Sinnemahoning Creek

Watershed Conservation Plan

December 2010

For more information about the Sinnemahoning Creek Watershed Conservation Plan, contact the Watershed Conservation Program

Western Pennsylvania Conservancy

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Bennett Branch Watershed Association

Bucktail Watershed Association

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The Pennsylvania Rivers Conservation Program

Sinnemahoning Creek Watershed Conservation Plan

December 2010

Prepared for:

Sinnemahoning Creek Watershed Community

Prepared by:

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Austin Historical Society
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Black Forest Conservation Association
Bucktail Watershed Association
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Hancock Timber Resource Group
Hemlock Springs
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Northcentral Planning & Development Commission
Northern Tier Community Action Corporation
Northwestern Pa Outdoors Visitor's Bureau
Old Alth Farm
Parker Dam State Park
Patterson State Park
Penn State DuBois Eco Club
Pa Wilds Planning Team
Pa Wilds Recreation Team
Pa Department of Conservation and Natural Resources
Pa Department of Environmental Protection (DEP)
DEP Bureau of Abandoned Mine Reclamation
DEP Knox District Office
Pa Elk Range Adventures
Pa Fish and Boat Commission
Pa Game Commission
Pa Geological Survey
Pa Historical and Museum Commission
Pa Lumber Heritage Region
Potter County Conservation District
Potter County Planning Commission
Potter County Visitors Association
Prouty Place State Park
Saint Marys School District
Saint Marys Sportsmen's Club
Saint Josephs Church, Penfield
Sinnemahoning Sportsmen's Club
Sinnemahoning State Park
Sizerville State Park
Sproul State Forest
Susquehanna Greenway Partnership West Branch Region
Susquehanna River Basin Commission
Susquehannock State Forest
The Nature Conservancy

ACRONYMS

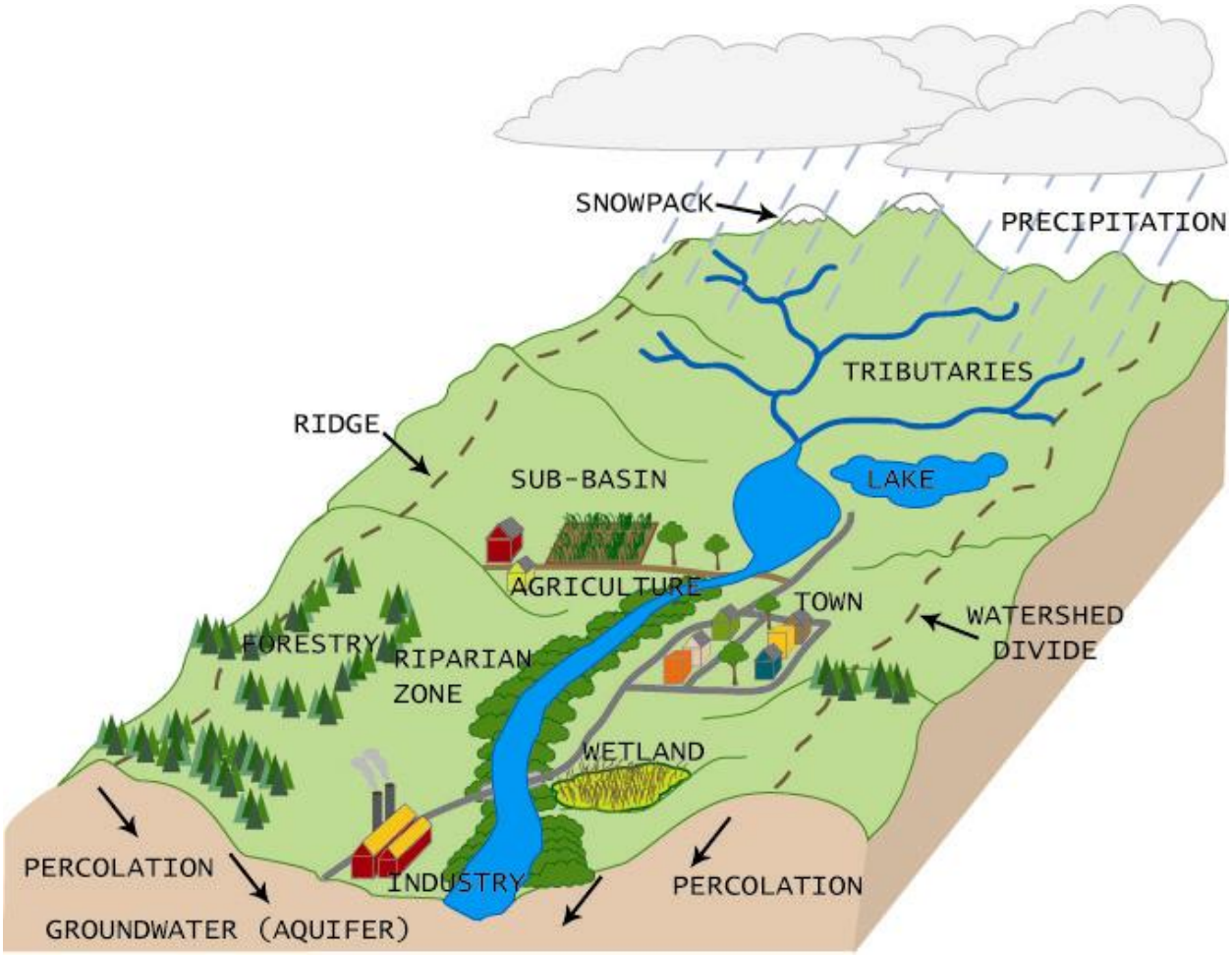
ACB	Alliance for the Chesapeake Bay
AFO	Animal Feeding Operation
AMD	Abandoned Mine Drainage
APHIS	Animal and Plant Health Inspection Service
ASA	Agricultural Security Areas
ATA	Area Transit Authority
ATV	All Terrain Vehicles
BAMR	Bureau of Abandoned Mine Reclamation
BAT	Brownfield Action Team
BDA	Biological Diversity Area
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operation
CCC	Civilian Conservation Corp
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CNHI	County Natural Heritage Inventory
CREP	Conservation Reserve Enhancement Program
CSO	Combined Sewage Overflow
CWA	Clean Water Act
CWF	Cold Water Fishery
DA	Dedicated Areas
DCNR	Department of Conservation and Natural Resources
DEP	Department of Environmental Protection
DMAP	Deer Management Assistance Program
DSA	Driving Surface Aggregate
EAB	Emerald Ash Borer
EPA	Environmental Protection Agency
ESM	Environmentally Sensitive Maintenance
EV	Exceptional Value
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
H+	Hydrogen Ion
HQ	High Quality
HU	Hydrologic Unit
IBA	Important Bird Area
IMA	Important Mammal Area
IMAP	Important Mammal Area
IPM	Integrated Pest Management
LCA	Landscape Conservation Area
LHP	Landslide Hazard Program
LHR	Lumber Heritage Region

MSWLF	Municipal Solid Waste Landfills
NASS	National Agricultural Statistic Service
NFIP	National Flood Insurance Program
NISIC	National Invasive Species Information Center
NOMA	Nutrient and Odor Management Act
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Pollutant List
NRCS	Natural Resource Conservation Service
OH-	Hydroxide Ions
PASDA	Pennsylvania Spatial Data Access
PDA	Pennsylvania Department of Agriculture
PDE	Pennsylvania Department of Education
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PM	Particulate Matter
PNHP	Pennsylvania Natural Heritage Program
PNMP	Pennsylvania Nutrient Management Program
POWR	Pennsylvania Organization for Watersheds and Rivers
QDM	Quality Deer Management
RCRA	Resource Conservation Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SFHA	Special Flood Hazard Areas
SGL	State Game Lands
SMCRA	Surface Mine Conservation Recovery Act
SRBC	Susquehanna River Basin Commission
SSO	Sanitary Sewer Overview
TMDL	Total Maximum Daily Loads
TSF	Trout Stocked Fishery
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WNS	White Nose Syndrome
WPC	Western Pennsylvania Conservancy
WWF	Warm Water Fishery

WATERSHED DEFINITION

A watershed is an area of land that drains to a common waterway, such as a stream, lake, wetland, aquifer, or ocean. Each waterbody has its own watershed; some are small, such as Sinnemahoning Creek, and others are larger, such as Susquehanna River. The highest elevation surrounding a waterbody defines its watershed boundary. A drop of water falling outside the boundary will drain to another watershed.

Land uses and human influences can impact the quality of the watershed. Everyone lives in a watershed and "we all live downstream." Local impacts on the waterbody affect the quality of the watershed downstream, just as impacts upstream affect the local quality of the watershed.



EXECUTIVE SUMMARY

Located in north central Pennsylvania in Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties, Sinnemahoning Creek is the largest tributary to the West Branch Susquehanna River. The headwaters begin in three tributary streams—Bennett Branch, Driftwood Branch, and First Fork Sinnemahoning Creek.

Driftwood Branch Sinnemahoning Creek

The Sinnemahoning Creek Watershed Conservation Plan is a comprehensive study that compiles broad-based data about recreational, historical, socio-economic, and natural resources throughout the region. The plan involves a strong community participation element through the identification of local needs and concerns.

This document is non-regulatory, and serves as a reference and educational tool promoting the conservation of natural resources, monitoring and improvement of water quality, and advocating sound community-planning practices. Recommendations identified in this plan are not enforceable by any agency. Implementation of this plan is the responsibility of the entire watershed community, and depends upon cooperation and collaboration among many different organizations.

Pennsylvania Rivers Conservation Program aids groups in accomplishing local initiatives through planning, implementation, acquisition, and development activities. As part of the program, Pennsylvania Department of Conservation and Natural Resources (DCNR) established the Pennsylvania Rivers Registry to validate the completion of approved watershed conservation plans. The registry serves to promote public awareness of completed plans, while fostering support for future projects that will enhance the overall quality of the watershed.

The Sinnemahoning Creek Watershed Conservation Plan was conducted to document current conditions that identify initiatives to improve the livability and attractiveness of the region. Through public perception of current conditions and future expectations, the plan engages community involvement into the development of a future vision for the watershed and creates a prioritized list of recommendations to achieve this vision.

Project Background

In 2006, Western Pennsylvania Conservancy (WPC), in cooperation with Bennett Branch Watershed Association and Bucktail Watershed Association, received funding for the Sinnemahoning Creek Watershed Conservation Plan from DCNR.

Focus Group Meeting March 2008

The planning process was initiated in July 2007 with the establishment of the local project steering committee comprised of representatives from various community and conservation groups, residents, businesses, and agencies. The steering committee was the local driving force guiding the plan's development. The goal of the Sinnemahoning Creek Watershed Conservation Plan is to assess past and present conditions of resources to develop a plan for the future of the watershed, which will: promote responsible recreation; educate and

encourage stewardship to protect and restore natural resources, and foster an appreciation and understanding of cultural and historical legacies.

Outreach to the community, a key component of the planning process, began by September 2007 with the development of surveys and traveling displays. John Sidelinger donated one of his original paintings to be used as the cover design of the plan and as a raffle prize to increase survey participation. In October 2007, a series of public meetings was held in Austin, Emporium, Force, and Sinnemahoning to engage public participation. Individuals were given additional opportunities for involvement through personal interviews and/or advisory committees. Municipalities were asked for their involvement through a phone questionnaire and follow-up survey. School student workshops were held to obtain the students' perspective on the watershed and its future. In March 2008, advisory committee members gathered for a focus group meeting to discuss the resources, assets, and issues in relation to the Sinnemahoning Creek watershed.

In November 2009, with the completion of the draft plan, area residents were given another opportunity to participate by reviewing the plan at a series of public meetings. Comments about the draft plan were collected for 30-days following the public meetings and incorporated into the final plan. A copy of the plan is available on the WPC website at http://www.waterlandlife.org/115/watershed-conservation-plans.

Student Workshop March 2008

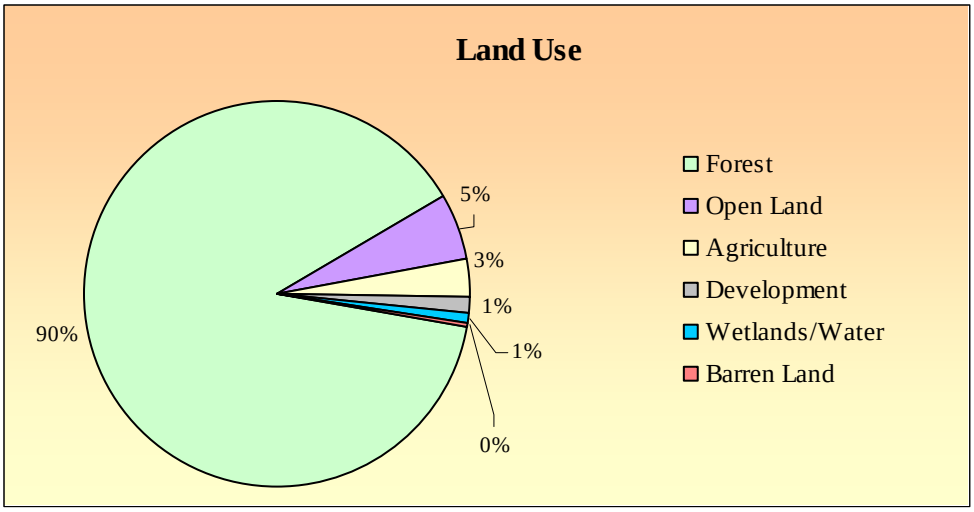
Report Summary

Project Area Characteristics

- Located within Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties, the project area includes 1,050 square miles in 26 municipalities.
- Situated within the Pennsylvania Wilds and Pennsylvania Lumber Heritage Region, the Sinnemahoning Creek watershed is home to free roaming elk, seven state parks, four state forests, and several state game lands.
- Primarily a rural watershed, there are four population centers in the region—Austin, Driftwood, Emporium, and Saint Marys.
- In 2000, the population of the watershed reached 9,096 residents, an increase of 515.
- Consistent with Pennsylvania and the U.S., manufacturing, retail trade, and healthcare industries are the primary workforce industries within the watershed.

Land Resources

- Forestland dominates the land use at 90 percent; of which, 74 percent is deciduous forest, six percent is evergreen forest, and 20 percent is mixed forest.
- Other important land uses within the watershed include oil and gas exploration, mining, and agriculture.
- A variety of potential critical and hazardous areas exist, including scrap salvage yards, illegal dumpsites, Resource Conservation Recovery Act sites, abandoned mines, and brownfield sites.



Water Resources

- Sinnemahoning Creek and its tributaries form the largest watershed tributary to the West Branch Susquehanna River.
- Over 67% of the streams within the Sinnemahoning Creek watershed are designated as High Quality or Exception Value Coldwater Fisheries.
- A vast majority of the watershed is forested, which helps to protect water quality and benefit restoration efforts.
- Approximately 118 miles of streams are impaired.
- Major sources of water quality impairments result from abandoned mine drainage, sewage contamination, and erosion and sedimentation.
- Five Total Daily Maximum Load reports have been completed for Bennett Branch, Dents Run, Spring Run, Trout Run, and West Creek.
- A tragic train derailment in 2006 spilled 42,000 gallons of sodium hydroxide into the exceptional value waters of Sinnemahoning Portage Creek, poisoning fish and other aquatic life for miles downstream. In the end, the resulting legal settlement brought over $7 million for conservation efforts throughout the region.

Biological Resources

- Vast forest expanses, intact habitats, and high water quality support a diversity of wildlife.
- Game species, such as whitetail deer, black bear, turkey, elk, and coyote, bring hundreds of sportsmen to the region, which boosts the local economy.
- The Sinnemahoning Sportsmen's Association hosts a unique rattlesnake hunt annually.
- This section of the PA Wilds is inhabited by the largest herd of elk herd east of the Mississippi River.

- Four Pennsylvania Endangered species (Case's ladies-tresses, cattail sedge, downy willow herb, and northern water-plantain) and four Pennsylvania Threatened species (Appalachia blue violet, Allegheny woodrat, bald eagle, and stalked bulrush) are found within the watershed.

- In all, 57 species and habitats of concern can be found here, including 22 plants, 13 invertebrates, seven natural community types, five reptiles, four mammals, four birds, one bat, and one geological feature.

- A nesting pair of bald eagles is resident at Sinnemahoning State Park.

- Eastern hellbender salamanders, indicators of good water quality, are known to inhabit the watershed.

- Two Important Bird Areas (Quehanna Wild Area and Southern Sproul State Forest) and one large Important Mammal Area (Northern Allegheny Plateau) are located within the project area.

Cultural Resources

- Year-round recreational opportunities are available with the four state forests, six state parks, seven state game lands, and numerous other facilities.

- Cherry Springs State Park is the only designated star park east of the Mississippi.

- Popular recreational activities include fishing, hunting, trapping, wildlife watching, camping, bicycling, snowmobiling, ATV riding, horseback riding, sledding, ice fishing, ice skating, canoeing, and kayaking.

- The region has a profound place in Pennsylvania history. The region served as home to numerous Civilian Conservation Corps camps, had the second-worst flood in Pennsylvania history, and because of its vast forest resources, was a major part of Pennsylvania's lumber heritage.

Issues and Concerns

- Identifying visions and goals is a fundamental element of watershed conservation planning. In order to obtain these visions and goals, local stakeholders were contacted using a variety of methods, including portable displays, public meeting workshops, student workshops, a focus group meeting, public surveys, municipal surveys, individual interviews, personal communication, community events, and a project website.

Wildlife watchers impeding traffic observing the elk herds in Benezette

- Survey and interview participants identified priority concerns including water quality and quantity, abandoned mine drainage, illegal dumping, invasive species, erosion and sedimentation, illegal use of all-terrain vehicles, wildlife habitat, tourism impacts on local communities, oil and gas well exploration, and the Norfolk Southern train derailment.

Management Recommendations

- Management recommendations are suggestions to maintain or improve the conditions that affect many aspects of life within the region. The recommendations were compiled from municipal and

public surveys, public meeting workshops, student workshops, focus group meeting, and key individual interview comments.

- The recommendations cover a broad range of topics, but should not be considered all encompassing. The suggestions are non-regulatory in nature, and best-suited as a guide to conserving, restoring, or improving important watershed characteristics.

- Creativity in implementing the identified recommendations or developing additional suggestions is highly encouraged.

- Management recommendations may be broad and general to support funding proposals for a variety of projects and purposes, or they may be very narrow and specific to benefit a certain need for this watershed.

CHAPTER 1. PROJECT AREA CHARACTERISTICS

This section provides an overview of the project area, its location, watershed sub-basins, topography, municipalities, air quality, land-use regulations, and socio-economic factors.

First Fork Sinnemahoning Creek

Project Area

Location

Situated within the Pennsylvania Wilds region, the Sinnemahoning Creek watershed is home to Pennsylvania's free roaming elk herd, seven state parks, four state forests, and several state game lands (SGL). The watershed encompasses 1,050 square miles within the jurisdiction of Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties. All or parts of 26 municipalities make up the project area (Figure 1-1 and Table 1-1).

Pennsylvania Wilds is the name given to a 12-county region in north central Pennsylvania, as a marketing initiative for outdoor recreation. The region offers 2.1 million acres of public land, 27 state parks, and hundreds of miles of trails and waterways. The goal of the initiative is to encourage growth of tourism and tourism related-businesses enhancing visitors experience, while protecting the natural resources that make this region unique.

The Sinnemahoning Creek watershed encompasses a portion of the Lumber Heritage Region (LHR). The LHR is a 15-county region that in 2001 was designated as one of 12 heritage areas in Pennsylvania for the purpose of highlighting and interpreting the rich cultural, historical, natural, and recreational resources of Pennsylvania forests.

The roles of the LHR include (LHR, 2005):

- Providing technical, educational, and financial assistance to communities, local government, businesses and general public
- Coordinating program to interpret the region's lumber history, celebrate its living heritage, and foster a great understanding of contemporary lumber and forest product industries, and rural life
- Enhance the region's economy by providing forest management education; concerning and interpreting historical, natural, and recreation resources; and enhancing tourism in cooperation with local communities improving the quality of life.

Size

Sinnemahoning Creek is the largest tributary to the West Branch Susquehanna River, although the mainstem only flows approximately 12 miles. The headwaters of Sinnemahoning Creek begin in three tributary streams, Bennett Branch, Driftwood Branch, and First Fork Sinnemahoning Creek.

Bennett Branch begins in northern Clearfield County, and flows northeast into the southeastern portion of Elk County. Leaving Elk County, it continues following Route 255 into Cameron County to the Borough of Driftwood.

Driftwood Branch begins in the northern reaches of Elk County. It flows in a southern direction to Emporium, Pa. where it is joined by Sinnemahoning Portage Creek. The flow continues south following

Route 120 into the Borough of Driftwood. In the borough, Driftwood Branch and Bennett Branch join to form Sinnemahoning Creek.

Table 1-1. Watershed Municipalities

Municipality	Square Miles	Percent of Watershed
Cameron County		
Driftwood Borough	18.13	1.73%
Emporium Borough	0.69	0.07%
Gibson Township	91.19	8.68%
Grove Township	69.46	6.61%
Lumber Township	50.81	4.84%
Portage Township	18.05	1.72%
Shippen Township	155.39	14.80%
Total	*403.72*	*38%*
Clearfield County		
Covington Township	0.46	0.04%
Girard Township	1.05	0.10%
Goshen Township	10.77	1.03%
Huston Township	61.20	5.83%
Karthaus Township	0.14	0.01%
Lawrence Township	17.22	1.64%
Pine Township	1.84	0.18%
Sandy Township	2.54	0.24%
Union Township	0.61	0.06%
Total	*95.83*	*9%*
Clinton County		
East Keating Township	25.26	2.41%
Leidy Township	0.04	0.00%
West Keating Township	3.09	0.29%
Total	*28.39*	*3%*
Elk County		
Benezette Township	98.01	9.33%
Fox Township	25.25	2.40%
Horton Township	2.28	0.22%
Jay Township	68.15	6.49%
Jones Township	19.45	1.85%
Saint Marys, City of	48.30	4.60%
Total	*261.44*	*25%*
McKean County		
Liberty Township	1.98	0.19%
Norwich Township	21.30	2.03%
Sergeant Township	1.16	0.11%
Total	*24.44*	*2%*

A third major tributary, **First Fork Sinnemahoning Creek**, joins Sinnemahoning Creek approximately 15 river miles east of the confluence of Driftwood Branch and Bennett Branch near Driftwood in Cameron County. First Fork Sinnemahoning Creek begins in the southwestern portion of Potter County. It flows in a southwestern direction, until joined by Freeman Run where the flow follows Route 872 south.

Climate

The climate follows that of a typical temperate climate with hot, dry summers and cold winters. The average high temperature ranges from 32 degrees to 83 degrees Fahrenheit, while the average low temperature ranges from 15 degrees to 58 degrees Fahrenheit. Historically, the record high temperature of 101 degrees Fahrenheit occurred in 1936 and 1988. The historic low temperature of -35 degrees Fahrenheit occurred in 1961 (Weather Channel, 2007).

Precipitation occurs rather evenly throughout the year averaging 35 to 50 inches per year. The region has a growing season of 120 to 160 days.

Although unlikely, the region is not unaffected by severe weather. In 1985, an F4 tornado (on the Fujita Scale of F0-F6 [The Tornado Project, 1999]) ravished portions of Moshannon and Elk state forests and Parker Dam State Park. It was part of the U.S.-Canadian outbreak, with 41 tornados touching down, and causing $450 million in damages. The outbreak was the third costliest tornado in U.S. history. The twister that entered Moshannon State Forest and Parker Dam State Park caused damage that was 2.2 miles wide, with winds traveling nearly 250 mph over a 69-mile path (U.S.-Canadian Outbreak, 2007).

Topography

The project area is located within the Pittsburgh Low Plateau and the Deep Valleys sections of the Appalachian Plateaus Geomorphic Province. A geomorphic or physiographic province is a landform area delineated according to similar terrain shaped by a common geologic history (Radford University, 2005).

The Appalachian Plateau is an eroded plain of sedimentary rock that slopes gently towards the northwest. Elevation varies throughout the region with a moderate to very high relief.

Table 1-1. Watershed Municipalities (continued)

Municipality	Square Miles	Percent of Watershed
Potter County		
Abbott Township	1.14	0.11%
Austin Borough	4.04	0.38%
Eulalia Township	1.99	0.19%
Homer Township	30.09	2.87%
Keating Township	24.72	2.35%
Portage Township	38.12	3.63%
Summit Township	34.46	3.28%
Sweden Township	0.27	0.03%
Sylvania Township	29.69	2.83%
West Branch Township	1.13	0.11%
Wharton Township	70.66	6.73%
Total	*236.31*	*23%*
Watershed Total	**1,050.13**	

Majority of the area is located in the Deep Valley section characterized by deep, angular valleys with the elevation ranging from 560 to 2,560 feet. Bedrock occurs in several low amplitude, broad anticlines and synclines, whose northeast-southwest axes control the streams orientation (Department of Conservation and Natural Resources (DCNR[2]).

The remaining land area, headwaters of Bennett Branch, is located within the Pittsburgh Low Plateau section. The region is characterized by smooth undulating upland surfaces cut by numerous, narrow, relatively shallow valleys. Elevations range from 660 to 1,700 feet and local relief is generally less than 200 feet, but can be as much as 600 feet between valley bottoms and upland surfaces (DCNR[1]).

Major Tributaries

Sinnemahoning Creek is designated a warm-water fishery. There are 11 named tributaries directly entering Sinnemahoning Creek, of which four are considered major tributaries; they include Bennett Branch, Driftwood Branch, First Fork Sinnemahoning Creek, and Wykoff Run. Tributaries will be discussed further in the Water Resources chapter.

Air Quality

Each year, nearly 200 million tons of toxic emissions pollute the air in the U.S., making air pollution the nation's largest environmental risk (DEP, 2003a). Any substance in the air that causes damage to life, ecosystems, or property is an air pollutant. Natural and synthetic processes can lead to air pollution. Over 90 percent of the pollutants originate from industry, power plants, vehicles, and other human influences. In 1970, the Clean Air Act passed. Amended in 1977 and again in 1990, the act set a national goal to have clean and healthy air for everyone.

Airborne pollutants can travel very long distances. They can fall to the ground in raindrops, fog, dew, dust, or simply due to gravity. Identifying sources of airborne pollutants to a body of water can be complicated. Pollutants can enter waterways through direct deposition (falling directly into waterways) or through indirect deposition (falling onto land and being washed into waterbodies as runoff). Researchers developed the concept of airsheds to assist in the study of atmospheric deposition, which is the process of airborne pollutants falling to the ground (U.S. Environmental Protection Agency [EPA], 2003).

Precipitation entering area waterways is an example of wet atmospheric deposition

Airsheds are geographic areas responsible for emitting 75 percent of the air pollution reaching a body of water. Different pollutants have different airsheds because of their varying behaviors in the atmosphere. Airsheds are determined using mathematical models of atmospheric deposition, as opposed to watersheds, which utilize physical features of the landscape (EPA, 2003).

Atmospheric Deposition

Atmospheric deposition is the process of airborne pollutants falling to the ground. There are two types of atmospheric deposition: dry and wet. Dry deposition refers to gases and particles that fall to the earth. They deposit on buildings, cars, homes, and trees, where particles wash away in runoff during storm events.

Rain, fog, and snow are examples of wet deposition. One type of wet deposition is acid rain, which typically occurs when nitrogen oxides and sulfur dioxide react in the atmosphere with water, oxygen, and other chemicals to form various acidic compounds.

Atmospheric deposition can affect the water quality in lakes and streams; terrestrial and aquatic wildlife; forests; human health; visibility; and materials, such as automobiles, statues, and buildings. More information about the effects of acid precipitation is located within the Water Resources chapter.

Critical Pollutants

Six critical pollutants identified nationally as affecting air quality include carbon monoxide, lead, nitrogen oxides, ozone, particulate matter, and sulfur dioxide.

Carbon Monoxide

Carbon monoxide is a poisonous compound that results from the incomplete burning of fuels, such as motor vehicle exhaust, industrial processes, and wood stoves. It can impair vision, alertness, and other mental and physical function when inhaled. Individuals suffering from cardiovascular disease are at the highest risk, but carbon monoxide can also affect healthy individuals. Carbon monoxide poisoning can be fatal when high levels are present, because it replaces the oxygen in blood and inhibits the delivery of oxygen to body tissues (DEP[9]).

The majority of the counties comprised in the watershed are among the cleanest in the U.S for carbon monoxide. Clearfield County is the only exception ranking in the 70th percentile of the dirtiest counties in the U.S. Cameron County is one of the cleanest counties ranking in the zero to 10th percentile (Green Media Toolshed, 2005).

Lead

Burning of leaded fuel and industrial processes, such as battery manufactures and lead smelters, emit lead particles into the atmosphere. Metal processing is the major source of lead emissions. Ingested or inhaled, lead poisoning reduces mental abilities; damages blood, nerves, and organs; and raises blood pressure. Lead is highly toxic, and accumulates in the body; even small doses are harmful (DEP[9]).

Nitrogen Oxides

Burning fossil fuels at temperatures exceeding 1,200 degrees Fahrenheit produces Nitrogen oxides (NO_x). Automobiles, trucks, buses, airplanes, industries, and power plants emit NO_x into the atmosphere. They contribute to the deposition of nitrogen in soil and water through acid rain and play a major role in

the formation of ground-level ozone. Human health is impacted when NO_x enter the lungs and make breathing more difficult (DEP[9]).

The majority of watershed counties are among the dirtiest in the U.S. for NO_x. Cameron County is the only county ranking among the cleanest in the U.S., being located in the zero to 10th percentile. Clearfield County ranked the highest being located in the 80th percentile, while Elk and Potter ranked in the 50th percentile (Green Media Toolshed, 2005).

Ozone

Ozone is a colorless, odorless gas that forms in the atmosphere. Depending on where it is located in the atmosphere, it can be beneficial or harmful. When located in the upper atmospheric layer, it is the ozone layer, and filters the sun's harmful ultraviolet rays. When located in the lowest atmosphere, it is ground-level ozone. Ground-level ozone is a secondary pollutant—a pollutant formed in the atmosphere instead of directly emitting from a specific source. It forms when NO_x combine and react with volatile organic compounds in the presence of sunlight and warm temperatures (DEP[9]). Ozone, and pollutants causing it, travel hundreds of miles away from their source.

When inhaled, ozone reacts with tissues in our lungs, making breathing difficult. People with asthma and lung disease are most seriously impacted, but even healthy individuals are at risk with prolonged exposure.

Particulate Matter

Particulates are tiny drops of liquid or small particles of dust, metal, or other materials that float in the air. Particulate matter is a mixture of these particles. Four different types and sizes exist. Particulates travel into the lungs, becoming trapped, causing respiratory ailments, and can carry cancer-causing chemicals, producing greater health problems (DEP[9]).

Total suspended particulates vary in size up to 45 micrometers in diameter. They can remain suspended in the air from a few seconds to up to several months (DEP[9]). Federal or state air quality standards do not exist for total suspended particulates.

Particulate matter 10 (PM_{10}) are solid matter or liquid droplets from smoke, dust, fly ash, or condensing vapors suspended in air for long periods. They are less than 10 micrometers in diameter.

Cameron, Clearfield, Elk, and Potter counties ranked among the cleanest counties in the U.S. for PM_{10}. Clearfield County ranked in the 40th percentile, while Cameron and Potter ranked in the zero to 10th percentile, and Elk ranked in the 10th percentile (Green Media Toolshed, 2005).

Particulate matter 2.5 ($PM_{2.5}$) are fine particles with diameters less than 2.5 micrometers. They can accumulate in the respiratory system, and are associated with numerous adverse health effects, especially among children, the elderly, and individuals with asthma or cardiopulmonary disease (DEP[9]).

The majority of the watershed's counties rank among the cleanest in the U.S. for $PM_{2.5}$. Clearfield County ranks in the 50^{th} percentile, while Potter and Elk counties rank in the 10^{th} percentile, and Cameron County in the zero to 10^{th} percentile (Green Media Toolshed, 2005).

Sulfates and Nitrates

Classified together as a critical pollutant are sulfates and nitrates. Sulfates are one of the key components in the formation of acid precipitation. Studies determining impacts nitrates have in the formation of acid precipitation are ongoing. Both sulfates and nitrates have a role in reducing visibility.

Sulfur Dioxide

Emitted into the atmosphere from burning coal or oil containing sulfur, sulfur dioxide is damaging trees, plants, and agricultural crops. In addition, it can accelerate the corrosion of materials, such as monuments, buildings, and iron-containing metals (DEP[9]). Sulfur dioxide is the main component of acid precipitation, joining with water vapor in the atmosphere to form sulfuric acid. Children, the elderly, and individuals with asthma, chronic lung disease, and cardiovascular disease are more susceptible to negative health effects from this pollutant.

Sulfur dioxide pollution varies among the counties, with Cameron and Potter counties among the cleanest, and Clearfield and Elk counties among the dirtiest. Cameron and Potter counties fall in the zero to 10th percentile, while Clearfield and Elk counties fall into the 90th and 80th percentiles, respectively (Green Media Toolshed, 2005).

Mercury

Although not identified as a national critical pollutant, Mercury is an important one. Mercury occurs naturally in air, water, and soil. Many rocks, including coal, release mercury into the atmosphere when burned. An estimated half of all mercury deposited within the U.S. comes from sources within the U.S. (EPA, 2005). Approximately 40 percent of the domestic mercury released is from coal-burning power plants. Of the mercury emission from coal-burning power plants, only one-third deposits in the U.S.

Mercury emitted into the atmosphere eventually settles into water or onto land, where it is carried to water by runoff. Once deposited, certain microorganisms can change it into methylmercury, a highly toxic form that builds up in fish, shellfish, and animals that eat fish (EPA, 2005). Some species of fish and shellfish build up more methylmercury than others, and depending on what they eat, how long they live, and where they are located in the food chain, the level of methylmercury varies.

Humans are exposed to methylmercury primarily through the consumption of fish and shellfish. At high levels, mercury exposure can harm the brain, heart, kidneys, lungs, and immune system (EPA, 2005). In unborn babies, newborns, and young children, high levels of methylmercury can affect the development of the nervous system and impair learning.

EPA, U.S. Food and Drug Administration, and individual states work together in establishing local fish advisories. These advisories suggest how often women who may become pregnant, pregnant women, nursing mothers, and young children should eat certain types of fish. Advisories for men, women, and children of all ages are issued when appropriate. Pennsylvania advisories are updated annually on the DEP's website (keyword: fish advisories).

George B. Stevenson Dam at Sinnemahoning State Park on First Fork Sinnemahoning Creek

The commonwealth of Pennsylvania advises that citizens limit the consumption of recreationally caught sport fish from Pennsylvania waterways to no more than one half pound meal per week. More proactive advice is available for fish caught in certain waterbodies. The following advisories were issued for waterways in the Sinnemahoning Creek drainage for 2008 (DEP, 2008b).

- **First Fork Sinnemahoning Creek – George B. Stevenson Dam** the entire lake has two meals per month advisory for large mouth bass because of mercury.

- **First Fork Sinnemahoning Creek** from the Dam to mouth has two meals per month advisory for smallmouth bass because of mercury.

- **Sinnemahoning Creek** from the confluence with Jerry Run to the mouth has two meals per month advisory for smallmouth bass because of mercury.

Impacts of Air Pollution

Air pollution not only affects the quality of the air, but the economy, health, and environment as well. It contributes to land and water pollution, altering the chemical makeup of streams and soils. It can lead to impairment or destruction of habitats (through the loss of trees, plants, and animals), decreasing property values and incomes, and increasing medical expenses and employee absenteeism (Kling and Wuebbles, 2003).

Socioeconomic Profile

Land-Use Planning and Regulation

Very little planning and regulations are in place to protect communities from development and unwanted land uses. The Pennsylvania Municipalities Planning Code grants Pennsylvania municipalities land-use regulation control powers, including comprehensive planning, subdivision regulation, and zoning. However, the majority of municipalities, 85.7 percent, were not utilizing these controls, leading the way for unwanted or uncontrolled land uses, such as industrial, commercial, or residential development. Table 1-2 and Figure 1-3 identify land-use ordinances utilized by watershed municipalities.

Figure 1-3. Land Use Ordinance by Type

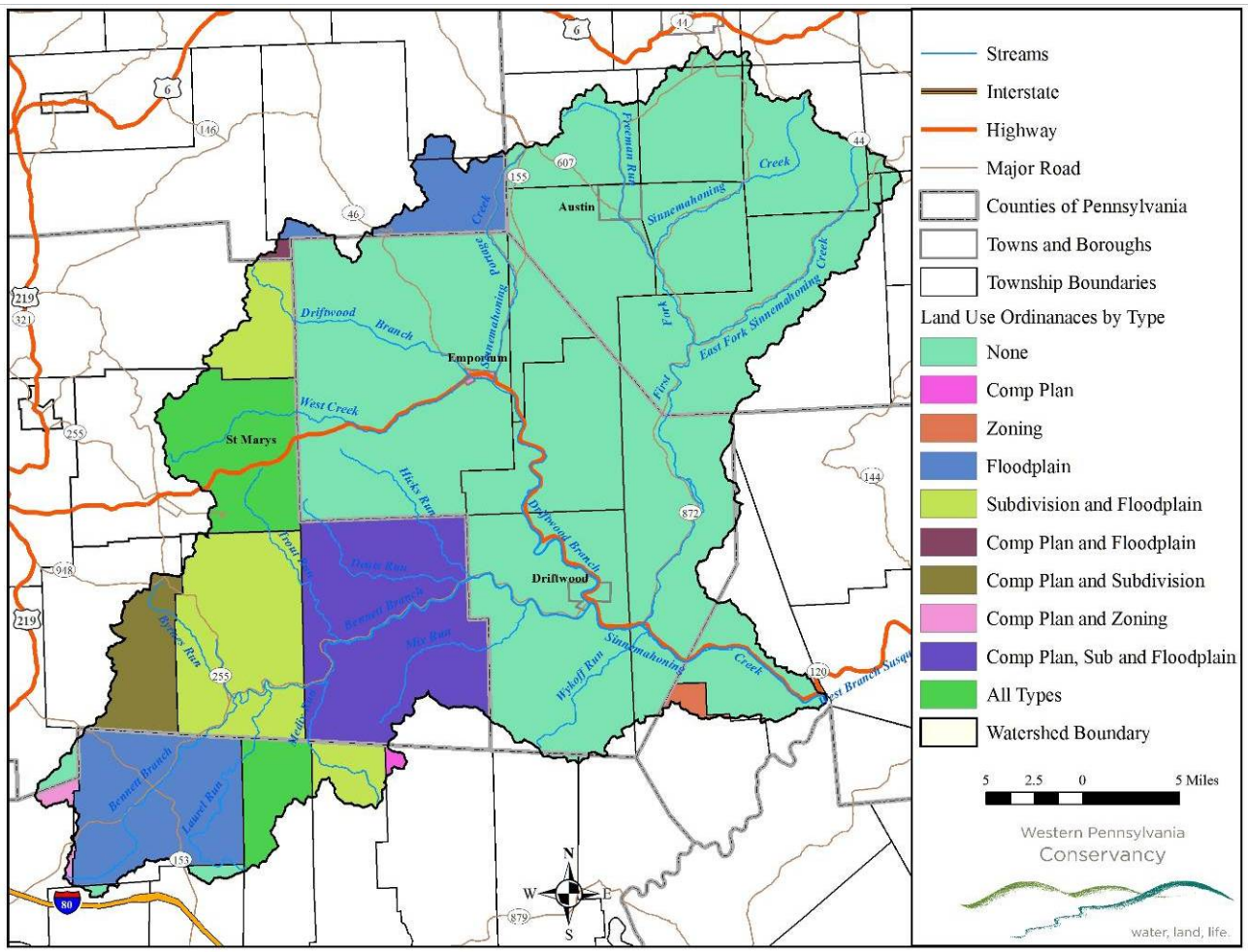


Table 1-2. Land-Use Ordinances

Municipality	Comprehensive Plan	Zoning Ordinances	Subdivision Regulations	Floodplain Ordinances
Cameron County	Yes	Yes	n/a	n/a
Driftwood Borough	No	No	n/a	n/a
Emporium Borough	Yes	Yes	n/a	n/a
Gibson Township	No	No	n/a	n/a
Grove Township	No	No	n/a	n/a
Lumber Township	No	No	n/a	n/a
Portage Township	No	No	n/a	n/a
Shippen Township	No	No	n/a	n/a
Clearfield County	Yes	No	Yes	n/a
Goshen Township	No	No	Yes	Yes
Huston Township	No	No	No	Yes
Lawrence Township	Yes	Yes	Yes	Yes
Clinton County	Yes	Yes	n/a	n/a
East Keating Township	No	n/a	n/a	n/a
West Keating Township	No	n/a	n/a	n/a
McKean County	Yes	No	No	No
Norwich Township	No	No	No	Yes
Elk County	Yes	No	n/a	n/a
Benezette Township	Yes	No	Yes	Yes
Fox Township	Yes	Yes	Yes	Yes
Jay Township	No	No	Yes	Yes
Jones Township	No	No	Yes	Yes
Saint Marys, City of	Yes	Yes	Yes	Yes
Potter County	Yes	Yes	Yes	No
Austin Borough	No	No	n/a	n/a
Eulalia Township	No	No	n/a	n/a
Homer Township	No	No	n/a	n/a
Keating Township	No	No	n/a	n/a
Portage Township	No	No	n/a	n/a
Summit Township	No	No	n/a	Yes
Sylvania Township	No	No	n/a	n/a
West Branch Township	No	No	n/a	n/a
Wharton Township	No	No	n/a	n/a

(Source: Pennsylvania Department of Community and Economic Development; Municipal Surveys)

Comprehensive Plans

Comprehensive plans are created to serve as a guide to public and private actions and decisions to ensure the appropriate development of public and private property (Allegany County Planning Department, 2002). Many municipalities and counties recognize that without formal plans they may be vulnerable to undesirable land uses through uncontrolled industrial, commercial, or residential development. Although often used to guide municipal actions, comprehensive plans have no regulatory authority, unless implemented through the development of ordinances and other municipal regulations that may relate to the plans. According to the Municipalities Planning Code, counties in Pennsylvania are required to review and update their comprehensive plans every 10 years.

Each county has completed a comprehensive plan. Only five municipalities—Emporium Borough, Lawrence Township, Benezette Township, Fox Township, and the City of Saint Marys—have completed municipal or joint municipal comprehensive plans. Municipalities that do not have plans and

municipalities and counties with plans older than 10 years should consider conducting or updating their plan.

Subdivision Regulations

Subdivision regulations limit the number of times that a parcel can be divided into two or more smaller parcels; and therefore, represent an important tool in controlling sprawl. Subdivision regulations can ensure that new developments do not overburden local roads, facilities, and services; new roads and infrastructure integrate with existing and planned roads and facilities; and provide adequate provisions for stormwater management, erosion control, water supply, wastewater, and traffic access (Vermont Conservation Education Fund, 2002). Municipalities and counties currently not utilizing subdivision regulations should consider establishing them to assist in managing growth of the region.

Four counties, Clearfield, Elk, McKean and Potter, have countywide subdivision regulations. In addition, watershed municipalities within these counties all have municipal subdivision regulations with the exception of Huston Township in Clearfield County. The remaining counties and municipalities are not utilizing subdivision regulation.

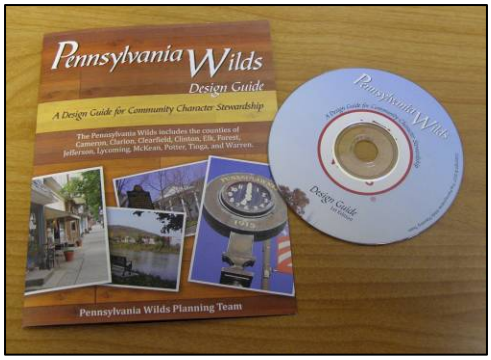
Zoning and Land-Use Ordinances

Zoning is a legal mechanism by which government bodies, for the sake of protecting public health, safety, morals, and general welfare, can limit a landowner's right to use privately owned land through the development of zoning ordinances. Zoning ordinances divide all land within a governing body's area into districts, and create regulations that apply generally to the governing body as a whole, as well as specifically to individual districts.

Cameron and Clinton are the only counties to have countywide zoning. Emporium Borough, Lawrence Township, West Keating Township, and the City of St Marys are the only municipalities to utilize zoning and land-use ordinances. Municipalities not using zoning and land-use ordinances are susceptible to unwanted and undesirable land uses that could degrade the quality of life of their residents. Municipalities should be proactive and consider establishing land-use ordinances to protect the character of the communities.

Pennsylvania Wilds Design Guide

Introduced in 2007, the Pennsylvania Wilds design guide is a non-regulatory tool to help municipalities guide development patterns to fit into their community's aesthetics. The Pennsylvania Wilds Planning Team encourages public agencies, property owners, investors, developers, design professionals, community organizations, and others to utilize the guide when designing and approving development permits. The guide provides recommended suggestions for specific design, placement, and signage. The guide is available at the Lumber Heritage Region office in Emporium. Benefits of using the design guide include (The Pennsylvania Wilds Planning Team, 2007):



- Strengthening community and regional identity
- Increasing public awareness of design issues and options
- Resulting in well-designed projects
- Avoiding development patterns that look foreign to the region
- Enhancing property values
- Protecting investments in the region's tourism industry

Conservation by Design

Conservation by Design is an approach used to conserve open spaces, greenways, and natural resources, while addressing development issues. Conservation by Design utilizes local zoning and subdivision ordinances to aid conservation. When utilizing Conservation by Design strategies, development is rearranged to decrease the amount of buildable space on each individual parcel and increase the amount of community open space.

Conservation by Design is a formalized four-step process:

Step 1 – Identification of land for permanent protection within the development site. These lands become the community open space that is owned by the landowner association and residents living within the development. This area can include natural features, such as floodplains, steep slopes, historical sites, farmland, etc.

Step 2 – Locate sites of homes to maximize open space views

Step 3 – Identification of where roads and trails should go; this is the reverse of the conventional development process of identifying roads first

Step 4 – Determine the boundary of the lots

Conservation by Design provides an alternative to the typical residential development of cul-de-sacs, manicured lawns, and boxy communities. It provides shared community space and vistas for all residents to enjoy. More information about Conservation by Design is available on the Natural Lands Trust website www.natlands.org.

Smart Growth

When new developments are being proposed, municipalities and counties should consider implementing cooperative land-use strategies to improve their quality of life. They also should consider initiating Smart Growth practices when addressing development issues. Some strategies to consider are:

- Mixing land use
- Taking advantage of compact building designs
- Creating a range of housing opportunities and choices
- Creating walkable neighborhoods
- Fostering distinctive, attractive communities with a strong sense of place
- Preserving open space, farmland, natural beauty, and critical environmental areas
- Strengthening and directing development toward existing communities
- Making development decisions predictable, fair, and cost-effective
- Encouraging community and stakeholder collaboration in development decisions

Implementing smart growth practices into existing communities provides a balanced, well-rounded community. Smart Growth invests time, attention, and resources in restoring community and vitality to central cities and older suburbs. New Smart Growth is more town-centered, is transit and pedestrian oriented, and has a greater mix of housing, commercial and retail uses. It also preserves open space and many other environmental amenities (Sustainable Community Network).

Demographics and Population Patterns

Since 1980, the watershed population has maintained stable, with a minor decrease in 1990 and a slight increase in 2000. The population of the watershed was calculated using census block group data from 1980, 1990, and 2000 (Table 1-3). Figures 1-4 and 1-5 illustrate population and population change.

Table 1-3. Population and Population Change

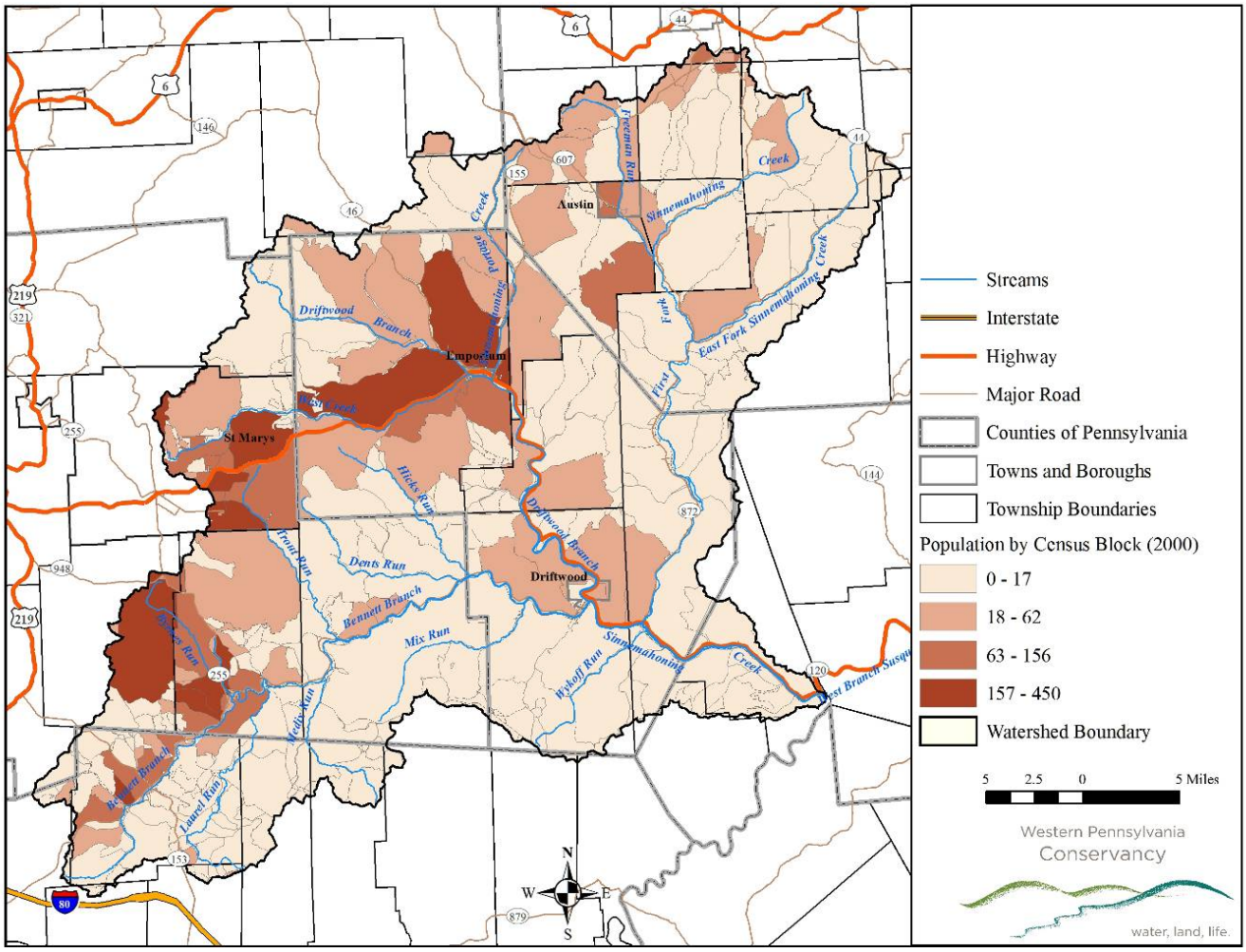
	Population 1980	Population 1990	Population 2000	Percent Change 1980-1990	Percent Change 1990-2000	Percent Change 1980-2000
Population	18,356	17,336	18,265	-5.6%	5.40%	-0.50%
Female	9,288	8,755	9,187	-5.6%	4.8%	-1.09%
Male	9,068	8,581	9,096	-5.5%	5.9%	0.31%

(Source: Free Demographics, 2005; U.S. Census Bureau, 1990; U.S. Census Bureau, 2000)

Among the watershed municipalities, St. Marys has the largest population, with 14,502 residents. However, only a small portion resides within the project area. Lawrence Township, Clearfield County and Fox Township, Elk County are the second and third largest, with 7,712 and 3,734 residents respectively. On the other spectrum, East Keating Township has the lowest municipal population, 24 residents, of which only a portion resides in the watershed.

The ratio of males to females is approximately one to one, with females holding a slight edge (Free Demographics, 2005). Table 1-4 displays the percentage of population by sex and age. Identified are six categories, including preschool aged, school aged, college aged, post collegiate aged, midlife aged, and retirement aged.

Figure 1-4. Population by Census Block (2000)



There are only a few population centers within the Sinnemahoning Creek watershed— Austin Borough, Driftwood Borough, Emporium Borough, and Saint Marys. Overall, the population within these centers is decreasing. Table 1-5 lists the entire population for each municipality in the Sinnemahoning Creek watershed.

Table 1-4. Population by Sex and Age

Age	Male	Female	Total
Under 5 years	1,143	1,142	2,285
5 to 17	3,945	3,697	7,642
18 to 24	1,368	1,271	2,639
25 to 39	4,236	4,075	8,311
40 to 61	6,161	5,991	12,152
≥62	3,718	5,048	8,766
Total:	**20,571**	**21,224**	**41,795**

(Note: Population calculated using 2000 Municipality Census Data; Source: Free Demographics, 2005; U.S. Census Bureau, 2000)

Austin

Incorporated October 19, 1888, the borough was named for the town's founder, E.O. Austin. Throughout the 1990s, the population grew nine percent, but declined four percent through 2005. In 2005, the borough had 597 residents, after 26 residents left between 2000 and 2005.

Driftwood

Incorporated on January 17, 1872, the borough obtained its name from the large amount of unclaimed timber near the center of town. It was the second and final borough incorporated in Cameron County. Throughout the 1990s, the population decreased by 11 percent and an additional six percent through 2005. In 2005, the population of Driftwood Borough was 97, having decreased by six residents since 2000.

Emporium

Incorporated on October 13, 1864, the borough got its name from an agent of the Holland Land Company passing through the area in 1785. Throughout the 1990s, the population grew one percent, but declined six percent through 2005. Between 2000 and 2005, the population in Emporium decreased by 164 residents to total 2,362.

Overview of the Borough of Emporium, Cameron County, Pa.

Saint Marys

Incorporated on December 8, 1842, Saint Marys was originally a small, Bavarian Catholic town. In 1994 the borough's designation was changed to a city. Throughout the 1990s, the population grew by 163 percent, but declined by four percent through 2005. The population decreased by 629 residents from 2000 to 2005 to a population of 13,873.

Infrastructure

Infrastructure is a set of interconnected structural elements that provide the framework supporting an entire structure. Although the term has diverse meanings, it typically refers to municipal infrastructure, such as roadways, public transportation, airports, sewage, and public water supply, as in this instance. The existence of infrastructure is important to the development and redevelopment of communities. Sanitary sewer systems and public water supplies usually determine how much development a given area can support and where it its located. A lack of clean water and proper sewage treatment and disposal can hinder development and economic conditions. Planning for infrastructure, development, and redevelopment are key to the future of the area.

Sanitary Sewer Systems

Septic systems or sewage systems treat wastewater. Septic systems are individual sewage systems that treat waste on-site. In North America, approximately 25 percent of the population relies on septic tanks, typically in small towns, as well as rural areas (Septic Tanks, 2007).

Table 1-5. Municipal Population

Municipality	Population in 2000	Size (Miles^2)	Pop/Mile^2	Size in Project Area	% Municipality in Project Areas
Cameron County					
Driftwood Borough	103	1.79	57.49	1.79	100
Emporium Borough	2526	0.7	3460.23	0.70	100%
Gibson Township	222	94.5	2.35	91.19	97%
Grove Township	129	73.49	1.76	69.46	95%
Lumber Township	241	51.39	4.69	50.81	100%
Portage Township	258	18.11	14.24	18.05	100%
Shippen Township	2495	157.15	15.88	155.39	100%
Clearfield County					
Covington Township	621	52.37	11.86	0.46	1%
Girard Township	674	63.36	10.64	1.05	2%
Goshen Township	496	49.22	10.08	10.77	22%
Huston Township	1468	63.62	23.07	61.20	96%
Karthaus Township	811	35.64	22.76	0.14	<1%
Lawrence Township	7712	83.11	92.79	17.22	21%
Pine Township	77	23.03	2.4	1.84	8%
Sandy Township	11556	51.78	223.16	2.54	5%
Union Township	918	31.14	29.48	0.61	2%
Clinton County					
East Keating Township	24	50.79	0.47	25.26	50%
Leidy Township	229	96.97	2.36	0.04	<1%
West Keating Township	42	38.23	1.1	3.09	8%
Elk County					
Benezette Township	227	106.79	2.13	98.01	92%
Fox Township	3734	67.28	55.5	25.25	38%
Horton Township	1574	56.97	27.63	2.28	4%
Jay Township	2094	67.8	30.89	68.15	100%
Jones Township	1721	145.43	11.83	19.45	13%
City of St Marys	14502	99.32	146.01	48.30	49%
McKean County					
Liberty Township	1726	83.51	20.67	1.98	2%
Norwich Township	633	95.62	6.62	21.30	22%
Sergeant Township	176	80.28	2.19	1.16	1%
Potter County					
Abbott Township	226	69.92	3.23	1.14	2%
Austin Borough	623	3.98	156.45	4.04	100%
Eulalia Township	941	31.09	30.27	1.99	6%
Homer Township	390	31.92	12.22	30.09	94%
Keating Township	307	41.37	7.42	24.72	60%
Portage Township	223	38.12	5.9	38.12	100%
Summit Township	112	49.4	2.27	34.46	70%
Sweden Township	775	33.72	22.98	0.27	1%
Sylvania Township	61	29.86	2.04	29.69	100%
West Branch Township	392	62.63	6.26	1.13	2%
Wharton Township	91	61.8	1.47	70.67	100%

Sewage systems collect wastewater and transport it for treatment at off-site locations. There are three types of sewer systems: storm, sanitary, and combined. Stormwater systems carry stormwater runoff through pipes and ditches where they eventually enter into streams. Sanitary systems carry raw sewage from homes and businesses to wastewater treatment facilities. Combined systems carry a combination of raw sewage and stormwater runoff to wastewater treatment facilities. Combined systems often cannot effectively treat all of the water reaching the sanitation plant during rainstorm events, causing pollution. Table 1-6 identifies the public sewage systems within the project area.

Table 1-6. Public Sewage Systems

Facility	Capacity (avg. daily flow)	Wet weather flow	Communities served
Austin Borough Sewer			Austin Borough
Clearfield Municipal Authority			Lawrence Township
Fox Township Sewer Authority			Fox Township
Grove Township Crestline Sewage Treatment Plant			Grove Township
Huston Township Sewer Authority			Huston Township
Jay Township Authority			Jay Township
Johnsonburg Municipal Authority			Jones Township
Mid Cameron Authority	1 million gal.		Emporium Borough, Shippen Township
Saint Marys Sewage Authority	2.87 million Gal.	7.87 million Gal.	City of Saint Marys

(Source: Wastewater Treatment Plant, 2007; EPA, 2007a)

When sanitation systems malfunction and cause raw sewage to enter nearby streams, it is a sanitary sewage overflow (SSO). When the flow exceeds the capacity of the sanitary system, allowing untreated wastewater to enter area streams, it is a combined sewer overflow (CSO). CSOs typically occur during heavy storm events. The overflows from SSOs and CSOs flush human and industrial waste, oil, toxic materials, pesticides, and litter directly into streams.

Every municipality within Pennsylvania is required to have an Act 537 Pennsylvania Sewage Facility plan. This plan identifies how the municipality will manage sewage. Of the 27 municipalities in the project area, 18 have Act 537 plans older than 20 years, with most of them dating back to the early 1970s. Updating older plans is essential, especially in areas where tourism is spurring development.

Public Water Supply

Access to clean water is very important. In Pennsylvania, 89 percent of the population obtains their drinking water from a public water supplier (DEP[5]). There are nine public water suppliers providing drinking water to area residents (Table 1-7). Rural residents are less likely to have public water, and rely on springs and wells for their daily needs.

Phone Services

There is much debate over the establishment or enhancement of wireless communication throughout the region. Many area residents selected this area to reside for its rural aesthetics and pace of life. The establishment of towers to enhance wireless communications could be viewed as an eyesore in the viewscape and a disruption to the rural way of life.

The availability of contacting emergency services also lies in this debate. New technologies with wireless communication can help emergency responders pin point a caller's location using global positioning systems (GPS). Inadequate signals lead to no dial tone, busy signals, dropped calls, and bad

Table 1-7. Public Water Suppliers

Facility	Capacity (gallons per day)	Communities Served
Austin Borough Waterworks	70,000	Austin Borough
Clearfield Municipal Authority	250,000	Goshen Township, Lawrence Township
Driftwood Borough Water Company	108,000	Driftwood Borough
Emporium Water Company	500,000	Emporium Borough, Shippen Township
Huston Township Water Authority	96,000	Huston Township
Jay Township Water	652,000	Jay Township
Saint Marys Joint Water Authority	5,000,000	City of Saint Marys
Fox Township Water Authority/ Toby Water Company	57,600	Fox Township
Wilcox Water Company	72,000	Jones Township

(Source: DEP, 2005b)

connections. Having wireless communication can increase response time with quicker notification of emergencies, and it could save lives.

Phone booths and pay phones are gradually disappearing. Between 1998 and 2006, the number of pay phones decreased by 1.1 million according to findings from the Federal Communications Commission (Miller, 2005; Schleicher, 2007). The increased popularity of cell phones led to fewer people needing or using public pay phones. Due to the decreasing number of pay phones and the rural nature of the region, the likelihood of locating a public pay phone during an emergency is minimal.

Technologies are available to help minimize or mask eyesores with the establishment of wireless communication towers. The Pennsylvania Wilds Design Guide identifies practices to reduce the visibility of these structures: stealth telecommunication structures, co-locations, and height regulations (The Pennsylvania Wilds Planning Team, 2007).

Stealth telecommunication structures – are concealed structures disguised to blend into the surrounding environment, lessening the obtrusive nature, and being unnoticeable to a casual observer.

Co-location – establishes new antennas at existing features, such as water tanks, church steeples, and billboards. Municipalities can provide incentives for co-location in the municipal zoning ordinance by making a quicker and easier permitting process for co-location as opposed to building new structures.

