontinalis*	X	X	X	X	X	X	X	X	X
Brook trout	*Salmo trutta*	X	X	X	X	X	X	X	X	X
Blacknose dace	*Rhinichthys atratulus*	X	X	X	X	X	X	X	X	X
Mottled sculpin	*Cottus bairdi*	X	X	X	X	X	X	X	X	X
Creek chub	*Semotilus atromaculatus*	X	X	X	X		X		X	X
White sucker	*Catostomus commersoni*	X	X	X	X		X	X	X	
Pumpkinseed	*Lepomis gibossus*			X						X
Golden shiner	*Notemigonus crysoleucas*					X	X			
Rainbow trout	*Oncorhynchus mykiss*					X				
Longnose dace	*Rhinichthys cataractae*								X	
Johnny darter	*Etheostoma nigrum*								X	
Fantail darter	*Etheostoma flabellare*								X	

The fishery in section 02 is a combination of wild and stocked brook trout and brown trout. The wild trout biomass increased from 1986 to 1991, showing a Class A biomass (49.14 kg/ha). This prompted the 1993 resurvey to determine if the Class A population was maintained, which would allow for the discontinuation of stocking. However, the 1993 survey showed a decrease in the brown trout population to a Class B level (21.98 kg/ha) and the section continues to be managed for a combination of wild and hatchery trout (Lorson et al. 1995).

Section 3 is the only special regulations area in the watershed, and is currently maintained as Catch and Release Fly Fishing Only Area. The section was sample in 1983 by the PA DEP and in 1977, 1986 and 1991 by the PFBC. Fish populations in the stream reach have consistently contained brown trout, brook trout, mottled sculpin, and white suckers. The 1983 sampling period produced the most species and the next sampling date, 1986, produced the fewest fish species. In 1991, three species that were collected

in 1983 but missing from the 1986 sample were again collected. The 1991, survey also yielded a new species not previously collected in the section (Johnny darter) (Table 7).

Table 7. Fish data for Clear Shade Creek, Section 03 (site 301)*.

Common Name	Scientific Name	1977	1983	1986	1991
Brown trout	*Salmo trutta*	X	X	X	X
Rainbow trout	*Oncorhynchus mykiss*		X		
Brook trout	*Salvelinus fontinalis*	X	X	X	X
Blacknose dace	*Rhinichthys atratulus*		X		X
Creek chub	*Semotilus atromaculatus*		X		X
White sucker	*Catostomus commersoni*	X	X	X	X
Johnny darter	*Etheostoma nigrum*				X
Fantail darter	*Etheostoma flabellare*	X	X		X
Mottled sculpin	*Cottus bairdi*	X	X	X	X
Northern hogsucker	*Hypentelium nigricans*	X	X		
Rock bass	*Ambloplites repestris*	X	X		

*1983 fish data were collected by PA DEP, whereas 1977, 1986 and 1991 data were collected by the PFBC.

PFBC fish data for section 04 ranges from 1977 to 2009. The 2009 survey included two sampling locations on section 04 and was part of a trout residency study. Only one species (white sucker) was present in 1977, and that species has been present in all subsequent surveys. (Table 8). The 2009 sampling period showed the greatest species abundance with eight species present at each site.

Table 8. PFBC data for Clear Shade Creek, Section 04.

Common Name	Scientific Name	Site 401 1977	Site 401 1991	Site 402 2009	Site 403 2009
Brown trout	*Salmo trutta*		X	X	X
Brook trout	*Salvelinus fontinalis*		X	X	X
Creek chub	*Semotilus atromaculatus*		X	X	X
White sucker	*Catostomus commersoni*	X	X	X	X
Johnny darter	*Etheostoma nigrum*		X		X
Mottled sculpin	*Cottus bairdi*		X	X	X
Blacknose dace	*Rhinichthys atratulus*			X	X
Fantail Darter	*Etheostoma flabellare*			X	X
Rainbow Trout	*Oncorhynchus mykiss*			X	

Section 04 historically contained fewer wild trout compared to sections 02 and 03. The naturally reproducing brown trout population was limited and stocking had been used to provide the greatest angling recreational potential. The lack of wild trout

may have been due to the existence of the Windber Reservoir. Since the dam was breached in 1998, Section 04 may now contain similar trout densities as sections 02 and 03.

The PFBC sampled the tributary Cub Run in 1978, 1982 and 2000. In 1978, Cub Run was classified as a Class A trout stream; however, another sampling in 1982 showed a Class D trout biomass. The decline in trout biomass was likely the result of the 1978 sample being abnormally high due to trout from Clear Shade Creek moving into a flooded gravel flat at the Cub Run site (Weirich et al. 1982).

Six fish species were collected in 2000 compared to three species in 1978 and 1982 (Table 9). Blacknose dace, creek chub and white sucker were present for the first time in 2000. Wild brown trout and both wild and hatchery brook trout were collected in 2000.

Table 9. Fishes collected by PFBC on Cub Run.

Common Name	Scientific Name	1978	1982	2000
Brook trout	*Salvelinus fontinalis*	X	X	X
Brook trout -- hatchery	*Salmo trutta*			X
Brown trout	*Salmo trutta*	X	X	X
Blacknose dace	*Rhinichthys atratulus*			X
Creek chub	*Semotilus atromaculatus*			X
White sucker	*Catostomus commersoni*			X
Mottled sculpin	*Cottus bairdi*	X	X	X

PFBC biologists have noticed a decline in young-of-the-year and adult brown trout since the initial 1978 survey. Several factors likely interact to limit the numbers of wild trout in Cub Run. It is possible that the hatchery brook trout stocked in Cub Run are negatively affecting the wild trout population both directly and indirectly. Direct competition among stocked and wild trout has an effect on wild trout survival. Indirectly, the stocked fish further add stress to wild trout by attracting increased angling pressure (Smith and Lorson 2000).

Piney Run is managed in two sections. Section 01 is classified by the PFBC as a wilderness trout stream and by the PA DEP as Exceptional Value (EV). The remaining stream section, section 02, is managed for stocked brook trout and is classified as HQ-CWF.

Section 01 was sampled through electrofishing in 1980. The survey yielded a naturally reproducing brook trout population that was characterized by slow growth and less than 10% of the population being of legal size. Four year classes were present, but the catch was dominated by young-of-the-year and yearling fish. Brook trout was the only species collected (Boyer et al. 1981).

Section 02 was sampled at two sites in 1978 and 1996 (Table 10). At the upstream site, site PR201, three species (brown trout, brook trout and mottled sculpin) were present in both sampling years and two species (rainbow trout and northern hogsucker) were collected only in the 1996 survey. At the downstream site, site 202, only brook trout were present in both sampling years. Brown trout and white sucker were collected in 1978 only and mottled sculpin were collected only in 1996 (Brawley and Lorson 1997).

Table 10. PFBC fish data for Piney Run, Section 02.

		Site 201		Site 202	
Common Name	Scientific Name	1978	1996	1978	1996
Brown trout	*Salmo trutta*	X	X	X	
Rainbow trout	*Oncorhynchus mykiss*		X		
Brook trout	*Salvelinus fontinalis*	X	X	X	X
Mottled sculpin	*Cottus bairdi*	X	X		X
White sucker	*Catostomus commersoni*			X	
Northern hogsucker	*Hypentelium nigricans*		X		

The USFWS conducted a separate fish study in 2007 in collaboration with the Stream Team and the Shade Creek Watershed Association (Table 11). The study consisted of electrofishing at four sites throughout the watershed; one site located on Clear Shade Creek, two sites on Piney Run, and one site on Cub Run.

Table 11. Fishes collected during USFWS 2007 survey.

Common Name	Scientific Name	CRM	PRM	PRB	CSB
Brook Trout	*Salvelinus fontinalis*	16	1	56	
Brown Trout	*Salmo trutta*	13			20
Rainbow Trout	*Oncorhynchus mykiss*			1	1
Blacknose dace	*Rhinichthys atratulus*	208	47	1	86
Cheek Chub	*Semotilus atromaculatus*	9	37		5
Fantail Darter	*Etheostoma flabellare*	2	17		26
Longnose Dace	*Rhinichthys cataractae*	9	2		6
Mottled Sculpin	*Cottus bairdi*	10	5	103	39
Northern Hogsucker	*Hypentelium nigricans*			1	
White Sucker	*Catostomus commersoni*	8	2		15

Clear Shade Creek was shocked at the Iron Bridge, above its confluence with Cub Run (Site CSB). This site yielded 20 brown trout, 86 blacknose dace, 5 cheek chub, 26 fantail darter, 6 longnose dace, 39 mottled sculpin, and 15 white suckers.