Height regulations – municipal zoning ordinances can limit the size of telecommunication structures, and ensure that they do not protrude the viewscape.

Transportation and Safety

Transportation and safety throughout the watershed is extremely important. Vehicle transportation is the most popular form of transportation. Emergency services are essential to the area, especially since the region is a growing tourist destination.

Area Transportation Authority of north central Pennsylvania (ATA) provides public transportation in Cameron, Clearfield, Elk, Jefferson, McKean, and Potter counties. ATA provides countywide services

from 5:00 a.m. to 5:00 p.m. on working days. They also provide medical assistance transportation, ride to work program, and shared-ride program for persons with disabilities. Offering three types of routes—Call-A-Bus, fixed routes, and deviation routes—ATA is able to cover transportation needs in one of Pennsylvania's most rural regions.

Roadways

Roads traversing the region are categorized as secondary, tertiary, unnamed township, state, and local roads. Secondary routes are typically two-lane routes that link communities to one another, while tertiary routes are two-lane routes within communities.

One of the many state forest roads traversing the region

State routes 120, 153, 155, 255, 555, 607, and 872 are secondary routes that traverse the area. Although no major highways or interstates exist within the project area, Interstate 80 is slightly southwest, U.S. Route 219 is west, and Pennsylvania Route 6 is to the north. In addition to these major connectors, there are numerous tertiary and state forest roads within the region. The section of Route 120 that crosses through the watershed from Emporium to Renovo is a scenic by-way and part of Bucktail State Park.

Route 555, designated as part of the Pennsylvania Wilds Elk Scenic Drive, follows Bennett Branch through the southern portions of Elk and Cameron counties. This designation attracts numerous tourists into the region, especially during the fall months, when they are looking for the free-roaming Pennsylvania elk herd. This secondary road, with very few pull-offs, can become a dreadful commute for local residents and emergency responders passing through during peak tourism season.

Airports

Airports have a vital role in transportation in today's society, moving passengers and goods all around the world. Saint Marys Municipal Airport is the only airport within the boundaries of the study area. In the late 1980s, commercial passenger service started, but due to a lack of activity it was discontinued. Commercial passenger service is not presently available at the airport.

Four additional airports are nearby, including three that provide commercial passenger service—DuBois-Jefferson Airport, University Park Airport, and Bradford Regional Airport. Clearfield Lawrence Airport provides services to private pilots, including hanger rental, meeting room, and a lounge.

Railroads

Railroad transportation is active throughout the region. There are 101.8 miles of active railroad lines traversing the region operated by 10 railroad companies. In addition, 18.15 miles of two railroad lines are abandoned and 1.83 miles of one line is no longer in use.

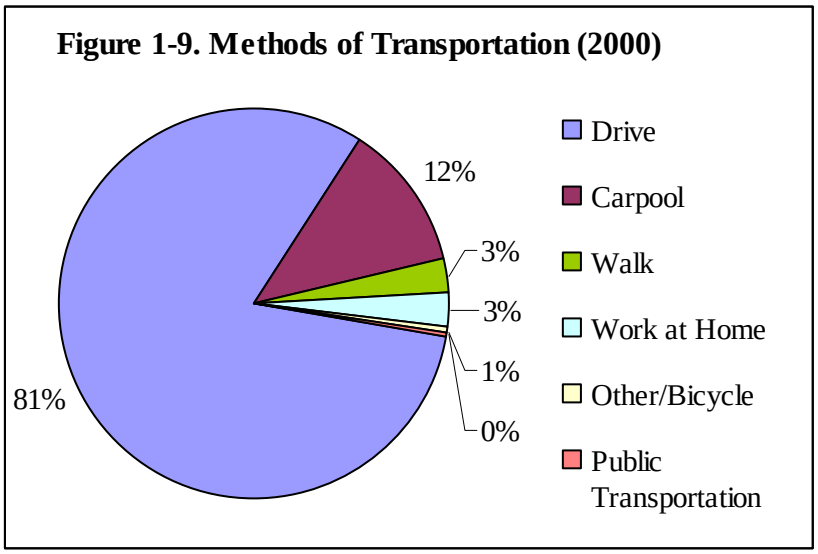
This Norfolk Southern rail line is one of 10 active rail lines within the project area

This transportation is important to the economics of the region. Railroads parallel the majority of waterways within the Sinnemahoning Creek watershed. This causes safety concerns for area residents trying to access the waterways for recreational purposes. Residents are also concerned with public access to area streams for fishing, kayaking, and

canoeing. Railroad right-of-ways are private property, owned and enforced by railroad companies, limiting access to the waterways. An agreement with railroad officials is needed in the region to obtain permission for the public to cross tracks or establish designated paths to cross tracks, opening area waterways for recreational purposes.

June 30, 2006, a Norfolk Southern train derailed leaking 42,000 gallons of sodium hydroxide along and into Sinnemahoning Portage Creek near Gardeau, Pennsylvania. Direct impacts affected 11 miles of Sinnemahoning Portage Creek, with impairments seen 30 miles downstream into Driftwood Branch. The importance of reviewing, establishing, or updating emergency management plans in order to respond to emergencies along rail lines was highlighted even more by the train derailment. The Water Resources chapter discusses impacts to the waterways from the train derailment in further detail.

Figure 1-9. Methods of Transportation (2000)



Methods of Transportation

The most popular method of transportation used by residents is the automobile. Within the project area, 81 percent of the working population drives to work. Approximately 12 percent carpool, three percent walk, and three percent work at home. Between 1990 and 2000, the number of people utilizing public transportation and walking to work had decreased while the number of people working from home increased.

Emergency Services

Having access to emergency services is essential. Emergency services and facilities are typically found in centralized population areas, where responders can quickly reach emergency situations. Ambulance, police departments, fire departments, and hospitals are examples of emergency services and facilities. Services to communities outside the population centers also are available, but with possible delays. Due to the rural character of the region, responders are often trained in wilderness survival techniques.

There are 20 facilities available to respond in case of an emergency. Typical of rural areas, the majority of these facilities are volunteer oriented. They include 10 fire stations, three police departments, four hospitals, and six ambulance service centers. Figure 1-10 displays the locations of nearby emergency service centers.

Economy and Employment

Economic conditions are constantly changing. Monitoring economic conditions uses various tools, including the average household income and unemployment rate. Table 1-8 compares the average household income and the unemployment rate within the watershed to that of Pennsylvania and the U.S.

In 1980, the average household income was $16,887, and in 2000, it increased to $41,803, an increase of 147.5 percent. The inflated cost of living and decreased population have had some impact on the household income.

The seasonally adjusted unemployment rate is a statistical technique used to determine whether monthly employment changes are due to normal seasonal patterns or changing economic conditions.

Table 1-8. Economic Comparison

	Sinnemahoning Watershed	Pennsylvania	U.S.
Average Household Income			
1980	$16,887	$19,744	$20,382
1990	$26,543	$36,675	$38,464
2000	$41,803	$52,682	$56,643
Unemployment Rate (Seasonally Adjusted)			
1990	9.6%	5.6%	5.9%
2000	5.7%	4.2%	3.9%
Sep-07	N/A	4.5%	4.7%

(Source: Bureau of Labor Statistics, 2007; Free Demographics, 2005; U.S. Census Bureau, 1990; U.S. Census Bureau, 2000)

Historically, the watershed unemployment rate has been above the state and national unemployment rate. As of September 2007, the national unemployment rate was 4.7 percent and Pennsylvania's unemployment rate was below that at 4.5 percent. The rate in Cameron and Potter counties was above both the Pennsylvania and national rates at 6.0 percent. Clearfield and Clinton fall between the national and Pennsylvania rates at 4.6 percent. Elk and McKean counties are below the unemployment rates at 4.3 and 4.2 respectively. The watershed unemployment rate for 2007 could no be calculated at this time.

Major Employers

A company or organization that employs 200 or more people is designated as a major employer. The 13 major employers are identified in Table 1-9.

Table 1-9. Major Employers

Facility	Number of Employees	Location
Elk Regional Health System	997	Saint Marys
GKN Sinter Metals Inc (Auto Parts Mfg)	900	Emporium
GKN Sinter Metals Inc (Steel Product Mfg)	800	Emporium
Metaldyne Sintered Components	600	Saint Marys
Keystone Powdered Metals Co	470	Saint Marys
Osram Sylvania Inc (Glass & Clay Production)	410	Saint Marys
Osram Sylvania Inc (Electric Lamp & Part Mfg)	400	Saint Marys
Eastern Sintered Alloys Inc	275	Saint Marys
Community Nurses Home Health	260	Saint Marys
Keystone Powdered Metals Co	250	Saint Marys
Morgan Advanced Materials	250	Saint Marys
SGL Carbon LLC	245	Saint Marys
GKN Sinter Metals Inc	200	Saint Marys

(Source: Harris Infosource, 2007)

Employment Industry

Consistent with the U.S. and Commonwealth of Pennsylvania, manufacturing is the leading employment industry, accounting for 38.9 percent of the workforce. Retail trade was second with almost 11 percent. Healthcare and social services is the third major industry in the area with 9.71 percent of the watershed workforce. Table 1-10 displays the breakdown of employment by industry for the U.S., Pennsylvania, and Sinnemahoning Creek watershed.

Table 1-10. Breakdown of Employment by Industry

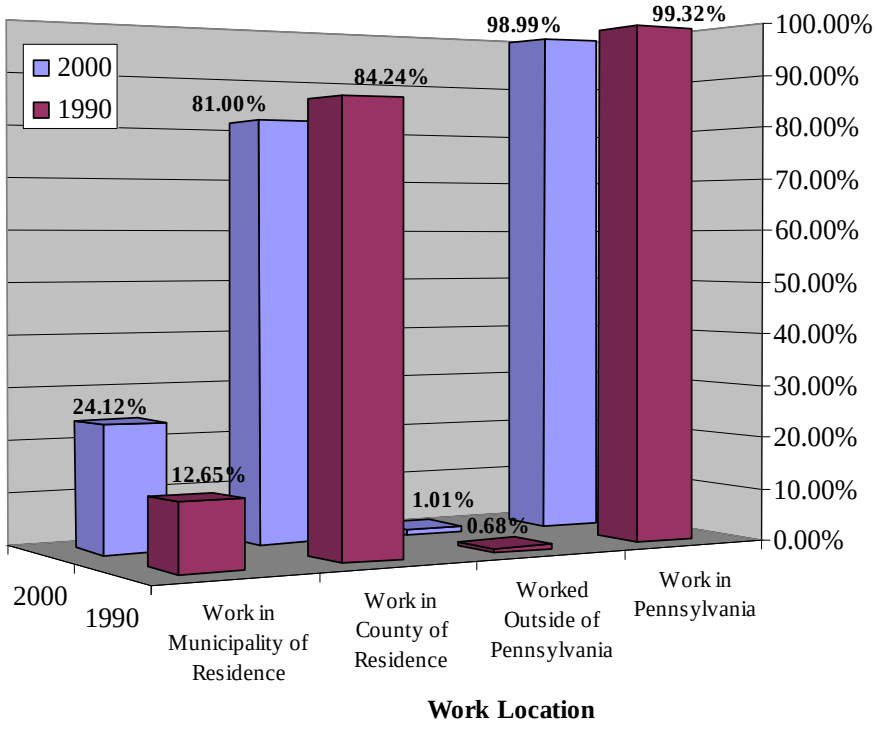
Industry	Sinnemahoning		Pennsylvania		U.S.	
	Absolute Employment	%	Absolute Employment	%	Absolute Employment	%
Accommodations and food services	372	4.58%	324,035	5.72%	7,902,849	6.09%
Administrative, support, and waste management services	130	1.60%	167,338	2.95%	4,395,117	3.39%
Agriculture, forestry, fishing, and hunting	72	0.89%	56,904	1.00%	1,931,064	1.49%
Arts, entertainment, and recreation	100	1.23%	73,855	1.30%	2,306,263	1.78%
Construction	450	5.54%	339,680	6.00%	8,811,981	6.79%
Educational services	484	5.96%	497,026	8.78%	11,364,630	8.76%
Finance and insurance	156	1.92%	293,969	5.19%	6,483,758	5.00%
Health care and social assistance	789	9.71%	739,803	13.06%	14,459,058	11.15%
Information	184	2.26%	148,845	2.63%	3,996,594	3.08%
Management of companies and enterprises	0	0.00%	4,140	0.07%	70,434	0.05%
Manufacturing	3161	38.90%	906,901	16.01%	18,295,669	14.10%
Other services (except public administration)	314	3.86%	274,059	4.84%	6,320,480	4.87%
Professional scientific and technical services	102	1.26%	307,537	5.43%	7,597,636	5.86%
Public administration	262	3.22%	235,866	4.16%	6,212,425	4.79%
Real estate, rental and leasing	47	0.58%	78,123	1.38%	2,448,199	1.89%
Retail trade	885	10.89%	684,296	12.08%	15,222,240	11.73%
Transportation and warehousing	250	3.08%	248,936	4.40%	5,569,629	4.29%
Utilities	105	1.29%	55,528	0.98%	1,174,876	0.91%
Wholesale trade	222	2.73%	210,136	3.71%	4,669,192	3.60%
Total	**8,085**		**5,646,977**		**129,232,094**	

(Source: Free Demographics, 2005; U.S. Census Bureau, 1990; U.S. Census Bureau, 2000)

Work Location and Time Traveled to Work

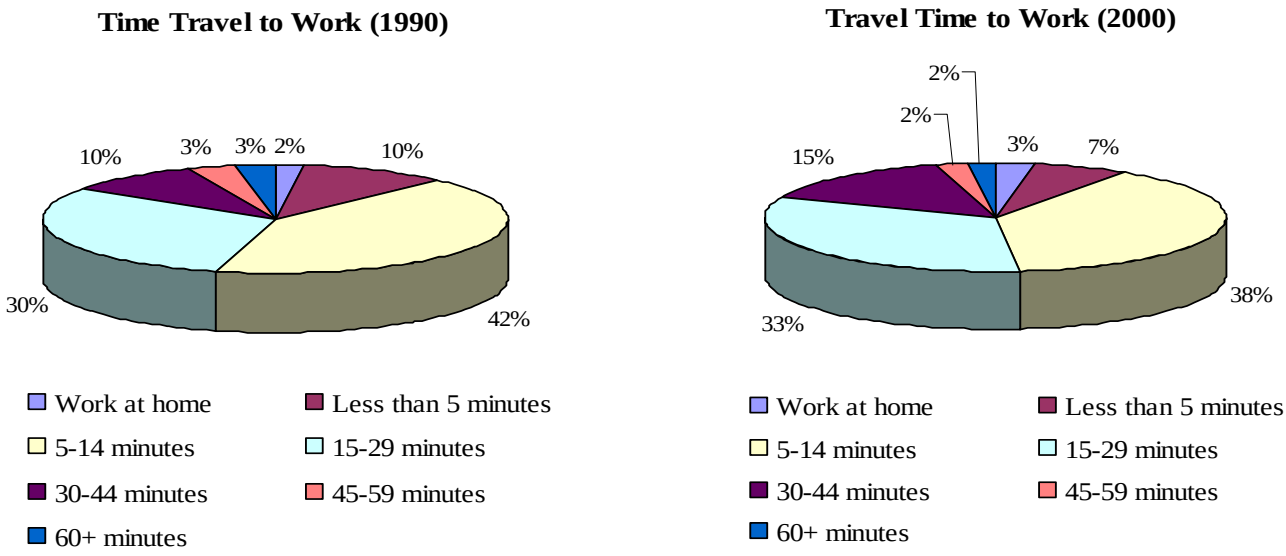
From 1990 to 2000, the local workforce that worked within the municipality where they resided doubled. In 2000, approximately 24 percent of the local workforce worked within the municipality where they resided, while 84 percent worked within the county of residence. Figure 1-11 displays the work location of residents in 1990 and 2000.

Figure 1-11. Work Locations



The majority of the employed population travels between 5 to 29 minutes to work. However, between 1990 and 2000, there was a small increase in the of people traveling between 15 to 44 minutes for work, while those working at home, traveling less than 15 minutes and those traveling more than 44 minutes decreased. In the 2010 census, it will be of interest to see if this pattern continues, with increases in fuel cost and opportunities to work from home and the rising unemployment rate.

Figure 1-12. Travel Time to Work Comparison 1990-2000



Education

Area youth enroll within eight school districts. The entire enrollment of each school may not entirely reside or be located within the project area. In most cases, school facilities and the majority of students attending each school are located within neighboring watersheds. Table 1-11 identifies each school district and school that obtains some portion of their enrollment from the watershed area.

No institutions of higher education exist within the project area; however, eight higher education institutions are located within 60 miles. Penn State University has three locations: main campus with 40,502 full time students, Altoona campus with 3,547 full time students, and DuBois campus with 605 students. University of Pittsburgh has a branch campus in Bradford with a full-time enrollment of 1,128 students. Two state schools providing secondary educational opportunities include Clarion University with a full-time enrollment of 5,261 and Lock Haven University with an enrollment of 4,622 (Pennsylvania Department of Education, 2007). Two schools are located in New York. NY, SUNY College of Technology—Alfred, NY—has an enrollment of 2,588 and St. Bonaventure—Olean, NY—has an enrollment around 2,000 students annually.

Table 1-11. School Districts

School	Grades	Enrollment
Cameron County		
Cameron County School District		
Cameron County Junior Senior High School	7-12	535
Woodland Elementary School	K-6	559
Clearfield County		
Clearfield Area School District		
Bradford Township Elementary School	K-5	279
Centre Elementary School	K-5	220
Clearfield Area High School	9-12	960
Clearfield Area Middle School	6-8	763
Clearfield Elementary School	K-5	691
Girard Elementary School	K-2	61
Goshen Elementary School	3-5	72
DuBois Area School District		
C.G. Johnson Elementary School	K-5	383
Dubois Area Middle School	6-8	1,176
Dubois Area Senior High School	9-12	1,437
Highland Street Elementary School	K-5	201
Juniata Elementary School	K-5	378
Luthersburg Elementary School	K-5	152
Oklahoma Elementary School	K-5	407
Penfield Elementary School	K-5	125
Sykesville Elementary School	K-5	135
Wasson Avenue Elementary School	K-5	334
West Branch Area School District		
West Branch Area Elementary School*	K-6	730
West Branch Area Junior Senior High School*	7-12	618

Table 1-11. School Districts (continued)

School	Grades	Enrollment
Clinton County		
Keystone Central School District		
Renovo Elementary School	K-6	271
Bucktail Area Junior Senior High School	7-12	311
Keystone Central Area Vocational Technical School	9-12	738
Elk County		
Saint Marys Area School District		
Bennetts Valley Elementary School	K-5	159
Fox Township Elementary School	K-5	227
South St. Marys Street Elementary School	K-5	618
Saint Marys Area Middle School	6-8	678
Saint Marys Area Senior High School	9-12	863
McKean County		
Smethport Area School District		
Smethport Area Elementary School	K-6	538
Smethport Area Junior Senior High School	7-12	555
Potter County		
Austin Area School District		
Austin Area Elementary School	K-6	124
Austin Area Junior Senior High School	7-12	135
Coudersport School District		
Coudersport Elementary School	K-6	576
Coudersport Junior Senior High School	7-12	509

*Enrollments listed above include the entire school enrollment of school districts that have students living in the Sinnemahoning watershed. Not all students reside or attend school within the project area. * Although the school district is identified as a Clearfield County district, the watershed population enrolled in the district is from Clinton County.*
(Source: Pennsylvania Department of Education)

CHAPTER 2. LAND RESOURCES

This chapter provides a comprehensive overview of the land resources within the Sinnemahoning Creek watershed, including physical characteristics, a description of present land uses, and a discussion of natural and manmade threats to the resources.

Mountainous terrain typical within Sinnemahoning Creek watershed

Geology

Geology is the science that deals with the study of the earth, its history, and its natural processes and products. Geology may also refer to the names and descriptions given to natural features on our planet. Geological investigations of an area can yield insight to the land's history, composition, structure, and natural resources.

Geology is an important component of a watershed, because it influences the region. Soils, plants, animals, groundwater, and topography in a region are dictated by the geology. Geology plays a role in determining quality and quantity of groundwater and surface water available within a region.

Today's landscapes reflect millions of years of natural events. Because forces acting on the land have had varying effects, vast arrays of landscapes exist throughout the earth. In order to categorize landscapes and landforms with similar features and help distinguish between them, geologists have divided the earth into various physiographic provinces. A physiographic province is a region containing similar terrain shaped by geologic history. Pennsylvania is divided into six physiographic provinces, each having a particular type of landscape and geology.

Appalachian Plateaus Province, the largest physiographic province in Pennsylvania, encompasses the region. Using elevation, relief, and geologic structure, physiographic provinces are subdivided into sections based on the distribution of patterns of rock formations, deformation, erosion, specific landforms, or other geologic features (Radford University, 2005). Divided into 10 sections, the Appalachian Plateaus Province is characterized as highland eroded by streams creating deep valleys and hilly topography. Two sections are prevalent within the Sinnemahoning Creek watershed, the Pittsburgh Low Plateau section and the Deep Valleys section.

Located in the Pittsburgh Low Plateau section, the Bennett Branch subwatershed is characterized by a smooth to irregular, undulating surface, narrow, relatively shallow valleys, surface mines, and reclaimed lands of shale, sandstone, siltstone, and coal. Local relief in the Pittsburgh Low Plateau section is low to moderate—ranging from 101 to 600 feet—with the elevation ranging from 660 to 2,340 feet. Underlying rock types include shale, siltstone, sandstone, limestone, and coal. Current and former surface mines have significantly altered a portion of the region's topography.

The remainder of the Sinnemahoning Creek watershed is located within the Deep Valleys section. Characterized by very deep, angular valleys with broad to narrow uplands, this section contains moderate amplitude--open folds that control valley orientation. Local relief in the Deep Valleys section is moderate to very high with elevations ranging from 560 to 2,550 feet. Underlying rock types include sandstone, siltstone, shale, and conglomerate.

The bedrock geology is from the Devonian, Pennsylvanian, and Mississippian periods that occurred during the Paleozoic Era approximately 290 to 405 million years ago. The Devonian period is named for the County of Devonian in southwest England where Devonian outcrops are common. The Devonian period occurred 365 to 405 million years ago. Red sandstone, gray shale, black shale, and limestone are associated rock types (Devonian, 2007).

Outcrop of rocks along Route 120

Pennsylvanian and Mississippian periods are separated in order to distinguish the coal-bearing layer of the Pennsylvanian from the layers of the Mississippian. Estimations situate the Pennsylvanian period occurring 330 to 290 million years ago, and currently underlying 35 percent of Pennsylvania. Cyclic sequences of sandstone, red and gray shale, conglomerate, clay, coal, and limestone are associated rock types (Sevon and Barnes, 2007). The Mississippian period, occurring 365 to 330 million years ago, contained red and gray sandstone, shale, and limestone as associated rock types.

Beyond physiographic provinces, an area can also be categorized by geologic formations. Geologic formations of a region are continuous rock units with a distinctive set of characteristics that make it possible to recognize and map.

In addition to physiographical regions used in describing landforms of the region, ecoregions describe biophysical characteristics. An ecoregion is the name given to an area having a distinctive composition and pattern of plant and animal species distribution (Washington State Department of Natural Resources, 2003). Other features, such as climate, landform, soil, and hydrology are important in the development of an ecosystem, and thus help define ecoregions. Although both provinces and ecoregion delineations consider the geology of an area, the difference is that ecoregions also view the distribution of species and ecosystems across the landscape.

The project area is within the Northern Forest ecoregion, and more specifically, the Unglaciated Allegheny High Plateau section of the North Central Appalachians division of the Atlantic Highlands subregion. This subregion is a maturely dissected plateau with sharp ridge tops and narrow valleys. Characterized by extensive forest, short growing season, nutrient poor soils, and high local relief, the area is rugged with steep valley sides, entrenched streams, and high-gradient channels (Woods, Omernik, & Brown, 1999).

Geology has a huge impact on watershed attributes, especially on their location and presence. Different landform structures exist in different locations due to the geology. Physiographic provinces and ecological regions have related geology and most often overlap. The existence of plant species in a region relies on geology, climate, and soil type.

Soil Characteristics

Soil Associations

Soil associations are comprised of two or three major soil types and a few minor soil types. The names given to the soil association are based on the major soil types found within them. In the name they are listed in order by the percentage of each soil type. For example, the Hazleton-Buchanan-Cookport soil association has three major soil types—Hazleton, Buchanan, and Cookport—the Hazleton soils compose

the largest percentage of the association followed by the Buchanan and Cookport soils. There are 17 associations within the region. Identified in Table 2-1 are brief descriptions of each of the associations.

Table 2-1. Soil Associations

Soil Association	Description
Albrights-Buchanan	Very deep and moderately well drained and somewhat poorly drained soils that are nearly level to moderately steep. They are formed on uplands in materials weathered from sandstone and shale.
Atkins-Philo-Monongahela	Poorly drained to moderately well drained, deep, nearly level and gently sloping soils on flood plains and terraces. The Atkins and Philo soils were formed in recent alluvium from sandstone, siltstone, and shale while the Monongahela soils were formed in old alluvium weathered from acid shale and sandstone
Bath-Mardin	Yellow and brown, very acidic and deep, well/moderately well drained
Buchanan-Hartleton-Leck Kill	Very deep and deep with somewhat poorly drained and well drained soils that are moderately steep to very steep. Soils are formed on uplands in materials weathered from sandstone and shale
Clymer-Cookport-Dekalb	Deep to shallow yellowish/yellowish-brown residual accumulations derived from fine/textured sandstone. Clymer and Dekalb soils are extremely acidic and somewhat droughty, Cookport soils are moderately well to somewhat poorly drained
Cookport-Hazleton	Deep and very deep soils that are moderately well drained and well drained soils that are nearly level to moderately steep soils. They are formed on uplands in materials weathered from sandstone and shale
Cookport-Hazleton-Clymer	Moderately well drained and well drained, deep, nearly level to moderately steep soils on broad uplands, ridges, and hillsides on the Allegheny Plateau. They are formed in residuum weathered from fine-grained and coarse-grained sandstone.
Hartleton-Wharton-Buchanan	Very deep and deep with moderately well drained and well drained soils that are gently sloping to very steep. They are formed on uplands in materials weathered from siltstone and shale
Hartleton-Wharton-Udorthents	Very deep and deep with moderately well drained and well drained soils that are nearly level to very steep. They are formed on uplands in materials weathered from shale, sandstone, and siltstone
Hazleton-Cookport-Ernest	Moderately well drained with low permeability
Hazleton-Buchanan-Cookport	Very deep and deep with moderately well drained and well drained soils that are nearly level to steep. They are formed on uplands in materials weathered from sandstone and siltstone
Hazleton-Cookport-Buchanan	Very deep and deep with moderately well drained and well drained soils that are nearly level to very steep soils. They are formed on uplands in materials weathered from sandstone and siltstone
Hazleton-Dekalb	Well drained, deep and moderately deep with moderately steep to very steep soils on hillsides. They formed in residuum weathered from fine-grained and coarse-grained sandstone
Hazleton-Dekalb-Buchanan	Characterized by highly permeable, well drained soils derived from the weathering of sandstone and shale

Table 2-1. Soil Associations (continued)

Soil Association	Description
Lackawanna-Wellsboro-Cattaraugus-Culvers	Deep, reddish glacial till and frost worked materials
Leck Kill-Hartleton Albrights	Very deep and deep with somewhat poorly drained to well drained soils that are nearly level to very steep. They are formed on uplands in materials weathered from shale, sandstone, and siltstone
Leetonia-Dekalb	Coarse and droughty soils, extremely acidic and sandy; they include many large stones and boulders of quartz conglomerate, except in small areas of medium-textured and less stony Dekalb soils
Rayne-Gilpin-Ernest	Well drained and moderately well drained with deep and moderately deep, gently sloping to very steep soils on hilltops, ridges, hillsides, and foot slopes. The Rayne and Gilpin soils are formed in residuum weathered from shale, siltstone, and fine-grained sandstone. The Earnest soils are formed in colluvium from shale, siltstone, and sandstone.
Wharton-Cavode-Chippewa	Moderately deep residual accumulations that come from dark-brown or gray shale and siltstone, sticky and plastic soils

(Sources: DEP, 2003b; Kopas, 1993; Goodman, et al., 1958; Eckenrode, 2007; Churchill, 1987; Pennsylvania; Soil survey of Clearfield County, Pennsylvania)

Prime Agricultural Soils

Soils that meet certain physical, chemical, and slope characteristics are prime agricultural soils or prime farmland (Farmland Protection Policy Act Annual Report FY 2000, 2001). These soils are important in meeting the country's short-term and long-term needs for food. Ultimately, these soils will produce the highest yields with minimal input of energy and economic resources. Based upon a predetermined set of criteria, they are designated by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in each county. The criteria typically include level to nearly level slopes, a well drained structure, deep horizons, an acceptable level of alkaline or acid components, and the capacity for producing food and crops. Figure 2-2 depicts areas that have prime agricultural soils or farmland of stateside importance. There are 80 prime agricultural soils. A listing of these soils by county is located in Appendix C.

In order for soils to be designated as prime soils they need to maintain soil qualities, growing seasons, and moisture supply to sustain high yields of food crops. Soils need an adequate and dependable supply of moisture from precipitation or irrigation. They cannot be excessively erodible or saturated for long periods. They need to have acceptable levels of acidity and alkalinity, few to no rocks, and be permeable to air and water. The length of the growing season and temperature also influence whether a soil is a prime agricultural soil. Slopes mainly range from zero to six percent.

Farmland of Statewide Importance

Important soils, distinguished for agricultural uses, not meeting the criteria for prime agricultural soils, may be designated as farmland of statewide importance. When managed properly, these soils produce high yields of crops, making farmland of statewide importance and prime agricultural soils essential to the region's agriculture production. Some of these areas may even produce yields as high as areas in prime farmland when conditions are favorable (Farmland Protection Policy Act Annual Report FY 2000, 2001). Farmland of statewide importance, designated by the State Rural Development Committee, may include tracts of land designated for agriculture by state law. Within the six counties that

comprise the project area, 95 soils are designated as farmland of statewide importance. They are listed by county in Appendix C.

Agricultural Land Preservation

Farm along West Creek

Agricultural lands are under increasing pressure to convert to residential or commercial developments and other land uses. According to USDA's Natural Resources Inventory conducted between 1992 and 1997, more than 11 million rural acres in the country were converted to a developed use and over half of that acreage was agricultural land. That conversion translates into a loss of over one million acres of agricultural lands each year, or more than 3,250 acres every day (USDA, 2000).

Pennsylvania's farmland, in farms participating and acreage, reached its pinnacle in 1900 when two-thirds of the state's land use was devoted to farming. Since that time, farmland and the number of farms has been steadily declining. As the percentage of farmland declines, the average farm size has increased, which is in line with national trends of fewer, larger farms and an overall reduction in farmland. Between 1982 and 1997, over 420,000 acres of farmland and 767,000 acres of pasture in Pennsylvania were lost to other land uses [Pennsylvania Game Commission (PGC), 2005a].

Pennsylvania has been aggressively pursing farmland preservation since 1988, when the Farmland Protection Program was formed by state legislature. Since its inception, the program has preserved over 377,900 acres on 3,339 farms. With these impressive numbers, Pennsylvania leads the nation in both acres and numbers of farm preserved. To qualify for the Farmland Protection Program, farms must be designated in agricultural security areas. Only Clinton and Potter counties have agricultural preservation programs within the project area (PDA, 2007a).

Agricultural Security Areas

The Agricultural Security Area (ASA) program, created by Pennsylvania legislature, is administered at the township level. ASAs are rural, agricultural areas targeted for protection from urban development. They receive special consideration regarding local ordinances affecting normal farming practices, state agency rules and regulations, and in eminent domain condemnation proceedings. To be eligible for an ASA designation, at least 250 acres must be nominated. The 250 acres do not have to be contiguous, but individual parcels must be no less than 10 acres. Lands eligible for the program include pasture, hayland, woodland, or cropland (PDA, 2006).

Within the project area, this program is not highly utilized, partially because of the minimal of agricultural land use in the region. There are 6,120 acres (9.56 square miles) enrolled in ASA accounting for less than one percent of the land use. Figure 2-2 identifies the ASA. Additional agricultural lands should enroll in the ASA program to preserve the land for agricultural purposes.

The benefits to the landowner are: limited government ability to condemn land for roads, parks, and other infrastructure projects; municipal agreement not to create "nuisance laws" including odor and noise ordinances, which may limit agricultural practices; and eligibility of landowners to sell the development rights of their farm as a conservation easement to the Commonwealth of Pennsylvania (Farmland Preservation).

An easement is a deed restriction to protect its natural resources that landowners voluntarily place on their property with another entity that establishes a material interest in the property to protect its natural resources (American Farmland Trust, 1998). With an easement agreement, the owner authorizes the easement holder to monitor and enforce restrictions set forth in the agreement, and ensures that the property be protected indefinitely.

Clean and Green Program

Pennsylvania administers the Clean and Green program, which provides incentives to landowners for preservation of agricultural lands and forestlands. The program provides real estate tax benefits by taxing land based on its "use value," rather than its market value. The program is available to landowners who own 10 or more acres of qualifying land or earn an annual gross income of more than $2,000 from farming. More information about the Clean and Green Program is available on the Pennsylvania Department of Agriculture's website at http://www.agriculture.state.pa.us/agriculture/cwp/view.asp?a=3&q=129083.

Conservation Reserve Enhancement Program (CREP)

CREP is a voluntary, federal program designed to reward landowners for implementing conservation practices on portions of their land. CREP is designed to improve water quality, benefit wildlife through habitat development and financially reward participating landowners. Administered by the USDA Farm Service Agency and implemented by the NRCS, CREP in Pennsylvania is supported by many conservation partners, such as Pennsylvania Department of Environmental Protection (DEP), PGC, Western Pennsylvania Conservancy, and Chesapeake Bay Foundation.

Landowners receive reimbursements for the installation of CREP practices, annual rental payments, and additional cash awards over a 10 or 15-year period. CREP practices include streambank fencing, livestock watering systems, and native tree and grass plantings. The environmental benefits of CREP are multiple and focus on improving water quality, strengthening and developing wildlife habitat, and encouraging landowners to be actively involved in conservation efforts (CREP, 2006).

More information about CREP is available on the Pennsylvania Game Commission's website http://www.pgc.state.pa.us/crep/site/default.asp or by calling 1-800-941-CREP.

Land Use

Evaluating the land use of a specific region can reveal a significant amount about that region. Land uses can provide clues about the major economic catalysts in a region, and offer a glimpse into its past. Looking at a region's land use can even identify trends not seen from everyday observation, such as insights into possible sources of environmental degradation. It is important to continually monitor land-use changes in a region in order to inform decision makers regarding planning and natural resources protection.

One of the numerous forestlands found through out the region

Open space dominates the landscape, with 89 percent of the landscape in forestlands, 5.4 percent in shrub and grasslands, and 3.1 percent in agricultural uses. Development accounts for 1.5 percent of the land area. Water and wetlands account for less than one percent of the land use. Barren lands, primarily comprised of mined areas, make up about 0.25 of a percent. Table 2-2 and Figure 2-3 depict the existing land use.

Forestry

Forests provide a variety of resources, including timber, wildlife habitat, water filtration, aesthetics, recreation, and employment. Over 90 percent of the nations' threatened and endangered species have some of their habitat on private forestlands (Koehn, 2005).

In 1630, an estimated 95 percent of Pennsylvania was forest. Harvesting timber to support a growing nation reduced the forest coverage of Pennsylvania to 30 percent by 1907. Over the past century, the number has rebounded; and today, Pennsylvania Department of Conservation and Natural Resources (DCNR) estimates the majority of Pennsylvania's land area is forested (2004).

Nationally, Pennsylvania ranks number one in hardwood production. Seventeen million of Pennsylvania's 28 million acres are covered by forest. Private landowners own the majority of forest in Pennsylvania, with 12.5 million acres—74 percent. State forest and state game lands make up 22 percent of Pennsylvania's forest, and three percent is national forestland (Bureau of Forestry). Within the project area, there are four state forests Elk, Moshannon, Sproul, and Susquehannock.

Table 2-2. Current Land Use

Land-Use Type	Square Miles	Percent of Land Area
Forest	**934.744**	**89.00%**
Deciduous Forest	692.502	65.93%
Evergreen Forest	54.495	5.19%
Mixed Forest	187.747	17.88%
Open Land	**56.72**	**5.40%**
Shrub/Scrub	45.73	4.35%
Grasslands/Herbaceous	10.99	1.05%
Agriculture	**32.202**	**3.07%**
Pasture/Hay	29.344	2.79%
Cultivated Crops	2.858	0.27%
Development	**15.457**	**1.47%**
Developed, Open Space	12.217	1.16%
Developed, Low Intensity	2.11	0.20%
Developed, Medium Intensity	0.912	0.09%
Developed, High Intensity	0.218	0.02%
Wetlands	**7.226**	**0.69%**
Woody Wetlands	4.861	0.46%
Emergent Herbaceous Wetlands	2.365	0.23%
Barren Land	**2.572**	**0.24%**
Water	**1.395**	**0.13%**

Throughout Pennsylvania, forestry is a key component to both the history and future of many communities. Before settlement in the region, the landscape was vast forestland, home to numerous species of large game animals including elk, bear, and panthers. Today, the region remains an immense forestland accounting for 89 percent of the landscape. The majority of the forestland—74 percent—is deciduous, while 20 percent is mixed, and six percent is coniferous.

The lumber industry, started in the region in the 1800s, is a major component of the local economy. Many livelihoods are based on the forest industry. Within Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties, the forestry industry adds $97.1 million to Pennsylvania's economy. Value-added industries, such as wood and paper products, add an additional $279.4 million (Jacobson & Seyler, 2004).

The region's forestry history is recognized through its inclusion in the Pennsylvania Lumber Heritage Region (LHR). The LHR is one of 11 heritage regions covering much of the Pennsylvania landscape. The designation recognizes the forested landscapes that dominate the project area.

Forest Management

Forest management is the art and science of structuring a forest to promote a desired outcome. Skilled foresters use silviculture (the art and science of controlling the establishment, growth,

composition, health, and quality of forest and woodlands) to meet the diverse needs and values of landowners and society on a sustainable basis (Helms, 1998). The type of management used may differ depending on these goals. Common types used in Pennsylvania often fall under the categories of "even-aged" versus "uneven-aged" management.

Even-aged management methods harvest all trees in a stand at one time or in several cuttings over a short time to produce stands of all or nearly the same age. This management method is commonly applied to achieve a forest comprised of shade-intolerant trees, such as black walnut, cherry, poplar, oak, Virginia pine, and table mountain pine. Typical management practices include clear-cutting, seed tree, and shelterwood.

1. Clear-cutting: The removal of all trees and most, if not all, woody vegetation from an area, leaving maximum growing space and resources available for the next generation. If done in an appropriate area, it can allow for rapid seedling growth and recolonization

2. Seed Tree: A heavy removal of trees within a forest, leaving some remaining mature trees for seed dispersal and regeneration purposes

3. Shelterwood: A heavy removal of trees within a forest, leaving some trees uncut to provide a seed source for regeneration. Once regeneration is established, multiple cuttings may occur removing the remaining trees

Uneven-aged management is used to maintain a stand with trees of varying ages—from seedlings to mature. Trees are harvested selectively to maintain shaded conditions. It is most often used to promote stands comprised largely of shade-tolerant species, such as sugar maple, and beech (Penn State, 1995). Typical management practices include individual section cutting, group selection cutting, and high-grading.

1. Individual Selection Cutting: A cutting of individual trees (economically valuable and non-economically valuable) used to protect forests health and multi-dimensional forest structure

2. Group Selection Cutting: Similar to individual selection cutting, but involves cutting small groups of trees

3. High-Grading: Involves cutting the biggest, most profitable trees in a stand leaving smaller, weak trees remaining. Also referred to as selective cutting or diameter limit cutting, some foresters view this as an even-aged technique, but it is rarely recommend as a sustainable management technique

Though specific management practices may be favored, these practices may not be appropriate for all types of stands. Forest management needs to be specific for each individual forest. No one practice can be recommended as the best or worst practices because of the varying characteristics and factors that exist for each forest. However, it is recommended that forest landowners work with a professional forester to manage their land to its greatest potential.

Pennsylvania Bureau of Forestry, administered by DCNR, offers a cost-free Forest Stewardship Program. Landowners can receive forestry management advice and develop a Forestry Management Plan for their properties.

Agriculture

In Pennsylvania, the number of farms and amount of farmland has been steadily declining. In some areas, development pressures are to blame. It is more profitable for landowners to sell their properties as opposed to farming the property. In 1959, there were 100,051 farms in Pennsylvania covering 11.9 million acres. As of 2001, there were 59,000 farms remaining, covering 7.7 million acres. As technological advances in the agricultural industries are developed, productivity increases, decreasing the amount of land needed (Shields).

Within Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties there were 468,826 acres in agricultural use in 1959. In 2001, that area decreased to 255,000 acres. There are 20,609 acres of agricultural land cover within the Sinnemahoning Creek watershed, of which 91 percent is used as pasture or hay land (Shields; PASDA).

Agriculture is still an important sector for employment and the local economy. Many livelihoods are based on the agricultural industry. Within the counties of the project area, the agricultural industry added approximately $72.4 million to the Pennsylvania economy in 2002. The majority— $49.6 million—was generated from livestock. This was a 20 percent increase from 1997 [USDA National Agricultural Statistic Service (NASS)].

Agricultural Management Practices

In managing agriculture, a series of sustainable principles and recommendations known as best management practices (BMPs) are utilized. Implementation of these practices minimizes the harmful impacts to the land and water, and can improve heard health and crop yields. Practices include techniques, such as streambank fencing, livestock fencing, manure storage facilities, remote watering systems, and nutrient management. For more information on these practices and others, you can contact your local cooperative extension or conservation district.

Oil and Gas Exploration

For over a century, oil and gas exploration has been a common fixture. Pennsylvania's history of oil and gas exploration dates back to 1859, when the world's first intentional and successful oil well was drilled in Venango County, near Titusville. Until oil fields were discovered in Texas during the 1900s, western Pennsylvania generated over half of the world's petroleum supply. Pennsylvania's annual contribution to the national petroleum supply since 2000 is less than one percent, but is still notable due to the distinguishing lubrication properties of Pennsylvania crude oil (Shultz, 1999).

As the demand for oil and natural gas grows around the world, exploration for these resources expands as well. Due to increased demand, and therefore, increased prices; oil and gas exploration in Pennsylvania has been expanding since the 1970s, and even more so in recent years (Table 2-3).

Table 2-3. Wells Drilled in Watershed Municipalities

County	2009*	2008	2007	2006	2005	2000
Cameron County	1	2	2	0	0	0
Clearfield County	23	24	28	22	64	22
Clinton County	0	1	0	0	0	0
Elk County	29	41	41	33	10	11
McKean County	29	41	4	8	25	0
Potter County	8	21	29	25	9	0
TOTAL	90	130	104	88	108	33

(Note: Only sites located within the municipalities of the Sinnemahoning Watershed are included. Other wells may have been drilled within other portions of the counties.)

*The 2009 data only includes data as of December 6, 2009

(Source: DEP, 2009b)

The U.S. produces 30 trillion cubic feet of natural gas annually. Since the detection of natural gas within the Marcellus Shale formation, the interest in natural gas well drilling in Pennsylvania has increased. It is estimated that Pennsylvania has 2.8 trillion cubic feet of natural gas available for development. In 2007, Pennsylvania ranked 15th in natural gas production and is the only state among the top 15 producers that does not charge a severance tax on natural gas production (Cattabiani & Worden, 2009).

A good indicator of future drilling activities in the region is the number of new drilling permit applications issued. In 2007, the DEP issued 7,241 oil and gas well drilling permits, which represents a 19 percent increase from 2006. Within Cameron, Clinton, Elk, McKean, and Potter counties 1,801 oil and gas well permits where issued, of which only a portion are located within the project area (DEP, 2008e).

Sinnemahoning Creek watershed is located in the region of Pennsylvania likely to produce natural gas. Portions of Elk and Clearfield counties are already producing gas, while the Potter County portion has an underground gas storage area (Flaherty & Flaherty III, 2002). Figure 2-4 identifies active, inactive, and abandoned well sites.

Marcellus Shale

The Marcellus shale is the second largest shale formation in the U.S. and is among the top natural gas shales in the world. Found in the Appalachian Region it extends 575 miles through West Virginia, Ohio, Pennsylvania, and New York. It received its name from the discovery of the first outcrop in Marcellus, New York in 1839. Formed during the Devonian period, it is a slightly radioactive black shale with a low density and is organically rich.

In 2002, it was believed that 1.9 trillion cubic feet of natural gas was available for development within the Marcellus Shale formation in Pennsylvania. Since then, additional studies have been conducted, and now based on new techniques, the Marcellus Shale formation is believed to have the potential to produce 500 trillion cubic feet of natural gas. It is believed that the amount of natural gas produced from the Marcellus Shale formation could support the entire U.S. for two years.

Natural gas recovery within the Marcellus shale formation is a relatively new industry in Pennsylvania. The number of permits issued for Marcellus shale gas wells increased from 475 permits in 2008 to 1,994 permits in 2009. However, due to the increased interest it is estimated that 5,200 permits will be issued in 2010 for Marcellus shale gas wells.

Natural gas within the Marcellus shale formation occurs within pore spaces, fractures, or breaks in the shale. It can also be absorbed in mineral grains and organic material. The Marcellus gas is an unconventional gas meaning that it requires stimulation and work in order to recover it. The majority of the gas is located within pore spaces, which are fine and poorly connected, making it difficult for the gas to escape. Gas that is naturally discharged escapes very slowly. Utilizing hydrofracturing techniques—blasting large amounts of water, sand, and other chemicals at the shale causing it to fracture—can establish a network for the natural gas to easily flow through the created cracks and into wells.

When drilling for natural gas, a vertical well is bored into the ground. In order to increase permeability and recover the gas from the Marcellus formation, horizontal drilling and hydrofracturing are used. When horizontal drilling techniques are used, the cost can more than double, but productivity can increase by 15–20 times.

Hydrofracturing techniques work well in recovering the gas; however, it requires a large volume of water, which becomes contaminated during the process. This technique was used to recover gas in the Barnett Shale formation in Texas, which required an average of three million gallons of water for one well.

In addition to the thousands of gallons of water, chemicals—including a friction reducer, wetting agent biocide, and scale inhibitor—are added to create slick water. The slick water mixes with water naturally found in the formation to create the fracturing solution, termed "frac" water. Each drilling company is required by law to provide the DEP with the material safety data sheet for the slick water. Appendix R provides a summary of hydraulic fracture solutions used within the Marcellus shale formation.

What's in the Slick Water?

Friction Reducer:
An organic polymer or potassium chloride

Wetting agent:
A non-ionic surfactant or soap

Biocide:
Toxic compound to control micro-organism growth

Scale inhibitor:
An organic polymer or phosphonate

The necessary use of this volume of water and the resulting contamination has caused drilling for gas in the Marcellus Shale to be met with resistance. One of the main concerns is that only 5–10 percent of the injected water is recovered leaving the majority of water and chemicals underground where they have the potential to cause additional problems. The development of a method for fracturing the formation without contaminating millions of gallons of water and efforts to increase recovery rate are imperative.

Wastewater production from Marcellus shale gas extraction efforts in Pennsylvania is estimated at 7,000 million gallons per year with current treatment capacity of only 550 million gallons a year. Currently three types of treatments are being used—pretreatment and discharged at publicly owned treatment works, evaporation with and without pretreatment, and chemical precipitation followed by discharge, recycle, or evaporation.

Efforts to recycle frac water are currently being explored and implemented. Before the frac water can be reused it needs to be filtered and treated. The reuse of the recycled water can decrease cost to the drilling companies and reduce the amount of water being withdrawn from area streams. Further studies are needed to increase frac water recovery, recycling opportunities, and wastewater treatment to ensure that the discharged water meets the standards of the receiving waters where it will be discharged.

In 2009, 39 Marcellus shale wells were drilled within the municipalities of the Sinnemahoning Creek watershed. Of these 39 Marcellus shale wells 74 percent of them utilized horizontal drilling techniques. Within the Susquehanna River watershed—of which Sinnemahoning Creek is part—Susquehanna River Basin Commission regulates the rate and volume of water withdrawals. Withdrawals for hydraulic fracturing for the year utilize the same amount of water that is withdrawn for power production in three days. However, less than 50-70 percent of the water used is recovered and what is recovered is categorized as a waste product. For more information about Marcellus shale and gas well drilling visit Penn State Cooperative Extension's website at http://naturalgas.extension.psu.ed/publications.htm.

Mining

Early coal mining gave little thought to the long-term environmental impacts that would occur from the practices. However, as awareness of the environmental harm caused by mining increased, regulations to address the issue improved. In 1971, Pennsylvania enacted the Surface Mining Conservation and Reclamation Act, and followed in 1977 by the federal government passage of the Surface Mining Control and Reclamation Act, which closely modeled the Pennsylvania regulation. With the creation of these

regulations, mining activities had guidelines to follow and state and federal oversight of the projects (DEP, 2005c).

An active mining site within the Bennett Branch subwatershed

The southwestern portion of the watershed, particularly the Bennett Branch subwatershed, has a long history of coal mining, which continues today. The majority of the mining activities are concentrated in the Bennett Branch subwatershed due to the geological makeup of the region. Sterling Run, a subwatershed of Driftwood Branch Sinnemahoning Creek, has also experienced significant mining actives. Figure 2-4. identifies active and abandoned mining activities and active reclamation projects.

A number of mining operations are actively mining and numerous abandoned mine sites exist. As of March 2008, there were 30 active mining permits issued in the watershed. Some of these operations are revisiting previously mined areas, reclaiming impacts left by the initial mining operation. Through re-mining impacts caused by earlier mining practices can be corrected and treated while additional natural resources are obtained. This is a win-win situation; the mining companies make a profit while contaminated lands are reclaimed.

Current mining operations work under stricter regulations than those preceding them, but still raise concerns among area residents. Most resident concerns are related to protecting the quality of their water. Due to rural characteristics and wildness of the region area residents rely on groundwater supplies through private wells to provide their water. In some areas of Pennsylvania, mining activities have contaminated the water supply leaving home owners with polluted drinking water. More information about residents concerns is located within the Issues and Concerns chapter.

Abandoned Mines

Once all the economically recoverable coal is removed from a mine, the mine is shut down, and the mine operator moves on to the next site. The story of the coal mine, however, often lives on long past the closing of the mine. Abandoned coal mines are a significant hazard throughout western Pennsylvania. Abandoned mines have left behind a legacy of un-reclaimed land and water quality problems that many are striving to correct.

Some of the most potent legacies of abandoned mines are the discharges of polluted water that significantly degrade nearby waterways. The discharges may contain metals, sulfates, and/or acids. Abandoned mine discharges are usually located in close relationship to the inactive coal mining sites.

This settlement pond is one of many passive abandoned mine drainage treatment systems within the Bennett Branch subwatershed

Pennsylvania Bureau of Abandoned Mine Reclamation (BAMR), a division of DEP, is working to remediate hazards and impacts of abandoned mine drainage in the Bennett Branch subwatershed. BAMR has invested more than $11.5 million towards remediation and restoration of local abandoned mine lands. Table 2-4 identifies abandoned mine land reclamation efforts occurring in the Bennett Branch subwatershed as of 2007.

Table 2-4. Abandoned Mine Land Reclamation Efforts

Site	Site Name	Status	Amount	Acreage
OSM 24(3895)101.1	Winslow Hill III	Completed	$391,297	28.8
OSM 24(3894)101.1	Winslow Hill III	Completed	$560,684	12.6
OSM 24(0519)101.l	Kersey	Construction	$2,769,634	74.4
OSM 24(0525)101.1	Gray Hill	Construction	$2,726,632	94
OSM 24(0521)101.1	Caledonia Northwest	Construction	$550,605	18
OSM 24(0515)101.1	Weedville	Design	NA	NA
OSM 24(0504)101.1	Tyler Run	Design	NA	42.4
OSM 24(3898)101.1	Porcupine Hollow	Construction	$1,156,042	49
COE Site 3895	Passive Treatment System	Construction	$407,477	NA
OSM 24(Dents Run)	Pass through grant to Bennett Branch Watershed Association	Construction	$3,028,000	NA
OSM 24(1934)	P&N Mine Site and Box Cut	Construction	$328,000	NA
OSM 24(3890)101.1	Winslow Hill IV	Design	NA	38
OSM 24(3890)101.1	Dents Run	Bid	NA	50
COE Site 3888	Passive Treatment System	Completed	$158,133	NA
COE Site 3893	Passive Treatment System	Completed	$515,987	NA
COE Site 3893	Surface Mine Reclamation	Unknown	$311,000	8
Discharge 17, Site 1934	Potential Lime Doser on Porcupine Run Hollywood Treatment Plant	NA	NA	NA

(Source: DEP, 2007)

Developmental Pressure

The rural address and rugged terrain keep this region primarily undeveloped. Large amounts of public lands already exist protecting the region's natural resources and communities from development. The steep slopes common throughout the area also hinder would be developers. Three Keystone Opportunity Zones are located in the region. Two—Barton Street and Catalano Property—are located in Emporium and one is located at the Saint Marys Airport Industrial Park. These locations, along with brownfield sites—identified later in this chapter—are primarily the areas capable of undergoing development.

Land Ownership

The majority of the Sinnemahoning Creek watershed—60 percent—is under public ownership by DCNR and PGC. DCNR operates six state parks and portions of four state forests in the region, while PGC oversees portions of seven state game lands. Figure 2-5 displays the public and managed lands within the Sinnemahoning watershed.

Critical Areas

Critical areas have constraints that limit development and various other activities. Critical natural areas contain rare, threatened, or endangered species; natural communities of concern; or significant ecological and geological landscapes worthy of protection. Steep slopes, ridgetops, floodplains, streambanks, and wetlands are examples of critical natural areas. Figure 2-6 displays the environmentally sensitive areas.

Landslides

A landslide is the movement of earth, rocks, or debris down a slope under the direct influence of gravity. Most landslides occur in areas with steep slopes where loose colluvial soils exist. They can occur gradually moving millimeters per year or rapidly as a mass. The speed at which it moves depends upon the angle of the slope, material type, and water content (U.S. Geological Survey (USGS), 2005).

Typically, landslides occur as a secondary or reactionary event to a natural disaster—such as severe storms, hurricanes, earthquakes, and floods—that can cause more damage than the initial disaster. Activities and influences of people are major factors for the increased damage caused by landslides. Factors, such as stream erosion, earth-moving activities, soil characteristics, weakened or fractured rock, mining debris, and weather, can determine the occurrence of a landslide (Delano & Wilshusen, 2001; USGS, 2005).

Landslides cause damage to transportation routes, utilities, and buildings. They can create travel delays and other side effects. The threat of landslides should always be assessed while planning any development project. Proactively avoiding a landslide is much cheaper as opposed to the clean up and repair that is required after a landslide. If development within landslide-prone areas is ultimately chosen, additional precautionary measures during development, such as additional drainage features and proper site planning, are essential to minimize the risk of a landslide (Delano & Wilshusen, 2001).

Landslide Hazards Program (LHP) was established as a part of the United States Geological Survey (USGS) in the mid 1970s. There role is to reduce long-term losses from landslide hazards by improving the understanding of the causes of ground failure and to suggest strategies to mitigate these causes. Through information gathering, research, and responding to emergencies and disasters LHP is able to produce scientific reports to a variety of audiences. Within Landslide Hazards: A National Threat, the Sinnemahoning Creek watershed is identified as being located within a region of the U.S. that has a high to very high potential for the occurrence of a landslides (USGS, 2005).

Subsidence Areas

Subsidence is the downward movement of surface material involving little or no horizontal movement. Occurring naturally due to physical and chemical weathering of certain types of bedrock, subsidence usually occurs locally as a result of underground mining, excessive pumping of groundwater, or subsurface erosion due to the failure of existing utility lines. Subsidence usually occurs slowly over a long period, but also can happen rapidly. The development of a sinkhole, for example, occurs when the support of the land is gradually removed, causing the land surface to sag and finally collapse, leaving a hole or cavity. Although subsidence is not common in the watershed, the potential exists, especially in the southwestern portion where abandoned coal mines exist (Kochanov, 1999).

Sinkholes

A sinkhole is a subsidence feature that can form rapidly. It is characterized by distinct breaks in the land surface and the downward movement of the surface materials into the resulting hole or cavity. Sinkholes only occur in certain parts of Pennsylvania underlined by carbonate bedrock, typical in central and eastern parts of the Commonwealth. This region is generally not affected by sinkholes, unless mine subsidence causes them.

Mine Subsidence

Mine subsidence is the movement of ground surfaces because of the collapse or failure of underground mine workings. In active, underground mining operations using longwall mining or high extraction pillar recovery methods, subsidence usually occurs concurrently with the mining operation in a predictable manner.

In abandoned mines where rooms and unmined coal pillars are often left in various sizes and patterns, it may be impossible to predict if and when subsidence will occur. Mine subsidence resulting from abandoned room-and-pillar mines is generally classified as either sinkhole or trough subsidence.

Sinkhole subsidence occurs in areas overlying shallow room-and-pillar underground mines. The majority of sinkholes develop where the amount of cover is less than 50 feet. They are typically associated with abandoned mines. DEP will no longer authorize underground mining beneath structures where the depth of overburden is less than 100 feet, unless the subsidence control plan demonstrates the proposed mine will be stable and that overlying structures will not suffer irreparable damage. This type of subsidence is fairly localized and is recognized by an abrupt depression evident at the ground surface as overburden materials collapse into the mine void.

Subsidence troughs over abandoned mines usually occur when the overburden sags downward due to the failure of remnant mine pillars. The resultant surface effect is a large, shallow, broad depression in the ground, which is usually elliptical or circular in shape. The flow of streams may be altered or disrupted, and surface cracks may occur, particularly near the edge of the trough.

A need exists to research areas where mining occurred in the past to determine the risk of subsidence. Homeowners should check with DEP to determine if their property is susceptible to mine subsidence and secure insurance through the PA Mine Subsidence Insurance Fund, if necessary.

Erosion and Sedimentation

Erosion is the transfer of soil particles through air or water. The relocation of these particles is sedimentation. Erosion and sedimentation are natural earthmoving processes, but the extent of this movement can be greater than normal due to poor land-use practices. Erosion and sedimentation is a very serious issue, with the potential to cause significant degradation to an area's waterbodies.

Erosion is common along streambanks, steep slopes, and ridgetops. Streambank erosion occurs when the land adjacent to the waterway erodes and deposits sediment into the waterway. Typically, erosion is accelerated by improper land uses and a lack of vegetation along the streambank. Vegetation anchors soil in place, preventing it from washing away during high stream levels or heavy rains. However, if the vegetation is removed or inadequate, the soil is easily washed into the waterbody. A lack of vegetation also leaves soils vulnerable to high winds, which can induce erosion.

Siltation fences are used to control the loss of soil from a construction site. This particular siltation fence is termed a "super siltation fence" and is located at an AMD remediation project within the Bennett Branch subwatershed

An increase in sediment in the waterbody itself is a cause for concern, as it alters native aquatic habitats. Excessive sedimentation clouds the water, which reduces the amount of sunlight reaching aquatic plants. It covers fish spawning areas and food supplies, and may clog their gills. Other pollutants attached to soil particles are deposited in waterbodies with the sediment. Downstream, sediment settles out of the water and is deposited in a new location, which can significantly alter the channel and flow of the stream.

Erosion occurring throughout the terrestrial portion of a watershed also can have a negative impact on the region's waterbodies. Soil eroded off construction sites, timber operations, or agricultural operations eventually reaches nearby streams, further exacerbating sedimentation problems.

In an effort to combat this problem, DEP and Pennsylvania Code regulate the disturbance of earth materials leading to erosion and sedimentation. Disturbances include any earth moving activities, such as timber harvesting, construction activities, agricultural plowing and tilling, etc. Disturbances of less than 5,000 square feet are required to minimize the potential for accelerated erosion and sedimentation through the implementation and maintenance of best management practices. Disturbances over 5,000 square feet must have a soil and erosion control plan on site. It is critical that these plans are implemented and monitored to ensure their effectiveness (Pennsylvania Code, 2008).

Fish and Wildlife Habitat

Habitats are the natural environments upon which animals and plants depend. Healthy habitats are important to maintaining a diversity of biological resources. Interferences and changes to habitats affect the variety of plants and animals that depend on them. Habitats where rare, threatened, and endangered species reside are critical in nature. Important habitats in the watershed include forested and riparian areas, floodplains, and wetlands.

Butterflies, like this monarch butterfly, rely on the presence of native wildflowers to survive

Riparian Corridors

Riparian corridors are lands located next to a body of water. When densely vegetated, they serve as a buffer against polluted runoff and provide habitat corridors for many species of wildlife. The Water Resources and Biological Resources chapters provide specific information about riparian corridors and their benefits.

Floodplains

A floodplain is the land adjacent to a waterway that dissipates floodwaters over the land surface thereby reducing the flow of flood waters. These scenic and valuable habitats are beneficial in reducing: streambank erosion and sedimentation, flooding downstream, loss of property, and the degradation of water quality. Some people even consider floodplains to be a natural sponge due to their ability to absorb and slowly release floodwaters recharging groundwater and decreasing the velocity and volume of flood waters. Floodplains also help improve water quality by trapping sediment and capturing pollutants similar to the role of wetlands.

Floodplains are delineated by the frequency of flooding events that cover them with water. The "100-year" flood is a flood that has a one percent chance of occurring in a given year, and thus a 25-year flood has a 25 percent chance of occurring in a given year.

Floodplains often contain rich sediments, as occasional flooding deposits nutrient rich soils from the floodwaters. Floodplains are also inhabited by unique plants and wildlife accustomed to the periodic inundation. Many species found within floodplains are seldom seen in other areas. More information about floodplains and the species that thrive in them is located in the Biological and Water Resource chapters.

Wetlands

Wetlands are "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (U.S Army Corps of Engineers, 2002). Wetlands are delineated according to hydrology, soil type, and vegetation. Whether constructed or naturally occurring, wetlands have a variety of appearances. Standing water, inundated soils, or an apparently dry field can be a wetland.