Piney Run was sampled at the T716 bridge (Site PRB). At this site, 56 brook trout and 1 rainbow trout were found. In addition, 1 blacknose dace, 103 mottled sculpin, and 1 northern hogsucker were also found.

The other site on Piney Run was at the mouth near the confluence with Clear Shade Creek (Site PRM). Fish collected were as follows: 1 brook trout, 47 blacknose dace, 37 cheek chub, 17 fantail darter, 2 longnose dace, 5 mottled sculpin, and 2 white sucker.

The last site shocked was Cub Run at the mouth (Site CRM). Fish species found included 29 brook trout, 208 blacknose dace, 9 cheek chub, 2 fantail darter, 9 longnose dace, 10 mottled sculpin, and 8 white sucker.

Figure 30. A wild brook trout collected on Clear Shade Creek during 2007 USFWS survey. Photo by Dave Sewak.

The fish species found are generally indicative of good water quality and stream conditions. The presence of coldwater species indicates the heath status of the stream. Brown trout are found in coldwater streams and waterways, with ideal temperatures ranging from 50-60 degrees Fahrenheit. Brown trout can tolerate some acidity, some siltation, and higher temperatures than brook trout.

The brook trout is Pennsylvania's state fish and is typically found in healthy coldwater streams. They can tolerate slightly acidic waters, but water temperatures cannot be over 65°F in order for them to survive.

Rainbow trout are native to the Pacific coast, ranging from California to Alaska. The species was brought to Pennsylvania intentionally to revive the fish hatchery populations, but is only found to be reproducing naturally in a few streams and rivers throughout the state. Rainbow trout live in water temperatures ranging from the mid 50s to the low 70s, as long as the water is clean and well oxygenated. They do not tolerate acidic conditions, and prefer slightly alkaline waters.

The minnow species collected during the USFWS surveys are common species in eastern, flowing waters. Creek chubs are one of the most common stream fishes in central and eastern North America and can be found in multiple habitat types. Blacknose dace and longnose dace both prefer flowing water and often occupy the same stream but utilize different habitat types. Longnose dace are more likely to be found in fast-flowing riffles while blacknose dace may occupy swiftly flowing runs (Steiner 2000).

White suckers are found across Pennsylvania and are the most common and widely distributed sucker species in the state. White suckers live in many different

habitat types from cool, clear headwater streams to warm rivers, lakes and ponds. They are pollution tolerant and can survive in low oxygen and silted waters. Being habitat generalists, white suckers can be found in the slow-moving pools, rocky riffles or dense weed beds of a stream.

Northern hogsuckers are considered indicators of good water quality because they tend to move away from areas that are polluted. They are particularly associated with clean gravelly riffles and adjacent gravel or rubble areas in streams. In suitable habitat, northern hogsuckers are abundant throughout the eastern United States. They are often found in trout streams because of their preference for clean, cool waters.

The mottled sculpin has a wide geographic range throughout the United States and Canada. It is a bottom-dwelling species of clear, clean upland mountain streams. Mottled sculpins often occupy trout streams, but can also live in waters too warm for trout.

The only percid species collected in the surveys, the fantail darter, can be found in cool or warm, clear, unsilted waters with gravelly and rocky substrates in small to medium-sized streams.

Other Studies

Clear Shade Creek First Day of Trout Surveys

Trout anglers in the Clear Shade Creek watershed were surveyed on the first day on April 14, 2006 by David Sewak and Mark Lee as members of MLTU. Melissa Reckner and Douglas Beri Jr. of the Kiski-Conemaugh Stream Team repeated this same survey again on April 12, 2008. Twenty surveys were given in 2006 and thirty-two were completed in 2008.

The purpose of this survey was to analyze the number of people, distance they are willing to travel, and the amount of money they are willing to spend in the Clear Shade Creek watershed. The survey consisted of fourteen questions, covering the categories of activities, trip expenditures, and demographics. A copy of the survey and the results for both years can be found in Appendix 7 and 8.

Table 12. First Day of Trout Survey Summary.

	2006 Survey	2008 Survey
Avg Age	33	43
Avg Years Experience	13.3	17.8
Avg Distance Travelled	45.2	39.8
Avg Group Size	4.4	5
Total Amount Spent	$7,148.00	$6,202.50

From the 2006 survey, the average age was 33 years old, with 13.3 years of fishing experience. The average distance driven was 45.2 miles with 4.4 people per group/vehicle. When asked what kind of trout species they would like to see the most, the results were a three-way tie with brook, rainbow, and tiger species each receiving fifteen votes. The figure that stands out the most is that the twenty groups surveyed spent a total of $7,148 within 25 miles of the Clear Shade Creek watershed. This number is significant for the small communities and businesses in the watershed for just one weekend.

The results of the 2008 survey are similar. Thirty-two surveys were completed with an average age of almost 43 years and an average of 17.8 years fishing experience. Most people surveyed came with relatives, with an average of five people per group. The total miles driven one way to the area for the day was 1276, with an average of 39.8 miles driven per vehicle, with most respondents coming from Johnstown. Rainbow trout was the species most requested by those surveyed with 25 responses, followed by brook, brown, and tiger all with 22 responses.

Most people surveyed responded that they would like to see more brook trout stocking and most keep the fish they catch. Many of those who responded said that they have a tradition of going to the same location for the first day of trout season and 24 of 32 responses said their experience was 'excellent.'

Economically speaking, the total amount of money spent in the area for the 2008 survey was $6,202.50, slightly less than the 2006 survey. Even though more people were surveyed in 2008, the distance traveled was less per person, as most people surveyed were local; though one person did travel 289 miles from New York City. In 2006, there were people surveyed from as far away as Texas, South Carolina, and Missouri. This lower cost may also be associated with higher fuel costs; the average cost for a gallon of regular unleaded gasoline in April 2006 was approximately $2.75, and in 2008, the amount rose to approximately $3.60 per gallon.

Another important economic factor is asked in question eleven, "As you know some of the costs of travel such as gasoline often increase. If the total cost of this most recent trip had been $__ higher, would you have made this trip?" The options for increased costs were $25, $50, $75, $100, and more than $100. An overwhelming majority responded they would continue to make the trip to the area no matter what the cost. This speaks volumes about the value of natural resources and the expense people are willing to pay for recreation in the Clear Shade area.

Areas of Concern

Forest Pests

Hundreds of insects have evolved to feed on trees and in most cases do not harm the tree host. The specialized natures of feeding behaviors generally reduce competition among insects. For example, some species may feed exclusively on roots and twigs but not leaves or bark. A different species may eat only the leaves. By occupying these specific feeding niches, the diversity of forest insect life can flourish. Most insects have short life cycles and produce many offspring that die before reaching adulthood. However, when more than the usual numbers of offspring survive to the adult stage, the numbers drastically increase and can develop into outbreaks. A few species that sometimes reach outbreak numbers can cause a lot of damage to forest trees.

Two forest health concerns of note in the Clear Shade Creek watershed are the beech bark disease and the hemlock wooly adelgid (Mark Mazer, PA DCNR Bureau of Forestry, Personal Communication, 10 Dec 2009). Beech bark disease consists of a relationship between the beech scale insect (*Cryptococcus fagusuga* Lindinger) and the fungal pathogen *Nectria coccinea*. The disease first appeared on beech trees following introduction of the beech scale from Europe to Nova Scotia at the turn of the century. Since then the scale has spread throughout New England, Pennsylvania and is now present in West Virginia. Beech bark disease is a canker disease caused by the *Nectria* fungus that enters the tree when the scale insect inserts a stylet into the bark and underlying tissue. The wound sites are then available for colonization by the fungus. The scale insect and fungus work in combination to kill patches of the inner bark. Cankers can expand and join together to girdle the tree, often causing death of the tree in these cases. Fortunately, some beech trees appear to be resistant to the scale insect. A resistant tree is less likely to suffer feeding injuries, reducing the risk of *Nectria* colonization. Leaving resistant trees intact will allow these trees to produce seeds that often produce scale resistant offspring and fewer diseased trees in the future (PA DCNR Bureau of Forestry 2009).

Figure 31. Eastern hemlock foliage infested with woolly adelgid egg sacks. Photo courtesy DCNR.