Wetlands are a vital component to a healthy watershed as they provide many unique and critical functions. More information about wetlands is discussed in the Water Resources chapter.

Wind Energy

In search for alternative energy, a variety of methods are being explored. One of the front-runners in Pennsylvania is wind energy. Wind energy is a sustainable, economical, and fast growing alternative energy source. It reduces some of the negative effects of fossil fuel electricity generation.

Although not identified within the top 25 sites for wind energy potential, Pennsylvania has moderate potential. DEP estimates there is a potential to generate 45 billion kilowatt-hours annually.

In order to establish a wind farm six components are needed and include (DEP, 2002):

- **Open land**—each turbine requires a 15-foot diameter area with no vegetation. Typically, one turbine is situated per every eight acres of land
- **Wind turbines**—supported by towers reaching over to 200 feet generate electricity at wind speeds between seven and 35 mph
- **Transmission lines**—proximity to transmission lines is an important factor in generating electricity to sell to a utility
- **Substation**—changes voltages to match voltage of transmission line
- **Weather station**—used to collect wind data in order to adjust turbines for maximum efficiency
- **Access roads**—needed to facilitate construction and maintenance at the site

Areas desired for wind energy coincide with areas of ecological significance. Forest ridges and other landscapes where high wind speeds are generated, often are also the most biologically rich forests and streams in the Commonwealth. For this region, site selection for establishing wind farms can be very controversial.

Issues about wind farms vary among nuisance, safety, and ecological concerns. Nuisance issues include spoiling views, noise, excessive lighting, and interference with communication signals, such as television. Impacts to wildlife include bird and bat mortality, habitat loss and fragmentation, and interfering with migration patterns (American Wind Energy Association).

A wind farm proposed within miles of Cherry Springs State Park would be the first in the Pennsylvania Wilds region. Opponents against the selection of the site worry that the lighting from the established turbines will degrade the only dark sky preserve east of the Mississippi. Proponents for the site feel the site's location 13 miles away from the Cherry Springs State Park will not affect stargazing, and would be an economic benefit to their community (Anonymous, 2007).

Additional information about wind farms and wind energy can be obtained from various websites identified in Appendix P: Useful Websites.

Hazardous Areas

Hazardous areas have or could have potentially hazardous materials or conditions. Hazardous areas include Superfund sites, hazardous waste haulers and storage facilities, illegal dumpsites, auto salvage yards, landfills, brownfield sites, and abandoned mines.

Comprehensive Environmental Response Compensation and Liability Act

The Comprehensive Environmental Response Compensation and Liability Act (CERCLA), commonly known as Superfund, enacted in 1980, provides broad federal authority to respond directly to

releases of hazardous substances that may endanger public health or the environment [U.S. Environmental Protection Agency (U.S. EPA), 2004]. By creating a tax on the chemical and petroleum industries, a trust fund was established to provide for cleanup when no responsible party can be identified. In 1986, the Superfund Amendment and Reauthorization Act (SARA) amended CERCLA.

Short-term and long-term action responses were identified in the law. Short-term actions require prompt response for releases or threatened releases. Long-term responses permanently and significantly reduce the dangers associated with releases or threats or releases of hazardous substances that are serious, but not immediately life threatening. These actions are conducted only at sites listed on U.S. EPA's National Priorities List (NPL).

Pennsylvania Pressed Metals is the only CERCLA site identified within the project area. Located in Emporium, Cameron County, the site is not included on the NPL.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA)—a federal statute—regulates the transportation, handling, storage, and disposal of solid and hazardous materials. Federal facilities may control regulatory responsibilities, including obtaining permits, identifying and listing hazardous waste, adhering to procedures when transporting or disposing of waste, developing risk management plans, and managing records (EPA, 2002). Requirements for underground storage tanks, including cover tank design, operation, cleanup and closure, are also contained in RCRA. There are 29 RCRA sites in the area; listed in Appendix E.

Illegal Dumpsites

Remote areas, streambeds, hillsides, back roads, and old coal mines are often inundated with old tires, appliances, and other items that people no longer want. These illegal dumps grow with continued use over time, and can cause a variety of environmental and health impacts. Dumpsites pose a direct threat the health and safety of humans, plants, and animals. They have the potential to attract disease-spreading pests, such as mosquitoes and rodents. Dumpsites have the potential to pollute the soil, surface and groundwater, and air quality depending on the materials that are disposed of at the site. They affect the esthetics of the area, property values, and landowner liability.

While municipalities often identify and clean-up illegal dumpsites that occur on municipal properties or large dumps that occur in remote areas; it is the responsibility of a property owner or individual caught in the act to clean-up an illegal dumpsite. Elk and McKean counties have had illegal dump surveys completed. These surveys access and document the location and size of illegal dumpsites. Illegal dumpsites were identified at 17 sites within the Elk County portion of the project area through PA CleanWays' Illegal Dump Survey. Site 27 has been cleaned up by employees of Elk State Forest. No illegal dumpsites were documented within the McKean County portion of the Sinnemahoning Creek watershed, during the Illegal Dump Survey. Surveys for Cameron, Clearfield, and Potter counties, have not been conducted as of 2008. Table 2-5 identifies dumpsites identified in the Illegal Dump Surveys.

PA CleanWays chapters and affiliates throughout the state work to clean up and prevent illegal dumping through action and education. Three associations of PA CleanWays operate within the watershed—Clinton County affiliate, Elk County chapter, and McKean County chapter. Cameron, Clearfield, and Potter counties currently have no chapter or affiliate of PA CleanWays.

An Illegal Dumping Enforcement Officer operates under the Elk County Solid Waste Authority to patrol and prosecute illegal dumping activities throughout the county (Russ Braun, Jones Township). Local businesses, organizations, or clubs often "adopt" rural roadways, trails, and/or waterways to help curtail illegal dumping. These volunteers pick up trash in their adopted areas two to three times per year,

similar to the Adopt-A-Highway Program run by Pennsylvania Department of Transportation. County governments or volunteer groups organize chapters and affiliates of PA CleanWays.

Table 2-5. Illegal Dumpsites

Site #	Municipality	Site Name	Calculated Tons	Distance From Waterway	Visibility From Roadway	Road Type	Terrain
16	Jones Township	Glen Hazel Rd Site 2	0.5	Within 50 ft	No	State Road	Medium Slope
18	Jones Township	Stony Hill Road	0.25	More than 100 ft	Yes	Municipal Road	Medium Slope
27	Benezette Township	Gray Hill Road	1	No Waterways	Partial	State Forest	Steep Slope
28	Benezette Township	Sumerson Road	1.5	Within 50 ft	Partial	County Road	Medium Slope
61	St Marys Borough	West Creek Road	0.5	50-100 Feet	Partial	Municipal Road	Medium Slope
62	Jay Township	Hill Road Site 1	2	No Waterways	Partial	Municipal Road	Steep Slope
63	Jay Township	Hill Road Site 2	0.25	No Waterways	Yes	Municipal Road	Flat
64	Jay Township	Gardner Hill Rd Site 3	0.75	No Waterways	No	Municipal Road	Flat
65	Jay Township	Washington Street	1	Within 50 ft	Yes	Municipal Road	Flat
66	Jay Township	Old Byrndale Rd Site 1	0.25	No Waterways	Yes	Municipal Road	Flat
67	Jay Township	Old Byrndale Rd Site 2	0.5	No Waterways	Yes	Municipal Road	Medium Slope
68	Jay Township	Apple Road	2.5	Waterway/ Wetlands	Partial	Municipal Road	Steep Slope
69	Jay Township	Rt. 255	0.5	No Waterways	Yes	State Road	Flat
70	Jay Township	McClintocks Road	1	Within 50 ft	Yes	County Road	Medium Slope
71	Benezette Township	Rock Hill Road	0.5	Waterway/ Wetlands	Yes	County Road	Flat
72	Jay Township	Smith Hill Rd Site 1	2.5	Within 50 ft	Yes	County Road	Flat
73	Jay Township	Smith Hill Rd Site 2	3	More than 100 ft	Partial	County Road	Extremely Steep
74	Jay Township	Grey Hill Rd	0.5	No Waterways	No	County Road	Gently sloped
76	Fox Township	Bennett Rd	0.5	No waterways	Yes	County Road	Flat

(***Source: PA CleanWays, 2007)***

Auto Salvage Yards

Auto salvage yards, commonly referred to as junkyards or wrecking yards, serve as locations for decommissioned and wrecked vehicles that are usable for parts and materials. Environmental impacts of auto salvage yards are related to fluids that result from salvage yard operations, including crank case oil, hydraulic oil, brake fluid, oil recovered from steam cleaning, gasoline, antifreeze, transmission fluid, window cleaner, and wastewater recovered from steam cleaning. In addition, tires and lead acid batteries must be properly stored or disposed. All generated wastes and associated products must be managed in compliance with municipal ordinances, DEP and EPA regulations.

Landfills

Landfills continue to be the chief method of solid waste disposal in Pennsylvania. A landfill is simply a disposal site for various types of waste, which are discarded into or onto the land. In the past, landfills were situated for convenience, and did not utilize any measures to control leachate, which is the liquid formed when water infiltrates into the waste and draws out chemicals, metals, and other materials. Without proper and now federally mandated measures, leachate can easily infiltrate and contaminate groundwater resources.

Federal regulations for municipal solid waste landfills (MSWLFs) mandated by EPA falls under Subtitle D (Part 258) of RCRA, which was last revised in 1991. The eight main components of the regulations are listed below (EPA, 2008).

- **Location restrictions** ensure that landfills are built in suitable geological areas away from faults, wetlands, floodplains, or other restricted areas
- **Composite liners requirements** include a flexible membrane (geomembrane) overlaying two feet of compacted clay soil lining the bottom and sides of the landfill; protect groundwater and the underlying soil from leachate releases
- **Leachate collection and removal system** sit on top of the composite liner and removes leachate from the landfill for treatment and disposal
- **Operating practices** include compacting and covering waste frequently with several inches of soils to reduce odor; control litter, insects, and rodents; and protect public health
- **Groundwater monitoring** requires testing groundwater wells to determine whether waste materials have escaped from the landfill
- **Closure and post-closure care requirements** include covering landfills and providing long-term care of closed landfills
- **Corrective action provisions** control and clean-up landfill release, and achieve groundwater protection standards
- **Financial assurance** provides funding for environmental protection during and after landfill closure (i.e., closure and post-closure care)

Landfills and landfill regulations are of particular importance in Pennsylvania due to the fact that, since 1992, the state has been the nation's lead importer of waste (Action PA, 2005). Pennsylvania can attribute this title to its geographical proximity to Megalopolis—the dense urban band that stretches from Washington D.C. to Boston—and that it has large amounts of inexpensive, rural lands.

No active landfills are located in the project area. The closest active landfill is located in Kersey, Elk County. There are 11 abandoned and two inactive landfill sites, which may be of concern, as they may have been built before federal and state regulations, and could be a source of groundwater contamination (DEP[4]).

Recycling

Recycling starts with community collection of approved materials, which generally includes glass, plastic, paper, and metal materials. Community collection may be done through curbside collection, drop-off centers, buy-back centers, and/or deposit/refund programs. After sorting, recyclable materials are sold and purchased in the same manner as any other commodity. Materials recovery facilities buy the materials and remanufacture the recyclables into new products.

Recycling receptacles located at Thunder Mountain Park in Benezette

The benefits from recycling are numerous and can have a positive impact on a community. Recycling materials keeps them out of municipal landfills, and therefore reduces the need for such facilities. Recycling also limits the amount of raw materials required to produce products, which reduces the need for resource extraction activities, reduces emissions, and saves a significant amount of energy in the process. Recycling programs also create numerous jobs. In Pennsylvania alone, 81,322 jobs are the result of recycling programs (DEP, 2006b).

Pennsylvania Act 101, the Municipal Waste Planning, Recycling, and Waste Reduction Act of 1988, mandates curbside recycling for municipalities with populations of at least 5,000 or a population density of a least 300 persons per square mile, by September 1991. Additionally, each county is responsible for developing its own municipal waste management plan (DEP, 2006b).

The rural characteristic of the Sinnemahoning Creek watershed limits curbside recycling opportunities due to economic feasibility. Only one municipality, City of Saint Marys, meets Act 101 requirements mandating curbside recycling. Most areas are limited to the 26 drop-off recycling centers in the region (Appendix T). There is a need for additional drop-off sites, especially outside of Emporium and Saint Marys areas. Establishing drop-off locations in additional areas will increase recycling efforts throughout the region (DEP[8]).

In 2010, Elk County drop-off locations discontinued collection of plastics. A new Elk County Community Recycling Center opened in the Stackpole complex in St. Marys to collect plastics and other recyclable materials.

Brownfields

According to U.S. EPA, “brownfields are real estate property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” Cleaning up and reinvesting in these properties takes development pressure off undeveloped, open land, while improving and protecting the environment (EPA, 2006a).

To address brownfields issues in Pennsylvania, DEP has created a Brownfields Action Team (BAT). BAT formed to streamline the revitalization of Brownfield sites and enhance the interaction between the local community and DEP. Responsibilities of the team include expediting permits, coordinating funding, and obtaining liability protection for sites. One approved BAT site, Driftwood Pellet/Molding Plant, is located within the project area.

DEP also developed a joint program with U.S. EPA called the “One Cleanup Program” in 2004. The purpose of the program is to ensure that brownfields recovered under Pennsylvania Brownfields Program

also satisfy requirements under federal regulations. Listed in Table 2-6 and Figure 2-7 are the 21-brownfield sites located within the region (DEP[2]).

Table 2-6. Brownfield Sites

Brownfield Site	Address	City	Status
10 East Fourth Street	10 East Fourth Street	Emporium	Unknown
Borough of Emporium Former Waste Disposal Area	Taylor Street and Barton Street	Emporium	Unknown
Carey's Store	10268 Main Street	Sinnemahoning	Unknown
Driftwood Pellet/Molding Plant		Driftwood	BAT Site
East Allegheny Ave Lot	241 West Fourth Street	Emporium	Unknown
Emporium Borough Taylor Street Property	Taylor Street and South Mountain Road	Emporium	Unknown
Former Auto Dealership	209 Sizerville Road	Emporium	Unknown
Former Auto Parts Store	37 East Fourth Street	Emporium	Unknown
Former Brown Co. Building	116 West Second Street	Emporium	Unknown
Former Machine Shop and Laundry	170 East Second Street	Emporium	Unknown
Former Tri-Fac Property	East Second Street	Emporium	Unknown
GE Transportation System-Motor Coils	55 Pike Street	Emporium	Site Specific
Huston Township Water Authority Building	Bennetts Valley Road	Penfield	Unknown
IDA Multi Tenant Facility	140 West Second Street	Emporium	Unknown
Jeffrey Madinger Prop Cleanup	RR 1 Box 12	Penfield	Statewide Health
Metal Wire Driftwood M&M Pipeline	Route 255	Driftwood	Site Specific
Olivett Prop	401 4th Street	Emporium	Statewide Health
Penfield Commercial Lot	Bennetts Valley Road	Penfield	Unknown
PPL Avery Hollow Check HG Meter Sites	2nd Ninth Street	Allentown	Statewide Health
Pro-America	Second Street	Emporium	Unknown
Pro-America 2	East Second Street	Emporium	Unknown

(Source: Geospatial Data Center, 2004; DEP[2]; DEP, 2008e)

CHAPTER 3. WATER RESOURCES

The Sinnemahoning watershed is blessed with an abundance of high-quality water resources that support fisheries, residents, and businesses. The vast expanse of forested hillsides support the continued preservation of these high-quality streams, but there are several threats that impact some streams within the watershed. Abandoned mine drainage (AMD), erosion and sedimentation, and improperly treated sewage are the main threats to this watershed. In order to maintain high-quality streams and restore degraded areas, local interest and involvement in restoration and conservation efforts will be critical to the continued enjoyment of this beautiful watershed within the Pennsylvania Wilds.

Steep, forested hillsides and high quality water resources characterize the Sinnemahoning Creek watershed

Location

Drainage

The Sinnemahoning Creek watershed is located within the 27,500-square-mile Susquehanna River drainage basin. Sinnemahoning Creek is the largest tributary watershed to the West Branch Susquehanna River, draining 1,034 square miles of land in Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties, Pa. Three major subwatersheds comprise the Sinnemahoning Creek watershed—Bennett Branch, Driftwood Branch, and First Fork. Sinnemahoning Creek is formed at the confluence of Bennett Branch and Driftwood Branch in the borough of Driftwood. The First Fork empties into Sinnemahoning Creek approximately 3.7 miles downstream of Driftwood. Sinnemahoning Creek flows for an additional 11.9 miles, before draining into the West Branch Susquehanna River near the town of Keating, Clinton County, west of Renovo, Pa.

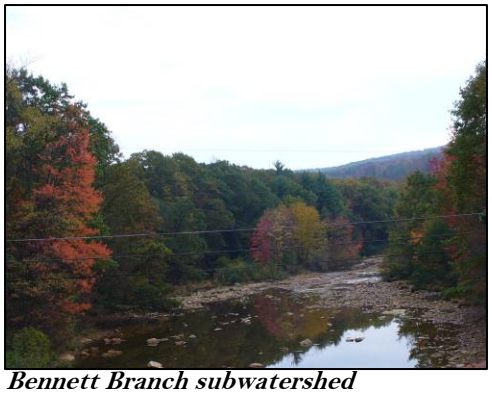
Watershed Address

The U.S. Geological Survey (USGS) has developed a system in order to better catalog and describe the location of surface water resources in the United States. This system divides and subdivides the U.S. into successively smaller units of water drainage, identified with the resulting specific Hydrologic Unit (HU) code. Major watersheds in the U.S. are described as one of 18 Water Resource Regions by the USGS. Each is given a name and two-digit number (Seaber et al., 1987). Pennsylvania is drained by three of these regions—Great Lakes, Ohio, and Mid-Atlantic. The Susquehanna River, including Sinnemahoning Creek, is in Region 02-Mid-Atlantic. The USGS further divides these regions into subregions, accounting units, and cataloging units. The HU for Sinnemahoning Creek watershed is **02050202**, which can be described as follows:

Region 02: Mid-Atlantic
Subregion 0205: Susquehanna
Accounting Unit 020502: West Branch Susquehanna
Cataloging Unit 02050202: Sinnemahoning

The Pennsylvania Department of Environmental Protection (DEP) uses a different cataloging system, which delineates six drainage basins within the state that are further divided into watersheds, each named for their major streams. The Sinnemahoning Creek watershed is located within the Susquehanna/Chesapeake Basin, and subsequently comprises Sub-basin Number 8—the Upper West

Branch Susquehanna sub-basin, and Watershed A—the Sinnemahoning Creek watershed. Therefore, DEP classifies Sinnemahoning Creek as **Watershed 8A**.



Bennett Branch subwatershed

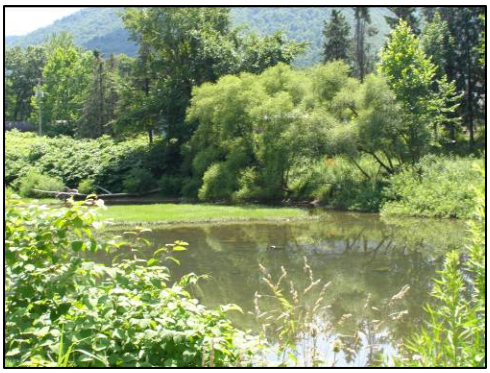
Major Tributaries

Bennett Branch

Bennett Branch of Sinnemahoning Creek originates just across the watershed divide that separates the Susquehanna River drainage basin from the Ohio River drainage basin. This dividing ridge is located east of Sabula, Clearfield County. From this perimeter of the watershed, Bennett Branch flows northeast through the towns of Penfield, Hollywood, Force, Caledonia, Benezette, Grant, Dents Run, and Mix Run before joining the Driftwood Branch in the town of Driftwood to form the Sinnemahoning Creek. Major tributaries to the Bennett Branch include: Byrnes Run, Laurel Run, Medix Run (pronounced mē-diks), Trout Run, Dents Run, Hicks Run, and Mix Run. This subwatershed is heavily impacted by AMD as a result of the resource extraction that occurred throughout the region. Extensive efforts to remediate the effects of that pollution are underway.

Driftwood Branch

The mainstem of Driftwood Branch of the Sinnemahoning Creek begins near the town of Straight Creek, Elk County, and flows southeast through the borough of Emporium and on to the borough of Driftwood. Major tributaries to the Driftwood Branch include: Clear Creek, North Creek, West Creek, Sinnemahoning Portage Creek, Hunts Run, and Sterling Run. The two largest of those tributaries are West Creek and Sinnemahoning Portage Creek. West Creek's headwaters form and flow underground near the outer limits of the city of Saint Marys, south of the Saint Marys Municipal Airport. It flows east to Emporium, where it empties into the Driftwood Branch. Just a short distance downstream, Sinnemahoning Portage Creek enters the Driftwood Branch. Sinnemahoning Portage Creek starts near Route 155 near Keating Summit, Potter County. It flows into McKean County, where several feeder streams empty into it before the village of Gardeau, where the 2006 Norfolk Southern train derailment occurred. Sinnemahoning Portage Creek continues in a southbound direction through Sizerville, ultimately flowing into the Driftwood Branch just outside of Emporium. The mainstem of Driftwood Branch continues flowing southeast to where it is joined by the Bennett Branch to form the Sinnemahoning Creek in Driftwood.



Driftwood Branch of Sinnemahoning Creek

First Fork

The First Fork of Sinnemahoning Creek originates with Prouty Run near Patterson State Park in Potter County. It flows southwest through Prouty Place State Park before Borie Branch converges to form the mainstem of First Fork. First Fork continues in a southwestern direction, picking up waters from Big Moores Run downstream. Freeman Run, a major tributary of First Fork, begins approximately 3.5 miles west of Odin, Potter County. Freeman Run flows south through the borough of Austin, running adjacent to Route 872 from there until it empties

First Fork of Sinnemahoning Creek near Costello

into the First Fork just north of Costello, Potter County. First Fork flows from that point in a more southerly route through Wharton and into Sinnemahoning State Park, where it is impounded by the George B. Stevenson Dam for the primary function of flood control, but also for recreational use of the reservoir. First Fork Sinnemahoning Creek flows adjacent to Route 872 to the mainstem of Sinnemahoning Creek near Jericho, Cameron County.

Sinnemahoning Creek

From the convergence of Bennett Branch and Driftwood Branch in the town of Driftwood, Sinnemahoning Creek flows east to Keating, Clinton County, where it empties into the West Branch Susquehanna River. Along its course, First Fork, Wykoff Run, Upper and Lower Jerry runs, and several other smaller tributaries enter Sinnemahoning Creek.

Table 3-1. Major Tributaries

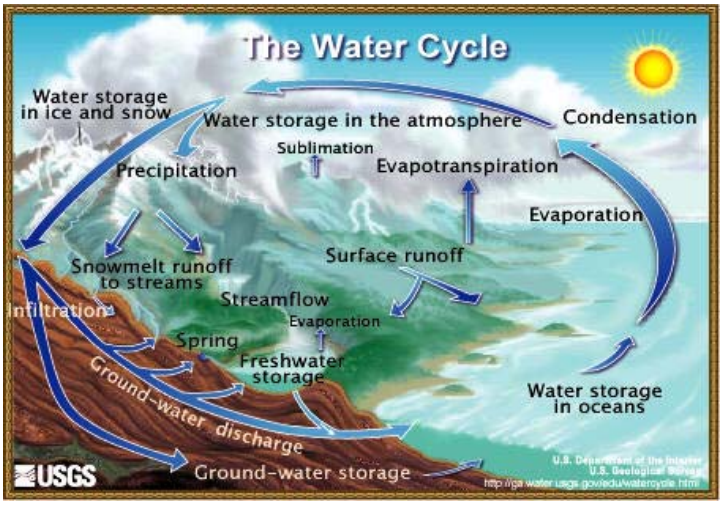
Tributary	% Area	Drainage Area (square miles)
Bennett Branch	***35.42***	***366.26***
Kersey Run	2.87	29.68
Laurel Run	3.65	37.71
Medix Run	2.47	25.49
Trout Run	3.20	33.04
Dents Run	2.42	25.00
Hicks Run	3.31	34.18
Mix Run	3.21	33.24
Driftwood Branch	***30.77***	***318.18***
Clear Creek	1.74	18.04
North Creek	1.83	18.88
West Creek	6.02	62.27
Sinnemahoning Portage Creek	7.08	73.19
Hunts Run	2.97	30.72
Sterling Run	2.38	24.56
Sinnemahoning Creek (mainstem) & First Fork	***33.85***	***350.04***
Freeman Run	3.15	32.56
East Fork	5.30	54.81
Wykoff Run	2.40	24.83

Hydrology

Hydrologic Cycle

The continuous cycle of water on earth, otherwise known as the hydrologic cycle, consists of five basic processes: condensation, precipitation, infiltration, runoff, and evapotranspiration (evaporation plus plant transpiration). Clouds are formed when water vapor condenses to liquid form as air temperature drops. When clouds can no longer hold the moisture within them, precipitation occurs. Precipitation may be contributed to surface water or infiltrate the ground contributing to groundwater. If precipitation occurs faster than the water can infiltrate a particular surface or if the surface is impermeable, the water will run off into streams, lakes, or other surface waters. The water runoff carries contaminants from surfaces, soil, and debris, which may pollute the waterways they drain into. Simultaneously, water may evaporate

(change from liquid to vapor) or be taken up by plants, transpired through the leaves, and evaporated into the atmosphere, where the process of condensation occurs; and the cycle continues.



Watershed Components

Groundwater

Water that seeps into the ground and is stored beneath the land surface in pores and openings of soil and rock is referred to as **groundwater**. Although groundwater is commonly considered a separate entity from surface water found in streams and lakes, the two are constantly interchanging and are actually a single resource. In fact, the majority of freshwater in Pennsylvania is found underground, supplying wells, streams, and reservoirs with water for drinking, industries, and other necessities of life.

Groundwater moves with the force of gravity. It may move through the earth until it emerges at the surface as a discharge (springs or seeps) or is stored underground within areas of rock and soil called **aquifers**. Groundwater discharge is a major contributor to surface waters. The average percentage of stream flow from groundwater is 60–70 percent. Therefore, stream flow and surface water availability is heavily dependent on the quantity of groundwater. As a result of this dynamic, the quality of streams and lakes can be directly impacted by the quality of groundwater (Fleeger, 1999).

Sources of contamination that may leach into groundwater include sewage waste, industrial chemicals, agricultural nutrients, metals and acidic compounds from mines and many other sources. These contaminants not only affect groundwater, but also affect surface and potable water supplies. Many public water suppliers and private homeowners rely on wells for drinking water and everyday use, and may be directly impacted by the quality of groundwater.

The yields of wells depend upon the ease of groundwater movement through rock and the level of the **water table**—depth at which the soil is completely saturated. Groundwater is found in two types of openings in rock—primary and secondary. Primary openings are spaces between fine mineral grains. Though the space between unconsolidated grains may be small, cumulatively they are capable of generating large amounts of water. In contrast, secondary openings occur from fractures in rocks. Alluvial deposits generate the most water and were formed from the movement of rivers.

Since groundwater is the single largest source of surface water, the quality of groundwater in an area can generally be determined by sampling streams at base flow, which is the point at which all surface flow comes from groundwater. In streams that are affected by mine drainage, sulfates, iron, and manganese can be found at unnaturally high levels, particularly at base flows. Similar to mine drainage, acid precipitation is able to dissolve the metals found in bedrock, causing those metals to leach into groundwater and streams.

The majority of residents throughout the Sinnemahoning watershed get their water from private wells and springs. The areas that are served with public water obtain their source water from streams and reservoirs. Therefore, these public water sources are affected by groundwater quality and quantity. Water suppliers within the project area may struggle to find clean drinking water free of contamination from

mine drainage and other pollutant sources. Thus, treatment costs increase in order to meet drinking water standards, which translates to higher water costs for municipalities and consumers. Water sources should be tested regularly to ensure drinking water standards are being met.

Surface Water

Surface water refers to water found above the land surface in rivers, streams, lakes, reservoirs, ponds, wetlands, and seeps. Surface water is in constant interaction with groundwater, which is stored below the surface within openings in rock material. Therefore, it is influenced by the quality of the groundwater, as well as inputs from land-use practices associated with farming, forestry, mining, and other activities.

Streams and Rivers

As water drains from ridges, tributaries form and grow in size and volume as the water flows to lower elevations. Larger streams are influenced by the water quality of these tributaries from which they originate, as well as pollution from acid precipitation and human land-use activities.

Not all streams flow year-round. Because surface water flowing in streams is primarily from groundwater, it is important to understand the relative position of the stream bottom with respect to the water table in order to define a perennial, intermittent, or ephemeral stream.

Although not all streams flow year-round, all streams within Pennsylvania are protected under the Pennsylvania Clean Streams Law of 1931, which gave the state of Pennsylvania the power to enact legislation and regulations pertaining to the protection of streams.

According to the Pennsylvania Code (1997), an **intermittent** stream is a "body of water flowing in a channel or bed composed of substrates primarily associated with flowing water, which during periods of the year is below the local water table and obtains its flow from both surface runoff and groundwater discharges." Streams that do not flow year-round are intermittent streams.

An **ephemeral** stream is a "water conveyance which lacks substrates associated with flowing waters and flows only in direct response to precipitation in the immediate watershed or in response to melting snowpack, and which is always above the local water table." For example, a small "stream" that flows down a grassy hill after a heavy rain would be considered ephemeral.

A **perennial** stream is a "body of water flowing in a channel or bed composed primarily of substrates associated with flowing water and is capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye and live at least part of their life cycles within or upon available substrates in a body of water or water transport system." Perennial streams flow year-round, because they are always below the water table.

Permissible pollution discharge limits are determined based on the amount a stream can tolerate and still support an aquatic community of species that characterize a perennial stream. In the past, mining operators in Pennsylvania were able to reclassify streams as intermittent or ephemeral, so there was no special protection under state mining regulations. However, DEP has shifted its policy to require detailed biological assessments before approving such changes. Under this new policy, non-permanent intermittent and ephemeral streams receive similar protection as permanent, perennial streams.

Protection of intermittent and ephemeral streams is included for logging and other earth-moving activities, although permitted activities may differ from those involving perennial streams. In cases where there is some question over what protections are in place for an activity, DEP's Northwest (serving Elk

and McKean counties) or Northcentral (serving Cameron, Clearfield, Clinton and Potter counties) Regional Offices should be consulted.

Lakes, Ponds, and Reservoirs

Lakes are inland bodies of water formed through natural or man-made processes. The natural processes by which lakes originated may include geologic events, such as the movement of the earth's plates, which disrupt the flow of a river to form a lake. In the United States, most natural lakes were formed thousands of years ago when the advance of glaciers caused great depressions to form and fill with water. Natural lakes are uncommon in Pennsylvania, and occur only in the northwestern and northeastern parts of the state. Lakes differ from ponds in that they have more visible waves, are deeper, have rooted plants that are only able to grow close to the shore, and have water temperatures that vary with depth. Ponds, natural and man-made, are present throughout the state, though their locations are not well documented.

Reservoirs, or impoundments, are common throughout Pennsylvania. Reservoirs are created when a body of water is detained by a structure, such as a dam. These reservoirs of water behind the dams, sometimes referred to as "lakes," are often utilized for recreational activities, such as fishing, swimming, and boating. They also may provide flood control or water supply for nearby communities. Some industries create reservoirs to contain waste water, which often contains pollutants discharged after use in their operations.

Along with the reservoir of water impounded by a dam, wetlands are often formed on the marginal areas surrounding them. These wetlands provide valuable wildlife and fish habitats. Some trees within those wetlands die when inundated by the saturated soil, but remain standing. These dead, standing trees are referred to as "snags," and they provide valuable habitat for animals that nest in the cavities that can be created in the dead wood.

Wetland in Sinnemahoning watershed

Wetlands

In order for an area to be considered a wetland, it must have three components: anaerobic or hydric soils, wetland vegetation, and indications that it has been covered with water at least part of the year (Mitsch & Gosselink, 2000). Anaerobic or **hydric soils** form under flooded or saturated conditions that last long enough that the upper part of the soil contains no oxygen. An area does not have to be covered with water during the entire year to be considered a wetland. Wetland areas may be permanently flooded by shallow water, permanently saturated by groundwater, or periodically saturated for varying periods of time during the growing season. These characteristics of wetlands are due to the fact that wetlands occur where the water table is at or very near to the surface. Seasonal fluctuations of the water table result in the wetland being wet or dry.

Wetlands retain water, which is slowly released to surface water streams or evaporated. If the water table is lower than the wetland, water may be absorbed into the ground from wetlands. Wetlands reduce the severity of flooding by retaining excess water and slowly discharging it.

Wetlands filter water by a variety of mechanisms. Wetland vegetation slows the velocity of water, allowing more time for suspended sediment to settle out. Pollutants, such as chemicals and metals, which are bound to the sediment particles also settle and separate from the flowing water. Nutrients from fertilizers, manure, and sewage are removed from the water and utilized by the plants growing in the wetland.

Wetland systems often support a variety of living organisms, termed biodiversity. The nutrient rich sediment that collects in a wetland provides abundant nutrients and food resources for plants and wildlife. The emergent vegetation and dead, standing timber provide excellent breeding and nesting habitat for insects and wildlife, especially waterfowl. Many migratory species depend on wetlands for rest and recharge during their long migratory treks.

Vernal pools are one type of wetland, where isolated ponds are created during the spring from rainwater and snow melt that has collected in depressions in the ground. These critical habitats provide breeding grounds for woodland frogs and salamanders. Vernal pools also support a variety of other floodplain, meadow, shrub lands, and woodland species.

Wetland Loss

More than half of all wetland habitats that once occurred in Pennsylvania have been lost. The major causes of wetland loss have been impoundment, drainage for agriculture and development, and conversion to other uses. The reduction of wetlands in any given area can drastically impact health and human safety by leading to increased occurrence and severity of flooding, decreased natural water quality revitalization, and exacerbated drought conditions. Loss of wetland habitat also negatively impacts wildlife.

Stricter environmental regulations today prevent major wetland drainage and impoundment. However, recent federal court decisions have reduced the protections given to smaller, isolated wetlands under the Clean Water Act. Although smaller wetlands still receive some protection under Chapter 105 of the Pennsylvania Code, permits can often be acquired for their alteration or destruction (Pennsylvania Game Commission, 2005b).

In Pennsylvania, the U.S. Army Corps of Engineers permits regulation authority to DEP, where one acre or less of wetlands is impacted. A general permit form must be obtained from your county conservation district or regional DEP office to change, expand or diminish the course, current or cross section of a watercourse, floodway or waterbody, including wetlands. In addition, the local municipality and county must be notified of the applicant's intent to obtain a general permit (DEP, 2006a).

DEP, in conjunction with the National Fish and Wildlife Foundation, has established a fund, called the "Pennsylvania Wetland Replacement Project," to help permit applicants meet the wetland replacement requirements identified in Chapter 105. If, after DEP consultation, wetland replacement onsite is not feasible or deemed unnecessary, the permit applicant may contribute to the fund, based on the size of the disturbance. With the fund, DEP will support restoration projects throughout the state that restore wetlands, riparian corridors, and other aquatic systems (DEP, 2007a).

It is critical to protect and maintain an abundance of wetlands in any watershed for flood protection, water quality improvement, and wildlife habitat. Artificially constructed wetlands do not perform the same as natural wetlands, but in any case, it is important to maintain as much wetland area as possible. Ideally, wetlands that are threatened by development or conversion should be protected with a buffer surrounding them to reduce the secondary impacts.

Wetlands in Sinnemahoning Creek Watershed

Figure 3-6 delineates wetlands found throughout the Sinnemahoning Creek watershed. Wetlands comprise less than one percent of the land area (Table 2-2, Chapter 2).

Wetlands can be constructed to serve a specific purpose related to improving water quality. Wetlands can be constructed to control stormwater runoff in developed areas, remediate polluted mine drainage,

and treat wastewater. Several small, artificial wetlands exist throughout the study area to serve those purposes.

Passive treatment systems to abate the effects of polluted mine drainage often include a system of settling ponds and wetlands to allow metals and pollutants to drop out of the water, incorporating alkaline additions when necessary. These treatment sites and wetlands offer a unique opportunity for a variety of educational workshops to teach the public and students about the effects of pollution, environmental remediation techniques, water quality, and biodiversity.

Floodplains

The area of land adjacent to a river, stream, or lake that absorbs the occasional overflow of water beyond the banks is known as the floodplain. Floodplains and wetlands dually act to absorb flood waters during high-flow and storm events. When houses, buildings, roads, and paved surfaces are constructed in a floodplain or eliminate natural wetlands, the ability of those areas to dissipate flood waters is diminished. In addition, the likelihood of property damage and human health and safety risk increases when development occurs within a floodplain.

The National Flood Insurance Program (NFIP), administered through the Federal Emergency Management Agency (FEMA, 2002), was established in 1968 with the National Flood Insurance Act. Property owners can purchase insurance to protect against flood loss if communities agree to adopt ordinances that reduce flood damage, including limiting building in floodplain areas. Ordinances must meet minimum regulatory standards of NFIP and the PA Floodplain Management Act (PA Act 166). Residents from non-participating communities can still purchase insurance, but at a higher rate (FEMA, 2002).

Table 3-2. Municipal Floodplain Ordinances

Municipality	Floodplain Ordinance
Cameron County	**Yes**
Driftwood Borough	N/A
Emporium Borough	Yes
Gibson Township	N/A
Grove Township	Yes
Lumber Township	Yes
Portage Township	N/A
Shippen Township	No
Clearfield County	**No**
Goshen Township	Yes
Huston Township	No
Lawrence Township	Yes
Clinton County	
East Keating Township	No
West Keating Township	No
McKean County	**No**
Norwich Township	Yes
Elk County	**No**
Benezette Township	Yes
Fox Township	Yes
Jay Township	Yes
Jones Township	Yes
Saint Marys, City of	Yes
Potter County	**No**
Austin Borough	Yes
Eulalia Township	No
Homer Township	N/A
Keating Township	No
Portage Township	No
Summit Township	N/A
Sylvania Township	N/A
West Branch Township	Yes
Wharton Township	N/A

In communities that adopt such ordinances, building in Special Flood Hazard Areas (SFHA) may occur only if the owner agrees to purchase flood insurance. SFHAs are areas within the 100-year flood zone, which means that there is a one percent chance of a flood reaching this zone each year. Special subsidies are available for existing structures built before the adoption of ordinances. Future structures

built in 100-year floodplains must meet certain requirements. During declared national disasters, FEMA may also make grants and loans available to those not participating in the program (FEMA, 2002). Many communities in Pennsylvania have adopted a riparian buffer approach to floodplain management. These "total prohibition" ordinances encourage the reduction of construction and development in the floodplain.

Vegetated riparian buffer zones are critical for protecting water quality

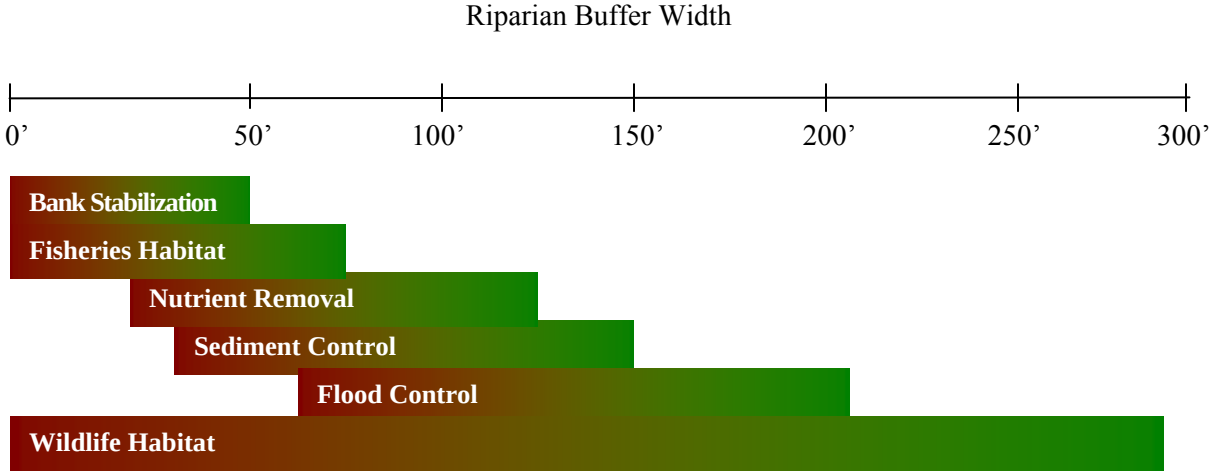
Due to the topography of the region—steep hillsides and narrow valleys—development and occupation is limited to valley areas, which affects floodplains. Floodplains can be considered "sensitive" areas because they are both inappropriate for building purposes and important for protection of streams and wildlife.

Currently, slightly less than half—45 percent—of the watershed's municipalities have floodplain ordinances in effect. Special attention to these flooding and floodplain development issues should be addressed when development projects are considered.

Riparian Areas

Riparian zones along a stream filter pollutants and sediment from runoff and provide a buffer between the land and water. A healthy riparian zone contains a variety of grasses, wildflowers, shrubs, and trees that reduce flooding and erosion by retaining water, slowing its velocity, and stabilizing soil. This also promotes groundwater retention. Riparian zones provide habitat for wildlife, regulate water temperature through shading, enhance recreational activities, and create in-stream fish habitat. Studies have shown that the wider and more substantial the riparian zone, the better it performs these functions (Klapproth & Johnson, 2000). Some streams that flow through agricultural properties or developed areas may not have adequate riparian zones to filter runoff. A lack of riparian zone vegetation may cause severe bank erosion and allow the spread of invasive plants, which thrive in disturbed areas, like the bare soil of an eroded streambank. Figure 3-9 shows recommended riparian zone widths for bank support, fisheries habitat, nutrient and pollution removal, sediment control, flood control, and wildlife habitat.

Figure 3-9 Recommended Riparian Buffer Widths



Retaining existing buffers is a cost-effective method to protect waterways from sedimentation, streambank erosion, and flooding. A number of tools and programs are available in Pennsylvania for landowners and communities to protect and enhance these important riparian zones and other important green areas, such as:

- Pennsylvania Stream ReLeaf Plan (DEP, 1997) and forest buffer tool kit (Alliance for the Chesapeake Bay [ACB] & DEP, 1998)
- Stream corridor restoration: principles, processes, and practices (Federal Interagency Stream Restoration Working Group, 1998)
- Chesapeake Bay riparian handbook: A guide for establishing and maintaining riparian forest buffers (Palone & Todd, 1997)
- Riparian forest buffers: function and design for protection and enhancement of water resources (Welsch)
- Pennsylvania's Conservation Reserve Enhancement Program (U.S. Department of Agriculture Farm Service Agency)

Floodplain and Riparian Area Protection

In addition to the programs previously mentioned, there are several avenues a community may pursue to protect, restore, and conserve riparian corridors and natural areas. These methods are discussed below. A municipality or conservation organization may pursue **land acquisition**, which is the purchase or donation of land, to protect or restore a high quality riparian zone or land located in the floodplain. The Pennsylvania Department of Conservation and Natural Resources (DCNR) offers funds for land acquisition to protect and restore natural areas. Land acquired with these funds must remain open to the public. Another financing option for the purchase of riparian land is to subdivide the area and sell the less-sensitive sections to offset the costs.

Another way to protect riparian land and natural areas is by establishing a **conservation easement**—a voluntary land preservation agreement between the landowner and a land trust or local government that permanently restricts the type of land use allowed on that property. The landowner maintains ownership of the land, but gives up some of the development rights. The conservation easement compensates the landowner for the economic loss resulting from these restrictions, such as limited timber harvesting or grazing. The landowner may receive a tax credit for the reduced value of the property. Within Pennsylvania, municipalities may hold conservation easements and use various taxing schemes to raise money for the acquisition of open space and agricultural land. The Recreation Use of Land and Water Act and the Rails to Trails Act limit landowner liability for property owners with easements or adjoining trails (ACB, 2004) that are open to the public for recreation.

Municipalities have several options in regards to **land-use planning**. County Comprehensive Plans are documents that address the timing and character of development. Although non-regulatory, the Municipalities Planning Code states that zoning ordinances must be consistent with comprehensive plans, which should contain planning for natural and historic preservation (Pennsylvania Municipalities Planning Code). An official municipality map designates existing and proposed open space reservations. If a municipality wishes to set aside a landowner's property for open space purposes, then the municipality has a legal obligation to buy the land within 12 months of the landowner's decision to develop it.

Municipalities may adopt **ordinances** to restrict activities within a certain distance of a stream, based on stream size, slope of the land, wetlands, etc. This may include limiting the building of structures in areas prone to flooding, restricting streamside vegetation removal, and regulating the amount of earth disturbance in riparian zones. Typically, restrictions increase in zones that are the closest to the stream.

Structures present before an ordinance is enacted are often exempt from these restrictions. Several examples of municipalities in Pennsylvania that have riparian ordinances include Salford and Horsham townships, Montgomery County; Kennett Township, Chester County; Warwick Township, Lancaster County; and Radnor Township, Delaware County (ACB, 2004).

Transferable development rights are used to compensate property owners in areas where development is restricted, by allowing them to sell development rights to increase development densities in other areas.

Density bonuses allow developers to increase development density in exchange for conserving natural areas or contributing to an open space fund.

A riparian stream buffer helps reduce stormwater runoff. Developers can receive **stormwater credits**, which result in construction of less costly stormwater management facilities, in exchange for maintaining or restoring riparian buffers (ACB, 2004).

Stormwater

Excess water from storm events and spring snow melt is commonly referred to as **stormwater**. Stormwater has traditionally been managed by creating ditches, drains, and pipes to funnel the water to the nearest stream or, in some cases, water treatment facility. While moving water away from homes and streets is important, we must also address the pollutants carried with the runoff and the potential for flooding due to the quick input of a large volume of water into the stream.

Stormwater picks up and carries debris, chemicals, and other pollutants to streams and reservoirs. Garbage, tree limbs, other types of debris can clog drains or even streams, causing isolated floods, not to mention the visual degradation of natural areas. Sediment can degrade aquatic habitat and interfere with the reproduction of fish, mussels, and other aquatic life. Excess nutrients from agricultural runoff increase the growth of algae. As the algae dies and decomposes, it removes vital oxygen from the water. Bacteria and other pathogens carried to streams and reservoirs by stormwater may cause health hazards to humans who use those water sources for recreation or drinking water. Harmful chemicals from industrial and household wastes and pesticides that wash into water supplies are toxic to wildlife and humans. Even when stormwater is diverted to a waste treatment facility, some pollutants are missed, and the increased volume of water results in increased treatment costs for the public. Often times, the amount of water reaching the facility is so great that the system overflows and untreated water and raw sewage are discharged directly into streams.

Impervious surfaces, such as roads, buildings, parking lots, and compacted soil, prevent or hinder stormwater's ability to soak into the ground, exacerbating its impacts. In municipalities with combined stormwater and sewage systems, this results in the aforementioned overflows. Significant stream impacts have been shown to occur when only 10 percent of the surface area is impervious (Booth, Montgomery, & Bethel, 1996). Impervious surfaces and stormwater runoff increase the volume and velocity of surface water flowing in a stream, which diminishes groundwater replenishment and increases the rate of erosion. These changes result in flooding, loss and degradation of habitat, erosion, sedimentation, and physical changes in the stream. Small floods may increase by up to 10 times with increases in imperviousness from urbanization (Hollis, 1975).

Municipalities are encouraged to minimize impervious surfaces and manage stormwater by using tools and techniques, such as performance zoning, residential design, and open space subdivision. In cooperation with businesses and homeowners, municipalities should encourage the use of porous pavement, rain barrels, rain gardens and vegetated swales, and vegetative buffers (especially in riparian

areas). Reducing impervious surface not only has environmental benefits, but reduces social, economic, and development costs as well.

Everyone can minimize the negative impacts associated with polluted stormwater runoff by doing their part at home. Use only the minimum effective amount of lawn fertilizers, pesticides and other household chemicals. Better yet, compost and use your own natural fertilizer on gardens and flower beds. Dispose of hazardous waste properly or through a local recycling program. Test septic systems regularly to ensure proper functioning and quick response to leaks. Clean your vehicles at a car wash where the water is treated and recycled and check for leaking fluids. Pick up and flush pet waste. Create rain gardens using native plants to control runoff from your home. Collect rainwater from the roof of your house in a rain barrel, and use this chlorine-free water to water plants, wash pets, and clean your house and outdoor furniture.

To respond to increased stormwater runoff, Pennsylvania created the Stormwater Management Act in 1978, which requires each county to develop stormwater management plans for each of its watersheds. Municipalities are required to adopt and implement ordinances consistent with these plans to regulate development. DEP provides funding options for stormwater management plans and model stormwater ordinances on its website, http://www.dep.state.pa.us (Keyword: Stormwater). Cameron County does not yet have a stormwater management plan. Clinton County has developed watershed-specific management plans for other watersheds in the county, but has not yet developed a county-wide stormwater management plan that includes Sinnemahoning Creek. Clearfield, Elk, McKean, and Potter counties have completed Phase I studies and are working on Phase II, which includes the development of the countywide stormwater management plan and ordinance for municipalities to adopt (DEP, 2009).

Dams

Dams were often installed along streams and rivers to harness the natural power of water for operating mills of varying sorts— saw, grist, and paper mills. Dams have also been established for navigation purposes and transportation of goods. The natural power of stream currents is still utilized for some industries today, and it can be harnessed for hydroelectric power generation.

The ruins of the Austin Dam remain as a symbol of the tragic flood of 1911

Often times, dams no longer serve a purpose, and are abandoned. If not maintained, they may fall into a state of disrepair and pose a safety risk. Dam failures may cause flooding, resulting in injury or death to humans, property damage, and interruption of transportation and emergency services. Dams obstruct migration paths of fish, and may inhibit the movement and dispersal of other aquatic life. Abandoned dams also hinder recreational paddlers' ease of transportation down a stream.

It must be determined, based on maintenance costs, safety, and potential uses of the dam, whether or not to remove one. If a community decides to leave a dam in place, a portage trail may be constructed around the dam for paddlers. If it is determined that a dam should be removed, a plan must be developed for the removal process and restoration of the stream and its habitat afterwards.

There are a few organizations responsible for the oversight of dam maintenance, regulation, and removal in Pennsylvania, including the U.S. Army Corps of Engineers, DEP, Pennsylvania Fish and Boat Commission (PFBC), and American Rivers. Necessary permits must be obtained prior to removing a dam, and assistance is available to support the planning and restoration process. A useful resource for additional information about the benefits of dam removal, volunteer monitoring, and references for

assistance is the *Citizen's Guide to Dam Removal and Restoration*, which can be obtained from the Pennsylvania Organization for Watershed and Rivers (POWR) at www.pawatersheds.org.

The George B. Stevenson Dam at Sinnemahoning State Park created a man-made lake by damming First Fork Sinnemahoning Creek in 1955 for flood control in the West Branch Susquehanna River Basin. The George B. Stevenson Reservoir is 142 acres in size and offers fishing, boating, and wildlife viewing opportunities for the public. Some concerns have been raised by the public about the extreme water-level fluctuations at this dam and how it affects the ecology of the stream, public safety, and local establishments that depend on recreation-based business from tourists and visitors to the reservoir.

The Austin Dam was built in 1909 to create reservoir from the flowing waters of Freeman Run to support a paper mill. That structure failed in September of 1911, flooding the downstream community of Austin, and killing nearly 80 people. More information on this disaster can be found in the Cultural Resources chapter.

Parker Dam State Park has a small dam built by the Civilian Conservation Corps in 1938. Today, Parker Lake is utilized for year-round recreation activities, including fishing, boating, swimming, and ice-skating.

There are several more small dams, some privately owned, throughout the watershed that are not well-documented. These small reservoirs serve or had served the purpose of supplying water for communities or mills. Many of these small dams and reservoirs no longer exist, and some of those that remain have been abandoned.

Water Quality

Water Quality Designations

Existing and Designated Uses

The Clean Water Act is enforced through the assignment of existing and designated water uses. **Existing uses** are uses that a waterbody has had since November 1975. **Designated uses** are those that are currently recognized, regardless of whether they have been attained since 1975 (Elder et al., 1999). Examples of uses include aquatic life, shellfish harvesting, and agriculture. Polluted discharges are not permitted if they violate this existing use. If a point source will violate a current or designated use, a public hearing must be held to inform the public before the permit is issued.

Water Classifications

A watershed designated as **High Quality (HQ)** or **Exceptional Value (EV)** is considered to satisfy all designated uses. Within Pennsylvania, a stream designated as HQ or EV meets a number of criteria, including specific water quality and biological standards. As with other designated uses, any proposed discharge that will degrade a HQ stream

DEP Exceptional Value Qualifications

- Located in a national wildlife refuge or a state game propagation and protection area
- Located in a designated state park or state forest natural area, national natural landmark, federal or state wild river, federal wilderness area, or national recreational area
- The water is an outstanding national, state, regional, or local resource
- Has exceptional recreational significance
- Achieves a score of at least 92% using approved biological assessment methods
- Designated as a "wilderness trout stream"
- Surface water has exceptional ecological significance.

DEP High Quality Water Qualifications

- Long-term water quality criteria better than PA Code Chapter 93.7 at least 99 percent of the time
- Chemical and toxicity characterizing good water quality
- Surface water quality supports high quality macroinvertebrate community
- EPA *Protocols for Use in Streams and Rivers* score of at least 83 percent compared to high quality reference stream
- Surface water has been designated a Class A Wild Trout Stream

below these criteria can only occur if a special exception is granted and the public is informed. Typically, no special exceptions are granted for EV streams.

The classifications of **Warm Water Fishery (WWF)** and **Cold Water Fishery (CWF)** describe the aquatic life that a waterbody is able to support. Warm-water streams support plants and animals that can survive in warmer temperatures, while cold-water streams support species that thrive at lower temperatures. In Pennsylvania, a WWF has a maximum healthy water temperature of 87° Fahrenheit versus 66° Fahrenheit for a CWF (PA Code, 1997).

Typically, streams are warmer because less vegetation is present in the riparian area to cast shade over the stream. Impoundments may slow water flow, raising the temperature of the pooling water to be somewhat higher than water in faster flowing segments. Warm water streams often are found in areas that have been more intensively developed or used for agricultural activities, while CWFs can be found in forested areas. In Pennsylvania, many CWFs that would otherwise be pristine are impaired by AMD. Often, streams have temperature characteristics that are intermediate, between a CWF and WWF, and contain species characteristic of both types. Though there is no official classification, many people refer to these streams as "coolwater" streams.

A **Trout Stocked Fishery (TSF)** possesses water quality that is not high enough to support naturally reproducing trout, but is able to support trout stocked by the Pennsylvania Fish and Boat Commission (PFBC).

Nearly three quarters—74.4 percent—of the streams within the Sinnemahoning watershed are designated HQ or EV, affording them more stringent protection from deliberate pollution and degradation. For the most part, the watershed is healthy and many of the streams are attaining their designated uses. A complete listing of all stream designations can be found in Appendix G (PA Code, 1997).

North Creek, one of the many high-quality coldwater fisheries found within the Sinnemahoning Creek watershed

Most of the stream segments within the Bennett Branch subwatershed are designated CWF, with many HQ-CWF segments and three EV segments—Byrnes Run, West Branch Hicks Run, and the headwaters of Mix Run. The mainstem of Bennett Branch is a WWF from Mill Run to its confluence with the Driftwood Branch. Many of these quality streams have been degraded by high levels of metals and low pH resulting from pollution from abandoned mines.

Over 88 percent of the stream segments within the Driftwood Branch subwatershed are designated as HQ-CWF or EV streams. Six EV stream segments are found within this subwatershed, including the headwaters of Elk Fork to Nichols Run, Cooks Run, Tannery Hollow Run, the headwaters of Clear Creek to Mud Run, the headwaters of Sinnemahoning Portage Creek to Cowley Run, and Cowley Run. The train derailment that resulted in thousands of gallons of sodium hydroxide being spilled into Sinnemahoning Portage Creek, severely devastated the stream's exceptional water quality. The mainstem of Driftwood Branch from Elk Fork to its confluence with Bennett Branch is a TSF.

First Fork is a major tributary to the mainstem of Sinnemahoning Creek. Looking at this tributary as a subwatershed, a vast majority—92.54 percent—of its stream segments are designated HQ-CWF. Five EV streams are present within the drainage area; they include East Fork Sinnemahoning Creek, Stony Lick Run, Birch Run, Bailey Run, and Lushbaugh Run. The mainstem of First Fork from the Stevenson

Dam at Sinnemahoning State Park to its mouth is designated as HQ-TSF. Other than those segments, no CWF, WWF, or TSF streams were designated.

The entire Sinnemahoning Creek mainstem is designated as a WWF. While there are no EV tributaries flowing directly to it, all unnamed tributaries, as well as Grove Run, Wykoff Run, Upper Jerry Run, and Lower Jerry Run are designated HQ-CWF streams.

Water Quality Monitoring

The monitoring of surface waters should be regular, systematic, and ongoing. Watershed groups, conservation organizations, and conservation districts throughout the region should work together to monitor water quality in all tributaries of the Sinnemahoning Creek watershed. Water quality monitoring achieves the documentation of baseline stream health data to monitor conservation, preservation, and restoration efforts. Typically, tests are conducted for pH, conductivity, dissolved oxygen, alkalinity, sulfates, nitrates, temperature, flow volume, and macroinvertebrates. Macroinvertebrate sampling, along with aquatic salamander surveys, can be used to analyze water quality based on the presence and abundance of certain pollution-intolerant animals, also known as bio-indicators.

Water quality monitoring of groundwater should also be conducted, since a majority of surface water is derived from groundwater discharge. Detection of pollution in the groundwater before it is discharged to surface water sources would enable proactive treatment exploration. This may aid in the identification of pollution sources through early detection, and allow for prioritized treatment and remediation strategies to be implemented.

Pollution Sources

Dents Run is severely impacted by abandoned mine drainage, which is prevalent throughout the Bennett Branch subwatershed

Point Source Pollution

Point source pollution refers to discharges, or pollution inputs, that enter a stream or lake directly via a pipe, culvert, container, or other means. One way the Clean Water Act is enforced is through the National Pollutant Discharge Elimination System (NPDES), whereby DEP issues permits for point source discharges (DEP[7]). In Pennsylvania, the DEP and local conservation districts are responsible for issuing point source permits to industrial operations, municipal wastewater treatment plants, concentrated animal feeding operations, and households. In addition, any disturbance of land from one to five acres requires an NPDES permit, even if it is a non-point source. The exceptions are for tilling, agricultural practices that are not part of a concentrated animal feeding operation (CAFO), and most logging disturbances that are less than 25 acres. However, many of these activities still require a soil and erosion control permit (DEP[7]).

Non-point Source Pollution

Non-point source pollution is pollution that enters a waterbody through an undefined source, usually in the form of polluted groundwater discharge or runoff from places, such as agricultural fields, logging operations, residential lawns, and streets. Non-point source pollution comprises the majority of pollution, mainly because they cannot be as easily regulated. Usually, AMD is considered non-point source pollution because it is created in large, poorly-defined areas that often discharge into a stream in a diffuse manner. Efforts to reduce non-point source pollution are often conducted on a state or local level through programs to implement best management practices (BMPs) offered by conservation districts and other agencies and organizations.

Major Sources of Impairment

While the majority of the streams in the Sinnemahoning Creek watershed are pristine and high-quality waterways, pollution and impacts are present, yet isolated. Abandoned mine drainage impacts are particularly present in the Bennett Branch subwatershed and in a few isolated streams elsewhere in the watershed. Since a majority of the watershed in forested and many dirt and gravel roads exist, erosion and sedimentation impacts are present throughout the project area. An isolated train derailment caused severe pollution impacts in the Sinnemahoning Portage Creek, which flows into the Driftwood Branch, causing fish kills and severe degradation to those fisheries. The vast expanse of protected and public lands bodes well for the continued conservation of this important tributary to the West Branch Susquehanna River.

Abandoned Mine Drainage

Abandoned mine drainage (AMD) is a significant cause of impairment throughout the Bennett Branch sub-watershed. It also is a concern in Sterling Run and West Creek, as are minimal AMD impacts affecting Parker Run and Canoe Run. AMD is formed when the fractured bedrock of abandoned mines allows rain, groundwater, and oxygen to come into contact with coal seam. Chemical reactions result in water contaminated with dissolved metals, including iron, manganese, and aluminum. Acid mine drainage is formed when sulfur-oxidizing bacteria in rock converts inorganic sulfur to sulfate and sulfuric acid in water. If there are insufficient neutralizing compounds, the water will become acidic. The polluted water discharges into streams and groundwater through mine openings, springs, and seeps. When the water is exposed to oxygen in the air, the metals will precipitate, or drop out of the solution as solids, creating even more acid and coating stream bottoms with silt-like metals. High levels of iron and aluminum can poison fish and threaten drinking water supplies (Fripp, Ziemkiewicz, & Charkavorki, 2000). Metal siltation and altered pH also affect the survivability of aquatic macroinvertebrates, which form the base of the food chain and the basis of a healthy, functioning stream ecosystem.

Underground mining refers to practices that extract coal by tunneling into the earth. Surface mining involves extracting deposits of mineral resources close to the surface. A common surface mining method is strip mining, which removes the layers of rock directly over the coal seam.

Remediation refers to treatment methods used to minimize or remove pollution from a contaminated area. The goals of AMD remediation are to reduce metals and water acidity or to raise water pH to acceptable levels. AMD treatment falls into two broad categories—active and passive. Active treatment involves the physical addition of a neutralizing agent, such as chemicals and lime, to the source of the AMD or directly into the stream. Passive treatment includes a variety of techniques to raise the pH and reduce metal loading using a constructed treatment system or containment project, such as a wetland or limestone drain. While initial costs for passive treatment can be higher, passive treatment generally requires less maintenance than active treatment systems (Turner et al.).