The hemlock woolly adelgid (*Adelges tsugae* Annand) is of special concern because it feeds on the Pennsylvania state tree—eastern hemlock, and can become numerous enough to stress trees, especially those already suffering from drought, defoliation, or other weakening factor. Adults are small, soft-bodied insects that feed by inserting its stylet into twigs. It overwinters on hemlock trees as a wingless adult, which lays eggs during warm weather in late winter and early spring that hatch in April. The newly hatched nymphs crawl to young branches to feed. After the nymphs grow to maturity, females secrete a white, waxy covering. The second-generation females then lay eggs in this cottony mass during June. Nymphs hatch from the eggs in July but do not become mature until winter.

Hemlock woolly adelgid has few natural enemies in the eastern United States, although some lady beetles do feed on them. Other natural enemies in Asia are being studied and may be introduced into the United States (PA DCNR Bureau of Forestry 2009).

Forest Stewardship

Because much of the Clear Shade Creek watershed is forested, the integrity and sustainability of that forest is crucial to the watershed's health. The portion of the watershed under state control is already managed under sustainable forest practices. It is important that the remainder of the watershed under private ownership also practice wise forest management with regard to timber harvesting and related activities.

Thermal Pollution

Certain stream organisms have a narrow range of temperatures at which they can survive. In a coldwater setting, a constant low temperature must be maintained to support the associated biotic communities. When a stream or body of water is exposed to direct sunlight, the temperature increases. Piney Run Reservoir and Pine Lake are both open bodies of water and are heated throughout the entire day by the sun. Water is released from the top of their dams and the heated water enters the stream. In some cases, the addition of warmer water makes thermal conditions unsuitable for coldwater organisms. Releasing water from the bottom of the reservoirs would help to ensure that a proper thermal environment is maintained. Pine Lake is currently not able to release water from the bottom of the reservoir. Piney Run Reservoir has bottom release capabilities, but this option has not previously been considered.

Acidification

Stream acidification can occur as a result of acid deposition. Clear Shade Creek and its tributaries are infertile streams and have very low alkalinities. As a result, they have very little buffering capacity, making them very susceptible to acidic events and acid deposition from acid rain. Fish, especially wild trout, and macroinvertebrate populations can be greatly impaired due to acidification.

Development

Development within the watershed is the greatest threat to water quality. Presently the watershed is perfectly balanced and even the slightest change can alter the stream's unspoiled nature. The Clear Shade Creek watershed contains some of the highest quality and most pristine water resources in the area; however, they are not immune to external pressure resulting in environmental changes. Even though the streams are currently of excellent quality, they are naturally infertile and have very little buffering capacity, making them extremely sensitive to even the slightest changes within the watershed.

With the influx of a more educated population comes an increase desire and money available to build homes in an unspoiled area away from the hustle and bustle of daily life. In addition to forest clearing, the construction of new homes also prompts the development of roads and increased traffic, which can lead to increased erosion and pollution of the streams nearby.

Creating forest clearings for new home construction increases forest fragmentation. Forest fragmentation has been known to alter the biotic community of an area because of an increase in edge habitat and a loss of interior forest habitat. Edge and interior forest habitat tend to favor different species, and an increase in edge can cause a shift in community composition and cause stress for sensitive species that require undisturbed forest habitat.

New development also poses pollution threats to nearby streams through sediment pollution. Sediment is the number one stream pollutant. Poorly designed or maintained roads can increase stream sedimentation through erosion or dust pollution. Increased traffic can further add to the harmful effects of improperly maintained and roads. When constructed properly, dirt and gravel roads can actually reduce and alleviate sediment pollution. They promote infiltration rather than overland flow, causing the water to be filtered before entering a stream. The Somerset Conservation District has a Dirt and Gravel Roads Program and is actively installing Best Management Practices on roads throughout the county.

An increase in development will also cause an increased need for water supply. The Windber Area Authority currently supplies an average of 1 million gallons of water per day from its groundwater wells. The design capacity of the system is 3 million gallons per day. If water demand would significantly increase, groundwater withdraws could cause a significant reduction in stream flow volume. The lower water quantity could impair the wild trout population in the watershed, especially during base flow periods.

Public Access

Although key components are under state control and public access is assured, the balance of the watershed's public access will always be in jeopardy, especially as potential development escalates. Conservation easements should be pursued in order to secure sustainable resources and public access in the watershed.

Shaffer Mountain Wind Farm

One of the greatest concerns in the Clear Shade Creek watershed is the proposed "Shaffer Mountain Wind Farm." The project, developed by Gamesa under the group name Shaffer Mountain Wind, LLC, would encompass 5,358 acres and include the construction of 33 wind turbines. Gravel roads for construction and operational maintenance are also proposed as part of the project. The total roadway corridor width is 45 feet including a 30-foot travel-way (15 feet of which will be constructed with gravel and the remaining 15 feet stabilized with grass vegetation), a 9-foot corridor for transmission lines and a 6-foot section for a drainage ditch. Timber harvesting and corridor construction would create a total of 174 disturbed acres.

Numerous local and state groups have spoken out against the project because of the potential for environmental harm. SCRIP and the Mountain Laurel Chapter of Trout Unlimited (MLTU) have each published position papers on the issue calling for increased vigilance and protection measures necessary to maintain the resource quality within the watershed. MLTU recommends an independent surface and groundwater study for the project site and its thorough examination by PA DEP, conservation organizations, municipalities, authorities and elected officials. In addition, Mountain MLTU advocates for proper training and education for permit reviewers, including conservation district technicians, in order to protect the most sensitive natural assets. MLTU recommends that the proposed windmill sites in the Piney Creek sub-watershed be eliminated altogether. Other groups, including the Windber Area Authority, Central City Sportsmen's Club and the PFBC have expressed similar concerns related to wind turbine placement and construction.

Groups of local, concerned citizens have also emerged in the Shaffer Mountain debate. Save Our Allegheny Ridges (SOAR) and Sensible Wind Solutions are two groups that are expressing strong opposition to the placement of wind turbines in the Clear Shade Creek watershed. SOAR is an organization whose mission is to preserve and protect the historic, natural and scenic integrity of Pennsylvania's Allegheny mountain ridges. Sensible Wind Solutions is a non-profit group that advocates for proper siting for industrial wind facilities by advocating their placement from high quality forested areas to fallow fields and strip mines.

The initial permit application for the Shaffer Mountain project was filed in the spring of 2007, but any type of construction on the project has yet to begin. Permit approval has not been granted. Instead, Gamesa continues to pursue the permit by addressing PA DEP defined deficiencies and opposition groups continue their work to make certain that the Clear Shade Creek watershed is protected from environmental harm.

Marcellus Shale Drilling

Production of natural gas can certainly be a boon to the local economy, but Marcellus shale drilling may lead to environmental consequences that could outweigh the benefits in the long-term. Besides the on-the-ground footprint of drilling the wells including roads, pipelines, drilling pads and wastewater storage pits, Marcellus shale drilling requires extremely large volumes of water for their specialized hydraulic fracturing process. Drilling a single well can require over 5 million gallons of water. Water quantity concerns arise over where the enormous volumes of water used in the process may come from, but perhaps an even greater concern is the disposal of frack water after the process is complete. After water is used, it becomes a slurry of water, salt, sand, and toxic chemicals. This water cannot be treated at an ordinary water treatment facility because of its toxic composition and huge volume. Frack water must be treated at specialized, approved facilities, which are currently scarce in Pennsylvania.

Regulations for permitting and monitoring Marcellus shale drilling are still being formed, but the industry is poised to quickly advance drilling with only limited regulations and procedures in place. Water resources in the Clear Shade Creek watershed could be in jeopardy if precautions are not taken to prevent damage from Marcellus shale drilling. Two Marcellus shale gas wells have already been permitted in the Clear Shade Creek watershed. All parties with a local interest in maintaining environmental integrity must be proactive in assuring that drilling companies do not decimate natural resources in the area.

Public Comments and Concerns

Figure 32. Opponents to the proposed Shaffer Mountain Wind Farm demonstrate at the Public Meeting at Shade-Central City High School.
Photo by Dave Lloyd for The Tribune Democrat.

The majority of public concern and interest in issues within the Clear Shade Creek watershed have been in response to the proposed Shaffer Mountain Wind Farm. Extraction of natural gas from the Marcellus shale formation is still very new.

In August 2007, the PA DEP held a public hearing at the Shade-Central City High School to garner public input about the Shaffer Mountain Wind Farm. Hundreds of people attended the event and over 50 people spoke to those in attendance about their opinions and concerns. Written comments and opinions were submitted as well. The majority of the opinions expressed at the meeting were in opposition to the wind farm because of the potential for harm to the environmentally sensitive Clear Shade Creek watershed.

Since the initial PA DEP hearing, groups have expressed their opposition using various methods including letters to the editor, position papers, lawsuits, and public rallies, including a rally at the state capitol in Harrisburg.

Preserving water quality is not the only concern of opposition groups. Groups have also expressed their concern for further harm to threatened and endangered species, including some species of raptors and bats. The groups have cited studies from other windmill sites where birds and bats have been killed as support against placing windmills in the vicinity of these species. The groups have also spoken out against forest fragmentation that would be caused by windmill construction.

Many of the project's opponents are also concerned about the potential harm to nearby property owners. They cite low frequency noise, vibrations, flickering light and "turbine syndrome"' as prospective dangers to those who live near proposed windmill sites. In addition, they fear that property values will decrease if the project proceeds because of the alterations in the natural beauty of the area.

Watershed Goals, Partners and Potential Funding Sources

Goal 1. Preserve water quality.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Closely monitor and scrutinize permitted projects.	Citizens Municipalities PA DEP SCD SCWA
Task 2	Continue to monitor water quality.	PFBC PA DEP SCD SCWA Stream Team Water Quality Monitoring Joint Venture
Task 3	Control erosion and sediment pollution.	Landowners SCD SCWA
Task 4	Enhance riparian areas.	Landowners Natural Biodiversity SCWA
Task 5	Limit and closely monitor resource extraction.	Municipalities PA DEP SCWA
Task 6	Protect species diversity.	DCNR PFBC

Goal 2. Maintain water quantity.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Closely monitor residential water usage and interbasin transfer.	PA DEP WAA
Task 2	Closely monitor water withdraws for resource extraction.	PA DEP SCD
Task 3	Continue to monitor groundwater and stream flow levels.	PFBC SCD USGS

Goal 3. Limit development.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Educate citizens about the importance of preserving natural areas.	Municipalities Natural Biodiversity SCC
Task 2	Increase formal protection of sensitive ecosystems.	Municipalities PA DEP SCC
Task 3	Closely monitor and scrutinize permitted projects – industrial and residential.	Citizens Municipalities PA DEP SCD SCWA

Goal 4. Maintain fishery.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Maintain special regulation stream section.	PFBC
Task 2	Monitor fish populations.	PFBC
Task 3	Encourage catch and release.	MLTU SCWA

Goal 5. Secure public access.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Create GIS mapping tool to determine conservation priorities.	SCC SCD MLTU PFBC
Task 2	Secure conservation and public access easements.	MLTU PFBC SCC SCD

Goal 6. Monitor and control progress of forest pests.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Monitor pest populations.	DCNR-Bureau of Forestry
Task 2	Apply pest treatments as necessary.	DCNR-Bureau of Forestry

Goal 7. Monitor status of invasive species		
Milestones		*Possible Partners or Funding Sources*
Task 1	Monitor invasive species populations.	Citizens DCNR Natural Biodiversity SCWA
Task 2	Educate visitors and citizens about the harmful effects of moving non-native species.	Citizens DCNR Natural Biodiversity

Goal 8. Reduce visible impact of human visitors.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Conduct litter clean-ups on highly trafficked stream segments.	MLTU SCWA PA Cleanways
Task 2	Encourage responsible trash disposal.	Citizens PA Cleanways SCWA
Task 3	Educate the public about the harmful effects of building homemade dams (i.e. Impede fish movement, increase sedimentation, limit O_2, etc).	Citizens PFBC SCWA Stream Team US FWS

Goal 9. Foster forest stewardship.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Evaluate known resources.	SCC SCD
Task 2	Educate landowners about proper forest management practices.	DCNR Forestry Consultants USDA-NRCS

Goal 10. Limit harm caused by windmill construction.		
Milestones		*Possible Partners or Funding Sources*
Task 1	Voice public concern.	Citizens MLTU SCC SCRIP SCWA
Task 2	Encourage alternative placement.	Citizens MLTU SCRIP SCWA
Task 3	Carefully review plans to ensure BMPs and proper oversight.	PA DEP SCD
Task 4	Remain vigilant after windmill construction.	Citizens MLTU SCD SCRIP SCWA

Key to Partners and Possible Funding Sources	
DCNR	Department of Conservation of Natural Resources
MLTU	Mountain Laurel Chapter Trout Unlimited
PA DEP	Pennsylvania Department of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
SCC	Somerset County Conservancy
SCD	Somerset Conservation District
SCRIP	Stonycreek Conemaugh River Improvement Project
SCWA	Shade Creek Watershed Association
Stream Team	Kiski-Conemaugh Stream Team
US FWS	United States Fish and Wildlife Service
USDA-NRCS	United States Department of Agriculture – Natural Resources Conservation Service
USGS	United States Geologic Survey
WAA	Windber Area Authority

Conclusions

The Clear Shade Creek watershed is truly a diamond in the rough. In an area, blemished by the effects of past mining activities, Clear Shade Creek and its tributaries remain pristine. Water quality is exceptional or of high quality, but is fragile and sensitive to even slight environmental changes. Presently, the ecosystem is perfectly balanced and must be protected.

Clear Shade Creek is a destination fishery. Streams in the watershed support abundant aquatic life, typical of untouched mountain streams. Trout are the most common species in the watershed and angling opportunities include chances at both stocked and wild trout in a beautiful setting.

Although the Clear Shade Creek watershed is an extraordinary natural resource, it is not immune to external stress and threats. Unplanned development and resource extraction in the watershed are the biggest concerns, and if allowed to occur, both the aquatic and terrestrial resources could be lost or severely diminished. Careful planning that encompasses the current recreational and economical value of the watershed's natural resources must take place to ensure that the watershed's current status is maintained and protected.

Figure 33. Clear Shade Creek upstream of the Rt. 160 bridge.
Photo by Melissa Reckner.

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APPENDIX 1. Stream Team Water Chemistry Data, 2007.

Site ID	Date	Site Name	pH	Temp (°C)	Conductivity (µs)	TDS (ppm)	Total Hd (ppm)	Phosphate (ppm)	Calc Hd (ppm)	DO (ppm)	Nitrate (ppm)
CS002	8/15/2007	Clear Shade @ Swinging bridge	7.21	17.00	88	44	40		32	8.8	<.2
M001	8/15/2007	Mile Run Foot Bridge	4.67	15.70	73	35	56		16	7.4	N/A
CS001	8/15/2007	Clear Shade @ Rt 56 Bridge	7.00	17.30	66	33	48		32	8.4	0.1
CS003	8/15/2007	Clear Shade @ Iron Bridge	7.53	18.80	81	41	56		24	8.6	N/A
CR001	8/15/2007	Cub Run Mouth	5.92	17.00	33	16	40		12	5.2	N/A
P004	9/14/2007	Piney Reservoir	6.47	15.80	41	20	44	<.2		6.8	<.2
P003	9/14/2007	Upstream Piney Res.	6.43	15.70	41	20	28	<.2		8.2	<.2
P005	9/14/2007	Piney below Res.	6.50	16.70	40	20	28	<.2		7.4	<.2
P006	9/14/2007	Clearshade (before confluence w/ Piney)	7.38	16.70	51	25	28	<.2		8.8	<.2
P007	9/14/2007	AMD seep (after Piney below)	6.37	14.50	60	35		<.2			<.2
P001	9/12/2007	Piney (near headwaters)	6.55	14.50	11	5	X	X		10.6	X
P002	9/12/2007	Piney (T 713 bridge)	6.90	13.50	23	11	50	<.2		10.6	<.2

APPENDIX 2. Stream Team Water Chemistry Data, 2006.