The type of treatment system used is highly dependent on the type and concentration of metals present in the AMD and site conditions. Chemical treatment is typically implemented through passive and active methods, such as the addition of lime or the use of limestone-lined ponds. If it is necessary to reduce metal concentrations and raise pH, then a variety of passive treatments may be used, including an anaerobic wetland, aerobic wetland, or combination of systems (Pennsylvania State University). A new treatment system is being installed in Hollywood that will capture mine drainage from several contributing abandoned mines within the Bennett Branch subwatershed.

Previously mined areas can also be dangerous, with unstable portals and roofs associated with underground mines and dangerous high walls and spoil banks associated with surface mines. In some cases, reclamation techniques, such as removal of refuse and/or re-grading and re-vegetating, can be used to make a site safer and reduce discharges.

Some funding for mine reclamation is available through the Office of Surface Mining and other state and federal programs. See the Land Resources chapter for information about the impacts of mining on the landscape and for funding opportunities. Underground and surface mining continue to be utilized. As more profitable coal seams are mined in Pennsylvania, the reclaiming of old areas and targeting of once unprofitable coal seams may become more cost effective.

Sewage Waste

Contamination from both public sewage treatment systems and private on-lot septic systems is a potential source of water pollution throughout the watershed. Public sewage services are concentrated in boroughs and more populated townships. All public systems must have a DEP point discharge permit to discharge treated wastewater, which may contain small amounts of nutrients and bacteria. Public and private systems have the potential to impact stream health and public water supplies, particularly if they are malfunctioning. This could cause drinking water contamination and increase drinking water treatment costs.

Rural, on-lot septic systems typically contribute a greater amount of sewage waste to streams when they are not maintained properly. Conventional systems consist of a large tank designed to hold about two days worth of wastewater and allow solids to settle out, as well as a drain field that distributes the wastewater so it can slowly absorb into the soil. Septic systems remove much of the bacteria, but are not very effective at removing nitrogen. They often fail when the drain field becomes clogged or saturated, and may cause raw sewage to contaminate streams and groundwater. These systems should be pumped out every few years to prevent buildup and clogs (BF Environmental Consultants, 2004).

More advanced on-lot systems are designed to remove nitrogen by moving effluent through a series of chambers containing different kinds of microbes. These systems have pumps, moving parts, and other components that need to be inspected every few years. These more advanced systems can remove twice the amount of nitrogen as conventional systems, but are more expensive and can have higher environmental impacts if not pumped out (BF Environmental Consultants, 2004).

Due to the remoteness of the watershed, there are few isolated population centers that offer public sewage systems for residents and businesses. Only nine of the 27 municipalities reported having public sewage services within the project area (Table 3-3). Of those, five were in the process of upgrading or foresaw the need to upgrade within sewage facilities within the next ten years. Of all the municipalities, including those that do not offer public sewage, nine municipalities were anticipating upgrades or considering the establishment of public sewage facilities.

Pharmaceuticals

For years, the public was instructed to flush unwanted or unused medicines down the toilet. Many sewage treatment facilities are not designed to remove specific pharmaceuticals from wastewater. In light of recent research, this practice is now being discouraged due to the potential pollution impacts to aquatic ecosystems and drinking water supplies. Hormones, antibiotics, and over 100 different pharmaceuticals have been found in waterways around the world (Hemminger, 2005).

Hormones, vitamins, and other chemicals within those medicines may affect water quality, the reproduction and development of aquatic organisms, as well as human health. Fish caught within the Allegheny River near Pittsburgh, Pa. exhibited sexual mutations, such as feminized males, which may be caused by prolonged exposure or accumulated levels of estrogen hormones in the water.

Table 3-3. Public Sewage Facilities

Municipality	Public Sewage	Facility	Capacity
Cameron County			
Driftwood Borough	No		
Emporium Borough	Yes	Mid-Cameron Authority	1 million gallons per day
Gibson Township	No		
Grove Township	No		
Lumber Township	No		
Portage Township	N/A		
Shippen Township	Yes	Mid-Cameron Authority	1 million gallons per day
Clearfield County			
Goshen Township	No		
Huston Township	Yes	Huston Township Sewer Authority	N/A
Lawrence Township	Yes	Clearfield Municipal Authority	N/A
Clinton County			
East Keating Township	No		
West Keating Township	No		
McKean County			
Norwich Township	No		
Elk County			
Benezette Township	No		
Fox Township	Yes	Fox Township Sewer Authority	N/A
Jay Township	Yes	Jay Township Authority	N/A
Jones Township	Yes	Johnsonburg Municipal Authority	N/A
Saint Marys, City of	Yes	Saint Marys Sewage Authority	N/A
Potter County			
Austin Borough	Yes	Austin Borough Sewer	N/A
Eulalia Township	No		
Homer Township	No		
Keating Township	No		
Portage Township	No		
Summit Township	N/A		
Sylvania Township	No		
West Branch Township	No		
Wharton Township	N/A		

Due to the rising concern of chemical and hormone pollution from pharmaceuticals, many conservation districts and watershed groups have begun organizing unwanted household medicine collections to prevent the potential contamination of waterways. One major challenge to organizing such and event is that pharmacists and police officers must be present at the collection to monitor controlled substances.

More information about pharmaceutical pollution may be obtained by contacting your local Penn State Cooperative Extension or county conservation district.

Nitrates

Nitrates are commonly used in fertilizers and in industrial applications, but are also found in rodenticides (pesticide used to kill rodents) and food preservatives (U.S. Environmental Protection Agency (EPA), 2007b). Nitrates also are a component of animal (including human) waste. Nitrates are easily soluble, and do not attach to soils, so it easily migrates to contaminate groundwater. Nitrates do not evaporate, and remain in water until ingested by plants or other organisms.

Nitrates have been found to contaminate unprotected wells (U.S. Agency for Toxic Substances and Diseases Registry, 2001). Nitrates can pollute streams by direct discharge of industrial effluent, runoff from agricultural lands, and faulty septic and municipal sewage systems. High levels of nitrates in water can result in eutrophication and algae blooms, which disrupt oxygen levels when the material decays, causing the death of aquatic life (EPA, 2006b). Nitrate pollution can also prove to be a risk to human health.

Infants, pregnant women, and nursing mothers are particularly at risk of adverse health effects in association with high levels of nitrates in drinking water. Methemoglobinemia, also known as "blue baby syndrome," is a syndrome that occurs in infants, due to the unique way the body metabolizes nitrate at that age. Infants metabolize nitrate into nitrite, which robs blood cells of oxygen, thus creating a blue coloration in body tissues. The most serious consequences of this condition are coma and death (Knobeloch et al., 2000). Nitrates also have been linked to certain types of cancer in young children and adults, as well.

Sodium Hydroxide

On June 30, 2006, a Norfolk Southern freight train traveling through the watershed derailed in McKean County near the town of Gardeau and spilled approximately 42,000 gallons of caustic sodium hydroxide into Sinnemahoning Portage Creek. The spill traveled over 30 miles, flowing down Sinnemahoning Portage Creek to Driftwood Branch and on down the Sinnemahoning Creek mainstem toward the West Branch Susquehanna River. The subsequent poisoning resulted in the death of thousands of aquatic animals. Shortly after the accident, in July, PFBC officials conducted a thorough assessment of the fish, amphibians, and other aquatic life of Sinnemahoning Portage Creek, Driftwood Branch, and Sinnemahoning Creek to gather data on the far-reaching impacts of the spill (Hartle, 2006).

Fish kill resulting from the sodium hydroxide spill as a result of the Norfolk Southern train derailment along Sinnemahoning Portage Creek in 2006 Photo credit: Jim Zoschg, Jr.

Sinnemahoning Portage Creek is designated as an EV stream from its headwaters to Cowley Run. The train accident occurred within this stretch, severely degrading a great portion of these exceptional value waters and devastating the aquatic life that depended upon it. The sodium hydroxide that was spilled into the creek is known to cause caustic chemical burns. It was estimated that up to 98 percent of

the aquatic macroinvertebrates in the stream were lost as a result of the poisoning, and all fish within an 11 mile stretch immediately downstream of the spill site were killed. Not only did the chemical spill kill fish and other aquatic organisms for miles downstream; but due to the potential health risk posed to humans, a warning against recreation within those waters was issued to the public (Hartle, 2006).

Fishermen would notice the impact as well. Prior to the train derailment, Sinnemahoning Portage Creek was managed as a Class A Wild Trout stream from the headwaters downstream to Cowley Run. Naturally reproducing wild brook and brown trout were found throughout this section. Wild trout also inhabited Sinnemahoning Portage Creek from Cowley Run to the mouth, and this section was also supplemented with stocked trout. Due to the severity of the fish kill, it was estimated that these wild trout populations could take up to six years to recover (Hartle, 2006).

In 2007, Norfolk Southern agreed to a damage settlement with the Commonwealth of Pennsylvania for $7.35 million, which was distributed evenly to DEP and PFBC to support conservation initiatives in the Sinnemahoning watershed, as well as throughout the counties in the region. The funds will be used for restoration of Sinnemahoning Portage Creek, as well as to increase and enhance fishing and boating opportunities throughout Cameron, Elk, McKean, and Potter counties (PFBC, 2007b).

The Sinnemahoning Stakeholders Committee of the Headwaters Resource Conservation and Development (RC&D) Council manages the Sinnemahoning Watershed Grant Program to distribute the DEP portion of funds derived from the civil settlement resulting from the spill. These grants are available for water quality, environmental improvement, and conservation projects for Sinnemahoning Portage Creek, Driftwood Branch, and Bennett Branch of the Sinnemahoning Creek watershed.

Headwaters RC&D is managed by the U.S. Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) and North-Central Pennsylvania Regional Planning and Development Commission. "The Headwaters RC&D Council is a non-profit 501(c)(3) organization that works to improve quality of life through natural resource conservation projects that result in community improvement, rural economic stability and environmental enhancement in the north-central Pennsylvania region (www.headwaterspa.org)." The Council manages projects in Cameron, Centre, Clearfield, Clinton, Elk, Jefferson, McKean and Potter counties that address agriculture, forest resource, community development, environmental education, water resource, and recreational needs of the region. See Appendix Q, federal agencies, USDA-NRCS Headwaters RC&D Council for contact information.

The PFBC manages another grant program with their portion of the settlement funds. Projects eligible for funding must benefit fishing, boating, and aquatic resources of Cameron, McKean, Elk or Potter counties. The project site must be kept open and accessible to the public. For more information on program availability, visit PFBC's website: www.fishandboat.com or contact your regional PFBC office (Appendix Q).

Acid precipitation

The term pH is used to quantify whether a solution is an acid or a base. Acidity is the concentration of hydrogen (H+) ions in solution, while basicity is the concentration of hydroxide (OH-) ions. A solution with an equal number of hydroxide and hydrogen ions is considered neutral. The lower the pH, the more acidic the solution, while a higher pH solution is more basic.

Rainwater is naturally slightly acidic—generally having a pH around 5.6—from the atmospheric reaction of carbon dioxide and oxygen to form carbonic acid. However, acidity from non-natural sources has caused rainwater in some areas to have a pH of 4.9 or lower. Acidity in precipitation (rain, snow, fog, dew, etc.) that results from the reaction of air pollutants with water is called **acid precipitation**. These pollutants mainly include sulfur and nitrogen oxides, which turn into sulfuric and nitric acids. The sources

of this pollution include emissions from vehicles, industries, and power generating plants. The effects of acid precipitation are usually felt many miles away from the source. Most pollutants in the project area come from emissions from more populated areas in the east and Midwest and from coal-burning power plants to the west.

The best way to document the pH of rain is to collect rainwater with rain gauges. Rain that is not affected by pollutants will naturally be acidic, with a pH between 5.0 and 6.0; however, a pH below 5.0 may indicate acid precipitation.

The 1990 Clean Water Act amendments include the most significant legislation to lessen emissions contributing to acid precipitation. The amendments promote the use of market-based approaches to reduce emissions, including pollution trading; innovative technologies to reduce sulfur and other emissions; and promoting the use of low-sulfur coal. Through the use of stricter standards for the emission of sulfur and the use of innovative sulfur scrubbers, sulfur emissions are now 20 percent lower than when the legislation was enacted. Unfortunately, affordable technologies have not been developed to remove the nitrogen component (Driscoll et. al., 2001).

The low pH of acid precipitation can adversely affect water quality. In addition, toxic metals in soils may leach into streams and groundwater. Aluminum pollution is amplified in waterways receiving acid precipitation. Both aluminum and acidity disrupt the water-salt balance in fish, causing red blood cells to rupture. Acid precipitation can also leach important nutrients from soils and decrease forest growth. Fortunately, ecosystems can recover from acid precipitation impacts. Research shows that macroinvertebrate life in a stream re-establishes itself within three years of decreased acidity, whereas fish populations may take up to 10 years (Driscoll et. al., 2001).

The acid precipitation issue is particularly difficult because there is little that can be done locally to solve the problem. The addition of alkalinity-producing chemicals to streams is a temporary solution for aquatic systems. Individuals can make changes to reduce their personal contribution to emissions through activities, such as driving fuel-efficient cars and using less energy. Additionally, legislators should be encouraged to support regulations that would further reduce pollution from smokestacks and cars.

Proper management of the numerous dirt and gravel roads that are found throughout the region is important to control erosion and sedimentation

Erosion and Sedimentation

Soil **erosion** is movement of soil by wind or water. A lack of vegetation, poor land management practices, stream channelization, and stormwater runoff greatly increase the rate of erosion. **Sedimentation** is the process by which eroded soil from streambanks, dirt roads, and land settle on a stream bottom.

Erosion and sedimentation are concerns throughout the watershed, particularly in areas with dirt and gravel roads, which are prevalent in many rural areas of the region. Many new dirt and gravel roads are constructed for resource extraction activities, including oil and gas well drilling, timber harvest, and surface mining. Erosion and sedimentation rates may also increase as the result of poor land management practices associated with development, agriculture, and forestry. However, there are regulations in place to control erosion and sedimentation associated with land management practices.

In Pennsylvania, any disturbance over 5,000 square feet must have an Erosion and Sediment Control Plan on site. Earth disturbance permits must be obtained for activities disturbing over 25 acres, including timbering and development. Most agricultural operations do not require earth disturbance permits, but must have a conservation plan to take part in incentive programs. Both earth disturbance permits and conservation plans require provisions for sediment control. A separate permit is required for stormwater management. Local county conservation districts assist in the development of erosion and sediment control and conservation plans (PA Code, 1997c). They also assist with paperwork for earth disturbance permits. However, all permits in High Quality and Exceptional Value watersheds must be approved by DEP.

Sediment control best management practices protect the quality of land and water by preventing erosion and sediment pollution. There are various erosion and sediment prevention and control techniques that are designed specifically for the type of development activity, including agriculture, forestry, and general development practices.

Best Management Practices

Agricultural Practices

Agricultural pollution is the second-leading cause of water quality degradation in Pennsylvania, after AMD. Pasture and hay fields comprise a majority of the agricultural land use within the project area (Table 2-2, Chapter 2). Polluted runoff increases with improper management of nutrients, such as manure and fertilizers, as well as inadequate stormwater runoff controls on crop and pasture fields, barnyards, and storage facilities. Agricultural best management practices (BMPs) focus on nutrient reduction, proper storage of manure, and runoff control techniques.

To reduce the potential for nutrient pollution in streams, farmers may develop a nutrient management plan, and then can participate in cost-incentive programs, such as Environmental Quality Incentives Program (EQIP) and Conservation Reserve Enhancement Program (CREP) (see Chapter 2 for more information on these programs). Cost-incentive programs provide reimbursement for 75 percent or more of incurred costs to implement BMP strategies.

To reduce erosion and sedimentation in runoff, recent efforts have focused on promoting no-till or reduced-till practices, which greatly reduce erosion and fuel costs associated with plowing. The local USDA-NRCS service centers located in DuBois, Coudersport, and Mill Hall can be contacted for more information (Appendix P). Many of the following examples of agricultural BMPs were recommended by the EPA to protect water quality.

Conservation tillage involves leaving crop residue—plant materials from past harvests—on the soil surface versus tilling and mixing the materials into the churned soil. This practice reduces runoff and soil erosion, conserves soil moisture, helps keep nutrients and pesticides on the field, and improves soil, water, and air quality (EPA, 2008).

Nutrient management planning involves accounting for all nutrient inputs on fields to plan and manage nutrient needs and where the nutrients are applied in order to prevent excessive nutrient buildup in soils and to lessen the potential for nutrients leaching into groundwater or polluting streams via runoff (EPA, 2008).

Integrated pest management employs pest control techniques that utilize minimal amounts of chemical pesticide and maximize mechanical and biological control methods to control insects, weeds, disease, and other pests to protect soil, water, and air quality (EPA, 2008).

Conservation buffers vary from grassed waterway filter strips to vegetated riparian buffers, all of which capture potential pollutants from runoff before it enters the stream (EPA, 2008).

Contour farming involves planting that follows the slope of the land, creating ridges that slow the run of water and allow increased infiltration and groundwater recharge.

Silt fences provide a temporary barrier to retain sediment by slowing water flow and promoting sediment deposition on the uphill side of the fence.

Strip cropping is the partitioning a field into alternate bands of different crops, such as row crops, hay, and small grains; when combined with contour farming methods, it allows increased infiltration and filtering of sediment from runoff.

Filter strips are areas of grass planted next to crops to filter sediment, organic matter, nutrients, and chemicals carried in runoff.

Grazing management may involve rotating livestock through different pastures/paddocks to minimize soil compaction, over-grazing, and soil erosion; providing alternate watering sources to deter livestock from seeking water in vulnerable areas of a pasture or directly from a stream running through the pasture to reduce nutrient polluted runoff and erosion and sedimentation; utilizing appropriate vegetation mixes to stabilize soil; and managing stocking rates and timing/season of grazing practices (Toor, Sims, & Maguire).

Animal feeding operations (AFOs) management minimize waste discharges through runoff controls, by using sufficient waste storage and utilization methods, as well as nutrient management planning (EPA, 2008).

Forestry Practices

The amount of water running off a forest during a storm event depends, in large part, on the forest age and proportion affected by timber harvesting. Following a timber cut, there is an increase in the amount of water running off a forest patch, because fewer trees exist to take-up the water or to intercept rainfall to slow its velocity and reduce soil compaction. Runoff carries sediment and nutrients to the stream.

High-grade cuts (which remove the best-quality trees and leave little for regeneration) and other forestry practices that leave few standing trees can increase the amount of runoff to streams. The filtering function of forests can be maintained through a number of sustainable forestry practices, such as dispersing harvesting operations so that only a small percentage of any watershed is affected at any one place and time, utilizing forestry methods that leave an appropriate amount of trees to prevent erosion, leaving a wide enough streamside forest buffer to filter sediment from surface runoff, utilizing thinning practices to maximize filtering capacity and forest health, and implementing additional sediment and erosion control BMPs (Klapproth & Johnson, 2000). These are discussed further in the Land Resources chapter.

Pre-harvest planning is a crucial element in forestry to protect water resources from polluted runoff, erosion, and sedimentation. Pre-harvest planning considers the lay of the land, important natural resources, and potential environmental impacts that may result from the logging activity. The plan should include information on how the operation will proceed in regards to site preparation, road and landing placement, and post-harvest erosion control and site management procedures.

Streamside forested riparian buffer zones should be protected and maintained during the operation to reduce streambank erosion and filter sediment and other pollutants from runoff. An intact forested buffer will also provide shade to help regulate water temperature of the stream, which is especially important for coldwater streams.

Forested wetland buffer zones are important also, not only to protect the vital wetlands, but to provide habitat for displaced wildlife, filter runoff, and recharge groundwater.

Logging roads and landings should be located away from steep slopes and be designed to minimize runoff, drain properly, and provide stabilized stream crossings.

Silt fencing, erosion control mats, and vegetated strips are additional measures that can be employed along roads, around landing areas, and between the operation and any water resources on the site to further control and prevent sediment and polluted runoff from reaching streams.

Sustainable harvest practices, such as those mentioned in Chapter 2, should take precedence over more intensive and all inclusive harvest methods, such as clear-cutting and high-grading.

Integrated pest management techniques that employ the least chemically-intensive approach to controlling pests will reduce the potential for those chemicals and pollutants to be carried off the land by runoff.

Post-harvest site management is planning for erosion control measures to be employed after the harvest. These may include replanting or reseeding the area, installing erosion control devices, and follow-up tree pruning and site management.

Development Practices

Land ordinances can be tailored to protect water resources. One of the biggest development impacts on water resources is developing in floodplain areas. Even small-scale development along a floodplain can reduce its effectiveness at dissipating floodwaters. Removing riparian vegetation can also increase the streambank erosion, causing stream widening and a buildup of sediment on the stream bottom. Effective land ordinances restrict building in these and other sensitive areas, or allow building if certain requirements are met (Klapproth & Johnson, 2000).

Stormwater runoff is another issue that should be adequately addressed in ordinances. During storm events, large amounts of water run off paved surfaces and other impervious areas, rapidly increasing the amount of pollution and water entering streams. Some of these issues can be avoided by preventing certain types of building in sensitive areas and encouraging building options that allow rainwater to percolate into soils.

The elimination and draining of wetlands for development can exacerbate flooding occurrences and severity, reduce a watershed's filtering capacity, and lead to increased sedimentation in streams. Stream channelization, another root cause of increased erosion, sedimentation, and flooding, is sometimes utilized during construction practices.

The main objectives of construction BMPs or stormwater BMPs are to control runoff to reduce flooding, minimize erosion, and provide filters to remove pollutants and sediments from runoff. Numerous construction and stormwater BMPs can be employed at large and small developments, residential settings, road construction, and many other types of development sites to achieve water resource protection. Table 3-4 is a partial list of the practices that can be employed on site to control better control and manage stormwater and runoff. More detailed descriptions and additional BMP

examples can be found at the Stormwater Authority website at: http://www.stormwaterauthority.org/bmp/bmp_presentation.aspx.

Road Maintenance

Municipal and state road maintenance can impact waterways by contributing chemical pollutants, as well as sediments and minerals to area waterways. Residual materials left from the use of salt and cinder to improve safety during winter conditions may be pushed into storm drains or directly dumped into streams and wetlands during winter maintenance activity. This practice may have a direct, negative impact on fisheries and water quality. In addition, excess salt, cinder, and other related debris may be removed from roadways, including bridges that span the waterways, by washing the materials into stormwater drains and over the sides of bridges. Municipalities and Pennsylvania Department of Transportation (PennDOT) road maintenance crews should be encouraged to utilize dry sweeping methods of debris removal to avoid contaminating waterways.

Table 3-4. Development and Stormwater Best Management Practices

Construction BMPs

Land grading to reduce slope steepness and control runoff
Preserving natural vegetation reduces establishment time and control runoff
Stabilizing entrances keeps dirt from construction vehicles on site
Riprap slows runoff velocity and stabilizes ditches
Check dams slow the velocity of runoff in channels like speed bumps to control erosion
Filter berms are temporary ridges of materials used to slow or divert runoff
Grass-lined channels slow runoff, reducing erosion and allowing water to absorb into the ground
Mulching is the placement of materials, such as hay, seed, or wood chips, on exposed soil to temporarily control erosion
Seeding, often combined with mulching, will establish vegetation on disturbed soils to control erosion
Sodding is the placement of established vegetation mats on soil that will root and bind to the soil
Geotextiles are porous fabrics that can be used for a variety of purposes
Gradient terraces are level terraces on a hillside that slow water flow to control erosion
Dikes may be constructed along the perimeter of a site to confine sediment to that area
Brush barriers utilize debris, such as stems, rocks, and brush, to create a perimeter or barrier
Silt fences are fabric barriers that trap sediment
Sediment basins and rock dams capture runoff and allow sediment to settle out

General Construction BMPs

Dust control is utilized to control wind erosion of soil particles
Temporary slope drains funnel runoff through a conduit rather than allowing it to flow over soil
Temporary steam crossing are stabilized crossing to minimize traffic impacts to streams
Vegetated buffers filter pollutants and sediment from runoff from construction sites

Post-Construction BMPs

Dry detention ponds hold small amounts of runoff from isolated storm events causing them to be dry for extended periods; they allow sediments to settle and water absorption into the ground
Wet ponds retain water for longer periods of time and serve the same purpose as dry ponds
Infiltration basin is a small impoundment used to allow water to soak into the ground
Porous pavement is created by mixing material with larger particles to create pores to allow water penetration through the pavement
Alternative pavers are semi-permeable pavement blocks, used in conjunction with porous material in between each paver block, allows increase water infiltration
Bioretention areas are vegetated areas that increase stormwater retention and filtration; examples include vegetated medians, islands, and parking lot perimeters and rain gardens
Swales are vegetated channels to manage stormwater
On-lot treatment of runoff typically refers to stormwater management practices applied at residential homes and lots; there a variety of mechanisms to achieve runoff interception and treatment, including green (vegetated) roofs, rain gardens, vegetated swales, and rain barrels to collect runoff

Dirt and gravel roads are prevalent throughout the Sinnemahoning watershed. Runoff from these roads often causes erosion and sediment pollution in local waterways. The Penn State University's Thomas D. Larson Pennsylvania Transportation Institute houses the Center for Dirt and Gravel Road Studies and the Dirt and Gravel Road Maintenance Program, which is administered at the local level by county conservation districts. The Center's purpose is to provide education, training, and technical assistance to municipalities and other road maintenance professionals to improve roads that in disrepair,

especially those contributing to sedimentation of streams. Funding for **Environmentally Sensitive Maintenance (ESM)** practices comes from the PA State Conservation Commission and PA Bureau of Forestry to improve rural, dirt and gravel roads. ESM practices are essentially the same as BMPs.

These ESM practices result in decreased runoff, erosion, and sedimentation, as well as decreased long-term maintenance costs (Center for Dirt and Gravel Road Studies). In addition to the following examples of ESM practices for dirt and gravel road repair, numerous other surface drains and maintenance techniques are described on the Center's website at: http://www.dirtandgravelroads.org/.

Pipes or culverts convey water under a road to maintain the natural flow pattern of a stream, while reducing runoff and stabilizing the roadway; they can also be used to move ditch flow away from the road to reduce erosion.

"Through-the-bank" pipes serve the same purpose of directing flow, but in this case runoff is piped from the road through an adjacent bank to a vegetated release area.

Headwalls and endwalls are stabilized walls to funnel water into a pipe or to control outflow. These walls reduce erosion surrounding the pipe and prevent water from redirecting around the pipe.

Sub-surface drainage techniques are used to add support to the roadway and allow water to drain through more easily, as well as allow the water to be slowly released, rather than being concentrated in a ditch.

Ditch flow redirection funnels water to a vegetated buffer area, rather than releasing it directly to a stream, to allow groundwater recharge and to let sediment and pollution to be filtered out.

High-water bypass is a subsurface drainage area on a low, flat section of the road where high flows may pass over the surface of the road to reduce damages overall.

Driving Surface Aggregate (DSA) is a road surfacing material composed of varying sized particles that lock tightly together, yet provide water infiltration, dust reduction, and decreased erosion. In addition to the environmental benefits provided by DSA, it requires less maintenance than a tradition dirt and gravel road, and it retains its structural integrity longer.

Bank benches, much like terraced hillsides, are vegetated steps in an embankment that slow runoff.

The Dirt and Gravel Road Program funding is administered at the local level by county conservation districts. Of the six counties of the Sinnemahoning watershed, Potter County received the most funding for dirt and gravel roads improvement of the 2009–2010 county allocations. In fact, Potter County received the sixth largest allocation throughout the state, with $132, 361 (Center for Dirt and Gravel Road Studies). See Table 3-5 for more information on the amount of each county's allocation.

Table 3-5. Sinnemahoning Dirt and Gravel Road County Allocations 2009–2010

County	2009–2010 Allocation	Percentage of Overall Funding	Rank Among All Counties
Potter	$132,361	3.75%	6th
Clearfield	$66,577	1.89%	17th
Cameron	$33,094	0.94%	32nd
Elk	$24,025	0.68%	43rd
Clinton	$22,747	0.64%	45th
McKean	$21,129	0.60%	47th

Impaired Waterbodies

In order to satisfy the requirements of the Clean Water Act, states must report to EPA every two years on the status of its waterways and provide a list of waterways not meeting water quality standards. Water quality standards are a combination of the designated use for a particular waterbody and the water quality criteria to protect that use. Typically, states report on the status of all assessed waterbodies, and this list is referred to as the Integrated Waterbody List (Pennsylvania). Streams are assigned to one of five categories based on their status on this list and states are required to develop a Total Maximum Daily Load (TMDL) for streams in Category 5. These streams include those that are not meeting their designated uses, excluding those where point source pollution controls may alleviate the problem.

Total Maximum Daily Load

All waterways are classified with a designated use; those that do not attain this use are considered to be impaired and must have a TMDL study conducted. The study is performed to determine the maximum amount of pollution that a waterbody can handle, while meeting certain safe water quality standards. The subsequent report on the study identifies objectives and methods to restore and maintain good water quality. The targeted pollutant reduction is the difference between the maximum pollution a waterway can tolerate and its existing amount of pollution.

Over 118 miles of waterways within the project area have been identified on the 2008 Pennsylvania Impaired Waterbody List. A complete listing of these 52 is available in Appendix H. To date, five TMDL studies have been completed for West Creek, Dents Run, Spring Run, Trout Run, and Bennett Branch.

Bennett Branch Sinnemahoning Creek Watershed TMDL (DEP, 2008a) addresses metals and pH impairments resulting from drainage of abandoned mines in three segments of the watershed. While there are no active mining operations in the study area, the TMDL report does account for the potential inclusion of a future active mining operation in addition to the present wastewater treatment facility of Jay Township. Historic mining operations and coal refuse have led to the metals and pH impairments of the watershed. Efforts are underway to correct these impairments through the installment of a major active treatment facility in Hollywood.

Dents Run Watershed TMDL (DEP, 2005a) addresses impairments to 22 stream segments caused by high levels of metals and decreased pH resulting from AMD. Abandoned mine land reclamation and passive AMD treatment systems have been utilized to correct these impairments. These efforts are ongoing and anticipated to continue through the cooperation of state agencies and the Bennett Branch Watershed Association.

Spring Run Watershed TMDL (DEP, 2007b) addresses AMD impairments resulting in high levels of metals and low pH affecting Spring Run, Stony Brook, and several unnamed tributaries. At the time of the study, there was one active mining operation in the area, but the majority of the impacts were due to discharge from abandoned mines.

UNT 24679 to Trout Run TMDL (DEP, 2004) addresses high metals and low pH resulting from AMD impairments to this watershed. Several projects to passively treat AMD, reclaim abandoned mine lands and refuse piles, and to seal mine openings have been completed throughout the area.

West Creek Watershed TMDL (DEP, 2007c) addresses impairments caused by high levels of metals and low pH from AMD from past mining operations, spoil piles, and a railbed composed of mine spoil materials.

Water Quality Trading

Water quality trading is applied when facilities with higher pollution control costs, called "buyers" purchase the right to pollute from "sellers", or other companies that have reduced their pollution output below their required limits. This enables polluters to reduce pollution at a lower cost than making reductions at their facilities. For instance, it may be cheaper for a polluter that discharges nitrates to buy credits from a polluter that can reduce its nitrate discharges more easily. Or, it may be cheaper for a polluter to pay for the installation of BMPs on a farm than to develop technologies to reduce pollution from nitrates. If the same pollution reduction goal can be achieved through trading, then it is a benefit to both the company and the farmer.

Generally, certain criteria must be met for a water quality trading program to work. There must be a "driver" or reason why pollution reductions are being sought. This is usually a TMDL, which requires point-source polluters to reduce their level of pollution by a certain amount in order to meet water quality standards. Water quality trading is most effective if there are different costs to control pollution within a watershed, making it more economically profitable to trade. Also, the levels of pollution must be such that not all sources must reduce their inputs. This provides a reason to bargain. Finally, watershed stakeholders and state regulatory agencies must be willing to try an innovative approach and engage in trading design and implementation. Water quality trading should be conducted within a legal, regulatory framework, such as the NPDES Program, which requires point-source polluters to obtain permits to discharge pollution in waterways of the U.S.

If nonpoint source pollution is present, a company could potentially pay for the implementation of BMPs in exchange for polluting over its target limit. All water trading activities must comply with the requirements of the Clean Water Act, as well as state and local requirements, including public notification of transfers of trading credits. One potential problem with water quality trading is localized impacts. For example, all of the credits purchased may discharge into the same small stream. Because of these possible complications, it is important that the trading program be designed so that localized impacts do not occur. For instance, the amount of credits that can be purchased by certain polluters can be set by the regulatory agency. Water quality trading is usually most successful in developed areas, and it is unclear whether such mechanisms would be effective in the project area.

Water Quantity

Groundwater recharge plays a major role in the availability of water for human consumptive uses. Groundwater recharge is the amount of water that has permeated the ground during periods of precipitation and replenished groundwater supplies. During periods of drought, more water is being withdrawn and used than can be recharged into the ground. Some areas in Pennsylvania and across the U.S. withdraw more water than can be recharged on a regular basis. In these areas, water quantity, in addition to water quality, becomes an extremely important issue.

Unusually low water level at the George B. Stevenson Dam reservoir at Sinnemahoning State Park in the fall of 2008

Water is withdrawn from both surface and groundwater sources. Many public water suppliers utilize groundwater or surface water from local waterways, and treat it to ensure that it meets safety standards for drinking water. In many rural and suburban areas, public water systems are not available, and residents depend upon private wells and springs.

Due to the rural location of the project area, the majority of residents rely on private wells and springs for their water needs. Public water suppliers are available in some of the more populated areas of the watershed, such as Emporium and Saint Marys.

When groundwater is utilized, a well is drilled into the **aquifer**—an underground area containing groundwater. There are two kinds of aquifers—confined and unconfined. In a **confined aquifer**, groundwater is under pressure because there is a layer of impermeable or nearly impermeable rock above it to confine the groundwater. When a well is drilled into a confined aquifer, pressure forces the water up the borehole. These are commonly referred to as artesian wells, and some receive so much pressure that they flow without being pumped. **Unconfined aquifers** do not have a layer of low permeability rock above them to restrict flow and create pressure. Wells established in unconfined aquifers must be pumped (Fleeger, 1999).

Pennsylvania State Water Plan

In 2008, an updated draft of the Pennsylvania State Water Plan was unveiled, providing a vision to sustain water supply with goals and recommendations. The plan includes an inventory of water availability, an assessment of current and future water use demands and trends, and an assessment of resource management alternatives and proposed methods of implementation. It also provides an analysis of problems and needs associated with specific water resource uses, such as navigation, stormwater management, and flood control (DEP, 2008d).

In the updated Pennsylvania State Water Plan, information is broken down into six watershed regions—Ohio River, Great Lakes, Potomac River, Delaware River, upper/middle Susquehanna River, and lower Susquehanna River. The Sinnemahoning Creek project area is located within the upper/middle Susquehanna region.

Water Use

In 2000, it was estimated that Pennsylvania withdrew 9,950 million gallons of water per day. Of the water withdrawn, 93 percent came from surface waters. Table 3-6 shows water withdrawal trends in Pennsylvania from 1990 to 2000 (Hutson, et al., 2004).

Table 3-6. Water Use

	Groundwater			Surface			Total		
Year	**Fresh**	**Saline**	**Total**	**Fresh**	**Saline**	**Total**	**Fresh**	**Saline**	**Total**
1990	1,020	0	1,020	8,810	0	8,810	9,830	0	9,830
1995	860	0	860	8,820	0	8,820	9,680	0	9,680
2000	666	0	666	9,290	0	9,290	9,950	0	9,950

All values are in millions of gallons per day

(***Sources*: *Solley, Pierce, & Perlman, 1993 & 1998; Hutson, et al., 2004***)

It was estimated that the largest water withdrawals in the U.S. in 2000 were used for thermoelectric power—48 percent—and irrigation—34 percent. Public water supply utilized 11 percent, while the remaining seven percent was utilized for industrial, mining, livestock, and aquaculture purposes (Huston, et al., 2004).

Within the entire Susquehanna River Basin, approximately 500 million gallons of water per day (Mgal/day) are withdrawn for consumptive uses. Of that, approximately 200 Mgal/day are utilized for public water supply, 130 Mgal/day for thermoelectric generating plants, 120 Mgal/day for agriculture, and

30 Mgal/day for industries. Hospitals, prisons, institutions, and golf courses account for approximately 60 Mgal/day of consumptive water uses (DEP, 2008d).

The majority of the water withdrawn from the upper/middle Susquehanna region of Pennsylvania was utilized for thermoelectric, public water supply, and industry uses, respectively. It was estimated that 71 percent of water was used for utilities and thermoelectric plants, while 19 percent was utilized by public water suppliers, and six percent was used for industry. The remaining four percent was comprised of mining, commercial, and agricultural uses (DEP, 2008d).

Thermoelectric generating power plants and public water suppliers are mandated to register water withdrawls through DEP. In addition, any industry that withdraws more than 10,000 gallons per day must also register. No additional industries have met that requirement within the upper West Branch Susquehanna River, which includes the headwaters of the West Branch Susquehanna River to the point where Sinnemahoning Creek drains into it; and 97 percent of the registered water withdrawn from this region is used for thermoelectric plants and three percent is used by public water suppliers (DEP, 2008d).

Water withdraw associated with gas well drilling is another major concern throughout the region. Depending on the type of natural gas exploration, different amounts of water are required to fracture the bedrock surrounding the formation to release the gas. Marcellus shale gas formations require millions of gallons for well fracking water, which results in waste brine water that contains salt and other pollutants. Often, this water must be disposed of with a water treatment facility offsite, thereby removing it from the watershed. With limited regulatory and monitoring resources, there may be violations that include illegal disposal of untreated water into local waterways, illegal water withdraws, and increased pressure on small water treatment facilities.

Flooding and Drought

In addition to water withdraw, flooding and drought are major concerns related to water quantity. In fact, the Susquehanna River is one of the nation's most flood-prone regions. In response to flooding throughout the region, the Susquehanna River Basin Commission (SRBC) and other state and federal agencies developed a network of dams and reservoirs to control flooding, as well as a the Susquehanna Flood Forecast and Warning System to warn communities of flooding potential due to weather conditions. The George B. Stevenson Dam at Sinnemahoning State Park is one of the flood control structures in the Susquehanna River basin network. Its primary function is to offer flood protection, but secondarily it offers recreational resources to the region.

Concerns have been raised by local residents and business owners regarding the management of water levels in the reservoir behind the dam. Several community members feel that the dam should be controlled by a trained professional dam tender to better maintain consistent water levels in the reservoir for the benefit and safety of the public. In the summer of 2008, water levels at the reservoir dropped so severely that much of the lake bottom was exposed. While state agency personnel investigated the cause of the severe drawdown, they also took advantage of the opportunity to install fish habitat structures in the reservoir area. Current drought information can be obtained from the DEP Bureau of Watershed Management website: http://www.depweb.state.pa.us/watershedmgmt.

Watershed Protection Laws

Clean Water Act

The 1977 amendments to the federal Water Pollution Control Act became known as the Clean Water Act (CWA). This act establishes the basic structure for regulating discharges of pollution into waterbodies of the U.S.. The CWA gives the EPA the authority to regulate pollution discharges and set water quality

standards. It also makes it unlawful for any person to discharge pollution from a "point source" into navigable waters without a permit. The CWA funds construction of sewage treatment plants and recognizes the need for planning to address "non-point source" pollution problems, as well (Elder, et al., 1999).

NPDES Permits

One of the ways that the CWA is executed is through the NPDES, whereby DEP issues permits for point source discharges. DEP and local conservation districts are responsible for issuing point source permits to industrial operations, municipal wastewater treatment plants, concentrated animal feeding operations, and households. A list of current permits can be found in Appendix F.

In Pennsylvania, an earth disturbance activity from one to five acres requires an NPDES permit if a point source exists at the site. Any disturbance over five acres requires a permit regardless of whether or not there is a direct point source to a waterway. Farmers do not need to obtain an NPDES permit unless the farm meets the criteria to be considered a concentrated animal feeding operation (CAFO). However, they must complete a conservation plan. Timber operations fewer than 25 acres are also exempt from NPDES permits, but must complete Erosion and Sediment Control Plans. Active NPDES permits may be found at the EPA Envirofacts website (http://www.epa.gov/enviro/index.html).

Nutrient Management Program

The Pennsylvania State Conservation Commission, formed through the Pennsylvania Nutrient and Odor Management Act (NOMA), administers the Pennsylvania Nutrient Management Program (PNMP). The program is controlled by the commission and county conservation districts with approved delegated authority. Concentrated Animal Operations are required to participate in the program, as well as any operation that wishes to gain liability protection under the act, or has received financial assistance through NOMA for BMP installation. In addition, any agricultural operation in violation of the Pennsylvania Clean Streams Law may be required to submit a nutrient management plan that meets NOMA requirements (PNMP).

Farmers participating in NOMA must develop and implement approved nutrient management plans. Nutrient management planning is a series of BMPs designed to reduce nutrient pollution by balancing nutrient inputs with nutrient requirements. Plans must be developed by a certified Pennsylvania Department of Agriculture (PDA) Nutrient Management Specialist. The intent of NOMA is to address water quality issues from such activities as animal number and density, nutrient losses from manure storage and handling areas, nutrient runoff from animal concentrated areas, and manure fertilization. Questions about the program should be directed to the appropriate county conservation district. Financial and technical assistance is available (PNMP).

Pennsylvania Sewage Facilities Act

Sewage is a major cause of pollution in Pennsylvania streams. Sewage pollution can come from municipal and non-municipal sewage treatment plants, as well as from private septic systems. This pollution can occur from plants that have inadequate capacity due to population growth or poor design and private systems that are not properly built or maintained. In some cases, both sewage waste and stormwater enter a municipal system through the same infrastructure, and the plant is not capable of handling all of this waste at once. The overflow waste deposited directly into the stream is called a combined sewage overflow (CSO) event.

The main type of pollution entering streams from sewage treatment plants and septic systems is inorganic and organic nutrients, sediment, and bacteria. Nutrients can lead to excessive plant growth, which depletes the oxygen levels of streams. Sediment is responsible for clogging the gills of aquatic

organisms and affecting in-stream hydrology and habitat. Bacteria can be harmful, and sometimes fatal, to both stream life and humans.

As a result of ongoing problems with unlawful sewage disposal, the Medix Inn Restaurant in Medix Run has been granted a permit from DEP to construct a sewage treatment facility to handle the large volume of wastewater from the establishment. Previous to this, wildcat sewers that allowed untreated sewage to be discharged into the Bennetts Branch had served both the village of Benezette and the Medix Inn (Russ Braun, Jones Township).

Wildcat sewers continue to serve the rural villages of Sterling Run, Driftwood, and Sinnemahoning, allowing untreated wastewater to enter the Driftwood Branch. Plans should be formulated to address these issues. Problems in these areas are addressed locally by installing holding tanks. Holding tanks are expensive to maintain, and limit development in these villages (Russ Braun, Jones Township).

Stream impacts caused by AMD can sometimes mask the effects of other pollutants, such as septic systems and agricultural runoff. In fact, these other pollutants can add pH and alkalinity to a stream, canceling some of the harmful effects of acidic mine drainage. Many streams in the watershed have a HQ or EV designation, which put limitations on the types of pollutants that may be permitted to enter a stream. Sewage pollution can have a significant negative impact on stream ecosystems and can affect the use of the stream for recreation and water supply. Six sewage treatment plants have permits to discharge treated wastewater to local streams. Depending on the age, condition, infrastructure, capacity of the system, and treatment methods used, the amount of waste matter entering streams from each of these plants may vary greatly.

Sewage treatment systems can affect groundwater storage quantity depending on the source of the water supply used for sewage disposal. If water entering a sewage treatment plant was obtained from sources of public water derived from wells, and thus groundwater, the water budget for that source will decrease, because the treated water is typically discharged to a surface body of water. Conversely, private on-lot septic systems return treated water to the groundwater storage area, and therefore don't disrupt the natural hydrologic budget.

Benezette Township recently completed an Act 537 Sewage Facilities Plan that will provide public sewage treatment to the Benezette area. The plan calls for a sewage treatment plant to be constructed in Benezette and public sewers to serve Benezette, the Elk Country Visitor Center, and a major subdivision on Winslow Hill (Russ Braun, Jones Township).

The Pennsylvania Sewage Facilities Act (Act 537) was enacted in 1966 to repair existing sewage disposal problems and to inhibit future problems. Defective sewage disposal systems can create a grave hazard to public health and the environment. They pose a risk of pollution to public and private drinking water sources, as they frequently can be directly discharged into the groundwater, and can expose various bacteria, viruses and parasites to humans and animals. The contaminated groundwater also pollutes surface water supplies as it discharges into those streams and reservoirs.

The major provisions of Act 537 are (DEP[1]):

1. All municipalities must develop and implement an official sewage plan that addresses their present and future sewage disposal needs.

2. Local agencies are required to employ both primary and alternate Sewage Enforcement Officers (SEO), who are responsible for implementing the daily operation of that agency's onlot disposal systems (OLDS) permitting program.

3. Local agencies, through their SEO, approve or deny permits for construction of onlot sewage disposal systems prior to installation.

4. DEP provides grants and reimbursements to municipalities and local agencies for costs associated with the Act 537 planning and permitting programs.

5. An Environmental Quality Board (EQB) must adopt regulations establishing standards for sewage disposal facilities.

6. A Sewage Advisory Committee (SAC) reviews existing and proposed rules, regulations, standards, and procedures, and then advises the Secretary of the DEP.

Abandoned Mine Drainage Legislation

The Federal Surface Mining Control and Reclamation Act (SMCRA) of 1977 established mandatory uniform standards for coal mining activities on state and federal lands, including environmental performance protection standards to reduce adverse effects of fish, wildlife, and other environmental values. An important component of this legislation is that mining companies are required to conduct remediation efforts for environmental degradation caused after the Act's passage (mine discharges, coal refuse, etc.) It gives companies an incentive to reduce environmental impacts in order to avoid the high costs of remediation. The Act also created the Abandoned Mine Reclamation (AMR) fund to help pay for the clean up of mine lands abandoned before 1977, which are not covered by the new standards and regulations (Environmental Literacy Council, 2002).

This Act, along with the Clean Water Act, has important implications for mining activities throughout Pennsylvania. Future mining activities in the Sinnemahoning watershed must comply with SMCRA, as well as the anti-degradation component of the Clean Water Act (Environmental Literacy Council, 2002).

CHAPTER 4. BIOLOGICAL RESOURCES

Ecosystems are groups of plants, animals, and their physical environments that interact together. Plants clean water, air and regulate temperatures. Plants and animals are essential for healthy ecosystems and clean water. Biological resources sustain and enhance our quality of life. Plants clean water, air, and regulate temperatures. Wood products, crops, and livestock offer economic income to the Sinnemahoning region. Wild game and fish offer opportunities for hunting, fishing, and wildlife watching. Trees, wildflowers, birds, and butterflies enhance our outdoor experiences. Bees and other pollinators ensure sufficient crop yields and beautifully blooming gardens. Having a diversity of living creatures is termed biodiversity. Humans, too, are a biological component of watersheds and ecosystems. In this chapter, biological resources, habitats, and threats to those resources will be discussed.

Unique habitats, like this sphagnum bog, characterize the Sinnemahoning Creek watershed

Natural Setting

Ecoregion Characteristics

An ecoregion is an area of land or water containing similar geographic characteristics and species that interact ecologically. Although both the physiographic province and ecoregion delineations consider the geology of the area, the difference is that an ecoregion also takes into account the climate, ecology, animals, and plants.

Each ecoregion is subdivided into divisions and subregions. The project area is located within Unglatiated Allegheny High Plateau section of the North Central Appalachians division of the Atlantic Highlands subregion of the Northern Forest ecoregion (Woods, Omernik, & Brown, 1999).

The Unglatiated Allegheny High Plateau ecoregion is characterized by rugged, steep, forested hillsides and narrow river valleys. Entrenched streams typically travel along high-gradient channels with prevalent waterfalls. The region experiences a cool, humid climate, along with long winters and a short growing season. This short growing season, coupled with poor soils, decreases the potential for agriculture throughout the region (Woods, Omernik, & Brown, 1999).

Throughout the nineteenth century, the Sinnemahoning watershed was extensively timbered for its large, rich hardwoods, such as chestnut, oak, and maples. Due to such extensive harvesting and the chestnut blight that ravaged the native species throughout its range, the forests of the region are primarily composed of sugar maple, beech, and hemlock today (Woods, Omernik, & Brown, 1999). Other common tree species associated with this ecoregion include red maple, sweet birch, black cherry, white ash, yellow birch, eastern white pine, yellow-poplar, and cucumbertree, and oaks (McNab & Avers, 1994).

Common wildlife that inhabit this region include mammals, such as black bear, bobcat, coyote, whitetail deer, eastern chipmunk, red and gray fox, woodchuck, raccoon, opossum, squirrels, white-footed mouse, striped skunk, cottontail rabbit, porcupine, and deer mouse, among many others (McNab & Avers, 1994). Today, populations of black bear, beaver, and bobcats are rebounding from the devastating effects that historic overharvest has had on their species. Elk were reintroduced to the area, and now form the largest herd east of the Mississippi River.

Familiar birds, such as wild turkey, ruffed grouse, woodcock, wood duck, and several species of warblers and hawks occupy the area, as do bald eagles. The red-backed, spotted, and northern dusky salamanders can be found in woodlands, wetlands, and streams of the Sinnemahoning watershed. Eastern hellbender salamanders are unique, aquatic amphibians that can be found in streams of the watershed. Timber rattlesnakes, tree frogs, wood turtles, and northern coal skinks inhabit the ecoregion, along with freshwater mussels (McNab & Avers, 1994).

Eastern larch

Coldwater fish species are common in the high quality streams of the watershed. Common species include native brook trout, but other non-native species of brown and rainbow trout are commonly found here, as well as dace and darters. Reservoirs and slower moving warm waters of the watershed are often inhabited with bass, sunfish, and bluegill. A complete listing of the fish and wildlife species found throughout the watershed can be found in Appendix I.

Natural Habitats

Forest Habitat

To see a glimpse of what settlers experienced as they entered the old-growth forests of the Pennsylvania Wilds region, one need not go far from the Sinnemahoning watershed. A few small segments of old-growth forest, along with many stands of mature second-growth forests nearing a century old, can be found here in Sinnemahoning. Below is a listing of old-growth natural areas of the Sinnemahoning watershed. More information about old-growth natural areas can be obtained by contacting the DCNR Bureau of Forestry (DCNR[3]).

The **Quehanna Wild Area** is 48,000 acres of small second-growth mixed hardwoods. The **Wykoff Run Natural Area** is a 1,215-acre patch within the Quehanna Wild Area at the headwaters of Wykoff Run. In all, they form an impressive stand of large, majestic forest, including a large stand of paper birch. Most natural openings in these two areas are peatlands. Other openings have been created by PGC for elk staging areas and wildlife food plots. These large open meadows bloom with wildflowers in spring and summer, offering ample opportunities for bird and wildlife viewing. This area is located along Wykoff Run Road near the town of Sinnemahoning.

Johnson Run Natural Area is a rugged forest full of large, old trees and boulders in the Elk State Forest near the town of Driftwood; the area is not marked. Johnson Run is the last small tributary to enter the Driftwood Branch before its confluence with Bennett Branch to form the Sinnemahoning Creek mainstem. The forest here is reminiscent of the forests early settlers encountered as they traveled through the region, and they protect the high quality cold water of Johnson Run.

Lower Jerry Run Natural Area surrounds its namesake stream, which is a high quality coldwater fishery that enters directly into the mainstem of Sinnemahoning Creek right along the dividing line between Cameron and Clinton counties. An old-growth stand of white pine and hemlock grows here and protects important reptile and amphibian species. This natural area is very remote, and it can only be accessed by hiking into it.

Bucktail State Park Natural Area is a scenic driving route that follows Route 120 through the watershed. While it is not an old-growth forest per se, much of the forest lining its path are comprised of mixed hardwoods representative of the northern forests that historically lined the hillsides. The vast swaths of uninterrupted habitat on either side of the road host populations of elk that sometimes venture near enough for passersby to catch a glimpse of the majestic creatures. Route 120 is a common link to the aforementioned old-growth natural areas, as well.

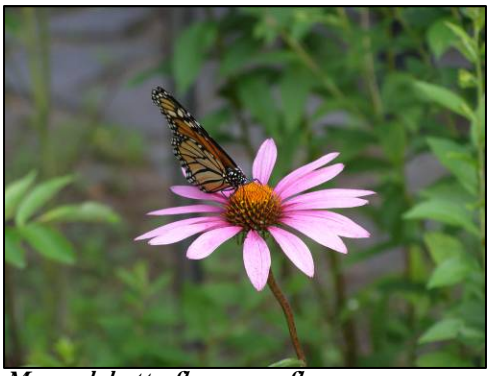
Sproul State Forest is a proposed Natural/Old-growth Forest Area, which encompasses the lower end of Sinnemahoning Creek and its mouth to the West Branch Susquehanna River near the village of Keating in Clinton County. This forest block is comprised of large, second-growth trees.

Tiger swallowtails

Forests play an important role in the regulation of global climate change and air quality. Carbon dioxide, one of the most abundant greenhouse gases, is naturally present in the atmosphere. When plants "breathe," the process of photosynthesis converts water and carbon dioxide from the atmosphere into sugar for the plants' growth and oxygen, which is released back into the air. The carbon removed from the atmosphere is stored, or sequestered, in the plant components (leaves, stems, branches, roots, etc.) When leaves or trees are downed, the carbon is contributed to the soil matter. Carbon dioxide is also released back into the atmosphere through respiration and the decomposition of organic matter. This natural exchange of carbon, along with other greenhouse gases (including those released from the burning of fossil fuels and gas combustion), contributes to the "greenhouse effect."

In the absence of greenhouse gases, the earth would be a cold, desolate planet that harbors no life. Excess greenhouse gases have the opposite effect, global warming. Human activities, such as deforestation, poor agricultural practices, vehicle exhaust, and the burning of fossil fuels, have greatly increased the contribution of carbon dioxide to the atmosphere. The preservation of forests, maintenance of riparian forest buffers, and forest management practices that leave residual trees aid in carbon sequestration, which in turn hinders global warming.

Protecting and maintaining the contiguous (uninterrupted) forest blocks that dominate the watershed is critically important. Sustainable forestry practices and the use of Best Management Practices (BMPs) when harvesting forest resources will ensure the future health of forest ecosystems throughout the watershed. Service Foresters are available to assist landowners with technical advice on sustainable forest management. Certified foresters provide cost-share assistance, forest stewardship plans, regional planning, education, and assistance with tree planting and riparian buffer restoration (DCNR[4]).



Monarch butterfly on coneflower

By selectively planning a harvest with a certified forester, one can ensure a continual return for their investment. Trees can be harvested on a staggered schedule to provide recurring income, while quality trees are left to reseed the area. Nearby, competing trees of less value can be removed to allow remaining trees a greater allocation of resources and nutrients, ensuring a faster growth rate and higher quality of wood. As

A vast majority of the Sinnemahoning Creek watershed is forested, providing abundant habitat for wildlife

tree leaves continue to fall to the ground each autumn, the soil is amended with organic matter and nutrients, which also contribute to better growth rates. Erosion and sedimentation are reduced by leaving trees to stabilize the soil.

Pruning and other maintenance activities will improve the quality of the timber in the forest lot. Selectively eliminating diseased and infested trees will improve the overall health of the forest. Wildlife should also be considered when harvesting a forest area. Brush piles made of cut limbs and saplings provide cover for small game, birds, reptiles, and amphibians. Dead, standing trees (called snags) are utilized by cavity nesting birds and other wildlife for shelter, while the insects that eat the decaying wood provide food for forest birds. Large or hazardous snags should be downed to eliminate the safety risk, though. Downed woody debris should be left for creatures of the forest floor, such as amphibians, spiders, insects, etc.

Maintaining tree species diversity in a forest is important to protect the forest from the devastating effects of insects and disease. Plantation-style monocultures (an area consisting primarily of one species) are particularly vulnerable to invasive pest species that attack one species or family of trees, such as the emerald ash borer. More will be discussed on invasive species later in this chapter.

Forestlands offer products other than timber, which can be utilized to boost the local economy with products that represent the timber culture and natural heritage of the Sinnemahoning watershed. Herbs and mushrooms harvested in a sustainable manner provide educational, recreational, and economical benefits. Botanicals and medicines may be derived from forest species. Wreaths and other crafts can be made from limbs, vines, and other forest vegetation. Other forest products include: maple syrup, fence posts, fuel wood, fruits, and nuts.

Successional Forest Habitat

Succession is the natural process of forest regeneration overtime. When a disturbance occurs in a forest, such as a logging or a natural event, or as the edge of a forested area transitions over time, the process of succession occurs. For example, if an area adjacent to croplands laid fallow, herbaceous vegetation, like wildflowers and grasses, would occupy the area. As time went on, shrubs and tree seedlings and saplings would grow. Eventually, the trees would grow into a mature forest. The entire process may take a very long time and can occur on varying scales from several hundred acres to very small areas.

A young porcupine, a common mammal of the watershed

During the early stage of the process, when the land is primarily occupied by grasses, herbaceous vegetation, small shrubs and tree saplings, it is referred to as **early-successional** habitat. This edge habitat is critical for certain species of wildlife. During this stage, grasses, seeds, berries, and twigs provide abundant forage, while shrubs and dense vegetation offer cover and safety for birds and small mammals. A variety of wildlife species prefer this stage of succession, such as rabbits, warblers, and American woodcock, while other species of warblers may avoid such areas (Rodewald, 2006).

During the **middle-successional** stage of forest regeneration, otherwise known as the pole timber stage, trees

dominate the landscape. The understory is still relatively dense, with seedlings and some shrubby species that are tolerant of shade. Salamanders and interior-forest birds prefer this type of transitional habitat (Pennsylvania Envirothon, 2007).

Once trees mature, the habitat is referred to as a **mature forest** habitat. During this stage, trees that have been overtopped by competing, faster-growing, or longer-lived trees tend to die and form "snags" that provide food, perches, and opportunities for cavity nesters, such as owls, woodpeckers, raccoons, and even bats. Retaining downed wood on the forest floor provides habitat for invertebrates, reptiles, amphibians, etc. In a mature forest, there is a greater abundance of mast-producing trees that offer acorns, nuts, and soft or fleshy fruits and seeds for wild turkey, black bear, and pileated woodpeckers that prefer mature forest habitats (Pennsylvania Envirothon, 2007).

Landowners and forest land managers should promote differing stages of succession to offer a variety of habitats for wildlife species. Also, when timbering an area, foresters should stagger and soften the edges of cuts by leaving some older trees and shrubs on the perimeter, and cutting in a meandering fashion to avoid abrupt transitions between habitats.

Urban Forestry

Forestlands provide habitat for plant and animal species, timber for fuel and wood products, income possibilities from other forest products for private forest owners, and recreational opportunities. Not only are rural forest blocks and riparian buffer areas important for the sustainability of healthy ecosystems and water quality, but urban forestry also is an important aspect of watershed conservation. Trees planted in urban settings and along roadways perform a number of functions, ultimately improving the livability and attractiveness of communities. Trees in urban settings regulate heat radiation and ambient air temperature by shading sidewalks, parking lots, and roads. They control erosion and help manage stormwater. Trees can be utilized to reduce energy costs and improve property values. Trees in urban settings improve air quality, improve a community's sense of pride, and enhance business and economic development. The Pennsylvania Department of Conservation and Natural Resources (DCNR) Bureau of Forestry has resources available on rural and community forestry, including a listing of certified service foresters and various programs available to assist individuals and communities (DCNR[4]). A listing of local service providers is available in Appendix Q.

Emporium is a certified Tree City USA

If a town or city, regardless of size, meets four standards set forth by the Arbor Day Foundation, it may become certified as a **Tree City USA**. Emporium has been a Tree City USA for 21 years, and Saint Marys has been one for four years. To meet the requirements, a community must have: a tree board department, tree care ordinance, community forestry program with an annual budget of $2 per capita, and an Arbor Day observance and proclamation. There are many benefits associated with becoming certified as a Tree City USA, including an action framework set-up to ensure the community success in implementing its forestry program, educational opportunities, improved public image and sense of community pride, preferences for financial assistance, and publicity (Arbor Day Foundation, 2007).

Backyard Habitat

Developing or maintaining a woodlot and natural habitat in your yard attracts a variety of wildlife, such as songbirds, butterflies, toads and other amazing creatures, which may help to reduce stress and anxiety at the end of a long work day or commute. These species also help to rid your yard of pests, and they may even reduce or eliminate the need for chemical pesticides.

Forests, woodlots, and backyard habitats offer opportunities for families to learn and bond together while enjoying their own little ecosystem. Backyard habitats and nearby natural areas also encourage outdoor recreation, which helps to combat the childhood obesity epidemic sweeping the nation, since children are becoming more accustomed to sitting in front of the television and playing video games. Having even a small backyard habitat or nearby woodlot offers opportunities for nature exploration, while children remain close to home in a safer area.

Private property owners are encouraged to consider landscaping with native wildflowers, trees, and shrubs versus mowing their entire lawn, especially areas adjacent to water sources. Native plant species that are adapted to the local weather conditions are best, as they require minimal watering and maintenance and are often preferred by native wildlife. Reducing the amount of "lawn" on your property will also save money in maintenance costs for gasoline powered equipment and it will save energy used for electrical equipment, which both reduce the amount of pollutants that are released into the air.

Planting trees on your property will help to manage stormwater runoff and erosion. When planted according to a specific scheme, one can create windbreaks using evergreen trees and native shrubs to protect their homes from harsh winter winds, which may help to reduce home heating bills. In addition to planting wind breaks, shrubs planted close to a home create "dead air" space, which adds another insulating layer to your home. Deciduous shade trees can be utilized to reduce energy bills, as well. During summer months when deciduous trees have a full crown of leaves, shade on the house will lower the temperature naturally, reducing cooling costs. It has also been shown that shading the cooling unit itself can result in a 10 percent increase in efficiency. In the winter, when the tree crown is bare, sunlight is permitted through to warm the home and reduce heating costs (U.S. Department of Energy, 2007).