Site ID	Site	Date	pH	Conductivity (uS)	D.O. (ppm)	CO2 (ppm)	Nitrate (ppm)	Phosphate (ppm)	Hardness (ppm)	Iron (ppm)	Temp. (°C)
CS001	Clear Shade Creek at Rt. 56	7/13/2006	6.80	40	8	4	0.44	<0.1			
CS003	Clear Shade Creek at Iron Bridge	7/13/2006	6.80	50	5.2		0.1	0.17	27		
CS002	Clear Shade Creek by Swinging Bridge in Wild Area	7/13/2006	6.80	55	8.6	3.5			28		
M001	Mile Run at Foot Bridge	7/13/2006	4.80		5					0.8	
	Cub Run 1	7/14/2006	6.86	28	5						
CR001	Cub Run 2 (mouth)	7/14/2006	6.45	21	5.5	2			10		
	Piney Run 1 (by camp)	7/14/2006	6.75	20	5.6	3			10		
P006	Clear Shade Creek above Piney Run and below dam	9/8/2006	7.01	59.3	12.7	2			30		16.2
	Piney Run 2 (mouth)	9/8/2006	6.87	31.5	9.2	4.5			24		17.9
P007	Piney Run discharge*	9/8/2006	6.61	43							18.8

APPENDIX 3. PFBC Water Chemistry Data.

Site Number	River Mile	Section	Date	Air Temp	Water Temp	pH	Specific Conductance	Total Alkalinity	Total Hardness
101	11.24	1	6/12/1986	23	15.8	6.9		8	34
201	10.33	2	8/12/1991		19.5	6.7	54	9	13
201	10.33	2	6/12/1986	21	14.2	6.9		10	12
	10.28	2	9/28/1976	21	13.3	6.2	50	5	14
202	9.3	2	8/12/1991		19.5	6.8	74	22	24
202	9.3	2	6/12/1986	18	12.7	6.8		11	23
203	5.54	2	9/28/1976	22	13.9	6.3	50	5	14
203	5.45	2	7/1/1986	12	12.7	7.1		9	19
203	4.67	2	8/13/1991		18.5	7.1	67	18	15
301	3.18	3	8/13/1991		23	7.1	69	18	16
301	3.18	3	7/3/1986	18	14.6	7.3		10	19
301	3.18	3	9/13/1977	22	17.2	7	70	11	19
403	2.39	4	4/8/2009		3	6.5	51	4	21
402	2.15	4	4/8/2009		4	6.3	50	5	25
401	0.72	4	8/14/1991		20	7	64	12	14
401	0.72	4	9/13/1977	23	17.8	6.7	60	8	14

APPENDIX 4. Raptor data from the Allegheny Mountain Hawk Watch.

Raptors observed at Allegheny Mountain Hawk Watch during fall migration seasons.									
Common Name	**Scientific Name**	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Black Vulture	*Coragyps atratus*	9	15	24	20	20	56	37	14
Turkey Vulture	*Cathartes aura*	297	347	416	459	427	1,193	394	836
Osprey	*Pandion haliaetus*	84	111	118	125	118	159	116	119
Bald Eagle	*Haliaeetus leucocephalus*	97	69	76	70	48	59	66	64
Northern Harrier	*Circus cyaneus*	38	52	85	61	49	95	111	64
Sharp-skinned Hawk	*Accipiter striatus*	613	1,000	1,732	1,179	1,006	1,393	1,228	1,157
Cooper's Hawk	*Accipiter cooperii*	162	194	505	191	204	297	173	288
Northern Goshawk	*Accipiter gentilis*	4	7	3	5	8	14	11	19
Red-shouldered Hawk	*Buteo lineatus*	53	56	93	81	117	167	66	122
Broad-winged Hawk	*Buteo platypterus*	2,954	3,887	3,217	13,974	1,194	5,566	3,042	3,766
Red-tailed Hawk	*Buteo jamaicensis*	1,426	1,284	2,429	1,548	1,553	3,331	1,223	2,780
Rough-legged Hawk	*Buteo lagopus*	0	4	6	4	4	8	5	3
Golden Eagle	*Aquila chrysaetos*	189	154	139	222	131	165	192	89
American Kestrel	*Falco sparverius*	43	55	99	75	70	80	94	101
Merlin	*Falco columbarius*	22	29	39	32	34	34	30	33
Peregrine Falcon	*Falco peregrinus*	22	15	32	48	50	21	43	52
Unknown Accipiter	Falconiformes sp.	19	34	81	32	36	39	36	42
Unknown Buteo	Falconiformes sp.	44	49	48	44	88	58	40	55
Unknown Falcon	Falconiformes sp.	5	5	12	11	7	3	5	15
Unknown Eagle	Falconiformes sp.	3	1	6	1	6	2	2	2
Unknown Raptor	Falconiformes sp.	87	117	195	166	180	126	125	122
Totals		**6,171**	**7,485**	**9,355**	**18,348**	**5,350**	**12,866**	**7,039**	**9,743**

APPENDIX 4. Continued.

Raptors observed at Allegheny Mountain Hawk Watch during spring migration seasons.									
Common Name	**Scientific Name**	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Black Vulture	*Coragyps atratus*	9	12	26	7	20	10	9	1
Turkey Vulture	*Cathartes aura*	384	410	268	240	427	156	530	470
Osprey	*Pandion haliaetus*	61	185	135	148	70	48	132	119
Bald Eagle	*Haliaeetus leucocephalus*	32	35	26	14	20	8	23	10
Northern Harrier	*Circus cyaneus*	28	29	31	29	48	55	24	9
Sharp-skinned Hawk	*Accipiter striatus*	220	171	265	92	213	112	164	199
Cooper's Hawk	*Accipiter cooperii*	57	56	85	56	91	71	38	69
Northern Goshawk	*Accipiter gentilis*	1	9	4	1	3	5	9	5
Red-shouldered Hawk	*Buteo lineatus*	36	110	72	36	72	61	73	24
Broad-winged Hawk	*Buteo platypterus*	854	433	327	636	442	252	277	314
Red-tailed Hawk	*Buteo jamaicensis*	465	478	489	279	620	289	445	573
Rough-legged Hawk	*Buteo lagopus*	0	1	4	0	1	6	3	4
Golden Eagle	*Aquila chrysaetos*	81	94	76	37	50	39	124	67
American Kestrel	*Falco sparverius*	39	26	27	23	33	21	11	18
Merlin	*Falco columbarius*	9	4	3	5	10	4	10	7
Peregrine Falcon	*Falco peregrinus*	3	4	1	0	8	2	8	6
Unknown Accipiter	Falconiformes sp.	11	17	16	15	18	9	16	11
Unknown Buteo	Falconiformes sp.	28	30	29	30	37	24	27	2
Unknown Falcon	Falconiformes sp.	1	3	2	2	0	1	5	3
Unknown Eagle	Falconiformes sp.	1	4	2	5	0	0	2	2
Unknown Raptor	Falconiformes sp.	51	50	81	73	66	34	53	54
Totals		**2,371**	**2,161**	**1,969**	**1,728**	**2,249**	**1,207**	**1,983**	**1,967**

APPENDIX 5. Macroinvertebrate Data.

CS1--Clear Shade Rt 56 Ogletown				
Class	**Order**	**Family**	**Genus**	**Number**
Crustacea	Decapoda	Cambaridae		5
Insecta	Coleoptera	Elmidae	*Microcylloepus*	1
Insecta	Coleoptera	Halipidae	*Halipus*	1
Insecta	Diptera	Chironomidae		7
Insecta	Diptera	Tipulidae	*Hexatoma*	2
Insecta	Diptera	Tipulidae	*Antocha*	3
Insecta	Diptera	Tabanidae	*Tababus*	1
Insecta	Diptera	Simmulidae	*Simula*	15
Insecta	Megaloptera	Sialidae	*Sialis*	2
Insecta	Ephemeroptra	Heptageniidae	*Stenonema*	4
Insecta	Ephemeroptra	Caenidae	*Caenis*	4
Insecta	Ephemeroptra	Ephemerellidae	*Ephemerella*	2
Insecta	Ephemeroptra	Baetidae	*Baetis*	1
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	26
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	15
Insecta	Hemiptera	Corixidae	*Trichocorixa*	2
Crustacea	Isopoda	Asellidae	*Caecidotea*	2

CS2--Clear Shade Iron Bridge				
Class	**Order**	**Family**	**Genus**	**Number**
Insecta	Coleoptera	Elmidae	*Promorsia*	10
Insecta	Diptera	Chironomidae		4
Insecta	Diptera	Tipulidae	*Hexatoma*	1
Insecta	Diptera	Tipulidae	*Antocha*	2
Insecta	Ephemeroptra	Heptageniidae	*Stenonema*	1
Insecta	Ephemeroptra	Caenidae	*Caenis*	1
Insecta	Plecoptra	Capniidae	*Capnia*	4
Insecta	Tricoptera	Philopotomidae	*Chimarra*	1

APPENDIX 5. Continued.