Grassland Habitat

Reducing the percentage of mowed-grass lawn on one's property will save money, reduce energy use, fuel consumption, and pollution emissions. Native wildflowers, grasses, and forbs can be used to beautify a property, enhance ecological interactions, and reduce the overall amount of lawn to be maintained. Native grassland habitats provide food, cover, and nesting material for a diversity of wildlife. Many of the native species that are attracted to grasslands offer natural pest control of insects, weeds, and rodent pests. Not only does this reduce the cost of controlling these pests, but it is more environmentally friendly compared to harsh chemical pesticides.

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) suggests planting drought tolerant warm season grasses suitable to the region, such as big bluestem, little bluestem, buffalo grass, and beardgrass. These grasses provide shelter and forage for wildlife, improve soils, and require little maintenance. When possible, hay harvest should be scheduled around the nesting season for ground-nesting birds, generally before May 1st and after August 15th. This will allow enough time for regrowth to provide cover throughout the winter months (USDA-NRCS, 2007).

Wetlands

Wetlands are functional ecological components of a watershed. Wetlands are defined as having anaerobic or hydric soils, wetland vegetation, and evidence of the area being inundated with water (permanently or seasonally). Wetlands aid in groundwater recharge and filter excess nutrients, chemical pollutants, and sediment from runoff, and offer education and recreation potential. Wetlands provide habitat for a diversity of plants and animals, making them biodiversity hot spots.

Wetlands are critical ecological components of watersheds that maintain water quality and provide habitat for a variety of species

Conserving wetlands and riparian buffers is one essential step to conserving water quality throughout the watershed and habitats that support a diversity of wildlife. Farmers may enroll marginal agricultural lands in the Conservation Reserve Enhancement Program (CREP), fence riparian areas adjacent to streams, create stabilized stream crossings, and restrict access to streams for cattle and other livestock. This will result in cleaner water and it improves the overall health of the surrounding ecosystem and livestock herds. Riparian buffers improve water quality, stabilize streambanks, and host a variety biological species. Pollinators enhance crop productivity and predatory species offer natural pest reduction services. In addition, the variety of life and activity attracted to wetlands adds to the aesthetic appeal and property value of the land. Farmers and landowners are encouraged to protect or create wetlands and riparian areas on their property, not only for the ecological benefits, but also for the direct benefits to the property owner.

Rivers and Streams

Many of the biological organisms that live in rivers and streams indicate the quality of water in which they live. These creatures are called **bio-indicators**. Freshwater mussels, aquatic macroinvertebrates, and lungless salamanders that require high quality water to thrive are natural indicators of water quality and ecosystem health. Conservation groups can study these organisms to gain a better understanding of the overall health of the ecosystem. These bio-indicators can be used to track the improvements in water quality following the installation of restoration projects and best management practices.

Wykoff Run

Headwater streams are typically small and shallow, and flow into larger streams. Streams contain riffle areas with fast moving water and pools of slower moving water. Different plant and animal communities inhabit distinct sections of the stream with varying characteristics. Small and fast flowing streams, especially those with an intact riparian forest buffer surrounding them, tend to be cold. Coldwater streams host species of fish, such as trout and dace. Most of the Sinnemahoning watershed is comprised of high quality coldwater streams. Some streams with slightly higher temperatures are considered coolwaters, and are inhabited by chubs, shiners, and sucker fish.

In larger, slower flowing streams and rivers, reservoirs, and in streams with little or no riparian vegetation to shade and cool the water, you will find fish that thrive in warmwater, such as bass, bluegills, and sunfish. The reservoir behind the George B. Stevenson Dam at Sinnemahoning State Park harbors many of these species of fish.

Wildlife

In order to conserve a diversity of wildlife, a diversity of quality habitats must be preserved to support various wildlife communities. Wildlife depends on the availability of food in all seasons, clean water, cover (for protection from predators and the elements), and space (to forage, raise young, and expand territory). Both year-round residents and migratory species depend on the resources the Sinnemahoning watershed has to offer. By conserving natural areas, improving soil and water quality, and restoring degraded habitats, wildlife populations will benefit.

This American goldfinch is just one of hundreds of bird species that frequent the watershed

Wildlife species are a critical component in all ecosystems. The continued balance of nature depends on the existence of biodiversity. Each species and wildlife community provides ecosystem benefits, some of which include: food for other wildlife and humans, pollination, clean water, decomposition, nutrient cycles, clean air, and soil improvements.

Table 4-1. Top 10 Most Popular Recreation Activities in DCNR Region 8

1. Walking
2. View nature
3. Sightseeing
4. Picnicking
5. Visit wild areas
6. Swimming
7. Camping
8. Nature walks
9. Fishing
10. Wildlife watching

A diversity of wildlife and fisheries benefits recreation potential for the area, which in turn improves the local economy and quality of life and health of watershed residents. According to *Pennsylvania's Recreation Plan 2004-2008* (DCNR, 2004a), walking, nature watching, visiting wilderness and natural areas, camping, nature walks, fishing, and wildlife watching were all among the top 10 favorite recreational activities within the Sinnemahoning watershed counties. All of those activities are enhanced by the presence of biodiversity, high quality habitats, and clean air and water. Therefore, these activities inherently include the preservation and conservation of wildlife, fisheries, and their associated habitats.

The Sinnemahoning region has experienced a great deal of stress on its natural resources over the past few decades from resource extraction and pollution. Despite the environmental degradation, there are diverse natural areas, rebounding species, and an abundance of wildlife throughout the watershed.

Birds

Some 198 species of birds are known to inhabit the Sinnemahoning Creek watershed (Appendix I). Birds vary from small, pollinator hummingbirds to forest dwelling warblers and robins. Various sparrows and woodpeckers may be seen in the forests and fields of the watershed. Larger birds of prey, such as eagles, hawks, and owls, hunt small rodents and fish. Birds provide hours of enjoyment for birdwatchers, they control insect and rodent pests, and they pollinate wildflowers and trees.

A bald eagle in flight at Sinnemahoning State Park

Bald Eagle

Bald eagle populations were once ravaged by excessive hunting and pesticide pollution in the environment, but are now

on the rebound. In the 1980s, breeding pairs in Pennsylvania had dwindled to three pairs. Reintroductions of juveniles and protection through the Endangered Species Act led to a steady increase in populations. As a result, the bald eagle's status was downgraded from endangered to threatened in the Commonwealth of Pennsylvania, and it was removed from the federal list of threatened and endangered species. The Pennsylvania Game Commission (PGC^2) manages this important bird species in the state. The greatest threat to the continued successful recovery of bald eagle populations in the state is human disturbance. Over-use of recreational waters, which bald eagles heavily rely on for food sources, hinders their ability to thrive. In addition, too much human disturbance may lead to nest abandonment and decreased reproductive success (PGC^2).

Eagles are top predators on their food chain and one of the largest birds of prey, weighing up to 17 pounds with a wingspan of seven feet (PGC^2). Bald eagles primarily feed upon fish, other birds, and small mammals, and they have even been observed stealing prey from other birds. A nesting pair of bald eagles is resident at Sinnemahoning State Park, and can often be seen from the observatory deck on the Stevenson Dam reservoir.

Amphibians

Amphibians depend on moisture to thrive. Some amphibians, such as the eastern hellbender salamander, are completely aquatic, thriving in the high-quality coldwater streams of the watershed. Many terrestrial salamanders depend on the vernal pools present in vast forestlands of the Sinnemahoning watershed to lay eggs and reproduce. There are 21 species of frogs, toads, and salamanders that inhabit the Sinnemahoning Creek watershed.

Eastern Hellbender Salamander

The eastern hellbender salamander is the only amphibian species of concern in the watershed. Hellbenders are long-lived animals, and due to their intolerance of polluted water, they indicate good water quality in the streams they inhabit.

Hellbenders are one of the largest salamanders in the world and the largest salamander in North America, reaching lengths over two feet long and weighing up to five pounds. Hellbenders are completely aquatic amphibians meaning they spend their entire life in streams. They primarily prey upon crayfish. Hellbender populations have declined throughout their range, primarily due to human misperceptions and pollution.

Table 4-2. Amphibians

American toad	green frog	redback salamander
bullfrog	longtail salamander	spotted salamander
dusky salamander	mountain dusky salamander	spring peeper
eastern hellbender	northern slimy salamander	spring salamander
eastern newt	northern two-lined salamander	valley & ridge salamander
four-toed salamander	pickerel frog	Wehrle's salamander
gray treefrog	red salamander	wood frog

Reptiles

There are 18 species of turtles, skinks, lizards and snakes that comprise the reptile population of the watershed. Some of these species provide natural pest control of insects and mice. Four of those species—coal skink, mountain earth snake, shorthead garter snake, and timber rattlesnake—are among the species of concern found within the watershed. Although none of them have been officially listed as threatened or endangered in the state, the timber rattlesnake is at risk of becoming endangered in the future.

Table 4-3. Reptiles

Coal skink
Common garter snake
Eastern box turtle
Five-lined skink
Milk snake
Northern brown snake
Northern water snake
Painted turtle
Racer
Rat snake
Red-bellied snake
Ring-necked snake
Short-headed garter snake
Smooth green snake
Snapping turtle
Timber rattlesnake
Wood turtle
Worm snake

Timber Rattlesnake

Timber rattlesnakes are venomous snakes that thrive within the large forest blocks of the Sinnemahoning watershed. They are listed as a candidate species in the state, meaning they could become threatened or endangered in the future. Major threats to the species include unregulated hunting and den raiding, as well as habitat degradation. This species, along with other reptiles and amphibians, is managed by the PFBC. A permit is required to hunt or possess timber rattlesnakes in the state of Pennsylvania.

Mammals

Mammal diversity within the Sinnemahoning watershed includes 59 species of mammals, such as elk, deer, carnivores, bats, opossum, moles, shrews, rabbits, and rodents (Appendix I). Mammal diversity is typically associated with large, intact tracks of forest, such as that of the Sinnemahoning watershed. Small mammals and game species, like whitetail deer, squirrels, rabbits, and foxes can be found throughout the region. Elk, which were once eliminated from the area and the state, now found roaming free within many of the natural areas of the Sinnemahoning watershed. These species, among others, provide opportunities for hunting, trapping, and wildlife viewing recreation. Five mammal species of concern have been known to inhabit the watershed. These species include the Allegheny woodrat, which is threatened in the state of Pennsylvania, the Appalachian cottontail, rock shrew, northern myotis, and northern water shrew.

Whitetail deer

Proper management of whitetail deer populations will keep the impacts associated with the species to a minimum. In areas that are overpopulated with deer, forest regeneration may be hindered, crops may be damaged, and resources may be scarce for other wildlife. Habitat destruction by overabundant deer populations has a huge impact on songbird populations, especially woodland warblers. In addition, overabundant deer populations pose a significant risk to the safety of motorists and damage to vehicles when roadway collisions occur. Whitetail deer management occurs at the state level through hunting permit allocations by PGC.

Public land managers experiencing high density deer populations should incorporate considerations into land and habitat management techniques. Food plots may be established to improve herd health. Public and private landowners may enroll in the Deer Management Assistance Program (DMAP), which provides hunters with additional permits to hunt antlerless deer on registered properties to help manage deer populations (PGC[1]).

Some participants of the public surveys and interviews that were conducted as part of this planning project discussed concerns over dwindling deer populations. Many hunters have been coming to this watershed for years to hunt, and have noted an apparent decline in deer populations. It is important to maintain a healthy deer herd through hunting limits and habitat management. Quality Deer Management

(QDM) is a cooperative effort among landowners, hunters, and state agencies to manage healthy deer populations by balancing the harvest of quality bucks and does with proper stewardship of the habitats on which they depend. Not only does this approach to deer management result in higher quality animals and habitat, but it is educates hunters and provides a better hunting experience for all (Quality Deer Management Association).

This bull elk is part of the largest elk herd east of the Mississippi River

Elk

Elk are larger relatives of the whitetail deer. They are easily distinguished by their white rump and large stature. Prior to settlement of the region, elk were found throughout the Sinnemahoning watershed and Pennsylvania. By the mid-nineteenth century, overharvest and habitat destruction nearly eliminated the species from the state, except for isolated populations within the Sinnemahoning region. And within a few years, they too were gone. In the early 1900s, elk were reintroduced to Pennsylvania using animals from overcrowded herds of Wyoming and other western natural areas. As part of the first reintroduction in 1912, elk were released in Clearfield County among other counties. In 1915, a second shipment of animals was brought to Pennsylvania and released in six counties, including Cameron and Potter.

Despite these efforts, ill-managed hunting seasons and poaching caused a major decline in the Pennsylvania elk populations. The remaining population held strong in the Bennett Branch area of the watershed by the 1960s, but overall numbers were drastically low. It was suspected that insufficient habitat was leading to poor reproductive success of the animal, and something had to be done to help the elk population rebound again. In response, a 10,000-acre elk management area was established in Elk and Cameron counties. Though populations continued to experience declines through the 1970s from brain worm and habitat deficiencies, elk herds eventually did make a comeback thanks to habitat improvements and improved cooperation between state game managers, sportsmen, and landowners.

Today elk populations in Pennsylvania are thriving, lottery hunting permits are awarded annually, and habitat improvements continue to be made. Official elk viewing areas have been established in an effort to reduce the impacts of elk viewing tourism on local residents of the watershed, and an elk visitor center will be completed in the near future.

Bats

Bats are common throughout Pennsylvania, and are very beneficial creatures to humans and the environment, as they control pests. The northern myotis is an important bat species that depends on the Sinnemahoning Creek watershed**.**

Depending on the species, bats may roost and/or hibernate in caves, mines, rock outcrops, attics, or abandoned buildings. These habitats are most vulnerable to degradation. Forestry and mining activities can disrupt and displace an entire colony of bats. Gates constructed at the entrance of abandoned mines and caves allow for the passage of bats and exclusion of humans to limit disturbance to the habitat.

White nose syndrome (WNS) is a fungus that affects bats with devastating mortality rates. The fungus appears white around the nose and wings of bats. As of August 2009, WNS had not yet been detected within the watershed; however, it was confirmed in the nearby counties of Centre and Mifflin

(PGC[3]). Though biologists have not yet determined how the disease is transmitted, a caving moratorium has been suggested to protect bat species (U.S. Fish and Wildlife Service).

Fish and Freshwater Mussels

Most of the waterways within the Sinnemahoning watershed are high-quality coldwater streams that support native trout populations that provide sporting opportunities for fishermen and freshwater mussels that filter water. Although, many streams are impaired. Some 93 species of fish can be found within the tributaries of the upper West Branch Susquehanna River watershed, many of which may inhabit the Sinnemahoning watershed (Appendix I). Though many species of fish occur throughout the region, none have been identified as species of concern within the Sinnemahoning watershed.

The watershed's streams, some of which are considered to be exceptional value coldwater fisheries, also support bottom-dwelling aquatic insect larvae and nymphs that help conservationists determine the health of the watershed. Eleven invertebrates and two mussels have been identified as species of concern in the watershed. Freshwater mussels are fairly rare within the watershed.

Species of Special Concern

The Sinnemahoning Creek watershed is located within Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties. All of the counties have completed CNHIs, except Cameron County. The following section briefly describes BDAs located within the Sinnemahoning Creek watershed (Figure 4-1). Specific names and exact locations of rare species are sometimes omitted from CNHIs and this report to protect those species and the landowners where they occur. Complete CNHIs can be downloaded from the PNHP website at: www.naturalheritage.state.pa.us.

Plants and animals are ranked on state and global scales based on the number of times the species has been documented in a geographic area. Most species have a rank assigned to them, even if they are not threatened or endangered. In Pennsylvania, a species is commonly considered to be of "special concern" if it has a ranking of "vulnerable" or lower. Global ranks are assigned based on data collected at similar state offices worldwide as a part of a network called NatureServe.

The federal Endangered Species Act of 1973 (and its amendments) provides broad protection for aquatic and terrestrial species of wildlife and plants that are listed as threatened or endangered in the U.S. or elsewhere. An **endangered** species is a species that is considered to be in danger of becoming extinct throughout its range. A **threatened** species is a species at risk of becoming endangered unless special action is taken. A **candidate** species is one that is proposed by a state or federal agency for listing as threatened or endangered at the state or local level.

In Pennsylvania, threatened or endangered status is determined by the appropriate state agency, and state-level laws are applicable. For instance, the PGC is responsible for assigning state statuses to bird and mammal species, while PFBC is responsible for fish, amphibians, and reptiles. Since there is no state agency that oversees invertebrates, such as moths and butterflies, these species can only receive threatened or endangered status if they are federally listed. Therefore, there may be some species that technically meet the state threatened or endangered requirements, but have not officially been given this designation. These species are typically monitored by Pennsylvania Natural Heritage Program (PNHP).

Provisions are made for listing species, as well as for the development of recovery plans and the designation of critical habitat for listed species. As part of both federal and state acts, an environmental assessment of properties for species of concern is required before development projects can be permitted. However, rather than stopping development altogether, changes in design or timing of construction can often be made to protect the habitat for these resources.

Within the Sinnemahoning Creek watershed, 49 plant and animals species of concern have been identified, including 22 plants, four birds, 11 invertebrates, two mussels, four reptiles, five mammals, and one amphibian. In addition, one geologic feature and seven natural community types have been listed among the species of concern as important natural features and habitats of conservation significance. To protect these important species and landowners, the location of individual species cannot be provided. Appendix J lists state and global rankings for species of concern identified within the project area.

Laurel Run is just one of many important habitats that support a diversity of wildlife

Conservation Areas

Natural Heritage Areas

County Natural Heritage Inventories (CNHIs) are conducted by PNHP. The PNHP is a collaborative organization dedicated to the collection, tracking, and interpretation of information regarding Pennsylvania's biodiversity. PNHP partners include Western Pennsylvania Conservancy, DCNR, PGC, and PFBC. PNHP is a member of NatureServe, which coordinates natural heritage efforts in all 50 U.S. states, Canada, Latin America and the Caribbean.

Natural heritage inventories identify and map the most significant natural places in a county for rare, threatened, and endangered species, as well as unique natural communities. Additionally, landscape level elements, such as large contiguous blocks of forest and high-quality watersheds, are also identified. The final product of the CNHI is a report highlighting specific areas and giving detailed management recommendations for their protection. These reports should be utilized by local municipalities, counties, utility companies, and groups involved with comprehensive planning, zoning, review of development proposals, and other objectives.

The natural areas identified in CNHIs are called **Biological Diversity Areas (BDA)**. A BDA is an area of land recognized as supporting species or natural communities of special concern; high-quality natural communities or ecosystems; or exceptional natural diversity. The core of these areas is typically small and surrounded by a larger area of supporting habitat.

A **Landscape Conservation Area (LCA)** is a larger area of land that contains minimal human disturbance, and allows ecosystems to function on a landscape level. These areas often contain multiple BDAs.

Table 4-4. Significance Rankings for BDAs

Significance Rank	Description
Exceptional	Sites are of exceptional importance for the biological diversity and ecological integrity of the county or region, containing one or more occurrences of state or national species of special concern or a rare natural community of adequate size, condition, and extent. These areas deserve complete and strong protection.
High	Sites are highly important for biological diversity of the county or region, and just like exceptional sites, contain species of special concern or natural communities that are highly ranked. Typically large and primarily undisturbed, these sites deserve strong protection.
Notable	Sites contain occurrences of species of special concern or natural communities that are either more common or of smaller size and extent than exceptional or high rank areas, or have activity and disturbance. These sites deserve special protection within the context of their characteristics, degree of disturbance, and place in the community.
Local	Sites have great potential for protecting biodiversity in the county, but have not yet been found to contain species of special concern or state significant natural communities. Because of their size, undisturbed character, or proximity to other significant areas, these sites deserve further study and investigation as possible high or exceptional sites.

Table 4-5. Biological Diversity Areas

Area Name	Significance	Important Features
Clearfield County		
Moshannon State Forest LCA	Exceptional	
Southwest Elk State Forest LCA	High	
Panther Rocks BDA	High	Acidic cliff; Appalachian gametophyte
Shagger's Inn Impoundment BDA	High	Osprey
Bennett Branch Headwaters LCA	Notable	
Laurel Run and Saunders Run BDA	Local	
Laurel Run Tributary Wetlands BDA	Local	
Parker Dam Beaver Ponds BDA	Local	
South Bennett Branch Wetlands BDA	Local	
Clinton County		
Bucktail State Park Natural Area DA	Exceptional	
Keating Mountain BDA	Exceptional	Hemlock (white pine) – northern hardwood forest community
Lower Jerry Run Natural Area DA	Exceptional	Northern hardwood forest community
Lower Jerry Run Watershed BDA	Exceptional	Northern hardwood forest community
Round Island Run Watershed BDA	Exceptional	High gradient clearwater stream; hemlock (white pine) – northern hardwood forest community

Table 4-5. Biological Diversity Areas (continued)

Area Name	Significance	Important Features
Clinton County (continued)		
Montour Island Run BDA	High	Big bluestem – Indian grass river grassland community; sycamore – mixed hardwood floodplain
Round Island BDA	High	Big bluestem – Indian grass river grassland community; sycamore – mixed hardwood floodplain
Sinnemahoning Creek Cliffs #1 BDA	High	Allegheny woodrat
Sinnemahoning Creek Cliffs #2 BDA	High	Allegheny woodrat
Sinnemahoning Creek Cliffs #3 BDA	High	Allegheny woodrat
Sinnemahoning Creek Cliffs #4 BDA	High	Allegheny woodrat
Lushbaugh Run Watershed BDA	Notable	High gradient stream
Elk County		
Boone Mountain LCA	Exceptional	
Upper Clear Creek LCA	Exceptional	
Elk River LCA	High	
Four Points Wetland BDA	High	Creeping snowberry
Marion Brooks Natural Area BDA	High	Creeping snowberry; aspen – paper birch forest
Silver Mill Headwaters Swamp BDA	High	Hemlock palustrine forest
Byrnes Run BDA	Notable	Exceptional value creek
Dieble/Mix Run BDA	Notable	Exceptional value creek
Upper Clear Creek BDA	Notable	Exceptional value creek
West Branch Hicks Run BDA	Notable	Exceptional value creek
Pine Tree Trail Natural Area BDA	Local	Hemlock (white pine) forest; red oak – mixed hardwood forest
Trout Run Oak Forest BDA	Local	Hemlock (white pine) – red oak – mixed hardwood forest
McKean County		
Havens Run BDA	High	American brook lamprey
Potter County		
First Fork Sinnemahoning Creek – North BDA	Exceptional	Maine snaketail; northern pygmy clubtail; ocellated darner; superb jewelwing
First Fork Sinnemahoning Creek – South BDA	Exceptional	Spine-crowned clubtail; northern pygmy clubtail; ocellated darner; superb jewelwing
Wharton LCA	Exceptional	
Bailey Run LCA	High	
Big Moore's Run BDA	High	Northern pygmy clubtail
Big Younglove Hollow BDA	High	Great-spurred violet

Table 4-5. Biological Diversity Areas (continued)

Area Name	Significance	Important Features
Potter County (continued)		
Birch Run LCA	High	
East Branch Cowley Run BDA	High	Northern pygmy clubtail
East Fork Sinnemahoning Creek BDA	High	Northern pygmy clubtail
Hemlock Trail BDA	High	Swainson's thrush
Cherry Springs Park BDA	Notable	Common claybark tiger beetle
Keating Summit BDA	Notable	Animal species of concern
Lookout Mountain LCA	Notable	
South Woods Branch BDA	Notable	Animal species of concern

Important Bird Areas

Areas that support critical habitat for a diversity of birds species or species of special concern are designated as Important Bird Areas (IBA) by the National Audubon Society Pennsylvania Chapter. Site conservation plans are developed to guide conservation initiatives and management activities based on the specific needs of the area. Two IBAs exist within the project area – **Quehanna Wild Area** and **Southern Sproul State Forest** (Audubon Pennsylvania). Both sites contain large tracks of contiguous forest to support a variety of bird species and other wildlife. An over-wintering pair of bald eagles inhabits the Quehanna Wild Area, adding to its significance. Both IBAs contain unique habitats. The Quehanna Wild Area contains a variety of age classes and forest types, including mixed oak, northern hardwood, red maple, aspen, gray birch, oak, white pine, hemlock, and spruce. The Southern Sproul State Forest contains rare, threatened, or unusual habitat within the Allegheny Plateau Province. It is exceptionally representative of a characteristic hardwood forest within the province.

Important Mammal Areas

Similar to IBAs, Important Mammal Areas Project (IMAP) designates Important Mammal Areas (IMAs) that support mammal species of special concern and a diversity of mammal species. IMAP is a partnership of sportsmen, scientists, and conservation groups and professionals. Mammal diversity typically coincides with large, contiguous tracts of forestland, such as the vast forested landscapes of the Sinnemahoning watershed (IMA). Conserving habitats and connecting natural corridors to these IMAs will help to sustain those mammal species that depend on the resources of the region.

The **Northern Allegheny Plateau IMA** is the largest designated IMA in Pennsylvania, covering nine counties, including Cameron, Clearfield, Clinton, Elk, McKean, and Potter counties, and four million acres. Included in this IMA are numerous state parks, state game lands, and state forests. The site supports diverse or unique communities of mammals, including elk, black bear, fishers, coyote, Appalachian cottontail rabbits, the (Pennsylvania Threatened) Allegheny woodrat, and flying squirrels. Ample opportunities for environmental education exist throughout the IMA, as well.

Japanese knotweed monoculture along Driftwood Branch

Invasive Species

A non-native invasive species can be defined as a plant, animal, or other organism introduced to an ecological system that causes economic or environmental harm, or harm to human health.

Invasive species are one of the most significant threats to wildlife conservation in Pennsylvania. Not all non-native species are harmful to other species or to wildlife, but some exotic species may have severe impacts. Invasive plant species can impact agricultural activities and inhibit forest regeneration in areas where disturbance (by deer, erosion, or human activities) gives them a competitive advantage. They may out-compete native species, causing cascading effects throughout the food chain, and reducing food availability and quality for species, such as turkey, bear, and birds.

Exotic species may have been introduced for a specific purpose or inadvertently. For example, autumn olive, an invasive shrub species, was introduced to many state parks by PGC for food and cover for wildlife and soil stabilization. Alternatively, invasive insects may burrow into the wood pallets of packing material to emerge to invade another country.

When invasive species dominate an area, they often cause decreased land value, increased maintenance and control costs, degraded soil or water quality, or direct human health concerns. West Nile Virus is one example of a non-native pathogen that has the potential to affect human health. Weeds threaten natural areas and wildlife. Invasive pests may decrease crop yields, affect livestock health, and require costly control efforts. Invasive species may be aesthetically unpleasing, encroach upon homes and gardens, affect landscaping, and threaten pets and humans.

Invasive species that have few natural controls, such as predators, to keep their populations in balance can become out of control, like these snails that have left the Stevenson Dam reservoir littered with empty shells

Integrated Pest Management (IPM) techniques incorporate science and information about the target pest, varying economic approaches, and utilization of ecologically sensitive control tactics to deal with infestations. In order to be effective at managing invasive species, the first step is prevention. Most invasive species are opportunistic, and take advantage of disturbed areas and weakened species. By managing landscapes and protecting pristine natural areas, invasive species are less likely to overtake an area. By preventing an invasive species from establishing or spreading to an area, little or no money and/or chemicals will be necessary to control it.

The second step is to detect early, and begin control as soon as possible. Early detection and rapid response will result in less money and effort required to control the species. Numerous tools and publications are available to help one properly identify invasive species. Two starting points to access that information are USDA National Invasive Species Information Center (NISIC) at: www.invasivespeciesinfo.gov and the Global Invasive Species Database: www.issg.org/database.

Small, isolated populations should be contained to control spreading. Once established, invasive pests may be controlled by mechanical (physically pulling or cutting weeds, for example), chemical (pesticides), or biological (utilizing another living species to control the invasive target) means. Often, for well-established invasive species, a combination of control methods is necessary to effectively and efficiently control the invasive. When chemical means are necessary to control an invasive pest (weed, insect, or animal) the person(s) applying the pesticide must be certified by the State of Pennsylvania. Landowners and land managers should contact their county Cooperative Extension office or a private, certified applicator to seek assistance.

Education is a critical component in the management of invasive species. Volunteers, land managers, and citizens in general should be taught the correct identification of invasive species that threaten the watershed, so they can be detected and reported to the proper agency at the first sign of encroachment.

Addressing the problem early also helps to minimize the negative impacts on native species and natural resources. Once well established, many of these species are difficult and costly to control. Fact sheets on invasive species can be downloaded at the U.S. Forest Service website: http://www.fs.fed.us/invasivespecies/speciesprofiles/index.shtml. Other useful resource links can be found in Appendix P. Useful Websites.

Invasive Plants

Invasive species pose the most significant threat in areas that have been altered by disturbances, such as an impoundment, development, mining, oil and gas extraction, poor forestry, and poor agriculture practices. In disturbed areas, invasive species can displace native plants intolerant to the changing conditions. Native wildlife prefers native plant species for food, and tends to avoid invasive plants, which allows the invasive to proliferate. When a non-native species establishes itself in a foreign habitat, it usually free of natural predators and pathogens, allowing it to spread and multiply with little natural controls.

Some invasive plants pose a threat to health and human safety, and are categorized as **noxious weeds**. This federal designation, set forth by USDA Animal and Plant Health Inspection Service (APHIS), adds additional penalties and controls on those species. A Cooperative Weed Management Area partnership has been established and is active controlling invasive plants throughout the watershed. Contact the Headwaters Resource Conservation and Development Council for more information (Appendix Q).

Department of Agriculture (PDA), it is illegal in Pennsylvania to propagate, sell, or transfer any of the state designated noxious weeds (PDA, 2007b).

Table 4-6. Noxious Weeds of Pennsylvania

marijuana (*Cannabis sativa*)
Canada thistle (*Cirsium arvense*)
multiflora rose (*Rosa multiflora*)
Johnson grass (*Sorghum halepense*)
mile-a-minute (*Polygonum perfoliatum*)
kudzu (*Pueraria Montana v. lobata*)
bull or spear thistle (*Cirsium vulgare*)
musk or nodding thistle (*Carduus nutans*)
shattercane (*Sorghum bicolor*)
jimsonweed (*Datura stramonium*)
purple loosestrife (*Lythrum salicaria*)
giant hogweed (*Heracleum mantegazzianum*)
goatsrue (*Galega officinalis*)

A good source of information on invasive plants is *Plant Invaders of Mid-Atlantic Natural Areas*, a guide produced by the National Park Service and U.S. Fish and Wildlife Service (Swearingen et al., 2002).

Japanese knotweed

One invasive exotic plant species that was found within the project area and could pose serious threats to the native biodiversity of the area is Japanese knotweed. Japanese knotweed has been reliably identified in disturbed areas on the banks Sinnemahoning Creek and some of its tributaries. It spreads mainly through its root system, and one plant can grow to encompass miles of streambank. Very small root and stem fragments are capable of sprouting to generate new growth, and streambank erosion can transport these plant parts downstream to take root in new areas.

On trails and natural areas, knotweed is unsightly, and may be considered a safety hazard. Knotweed monocultures (an area dominated by one species) can encroach upon trails, inhibit growth of trees in riparian areas, increase erosion, and it offers little habitat value to native species. Knotweed grows and spreads aggressively, making it very costly to control once established.

The best control method for well-established knotweed monocultures is to cut the stalks close to the base throughout the spring and summer to prevent flowering and seeding. Cutting also encourages

regrowth and expenditure of stored energy, which weakens the plant's reserves. Do not mulch any cut vegetation, as regrowth can occur from each fragment. An herbicide application may be applied before the first killing frost in the fall, which will carry herbicide from the leaves to the roots, resulting in more effective control. A certified herbicide applicator should be contracted to ensure appropriate application procedures and regulations are followed. As with any control strategy for invasive species, persistence is the key to success.

Multiflora rose

Multiflora rose was first introduced to the U.S. as rootstock for ornamental plants in 1866. The U.S. Soil Conservation Service and PGC later promoted it for purposes, such as living fence around livestock pastures, and as wildlife habitat for small game and bird species. The tenacious growing behavior of the plant enables it to quickly dominate large areas and consume resources that would otherwise benefit native shrubs and herbaceous species. The thickets formed by multiflora rose are dense, and it can completely overtake pastures, excluding livestock from grazing large portions of pasture. The large monocultures decrease biodiversity, as the variety of food and nesting habitat available to native birds and wildlife is decreased. Furthermore, the fruits do not contain the proper fat ratio migrating birds need to survive. Larger mammals, including humans, are often excluded from areas occupied by multiflora rose, as the thorny plant weaves tight, impenetrable assemblage of stems.

To control multiflora rose, bushes may be pulled, but ensure that all of the root system was removed, otherwise regrowth will occur. Herbicides may be effective in controlling this persistent species. A naturally occurring virus spread by mites called rose rosette disease, is one example of a biological control for multiflora rose. However, this disease also affects cultivated roses, and may be considered undesirable by some.

Mile-a-minute

Mile-a-minute is a rapidly growing invasive vine that quickly dominates areas. It is a thorny vine with distinctive triangular leaves and disc shaped leaf appendages. It produces purple-blue berry fruit, which are readily distributed by bird species that feed upon them. Its aggressive growth rate is how it got its name, and it is also the reason why it is so detrimental to the natural areas it invades. It can quickly blanket forests and smother native plant species. It offers little habitat value for native wildlife and may even reduce land value and sustainable forests.

While other invasive plant species may invade the watershed, the ones detailed in this chapter have been identified as the major species of concern. A cooperative weed management area was designated within the watershed, and efforts are underway to control invasive plant and restore habitat in those areas with native plant alternatives. Please reference Appendix R. for suggestions on native plants usage.

Goatsrue

Goatsrue is a federally listed noxious weed. It is a perennial herb that is capable of overtaking wetland plant communities and disrupting wetland ecosystems. It may fatal if ingested, and may also be toxic to livestock, such as sheep. Goatsrue was recently discovered in Cameron and McKean counties. There is high potential for it to be spread through the area due to heavy equipment movement and infrastructure construction associated with the Marcellus Shale gas extraction in these counties.

Insect traps are set out to survey and track invasive pests

Invasive Animals

Invasive animal species include forest pests, such as the emerald ash borer, gypsy moth, and hemlock woolly adelgid, and aquatic

species, such as the zebra mussel. The gypsy moth is prevalent throughout Pennsylvania and the hemlock woolly adelgid has been identified in many counties, including those within the Sinnemahoning Creek watershed.

Emerald Ash Borer

The emerald ash borer (EAB), an invasive insect, was first positively identified in Pennsylvania on June 21, 2007 in Cranberry Township, Butler County. The EAB has already defoliated millions of trees throughout the country, and now threatens Pennsylvania's forests. An immediate ban on the import of firewood to State Parks and State Forests was relayed throughout the state to suppress the spread of the species. Because it is difficult for the average person to tell what species of tree the firewood was derived from, the ban includes all hardwoods. The quarantine restricts or prohibits the transport and sale of ash wood products and plants that may harbor the pest (DCNR, 2007).

It is not the adult emerald ash borer beetles that cause the devastating effects of girdling and killing trees, but rather their larvae that feed under the bark. As the larvae eat paths under the bark, called "galleries," they disconnect the cells that carry nutrients and water to the limbs and leaves of the tree. Over time, usually within three years of the infestation, the tree dies as a result of stress and inability to circulate life-sustaining nutrients and water throughout the plant.

EAB presence is most easily identified by the D-shaped exit holes bored into the wood of a tree. Adult beetles are approximately a half inch long and slender with dark green metallic coloration. If you suspect the presence of EAB in your area, notify your regional DNCR Bureau of Forestry, PDA, Penn State Cooperative Extension, or the EAB hotline: 1-866-253-7189.

Gypsy Moth

The gypsy moth was introduced to the U.S. from Europe in the 1980s. It feeds while in the larval, or caterpillar, stage. Eggs are deposited in July, and overwinter on bark and stones. Gypsy moth caterpillars hatch and begin feeding from mid- to late-April in southern Pennsylvania, and in early-to mid-May in the northern part of the state. Oaks, sugar maple, beech, and aspen trees are preferred food sources for this caterpillar's voracious appetite. Large gypsy moth populations may strip entire trees of their foliage, leaving them weakened and susceptible to disease, drought, and attack by other pests. A tree begins to suffer when 30 percent or more of its leaf surface is lost (Purdue Research Foundation, 2004).

According to the 2006 Pennsylvania Annual Pest Conditions Report compiled by DCNR, Bureau of Forestry, Division of Forest Pest Management (2006), "Gypsy moth defoliated more acres of forest than any other pest or pathogen in 2006, and is considered to be at outbreak levels." The state of Pennsylvania initiated a suppression program in 2006, which included the cooperation of five counties, four forest districts, one state park, PGC, and two stewardship landowners. Gypsy moth populations are expected to continue to increase and the suppression program will expand in the year 2007 to include at least 14 counties on 45,474 acres of land, though those estimates are expected to change.

Gypsy moth populations are typically highest following wet, more temperate winters, while cold, dry winters cause the death of egg masses. Private landowners with forested land containing 250 or more egg masses per acre may be eligible for insecticide applications administered through the DCNR Bureau of Forestry. However, the biggest factor controlling populations is a natural fungus, which grows on most hardwoods, and adversely affects the gypsy moth (Purdue Research Foundation, 2004).

Hemlock Woolly Adelgid

This tiny, fluid-feeding insect was introduced from Japan in the early 20th century, and was first discovered in Pennsylvania in 1969. Cold weather may contribute to high mortality, and will likely limit

expansion of this pest. The hemlock woolly adelgid most commonly affects hemlocks, but can also affect spruce trees (DCNR[1]).

The species prefers mild conditions, and is most active from October to June. Eggs hatch in February or March. Damage is inflicted when an immature nymph or adult sucks sap from twigs, which causes hosts to lose needles, and possibly die. Biological control agents include a beetle, which was released by DCNR in 2004 on affected hemlock trees in central and southern Pennsylvania. DCNR is also in the process of establishing sites for chemical applications against the hemlock woolly adelgid (Spichiger, 2004).

CHAPTER 5. CULTURAL RESOURCES

This section provides an overview of the culture in the region and examines the historical and current activities that define the rural character of the region. Included in this section is a summary of recreational opportunities available, environmental education efforts, and a historical overview.

Mother and daughter at Sterling Run playground

Recreation

Anything that anyone does for amusement in his or her leisure time is recreation. In Pennsylvania, recreation is big business, ranked as the second-leading industry, and for some areas, the only industry. It brings in revenue from tourists who seek food, accommodations, and mementos of their visit. Recreation is not only beneficial to the local economy, it is a healthy endeavor. Based on findings from Panorama Recreation (2004) the benefits of recreational opportunities are:

- Active lifestyle essential to personal health
- Key to balanced human development
- Essential to a quality of life
- Reduces self-destructive and anti-social behavior
- Builds strong families and healthy communities
- Reduces health care, social services, police, and justice costs
- Significant economic generators
- Essential to ecological survival

As a part of the Pennsylvania Wilds region, this watershed is an asset, with a diversity of recreational opportunities that appeal to a wide range of potential visitors, as well as local citizens who reside in the region. A well-managed and balanced tourism industry is essential to protect the character of the region. Pennsylvania Wilds Planning Team compiled a “design guide” to guide planning and development within the communities to incorporate and maintain the rural nature of the region. Copies of the guide are available through the Lumber Heritage Region.

Part of a well-managed and balanced tourism industry is to enhance a visitor’s experience without changing the local character of the region. Individual destination sites may attract visitors, but without infrastructure to support it, visitors may shorten trips, be unlikely to return, or not recommend the area to others. Restaurants, hotels, gas stations, and public restrooms accessibility and availability enhance visitors’ experiences.

To maintain a balanced tourism industry the local character of the region needs to be protected. Improved tourism infrastructure should enhance the visitor’s experience without altering the reason people are inclined to visit the Pennsylvania Wilds region in the first place—the “wild” natural resources. A balanced tourism industry supplies just the right amount of infrastructure to cover the demand without its character being modified. Area residents prefer the establishment of small locally-owned businesses, as opposed to chain franchises.

Recreational Opportunities

Parks

Parks can be classified into five categories based upon size, service population, and intended use. Fifteen park sites have been identified and classified into these categories. Figure 5-1 displays park locations, while Appendix K highlights attributes of each facility.

State parks vary in size and amenities and often attract visitors from beyond the region and state. The purpose of state parks is to provide easily accessible outdoor recreational opportunities. Six state parks are available in the area for residents and visitors. They range in size from five-acre passive parks to 1,910-acre parks with campgrounds, swimming areas, and environmental education centers.

Observation dome at Cherry Springs State Park that is available for rental

Friends groups are citizen volunteer groups that can be formed to raise money, provide education, and steward state parks and state forests. The Friends of Parker Dam State Park was formed in 2009. The Pennsylvania Parks and Forest Foundation provides assistance with forming such groups.

Cherry Springs State Park is a 48-acre park named for the large stands of black cherry trees. It is the only dark skies park—a place where artificial light is managed to preserve the night sky for astronomers—east of the Mississippi River. Recreational activities at the site include picnic area, campgrounds, mountain bike trails, and star gaze field. Four observation domes are available for rental at the park. For more information about observation dome rentals and star gazing rules please visit http://www.dcnr.state.pa.us/stateparks/parks/cherrysprings/cherrysprings_darkskies.aspx.

Parker Dam State Park is a 968-acre wooded park with picturesque forest, swamp, and meadowlands. Recreation activities available include campground, beach area, trails, backpacking, cross-country skiing, snowshoeing, ice skating, and snowmobiling, wildlife observation, lake for boating and fishing, and picnic areas. The park also features an environmental education center.

Patterson State Park is a 10-acre park and trailhead for the Susquehannock Trail. It has two rustic picnic pavilions and primitive campground.

Prouty Place State Park is a five-acre passive park that provides access for hunter, anglers, and hikers. There are no facilities at the park.

Sinnemahoning State Park is a 1,910-acre park along First Fork Sinnemahoning Creek. It contains the 142-acre Stevenson Dam, and is home to a pair of nesting bald eagles. Recreational activities available include areas to camp, boat, fish, hunt, hike, ice fish, picnic, snowmobile, and observe wildlife.

First Fork Sinnemahoning Creek from the bald eagle viewing area at Sinnemahoning State Park

Sizerville State Park is a 386-acre park located along

the border of Cameron and Potter counties. It is named for a historic logging boomtown and the earliest settlers in the region, the Sizer family. Recreational opportunities available include areas to camp, picnic, swim, fish, hike, hunt, trap, observe wildlife, cross-country ski, and snowmobile. An environmental educational center is located at the park near the office and pool.

Larger parks are considered regional parks. These parks are located within 30 to 60 minutes from the population they serve. Cameron County Fairgrounds and Austin Dam Memorial Park are regional parks in the Sinnemahoning region.

Austin Dam Memorial Park is a 76-acre memorial to the victims of the 1911 breech of the Bayless Dam, also referred to as Austin Dam. Remnants of Austin Dam, picnic areas, trails, and primitive campsites are available at the site.

Community parks are those within one to two miles of its users, and contain at least 25 acres. Playgrounds at local elementary schools available to the public, such as Bennetts Valley Elementary School and Austin Area School District, are examples of community parks.

Smaller parks, between five to 25 acres and within three-quarters of a mile of residents, are neighborhood parks. These parks intend to provide recreational opportunities close-to-home. Driftwood playground, Sterling Run playground, and Thunder Mountain Park are neighborhood parks.

Linear parks are the fifth park classification. Linear parks, sometimes referred to as ribbon parks, have trails for walking or bicycling. Bucktail State Park is one linear park located within the region.

Bucktail State Park Natural Area is a 75-mile scenic drive along Route 120 from Emporium to Lock Haven. The route, although this state park is predominantly private property, it follows the Native American path of the "Old Sinnemahoning Trail," and is named in honor of the Bucktails Civil War regiment.

State Forests

The first State Forest Land purchase occurred in 1898 with the intent to acquire and protect the watershed following devastating logging practices and that resulted in fires of the late 1800s and early 1900s. In 1900, forest reservations were declared parks and outing grounds for the public. However, it was not until 1920 that any formal recreational areas were established.

State Forest lands provide a variety of recreational opportunities that include non-motorized and motorized activities. Non-motorized activities include camping, hunting, fishing, hiking, horseback riding, trapping, picnicking, mountain biking, canoeing, kayaking, boating, rafting, cross-country skiing, geocaching, and wildlife watching. Motorized activities include snowmobiling, off-road vehicle riding, and scenic driving.

Due to the variety of recreational opportunities, conflicts arise between impeding recreational activities, such as wildlife observation and use of off-road vehicles. Even hunters and hikers can clash. In efforts to minimize conflicts among users, some recreational activities are restricted to certain areas. For example, natural areas and keystone trails are not available for equestrian use while some trails are designed for equestrian use. Within the project area, there are four State Forests—Elk, Moshannon, Sproul, and Susquehannock.

Elk State Forest provides 198,000 acres of valuable forest resources, recreational opportunities, water supply, and wildlife habitat within Cameron and Elk counties. The

majority of the forest is located within the project area. Named after the great number of elk in the area; it is the only place in Pennsylvania where free-roaming elk herds exist.

Moshannon State Forest is located south of the Elk State Forest in Clearfield and Elk counties. Home to the Quehanna Wild Area, Moshannon State Forest provides 187,000 acres of forestland for recreational, wildlife, and forest products.

Only a small portion of ***Sproul State Forest*** in Clinton County is located within the project area. The entire forest provides over 300,000 acres of forest resources to Pennsylvanians. It is the largest Pennsylvania State Forest.

Susquehannock State Forest is located in Potter County and the headwaters of First Fork Sinnemahoning Creek that contains Freeman Run. Most of the forestland is located within the project area providing over 260,000 acres of valuable forest resources. The name is derived from the Susquehannock tribe, which once inhabited the land in this region.

Trails

As links among communities, trails provide alternative transportation, recreation, and educational opportunities. Activities utilized on trials include hiking, bicycling, horseback riding, ATV riding, snowmobiling, cultural and historic cultivation, and environmental education. In addition to the numerous state park and state forest trails identified in Appendix K, there are three well-known trails in the region.

Quehanna Trail near the Parker Dam Trailhead

Susquehannock Trail is an 85-mile trail that loops around the Susquehannock State Forest with varying degrees of difficulty. The trail is a state forest trail maintained by Pennsylvania Department of Conservation and Natural Resources (DCNR) and volunteers from the Susquehannock Trail Club.

Quehanna Trail is a 75-mile trail that loops around Moshannon and Elk State Forests. It begins at Parker Dam State Park, the trail passes through the Quehanna Wild Area, Sinnemahoning, and the Marion Brooks Natural Area. DCNR and volunteers from the Quehanna Area Trails Club maintain the trail.

Bucktail Path is a 34-mile trail that travels through Elk State Forest from Sizerville State Park to the village of Sinnemahoning. DCNR and volunteers from the Keystone Trails Association maintain the trail.

Elk Trail is a 19-mile trail that provides opportunities to view wildlife. Parking is available on Dents Run Road approximately two miles north of Route 555.

West Creek Rail Trail is currently in the feasibility and master site planning phase. This will be a 19-mile trail connecting Emporium to St. Marys along an abandoned railroad corridor.

All-Terrain Vehicle (ATV) and snowmobile use is a popular recreational activity. An off-road vehicle, off-highway vehicle, or ATV is any motorized vehicle capable of cross-country travel on land, water, snow, ice, marsh, swampland, or other natural terrain. A snowmobile is an engine-driven vehicle

designed to travel over snow or ice with an endless belt track or tracks, is steered by a ski or skis, and has an overall width of 48 inches or less. The use of ATVs and snowmobiles is on the rise, and the improper or illegal use by some has given this activity a bad reputation.

DCNR, along with the Commonwealth of Pennsylvania, regulates the use of ATVs and snowmobiles according to Chapter 77 of the Pennsylvania Vehicle Law. In 2001, Act 68 modified the law that requires ATV owners and operators to register their vehicles. Snowmobile registration is required with DCNR. In addition, snowmobiles in Pennsylvania purchased after October 23, 2001 must have a titled issued by DCNR. Older snowmobiles do not require a title until transferred to a new owner. ATV and snowmobile registration fees are used to finance efforts to develop and maintain trails on public lands, encourage trail development on private lands, teach safety and riding etiquette, and for law enforcement.

Recreational areas for snowmobile use are more available than those for ATVs. Public facilities for the exclusive use of ATVs are needed in the Sinnemahoning region. It is illegal to ride ATVs on state game lands, except by disabled hunters. West of Sinnemahoning Creek watershed, the Allegheny National Forest offers more than 70 miles of trails for riders. Environmentally sound public trails or an ATV park would provide riders with legal opportunities to ride, and thereby reduce damages to private property and increase safety for riders.

State parks, state forests, and stage game lands within the Sinnemahoning and the areas that surround the region have over 700 miles of trails available for snowmobile use. In addition, over 650 miles of roadways are available for snowmobile use. Appendix K and Figure 5-3 identify trails and roadways available for use by snowmobiles.

Enhanced efforts are needed to educate riders about how to recreate in an environmentally sound manner. Youth snowmobile operators between the ages of 10-16 must complete a snowmobile safety course to ride on public trails. Youth under the age of 10 cannot operate a snowmobile on any public land. Youth ATV operators between 8-16 years of age must complete an ATV safety course to ride on public lands. Youth under the age of eight cannot operate an ATV on any public land. Youth operators under the age of 16 cannot ride on or cross highways and roads.

Equestrian trails are also available in state forest and state game lands. The Thunder Mountain Equestrian Trail provides 26 miles of trail through the Elk State Forest. State game lands provide 65.5 miles of additional trails within the region. Horseback riding in state game lands is limited to designated routes and certain times of the year. Consult the Pennsylvania Game Commission (PGC) website for details on these limitations and for maps of designated routes.

Golf Courses

There are two golf courses within the project area—Emporium Country Club and Bavarian Golf Course. Built in 1953, Emporium Country Club offers front and back nine holes with a combined yardage of 6,291. The Bavarian Golf Course is a private 18-hole course located outside of St. Marys in the headwaters of West Creek a tributary to Driftwood Branch Sinnemahoning Creek.

Municipalities can designate roadways as joint-use roads that permit vehicle and recreational vehicle traffic

Camping

A popular recreational activity, there are a variety of opportunities available for camping. State Forest, State Parks, and private campgrounds provide opportunities. Camping on State Game Lands is not permitted. Seven private campgrounds

and six state park campgrounds provide a variety of facilities and amenities. In addition to the organized camping facilities, numerous private camps exist in the region, for hunters and anglers. The structures of these camps vary from shacks without power or water to trailers and houses.

Unlike State Game Lands, State Forest Lands are open to camping. Primitive backpack camping of one night along a trail or anywhere within State Forest land—except for natural areas— is permitted. Motorized camping where a vehicle is used to transport or store equipment is allowed, but requires a permit from the local district forest office. Group camping with 10 or more people is acceptable in certain areas where little or no environmental harm will come and requires a special activities agreement with the local district forest office.

Austin Campground is located in Potter County, along Nelson Road in Austin. Cabins, campers, a bunkhouse, and 128 sites are available to rent year-round.

Austin Dam Memorial Park permits primitive camping at the site year-round. Registration fees are not required, but donations are requested to help offset cost associated with park maintenance.

Benezette Store and Campground offers primitive and modern camping. Dump station, restrooms, showers, sleep rooms, restaurant, and canopies are available.

Big Elk Lick Campground is a privately-owned campground located off Route 555 in Benezette. Horses are allowed in the campground.

Cherry Springs State Park has an open field campground with 30 rustic sites. Site reservations are not available, campsites are available on a first-come first-served basis.

Geist Mountain Creek Campground and Cabins is a privately-owned campground located near the village of Sinnemahoning.

Hemlock Campground is located along First Fork Sinnemahoning Creek off Wharton Road in Austin, Potter County.

Medix Run Lodges and Campground has 12 sites and three lodges available. Campsites have electric and water hookups and fire ring. Campground also has a bathhouse and pavilions.

Parker Dam State Park has 109 campsites, 16 cabins, and three organized group tent areas available. Modernized campsites have a variety of terrain from grassy to forested areas. Eighty sites have electricity available. A shower house, playground, dump station, and camp store are available. Pets are permitted at designated sites.

Patterson State Park allows primitive camping. Reservations are not available at the site and registration fees are collected using the honor system. Facilities at the park are limited so plan on packing out what you bring in.

Prouty Place State Park has no facilities, but offers primitive camping. Visitors to this park need to follow the Leave No Trace principals and pack out what they bring in.

Sinnemahoning State Park has 35 modern campsites and a rental cabin available. A playground, shower house, and pump station also are available. Pets are permitted in certain areas, but not in the cabin area.

Sizerville State Park provides 18 modernized sites offering electricity and five secluded walk-in sites located along Cowley Run. A playground, shower house, and pump station are available. Pets are not welcome in the campground.

Cabins, Lodges, and Bed and Breakfasts Facilities

Several cabins, lodges, and bed and breakfasts are available to rent throughout the region. These facilities provide services for guest traveling far distances, families with young children, or are physical limited and expand the profile of potential visitors. Lodging varies from rooms at a bed and breakfast to rustic cabins, such as those at Wapiti Woods or Medix Run, to private houses, such as Elk Country Hideaway. A list of cabins, lodges, and bed and breakfasts is located in Appendix K.

Geocaching

Initiated in Portland Oregon in May 2000, geocaching is on the rise as a recreational activity. An adventurous treasure hunt game, it uses a global positioning system (GPS) unit to find a hidden cache. At first, the game was called GPS Stash Hunt, but was later changed to geocaching, because of the negative connotation of "stash." The name geocache comes from "geo" meaning earth and "cache" a French word that refers to a place to store or hide items.

The game is simple and can be played almost anywhere in the world. Players obtain coordinates to a cache site via the Internet. They then travel to the cache coordinates and search for the hidden treasure. When a participant finds a cache, they may take an item from the cache if they can replace it with an item of same value. Each visitor is asked to sign the logbook providing information to the cache hider about whom and when the cache was found. More information about geocaching is available on the geocaching.com website.

Cameron County is the "Geocaching Capital of the World." Varieties of caches are available within the region. There are more than 3,000 caches within Cameron County with over 2,000 in the Driftwood and Sinnemahoning areas. The Allegheny Geo Trail is a series of geocaches within a 10 county radius that surround the Allegheny National Forest and its gateway counties in north central Pennsylvania. Each county has 10-20 specified caches. Special county geocoins are given to geocachers who find six of the specified caches in a county and those that find six caches in each of the 10 counties can get an Allegheny Geotrail coin. More information about the Allegheny Geo Trail is available on the Internet at alleghenygeotrail.com (Cameron County Chamber of Commerce, 2008).

Fishing

Since 1866, the responsibility to protect and manage Pennsylvania's fishery resources and regulate recreational fishing and boating has been that of Pennsylvania Fish and Boat Commission (PFBC). Nearly two million people fish in Pennsylvania each year, with an estimated economic impact of $1.35 billion (PFBC[1]). The Pennsylvania Wilds region provides ample opportunities for anglers. The opportunities are compiled in the Pennsylvania Wilds Fishing Guide available on the Northwest Pennsylvania Great Outdoors Visitors Bureau website.

Abundant fishing opportunities are available with 40 Class A Wild Trout Streams, 26 Approved Trout Waters, and five Special Regulation Areas. Sinnemahoning Creek is a Warm Water Fishery (WWF). The tributaries that enter Sinnemahoning Creek after the confluence of Bennett Branch and Driftwood Branch are High Quality Coldwater Fisheries (HQ-CWFs.)

Bennett Branch is designated as a Coldwater Fishery (CWF) from its source to Mill Run. From Mill Run to the confluence with Driftwood Branch, it is a designated WWF. Thirty-six tributaries to Bennett Branch are designated CWFs, 12 are HQ-CWFs, and three are Exceptional Value (EV) streams.

The mainstem of Driftwood Branch, from its source to Elk Fork, is a HQ-CWF. From Elk Fork to Bennett Branch, its designation is a Trout Stocked Fishery (TSF). Four tributaries are CWF, six are EV, and 32 are HQ-CWF.

First Fork Sinnemahoning Creek and its tributaries are primarily HQ-CWFs. Five tributaries are EV, and the mainstem from Stevenson Dam to the mouth at West Branch Susquehanna River is a High Quality Trout Stocked Fishery (HQ-TSF). The mainstem of Sinnemahoning Creek is a Warmwater Fishery (WWF) and five tributaries entering directly into it are designated HQ-CWFs. All stream segment designations are identified in Appendix G.

Wilderness Trout Waters Program, established in 1969, was designed to protect and promote native brook trout fisheries, the ecological requirements necessary for natural reproduction of trout, and wilderness aesthetics. In order for a stream segment to be classified as wilderness trout waters, it must have an EV designation. It must provide a wild trout fishing experience in a remote, natural, and unspoiled environment where there are minimal disruptive activities. Nearly 47 miles of stream within the Sinnemahoning watershed received the wilderness trout designation (PFBC, 2008). They are identified in Appendix K.

Class A Wild Trout streams support a population of naturally reproducing trout of sufficient size and abundance to support long-term and rewarding fisheries. Waterways under this designation do not participate in stocking programs. Forty tributaries that have received the Class A Wild Trout designation within the Sinnemahoning Creek watershed are identified in Appendix K.

Approved Trout Waters are waterways—lakes, ponds, and reservoirs—that meet the criteria that qualify them to be stocked with trout by PFBC. Twenty-seven waterways that qualify as Approved Trout Waters are identified in Appendix K.

Special Regulation Areas are waterways that fall into various regulations of PFBC, such as Catch and Release, Fly-Fishing Only, and Delayed Harvest. As of 2008, there are five special regulation areas in the Sinnemahoning Creek watershed. Consult the annual fishing summary guidelines for changes to regulations.

> ***Birch Run Watershed*** is designated as a Wild Brook Enhancement Area. Birch Run and its tributaries are open year-round with no tackle restrictions. Brook trout cannot be killed or kept in anglers' possession; all other species are legal during regular seasons.
>
> ***Driftwood Branch Sinnemahoning Creek*** is designated as a Catch and Release Fly-Fishing Only area from the Shippen Township building to Route 120 west of Emporium. The area is open to anglers year-round from one hour before sunrise to one hour past sunset. Artificial lures are required, and anglers must have a trout stamp and cannot have any trout in their possession.
>
> ***Hunts Run*** is designated as Catch and Release Only for 4.7 miles that starts at the confluence of McNuff Branch to the mouth. Anglers are required to have a trout permit and cannot have trout in their possession.

First Fork Sinnemahoning Creek is designated as a Delayed Harvest Artificial Lures Only area, and is open to anglers year-round. Spin or fly rods that use lures made from synthetic materials are permitted. Anglers are limited to three, nine-inch trout from June 15 to Labor Day. All other times, fish must be released.
G.B. Stevenson Reservoir participates in the Early-Season Trout Stocked Water Program. From March 1 to March 31, the reservoir is open for trout fishing. Anglers are required to have a trout stamp and are limited to three fish at least seven inches long each day.

Boating

Boating regulations are under the jurisdiction of the PFBC. An estimated 2.5 million people boat on the 83,000 miles of rivers and streams in Pennsylvania each year. In 2005, approximately 350,600 boats were registered. Recreational boating generates an estimated $1.7 billion to the economy each year (PFBC, 2007a).

Participants in the 2008 Cameron County Canoe Classic paddle Driftwood Branch Sinnemahoning Creek

PFBC manages 250 public access areas to Pennsylvania's waterways; in addition, organizations and municipalities manage many other access points. In 2005, in an effort to increase public access to waterways, PFBC initiated the Boating Facility Grant Program. This program provides grant money to public entities to establish stream access points that are open to the public. Grants are awarded for land acquisition, project design, engineering, development, expansion, and rehabilitation of public recreational boat access facilities. The grants require a 25 percent match.

Access to area waterways is limited due to the existence of railways that parallel the streams. Railroad officials have denied access across rail line tracks, and since the 2006 Norfolk Southern train derailment, enforcement of trespass laws has increased. Local government officials, sportsmen and conservation groups, and railroad officials should discuss and settle on a public waterway access plan.

Hunting

A popular recreation activity throughout western Pennsylvania, PGC manages and regulates hunting in Pennsylvania. An individual can begin hunting at 12 years of age after passing a hunter safety course.

The number of hunters in many states is on a rapid decline, as it is in Pennsylvania. It is essential for future wildlife management and preservation of the hunting and trapping heritage of Pennsylvania that the recruitment of new hunters and trappers is successful. Since 1998, the sale of licenses has decreased. Table 5-1 lists the number of licenses sold from 1998 to 2007.

Area sportsmen groups organize hunts and youth programs in efforts to increase participation. For example, Sinnemahoning Sportsmen's Association hosts annual coyote and rattlesnake hunts, and Saint Marys Sportsmen's Club hosts coyote and deer hunts. Local sportsmen's clubs, in cooperation with PGC, host hunter safety courses to educate new hunters about laws and safety.

Abundant amounts of public land are open to hunters throughout the region. Seven state game lands account for 52,398 acres, five state forests with 952,000 acres, and three state parks provide 2,126 acres for hunting.

Table 5-1. Hunting Licenses Sold

Year	Licenses
1998	1,071,205
1999	1,033,315
2000	1,038,846
2001	1,047,820
2002	1,017,154
2003	1,018,248
2004	1,013,866
2005	964,158
2006	945,842
2007	924,448
2008	926,898

(Source: PGC, 2009)

Elk State Forest includes 198,000 acres within Cameron and Elk counties.

Moshannon State Forest includes 187,000 acres of Clearfield County. Only a portion of this acreage is located within the project area.

Sproul State Forest is partially located within Sinnemahoning Creek watershed in Clinton County. Only a portion of the 305,000 acres designated as state forest is within the project area.

Susquehannock State Forest, partially located in the project area, has 262,000 acres available for public hunting.

Parker Dam State Park has 526 acres designated for hunting. Hunters are encouraged to use extreme caution due to other visitor uses at the park.

Sinnemahoning State Park has 1,400 acres available for hunting.

Sizerville State Park has 200 acres open to hunting.

State Game Lands 14, located near Howard Siding within the headwaters of Hicks Run and Dents Run, has 13,819 acres available for public hunting.

State Game Lands 25, partially located within the northwestern corner of the watershed above Saint Marys, provides access to 23,136 acres for public hunting.