CS3--Swinging Bridge				
Class	***Order***	***Family***	***Genus***	***Number***
Crustacea	Decapoda	Cambaridae		1
Insecta	Coleoptera	Elmidae	*Promorsia*	62
Insecta	Coleoptera	Elmidae	*Microcylloepus*	9
Insecta	Coleoptera	Elmidae	*Optioservus*	8
Insecta	Diptera	Chironomidae		5
Insecta	Diptera	Tipulidae	*Hexatoma*	1
Insecta	Diptera	Tipulidae	*Pseudolimnophila*	3
Insecta	Megaloptera	Coryalidae	*Neohermes*	1
Insecta	Ephemeroptra	Heptageniidae	*Stenonema*	5
Insecta	Plecoptra	Leutricidae	*Leuctra*	3
Insecta	Plecoptra	Capniidae	*Utacapnia*	1
Insecta	Plecoptra	Capniidae	*Capnia*	1
Insecta	Plecoptra	Perlodidae	*Isoperla*	1
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	17
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	17
Insecta	Tricoptera	Philopotomidae	*Chimarra*	7

P1--Piney Mouth				
Class	***Order***	***Family***	***Genus***	***Number***
Insecta	Coleoptera	Elmidae	*Promorsia*	1
Insecta	Coleoptera	Elmidae	*Microcylloepus*	1
Insecta	Odonata	Gomphidae	*Gomphus*	2
Insecta	Diptera	Chironomidae		4
Insecta	Diptera	Tipulidae	*Hexatoma*	3
Insecta	Megaloptera	Sialidae	*Sialis*	1
Insecta	Megaloptera	Coryalidae	*Nigronia*	1
Insecta	Ephemeroptra	Leptophlebiidae	*Leptophlebia*	2
Insecta	Plecoptra	Leutricidae	*Leuctra*	1

APPENDIX 5. Continued.

P2--Piney Above Reservoir				
Class	**Order**	**Family**	**Genus**	**Number**
Crustacea	Decapoda	Cambaridae		1
Insecta	Coleoptera	Elmidae	*Promorsia*	1
Insecta	Diptera	Tipulidae	*Hexatoma*	1
Insecta	Ephemeroptra	Baetidae	*Baetis*	1
Insecta	Plecoptra	Capniidae	*Capnia*	1
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	2
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	1

P3--Piney 7713 Bridge				
Class	**Order**	**Family**	**Genus**	**Number**
Crustacea	Decapoda	Cambaridae		1
Insecta	Diptera	Tipulidae	*Hexatoma*	7
Insecta	Diptera	Tipulidae	*Antocha*	2
Insecta	Diptera	Simulidae		1
Insecta	Plecoptra	Leutricidae	*Leuctra*	10
Insecta	Plecoptra	Capniidae	*Utacapnia*	3
Insecta	Plecoptra	Capniidae	*Capnia*	10
Insecta	Plecoptra	Peltoperlidae	*Peltoperla*	1
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	3
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	1
Insecta	Tricoptera	Polycentropodidae	*Neureclipsis*	1

APPENDIX 5. Continued.

CR1--Cub Run Mouth				
Class	***Order***	***Family***	***Genus***	***Number***
Crustacea	Decapoda	Cambaridae		1
Insecta	Coleoptera	Elmidae	*Promorsia*	15
Insecta	Diptera	Chironomidae		1
Insecta	Diptera	Tipulidae	*Hexatoma*	1
Insecta	Diptera	Tipulidae	*Antocha*	1
Insecta	Ephemeroptra	Caenidae	*Caenis*	1
Insecta	Ephemeroptra	Ehpemeridae	*Ephemera*	1
Insecta	Plecoptra	Capniidae	*Capnia*	24
Insecta	Tricoptera	Polycentropodidae	*Cyrnellus*	1
Insecta	Tricoptera	Lepidostomatidae	*Lepidstoma*	1

APPENDIX 5. Continued.

CR2--Cub Run				
Class	***Order***	***Family***	***Genus***	***Number***
Crustacea	Decapoda	Cambaridae		5
Insecta	Coleoptera	Elmidae	*Promorsia*	32
Insecta	Coleoptera	Elmidae	*Microcylloepus*	5
Insecta	Coleoptera	Elmidae	*Optioservus*	8
Insecta	Coleoptera	Hydrophilidae	*Tropisternus*	1
Insecta	Odonata	Gomphidae	*Gomphus*	1
Insecta	Diptera	Chironomidae		6
Insecta	Diptera	Tipulidae	*Hexatoma*	8
Insecta	Diptera	Tipulidae	*Pseudolimnophila*	6
Insecta	Diptera	Tipulidae	*Antocha*	1
Insecta	Diptera	Tipulidae	*Tipula*	2
Insecta	Ephemeroptra	Heptageniidae	*Stenonema*	1
Insecta	Ephemeroptra	Caenidae	*Caenis*	1
Insecta	Plecoptra	Leutricidae	*Leuctra*	1
Insecta	Plecoptra	Leutricidae	*Capnia*	9
Insecta	Plecoptra	Perlodidae	*Isoperla*	1
Insecta	Plecoptra	Pteronarcyidae	*Pteronarcys*	2
Insecta	Plecoptra	Perlidae	*Acroneuria*	3
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	2
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	6
Insecta	Tricoptera	Philopotomidae	*Chimarra*	1
Insecta	Tricoptera	Brachycentridae	*Micrasema*	7

APPENDIX 5. Continued.

MR--Mile Run				
Class	***Order***	***Family***	***Genus***	***Number***
Crustacea	Decapoda	Cambaridae		2
Insecta	Coleoptera	Elmidae	*Promorsia*	1
Insecta	Diptera	Chironomidae		7
Insecta	Diptera	Tipulidae	*Pseudolimnophila*	1
Insecta	Diptera	Tipulidae	*Antocha*	2
Insecta	Diptera	Simulidae		1
Insecta	Plecoptra	Leutricidae	*Leuctra*	5
Insecta	Plecoptra	Leutricidae	*Capnia*	56
Insecta	Plecoptra	Perlodidae	*Isoperla*	3
Insecta	Tricoptera	Hydropsychidae	*Cheumatopsyche*	7
Insecta	Tricoptera	Hydropsychidae	*Hydropsyche*	3
Insecta	Tricoptera	Polycentropodidae	*Cyrnellus*	5
Insecta	Tricoptera	Polycentropodidae	*Polycentropodus*	1
Insecta	Tricoptera	Rhycophilidae	*Rhyacophila*	1

APPENDIX 6. PFBC trout biomass and abundance values in the Clear Shade Creek watershed.

Stream	Section	Survey Date	Survey Type	Brook Biomass (kg/ha)	Brook Abundance (#/km)	Brown Biomass (kg/ha)	Brown Abundance (#/km)	Total Biomass (kg/ha)	Total trout (#/km)
Clear Shade Creek	1	1986	Petersen Mark-Recapture	5.80	274	11.13	41	16.93	315
Clear Shade Creek	2	1976	Petersen Mark-Recapture	1.08	30	19.74	240	20.82	270
Clear Shade Creek	2	1986	Petersen Mark-Recapture	1.67	13	26.62	196	28.29	209
Clear Shade Creek	2	1991	Petersen Mark-Recapture	5.84	79	50.49	370	56.33	449
Clear Shade Creek	2	1993	Petersen Mark-Recapture	4.35	36	21.77	143	26.12	179
Clear Shade Creek	3	1977	Petersen Mark-Recapture	0.19	3	12.35	117	12.54	120
Clear Shade Creek	3	1986	Petersen Mark-Recapture	4.39	69	39.32	274	43.71	343
Clear Shade Creek	3	1991	Single Pass (CPUE)	0.50	6	10.24	103	10.74	109
Clear Shade Creek	4	1977	Single Pass (CPUE)	0.00	0	0.00	0	0.00	0
Clear Shade Creek	4	1991	Single Pass (CPUE)	0.16	12	4.50	130	4.66	142
Piney Run	1	1980	Petersen Mark-Recapture	18.06	815	0.00	0	18.06	815
Piney Run	2	1978	Petersen & Single Pass	5.60	107	5.32	18	10.92	125
Piney Run	2	1996	Single Pass (CPUE)	2.36	78	0.63	2	2.99	80
Cub Run	2	1978	Petersen Mark-Recapture	12.49	467	30.88	407	43.37	874
Cub Run	2	1982	Petersen & Single Pass	1.99	49	6.96	35	8.95	84
Cub Run	2	2000	Single Pass (CPUE)	3.25	33	0.97	5	4.22	38

APPENDIX 7. First Day of Trout Survey and Results, 2006.

Date:	Site:	Surveyor:

Clear Shade Version

The Westsylvania Heritage Corporation and the Canaan Valley Institute, in conjunction with the Kiski-Conemaugh River Basin Alliance (KCRBA)'s members, are working together on both quantifying and qualifying the restoration that has been done within the basin and how it has affected the region's economy and environment. Would you please help us by filling out this short survey?

We truly appreciate you taking the time to answer this survey.

Thank you,

Section I. Activities

1. What was the primary reason for making the trip to this area?
a. To participate in outdoor activities **15**
b. To visit other attractions in the area **3**
c. Visiting friends or relatives in the area **1**
d. Business
e. Other _____

2. Please, check the activities you participated in during this trip. Also, please check the activities you participate in this area throughout the year. Please, leave blank those that don't apply.

	Today	Spring	Summer	Fall	Winter
Hunting				**4**	**2**
Fishing	**18**	**13**			
Biking		**1**	**2**	**1**	
Camping	**2**	**1**			
Picnicking					
Sightseeing/Photography					
Hiking			**1**		
Running				**1**	
Bird watching		**1**	**1**		
Wildlife viewing					
Rock climbing					
Canoeing/Kayaking					
Boating					
Fruit gathering					
Botanical observation					
Cross country skiing					
Snow mobiling					
Visit a heritage area					
Visit a Museum					
Other:					

2.1 If you checked more than one activity for this trip, which of these activities was the most important reason for your trip to this area? **Fishing (2), camping**

2.2 For how long have you been practicing this activity? **1 or 2 times (2); 5 yrs; 9 yrs; 10 yrs; 15 yrs (2); 18 yrs (3); 20-25 yrs (3); 15-30 yrs; 35 yrs (2); 40 yrs (2); 48 yrs**

3. How far did you drive, ONE WAY, to come to this area? (one way miles)
5 (2), 7, 8, 10, 15 (4), 20 (2), 21, 35, 50, 80 (2), 120, 200, 250, 400

4. Including yourself, how many persons came with you in this trip today?
1, 2 (3), 3 (4), 4, 5 (4), 5, 7 (2), 8, 10, 15, 20 (2)

5. Please, complete the following table with some details about the people that are here with you today.

# Trips each person in your vehicle has made this year	**2-3 (2); 6; 1**
Zip Code(s)	**08332 (2); 15221; 15530 (2); 15650; 15677; 15763; 15902 (2); 15905 (2); 15909 (5); 15921; 15924 (7); 15935 (2); 15963 (9); 17250; 17501; 19440; 19444; 19940; 29210; 29631; 44320 (2); 61616; 65809; 75211**
Age(s)	**4; 5; 13 (2); 14 (2); 15 (5); 17 (4); 18 (2); 19 (5); 20; 21 (4); 22; 23; 25; 26 (2); 28 (3); 30 (7); 31; 32 (4); 34 (2); 36 (3); 37 (2); 38; 40 (2); 42 (3); 43; 44; 45; 48 (2); 50 (3); 51 (2); 53 (2); 58 (2); 62; 64 (3); 68**

6. The people that are here with you today are
9 Relatives
13 Friends
1 Members of a club

7. Who do you most frequently do this activity with?
11 Relatives
15 Friends
Members of a club
Alone
Other: _____

Section II: Trip Expenditures

8. Did your group, or will your group, purchase food, gasoline, clothing, etc., in communities surrounding the property during this trip (communities located within 25 miles of the property)?

Yes **20** No **1**

8.1 If YES, please indicate the amount you and members of your group with whom you shared expenses (e.g., other family members, traveling companions) spent on each category on this trip.

Trip Expense	$ Amount Spent in
Gas & Oil for Auto &/or Boat	**200; 192.50 (2); 145; 100; 80; 75; 50 (3); 40 (2); 26; 25; 20 (5); 10; 5**
Food/drink: restaurants	**200; 100; 80; 57.50; 30; 20; 10; 5**
Food/drink: grocery stores	**715; 300; 200 (5); 140; 100; 71; 70; 60 (2); 40; 20 (2); 10**
Supplies/fishing tackle/other retail	**357.50; 200; 150 (2); 51; 50 (2); 40 (30; 30; 25; 20 (3); 15 (2); 10**
Activities: admissions, entertainment fees, sporting goods	**250; 82**
Equipment rental	
Souvenirs	
Rental car	
Other; Please List_____	**1,073**

9. Is your group staying overnight in this area on this trip?
Yes **16** No **4**

9.1. If YES, check one:
In a motel
In a B&B
Camping **13**
Owned seasonal home **2**
With friends **1**

9.2. If Yes, for how many nights? **3 (7); 2 (8); 1**

9.3 If Yes, how much is your group spending for lodging each night? $_____

10 Your fishing License is:
21 Resident Age 16-64
1 Senior Resident Age 65-up
__ Senior Resident - Lifetime Age 65-up
__ National Guard & Armed Forces Reserve (resident)
__ 1-day Resident (not valid April 1-30) 16 & up
__ Non-Resident Age 16-up
__ Seven-Day Tourist Age 16-up
__ Three-Day Tourist Age 16-up
__ 1-day Tourist (includes all stamps, license not valid in April)
__ Trout Salmon Stamp 16 & up

10.1 What type of fishing do you do most?

18 Bait
10 Spinners/spoons
5 Fly

10.2 Would you like to see?

13 More stocking
2 Less stocking
5 Stay the same

10.3 Do you keep the fish you catch?

13 Yes
10 No

10.4 If 10.3 is yes? How many in a year do you keep from this stream?
3; 5; 6; 12 (3); 15; 20; 30 (2); 60; 100

10.5 Would you like to see more brook trout in this waterway?

20 Yes
___No

10.6 Which Trout Species do would you like to see the most?

3 Brook
2 Brown
3 Rainbow
Golden
4 Tiger
13 All of the above

11. As you know, some of the costs of travel such as gasoline often increase. If the total cost of this most recent trip had been $_____ higher, would you have made this trip?

Higher cost	$25	$50	$75	$100	More
YES	20	17	12	11	13
NO	1	5	9	8	6

Section III. Demographics

12. Finally, please, tell us a little about yourself.

Gender
19 Male
__ Female

Income Level
__ Less than $10,000
2 $10,000 to $19,999
3 $20,000 to $29,999
3 $30,000 to $39,000
1 $40,000 to $49,000
2 $50,000 to $74,999
2 $75,000 to $99,999
1 $100,000 to $149,999
__ $150,000 or More

Education Level
__ Some High School
7 High School Graduate
2 Vocational/Technical
2 Some College
4 College Graduate
3 Graduate Study

13. How will you rate you overall experience in this area?
11 Excellent
4 Above average
3 Average
1 Less than average
__ Poor

14. Other comments or suggestions to help us improve your next visit:

THANK YOU

APPENDIX 8. First Day of Trout Survey and Results, 2008.

Clear Shade Version

The Westsylvania Heritage Corporation and the Canaan Valley Institute, in conjunction with the Kiski-Conemaugh River Basin Alliance (KCRBA)'s members, are working together on both quantifying and qualifying the restoration that has been done within the basin and how it has affected the region's economy and environment. Would you please help us by filling out this short survey?

We truly appreciate you taking the time to answer this survey.

Thank you,

Section I. Activities

1. What was the primary reason for making the trip to this area?
a. To participate in outdoor activities **27**
b. To visit other attractions in the area **2**
c. Visiting friends or relatives in the area **1**
d. Business
e. Other _____

2. Please, check the activities you participated in during this trip. Also, please check the activities you participate in this area throughout the year. Please, leave blank those that don't apply.