State Game Lands 30, is located within the southern portion of McKean County and provides 11,572 acres for hunting, of which a portion is within the Driftwood Branch Sinnemahoning Creek subwatershed.

State Game Lands 34 provides 8,800 acres in the Medix Run area, of which only a portion is located within the Medix Run and Mix Run subwatersheds.

State Game Lands 93, is located within the headwaters of Bennett Branch, in Huston Township, Clearfield County. A portion of its 4,876 acres is within the Bennett Branch subwatershed.

State Game Lands 293 provides 2,284 acres along West Creek in Saint Marys for public hunting.

State Game Lands 311 passes through Dents Run in the Bennett Branch subwatershed, provides 1,730 acres for public hunting.

Wildlife Watching

For many residents in the area, wildlife watching, including birds, is a favorite pastime. The region has seen increased tourism for wildlife observation from recent advertisement efforts about the Pennsylvania Wilds. This is especially true because the area is home to the only free-roaming elk herd in Pennsylvania and contains numerous amounts of forest habitat for wildlife. In addition to all the state parks, state forestlands, and trails, these areas are great places to view wildlife.

Beaver Run Dam is a shallow water impoundment and field located off Quehanna Highway about nine miles southeast of the Route 555 intersection. The dam provides opportunities to see waterfowl, wading birds, songbirds and deer. It is also located within close proximity to several trails.

Bucktail State Park Natural Area is a 75-mile scenic drive along Route 120 from Emporium to Lock Haven. The route, although this state park is predominantly private property, it follows the Native American path of the "Old Sinnemahoning Trail," and is named in honor of the Bucktails Civil War regiment.

Wildlife watchers utilize resources available at the Winslow Hill Elk Viewing Area

Elk Country Visitor Center is a premiere elk viewing and education facility located just outside of Benezette on Homestead Drive. The Center offers trails, a 4-D interpretive theater, exhibits and more. Locally-made foods, art, and products are marketed in the center's gift shop.

Hicks Run Viewing Area is part of Elk State Forest along Route 555 about 12 miles east of Benezette. Elk and grassland birds are common at the site. Restrooms were recently installed.

Johnson Run Natural Area is a 216-acre old-growth hemlock-hardwood forest, which can only be accessed by way of the Bucktail Hiking Trail within Elk State Forest.

Lower Jerry Run Natural Area is a secluded old-growth white pine and hemlock forest located within Elk State Forest. The only access to the site is by foot. The area is a reptile and amphibian special protection site.

Marion Brooks Natural Area is 917 acres of birch stands located within Moshannon State Forest, just off the Quehanna Highway. The area is home to various species of woodpeckers, butterflies, dragonflies, birds, and snakes. Birds, foxes, coyotes, and bears feed upon the blueberries and huckleberries that grow at the site.

Pine Tree Trail Natural Area, within Elk State Forest, is 276 acres of white pine stands that was once a farm. Follow the pine tree trail through the natural area, crossing Dents Run. This site is a good place for bird and wildlife watching.

Porcupine Run Viewing Area is located at the intersection of Winslow and Dewey Roads in the Elk State Forest near State Game Lands 311. It is a great location for bird and elk viewing.

Quehanna Wild Area is known as Pennsylvania's first large forest area devoted to peace and solitude. It includes 48,000 acres of second-growth mixed hardwood forest within Moshannon and Elk State Forests. It contains the 1,215 acre **Wykoff Run Natural Area**, featuring large paper birch stands and large open meadows.

Shagger's Inn is a shallow water impoundment providing critical wetland habitat. A popular bird watching spot near Parker Dam State Park, it is one of a few locations where osprey nest in Pennsylvania.

Winslow Hill Viewing Area is the most popular elk viewing area in Pennsylvania. In addition to the elk, this is a great location to see various bird species, such as wild turkey. ***Wykoff Run Road to Quehanna Highway*** provides several pull-offs along Wykoff Run, a well-known trout stream. It is a popular bird watching area for red-tailed and broad-winged hawks. Restrooms were recently installed along the Quehanna Highway.

Two area businesses, PA Elk Range Adventures and Big Woods Adventure, provide guided hunting, fishing, and wildlife watching adventures. Both provide guide services throughout the Pennsylvania elk range.

Winter Recreation Opportunities

Outdoor recreation does not have to cease through the winter months. Within the Sinnemahoning watershed, there is a plethora of recreational opportunities that include snowmobiling, cross-country skiing, snowshoeing, ice fishing, ice skating, and sledding.

Snowmobile use is a popular recreational activity throughout the area, with access to over 700 miles of trails. The resources available for snowmobile use were discussed in further detail in the trails section.

Cross-country skiing and snowshoeing were historically used as a means for transportation over snow. Today their use is for recreational purposes. Snowshoes and skis distribute a person's weight equally over the snows surface so they do not sink in the snow. Skiing is a faster method of transportation and utilizes poles that push off the snow to gain speed. Snowshoeing does not utilize poles and leaves a person's hands free for other activities. Parker Dam and Sizerville State Parks have cross-country skis and snowshoe equipment available for use under the Get Outdoors Pennsylvania recreation program. Parker Dam State Park has educational programs to help first time cross-country skiers and snowshoe users; check their website for program details http://www.dcnr.state.pa.us/stateparks/parks/parkerdam.aspx.

Parker Dam and Sinnemahoning State Parks offer anglers opportunities to ice fish at their own risk. Ice thickness should be at a minimum of four inches before accessing the lake. Anglers are encouraged to carry safety equipment with them.

The beach area at Parker Dam State Park provides opportunities to ice skate, conditions permitting. Ice is monitored for safety in the skating area.

Another popular recreational activity on public or private lands, anywhere there is a hill clear of hazards, such as trees and boulders is sled riding. Parker Dam State Park has a designated sledding area in the park near the boat rentals.

Area residents inquired about possibilities for additional winter recreational activities. The mountainous terrain is ideal for downhill skiing. Establishing a ski resort in the area could increase tourism into the area during peak and off-peak seasons. Careful planning and study are needed to determine if a ski resort would be possible and beneficial to the region. A ski resort would provide additional jobs year-round; the number of opportunities would ultimately be determined by the extent of facilities established.

Annual Events

Annual events bring people together to celebrate the heritage of an event, place, or time. This region hosts several events on an annual basis that highlight its heritage and preserve a way of life.

Autumn Festival takes place at Sizerville State Park on the first Saturday in October. The festival is a celebration of old time skills and crafts. Demonstrations on quilting, bee keeping, woodcarving, candle making, and tatting (making dollies or lace) take place during the event.

Cameron County Canoe and Kayak Classic held the first Saturday in April. Contestants paddle along 11 miles of Driftwood Branch Sinnemahoning Creek from the Cameron County Country Club, Emporium to Driftwood. The Classic started in 1975 as a race among friends and has grown from the 16 original paddlers to 129 vessels in 2008.

Participants of the annual Cameron County Canoe Classic make their way down Driftwood Branch on April 5, 2008

The ***Dam Show***, sponsored by Austin Dam Memorial Association and Potter County Fine Arts Council, takes place each summer at the Austin Dam Memorial Park. The event remembers the devastating events that occurred when the dam broke and flooded the town below in 1911. This music festival features local artists of all ages and includes story telling and light shows. For more information, visit the website at http://www.damshow.com.

The ***Elk Expo***, hosted by Northwest Pennsylvania Great Outdoors Visitor's Bureau, takes place at the Elk County Fairgrounds in Kersey. The event features chainsaw carving demonstrations, 3D archery shoot, photography contest, elk education center, seminars, elk viewing tours, and the elk hunting license drawing.

Fall Festival is held at Parker Dam State Park. This event is a celebration of old time skills and features a pumpkin float to commemorate the Pumpkin Floods that occurred in Clearfield, Pa.

Winter Family Festival, sponsored by Clearfield YMCA, takes place at Parker Dam State Park in January or February. The event provides opportunities to learn about winter recreation, such as ice

fishing, snowshoeing, ice harvesting, and winter survival. Other events included super snowball flag football tournament, blizzard volleyball tournament, frozen salami sling, snowman contest, sleigh rides, and snowmobiling.

Woodhick Weekend takes place on the Sunday of Labor Day weekend at Parker Dam State Park. Participants compete in five events used by the early timbering industry for the coveted title of Woodhick or Woodchick of the year.

The ***Woodsman Show***, hosted at Cherry Springs State Park in August each year, celebrates the history of the lumbering times past. Lumberjacks compete in events, such as axe throwing, crosscut sawing, and tree felling. Chainsaw carving competition and auction, exhibits, historic reenactments, vendors, and traditional music are also part of the festivities sponsored by the Galeton Rotary Club. For more information, visit their website at http://www.woodsmenshow.com.

Woodsy Owl Weekend is hosted during a spring weekend at Parker Dam State Park where volunteers enhance the park through trail maintenance, litter removal, tree plantings, and painting. Volunteers receive free camping for the weekend in return for their efforts.

Area sportsmen clubs host several annual events, including youth fishing derbies, youth field days, coyote hunts, snake hunts, and educational events, such as hunter's safety, throughout the year. These events encourage youth participation in the outdoors and highlight the region's natural resources, including its waterways and wildlife.

Local Attractions

Austin Historical Society Museum is a replica of E.O. Austin's house. Located adjacent to the original site, the museum houses and preserves archives from the town of Austin and the surrounding area.

Bucktail Monument, located in Driftwood, recognizes and honors the Bucktail regiment for their service during the civil war.

Cameron County Historical Society's Little Museum, originally a two-room schoolhouse until the consolidation of schools in 1962, houses historical artifacts from Cameron County's past. The collection at the museum highlights the lumbering and coal mining era, Civilian Conservation Corps (CCC) camps, and famous sons of Cameron County. Located along Route 120, the museum is open on Wednesdays and Sundays from Memorial Day through October.

CCC Interpretive Center located at Parker Dam State Park honors the work done by members of the Civilian Conservation Corps. The center is open during the summer season on Sundays.

Tom Mix Comes Home Museum is located on a rural route outside of Driftwood. This museum highlights the birthplace of western actor Tom Mix and his celebrity outhouse.

Civilian Conservation Corps museum located at Parker Dam State Park

Wayside Memorial Spring, also known as Pepper Hill Fire Memorial, honors the memory of eight CCC members who lost their lives battling a wildfire at Pepper Hill on October 18, 1938 (http://www.dcnr.state.pa.us/forestry/stateforests/elkhistory.aspx).

Artisans

The Sinnemahoning watershed boasts a surplus of talented artisans, people who are skilled in the arts, such as quilters, painters, woodworkers, jewelers, potters, photographers, and many more. Artisans help to define the wilderness and back-to-basics character of the area, because their work is unique and made by hand, instead of the ever-growing line of mass produced products. Watershed artisans also provide a major attraction for tourists, which can, in turn, add to the economy. The artwork used on the cover of the Sinnemahoning Creek Watershed Conservation Plan, as well as other promotional materials, is an original painting by local artisan, John Sidelinger. This piece of artwork has sparked awareness and interest in the plan that otherwise might not have been achieved, and further demonstrates how art is important to the community.

Artisans of the watershed can easily be inspired by nature, and some may even create artwork (wreathes, decorations) from what they find in nature. The population of the watershed is exposed to art, whether it is for sale in a local restaurant or in a designated location. The Pennsylvania Wilds planning team formed an artisan network to identify all artisans located within the 12 county PA Wilds region. As of January 2007, the count of local artisans was at 304. Some artisans and locations where local art can be displayed are already recognized on the PA Wilds website. July 2008, Cameron County Chamber of Commerce opened an Artisan Center at its office in Emporium. The center opened with s display of artwork from 10 artists.

Nearby, Elk County Council on the Arts—located in Ridgway, Pa.—offers a place for artisans to display their work, and hosts events, performances, and classes for the public. The Enchanted Woodlins Project, also of Ridgway, Pa. is a partnership between the Appalachian Arts Studio, community, state, and federal government to construct outdoor chainsaw art pieces that will be distributed throughout the PA Wilds region. Other lumber products, such as carved wood birdhouses are unique creations of this area because of its plentiful hardwood forests. Saint Marys, Pa. is the location of Carved in Stone, a store that produces beautiful hand-carved stones. In addition, the individual artisans scattered throughout the area add to their specific communities and beyond.

Environmental Education

Environmental education can be, and has been, defined in different ways. In 1984, Pennsylvania Department of Education (PDE) and DCNR joined efforts with other environmental educators from the state to develop the Pennsylvania Master Plan for Environmental Education. The plan describes environmental education as, “a learning process concerned with the interrelationships among components of the natural and human-made world, producing growth in the individual, and leading to responsible stewardship of the earth” (Pennsylvania Center for Environmental Education). Many groups throughout the state are invested in bringing this definition to life and teaching environmental education to students of all ages.

The education center at Sizerville State Park provides informational displays and equipment rental to park visitors

Pennsylvania Department of Conservation and Natural Resources (DCNR)

The Sinnemahoning Creek watershed is home to six state parks: Cherry Springs State Park, Parker Dam State Park, Patterson State Park, Prouty State Park, Sinnemahoning State Park, and Sizerville State Park. Each state park is managed by DCNR, which offers a variety of environmental education activities and programs to the public. Schools and teachers can take advantage of the curriculum-centered activities and programs to further their students' education.

Of the six state parks, Cherry Springs State Park and Parker Dam State Park provide year-round environmental education. Cherry Springs State Park is located in Potter County along PA Route 44, while Parker Dam State Park is situated in the north western corner of Clearfield County. Some environmental education and interpretive programs at both parks include campfires, hands-on activities, and guided walks. Cherry Springs also boasts the darkest skies in the east, which enables wonderful stargazing educational opportunities; and Parker Dam State Park has additional opportunities, such as maple sugaring demonstrations in the spring and apple cider making in the fall. Parker Dam also is the only park within the watershed that presents a year-round watershed specific education program.

Patterson State Park and Prouty State Park do not have environmental education at this time. However, the chance to be in the outdoors is an environmental educational experience all in its own. Patterson State Park is located at the Susquehannock Trailhead and has two pavilions for picnicking. Prouty State Park is five acres of land near Susquehannock State Forest.

The remaining two state parks within the watershed are Sinnemahoning State Park and Sizerville State Park. Both parks provide environmental education for designated months out of the year. Sinnemahoning's program runs from May through October, and Sizerville's starts a month earlier, and goes to October. Sinnemahoning State Park has some specialized environmental education in addition to the central program developed by DCNR. Sizerville State Park is equipped with an Environmental Education Building, which provides interactive displays and learning opportunities. Outside the building there is a butterfly garden with plants designed to attract butterflies, visitors use the garden to monitor and learn about butterfly species. Sinnemahoning State Park also has butterfly gardens.

Pennsylvania Department of Environmental Protection (DEP)

DEP continues to support environmental education through the Pennsylvania Environmental Education Grants Program, by displaying curriculum and information on their website, and by regular participation at community events.

Pennsylvania Fish and Boat Commission (PFBC)

Through workshops, PFBC provides curriculum-based environmental education to teachers and other educators to enhance their instruction of youth. Through PFBC, educators are able to access the international conservation education program Project Wild and the Pennsylvania Amphibians and Reptiles Educator Workshop. PFBC also supplies the public with informational outreach and assumes an active role in envirothon competitions, which are further explained in the envirothon section.

Pennsylvania Game Commission (PGC)

The amount of public land in the Sinnemahoning watershed allows for many hunting opportunities. PGC offers hunter-trapper education to youth and adults, which provides an excellent form of wildlife education. Through other programs (such as Project Wild) conducted in cooperation with a variety of organizations, PGC conveys a wildlife education message to citizens throughout the state.

Schools

With the Sinnemahoning watershed's rural character and abundant natural resources, it is not a surprise that teachers within the watershed have a very active role in environmental education. Notably, Austin Area Junior Senior High School students are actively engaged in several different forms of environmental education. For example, the school participates in the Trout in the Classroom Program, sponsored by Pennsylvania Council of Trout Unlimited; and each year, 6th graders embark on a canoe trip. Saint Marys Area Senior High School also has a very energetic outdoor club and provides a quality outdoor classroom. Other schools within the watershed contribute on varying scales to the environmental education of area youth.

Envirothons

The Pennsylvania Envirothon provides environmental education to students throughout the state. Students involved in envirothons must answer questions on topics, such as aquatics, forestry, soils and land use, wildlife, and current issues. Each school has the opportunity to create envirothon teams to compete in a county competition organized by county conservation districts. The winning school from each county moves on to compete in the state competition.

Table 5-2. 2009 Envirothon Results

County	Rank
Cameron	41
Clearfield	50
Clinton	32
Elk	58
McKean	58
Potter	60
Total	67

(Source: PA Envirothon)

The results of the state competition can offer a glimpse of how well students within the watershed are environmentally educated in comparison to other areas. The 2008 envirothon results are listed in Table 5-2. A student who participates in an envirothon not only enhances their environmental education, they can participate as mentors to their peers and during other events.

County Conservation Districts

County conservation districts collaborate with state agencies, watershed associations, school districts, and other groups to provide environmental education to their communities. A part of that work (as mentioned above) involves organizing and conducting the county Envirothon competitions. Cameron, Clearfield, Clinton, Elk, McKean, and Potter County's environmental education efforts include in-school conservation presentations, field days, day camps, educational tours, demonstrations, festivals, and celebrations. College scholarships are also available through some conservation districts to students who have an interest in the environment.

Penn State Cooperative Extensions

Penn State University provides environmental education outreach through their county cooperative extension offices. Each office provides access to the expertise and resources of Penn State University while maintaining local service providers and accessibility. Programs run by Penn State Cooperative Extensions include after school programs, youth development and 4-H, and economic and community development.

PA CleanWays

PA CleanWays, a nonprofit organization, operates a chapter in Elk and McKean counties, as well as the affiliate CleanScapes, Incorporated in Clinton County. PA CleanWays spreads the environmental education message of the impact litter and illegal dumps have on the earth. The organization leads illegal dump surveys, roadside cleanups, educational outreach, a roads adoption program, proper disposal efforts, and beautification projects.

Solid Waste Authorities

The Solid Waste Authority (SWA) in each county provides educational programs to civic groups about prevention, clean-up, and enforcement of illegal dumping, as well as recycling and re-use of materials.

Historical Resources

Historical Overview

Potter and McKean counties were created from Lycoming County on March 26, 1804. Potter County was named to honor General James Potter, an American Revolution hero, even though General Potter never came to the region named after him. McKean County was named for Governor Thomas McKean.

Clearfield County was created on March 26, 1804 from portions of Lycoming and Centre counties, and is named for Clearfield Creek that flows within its bounds.

Elk County, named after the free-roaming elk herds that roam the region, formed from portions of Clearfield, Jefferson, and McKean counties in April 1843.

Cameron County, formed March 29, 1860 from portions of Potter, Clearfield, Elk, McKean, and Clinton counties, is named in honor of Simon Cameron, a Pennsylvania politician.

Origin of names

The name "Sinnemahoning" comes from the Indian word "Achsinnimahoni," which means Stony Lick (Bennett, 1996). The word “elk” comes from the German word “elch,” meaning moose or “Waapiti,” the Native American word for white rump, which describes the lighter fur on the elk’s hindquarters.

Early Settlement

Before European settlers first stepped foot in Pennsylvania, Native Americans lived throughout the commonwealth. Evident by their villages, fields, camps, and paths, they had been here for some time. As the number of settlers increased, they brought with them many new technologies and goods. Native Americans would trade animal pelts and land for these goods, becoming dependent on trade. However, not all European influences were beneficial to Native Americans. Diseases and alcohol had devastating results on Native American communities and on their physical and social well-being.

Settlement

Vast forestlands and natural terrain surrounded the hardy, active, and energetic settlers. Following slender, well-worn paths of Native Americans, they came to stake their claim on Iroquois lands. Ignoring numerous warnings of the Iroquois, the settler refused to vacate, that is until the raids by the Native Americans forced them to. In revenge, three settlers trailed the Native Americans to Sinnemahoning Creek where they attacked and killed eight of them (Beers & Co., 1890).

David Zeisberger, a Moravian minister and a missionary, was the first non-Native American among the Mohawk. A student of their language and culture, he became fluent in their language and conducted negotiations with England to protect Native American rights (Wikepedia Foundation, 2007).

In 1784, the Chief of the Six Nations signed the new purchase, which transferred ownership of the land to Pennsylvania and forced the majority of Native Americans to flee to Ohio, Canada, or further west.

The earliest known settlement was that of John Bennett and his father in 1787. They came to the Caledonia area via the Susquehanna River and Sinnemahoning Creek, the namesake for the portion of the stream he traveled. Settlement into the Cameron County region occurred in the early 1800s, when John Jordan established a settlement in Second Fork, known today as Driftwood. Others soon followed, adding to the settlement in Driftwood.

Shortly after, additional settlements occurred throughout Cameron County. Emporium was established in 1810 by John Earl Sr. Joseph Houser settled in the Rich Valley in 1811. The first settlement along Portage Creek was that of Hiram Sizer in 1820. In 1844, the first settlement along West Creek occurred.

Replica of a log slide built by William Parker in 1868, located at Parker Dam State Park

Industrialization

The area's natural resources held much potential for early settlers. The vast array of wildlife and fish kept food on their tables, while timber and mineral resources provided industrial opportunities, around which early pioneers built their daily lives.

The establishment of gristmills throughout the region began in 1811. The first mill was established along Clear Creek, and the second along North Creek. Prior to the establishment of the first gristmill, settlers had to travel 100 miles to Williamsport to grind their grain.

Early industry revolved around lumber, due to the considerable amounts of timber resources. Typically, harvesting of timber occurred during winter months while the ground was solid and movement of timber was easier. In the spring, rafts transported timber down waterways during spring floods. Rafts that floated Sinnemahoning Creek were typically smaller so they could negotiate the narrow, shallow, and crooked waterways (Lumber Heritage Region of Pennsylvania, 2001).

The first sawmills in the region were established in 1811 at the mouth of North Fork, and in 1814 in Emporium. The majority of the mills that existed throughout the region were developed after the 1820s. That was due to the steep terrain of the countryside and the settlement pace of the region. Most early sawmills were not built along waterways, which required the timber to be transported to waterways. Log slides were used to transport timber from the woods to streams. Log slides were paths created of split logs that were used to pull and drag logs down the mountains (Lumber Heritage Region, 2001).

Early sawmills were small, family-operated mills. It was not until 1847, when industrial lumbering began in the region that lumber companies formed and expanded the industry (Lumber Heritage Region, 2001). The transportation of logs via rafts began in 1849. Bennett's Branch Improvement Company was formed by timber owners to navigate the difficulties along Bennett Branch. In 1871, a large splash dam was built near Benezette, followed by another one 10 miles upstream. These improvements, along with the consistent use of Bennett Branch for transportation of lumber, increased the stream's width. (Lumber Heritage Region, 2001).

With the expansion of the railroad into the region, rafting phased out due to efficiency and economic reasons. The last raft floated down Driftwood Branch in 1903, and the last raft floated down Sinnemahoning Creek in 1915.

Millions of acres in Potter County were timbered between 1884 and 1920, which depleted the resources. In 1886, the Goodyear Lumber Mill was built in Austin, with a 400,000 board feet per day production capacity.

In the 1880s, tanneries began to appear throughout the region. Tanneries hired immigrant workers known as "woodhicks." They lived in camps in the woods, and stripped the bark off hemlock trees. The bark produced a liquor, which was required in the tanning process. In 1881, a tannery was established in Austin, and another was established in Costello in 1886 (Downs, 1998).

With the depletion of resources, the economy decreased and officials enticed George Bayless to establish a paper mill in the town of Austin. Opened in 1900, the paper mill provided 200 jobs and was the largest plant in Austin. The mill attracted many people to the region. Seasonal water shortages in Freeman Run, where the plant was located, affected business, and in 1910, the Bayless Dam was built (Downs, 1998).

Remnants of the Austin Dam

After an uncharacteristic mild winter in January 1911, the dam bowed 36 feet, which raised residents' fears that the dam would break. To ease fears and decrease pressure on the dam, a section of the dam and a stopper were removed. On September 30, 1911, after a season of heavy precipitation, the Bayless Dam broke, and released millions of gallons of water and more than 20,000 cord feet of lumber into the towns of Austin and Costello, killing 78 people (Downs, 1998).

Although a majority of the survivors moved, some remained and rebuilt the town. The dam and paper mill were rebuilt, only to be destroyed by fire in 1933. The second dam broke in 1942, with less damage and harm (Downs, 1998).

Civilian Conservation Corps

On March 31, 1933, President Franklin D. Roosevelt signed the Emergency Conservation Act that lead to the formation of the Civilian Conservation Corps (CCC). The CCC—a work relief program for young men ages 18-25 during the Great Depression—provided jobs, training, and housing. Members were placed in camps where they lived and participated in conservation work to improve access and amenities to address the recreational demand. Projects included building roads, bridges, foot trails, horse trails, cabins, and recreational impoundments.

Pennsylvania had the second most camps in the U.S. second to California. There were 14 camps situated throughout the Sinnemahoning Valley from Cherry Springs all the way to Parker Dam. Projects at these camps varied from fire protection, flood recovery, road and trail building and maintenance, park enhancements, dam building, and stream improvements to emergency rescues (Pennsylvania CCC Archive).

Table 5-3. Civilian Conservation Corps Camps

Camp	Location
S-72 PA	Huntley
S-73 PA	Laurel
S-84 PA	Dents Run
S-85 PA	Sizerville
S-86 PA	Wycoff Run
S-117 PA	Penfield
S-118 PA	Medix Run
S-130 PA	Lushbaugh
S 131 PA	Potterdale
S-132 PA	Cameron
S-134 PA	Costello
S-136 PA	Cherry Springs
S-144 PA	Charles E. Baer
S-147 PA	North Creek

(Source: Pennsylvania CCC Archive)

During the construction of the dam at Parker Dam State Park, three different CCC camps assisted in the projects—S-73, S-116 Anderson Creek, and S-118. Work to repair the old pond and splash dam at the site was started by the Laurel camp. Limited work force and materials slowed the development of the project. When William Dague became interested in the project at Parker Dam in 1934, additional resources from the Anderson Creek and Medix Run camps became available. Completed in 1935, the dam was damaged in the flood of March 1936. Members of S-116 and S-118 camps rebuilt the dam in time for the grand opening of Parker Dam State Park in July 1937, which again failed that fall. In 1938, members of S-116 and S-118 reconstructed the dam and by spring 1940, the dam and lake were ready for public use (Rensel, 2003).

In 1942, the U.S. involvement in World War II caused a depletion on resources and the workforce necessary to continue the CCC program; therefore, it was deauthorized. The efforts of these young men through a challenging time in history are evident at the numerous state and national parks across the U.S.

Postal Delivery

In colonial times, communications depended on friends, merchants, and Native Americans to carry messages between colonies. However, most correspondences ran between the colonies and England. William Penn established Pennsylvania's first post office in 1683 (U.S. Postal Service).

In May 1775, as the colonies separated from England, a Continental Congress was organized to establish an independent government. One of the first questions before its delegates was how to convey and deliver the mail. Benjamin Franklin was appointed chairperson of the committee to establish a postal system, and he was later appointed the first Postmaster General. The present day postal service descends from the system planned by Benjamin Franklin (U.S. Postal Service).

In the days prior to telephones, radios, and television, communication from the outside world was obtained through mail and newspapers. Mail was delivered to the post office and picked up by recipients. Many families waited days, weeks, or months to pick up their mail. They had to coordinate trips for supplies, food, or equipment to pick up mail.

Transportation

Early forms of transportation routes were paths created by Native Americans. These paths provided a means for travel and trade among distant and diverse Native American communities. Settlers followed these paths on foot and horseback as one of the ways to enter the area. They also used canoes and Native American boats.

The Sinnemahoning path is the only major Native American path that traverses the region. Beginning in Lock Haven, the path follows the West Branch Susquehanna River to Keating, where it then follows Sinnemahoning and Portage creeks to Port Allegheny.

With the increase of settlers that entered the region, transportation improvements were needed. In early days, packsaddles were used to transport goods and commodities from one place to another. They followed mere paths over mountains, and through forests. In the early 1800s, the establishment of roadways was being started.

In 1806, in an effort to increase access into their territory, the Holland Land Company established Ellicott Road. This road, designed as a wagon road from Dunnstown to Ellicottsville, followed a portion of Sinnemahoning and Driftwood Branch Sinnemahoning creeks.

By the mid-1800s, railroad establishments were active throughout the region. They revolutionized land transportation, and transformed the standard of living. In 1863, the Philadelphia and Erie Railroad company laid tracks through Driftwood. The establishment of a fork in the tracks allowed transportation north and west.

The Buffalo, New York & Philadelphia Railroad was completed to Emporium on December 23, 1872. The first rail on the old Buffalo & Washington Railroad was placed in October 1867, and opened to Emporium on December 28, 1872

In 1874, the Low Grade Railroad opened from Driftwood (Cameron County) to the mouth of Redbank Creek (Clarion and Armstrong counties).

Education

Many pioneer settlers had limited education, and wanted more for their children. Early schools were subscription schools, which required fees for students to attend. It was not until the enactment of the Common Schools Act in 1838 that established a general system of education and provided all students with a free education (Beers, 1890).

The first schools were organized in the early 1800s. In 1817, Eliza Dodge taught a summer term near the mouth of North Creek. William Boyd taught in a school along Sinnemahoning Creek in 1818. Several schools soon followed, with the first built above Emporium, near Rich Valley, in 1819. The first high grade schools were established in Sinnemahoning around 1864-1865, which were later suspended in 1873 due to finances (Beers & Co., 1890).

Significant People

George Bayless, an industrialist from Binghamton, New York, was the owner and operator of the Bayless Dam. In September 1911, the dam broke flooding the towns of Austin and Costello.

The **Bucktail Regiment—**a famous civil war regiment—was composed of 700 men from Cameron, Clearfield, Elk, McKean, and Tioga counties of Pennsylvania. These men, by trade, were lumberjacks, raftmen, and farmers from the rugged mountains of northern Pennsylvania. They got their name from their regimental badge of honor—the tail of a whitetail buck. Each recruit had a deer tail attached to his cap.

Tom Mix, a popular silent film actor and King of Cowboys, was born and raised near Driftwood. During his career, he starred in over 300 western films.

Joseph T. McNarney was a World War I flying ace and a four star general from Emporium.

In 1872, ***Victoria Claflin Woodhull***, who spent many years of her childhood in Sinnemahoning, was the first woman nominated for president of the U.S. She represented the equal rights party, but lost the election to Ulysses S. Grant (Bennett, 1996).

Pennsylvania Folklore of Buried Treasure

Near the village of Gardeau in McKean County, buried treasure exists. During a hurricane, in 1680 a Spanish galleon sank off the coast of Baltimore. Undetectable at the bottom of the ocean, efforts to retrieve the vessel failed. That is until 1811, when the British Captain Blackbeard recovered the wreckage. Mounting conflict between Britain and France, compounded with knowledge of his discovery among privateers Blackbeard knew transportation of the treasure via the ocean was impossible. However, 400 miles away laid safety in the British ally of Canada (Scully).

From Baltimore, Blackbeard spent several months traversing up the Susquehanna River to its West Branch tributary. War looming between Britain and America, Blackbeard continued his journey into the rustic and wild territory of northern Pennsylvania via Driftwood Branch of Sinnemahoning Creek. The journey harsher than originally estimated, Blackbeard buried his treasure of silver bars near an old saltlick (Scully).

Anticipating returning after the war, he left Colonel Noah Parker to guard the treasure. Keeping intruders away, Parker vowed that he never found the silver. Thousands continue to search for the treasure but never find it although part of Pennsylvania folklore, it is believed that all or a portion of the treasure remains buried in the northern Pennsylvania wilderness (Scully).

Historical Sites, Structures, and Districts

In 1966, the National Historic Preservation Act established the National Register of Historic Places. Listed properties include districts, sites, buildings, structures, and other objects significant to American history, architecture, archeology, engineering, and culture. Although it is encouraged that registered sites and structures are to be maintained to preserve historic integrity, private property owners can maintain or manage their property as they see fit.

Cherry Springs State Park Picnic Pavilion built by the Civilian Conservation Corps

Pennsylvania Historical Museum Commission manages the register for Pennsylvania. The state historic preservation officer submits nominated properties to the state review board. If the property owners or the majority of the owners (if the property is owned by more than one person), object to the nomination, it is sent to National Parks Service for a determination of eligibility without formally listing the property in the National Register (National Parks Service, 2001).

Within the Sinnemahoning watershed, five sites—Parker Dam State Park Family Cabin District, Parker Dam State Park Octagonal Lodge, Parker Dam State Park Dam District, Austin Dam, and Cherry Springs Picnic Pavilion—are identified in the National Register. The CCC, with Austin Dam being the only privately built structure, built four of the five historical structures.

Parker Dam State Park

The CCC operated two camps at Parker Dam State Park, S-73 and S-118. S-73, also referred to as the Laurel or Tyler camp, existed from May 1933 to October 1935. S-118, based at the site, existed from June 1933 to late 1941. They provided emergency conservation work for unemployed young men during the Depression.

One of their first projects at the site was to build a dam to replace an old logging interest structure, which was completed in 1934. They also built an adjacent structure that now hosts the CCC Museum. The dam and the museum composed the **Parker Dam State Park Dam District.**

Parker Dam State Park Family Cabin District contains 24 buildings, of which eight do not contribute to the character of the district. The eight structures are latrines constructed in 1976. The district contains one of the largest family cabin areas constructed by the CCC. At the site, there are 16 cabins varying from one to three rooms available to rent.

Parker Dam State Park Octagonal Lodge is the only octagonal CCC structure built in the Pennsylvania parks system. The octagonal log structure contained saddle corners and white cement. Destroyed by a tornado in the early 1980s, the roof was restored using its original design.

Austin Dam

Austin Dam, built in 1909, was part of the Bayless paper mill. The structure averaged 46 feet in height and extended 534 feet across the Freeman Run valley. The thickness of the base was 20 feet, and tapered to six feet, nine inches at its height of 32 feet. Breaking in 1911, the Austin Dam disaster is the second-deadliest flooded dam disaster in Pennsylvania history. The ruins of the dam remain in a series of broken sections across the valley. Five sections remained upright, while two large sections and several small sections toppled over.

The Austin dam disaster was significant in creating a tragic flood, and fostered legislation to prevent such disaster. Because of the events that occurred with the Austin Dam, the first regulation and inspection of Pennsylvania dams was enacted.

Cherry Springs State Park

The **Cherry Springs Picnic Pavilion** was built by CCC camp S-88 from September 1933 to late 1941. The layout of the building was an H-plan log structure. Built using natural materials—wood, rocks, and white cement chinking—the rural structure blends into its environment.

CHAPTER 6. ISSUES AND CONCERNS

A fundamental element of watershed conservation planning is providing ample opportunities for open and direct communication between plan developers and local citizens. Stakeholders were given the chance to provide their unique perspective on topics affecting the region and everyday life. Western Pennsylvania Conservancy (WPC) and Sinnemahoning Creek Watershed Conservation Plan steering committee hosted a series of public meetings, and met with groups and individuals to ascertain these views. Public meeting workshops, public and municipal surveys, and stakeholder interviews were used to identify issues and concerns of area residents, which are presented in this chapter. Expressed views and opinions represent those of the stakeholders, and do not necessarily reflect the views and opinions of WPC or representatives of the project steering committee.

Meeting Summaries

Initial Meetings

In October 2007, WPC, along with Bennett Branch Watershed Association, Bucktail Watershed Association, First Fork Watershed Association, and other representatives on the project steering committee, hosted a round of four public meetings in Sinnemahoning, Emporium, Force, and Austin. During these meetings, the process used to develop the Sinnemahoning Watershed Conservation Plan was introduced to the community. Background information about the Pennsylvania Department of Conservation and Natural Resources (DCNR) planning process was presented. Attendees were given their first opportunity to identify important local issues and concerns.

Prioritizing topics of concern at a public meeting

Advisory Committees

In January 2008, a group of local residents, identified by the project steering committee as individuals with expertise or knowledge of the area and watershed resources, were invited to serve on advisory committees. Five committees were formed, one for each resource category (land, water, biological, cultural, and socio-economics). At the January focus group workshop, advisory committee members were given the opportunity to discuss attributes and issues of the watershed related to their area of knowledge. Breakout sessions were facilitated and participants were given resource maps to identify areas of concern or interest. Following the workshop, committee members were asked to review the plan for consistency, accuracy, and missing information prior to public release. Members also were involved in the prioritization of management recommendations.

Student Workshops

Education workshops were held at two high schools within the Sinnemahoning watershed in order to gain students' perspectives on the strengths, weaknesses, and needs of their watershed. The presentations started with a short presentation on watersheds and concluded with a series of questions designed to spur thought and discussion about the watershed. The first workshop was held on March 31, 2008 at Austin Area High School and the second at St. Marys High School on November 6, 2008. The results of these workshops are identified later in this chapter.

Draft Presentation

Surveys and Interviews

Public and municipal official surveys were conducted, as well as key individual interviews. Both surveys and interviews were designed to identify how stakeholders use and perceive the area and its resources. Public surveys were distributed at public meeting workshops, community events and festivals, and were available on WPC's website.

Municipal official surveys were conducted in two parts. The first part consisted of a five minute phone interview with a representative of the municipality. During this phase of the survey, information regarding municipal planning and zoning, water and sewage services, and recreational facilities was collected. During the second phase, a follow up survey, similar to the public survey, was distributed to analyze the importance of certain issues and to document future projects the municipalities were planning or would like to have incorporated into the plan. Results of these surveys will be identified later in this chapter.

Approximately 28 key individuals had been contacted for a one-on-one interview, of which 12 participated. Interviews were conducted via telephone, unless otherwise requested by the interviewee. The purpose of conducting individual interviews was to delve more in-depth into the topic areas of the plan with individuals who were longtime watershed residents or possessed a wealth of knowledge in one or more of those topic areas. This method of public input allowed us to discuss concerns, cherished qualities, and management recommendations with those who are most familiar with the area. A copy of the interview questions is located in Appendix L, and results of the interviews will be identified later in this chapter.

Issues and Concerns

Many issues and concerns addressed by the watershed community are interconnected and cannot be addressed separately. Projects should be designed to address the issues collectively whenever possible. Issues identified by watershed stakeholders are summarized in the following sections.

Water Resources

Water resources are a strong contributor to the natural beauty of the Sinnemahoning watershed, as well as an abundance of recreational opportunities. It contains many healthy streams that provide ample fishing for locals and can help stimulate economic growth by attracting anglers. However, there are several factors that are threatening the area's valuable water resources.

AMD impacted stream

Abandoned Mine Drainage

Abandoned mine drainage (AMD) was a popular topic of concern with the local residents and concerned visitors of the watershed. AMD has deteriorated several stretches of water, including Sterling Run, West Creek, and Bennett Branch. Mineral deposits carried into these once-productive streams have taken away from the area's natural beauty and appeal. These AMD issues are being addressed through restoration efforts, such as lime dosers at Porcupine Hollow and West Branch and passive and active treatment systems.

Erosion and Sedimentation

Erosion is another major concern of stakeholders. Both streambank erosion and the erosion of roadways are having impacts on water quality throughout the watershed. Streambank erosion can create significant siltation in the stream and have an impact on aquatic life. Proper care should be taken of riparian buffer zones to ensure that banks have a stable root system to minimize erosion. There also were several reports of siltation problems caused by the logging industry. Logging trails create loose dirt that is easily washed into streams during a rain event. There needs to be closer regulation of logging practices to ensure minimal impact on stream quality.

Streambank erosion along Dents Run

The abundance of dirt and gravel roads in the watershed was another concern of local stakeholders. These roads provide another source of sedimentation to streams during rain events. A popular suggestion to alleviate the problem was to use crushed limestone to surface roads. This practice would promote stream health as well, because limestone will increase the alkalinity of runoff, and buffer the stream against some toxins.

Hazardous Chemical Spill

The highly publicized train derailment that dumped 47,000 gallons of sodium hydroxide into Sinnemahoning Portage Creek in 2006 was a tragic event for the water quality of the watershed. The spill resulted in a large fish kill, and the effects were felt by aquatic life for 30 miles downstream of the accident site. The reparations paid by Norfolk Southern totaled more than $7.35 million. Portions of the settlement went to PA Fish and Boat Commission (PFBC) and PA Department of Environmental Protection (DEP). Both agencies are using the money to fund projects throughout the region to improve the overall health of the area. Norfolk Southern has completed their cleanup efforts, but is required to continue monitoring the site.

Fish kill in Driftwood Branch after the toxic spill along Sinnemahoning Portage Creek tributary
Photo credit: Jim Zoschg, Jr.

Sewage

Waste water treatment systems are still a concern for much of the watershed. There have been treatment facilities developed for some areas, including St. Marys, Parker Dam State Park, Weedville, and Emporium. However, there were several concerns expressed about the operating efficiency of these facilities. There also is a large portion of the watershed that is not linked into a water treatment facility. Some people reported that there are still several camps that drain their sewage waste directly into streams.

The plant in Weedville has been under scrutiny for its employees falsifying records. Officials reported that nearly 1,500 falsified reports were filed from January 2006 to October 2007. The false reports were concerning the fecal coliform results that measure the discharge of human waste from the plant.

Water Quantity

Several residents of the First Fork drainage, particularly those that live below the George B. Stevenson Dam at Sinnemahoning State Park, raised concerns about the water level in the reservoir in late summer–early fall of 2008. The severe summer drought conditions caused significant water level reduction in the reservoir, to the point that it was unusable for recreation, causing a considerable impact to

the local businesses that depend on recreation tourism revenue. Several public survey respondents cited fluctuating water levels and sedimentation at the dam as areas of concern.

Infrastructure

A large number of respondents were concerned with the condition of roadways within the watershed and the effects that they have on water quality. A majority of the roads are dirt and gravel surfaces and are prone to erosion. The loose surface is susceptible to erosion during heavy rain events, and can cause large amounts of sediment to be washed into streams. Several participants suggested that more training is necessary for those parties responsible for road maintenance. There are programs that teach maintenance practices to reduce dust problems and prevent sedimentation issues. Pennsylvania's dirt and gravel program offers such training, and provides funding for municipalities to properly maintain their unpaved roadways. The use of limestone as a road surface was also suggested by several participants. The basic quality of limestone will work to buffer the runoff entering adjacent streams. Limestone increases pH, thereby buffering the water, so that any acidic pollutants will not have as dramatic an effect on the health of the stream. Limestone that is washed into the stream will work to promote stream health, instead of degrade it, like other sediments do.

Dirt road

Another concern associated with roads in the watershed is that rural, two-lane roads can often become crowed with tourists. Elk throughout the area attract many people to the region, who cruise the roads in hopes of spotting this unique wildlife species. A general lack of shoulders and pull-off spots along these routes often results in cars being parked along the narrow roads or unexpected slow-moving traffic. This can cause safety hazards for motorists, wildlife viewers, and wildlife, alike. These concerns were matched with suggestions for an increased number of pullovers and wildlife viewing areas. These designated areas to park and watch wildlife would improve the safety and enjoyment of elk and wildlife viewing throughout the region.

Employment

Participants reported that employment opportunities for the watershed are very limited. The high unemployment rate and limited employers create a situation that deters young people from staying in the area. The jobs that are available are mostly factory or mining positions. There are even fewer jobs for those that are looking for a position in which they can utilize their college education.

Participants pointed out that the jobs that are available are not in industries that are typically environmentally friendly. The strength of the Sinnemahoning watershed is within its natural setting and rich environment. However that is being threatened by air pollution from factories; effects from oil, gas, and coal mining; and the logging industry. These industries can damage natural resources that draw people to the area. Some participants pointed out that many of the mining jobs have been disappearing. The future potential for new jobs lies in the recreation industry, so care needs to be taken to ensure that natural resources are conserved for future recreation.

Recreation

The recreation value of the Sinnemahoning watershed relies on its natural land, water, and wildlife resources. While hunting, fishing, and other outdoor recreation bring a lot of people into the area, stakeholders realize that efforts need to me made to ensure natural lands are preserved. Survey results

show that there is a need for more shower facilities, restaurants, restrooms, and other convenience services, but their creation cannot be at the cost of the natural and wild character of the watershed. There are however, some new restroom facilities being added. There will be an outhouse located at Hicks Run Wildlife Viewing Area just off route 555. Another outhouse is being constructed inside Moshannon State Forest at the Hoover Farm Wildlife viewing area at the intersection of Quehanna Highway and Wykoff Run Road.

All-Terrain Vehicles

A major recreation issue in the Sinnemahoning watershed is the use of all-terrain vehicles (ATVs) and their sometimes irresponsible use, illegal trespassing, and the impacts that they are capable of inflicting upon environmental resources. It is apparent that ATV use is a major source of recreation throughout the watershed, but many parties are concerned with environmental impacts and safety and liability issues associated with this activity. Several suggestions were made to create more legal ATV trails, but there also were conflicting reports that there were enough trails already. Comments were also made that ATV use adds to water quality problems, because they may loosen soil and increase erosion and sedimentation. Closer regulation and designated tails could control damage and increase safety, while maintaining ATV recreational opportunities.

Wildlife Viewing

The diversity of wildlife present in the watershed attracts many people who like to hunt, fish, and enjoy observing nature. Elk herds offer a unique wildlife watching experience, and viewing areas make the watershed a popular destination for wildlife observers. There are several designated wildlife viewing areas within the state forests and Sinnemahoning State Park. But limited pull-off locations along roadways can create dangerous safety hazards on the small, country roads typical throughout the region. There is a volunteer based organization called the Sinnemahoning State Park's Bugle Corps that help the visitors who come to enjoy the elk.

Elk watchers parked on the roadside

Hunting and Fishing

Public participants perceive whitetail deer populations as having decreased dramatically in the last several years. The shortage of deer is frustrating to residents and deters visitors from traveling to the area for hunting season. Some participants reported poaching, poor hunting ethics, and improper herd management as potential reasons for the decrease in population. Regardless of the cause, hunting and fishing opportunities attract visitors to the region, and any decrease in that population influx consequently results in impacts to local businesses that depend on seasonal support from sportsmen.

The watershed is home to many high quality fisheries, yet many participants suggest that these streams are not meeting their full potential. Water quality has been degraded in some areas due to AMD, sedimentation, or other sources of pollution. Another concern is inadequate public access to streams. The remoteness of the area and high percentage of forested lands are contributors to the quality of these fisheries, but it also can make it difficult to gain access to streams. This problem affects anglers, as well as, canoeists and kayakers. More boat launches would enable better utilization of this valuable water resource for recreation, but the launches would have to maintain the integrity of the natural setting.

Invasive Species/Biodiversity

Invasive species are a growing area of concern that can become an overwhelming problem if not addressed early. Invasive species are very detrimental to biodiversity, and can force out valuable native species. They are able to reproduce and spread quickly, and can be extremely difficult to control, because they normally have limited or no natural controls in the new territories they invade. Once an invasive takes hold of an area, they require intensive efforts to control them, and can be near impossible to completely eliminate. The most important and successful technique for controlling invasive species is to recognize the problem early and respond quickly. They also degrade and disrupt natural systems that are of great value to the appeal of the Sinnemahoning watershed. Several stakeholders conveyed their concern about finding growing populations of invasive species within the watershed. It is important that these populations of invasive species be identified early and actions be taken to control them as soon as possible.

Japanese knotweed monoculture along Driftwood Branch

Oriental bittersweet, an invasive vine, has been reported at the lower end of First Fork; and the fast-growing mile-a-minute vine is growing from the mainstem of Sinnemahoning Creek up into the First Fork drainage to Big Nelson Run. Japanese knotweed is another invasive plant that grows in large monocultures and has the potential to completely take over an area. It easily spreads along waterways and has been spotted throughout the watershed along Sinnemahoning Creek, Driftwood Branch, First Fork, and Bennett Branch. Japanese stiltgrass and garlic mustard are two more invasive plants that are widespread throughout the watershed. Multiflora rose has been found in Parker Dam State Park. Their seeds can be distributed easily along roadways. Logging trucks and some road maintenance vehicles are serving as primary vectors for transportation of these invasive species into the forest. Some other invasive plants that were reported within the watershed include bush honeysuckles, Japanese barberry, autumn olive, Chinese wisteria, and burning bush.

There were also concerns about some invasive insect species that are threatening the biodiversity of the watershed. Hemlock woolly adelgid is an invasive insect that has been spreading throughout Pennsylvania and has now been spotted along Wykoff Run. Hemlock woolly adelgid is specific to hemlock trees, and their egg masses appear as white buildups at the bases of the needles. The exotic Viburnum beetle is another invasive insect that is affecting biodiversity by defoliating the native Viburnum species. In addition, emerald ash borer was recently spotted in the western part of the state; and wood quarantine mandates have been put into effect to help slow the spread of this invasive insect species to other parts of the state, including the Sinnemahoning watershed. People are encouraged to purchase or obtain firewood from sources within the watershed to avoid introducing this and other forest pests.

Public Meeting Results

During the first round of public meetings, visioning sessions were held to provide attendees with the opportunity to identify issues facing the watershed. The section below is a comprehensive list of all comments identified at those meetings.

The comments listed below do not necessarily reflect the views of the Western Pennsylvania Conservancy. All comments and suggestions from the public were recorded and taken into consideration while developing the conservation plan.

Table 6-1. Top Ranked Comments from Public Meetings

Topic	Rank	Comment
Biological Resources	1st	Promote isolation for wildlife—elk, bobcat
	2nd	Invasive species—education, prevention, and control
	3rd	Increased deer herd and habitat improvement
Cultural Resources	1st	It is the "Yellowstone" of Pennsylvania with numerous recreational opportunities, hunting and fishing; draw for sportsmen
	2nd	Scenic beauty—"Jewel of the Commonwealth" having four seasons; trees and natural setting; big country—natural state
	3rd	Identify and establish permanent public access to waterways for canoeing, kayaking, and fishing including handicap access
Land Resources	1st	Limit future mining and drilling
	2nd	Large quantity of public lands to access
	3rd	Trash and illegal dumping
Project Area	1st	Need land management and zoning; resource-friendly zoning and planning; zoning and ordinances in riparian corridors
	2nd	Protect the rural characteristics of small, safe communities, slow pace of life, and limited road access with little traffic; maintain quality/rural landscape without sprawl; affordable cost of living
	3rd	Tourism management—develop in its own community; natural-based to fit the area—no chain franchises; balanced growth and infrastructure
Water Resources	1st	Stream and water quality—erosion and AMD
	2nd	AMD prioritization and remediation
	3rd	Continue stabilization, restoration and improvement projects for stream channel/streambank restoration; natural stream design

Protection

Participants at the public meetings were asked to describe what attributes and aspects of the watershed and region were favorable and worth protecting. They were encouraged to think about community values, natural resources, recreational opportunities and other topic areas of the plan. Below is a complete list of the features residents and visitors of the watershed value in high regard and would like to maintain or enhance for the future of the watershed.

Project Area	**P**
Land Resources	**L**
Water Resources	**W**
Biological Resources	**B**
Cultural Resources	**C**
Other	**O**

Table 6-2. Public Comments on Protecting Watershed Resources

# of Votes	Comment	Topic
73	It is the "Yellowstone" of Pennsylvania with numerous recreational opportunities, hunting and fishing; draw for sportsmen.	**C**
51	Scenic beauty—"Jewel of the Commonwealth"; having four seasons; trees and natural setting; big country—natural state	**C**
36	Protect the rural characteristics of small, safe communities, slow pace of life, and limited road access with little traffic; maintain quality/rural landscape without sprawl; affordable cost of living	**P**
15	Promote isolation for wildlife—elk, bobcat	**B**
14	Large quantity of public lands to access	**L**
14	Native fish	**C**
11	Growth impact with improved community revival	**P**
10	Continuous forest and low populations of invasive species	**B**
10	Good people with respect for each other	**P**
9	Community traditions, sense of pride, family roots	**P**
9	Maintain branches (Sinnemahoning, First Fork, and Driftwood) among the best freestone trout streams in Pennsylvania	**C**
9	Potential that comes with water quality improvements	**W**
8	Water quality, riparian areas, wetlands, and flood control	**W**
8	Wildlife habitat and unique wildlife	**B**
7	Continue streambank improvement, including stabilization and restoration	**W**
7	Dirt and gravel roads program	**P**
7	Lack of resource extraction; protect resources	**L**
6	Pristine streams	**W**
5	Low population density	**P**
5	Tourism	**C**
4	Air quality	**P**
4	Historical preservation and improvements	**C**
4	Invasive species projects	**B**
3	Access points to waterways	**C**
3	Environmental education in schools	**C**
3	Family roots	**P**
3	Historic assets	**C**
3	Protection of watershed by different agencies	**W**
3	Schools, churches	**P**
2	10 minutes from Parker Dam State Park	**P**
2	AMD (passive and active treatment) ongoing	**W**
2	No cell phone service and cell towers	**P**
2	Small family farms	**P**
1	Accommodations limited to protect watershed	**W**
1	Balanced infrastructure	**P**

1	Cultural opportunities	**P**
1	Educational value of living in rural communities	**P**
1	Gateway to elk	**P**
1	Health care	**P**
1	Pretty girls	**P**
0	Bookstores	**P**
0	Mountain biking	**C**
0	Watershed and Trout Unlimited group efforts	**W**

Improvements and Future Visions

Public meeting participants were then asked to address issues and concerns they have for the future of the watershed region. They identified negative aspects and impacts to the watershed and its resources and assets. Their input ranged from concerns about improvements that should be made to communities and natural resources; ideas for increasing recreational opportunities; identifying major impacts to water quality, natural habitats, and general aesthetics of the region; to specific projects or approaches to remedy those negative aspects of the watershed. Table 6-X is the complete list of comments regarding issues, concerns, and improvements that should be made to enhance the watershed.

Table 6-3. Public Comments on Future Watershed Improvements

41	Need land management and zoning; resource-friendly zoning and planning; zoning and ordinances in riparian corridors	**P**
36	Identify and establish permanent public access to waterways for canoeing, kayaking, and fishing, including handicap access	**C**
24	Stream and water quality—erosion and AMD	**W**
18	AMD prioritization and remediation	**W**
18	Tourism management—develop in its own community; natural-based to fit the area—no chain franchises; balanced growth and infrastructure	**P**
15	Limit future mining and drilling	**L**
14	Environmental education; more youth involvement	**C**
14	Infrastructure to support tourism—food, gas, hotel, restrooms, and grocery (no chain franchises)	**P**
13	Cooperation of local, state, and federal agencies, local groups, concerned citizens, and legislators—increase local residents' involvement and exposure to watershed issues	**O**
13	Trophy trout stream—destination wild trout fishery	**C**
12	Dirt and gravel road—education of road masters; increase funding	**P**
12	Invasive species—education, prevention, and control	**B**
11	Continue stabilization, restoration, and improvement projects for stream channel/streambank restoration—natural stream design	**W**
11	Develop rails-to-trails	**C**
11	Increased deer herd and habitat improvement	**B**
11	Public access limited by railroads; it is illegal to be on railroad; new company leasing railroad—get memorandum of understanding to provide access to streams	**C**
10	All-terrain vehicles—enforcement of laws to limit trespassing	**C**
10	Clean water	**W**
10	Comprehensive stormwater management planning	**W**
10	Trash and illegal dumping	**L**

9	Canoeing/kayaking potential	**C**
9	Infrastructure to maintain character as natural as possible; encourage municipalities to use of PA Wilds Design Guide	**P**
9	Tourism—better management and higher quality tourists (i.e. more responsible tourists); Increase tourism during off-seasons and limit impacts during peak times	**C**
8	Fish in Bennett Branch (future vision)	**B**
8	Working with planning commissions; vulnerable to negative development (uncontrolled planning)	**P**
7	Agricultural and forestry sustainability—educational agriculture/forestry tours; Keep the working land-base in production	**L**
7	Dialogue with PennDOT about controlling the unregulated traffic along routes 153 and 255	**P**
7	Great fishery and fish hatchery (future vision)	**C**
7	Historic area preservation and identification	**C**
7	Open state lands (DCNR) to snowmobiles, all-terrain vehicles, horses, and other recreational uses	**C**
7	Rebuild earth-dam at Austin Dam site to establish a 10 feet deep lake/pond for recreational purposes. (Austin Dam Association)	**C**
7	Streamline Pennsylvania government; get rid of township and political subdivisions; establish memorandum of understanding for partnership/obtaining permits spanning across municipal lines	**P**
6	Increased truck traffic from landfills and coal mines	**P**
6	In-stream liming to adjust alkalinity; conduct alkalinity studies; Laurel Run liming project	**W**
6	Jobs	**P**
6	Keep watershed clean scenic and healthy	**O**
6	Money generated on state lands should be given back to the communities	**P**
6	Recreation opportunities that spur redevelopment	**C**
6	Wildlife management/forest/wildlife habitat—acid precipitation impacts and lack of alkalinity to neutralize it	**B**
6	Youth involvement and education; develop a movie explaining what happens downstream	**C**
5	Dredging to reduce flooding	**W**
5	Environmentally safe attractions for tourism and retain younger generation	**C**
5	Improve impaired waterways	**W**
5	Incentives for conservation easements for private landowners	**P**
5	Leave area alone, remaining undeveloped and wild	**O**
5	Need support of political officials	**O**
5	PA Wilds will energize and bring communities together	**O**
5	Sedimentation from logging	**L**
5	Sufficient number of landfills exists	**L**
5	Water quantity/reservoir low and small; impacts to public water supply and business development	**W**
4	Attractive stream through enhancement/clean-up projects, such as AMD remediation	**W**
4	Austin sewage treatment plant—effects on macroinvertebrate hatch	**B**
4	Do not turn Interstate 80 into a toll road	**P**
4	Enforcement of forestry and logging laws	**L**
4	Enhance historical sites and increase funding, such as Austin Dam site	**C**

4	Environmental education—adult education is lacking and missing	**C**
4	Erosion—mostly natural	**L**
4	Expand uses of "camps"—extending services yearlong	**P**
4	Food and overnight accommodations—business development needed	**P**
4	Incentives for local residents to develop businesses	**P**
4	Increase trail use at state parks	**C**
4	Media coverage	**O**
4	More volunteer help; reduce apathy	**O**
4	No additional land transferred to the state	**L**
4	No land sprawl; It's not the Poconos	**L**
4	Pennsylvania Fish and Boat Commission and Pennsylvania Game Commission (PGC) should take an interest and get involved—management areas are too large to manage with current personnel	**W**
4	Reduce posting of private property through incentives to maintain private lands and protect landowners' liability	**C**
4	Regulation of private hunting and fishing clubs	**L**
4	Restore bass fishery and establish walleye fishery	**C**
4	Tourist information/guide about area resources—where to eat, stay, purchase gas and inform them that there is no cell service available	**C**
4	Trail maintenance for all trail types	**C**
3	A portion or percentage of timber sales given to counties	**P**
3	Business development assistance	**P**
3	Challenges of working with Department of Conservation and Natural Resources	**O**
3	Communication—establish cell phone and wireless connections for safety	**P**
3	Economic industry will change, allowing people to work where they want to live, such as attractive natural places	**P**
3	Establish environmentally friendly industries	**P**
3	Identify tourism audience and cater to them	**C**
3	Proper fisheries management	**C**
3	Public awareness of resources available	**O**
3	Quality of water quantity—ensuring drinking water is available	**W**
3	Railroad for transportation into the region	**P**
3	Re-evaluation of area streams by Pennsylvania Fish and Boat Commission to determine stocking needs	**C**
3	Return area to what it was 20 years ago	**O**
3	Sinnemahoning State Park to establish cabins and rental facilities	**C**
2	Acid precipitation and its impacts	**P**
2	Decrease ticks	**B**
2	Dirt and gravel road legislation for cold-water fisheries and other lower quality streams	**P**
2	Documenting local history	**C**
2	Educate residents about "what a watershed is"	**C**
2	Education for landowners and small companies	**L**
2	Establish an environmental education facility at Sinnemahoning State Park	**C**

2	Establish trails and greenways along rivers (access to trails)	**C**
2	Eye soars, such as cluster camps and abandoned vehicles	**L**
2	Financial and technical assistance for private landowners	**O**
2	Fire, emergency, 911, hospital, PennDOT—stress with additional visitors; all volunteer organizations; volunteer emergency organizations should get preference for grant money	**P**
2	Future recreation use compatible to resources; no all-terrain vehicle trails	**C**
2	Groundwater monitoring and protection	**W**
2	Have a well-established and viable tourism industry	**P**
2	Improvements after train derailment	**W**
2	Lack of trails for ATVs, state needs to offer recreational facilities	**C**
2	Pennsylvania Game Commission to cooperate with local communities, for example, the deer season change caused local businesses to close	**O**
2	Promote tourism and forest industries	**P**
2	Recycling/reuse of products—cans and bottles	**L**
2	Regulations challenging	**O**
2	Return streams to native species	**C**
2	Return tourism tax profits to local communities	**P**
2	Roadway improvement—sedimentation reduction	**P**
2	Use prisoners' labor for future projects	**O**
2	Utilizing forest resources for economic development (value-added products); development of wood products industry and business	**P**
1	Bird watching, wildlife viewing, snake hunts, events promoting creative businesses; finding niches	**C**
1	Camps—decreased interest with deer herd population decreasing, cultural shift in hunting	**C**
1	Combine forestry and municipal Dirt and Gravel Roads Programs	**P**
1	Commercial development inside state parks would destroy purpose of the park	**C**
1	Commercial recreation outfitters to be more responsible to educate recreationists	**C**
1	Continue getting-youth-outdoors programs, loss of a generation	**C**
1	Expand Dirt and Gravel Roads Program to logging roads	**P**
1	Forest fragmentation	**B**
1	Horseback-riding trail development to prevent erosion and maintain trail quality	**C**
1	Increase accessibility of the GP-1 permit	**O**
1	Local agency updates, as to what is going on, beyond website information—sharing of data and information with various agencies and organizations	**O**
1	Monitoring program continued	**W**
1	Other outdoor/non-hunting promotion and infrastructure to support it	**C**
1	Pennsylvania Fish and Boat Commission legal documentation to provide public access to waterways by private landowners deters participation	**C**
1	Power plant impacts from Schallville, one of the worst-polluting plants	**L**
1	Public facilities and camps sewage regulations	**W**
1	Windmills—negative impacts	**L**
0	Area is the gateway to "elk country"	**C**
0	Bio-fuels production	**L**

0	Complete Cameron Conservation District's list of projects	**O**
0	Cross-country ski trails are hardly used, and residents are not aware of the resource	**C**
0	Equal funding to AMD projects in rural and urban watersheds	**W**
0	Establish a casino	**P**
0	Establish bait fishing only area	**C**
0	Golf courses to establish places for guests to stay	**P**
0	Hunters and anglers no longer utilize local resources for supplies and accommodations	**P**
0	Only triple watershed divide this side of the Mississippi	**W**
0	Organization to enforce the state	**O**
0	Original Civilian Conservation Corps (CCC) hiking trails are in poor condition and need restoration	**C**
0	PA Wilds has no money	**O**
0	Parking and signing at trails	**C**
0	Pennsylvania Game Commission Wildlife Conservation Officer Position is currently vacant	**O**
0	Poconos as example, development takes care of the services; if you build it or clean it up, they will come	**P**
0	Potential for downhill skiing and tubing	**C**
0	Private property invasion, including trespassing and trash	**L**
0	Safety outlets for recreation	**C**
0	Sewage—more on public treatment plants	**W**
0	Tourism based on motorcycle tourism	**C**
0	Tourism, such as star gazing and hiking, needs to generate money to support itself like fishing and hunting industries	**P**
0	Treat dirt and gravel roads with limestone	**P**
0	Unequal financial treatment between rural and urban communities	**P**
0	Water quantities dependent on weather	**W**
0	Windmill issue needs addressed in planning	**P**
0	Winter recreation dependent on weather—snowmobile, cross-country skiing, snowshoeing, snowmobiling, etc.	**C**
0	Wykoff Run flooding	**W**

Survey Results

Two types of public input surveys—general public and municipality—were conducted to gather information on the issues and concerns of watershed stakeholders.