Hunting	**12**
Fishing	**31**
Biking	**3**
Camping	**12**
Picnicking	**8**
Sightseeing/Photography	**3**
Hiking	**7**
Running	**0**
Bird watching	**2**
Wildlife viewing	**3**
Rock climbing	**0**
Canoeing/Kayaking	**0**
Boating	**0**
Fruit gathering	**5**
Botanical observation	**2**
Cross country skiing	**3**
Snow mobiling	**3**
Visit a heritage area	**1**
Visit a Museum	**0**
Other:	**Mushrooms (1)**
	Quad (1)

2.1 If you checked more than one activity for this trip, which of these activities was the most important reason for your trip to this area? **Fishing (25)**

2.2 For how long have you been practicing this activity? **1yr (2), 3yr, 5yr (2), 7yr (3), 8yr (2), 10yr (2), 11yrs, 12yrs (2), 15yrs, 20yrs (2), 23yrs, 25yrs, 40yrs, 50yrs, all life (7)**

3. How far did you drive, ONE WAY, to come to this area? (one way miles)
3, 5 (2), 8 (4), 10 (3), 11, 12 (2), 15 (4), 20 (5), 25 (3), 40, 50, 80 (2), 120, 180, 205, 289

4. Including yourself, how many persons came with you in this trip today?
1, 2 (11), 3 (6), 4, 5 (3), 6 (4), 7, 10 (2), 15, 30

5. Please, complete the following table with some details about the people that are here with you today.

# Trips each person in your vehicle has made this year	**1 (13), 2 (7), 5 (5), 6 (3), 10, 15 (2), 20 (3), 25, 70**
Zip Code(s)	**10111; 15036; 15501 (2); 15650; 15750; 15901 (2); 15902 (2); 15904 (3); 15905 (10); 15906 (9); 15920; 15953; 15951 (6); 15963 (27); 18036**
Age(s)	**6; 8 (2); 10; 11; 12 (3); 13 (2); 14 (3); 15 (3); 16; 19; 20; 22; 23; 24; 25; 28 (2); 29; 35 (2); 38 (2); 39; 40 (3); 44; 45 (2); 46 (3); 47; 48; 49 (2); 50 (2); 53 (3); 55; 60 (2); 64; 70**

6. The people that are here with you today are
22 Relatives
15 Friends

7. Who do you most frequently do this activity with?
23 Relatives
15 Friends
Members of a club
Alone
Other: _____

Section II: Trip Expenditures

8. Did your group, or will your group, purchase food, gasoline, clothing, etc., in communities surrounding the property during this trip (communities located within 25 miles of the property)?

Yes **16** No **7**

8.1 If YES, please indicate the amount you and members of your group with whom you shared expenses (e.g., other family members, traveling companions) spent on each category on this trip.

Trip Expense	$ Amount Spent in
Gas & Oil for Auto &/or Boat	**200; 140; 100 (2); 75; 60; 50; 25 (2); 20 (3); 10 (2); 7; 6; 5 (2); 3; 2**
Food/drink: restaurants	**10 (2); 20; 50; 200**
Food/drink: grocery stores	**10 (2); 20; 25 (2); 50; 65; 100; 120**
Supplies/fishing tackle/other retail	**2 (2); 10 (4); 15; 20; 30; 50 (2); 70; 75; 100; 380**
Activities: admissions, entertainment fees, sporting goods	**2.50; 50**
Equipment rental	
Souvenirs	
Rental car	
Other; Please List_____	

9. Is your group staying overnight in this area on this trip?
Yes **13** No **10**

9.1. If YES, check one:
In a motel
In a B&B
Camping **9**
Owned seasonal home
With friends **4**

9.2. If Yes, for how many nights? **4; 2 (3); 1 (5)**

9.3 If Yes, how much is your group spending for lodging each night? **No answers**

10 Your fishing License is:
31 Resident Age 16-64
__ Senior Resident Age 65-up
__ Senior Resident - Lifetime Age 65-up
__ National Guard & Armed Forces Reserve (resident)
__ 1-day Resident (not valid April 1-30) 16 & up
1 Non-Resident Age 16-up
__ Seven-Day Tourist Age 16-up
__ Three-Day Tourist Age 16-up
__ 1-day Tourist (includes all stamps, license not valid in April)
__ Trout Salmon Stamp 16 & up

10.1 What type of fishing do you do most?

28 Bait
9 Spinners/spoons
6 Fly

10.2 Would you like to see?

26 More stocking
0 Less stocking
3 Stay the same
s
10.3 Do you keep the fish you catch?

27 Yes
4 No

10.4 If 10.3 is yes? How many in a year do you keep from this stream?
Limit (5); 2; 5 (6); 6 (2); 10 (2); 12; 15 (3); 20; 30; 50; 100

10.5 Would you like to see more brook trout in this waterway?

22 Yes
2 No

10.6 Which Trout Species do would you like to see the most?

5 Brook
4 Brown
8 Rainbow
1 Golden
3 Tiger
9 All of the above

11. As you know, some of the costs of travel such as gasoline often increase. If the total cost of this most recent trip had been $_____ higher, would you have made this trip?

Higher cost	$25	$50	$75	$100	More
YES	**29**	**22**	**21**	**21**	**1**
NO	**3**	**9**	**10**	**10**	

Section III. Demographics

12. Finally, please, tell us a little about yourself.

Gender
27 Male
5 Female

Education Level
2 Some High School
2 High School Graduate
2 Vocational/Technical
1 Some College
5 College Graduate
2 Graduate Study

13. How will you rate you overall experience in this area?
23 Excellent
1 Above average
6 Average
1 Less than average
1 Poor

14. Other comments or suggestions to help us improve your next visit:
Stop piping out water, no windmills, put up no littering signs, no camping, more habitat (2), more garbage cans, better access for children, need more fish, improve water quality (2), fire pits, better parking (2), add electric boxes, clean up paths, stock cub run more, put in port-a-johns, need more fish commission presence

THANK YOU

APPENDIX 9. Daily American Newspaper Article.

Shocking study in Shade watersheds

By DAN DiPAOLO
Daily American 30 North Chief
Daily American Tuesday, July 17, 2007 12:25 AM EDT

OGLE TOWNSHIP - Local conservation groups are working to document the health of a number of streams that face potential impact from both future wind turbine and mining projects.

A study focusing on three high-quality trout streams, Clear Shade Creek, Piney Run and Cub Run was started by members of the Kiski-Conemaugh Stream Team assisted by the U.S. Fish and Wildlife Service Monday.

They gathered near the southeast edge of Gallitzin State Forest near an old iron bridge, pulled on waders and armed themselves with nets. Doris Mason and John Sloyer measured out a 200-meter stretch of the shady and soft-running creek while Jennifer Kagel, a U.S. Fish and Wildlife Service fishery biologist, readied fish capture equipment.

A mix a pine and leafy trees overhead dappled the water with only the occasional splash of sunlight while Melissa Reckner, Amanda Love and Larry Hutchinson fanned out behind Kagel in the knee deep water.

“It's going in,” Kagel said. A beeping similar to that of a dump-truck backing up sounded from her Ghostbusters looking backpack as she dipped the metal detector-like wand into the water.

Shortly after, the first of 192 fish was scooped out of the water, stunned by the electrical pulse emitted by Kagel's rig. Among the catch were 21 trout, some so small they were indicative of natural reproduction, said Reckner, the program director for the stream team.

Finding that sections of Piney and Cub Run sustain the natural reproduction of trout species has led to them being classified as exceptional-value by the state.

The study, which started last March, was sponsored in part by a $5,000 grant received from the Westsylvania Heritage Corporation and administered in part by the Coldwater Heritage Partnership Program.

The overall goal is to record and examine the health of the runs and also determine the economic impact healthy streams can have on the region.

The slow wade upstream took more than two hours as Kagel waved the halo-tipped end of the wand under every rock and clump of water-soaked brush.

Brown and rainbow trout, fantail and muddled darters, sucker fish, black-nosed dace, sculpin and chub all went into the bucket. At the 100-meter mark, the group encountered a small dam shaped like an “S”. In front of the dam, the water has pooled to a depth of almost three feet.

“I know they mean well,” said Kagel. “But this disturbs the sediment transport system in the stream.” The

structure also keeps fish from getting downstream, said Sloyer, a stream restoration technician.

While Kagel waded on, Sloyer started pulling rocks off the dam. “I could do this all day,” he said.

Fixing the dam was easier than bringing back several of the fish, however. Stress and shock killed more than a dozen of the captures despite efforts to revive them.

After weighing, if the fish was still weak and unresponsive, both Reckner and Sloyer pulled them backwards through the water in order to put more oxygen on the gills. “Nurse-maiding,” Kagel called it.

Despite that, organizers called the survey a success. “This section should recover quickly. It is important we gather this information. I was pleased to see there was reproduction,” Reckner said.

(Dan DiPaolo can be contacted at dand@dailyamerican.com.)