The comments listed below do not necessarily reflect the views of the Western Pennsylvania Conservancy. All comments and suggestions from the public were recorded and taken into consideration while developing the conservation plan.

Public Survey Results

Public surveys were distributed from September 2007 to October 2008. Surveys were available at public meetings, community events, and on the Internet. A total of 239 completed public surveys were returned. The results of the surveys were taken into consideration during the development of the management recommendations for this plan.

Residents

1. In what county and municipality do you reside?

Cameron

- Driftwood 3
- Emporium 27
- Gibson 2
- Grove 6
- Lumber 7
- Shippen 17
- Portage 1
- Huntley 1
- Sinnemahoning 1

Clearfield

- Goshen 2
- Huston 1
- Lawrence 1
- Sandy 5
- Madera 1
- Union 1
- Penfield 5
- Dubois 4
- Clearfield 1
- Bradford 2

Clinton

- East Keating 1
- West Keating 1
- Renovo 1

Elk

- Benezette 6
- Fox 2
- Jay 14
- Jones 1
- St. Marys 5
- Ridgway 1
- Horton 2

McKean

- Norwich 1

Potter

- Austin 7
- East Fork 1
- Eulalia 2
- Homer 1
- Keating 5
- Portage 1
- Summit 1
- Sylvania 2
- West Branch 1
- Wharton 3
- Coudersport 3
- Cross Fork 1

2. Near what part of Sinnemahoning Creek watershed do you reside?

45	Bennett Branch	20	Sinnemahoning Mainstem
49	Driftwood/Sinnemahoning Portage	16	Don't Know
21	First Fork	11	Other

3. How long have you lived in the area?

5	Less than 1 year	23	31–40 years
26	1–10 years	20	41–50 years
42	11–20 years	14	51–60 years
16	21–30 years	17	60+ years

4. How far do you travel to work?

35	Less than 1 mile	2	Farther
63	1–15 miles	12	Retired
17	16–30 miles	10	N/A
8	31–45 miles	1	Other (varies by job location)
3	46–60 miles		

5. How often do you visit state parks and state forests in your area?

113 Frequently (6 or more times a year)
39 Occasionally (2–5 times a year)
7 Sporadically (once every year)
5 Rarely (once every few years)
0 Never

Visitors

1. Do you own property in the watershed?

45 Yes
75 No

2. How far did you travel to visit?

9 Less than 1 mile
27 1–30 miles
12 31–60 miles
9 61–90 miles
15 Farther:
- 185 miles
- 200 miles
- 210 miles
- 250 miles
- 270 miles
- 350 miles
- 300+ miles
- 550 miles

17 91–120 miles
14 121–150 miles
20 151–180 miles

3. How long did you stay on this trip?

35 Less than one day
28 1–2 days
24 3–4 days
4 5–6 days
18 One week
2 A week and a half
3 Two weeks
9 Longer

4. Approximately how much did you spend?

48 Less than 100 dollars
60 100–500 dollars
11 500–1,000 dollars
1 1,000–2,000 dollars
0 2,000–3,000 dollars
2 3,000–5,000 dollars
0 5,000+ dollars

5. What were your two biggest expenses?

60 Food/Lodging
17 Recreation/Supplies
10 Other:
- Canoe race
- Cars
- Coffee
- Own property—camp at home
- Beer
- Taxes for cabin

7 Souvenirs
94 Travel/Gas

6. What was you reason for visiting?

9	Business	82	Recreation/Vacation
20	Family/Friends	16	Visiting
2	Passing through		
23	Other:		

- Research
- Mine remediation projects
- Dam Show
- Quiet
- Canoe/Kayak race
- Camp
- Fishing/Hunting
- Second home
- Wildlife
- Conservation Plan meeting
- Rest
- Participate in organized activity at Parker Dam
- Elk
- To stay at my cabin of 40+ years

7. How often do you visit?

12	First time	30	Yearly
57	Seasonal	10	Occasionally (every2–5 years)
5	Other:	0	Every 5+ years

- Once a week
- Frequently
- Monthly (or more)

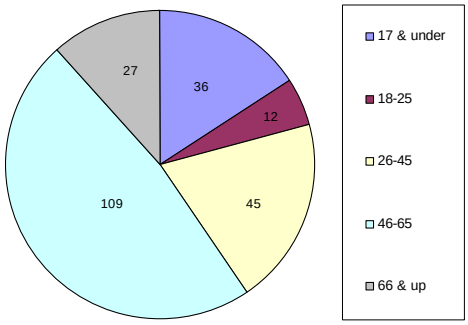
General Demographics

1. What is your gender?

151	Male
79	Female

2. What is your age?

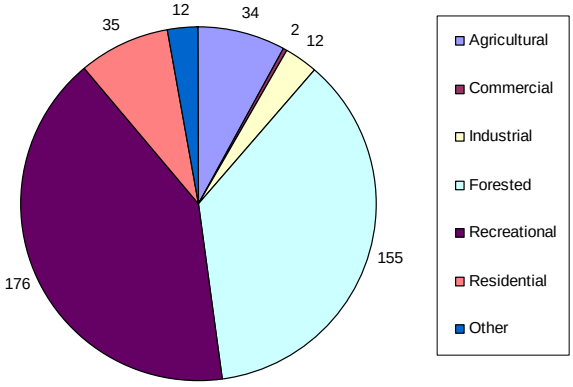
Figure 6-1. Age of Survey Participants



General

1. What do you think are the two most important land uses within the Sinnemahoning Creek watershed area?

Figure 6-2. Most Important Land Uses Within the Watershed



2. Where did you obtain this survey?

33 Business/Restaurant
12 Event
71 State park/State forest
49 Other:

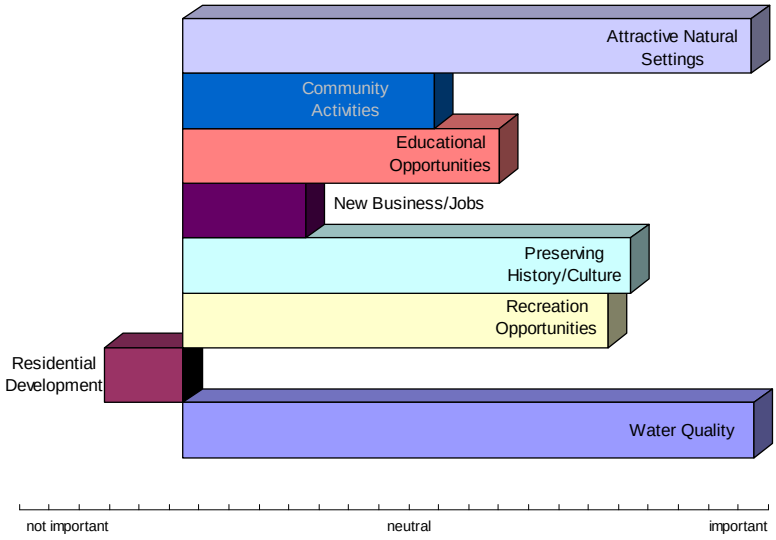
- West Branch Symposium
- Dam Show
- Carla
- Public meeting
- Beno DeMonte
- Self
- Bureau of Forestry
- ERHC event at SMAHS
- County planning
- Library
- Kim Lanich
- Jim Zoschg
- Camp site

47 Watershed group
2 Website

- Conservation office
- Work
- Event, sled race
- Friend
- Brown Library
- School
- Conservation planning meeting
- Event, Girl Scouts
- Canoe race
- SSA website
- Pharmacy
- DEP worker

3. Please indicate the importance of the following watershed values.

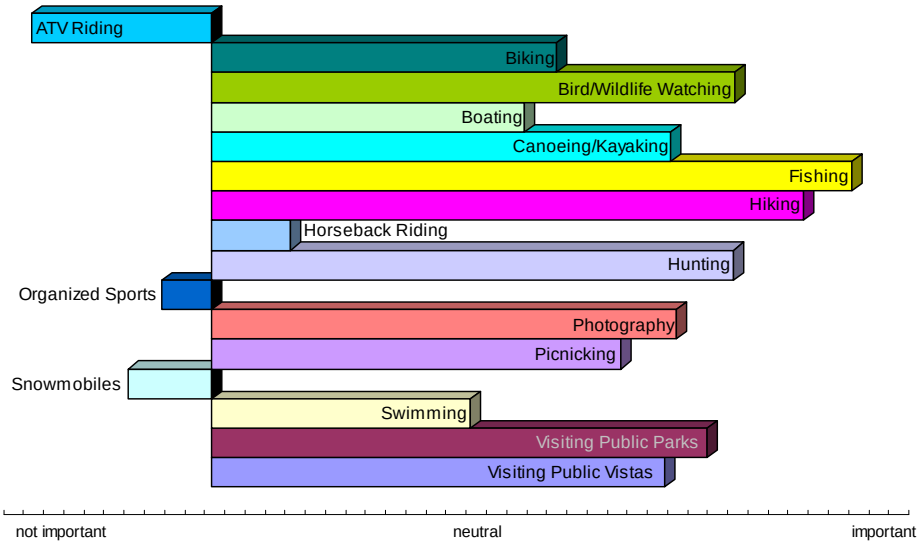
Figure 6-3 Importance of Watershed Values



	Very Important	Somewhat Important	Neutral	Not Likely Important	Not Important	Total
Attractive Natural Settings	2*175=350	1*29=29	0*2=0	-1*0=0	-2*0=0	=379
Community Activities	2*65=130	1*66=66	0*45=0	-1*10=-10	-2*9=-18	=168
Educational Opportunities	2*81=162	1*74=74	0*31=0	-1*5=-5	-2*10=-20	=211
New Business/Jobs	2*59=118	1*38=38	0*40=0	-1*18=-18	-2*28=-56	=82
Preserving History/Culture	2*125=250	1*55=55	0*22=0	-1*2=-2	-2*2=-4	=299
Recreation Opportunities	2*124=248	1*55=55	0*14=0	-1*5=-5	-2*7=-14	=284
Residential Development	2*34=68	1*26=26	0*43=0	-1*39=-39	-2*54=-108	=-53
Water Quality	2*188=376	1*11=11	0*3=0	-1*2=-2	-2*2=-4	=381

4. Please indicate the importance of the following recreational values in the watershed.

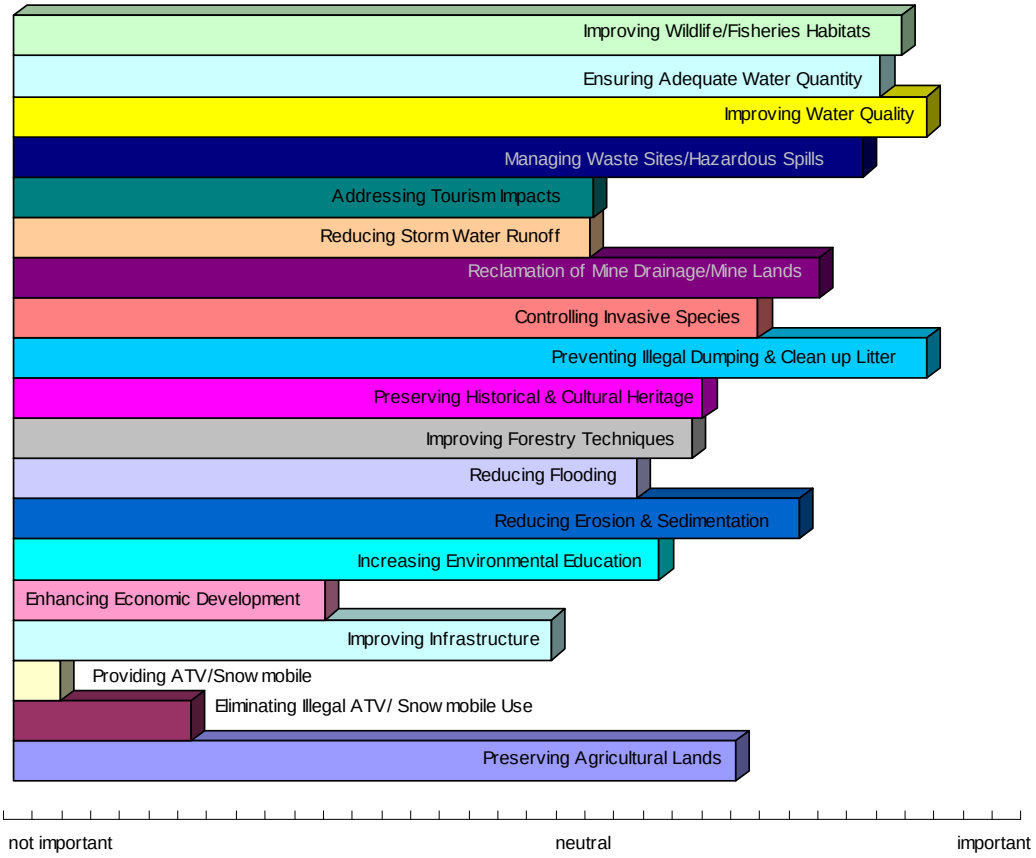
Figure 6-4 Importance Values of Recreation Activities



	Very Important	Somewhat Important	Neutral	Not Likely Important	Not Important	Total
ATV Riding	2*30=60	1*19=19	0*45=0	-1*19=-19	-2*75=-150	= -90
Biking	2*67=134	1*69=69	0*40=0	-1*10=-10	-2*11=-22	= 171
Bird/Wildlife Watching	2*108=216	1*58=58	0*26=0	-1*2=-2	-2*6=-12	= 260
Boating	2*67=134	1*54=54	0*49=0	-1*13=-13	-2*10=-20	= 155
Canoeing/Kayaking	2*95=190	1*53=53	0*33=0	-1*7=-7	-2*4=-8	= 228
Fishing	2*143=286	1*40=40	0*16=0	-1*0=0	-2*4=-8	= 318
Hiking	2*127=254	1*48=48	0*16=0	-1*4=-4	-2*2=-4	= 294
Horseback Riding	2*38=76	1*39=39	0*57=0	-1*14=-14	-2*31=-62	= 39
Hunting	2*128=256	1*26=26	0*29=0	-1*5=-5	-2*9=-18	= 259
Organized Sports	2*30=60	1*19=19	0*63=0	-1*30=-30	-2*37=-74	= -25
Photography	2*95=190	1*53=53	0*37=0	-1*6=-6	-2*3=-6	= 231
Picnicking	2*78=156	1*62=62	0*38=0	-1*7=-7	-2*4=-8	= 203
Snowmobiles	2*31=62	1*29=29	0*45=0	-1*27=-27	-2*53=-106	= -42
Swimming	2*50=100	1*64=64	0*48=0	-1*14=-14	-2*11=-22	= 128
Visiting Public Parks	2*101=202	1*61=61	0*23=0	-1*7=-7	-2*5=-10	= 246
Visiting Public Vistas	2*94=188	1*57=57	0*24=0	-1*10=-10	-2*5=-10	= 225
Other						
• Safety • Keeping the areas in a natural pristine condition • Legal off-road trails for trucks and jeeps			• Winter sports—skiing snowshoeing • Stopping ATVs from chasing wildlife away and interrupting the serenity of the area; protecting landowners' rights to privacy			

5. Please indicate the importance of addressing the following watershed issues.

Figure 6-5 Importance of Watershed Issues



	Very Important	Somewhat Important	Neutral	Not Likely Important	Not Important	Total
Preserving Agricultural Lands	2*105=210	1*44=44	0*28=0	-1*4=-4	-2*1=-2	= 248
Eliminating Illegal ATV/ Snowmobile Use and Conflicts	2*25=50	1*32=30	0*24=0	-1*11=-11	-2*5=-10	= 61
Providing ATV/Snowmobile Recreation Facilities	2*45=90	1*29=27	0*45=0	-1*15=-15	-2*44=-88	= 16
Improving Infrastructure	2*70=140	1*63=63	0*37=0	-1*10=-10	-2*4=-8	= 185
Enhancing Economic Development	2*54=108	1*47=47	0*46=0	-1*14=-14	-2*17=-34	= 107
Increasing Environmental Education	2*90=180	1*54=54	0*26=0	-1*4=-4	-2*4=-8	= 222
Reducing Erosion & Sedimentation	2*115=230	1*46=46	0*16=0	-1*2=-2	-2*2=-4	= 270
Reducing Flooding	2*90=180	1*47=47	0*29=0	-1*7=-7	-2*3=-6	= 214
Improving Forestry Techniques	2*96=192	1*48=48	0*31=0	-1*3=-3	-2*2=-4	= 233
Preserving Historical & Cultural Heritage	2*89=178	1*65=65	0*24=0	-1*4=-4	-2*1=-2	= 237
Preventing Illegal Dumping & Clean up Litter	2*145=290	1*28=28	0*10=0	-1*2=-2	-2*1=-2	= 314
Controlling Invasive Species	2*111=222	1*42=42	0*22=0	-1*6=-6	-2*1=-2	= 256
Reclamation of Mine	2*125=250	1*36=36	0*15=0	-1*3=-3	-2*3=-6	=277

Drainage/Mine Lands						
Reducing Storm Water Runoff	2*74=148	1*60=60	0*33=0	-1*6=-6	-2*2=-4	= 198
Addressing Tourism Impacts	2*75=150	1*61=61	0*30=0	-1*6=-6	-2*3=-6	= 199
Managing Waste Sites/Hazardous Spills	2*135=270	1*27=27	0*12=0	-1*3=-3	-2*1=2	= 292
Improving Water Quality	2*149=298	1*23=23	0*12=0	-1*1=-1	-2*3=-6	= 314
Ensuring Adequate Water Quantity	2*139=278	1*24=24	0*16=0	-1*2=-2	-2*1=-2	= 298
Improving Wildlife/Fisheries Habitats	2*141=282	1*30=30	0*10=0	-1*3=-3	-2*2=-4	= 305
Other						

- Safety
- All the above
- Ladybugs and flies are a nuisance
- Keep developments out
- Food plots for wildlife
- Dirt Roads
- Improving oil/gas exploration techniques
- Winter sport options
- Keep dam discharges cool in summer for trout
- Creating legal off-road trails for trucks and jeeps
- Allow tanks for outhouses
- Not bringing a bunch more people here to ruin my peace and quiet, and chase away all the wildlife

6. Please indicate the top three services/amenities that are lacking within the watershed.

66 Gas stations
59 Public restrooms
54 Restaurants
35 Emergency services
21 Lodging
15 Convenience/grocery stores
12 Cell phone service
10 Don't need amenities, outdoor experience
6 Bait/fly/sporting goods stores
6 Garbage cans; clean-up
5 Recreational activities/areas
5 Small businesses
4 ATV/snowmobile recreation
4 Better trail/area maps
4 Doctors offices, hospitals/ER
4 Handicap access
4 Information on regional attractions
4 Picnic areas
4 Rails-to-trails development along Bennett Branch
4 Recreational rentals/sporting goods store
3 Access to fish mainstream
3 Campgrounds/cabins
3 Canoe/kayak access
3 Funding for community/local attraction development
3 Outdoor rentals—bike, ski, boat
3 Shopping
3 Soil erosion/water levels at Stevenson Dam
2 Department store (not Wal-Mart)

2 Equipment
2 Fire coverage
2 Hiking trails/groups/clubs
2 Interest from local residents
2 Jobs
2 More stream access
2 Outdoor retail
2 Phone booths
2 Police protection
2 Service for tourists
2 Swimming
2 Tourism marketing
2 Traffic congestion/control
1 A few night clubs
1 Auto service
1 Developing springs for drinking
1 Dog-friendly areas (dog parks)
1 Guiding for recreational activities
1 More pull-offs to observe wildlife
1 Nature center
1 Park offices open on weekends
1 Protection from toxic spills and AMD
1 Quality of roads
1 Recycling center
1 Signs for roads
1 State rest areas with restrooms
1 Supervision
1 Too much hunting—ground being opened up by opening state forest gates
1 Trail signage
1 Trails for horseback riders
1 Volunteers
1 Water/sewage infrastructure
1 Wider road berms for safe elk viewing along roads

7. Other comments or concerns.

- Need to start educating young people and the public about our environment
- Include Sterling Run and West Creek in your section about AMD; Bennett Branch sometimes overwhelms those smaller impacts
- Concern—Rosebud Mining Co. (deep mining)
- No windmills
- ATVs drive anywhere they want, causing erosion and destroying established trails
- Keep the roadless areas roadless
- Let the market drive the business, if facilities are needed, economic development will develop the needed facilities
- More communication with local residents to cooperate in enhancing their community
- To live with the tourism controlled
- Keep up the good work to improve watershed, particularly the fish kill remediation
- Potential gas/oil wells—habitat fragmentation and sediment
- Wind farms on forestland—habitat fragmentation and sedimentation

- Loss of "wildness" of watershed as result of commercialization by "PA Wilds" and resulting increases in development
- Concerns about proposed north central ATV trail that is mapped to travel through heart of Elk State Forest and crossing numerous EV and HQ watersheds
- A campaign for awareness of the attractions of Cameron County (statewide)
- I think what is hurting the watershed is that the state owns too much land, which in turn hurts the infrastructure of the area, because the state is exempted for paying taxes—the burden falls on the private individuals that own land; and the townships, county, etc. have a hard time budgeting the up-keep to the roads, improvements to roads, expansions to water and sewage systems, etc.
- As water quality increases, it would be a good idea to encourage the PFBC to stock walleye from Sinnemahoning downstream; this would afford many opportunities of additional stream usage and ripple through the economy as tourism increases
- Elk/wildlife viewing has been a big attraction, now elk are being hunted and made harder for people to see
- Do more to attract tourism to area this is last untouched area in PA, let's try and keep it that way
- Crack down on littering
- Stop trying to commercialize the wild
- I like the remoteness
- Allowing 4-wheelers on state lands and forestry roads
- Creation of watchdog volunteer system to help police the watershed, forest, game lands, etc.
- I am concerned about flooding the area with tourists before the infrastructure and funding is in place or planned
- State park should have store
- Cellular tower
- Have Stevenson Dam run better—need better night control
- Sedimentation in George B. Stevenson Dam
- Warm water and lack of flow on Driftwood Branch in summer months
- Eliminate put-and-take fishing technique
- The Stevenson Dam has far too many water fluctuations; the current dam tender does not do her job; please confirm this thru Army Corps, Baltimore office; this problem has been occurring for 8+ years
- As a business owner, all of these activities (recreational) are important to the economics of this area
- Viewing areas for tourists
- Pull-offs for fishing and hunting; parking
- Areas for new camps and homes
- Keep it wild; and keep it real
- Keep the land natural as it is; we don't need anymore housing developments
- The fluctuation at Sinnemahoning Lake at non-flood times is our most concern
- We have a cabin on Bailey Run Road and have been coming to Potter County every year since 1959. We spend approximately 130 days (April–early Dec.) a year there to hunt, fish, hike, and relax. We, our children, and grandchildren have always enjoyed fishing the Sinnemahoning Lake over the years. We realize the lake is a flood control area and weather conditions play a huge part in water fluctuation. However, the past 5+ years, the water has become a concern and disappointment. We moor a boat there and many, many times the water level is too high—it's almost impossible to put the boat onto the lake. The boat is setting in water and the board at waters edge is covered with water and "slime" and very slippery. We have seen folks fall into the lake from the slick conditions. We have spoken often to Lisa (superintendent) and get no firm reason why this happens. In fact, we get frustrated with her "no reason." We find this can happen

overnight, and there has been no rain to raise the water level. Why? Lisa told us to wear water shoes (so we don't get our sneakers wet) and she would have the workers apply a "non-skid" at our mooring spot. That is not the answer. Non-skid will make it difficult to slide the boat into the water. If the water level was monitored more closely in non-flood times there would not be a problem. We and other neighbors feel it is neglect on her part sometimes. Tuesday, April 8, 2008 we noticed the level was way too low—mud—did she leave gates open too long? When (John) superintendent was there, we had no problem—it seems since Lisa is in charge, we have a problem. We appreciate your taking the time to "hear us out." We enjoy the area and only hope the problem can be corrected.

- I believe the Driftwood Branch should be restocked with bass or at least stocked better with trout, so not so much great water is being wasted
- Don't want more roads through wildlife areas—improve or repair ones already in existence
- ATVs will destroy the very allure of this region
- ATVs will destroy the very quality of life we live for here
- Please cut out any and all hunting on state game lands—this should be a place of peace of mind for everyone, including the animals
- Emergency service access
- Overall, very impressed with the general condition of Sinnemahoning State Park; very clean; many outdoor activities available
- Water clean-up is essential to our environment and to preserve our forest lands for future generations to come
- Lack of concern for Cameron County at Harrisburg, PA
- Young people leaving the area in search of jobs
- Workers working in Emporium and living elsewhere—money leaving the area
- Natural resources shipped out of the county (hardwoods)
- Address tourism traffic for elk watching—very heavy on weekends
- I worry about the loss of water in the creeks since I was a child—old swimming sites are gone
- How about a little consideration for the people—those have been coming here for a long time and are losing their privacy; you want to bring back all kinds of people to give us more competition on the stream or in the woods to try to shoot the last deer in the county; these people you are trying to recruit to come here with PA Wilds to contribute to the economy might buy a soda and candy bar, but that's about it; the trouble they cause isn't worth the little money they spend; ask any long term resident or camp owner and their opinion will mirror mine about how our county is going down hill fast
- Don't commercialize what nature made already perfect
- It is very nice as is, maybe resting benches on trails for us over-40 group
- Love Parker Dam
- Stop the poaching and road hunting

Municipal Survey Results

Each of the 28 municipalities within the Sinnemahoning watershed was contacted to complete an information gathering survey. Initial phone surveys resulted in response from 20 municipalities. Phone interviews were followed up by mail-in surveys that 10 municipalities responded to. The surveys gathered valuable information about the issues and concerns of the municipal leaders of the watershed to be utilized during construction of the plan.

Phone Survey

1. **Does your municipality have a comprehensive plan? If yes, what is the name of the plan(s) and when was it adopted?**

   •5 of the 20 responded yes •12 of the 20 responded no •3 municipalities did not know

2. **Does your municipality currently utilize zoning and subdivision ordinances? If yes, what types of ordinances do you have?**

   •Zoning—7 yes, 13no •Subdivision—11yes, 9 no

3. **Does your municipality have floodplain ordinances? If yes, how are they enforced?**

   •9 of the 20 responded yes •4 of the 20 responded no •7 municipalities did not know

4. **Are there any municipal parks in your watershed? If yes, please list them.**

Driftwood Playground, Driftwood Borough, Cameron County
Mini Park, Emporium Borough, Cameron County
Front Street Park, Emporium Borough, Cameron County
Sinnemahoning Valley Grove Township Recreations, Grove Township, Cameron County
Lawrence Township Recreational Park, Lawrence Township, Clearfield County
Benezette Township Park, Benezette Township, Elk County
Fox Township Community Park, Fox Township, Elk County
Main Street Park, Fox Township, Elk County
Weedville Park, Jay Township, Elk County
Forest Park, Jay Township, Elk County
Jones Township Community Park, Jones Township, Elk County
Memorial Park, City of St. Marys, Elk County
Benzinger Park, City of St. Marys, Elk County
Luar Park, City of St. Marys, Elk County
Diamond Street Park, City of St. Marys, Elk County
Norwich Township Park, Norwich Township, McKean County

5. **Does your municipality have any public water services in the Sinnemahoning Creek watershed area? If yes, please list the name and capacity of each facility.**

   •8 of the 20 responded yes •12 of the 20 responded no

6. **Do you foresee the need to upgrade or establish a public water supply in your municipality in the Sinnemahoning Creek watershed area within the next ten years?**

   •4 of the 20 responded yes •12of the 20 responded no •4 municipalities did not know

7. **Does your municipality have any public sewage systems in the Sinnemahoning Creek watershed area? If yes, please list the name and capacity of each facility.**

   •9 of the 20 responded yes •11of the 20 responded no

8. Do you foresee the need to upgrade or establish a public sewage system in your municipality in the Sinnemahoning Creek watershed area within the next ten years?

•9 of the 20 responded yes •10of the 20 responded no •1 municipality did not know

Mail-In Survey

10 out of the 28 municipalities responded to the mailed survey (Gibson Township, Goshen Township, Huston Township, Lawrence Township, Jay Township, Jones Township, City of St. Marys, Eulalia Township, Keating Township, and Sylvania Township).

1. What county and municipality do you represent?

Cameron County	Driftwood Borough, Emporium Borough, Gibson Township, Grove Township, Lumber Township, Portage Township, Shippen Township
Clearfield County	Goshen Township, Huston Township, Lawrence Township
Clinton County	East Keating Township, West Keating Township
Elk County	Benezette Township, Fox Township, Jay Township, Jones Township, City of Saint Marys
McKean County	Norwich Township
Potter County	Austin Borough, East Fork Township, Eulalia Township, Homer Township, Keating Township, Portage Township, Summit Township, Sylvania Township, West Branch Township, Wharton Township

2. In what watershed(s) is your municipality located?

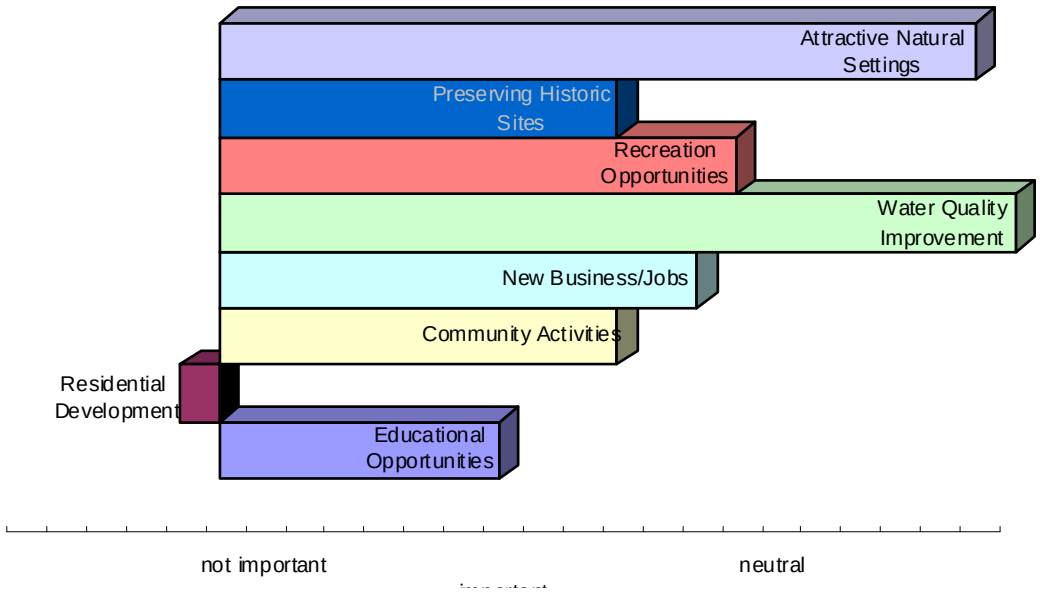
3	First Fork, including Freeman Run and East Fork	0	Sinnemahoning Creek mainstem, including Wykoff Run
3	Driftwood Branch, including Sinnemahoning Portage Creek and West Creek	0	Don't Know
4	Bennett Branch	2	Other—Laurel Run and Clarion

3. What do you think are the two most common land uses in your area?

4	Residential	7	Forested
1	Commercial/Industrial	1	Agricultural
1	Water/Wetlands	5	Recreation

4. Please indicate the importance of the following watershed values.

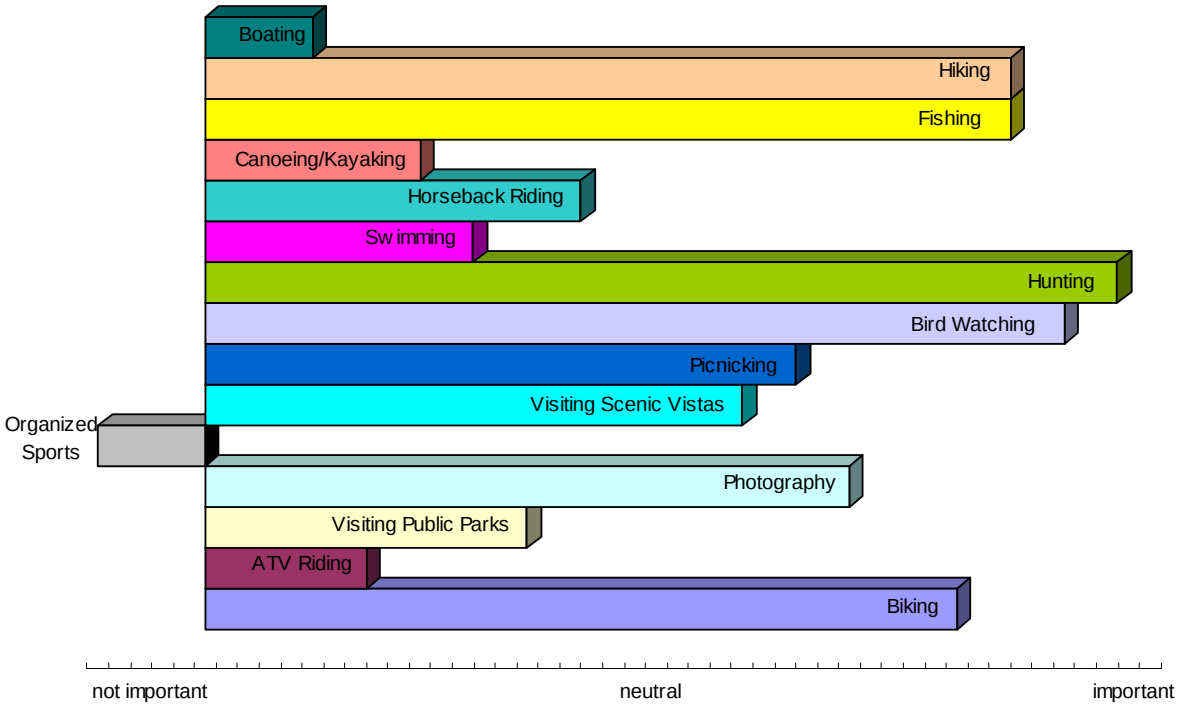
Figure 6-6 Importance of Watershed Values



	Very Important	Somewhat Important	Neutral	Not Likely Important	Not Important	Total
Attractive Natural Settings	2*9=18	1*1=1	0*0=0	-1*0=0	-2*0=0	= 19
Preserving Historic Sites	2*4=8	1*4=4	0*0=0	-1*2=-2	-2*0=0	= 10
Recreation Opportunities	2*5=10	1*4=4	0*0=0	-1*1=-1	-2*0=0	= 13
Water Quality Improvement	2*10=20	1*0=0	0*0=0	-1*0=0	-2*0=0	= 20
New Business/Jobs	2*4=8	1*5=5	0*0=0	-1*1=-1	-2*0=0	= 12
Community Activities	2*3=6	1*5=5	0*1=0	-1*1=-1	-2*0=0	= 10
Residential Development	2*1=2	1*3=3	0*2=0	-1*2=-2	-2*2=-4	= -1
Educational Opportunities	2*3=6	1*2=2	0*4=0	-1*1=-1	-2*0=0	= 7

5. Please indicate the importance of the following recreational activities in the watershed.

Figure6-7 Importance Values of Recreation Activities



	Very Important	Somewhat Important	Neutral	Not Likely Important	Not Important	Total
Boating	2*2=4	1*2=2	0*1=0	-1*2=-2	-2*1=-2	= 2
Hiking	2*6=12	1*3=3	0*0=0	-1*0=0	-2*0=0	= 15
Fishing	2*6=12	1*3=3	0*0=0	-1*0=0	-2*0=0	= 15
Canoeing/Kayaking	2*3=6	1*2=2	0*1=0	-1*2=-2	-2*1=-2	= 4
Horseback Riding	2*3=6	1*2=2	0*3=0	-1*1=-1	-2*0=0	= 7
Swimming	2*2=4	1*2=2	0*4=0	-1*1=-1	-2*0=0	= 5
Hunting	2*8=16	1*1=1	0*0=0	-1*0=0	-2*0=0	= 17
Bird Watching	2*7=14	1*2=2	0*0=0	-1*0=0	-2*0=0	= 16
Picnicking	2*4=8	1*4=4	0*0=0	-1*1=-1	-2*0=0	= 11
Visiting Scenic Vistas	2*3=6	1*4=4	0*2=0	-1*0=0	-2*0=0	= 10
Organized Sports	2*1=2	1*2=2	0*2=0	-1*2=-2	-2*2=-4	= -2
Photography	2*3=6	1*6=6	0*0=0	-1*0=0	-2*0=0	= 12
Visiting Public Parks	2*2=4	1*4=4	0*1=0	-1*2=-2	-2*0=0	= 6
ATV Riding	2*1=2	1*4=4	0*2=0	-1*1=-1	-2*1=-2	= 3
Biking	2*5=10	1*4=4	0*0=0	-1*0=0	-2*0=0	= 14
Other						
• Elk/wildlife observation						

6. What are the three most critical needs or challenges in your county or municipality that affects the Sinnemahoning Creek watershed?

- Timbering/Logging (2)
- Development
- Oil/Gas extraction
- Malfunctioning on-lot sewage systems
- None
- Stream improvement
- No more train wrecks on Portage stream. We have the Freeman Run and the Portage at Keating Summit
- Correcting issues relative to AMD (2)
- Other sources of pollution, including sewage
- Control storm water through natural mechanisms (2)

7. What projects would you like to see implemented in your area that could be included in the Sinnemahoning Creek Watershed Conservation Plan? Please list short-term and long-term projects and goals.

a) Land Use/Land Resources (farmland preservation, development, planning, etc.)

- I would like to see zoning
- Farmland Preservation
- Maintain agricultural enterprises in Jay Township
- Have no projects; the Austin Dam is in our township and would like to see it prosper, but not at the cost of our natural settings
- Public access to the main corridor of the Bennett Branch and a trail along the stream (short and long term)

b) Water Resources (quality, quantity, etc.)

- Expansion of water company service area and capacity
- Stream improvement
- Quality—to maintain good clean water to include all the little springs and creeks
- Restoration of water quality to be classified as a "cold water fishery" and the introduction of aquatic species
- Improve water quality of West Creek

c) Biological Resources (plant, animal, terrestrial, aquatic, areas of concern, etc.)

- Animal preservation (specifically deer management)
- Areas of concern—Freeman Run through Austin
- The Portage that runs close to the railroad tracks
- Restoration of all species that have been decimated over the past century, mainly as a result of AMD
- Sport fishes

d) Cultural Resources (historical, recreational, environmental education, etc.)

- Additional trails for hiking & biking (non-motorized use)
- We think our environment is our best resource; the wilderness is loved by most; I would like to see that kept; education towards preservation
- Legend of lost gold from Civil War (Historical)
- Mining towns
- Indian remains
- Lumbering in 1800's to 1900's
- West Creek Recreational Trail Association
- Elk County Conservation District
- Wetlands Education Center

e) Other (roads/other transportation, economy/jobs, population & demographic trends)

- The return to railroad transportation
- Secondary road improvement (limestone surface)
- Assistance to the municipality in developing ordinances that will protect our natural resources and permit development
- Jackson Road bridge replacement

Interview Results

Phone interviews were conducted with 12 key individuals who have intimate knowledge of watershed values and concerns. Questions are designed to allow the interviewee to express his/her insight into the strengths and weaknesses of the watershed and provide suggestions for how to make the plan as successful as possible. The results of the interviews are summarized in the following section.

1. How has the watershed changed in the past 10 years?

Streambank erosion and silt problems were each mentioned several times as new problems within the watershed. Some of these problems stem from increased development inside the floodplane and more logging projects. However, the efforts of the Cameron County Conservation District and local Trout Unlimited chapters have made an impact to remediate these problems.

The effect of mining in the area was also an important issue that has had harmful effects on the watershed within the last 10 years. The practice of strip mining has interrupted the pristine look of the forest, as well as its effectiveness as a buffer to the stream. It also was mentioned that limited change within the watershed is having a negative impact when it is refers to AMD that can still be found within the watershed, especially on the Bennett Branch. There are some sections that are being treated with lime dosing to counteract the mining effects. The remediation efforts at Purple Hollow and West Branch have provided a great bass fishery.

Some other negative impacts that have occurred include the train derailment on June 30, 2006 that caused a large fish kill due to a toxic spill into Portage Creek, and fertilizer runoff from farmland. New Japanese knotweed populations have been found in the Driftwood Branch that could have been introduced from an increase in development along Route 555.

There also have been several other positive impacts within the last 10 years. The creation of local watershed groups has helped identify pollution problems, and cleanup efforts have been successful.

Lower deer populations have had a positive effect on the regeneration of forests. There also has been no large outbreak of gypsy moth in recent years.

2. How do the following currently meet the needs of the watershed community?

Transportation

Most respondents reported limited availability of public transportation. Most travel is done by private vehicle. Reviews of the roadways presented a mixture of responses; most believed that roadways were sufficient, but several concerns were outlined. Respondents pointed out that many roadways were unpaved and present potential hazards to streams that they often border. They suggested that better care be taken to make sure runoff from roads does not carry silt into adjacent streams. Poor winter maintenance was another reason given by those that believed the roadways were insufficient.

It was reported that there are large stretches of land that are without any type of roadway. Therefore, these areas are very inaccessible to people. This is positive for the area, because it can be isolated from human impacts and remain wild.

Increased traffic due to PA Wilds tourism promotion and the popularity of elk viewing has made traffic a concern. The increase of people that are traveling through an area with limited roadways is a concern. There also is a problem with elk viewers pulling off and stopping along narrow roadways. There should be an effort to police viewers to ensure safety along roadsides.

Infrastructure

Overall, responses indicated that water and sewer systems that are in place now are operating well, but further development is necessary. Infrastructure needs to be expanded in order to accommodate the PA Wilds Welcome/Nature Center. Sewer systems were reported to be adequate in Austin, Penfield, and the upper part of Bennett Branch. The areas that still need improvement are reported to have camps with sewage treatment mechanisms that still drain directly to creeks. Emporium has done a lot of work to develop their storm water management system, and they are currently improving their wastewater treatment center.

Employment Opportunities

Almost all respondents described high unemployment rates and very limited job opportunities. Major employers within the watershed are factories, such as Powdered Metal in Emporium. It was pointed out that most employment opportunities are in industries that are harmful to the environment. Mining, gas and oil well drilling, and logging industries all have a significant impact on the natural beauty and natural resources that are a huge draw to the watershed.

Factory jobs are not present throughout the entire watershed, though. There are even fewer employment opportunities below St. Marys along routes 255 and 555. While there are several low paying jobs available, there are few choices for those with a college education. Future job opportunities in the area will most likely be in recreation, because coal and timber industry jobs are declining.

Educational Opportunities

The majority of respondents reported that the elementary, middle, and high schools were good, but there is very limited opportunity for continuing education after high school. Those students who desire to attend college have to move from the area.

Several responses stressed the need for environmental education. One response pointed out that DCNR Bureau of State Parks, DCNR Bureau of Forestry, and county conservation districts are involved in providing environmental education to students. The St. Marys High School Outdoor Club was

highlighted as an active group that focuses on environmental education. They are responsible for an impressive outdoor classroom that provides vast environmental opportunities to students.

*Land-use Ordinance*s

Nearly 70 percent of responses indicated that land-use ordinances are nearly non-existent, and those that are in place are outdated and need improvement. It was reported that Cameron County has a well-maintained land-use ordinance that is effectively patrolled. It also was mentioned that DCNR sufficiently maintains public lands.

One suggestion was made that this was positive for the less populated areas, because more regulation can do more harm that it does good. It was also mentioned that there is a dire need for more land use ordinances in order to protect natural species and resources. More public education needs to be done to make people aware of the benefits that can come from land use ordinances.

3. Do the recreational opportunities currently meet the needs of the watershed community?

Parks/Picnic Sites

The majority of those interviewed agreed that there were enough parks and picnic areas available to the public. There is a wealth of state parks and state forests that provide ample recreational opportunity. Conversely, several respondents felt the area is lacking park and picnic opportunities. They also commented that those present are in need of improvement. One example provided explained how several recreational features had been removed from Prouty Place State Park. The park was once a great resource, but since the fire rings, picnic tables, and restrooms had been removed, people have not been using the park.

Hiking/Biking Trails

Most respondents agreed that there are several hiking trail opportunities within the watershed. They were in agreement when describing biking trails as limited or non-existent. It was reported that a major source of hiking trails are found within the state parks and state forests. A concern about the maintenance of hiking trails was expressed. It was suggested that more effort be put into improving and maintaining the trails that do exist.

A possible Rails-to-Trails project was described by one interviewee. The railroad was recently given right-of way to an old rail bed that runs between Emporium and St. Marys. The rail bed is a prime location for a new hiking and biking trail.

Off-Road Vehicle Riding

A majority of respondents agreed that there were not many ATV trails available, but they also agreed that ATVs can cause a lot of problems and need to be regulated. Several interviewees pointed out that there are several townships, including Jay and Benezette, which allow ATVs to travel on township roads. More than 70 miles of snowmobile trails are available to the public.

Several responses stated that the area does not need to create opportunity for ATV recreation. Some things that dissuade them from supporting the activity are the tendency for property damage and disregard for private property. It also was pointed out that if designated ATV trails were created, there would be a need for strict safety enforcement on the trails.

Scenic Vistas/Photography

About 90 percent of the interviewees agreed that the watershed is full of scenic views and photographic opportunities. They suggested that the state parks and state forests hold numerous opportunities to view the outdoors. DCNR Bureau of Forestry has done a good job in creating several

viewing areas for the watershed's wildlife treasures. Elk and bald eagles can be viewed and photographed from countless locations. Several mountain lookouts and waterfalls also can be found throughout the watershed. One suggestion was made to further publicize the photography possibilities of the watershed. The only negative comment was concerned with the accessibility of these scenic areas due to some being located on private lands.

Wildlife/Bird Watching

Almost all of the respondents agree that there are ample opportunities to see wildlife and bird watch. They reported that this type of recreation is a growing attraction to the watershed. While elk are a major part of wildlife observation, there were reports that there are fewer whitetail deer to be seen. Several interviewees said that there were many birding opportunities throughout the watershed. There are identified birding areas in Clearfield and Elk counties. One report stated that there are some very active individuals that are dedicated to bird watching, and keep a close watch on the bird life in the area.

Hunting/Fishing

Respondents were in agreement that plenty of opportunities exist for hunting. There are several state game lands that provide ample hunting choices for the public. However, the majority of reports also point out that whitetail deer herds have dropped considerably. The drop in deer population has, in turn, decreased the draw of hunters to the area. There is a vast availability of land to hunt, but the drop in deer is an issue that needs to be addressed in order to bring hunters back to the area.

Concerning fishing, respondents had concerns about stream health and trout stocking. Several interviewees reported AMD impacts that have limited fishing opportunities. Others reported that there was a need for more fish stockings, because there are plenty of healthy streams that can support an abundance of trout. Another concern for fishing is that there is limited public access to waterways. Creating more access points along the stream was suggested to improve fishing opportunities within the area.

Boating/Swimming

Responses indicated that there are many opportunities for those wishing to enjoy boating and swimming on waterways in the watershed. Parker Dam State Park, George B. Stevenson Dam at Sinnemahoning State Park, and the West Branch Susquehanna River were all reported to be good locations to enjoy canoeing and kayaking. Opportunities for using a motorboat are limited, however. The Cameron County Canoe and Kayak Classic race has been drawing crowds to the Driftwood Branch of the Sinnemahoning watershed for the last 34 years. While opportunities to get out on the water exist, reports indicated a need for more. Some AMD problem areas deter paddlers from the streams. Cleanup efforts on these impacted streams could create great new resources for canoe and kayak users. Some of the popular swimming destinations were at the Sizerville State Park swimming pool and at the reservoirs at other state parks.

Cameron County Canoe and Kayak Classic

Historical Sites/Structures

The consensus of those interviewed was that there are very limited historical recreation opportunities. There is a need for more historical societies in order to make the history more apparent to the public. One report indicated the historical significance of coke ovens that is not being utilized. There are some small museums throughout the watershed, but they are not very well known. One such museum,

located in Emporium, is run by the Cameron County Historical Society and depicts the heritage of Cameron County.

Golf Courses and Other

Respondents reported that there are some options for golfing within the watershed. There are two courses in St. Marys, one in Emporium, and another one in Coudersport (just outside of the watershed). The majority of respondents agree there was a sufficient amount of golf courses to support the area's needs.

Winter Recreation

The top two winter recreation activities pointed out by those interviewed were cross country skiing and snowmobiling. There are plenty of trails for both activities that are located mostly in state parks. Snowmobiles have their own designated routes through state parks and state forest lands. There were conflicting reports by respondents about the usage of these trails. One said that the popularity of snowmobiling was declining, while another stated that they are still being used frequently. The interviewees agreed that cross country skiing opportunities were great, but need to be publicized more. While cross country skiing is popular, there are no formalized places to downhill ski or go tubing within the watershed area.

4. What are some of the positive features of the watershed?

Respondents pointed out the wonderful natural resources and beauty of the watershed. Several interviewees listed the remoteness and relatively undisturbed wilderness as important positive features. Ample fishing, hunting, camping, and hiking resources also were mentioned as being important to the watershed's appeal. It was pointed out that continuous forestland is important, because it provides habitat for wildlife, such as bobcat and black bear. One reason that the watershed is able to retain its large forested land area is because it is composed of large sections of state owned lands.

One interviewee positively described how the watershed has remained undisturbed and wild, while so many other regions have been broken up by development. Some areas of the watershed do not have oil, coal, or natural gas resources that bring with it destruction of the land. However, the recent discovery of potential gas resources is an issue that should be watched closely to conserve the wilderness still intact.

One respondent was excited about the future of the watershed. The water resources are being cleaned up where needed, and the elk population is a major attraction to the watershed. However, the increased draw of visitors to the area may be a concern. Is the watershed ready to handle an increase in visitors and the influence that people have on the outdoors? Efforts must be made to ensure that the wild features that are positive attractions of the watershed remain protected.

5. What are some of the negative impacts currently affecting the land, water, and biological resources?

Almost all respondents were concerned with AMD problems that are affecting Sterling Run, West Creek, and Bennett Branch. The effect of mining on stream health is the most negative impact within the watershed according to those interviewed. Acid precipitation is another concern that is having a negative impact on streams. Acid precipitation is reducing the alkalinity of streams, and preventing maintenance of healthy aquatic habitats. One respondent indicated that local citizens view AMD-affected streams as unredeemable.

Several interviews highlight road sedimentation as a major, negative impact in the watershed. Many roads are not paved, and rain events wash sediment into nearby streams. It was suggested that limestone

roads are needed to prevent erosion and help raise the alkalinity of nearby waterways. Storm water management also is a concern in Emporium and St. Marys, where storm water management systems are being improved.

Some other negative impacts that were mentioned involved natural resources that are being taken from the watershed. Exploration of natural gas can have serious negative impacts on the land, and drilling should not be a hurried process because of the contamination that it can cause. The logging industry is another concern for respondents. There is limited regulation on logging, and more must be done to ensure that it has as little an impact as possible on the health of the watershed. There also was a comment about the lack of jobs for those with college educations. The job market forces college graduates to move away to find jobs.

6. Do you have any specific projects or type of projects you would like to see identified in the plan?

The primary interest of the majority of respondents was to clean up AMD-affected streams. One response noted that the watershed could be an amazing fishing destination if the waterways were rescued from pollution. Several suggestions were made to do research and remediation projects on Sterling Run and West Creek for AMD and acid precipitation.

There also were several suggestions for riparian buffer projects, particularly along Driftwood Branch and Portage Creek, where aquatic habitat restoration and chanalization are additional issues. Riparian buffers would reduce erosion and sedimentation, the next most popular issue. Suggestions were made to improve roads with limestone to prevent sedimentation and help buffer streams.

Respondents also suggested that more effort be put into publicizing important issues affecting the watershed. Gaining public favor can go a long way in terms of getting projects started. Additional media coverage also will help when trying to gain access to grant money for project implementation. The reparation money from the train derailment along Sinnemahoning Portage Creek will be used to remediate damages caused by the accident, as well as improve watershed resources throughout the region.

Some additional suggestions were to develop more fishing access, as well as increase the number of trout stockings throughout the area. Better doe management was another issue raised to help restore whitetail deer populations. Closer regulation of the logging industry was another important topic.

7. What must the watershed conservation plan say to be successful?

Reports indicated that it is very important that the plan be well-publicized. The public must be informed about the project and what impacts it can have on their area. This will, in turn, allow the plan to be done locally, and ensure that local communities have their part in the creation process. The suggestion also was made to be specific about the projects and partners, and to make sure that education efforts are followed through.

Respondents also suggested that the plan focus more on improvements rather than conservation efforts. Enough of the area has already been conserved, but there are several areas, such as roads, that are in need of improvement. Management efforts should be low-impact, and measures should be taken to ensure any projects or improvements remain natural.

8. What must the watershed conservation plan *not* say to be successful?

Those interviewed agreed that the plan should recommend keeping the area wild and to not over-commercialize it. Current assets should be taken care of and preserved. There is no need to turn the wild areas into overcrowded tourist attractions. Community growth should come from within, through locally-owned businesses and not corporate chains, such as McDonalds and Hampton Inns.

There also was a concern that the plan's language could be too broad to be effective. The plan's suggestions need to be tailored to specific areas for optimal effectiveness. Care should be taken when developing the plan to not promote over–management of the area and disturb its natural look and feel.

Other suggestions of what the plan should avoid included: not emphasizing ATV and snowmobile use, and not including requirements, zoning, and ordinances.

9. Do you have any other questions or comments?

- Invasives—more than any other factor, exotic plants and forest pests pose the largest threat to the watershed. Left alone, they will drastically degrade the watershed, and disrupt its natural systems in the upcoming years.
- First Fork—on the lower end, oriental bittersweet is choking out trees, below Sinnemahoning State Park there are areas of forest blanketed in this invasive. There is a mile-a-minute vine infestation in Sinnemahoning State Park north to Big Nelson Run in Potter County.
- Japanese knotweed is becoming prevalent on Driftwood Branch, very heavy on Sinnemahoning Creek, and populations are beginning to show up in the First Fork watershed. There is knotweed established on the lower end of Bennett Branch, as well.
- Japanese stilt grass and garlic mustard are widespread throughout the watershed, using forest roads and streams as arteries for spreading. It appears that road maintenance practice on township and forestry roads are very effective at spreading these two invasives deep into our natural areas.
- Exotic bush honey suckles (Tartarian and Morrow's) are overrunning many natural areas, while Japanese barberry and autumn olive are becoming more prevalent in natural areas. Multiflora rose is beginning to be killed by rose-rosette disease, which is good.
- Other invasives are escaping into the wild, and causing localized infestations—Chinese wisteria, winged burning bush (a.k.a. *Euonymus*), Japanese honeysuckle, and Norway maple.
- Forest pests—hemlock woolly adelgid was recently detected in Wykoff Run, and it poses a threat to dramatically change the character of the Sinnemahoning Creek watershed. Exotic willow leaf beetle and its heavy defoliation are becoming more prevalent on area streams—willows seem to be able to survive defoliation. Exotic Viburnum leaf beetle is entering the watershed from the north, and severely defoliating native Viburnum species. The Viburnum shrubs appear to be dying after several years of severe defoliation; this poses a threat to region's biodiversity.
- Forestland development—I believe in the upcoming years we will have significant pressure in the watershed to develop nongovernmental forestland. The Sinnemahoning is unique in the large tracts of forest land contained within its watershed boundaries. The plan should address means to maintain this forested characteristic. Currently, there is pressure to subdivide property and sell off lots for camps in some areas of the watershed. Recently, a large tract of land in Medix Run was subdivided into such a development. The results are saddening. Furthermore, in areas adjacent to the watershed, tracts of forest land are being carved up with a high density network of roads and gas wells. This disturbance results in heavy sedimentation to our streams and creates opportunities—pathways—for invasive plants, such as Japanese stilt grass and garlic mustard, to spread right into the center of the forest. It also destroys the very 'wilderness' aspect, for which the Sinnemahoning is known. The same could be said about the location of wind farms within the

watershed. Locating wind farms and their access roads on existing openings, such as fields, farms, strip mines, would not be too detrimental. But we need to plan ahead, so as to prevent their being placed on forestland to prevent the detrimental effects of forest fragmentation.

- Focus on AMD cleanup in Bennett Branch, Sterling Run (Driftwood Branch). Prevent new mining of 'virgin' ground. Tie-in mining projects with beneficial reclamation. Encourage miners to reclaim and reforest with tree species native to the Sinnemahoning Creek—big one—there is too much Norway spruce, Scotch pine, and black locust being planted.
- Seek to maintain the 'wildness', the solitude, and the slow-paced way of life present in the watershed. This is a real concern among residents, with the PA Wilds program being implemented.
- Reforesting of riparian corridors, preventing/educating landowners against clearing forest cover in the stream corridor. The majority of streambank erosion problems in the county stem from lack of riparian forests—this is a real big issue
- Address siltation resulting from dirt and gravel roads—township roads and some state forest roads are slowly being addressed with driving surface aggregate and limestone chips. However, their funding is limited, and there are many other roads that are in need to prevent sedimentation runoff from entering streams.
- Address poor logging practices, especially those located on steep hillsides. Logging roads in high-gradient areas seem to cause the most damage—sedimentation wise.

High School Workshops

In order to ensure that the younger generations were given opportunity to provide their input into the plan, school programs were conducted at two high schools in the watershed. Students from Austin High School and Saint Marys High School were surveyed after listening to a presentation about watersheds. The students were engaged in open discussion that provided insight into the future of the watershed and what issues and concerns are most important when considering living in the watershed. The results of the student surveys are listed below.

Conducting a school presentation at St. Marys High School

* Indicates that the response was identified by both schools.

What do you like about the area?

- All seasons
- ATVs*
- Beauty
- Biking
- Breeze
- Bridge jumping
- Camping*
- Canoeing/Kayaking*
- Cell phone service
- Clean water*
- Climate (four seasons)*
- Dark skies
- Dirt biking
- Easy to navigate the area
- Elk
- Fall/Woods
- Family in the area
- Fishing*
- Fresh air and water*
- Friendly community
- Golf carting
- Good food
- Headwater area
- Hiking*
- Hills
- Hunting*
- Know everyone
- Little (low) traffic
- Locally-owned businesses
- Low crime rate

- Low population*
- Mudding
- Natural
- Nice people
- No gangs
- One language spoken
- Open space
- Outdoor activities
- Outdoor house for animals
- Peaceful/Calm
- People
- Quiet*
- Rural scenery
- Sheetz
- Skiing
- Small town atmosphere*
- Snake hunting
- Snowboarding & sledding
- Snowmobiling
- Spotting
- State parks
- Sun
- Swim*
- Trails*
- Trapping
- Video games
- View
- Walking
- Wal-Mart
- Wildlife*
- Woods/Forest*

What could be improved?

- Activities needed—malls/businesses
- AMD cleanup
- Austin Dam Road
- Battery cars
- Cell phone service*
- Clean school
- Cleaner roads & streams (litter, sediment, pollution)*
- Community college or branch campus
- Control mining (strip mining)
- Deer/Trout management*
- Eco-friendly buildings
- Flood warning
- Fuel efficiency
- Improve trails at state parks
- Increase learning opportunities
- Increased population
- Land use
- Less ATV laws
- Less posted signs/open private property
- Less school days
- Less shooting animals
- Local hunters only
- Logging industry—cease/limit
- Lower prices
- Mass transit
- Metal/debris in streams (section behind Austin School)
- More and better waste disposal
- More ATV trails*
- More coyotes and animals
- More flowers
- More jobs
- More snow
- More stores & food
- More sun
- Movie theater
- No cell phones
- No criminals
- No Wal-Mart (large chain stores)
- Plant more trees*
- Private property respect/less trespassing
- Public water system
- Quality of life—ice cream
- Recreation areas*
- Recycling
- Revitalize/fix town—old buildings
- Roadways*
- Skate park
- Sports facilities (recreation center)
- Stop logging
- Trail/park enhancement
- Variety of fish
- West Branch cleaned up/alive again

What type of recreational activities do you enjoy?

- ATV*
- Archery
- Being outside
- Biking (street and trail)*
- Boating/Canoeing
- Bungee jumping
- Camping*
- Car racing
- Car shows
- Circus
- Cross country skiing
- Dam Show
- Demolition derby
- Exercising
- Fishing tournaments
- Fishing*
- Geocaching
- Hamburger eating contest
- Hiking*
- Horseback riding
- Hunting*
- Jumping from high places
- Lower fish license prices
- Marching band
- More swimming/fishing holes
- Music
- Organized sports
- Party
- Pets
- Pie eating contests
- Pools
- Raising rattlesnakes program
- Rock climbing
- Running
- Science center
- SCUBA diving
- Shopping*
- Skateboarding
- Skiing
- Sky diving
- Sledding/skiing/ snowboarding*
- Snake hunting
- Snowmobiles*
- Squirrel/small game hunting
- Swimming
- Trap shooting
- Trapping
- Video games
- Visiting friends and family
- Walking
- Water sports
- Working out
- Writing
- Youth field days

Do you visit state parks and state forests in your area? Why?

- Annoying parents (getting away from sister)
- Astronomy
- Beauty
- Boating/kayaking
- Camping*
- Dirt
- Eagles
- Enjoy outdoors
- Fall season
- Family reunion
- Field trips
- Fishing*
- General recreation
- Hiking
- Hunting
- Paddling
- Photography
- Picnic*
- Playgrounds
- Pools
- Pretty rocks
- Privacy
- Quiet
- Sidewalks
- Squirrels
- Swimming*
- Swings
- Trees
- Walking trails
- Water sliding
- Wildlife

State parks/forests visited (bold—located within watershed)

- Bendigo State Park
- Black Moshannon State Park
- **Cherry Springs State Park**
- Clear Creek State Park
- Cook Forest State Park
- East Branch
- **Elk State Forest**
- S.B. Elliot State Park
- Kinzua State Park
- **Moshannon State Forest**
- **Parker Dam State Park**
- **Sinnemahoning State Park**
- **Sizerville State Park**
- Twin Lakes State Park

Improvements for state parks/forests

- Baby-oriented things
- Bigger dams
- Bigger playground
- Camping areas
- Cleaner restrooms
- Concession stands
- Deeper water
- Fishing tournaments
- Flush toilets
- Food—Lakeview homemade birch beer
- Hand sanitizer in bathrooms
- More pavilions
- More wildlife
- Showers
- Stock salmon
- Swimming pools

What are some positive and negative impacts currently affecting land, water and biological resources within the Sinnemahoning Watershed?

<u>Positive Impacts</u>

- Aluminum recycling
- Cell phone and ink recycling
- Convicts—trash removal
- Dam Association
- Dark skies
- Deer feeders
- Diversity of fish species improvement natural fish
- Elk population
- Existing bird/bat houses
- Factory's closing
- Fish nursery
- Gas/oil industries
- Hunting correctly
- Limestone on roads
- Little business to pollute
- Low development
- Low electric use
- Ongoing conservation projects
- Planting trees
- Recycling*
- Relatively clean area
- Selective logging
- Snake population enhancement
- Stevenson Dam
- Taking better care of streams & wildlife
- Trees
- Wildlife

<u>Negative Impacts</u>

- Acid precipitation*
- Air pollution
- Austin pump house
- Burning of fossil fuels

- Care level of local population
- Cement culverts
- Clearing trees
- Construction
- Dead animals in creek
- Deer herd decline
- Dirt and gravel roads
- Drought—fire bans
- Elk Creek (highly polluted)
- Erosion/Sedimentation/Runoff*
- Fertilizer
- Fire
- Floods
- Gas spills
- Increasing population—increasing pollution
- Iron in water
- Killing animals
- Litter
- Logging (clear-cutting)*
- Marvin's Plant (metal plant)
- Mining
- Oil
- Old paper mill
- Over hunting
- Pollution*
- Predator populations
- Rocks—injury
- Sewer plant/pollution
- Skeletal remains
- Train derailment
- Trash/illegal dumping in water/land/roadside trash

What changes would you like to see within the next ten years?

- ATV trails
- Clean-up area
- Clean/improve/more/signage trails*
- Cleaner streams
- Community activities and facilities—pool
- Community activities/events
- Decrease predator population
- Deeper water
- Discovery of new bog
- Excess road work/minimize
- Fitness center
- Fix AMD
- Fix East Branch dam
- Higher education opportunities
- Hospital
- Improve air quality
- Increase deer population*
- Job diversity
- Less gas well drilling
- Less logging/clear-cutting
- Less smoke (air pollution)
- Limit human population
- Lower fuel costs
- More activities
- More buildings
- More businesses
- More camping sites
- More conservation efforts in general
- More fish
- More interaction with neighboring communities
- More land set aside—forest
- More opportunities to stay in the area
- More parks
- More people living in area
- More school involvement in conservation projects
- More schools
- More trails to connect towns and surrounding area*
- Museum
- PennDOT road maintenance impacts to area waterways/township supervisors
- PGC to confirm presence of mountain lions, big foot
- Private camps—impacts
- Recycling
- Roads
- Snow fences along highways

- Solar powered cars/solar powered homes
- Stop illegal dumping
- Stop paper mill pollution
- Utilize parks more
- Wind turbines

Can you suggest any projects or types of projects that students, like yourselves, could be involved in or would be interested in being involved in?

- Adopt a highway/forest *
- Alternative energy sources
- ATV dice runs and trail development
- Beautification (flower planting)
- Bigger playground
- Bring back the beach at Sinnemahoning State Park
- Build and design trails
- Build wetlands
- Build wildlife habitat (bird houses)
- Building playgrounds
- Building renovation
- Canoe/kayak trips
- Clean streams
- Clean up litter *
- Cleaning machine
- Community pool
- Conserve resources (electricity)
- Day care center
- Deer farm
- Deer population improvements (food plots, habitat management, season regulation changes)
- Design a park
- Dinosaur machine/digging up bones
- Ecology club field trip to clean streams
- Fish habitat construction
- Fish population at derailment site
- Fishing stocking
- Fresh Air Fund projects
- Greenhouse
- Higher speed limits
- Improve bridges and roads*
- Improve marine life
- Limit forestry
- Litter cleanup
- Lower gas prices & taxes
- Monitor water quality
- Monkey training
- More ATV trails
- More public land
- More trails
- More veterinarians
- PA Wilds
- Plantings—trees, flower gardens*
- Recreation center
- Recycling
- Re-introduction of eel
- Remove invasive species
- Steambank stabilization
- Stock pheasants/fish
- Stream clean-up
- Stream monitoring (better equipment, boots)
- Stream restoration/re-introduce fish/remove debris
- Time machine
- Tourism—lodging/promotion/activities
- Trail improvements
- Tree houses
- Updating kiosk
- Water quality testing
- Weather monitoring
- Wellness center
- Zoos

Who could see themselves staying or returning to the region to live and work in the future? What reasons make you want to stay/return, and what reasons make you want to leave?

<u>Why return?</u>

- Climate
- Environment

<u>Why not?</u>

- Better hunting/fishing/outdoors elsewhere
- Close-by shopping

- Familiarity
- Family and friends*
- Few natural disasters
- Good public school system
- Hunting/Fishing
- Job security
- Quiet
- Rural setting/small town atmosphere
- Safe environment
- Small community
- Tiny/low population
- To see improvements
- Explore different countries
- First man on Mars
- Lack of health care
- Lack of jobs*
- Lack of recreation*
- Lights
- Meeting new people*
- Opportunities
- Prefer increased population and cities*
- See what resources (animals) are in other areas
- Want to travel*
- Winter

Receiving input from local stakeholders is a crucial component to the success of the conservation plan. Gaining access to local knowledge is necessary to understand the strengths and weaknesses of the watershed values. The best sources of information and insight into the watershed are the people who live in it and have firsthand experience with the challenges it faces. The information gathered through surveys and interviews determines what recommendations are made to preserve the strengths and remediate the weaknesses affecting the Sinnemahoning Creek watershed.

CHAPTER 7. MANAGEMENT RECOMMENDATIONS

This section highlights recommendations to improve the quality of life for residents and visitors of the watershed through the conservation of local waterways, natural resources, cultural heritage and sense of place. It also features recommendations to promote the use and stewardship of those resources for the benefit of recreation and tourism.

This guide addresses issues and recommendations developed by the general public, conservation organizations, and government agencies active within the watershed. The prioritization of the recommendations was determined by the local steering and advisory committees and by the public. Priority listed as *N/A** were added after the prioritization process. The recommendations were prioritized based upon impacts to the watershed, feasibility, and probability of funding. This section should be used as a tool to help conservation and civic groups and local, state, and federal agencies work collaboratively to achieve the objectives and goals to improve the watershed and communities contained within.

The *goals* and *methods* identified in the table below are non-regulatory. *Potential partners* are groups with the resources best suited to cooperate to meet each objective. *Potential funding sources* are included to guide the partners in their search for money to implement projects to meet that goal. Those listed as potential partners should generate discussion about meeting one or more goals and working together to seek and secure funding. The *potential funding sources* is not an all-inclusive list and is subject to change due to ever-changing economic circumstances. The general *conservation groups* category includes such groups as Western Pennsylvania Conservancy and Northcentral Pennsylvania Conservancy; Bennett Branch, Bucktail, and First Fork watershed associations; sportsmen's clubs and other cultural and recreational groups. Additional information on potential funding sources, useful Internet resources, and contact information for your local partner groups can be found in Appendices O, P, and Q, respectively.

Table 7-1. Acronyms used in Management Recommendations Matrix

BAMR	Pennsylvania Department of Environmental Protection - Bureau of Abandoned Mine Reclamation
DCED	Pennsylvania Department of Community and Economic Development
DCNR	Pennsylvania Department of Conservation and Natural Resources
DEP	Pennsylvania Department of Environmental Protection
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HUD	Housing and Urban Development
LWV	League of Women Voters
NRCS	United States Department of Agriculture - Natural Resources Conservation Service
OSM	United States Department of Interior - Office of Surface Mining
PABS	Pennsylvania Biological Survey
PACD	Pennsylvania Association of Conservation Districts
PALMS	Pennsylvania Lake Management Society
PASA	Pennsylvania Association for Sustainable Agriculture
PDA	Pennsylvania Department of Agriculture
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PENNVEST	Pennsylvania Infrastructure Investment Authority
PGC	Pennsylvania Game Commission
PNHP	Pennsylvania Natural Heritage Program
PSAB	Pennsylvania State Association of Boroughs
PSATS	Pennsylvania State Association of Townships
RWA	Rural Water Authority
SEO	Sewage Enforcement Officer
USACE	United States Army Corps of Engineers
USDA	United State Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WPCAMR	Western Pennsylvania Coalition for Abandoned Mine Reclamation
WREN	Water Resources Education Network

Project Area Characteristics

Goal 1-1: Become proactive, and establish land-use ordinances to protect communities from unwanted land uses and businesses before they are proposed or established.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Utilize responsible zoning to protect communities without significantly impeding landowner rights.	Municipalities, Planning Commissions, Conservation Groups, Landowners	DCED, Foundations, Private Sources	High
2. Encourage municipalities and counties to utilize regulation control powers available to them, such as zoning and subdivision ordinances, to preserve and improve the quality of life and manage growth within their community.	Municipalities, Planning Commissions, Conservation Groups, Landowners	DCED, Foundations, Private Sources	High
3. Develop land-use ordinances or subdivision regulations in accordance with municipal and county comprehensive plans to protect the character of communities and valuable resources from undesirable land uses.	Municipalities, Planning Commissions, Conservation Groups, Landowners	DCED, Foundations, Private Sources	High
4. Encourage municipalities and counties to maintain up-to-date comprehensive plans, reviewing and updating their plan every 10 years.	Municipalities, Planning Commissions, Conservation Groups, Landowners	DCED, Foundations, Private Sources	High
5. Build partnerships with municipal officials, businesses, developers, and other stakeholders to enforce existing ordinances and alter negative perceptions of zoning through education and awareness programs.	Municipalities, Counties, Planning Commissions	DCED, Foundations, Private Sources	Medium
6. Strengthen the regulation of land-use ordinances, so they are not easily changed.	Municipalities, Counties, Planning Commissions	DCED, Foundations, Private Sources	Medium

Goal 1-2: Enhance area roadways, minimizing impacts and improving safety for residents and visitors.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Implement best management practices that protect water resources when improving and upgrading dirt and gravel roads, secondary, and rural roadways.	Conservation Groups, Municipalities, Road Masters, DEP, BoF	PennDOT, DCED, Foundations, Private Sources	High
2. Educate road masters about best management practices and techniques for dirt and gravel roadways maintenance.	Conservation Groups & Districts, Penn State Dirt & Gravel Road Program, Municipalities, DEP, PennDOT	PennDOT, DCED, DEP, Foundations, Private Sources	High
3. Include sound geologic investigation and best management practices during maintenance and construction of roadways to minimize impacts.	Conservation Groups, Road Masters, PennDOT, DCNR - BoF	PennDOT, DCED, Foundations, Private Sources	High

Goal 1-2: Enhance area roadways, minimizing impacts and improving safety for residents and visitors (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Support municipal participation in the Dirt and Gravel Roads Program to reduce erosion and sedimentation.	Municipalities, Conservation Groups, Conservation Districts, DEP	PennDOT, DCED, Foundations, Private Sources	High
5. Increase funding to fix and address impacts caused by poorly managed dirt and gravel roads.	Conservation Groups, Road Masters, Penn State Dirt & Gravel Road Program, Municipalities, Legislators, DEP, PennDOT, DCED	PennDOT, DCED, DEP, Foundations, Private Sources, Legislature	Medium
6. Increase maintenance on roadways, especially those used heavily by the trucking industry.	Municipalities, PennDOT, BoF	PennDOT, DCED, Private Sources	Medium
7. Determine impacts that salt and ashes have on the water quality, and investigate alternative practices.	Conservation Groups, Universities, Road Masters, Municipalities, DEP, EPA, PennDOT	PennDOT, DCED, DEP, Foundations, Private Sources	Medium
8. Combine state forest and municipal dirt and gravel road programs, and expand it to logging roads.	Municipalities, Legislators, DCNR, PennDOT	PennDOT, DCED, DEP, Foundations, Private Sources, Legislature	Medium
9. Establish dirt and gravel road legislation for coldwater fisheries and lower quality streams.	Conservation Groups, Penn State Dirt & Gravel Road Program, Municipalities, DEP, PennDOT, Legislators	PennDOT, DCED, DEP, Foundations, Private Sources	Medium
10. Control unregulated traffic along the Elk Scenic Drive through increased, collaborative enforcement.	Municipalities, State Police, PennDOT, DCNR	Foundations, Private Sources, Legislature	Low

Goal 1-3: Support the Pennsylvania Wilds initiative to encourage growth of tourism and tourism related businesses enhancing visitors' experience, while protecting the natural resources that make this region unique.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Revitalize downtown areas to encourage the establishment of small businesses that compliment the community character. Utilize the PA Wilds Resource Center (Appendix Q).	Planning Departments, Municipalities, Chambers of Commerce, HUD, TPAs	DCED, Foundations, Private Sources	High
2. Plan for development based upon limitations of the physical characteristics of the region, including the consideration of water use limitations in permitting decisions, water quantity, soil type, etc.	Planning Departments, Municipalities, Conservation Groups, NRCS, DEP, USGS, HUD	DCED, Foundations, Private Sources	High

Goal 1-3: Support the Pennsylvania Wilds initiative to encourage growth of tourism and tourism related businesses enhancing visitors' experience, while protecting the natural resources that make this region unique (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
3. Encourage landowners and engineers to implement Conservation by Design, Smart Growth, or Pennsylvania Wilds Design Guide principals when development opportunities arise.	Planning Departments, Municipalities, Landowners, Engineers, HUD	DCED, Foundations, Private Sources	Medium
4. Consult the Pennsylvania Wilds Design Guide before establishing, designing, or altering properties.	Municipalities, Engineers, Planning Departments, HUD	DCED, Foundations, Private Sources	Medium
5. Conduct a demonstration project utilizing PA Wilds Design Guide at a local site for educational purposes.	Wilds Planning Team, Planning Departments, Conservation Districts	DCED, DCNR, Foundations, Private Sources	Medium

Goal 1-4: Open lines of communication among municipalities, counties, states, agencies, conservation groups, businesses, and organizations to development partnerships needed to discuss and address issues.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Build partnerships with municipal officials, businesses, developers, and other stakeholders to enforce existing ordinances and alter negative perceptions of zoning through education and awareness programs.	Municipalities, Counties, Planning Commissions	DCED, Foundations, Private Sources	Medium
2. Foster communication and cooperation between municipalities and counties.	Municipalities, Counties	DCED, Private Sources	Medium
3. Establish an agreement between local municipalities, conservation organizations, and railroad companies to establish public access to obtain permission for the public to cross tracks or establish designated paths to cross tracks, opening area waterways for recreational purposes.	Municipalities, Counties, Conservation Groups, Railroad Companies, DCNR, PFBC	Private Sources	Medium
4. Establish joint or shared management of non-road issues among townships and boroughs.	Municipalities, Counties	DCED, Private Sources	Medium
5. Establish memorandums of understanding between municipalities and public entities to share equipment to clean up after local disasters, such as flooding and tornados.	Municipalities, Counties, DEP, DCNR, DCED, PFBC, PGC	Private Sources	Medium
6. Encourage collaboration amongst environmental groups, including the development and support for more groups.	Conservation Groups, Conservation Districts	Private Sources, Foundations	Medium

Goal 1-5: Carefully plan development to ensure economic stability needed to maintain a balanced workforce and enhance marketability of the region, without altering its rural character.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Forge an alliance or network among local business owners to support each other's businesses and develop a website promoting these local businesses.	Businesses, Chambers of Commerce, Planning Commissions	Foundations, Private Sources	Medium

Goal 1-5: Carefully plan development to ensure economic stability needed to maintain a balanced workforce and enhance marketability of the region, without altering its rural character (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
2. Diversify the local job market by developing and offering incentives and tax breaks to attract new businesses.	Municipalities, Legislators, Planning Departments, Counties	DCED, Foundations, Private Sources	Medium
3. Promote sustainable industries to keep young adults in the region and improve economic viability.	Municipalities, Counties, Planning Commissions	DCED, Foundations, Private Sources	Medium
4. Utilize nature-based tourism opportunities to increase revenue (i.e. equipment rentals, hunting and fishing supplies, lodging, gas stations, and restaurants).	Conservation Groups, Businesses, DCNR, TPA	DCNR, DCED, Foundations, Private Sources	Medium
5. Upgrade and maintain technology, such as high-speed internet and cable, to enable the region to be competitive and attract new businesses.	Telephone, Cable, and Satellite Companies	DCED, Foundations, Private Sources	Medium
6. Increase economic stability that promotes sustainable natural resource use, such as establishing local resource-oriented sustainable industries like value-added products and farmers markets.	Businesses, Chambers of Commerce, Planning Commissions, DCNR, PDA	DCNR, DCED, Foundations, Private Sources	Medium
7. Promote alternative energy practices, increasing job markets and decreasing dependency on gas and oil.	Conservation Groups, DEP, EPA	DEP, EPA, Private Sources, Foundations	Medium
8. Establish incentives for local residents to develop businesses. Restaurants and overnight accommodations are especially needed.	Municipalities, Planning Commissions, DCNR, DCED	DCED, DCNR, Foundations, Private Sources	Medium
9. Offer incentives to help keep young adults in the area.	Municipalities, Counties, Businesses	DCED, Foundations, Private Sources	Low
10. Conduct a study to determine if wireless communication using technology to mask communication towers would be feasible and/or desired enabling the region to be competitive and attract new business, while maintaining the viewscape.	Telephone, Cable, and Satellite Companies, Municipalities, Citizens, Emergency Responders	DCED, Foundations, Private Sources	Low

Goal 1-6: Identify impacts of acid precipitation to minimize or remediate these impacts.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop a network of volunteers to identify waterways that may be impaired by acid precipitation by collecting rainwater and measuring its pH.	Conservation Groups, Conservation Districts, DEP, EPA, DCNR	DEP, EPA, PFBC, Private Sources, Foundations	Medium
2. Map and identify acid precipitation patterns to determine if aquatic life is being altered by impacts of acid precipitation.	Conservation Groups, Conservation Districts, PFBC, DEP, EPA	DEP, EPA, PFBC, Private Sources, Foundations	Medium

Goal 1-7: Enhance financial support and services to prepare and train emergency response providers.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Improve emergency management services through additional funding, upgraded equipment, and training for volunteer or professional responders.	First Responders, Paramedics, Police and Fire Departments, Hospitals, Emergency Call Operators	DCED, Foundations, Private Sources	Medium
2. Install dry hydrants in rural areas of the watershed where public water supply is limited.	Conservation Districts, Fire Departments, DEP, DCNR	DEP, DCED, Private Sources, Foundations	Medium
3. Develop a maintenance program for dry hydrants.	Conservation Districts, Fire Departments, DEP, DCNR	DEP, DCED, Private Sources, Foundations	Low

Land Resources

Goal 2-1: Protect agricultural, forest, and ecologically significant lands, and establish incentives to protect these resources.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage laws to protect surface owners' rights and property from damage caused by subsurface mineral rights owners' access and resource extraction operations.	Conservation Groups, Conservation Districts, Landowners, Legislators, DEP	Legislature, Private Sources, Foundations	High
2. Encourage farmland/forestland tax matching programs to provide incentives to keep land in agriculture/forest and not convert it to residential use.	Conservation Groups, Conservation Districts, Legislators, Counties, DEP, NRCS, DCNR	Legislature, Private Sources, Foundations	High
3. Protect large forest tracts and key riparian areas by working with landowners to keep these tracts intact through enrollment in forestland stewardship programs, purchase of conservation easements, or establishing zoning ordinances.	Conservation Groups, Planning Commissions, Municipalities, Landowners, DCNR	DCNR, Foundations, Private Sources	High
4. Protect prime farmlands from conversion to other uses by purchasing conservation easements, assisting in the multi-generation transfer of ownership, or utilizing farmland preservation programs.	Conservation Groups, Conservation Districts Planning Commissions, Municipalities, Landowners, DCNR	NRCS, PDA, Foundations, Private Sources	High
5. Ensure incentives, such as tax advantages for establishing conservation easements, remain as an encouragement to landowners.	Conservation Groups, Legislators, DEP, EPA, NRCS, PDA, USDA	Legislature, Private Sources, Foundations	High
6. Develop a strategic plan to prioritize and protect ecologically significant areas through conservation easement purchases or other conservation practices.	Conservation Groups, Municipalities, DCNR	DCNR, Foundations, Private Sources	High

Goal 2-1: Protect agricultural, forest, and ecologically significant lands, and establish incentives to protect these resources (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
7. Develop a program or means through which landowners can obtain conservation easements for biologically diverse and prime habitat areas on their properties.	Conservation Groups, Municipalities, Legislators, Landowners, USDA, DEP, EPA, NRCS, PDA	DCNR, Legislature, Private Sources, Foundations,	High

Goal 2-2: Promote management practices on active mine sites to minimize impacts, prevent mine drainage, and improve conditions where possible.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Promote strict enforcement of erosion and sedimentation regulations on active mine sites.	Conservation Districts, DEP, EPA	DEP	High
2. Encourage active mine sites to utilize management techniques, such as land liming, alkaline addition in backfill, and filling mine voids with fly ash to prevent future mine drainage discharges.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	High
3. Encourage Pennsylvania Department of Environmental Protection to establish and enforce requirements for sealing core-drillings to prevent the contamination of water sources.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	High
4. Encourage high-value hardwood tree plantings as one method to reclaim mine lands, and support the Pennsylvania Department of Environmental Protection and U.S. Department of Interior's Office of Surface Mining Reforestation Initiative on active mine sites.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	High

Goal 2-3: Minimize impacts from exploration, production, retirement, and abandonment of wells.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop, enforce, and implement best management practices specific to gas and oil exploration.	Conservation Groups, Conservation Districts, DEP	DEP, Private Sources, Foundations	High
2. Monitor cumulative impacts of oil and gas wells to protect watershed resources and rural character of the region.	Conservation Groups, Conservation Districts, DEP, Penn State Extension	DEP, Private Sources, Foundation	High
3. Institute closer government oversight on gas well exploration and production, including impacts to natural resources.	Conservation Groups, Landowners	DEP, Private Sources, Foundations	High
4. Plug abandoned gas wells in the watershed to prevent brine water and abandoned mine drainage from entering the streams and potable water supplies.	Conservation Groups, Conservation Districts, DEP	DEP, Private Sources, Foundation	High

Goal 2-3: Minimize impacts from exploration, production, retirement, and abandonment of wells (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
5. Remove leaking underground fuel storage tanks.	Conservation Groups, Conservation Districts, DEP	DEP, Private Sources, Foundations	High
6. Organize third-party moderated discussions between surface and subsurface rights owners prior to beginning exploration, construction, and production activities to address and resolve issues.	Subsurface Rights Owners, Landowners, DEP	Private Sources, Foundations	Medium
7. Encourage cooperation between surface and subsurface rights owners to minimize conflicts and impacts to the natural resources.	Conservation Groups, Conservation Districts, DEP, Penn State Extension	DEP, Private Sources, Foundations	Medium

Goal 2-4: Identify and alleviate impacts and concerns caused by the exploration of natural gas within the Marcellus shale formation.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop a method for fracturing the Marcellus shale formations without contaminating millions of gallons of water, such as reusing fracturing water and/or utilizing reverse osmosis units to remove salts and heavy metals from production water.	Gas Companies, DEP, EPA, SRBC	Gas Companies, DEP, EPA	N/A*
2. Avoid potentially toxic substances in fracturing fluids and inform landowners about what substances are being used if and when they request the information.	Gas Companies, Landowners, Concerned Citizens, DEP, EPA	Gas Companies	N/A*
3. Treat fracking water at permitted facilities capable of treating the chlorides and toxins.	Gas Companies, Conservation Groups, DEP, EPA	Gas Companies	N/A*
4. Conduct an environmental impact assessment of potential Marcellus shale drilling sites in order to alleviate impacts before development activities occur.	Gas Companies, Conservation Groups, DEP, EPA	DEP, EPA, Private Sources, Foundations	N/A*
5. Conduct baseline water quality monitoring before, during, and after well drilling activities	Conservation Groups, Gas Companies, Landowners, DEP, EPA	Gas Companies, Private Sources, Foundations, DEP, EPA	N/A*
6. Adopt the precautionary principle when fracturing formations and conduct no fracturing above the base of groundwater until a guarantee that there will not be any harmful impacts to groundwater supplies.	Conservation Groups, PAGS, USGS, DEP, SRBC, EPA	DEP, EPA, Sinnemahoning Stakeholders Fund, Private Sources, Foundations	N/A*

Goal 2-4: Identify and alleviate impacts and concerns caused by the exploration of natural gas within the Marcellus shale formation (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
7. Monitor water withdrawal activities closely to ensure stream quality and quantities are protected and establish flow monitoring devices to assist in this task.	Conservation Groups, PAGS, USGS, DEP, SRBC, EPA	DEP, EPA, Sinnemahoning Stakeholders Fund, Private Sources, Foundations	N/A*
8. Host public meeting workshops prior to development activities to educate citizens about the process to alleviate their concerns.	Conservation Groups, DEP, Gas Companies	Gas Companies, Privates Sources, DEP, EPA	N/A*

Goal 2-5: Coordinate efforts among agencies, conservation groups, and industries in order to protect infrastructure and natural resources, while recovering natural gas within the Marcellus shale formation.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Work with legislators to establish a severance tax or severance fee on natural gas extraction to develop a fund to reimburse impacted municipalities for road infrastructures, remediate impacts caused by the recovery of natural gas, and cover Pennsylvania Department of Environmental Protection's administrative costs associated with permitting, inspections, and enforcement.	Legislators, Municipalities, Conservation Groups, DEP, EPA	DEP, EPA, Private Sources, Foundations	N/A*
2. Change bonding requirements for existing vertical wells to cover the likely higher plugging costs for Marcellus wells by working with neighboring states to establish sufficient bonding rates to cover the costs of plugging wells if abandoned.	Legislators, Conservation Groups, DEP, EPA	DEP, EPA, Private Sources, Foundations	N/A*
3. Work with Department of Environmental Protection to establish protection for Exceptional Value High Quality, and Wilderness Trout streams requiring individual permits for gas development providing the public an opportunity to review, comment, or request a public meeting about the proposed drilling activities or not permit the sites at all.	Conservation Groups, DEP, PFBC	DEP, PFBC, Private Sources, Foundations	N/A*
4. Evaluate the overall impacts to groundwater and surface water flows and place a cap on permits to prevent Total Maximum Daily Loads from being reached.	Conservation Groups, Conservation Districts, DEP, EPA, Gas Companies	DEP, USGS, Private Sources, Foundations	N/A*

Goal 2-6: Reclaim abandoned wells, mines, and quarries.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Reduce hazards, such as highwalls and mine drainage, on active and abandoned mine sites, and continue working with Pennsylvania Bureau of Abandoned Mine Reclamation to eliminate these hazards.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations	High

Goal 2-6: Reclaim abandoned wells, mines, and quarries (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
2. Implement strategies to remediate abandoned mine drainage, including the upgrading of treatment systems based on continued monitoring results and identifying discharges with suitable deposits of iron oxide recovery.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations	High
3. Conduct an assessment of abandoned mine drainage contamination and develop a prioritized remediation and implementation plan.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations	High
4. Continue support for industry reclamation incentives and expand current reclamation programs to implement higher quality reclamation techniques.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	High
5. Promote redevelopment of abandoned sites through programs similar to brownfield redevelopment.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	Medium
6. Inventory abandoned wells and mines, and plan for remediation.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	Medium

Goal 2-7: Work with the agricultural community to implement best management practices and maintain land for agricultural uses.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Promote conservation practices, such as cover crops, crop residue, contour strips, riparian buffers, barnyard stabilization, nutrient management planning, streambank fencing, and responsible pesticide/herbicide use.	NRCS, Municipalities, Conservation Districts, Conservation Groups, Cooperative Extension, PDA	DEP, NRCS, PDA, Private Sources, Foundations	High
2. Implement a riparian restoration program to install streambank fencing to exclude livestock from streams, stabilize stream crossings, provide alternative watering sources, and enhance riparian corridors with plantings of native species.	Conservation Groups, Conservation Districts, Cooperative Extension, Municipalities, PDA, NRCS	DEP, NRCS, PGC, Private Sources, Foundations	High
3. Encourage agricultural landowners to develop nutrient management plans to boost activity and protect water resources.	Conservation Districts, Conservation Groups, NRCS, Penn State Extension	DEP, EPA, Private Sources, Foundations, Cost Share Programs, PDA, NRCS	Medium
4. Encourage landowners to enroll in cost-incentive programs, such as Environmental Quality Incentive Program, Conservation Reserve Enhancement Program, Conservation Reserve Program, Agricultural Security Program, etc.	Conservation Groups, Cooperative Extension, Municipalities, Conservation Districts, NRCS	DEP, NRCS, PGC, Private Sources, Foundations	Medium

Goal 2-8: Work with forestland owners to implement best management practices on their property.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Enforce forestry and logging laws.	Logging Companies, Conservation Groups, DEP, DCNR – BoF, Conservation Districts	DCNR, DEP, Private Sources, Foundations	High
2. Forestland owners should work with a professional forester to manage their land in a sustainable way.	Forestland Owners, Foresters, DCNR, Penn State Extension	DCNR, Private Sources, Foundations	Medium
3. Forestland owners should develop a Forest Management Plan for their property.	Forestland Owners, DCNR	DCNR, Private Sources, Foundations	Medium

Goal 2-9: Identify, inventory, cleanup illegal dumpsites, and prosecute violators using illegal dumpsites.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Monitor dumpsites for recent activity and prosecute violators.	Conservation Groups, Police Departments, County Prosecutors, Counties, Solid Waste Authorities, PA CleanWays	Private Sources, Foundations	Medium
2. Encourage PA CleanWays to conduct illegal dump surveys in Cameron, Clearfield, Clinton, and Potter counties.	Conservation Groups, Counties, Solid Waste Authorities, PA CleanWays, PennDOT	DEP, Private Sources, Foundations	Medium
3. Establish PA CleanWays chapters or affiliates in Cameron, Clearfield, and Potter counties.	Conservation Groups, Civilian Groups, Solid Waste Authorities, PA CleanWays, PennDOT	DEP, Private Sources, Foundations	Medium

Goal 2-10: Promote local agricultural and forestry products, producers, markets, and related program.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage community support for small "family" farms through "Buy Local" campaigns and farmers markets.	Conservation Groups, Cooperative Extensions, Agricultural Land Owners, Citizens, PDA	Private Sources, Foundations	Medium
2. Promote the importance and economic viability of small farms through marketing, education, and creation of avenues for adding value to locally produced agricultural commodities.	Conservation Groups, Citizens, Cooperative Extensions, Agricultural Landowners, PDA	Private Sources, Foundations	Medium
3. Establish periodic peer-to-peer tours highlighting best management practices utilized by forest and agricultural landowners.	Conservation Districts, Conservation Groups, Cooperative Extensions, PDA, NRCS	DEP, Private Sources, Foundations	Low

Goal 2-11: Minimize the risk of injury, property damages, and financial hardship caused by inactive and abandoned mine sites.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Seal abandoned and inactive mine entrances to eliminate unauthorized access.	Conservation Districts, Conservation Groups, DEP	DEP, EPA, Private Sources, Foundations	Medium
2. Determine areas at risk for mine subsidence by mapping inactive, closed, and abandoned mines.	Landowners, DEP	DEP, Foundations, Private Sources	Medium
3. Homeowners with property susceptible to mine subsidence should secure insurance through the Pennsylvania Mine Subsidence Insurance Fund.	Landowners, DEP	DEP, Foundations, Private Sources	Low
4. Develop a web-based abandoned mine mapping database.	DEP, BAMR, OSM, WPCAMR	DEP, EPA, OSM, Private Sources, Foundations	Low

Water Resources

Goal 3-1: Reduce erosion and sedimentation and minimize impacts when they reach area waterways.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Establish a permit process requiring all earth moving industries to abide by the same erosion and sedimentation control standards, and strengthen requirements on steep sloped areas.	Conservation Groups, Conservation Districts, Legislators, Resource Extraction Industries, DEP, PDA	DEP, Legislature, Private Sources, Foundations	High
2. Incorporate environmentally sensitive construction and maintenance techniques on dirt and gravel roads.	Conservation Groups, Conservation Districts, Municipalities, DEP, PennDOT, DCNR-BoF	DEP, EPA, Private Sources, Foundations	High
3. Incorporate best management practices to control erosion and sedimentation in any earth moving activity, including farming, forestry, development, and mining industries.	Conservation Groups, Conservation Districts, DEP, NRCS	DEP, EPA, NRCS, Private Sources, Foundations	High
4. Conduct a watershed assessment to determine sources of sedimentation, and develop strategies to reduce impacts by implementing best management practices.	Conservation Groups, Conservation Districts, DEP	DEP, EPA, Private Sources, Foundations	Medium

Goal 3-2: Minimize potential flooding damages by taking a proactive approach to managing floodplains.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Discourage development of primary and secondary residences in floodplain areas.	Conservation Groups, Planning Commissions, Municipalities, SEO	PEMA, FEMA, Private Sources, Foundations	High
2. Establish adequate riparian area vegetation and floodplain integrity to limit degradation of water quality and biological resources, and identify areas where floodplains can be re-established.	Conservation Districts, Conservation Groups, Municipalities, PEMA, NRCS	NRCS, DEP, EPA, Private Sources, Foundations	High

Goal 3-2: Minimize potential flooding damages by taking a proactive approach to managing floodplains (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
3. Conduct a detailed flood-prone area assessment and update floodplain maps.	Municipalities, Planning Commissions, Conservation Groups, PEMA, FEMA	PEMA, FEMA, DCED, Private Sources, Foundations	Medium
4. Acquire properties that are frequently impacted by serious flooding and convert them into open spaces, such as parks or natural areas.	Conservation Districts, DEP, EPA, FEMA, PEMA, DCED	PEMA, FEMA, DCED, Private Sources, Foundations	Medium
5. Implement channel improvement projects that use natural stream channel design techniques and/or bioremediation techniques to decrease flooding.	Conservation Districts, Conservation Groups, PFBC, DEP	PFBC, DEP, Private Sources, Foundations	Medium

Goal 3-3: Utilize riparian corridors to improve water quality and wildlife habitat.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Establish, enhance, and maintain vegetated buffers along waterways as a cost-effective means of controlling non-point source pollution runoff, especially along Driftwood Branch and Portage Creek.	Conservation Groups, Conservation Districts, Landowners, DEP, PennDOT	DEP, EPA, NRCS, Private Sources, Foundations, Cost-Share Programs, Settlement funds	High
2. Encourage streamside property owners to maintain an adequate vegetative buffer from the edge of the stream.	Conservation Groups, Conservation Districts, Landowners, DEP, PennDOT	DEP, EPA, NRCS, Private Sources, Foundations, Cost-Share Programs	High
3. Conduct an assessment of streambanks and riparian areas, and prioritize areas in need of restoration.	Conservation Groups, Conservation Districts, Landowners, DEP, PennDOT	DEP, EPA, NRCS, Private Sources, Foundations, Cost-Share Programs, Settlement funds	Medium
4. Increase wildlife habitat by planting diverse native plant communities along riparian buffers.	Conservation Groups, Conservation Districts, Landowners, DEP, PFBC, USACE	DEP, EPA, NRCS, Private Sources, Foundations, Settlement funds	Medium

Goal 3-4: Protect wetlands.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage state acquisition of important wetlands for protection.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, DCNR, Private Sources, Foundations	High
2. Protect wetland habitats and surrounding buffers for birds and wildlife, as well as their ecological services value, by limiting development, stormwater runoff, and other disturbances.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, DCNR, Private Sources, Foundations	High
3. Enhance and promote programs that restore wetlands to agricultural and streamside areas of limited value.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, Private Sources, Foundations, settlement funds	Medium

Goal 3-4: Protect wetlands (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Modify municipal ordinances to protect wetland areas that are of biological importance.	Conservation Groups, Municipalities, Planning Commissions, DEP	DEP, DCED, Private Sources	Medium

Goal 3-5: Minimize abandoned mine drainage and impacts of abandoned mine drainage on area waterways.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage active mine sites to take precautions to prevent future discharges by conducting land liming, alkaline addition, and filling mine voids with fly ash.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM, EPA	DEP, EPA, OSM, Private Sources, Foundations	High
2. Address impacts from abandoned mine drainage in Sterling Run, West Creek, and Bennett Branch subwatersheds.	Conservation Groups, Conservation Districts, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations, settlement funds	Medium
3. Conduct an assessment of abandoned mine drainage contamination, and develop a prioritized remediation and implementation plan.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations	Medium
4. Identify areas where water is lost to underground mines, which contribute to the production of land voids, and develop remediation strategies.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM, EPA	DEP, EPA, OSM, Private Sources, Foundations	Medium
5. Implement strategies to remediate abandoned mine drainage, including upgrading treatment systems and identifying discharges with suitable deposits of iron oxide for recovery.	Conservation Districts, Conservation Groups, DEP, BAMR, OSM	DEP, EPA, OSM, Private Sources, Foundations, settlement funds	Medium

Goal 3-6: Monitor water quality and quantity.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Study and monitor the effects of well drilling and fracking on surface water and groundwater to determine impacts on water quality and quantity, and work to minimize those impacts.	Conservation Groups, Conservation Districts, DEP, Penn State Extension	DEP, EPA, Private Sources, Foundations, Settlement Funds	High
2. Develop a water budget in order to better understand the sources and amounts of water available and the types of development activity that can be supported with the available resources.	USGS, Conservation Groups, Conservation Districts, PFBC, DEP, Penn State Extension	USGS, DEP, EPA, Private Sources, Foundations	Medium
3. Encourage area residents to monitor groundwater levels in critical areas to be used as baseline data to determine loss of groundwater.	Conservation Groups, Conservation Districts, Citizens, Schools, Penn State Extension	DEP, EPA, Private Sources, Foundations	Medium
4. Develop a locally-based program for disseminating information about protecting private well supplies to homeowners; include information about bacteria in wells, since the issue is common in the region.	Conservation Groups, Conservation Districts, DEP, LWV, RWA, Penn State Extension	DEP, WREN, Private Sources, Foundations	Medium

Goal 3-6: Monitor water quality and quantity (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
5. Conduct source water or well-head protection plans, in order to identify and protect drinking water sources, especially in the Nanny Run area.	Conservation Groups, Conservation Districts, Municipalities, LWV, RWA	WREN, Private Sources, Foundations	Medium
6. Assess the need and desire for increased or improved public water supplies, especially in Driftwood.	Municipalities, Conservation Groups, DEP, RWA	DCED, Private Sources, Foundations	Low

Goal 3-7: Reduce impacts caused by point and non-point source impairments.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Install best management practices to decrease erosion and sedimentation along dirt and gravel roadways.	Conservation Groups, Municipalities, DEP, PennDOT	DEP, EPA, Private Sources, Foundations, settlement funds	High
2. Encourage the transfer of permit violation fees to Sinnemahoning Stakeholders Committee to be incorporated into the Sinnemahoning Watershed Grant Program.	Sinnemahoning Stakeholder Committee, Headwaters RC&D, DEP	DEP	Medium
3. Utilize and support updates to the Pennsylvania Non-Point Source Management Plan.	Conservation Groups, DEP, NRCS, PDA	DEP, Private Sources, Foundations	Medium
4. Determine the impacts on water quality of salt and ash used for snow/ice removal, and investigate alternatives. Install real-time monitoring devices.	Conservation Groups, Municipalities, Universities, PennDOT	DEP, EPA, PennDOT, Private Sources, Foundations	Medium

Goal 3-8: Conduct an assessment of natural and man-made impoundments, and implement recommendations to enhance their ecosystems.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Inventory dams for their uses, and evaluate maintenance versus removal of those dams, while considering public safety, recreation, and present use.	Conservation Groups, Conservation Districts, American Rivers, DEP, USACE	DEP, EPA, Private Sources, Foundations	Medium
2. Assess, control, monitor, and mitigate exotic species that directly affect lake uses.	Conservation Groups, Conservation Districts, DEP, PALMS	DEP, EPA, Private Sources, Foundations	Medium
3. Assess and inventory lakes and ponds in the watershed for size, use, water quality, and aquatic life.	Conservation Groups, Conservation Districts, DEP, PALMS, DCNR	DEP, EPA, DCNR, Private Sources, Foundations	Medium
4. Investigate the cause of the decreased flow to First Fork Sinnemahoning Creek and the George B. Stevenson Dam reservoir at Sinnemahoning State Park during Summer 2008, and implement conservation practices to prevent similar future events.	Conservation Groups, Conservation Districts, DEP, DCNR, PFBC, USACE, USGS	DEP, PFBC, DCNR, Private Sources, Foundations	Medium

Goal 3-8: Conduct an assessment of natural and man-made impoundments, and implement recommendations to enhance their ecosystems (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
5. Work with landowners where old dams are located to educate them about benefits of removing old dams, such as the Pickrick Dam in Driftwood.	Conservation Groups, American Rivers, DEP, PFBC	DEP, American Rivers, Private Sources, Foundations	Medium
6. Encourage operators to protect aquatic life and stream habitats by gradually discharging overflows from flood control structures.	Conservation Groups, USACE, DCNR, DEP, PFBC	USACE, PFBC, DCNR, Private Sources	Medium

Goal 3-9: Establish and implement water conservation practices to reduce water consumption.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Launch a watershed-wide water conservation program to educate the public about the value of reducing water consumption and utilizing water conservation products and techniques.	Conservation Groups, Conservation Districts, DEP, Penn State Extension	DEP, WREN, Private Sources, Foundations	Medium
2. Work with landowners and developers to incorporate environmentally friendly water conservation practices in their homes and businesses.	Conservation Groups, Developers, Legislators, DEP, Penn State	Private Sources	Medium
3. Establish guidelines that require installation of low-flow devices for all new construction.	Conservation Groups, Developers, Penn State, Legislators, DEP	DEP, Private Sources	Medium
4. Establish an ongoing program for regional schools to promote water conservation.	Conservation Groups, Conservation Districts, Schools, Penn State	DEP, Private Sources, Foundations	Medium
5. Promote and establish a program for retrofitting homes and businesses for water conservation practices through tax breaks, rebates, and other incentives.	Conservation Groups, Developers, Penn State Extension, Legislators, Landowners, DEP	DEP, Private Sources	Medium

Goal 3-10: Minimize impacts from stormwater through comprehensive stormwater management planning.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Incorporate water quality design and pollution reduction strategies in stormwater management, especially in Emporium and St. Marys where stormwater flows directly into the waterways.	Conservation Districts, Conservation Groups, Counties, Planning Commissions	DEP, DCED, Private Sources, Foundations, Sinnemahoning settlement funds	Medium
2. Develop and implement a watershed-wide stormwater management plan.	Conservation Districts, Conservation Groups, Planning Commissions, Municipalities, Counties	DEP, DCED, Private Sources, Foundations	Medium
3. Develop a demonstration area of stormwater best management practices that incorporates water quality improvement techniques.	Conservation Districts, Conservation Groups, Counties, Planning Commissions	DEP, DCED, Private Sources, Foundations, Sinnemahoning settlement funds	Medium

Goal 3-11: Develop a collaborative watershed monitoring plan, integrating quality assurance and quality control standards.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Establish watershed monitoring protocols to be used by each organization participating in watershed monitoring, and develop a centralized database where all monitoring data can be compiled and made available to the public and other groups.	Conservation Groups, Conservation Districts, DEP, PFBC, DCNR	DEP, EPA, Private Sources, Foundations, Sinnemahoning settlement funds	Medium
2. Incorporate school districts, community groups, and interested residents to participate in water quality monitoring programs, such as DCNR's Watershed Education Program. Install real-time monitoring devices.	Conservation Groups, Conservation Districts, Community Groups, Schools, Residents	DEP, WREN, Private Sources, Foundations, Sinnemahoning settlement funds	Medium
3. Conduct seasonal chemical, biological, and visual assessments for at least one year to provide background data for prioritization of future projects.	Conservation Groups, Conservation Districts, DEP, PFBC, DCNR	DEP, EPA, Private Sources, Foundations, settlement funds	Medium

Goal 3-12: Encourage and support alternative and traditional sewage treatment opportunities to reduce sewage pollution entering streams and groundwater.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Work with municipalities and landowners to install proper septic tanks, wastewater treatment systems, or other alternatives to reduce the amount of untreated sewage entering streams and groundwater.	Conservation Groups, Municipalities, Landowners, Municipal Authorities, DEP, DCED, SEO	DEP, DCED, Private Sources, Foundations	Medium
2. Establish county or regional wastewater management systems, providing alternative sewage treatment options in rural communities, similar to program established in Broadtop Township, Huntington County, Pa.	Conservation Groups, Municipalities, Landowners, Municipal Authorities, DEP, DCED, SEO	DEP, DCED, EPA, Private Sources, Foundations	Medium
3. Encourage municipalities with older Act 537 Sewage Facility Plans to update their plans to prepare for potential developments spurred by PA Wilds initiative.	Municipalities, Conservation Groups, Municipal Authorities, DEP, DCED	DEP, DCED, Private Sources, Foundations	Medium

Goal 3-13: Investigate methods to reduce impacts of acidic precipitation.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop a monitoring network to identify area streams impaired by acid precipitation and its effects on aquatic life. Install real-time water quality monitors.	Conservation Groups, Conservation Districts, Citizens, DEP	DEP, EPA, Private Sources, Foundations	Medium
2. Continue conducting the liming project on Laurel Run, while investigating alternative methods to increase the streams alkalinity.	Conservation Groups, Conservation Districts, DEP	DEP, EPA, Private Sources, Foundations	Medium
3. Conduct an alkalinity study and implement in-stream liming to adjust alkalinity levels, focusing on Medix Run, Mix Run, and headwater tributaries.	Conservation Groups, Conservation Districts, DEP	DEP, EPA, Private Sources, Foundations	Medium

Goal 3-14: Further investigate wetlands and their functions.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Protect hydrology supporting wetlands.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, Private Sources, Foundations	Medium
2. Update wetland maps and develop a digital coverage database.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP, PennDOT	DEP, Private Sources, Foundations	Medium
3. Inventory and assess the functionality of watershed wetlands, and develop restoration strategies based upon the assessment.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, DCNR, Private Sources, Foundations	Medium
4. Study the impacts that economic development has had on historical wetland loss.	Conservation Groups, Planning Commissions, DCNR, PGC, DEP	DEP, DCNR, DCED, Private Sources, Foundations	Low
5. Encourage interstate collaboration to standardize methods used to delineate and identify wetlands.	Conservation Groups, Legislators, DEP, EPA, USACE, PennDOT	EPA, USACE, DEP, Legislature	Low

Biological Resources

Goal 4-1: Implement best management practices to protect forest resources.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Promote tree plantings, sustainable harvesting, and other best management practices.	Conservation Groups, Landowners, DCNR, Penn State Extension	DCNR, Private Sources, Foundations	High
2. Encourage cooperation between conservation districts and state agencies to enforce regulations on the logging industry to minimize erosion and sedimentation.	Conservation Groups, Conservation Districts, Landowners, DCNR, DEP, Penn State	DCNR, Private Sources, Foundations	High
3. Discourage the use of high-grading practices, such as diameter-limit harvest and selective cutting, and encourage timber harvesters to use sustainable best management practices based upon forest type and size under the direction of a professional forester.	Conservation Groups, Landowners, DCNR, Penn State Extension	DCNR, Private Sources, Foundations	Medium
4. Work with woodland owner associations to educate the public, restore degraded areas, and develop demonstration areas.	Conservation Groups, Landowners, DCNR, Penn State Extension	DCNR, Private Sources, Foundations	Medium
5. Decrease forest fragmentation by maintaining contiguous forest tracts and/or travel corridors between existing non-contiguous forest tracts.	Conservation Groups, Sportsmen Groups, Landowners, DCNR,	DCNR, PGC, Private Sources, Foundations	Medium
6. Restore American chestnut populations; utilize on abandoned mine reclamation sites and in other habitat enhancement projects.	Conservation Groups, DCNR, BAMR, American Chestnut Foundation, Penn State		

Goal 4-2: Increase the use of native plants.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Promote native tree plantings in remediation projects, such as streambank fencing or streambank stabilization.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	High
2. Encourage the use of native plants in landscaping, wildlife habitat plantings, and educational activities.	Conservation Groups, Conservation Districts, DCNR, PennDOT	DCNR, Private Sources, Foundations	High
3. Promote native tree plantings as part of surface mine reclamation plans.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Medium
4. Conduct an assessment and develop a management plan for native species.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Medium
5. Establish a reserve seed bank of native species that can be used in remediation efforts.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Medium

Goal 4-3: Enhance aquatic habitats.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Incorporate aquatic habitat improvements into streambank stabilization and water quality remediation projects.	Conservation Groups, Landowners, DEP, PFBC, Conservation Districts	DEP, PFBC, Private Sources, Foundations, Sinnemahoning settlement funds	High
2. Improve aquatic habitat for fish, mussels, and other organisms by implementing best management practices and other restoration activities.	Conservation Groups, Landowners, DEP, PFBC, Conservation Districts	DEP, PFBC, Private Sources, Foundations	Medium
3. Increase habitat and passage for fish, mussels, and other aquatic organisms by removing dams on small tributaries and maintaining stable flow regimes.	Conservation Groups, Landowners, DEP, PFBC, USACE, Conservation Districts	DEP, PFBC, American Rivers, Private Sources, Foundations	Medium
4. Utilize volunteers to quantify the amount of large woody debris in key stream reaches and headwater areas.	Conservation Groups, Conservation Districts, PFBC, DEP	PFBC, DEP, Private Sources, Foundations	Low

Goal 4-4: Identify and protect important habitats for plant and animal species.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Identify high quality wetlands located in the watershed.	Conservation Groups, DCNR, DEP, PFBC	DCNR, DEP, Private Sources, Foundations	High
2. Encourage landowners of fallow fields to delay mowing until July to protect ground nesting sites.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC	DCNR, PFBC, Private Sources, Foundations	High

Goal 4-4: Identify and protect important habitats for plant and animal species (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
3. Identify and protect additional environmentally sensitive areas and areas of high biodiversity.	Conservation Groups, Landowners, PNHP, PFBC, DCNR	DCNR, PFBC, Private Sources, Foundations	Medium
4. Encourage a no mowing strategy for some fields in public ownership, allowing them to provide habitat for wildlife.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC	DCNR, PFBC, Private Sources, Foundations	Medium
5. Encourage farmers to delay the first hay harvest until July providing young wildlife the opportunity to mature, if economic situation permits.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC	DCNR, PFBC, Private Sources, Foundations	Medium
6. Monitor activities in critical habitat areas.	Conservation Groups, Landowners, DCNR	DCNR, PGC, Private Sources, Foundations	Medium
7. Maintain grassland species habitats on public lands through practices, such as controlled burns and limited mowing activity.	Conservation Groups, Landowners, PNHP, PFBC, DCNR	DCNR, PFBC, Private Sources, Foundations	Medium
8. Establish more private backyard conservation areas to serve as wildlife habitat and travel corridors by providing activities and programs for landowners.	Conservation Groups, Landowners, PNHP, PFBC, DCNR	DCNR, PFBC, Private Sources, Foundations	Medium
9. Preserve native habitats by using smart land use planning strategies as defined in the Project Area Characteristics section.	Conservation Groups, Landowners, PNHP, PFBC, DCNR	DCNR, PFBC, Private Sources, Foundations	Medium

Goal 4-5: Protect rare, threatened, and endangered species and their habitats.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop monitoring strategies and management plans for species of concern that are particularly vulnerable to habitat destruction.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC	DCNR, PFBC, PGC, Private Sources, Foundations	Medium
2. Protect or improve habitats that support species of concern through acquisition, easements, and/or landowner education.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC	DCNR, PFBC, PGC, Private Sources, Foundations	Medium
3. Appoint a liaison to work with a member of the PA Biological Survey to submit recent identification of rare, threatened, and endangered species within the watershed and to report the condition of these species' habitats.	Conservation Groups, Landowners, PNHP, PFBC, DCNR, PGC, PABS	DCNR, PFBC, Private Sources, Foundations	Medium

Goal 4-6: Identify Important Bird and Mammal Areas.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Identify specific recommendations to improve habitat related to Important Bird Areas and Important Mammal Areas.	Conservation Groups, Landowners, PGC, DCNR, Audubon Society	DCNR, PGC, Audubon Society, Private Sources, Foundations	Medium

Goal 4-6: Identify Important Bird and Mammal Areas (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
2. Partner with local Audubon chapters and birding clubs to identify, characterize, and recommend Important Bird Areas.	Conservation Groups, Landowners, DCNR, Audubon Society	DCNR, Audubon Society, Private Sources, Foundations	Medium
3. Identify and recommend Important Mammal Areas to expand upon areas already designated.	Conservation Groups, Landowners, PGC	DCNR, PGC, Private Sources, Foundations	Medium

Goal 4-7: Implement wildlife management practices to protect biodiversity.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Work with sportsmen's groups and landowners to increase public and private lands available for hunting.	Conservation Groups, Sportsmen Groups, Landowners, DCNR, PGC	PGC, Private Sources, Foundations	High
2. Support laws, regulations, and programs to maintain whitetail deer populations at levels that will ensure healthy forests, productive agricultural lands, and healthy deer populations.	Conservation Groups, Sportsmen Groups, DCNR, PGC	PGC, Private Sources, Foundations	High
3. Follow the goals and objectives, as well as elk habitat management practices, as identified in the *Management Plan for Elk in Pennsylvania* (PGC, 2006) when managing elk herds and habitat.	Conservation Groups, Sportsmen Groups, DCNR, PGC	DCNR, PGC, Private Sources, Foundations	Medium
4. Foster continued involvement in hunting activities among all age groups, and educate hunters on the importance of population control.	Conservation Groups, Sportsmen Groups, DCNR, PGC	PGC, Private Sources, Foundations	Medium
5. Promote and support deer management strategies, such as special hunting tags and deer exclosures.	Conservation Groups, DCNR, PGC	PGC, Private Sources, Foundations	Medium
6. Survey and develop management techniques for unique species, such as bald eagles, elk, timber rattlesnakes, bobcats, etc.	Conservation Groups, Landowners, DCNR, PGC, PFBC	PGC, Private Sources, Foundations	Medium
7. Study the occurrence of fern overabundance to determine causes; and develop an approach to restore natural biodiversity in those areas using integrated pest management and native plant restoration.	Conservation Groups, Sportsmen Groups, Landowners, DCNR, PGC	PGC, DCNR, Private Sources, Foundations	Medium
8. Encourage private landowners to register their land in Deer Management Assistance Program to keep deer herds at ecologically healthy levels.	Conservation Groups, DCNR, PGC	PGC, Private Sources, Foundations	Medium
9. Develop areas for wildlife viewing and education to raise awareness about biodiversity.	Conservation Groups, Landowners, DCNR, PGC	PGC, Private Sources, Foundations	High
10. Determine or confirm the presence of mountain lions within the watershed through hunter/landowner education and surveys, evidence documentation, etc.	Conservation Groups, Sportsmen Groups, Landowners, DCNR, PGC	PGC, Private Sources, Foundations	Low

Goal 4-8: Monitor and control invasive species, pests, and diseases.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Continue implementing invasive species control projects at known sites using caution not to disperse seeds and spread invasive species to other areas of the watershed.	Conservation Groups, Conservation Districts, Landowners, DCNR, PennDOT	DCNR, Private Sources, Foundations, USDA NRCS & APHIS, Sinnemahoning settlement funds	Medium
2. Develop a prioritized early detection and rapid response control strategy for removing invasive species (plant and animal) by partnering with public and private landowners.	Conservation Groups, Conservation Districts, DCNR, Landowners	DCNR, USDA NRCS & APHIS, Private Sources, Foundations,	Medium
3. Monitor riparian buffers for invasive species, and implement control practices.	Conservation Groups, Conservation Districts, Landowners, DCNR	DCNR, Private Sources, Foundations	Medium
4. Conduct a watershed-wide invasive species plant survey to develop a list of areas where invasive species pose the greatest threats to biodiversity.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Medium
5. Develop a demonstration project to control invasive species, and restore natural communities, while providing educational opportunities at Sinnemahoning, Sizerville, and Parker Dam State Parks.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Medium
6. Compile a publicly accessible Internet database of exotic and invasive species that allows moderated submissions from the public.	Conservation Groups, Conservation Districts, DCNR	DCNR, Private Sources, Foundations	Low
7. Develop a partnership and build on lessons learned from Natural Biodiversity and National Park Service invasive species control projects.	Conservation Groups, Conservation Districts, National Park Service, Natural Biodiversity, DCNR	DCNR, Private Sources, Foundations	Low

Goal 4-9: Identify and protect biologically diverse areas.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop an incentive program to encourage and reward landowners who develop management plans, decrease development, and employ other conservation practices in and around riparian corridors and biologically diverse areas.	Conservation Groups, Sportsmen Groups, Landowners, DCNR, PGC, DEP	DCNR, DEP, PGC, Cost-share Programs, Private Sources, Foundations	Medium
2. Restrict activities, such as grazing and off-road vehicles, and control invasive species within biological diversity areas.	Conservation Groups, Landowners, DCNR, PGC	DCNR, Private Sources, Foundations	Medium
3. Establish biodiversity indices for selected stream segments to document the current status of biodiversity and to track changes over time as management recommendations are implemented.	Conservation Groups, Sportsmen Groups, DCNR, DEP, PFBC, USFWS	DEP, DCNR, PFBC, PGC, USFWS, Private Sources, Foundations	Medium

Goal 4-9: Identify and protect biologically diverse areas (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Protect biological diversity areas through collaborative partnerships among the present owner, citizens, local organizations, and Pennsylvania Department of Transportation.	Conservation Groups, Landowners, DCNR, PGC, PennDOT	DCNR, Private Sources, Foundations, Sinnemahoning settlement funds	Medium
5. Work with utility companies to limit herbicide use and to utilize alternative management techniques in right-of-ways. Also, encourage DCNR to use integrated pest management techniques to reduce herbicide use on public lands.	Conservation Groups, DCNR, Utility Companies, Adjacent Landowners, PennDOT	DCNR, Private Sources, Foundations	Medium
6. Refine information on Biological Diversity Areas contained in County Natural Heritage Inventories.	Conservation Groups, Counties, DCNR, PNHP, PGC, PFBC	DCNR, Private Sources, Foundations	Medium
7. Implement strategies to improve habitat within Biological Diversity Areas.	Conservation Groups, Landowners, DCNR	DCNR, Private Sources, Foundations, Sinnemahoning settlement funds	Medium
8. Develop new biotic study areas throughout the watershed, and encourage local schools to utilize this resource, thereby fulfilling state curriculum requirements and broadening educational understanding of ecological resources.	Conservation Groups, Landowners, Universities, School Districts, DCNR, PGC	DCNR, Universities, Private Sources, Foundations	Medium
9. Develop a land steward program for Biological Diversity Areas through which volunteers would be responsible for regular monitoring of these areas and educating landowners.	Conservation Groups, Landowners, DCNR, PGC	DCNR, Private Sources, Foundations	Low

Goal 4-10: Develop, adopt, and implement management plans to protect forest and wildlife resources.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage planning departments to adopt and utilize management plans that protect forest landscapes.	DCNR, Landowners, Conservation Groups, Planning Departments	DCNR, Private Sources, Foundations	Medium
2. Conduct studies in conjunction with the Pennsylvania Natural Heritage Program to monitor biodiversity, including surveys for historical species of concern, for which the current status is unknown.	Conservation Groups, Sportsmen Groups, DCNR, PGC, PNHP	DCNR, Private Sources, Foundations	Medium
3. Encourage landowners to utilize available programs and resources, such as the Private Landowner Assistance Program (PLAP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentive Program (EQUIP), habitat management department of PFBC and PGC, Portage Creek train derailment settlement grant programs through DEP and PFBC, Conservation Reserve Enhancement Program (CREP), and the Service Forester Program of DCNR.	PGC, PFBC, DCNR, DEP, USDA-NRCS & RC&D, PDA, County FSAs	PGC, PFBC, DCNR, DEP, USDA-NRCS & RC&D, Sinnemahoning settlement monies	Medium

Goal 4-10: Develop, adopt, and implement management plans to protect forest and wildlife resources (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Encourage the development and use of forest stewardship or forest management plans and participation in the Pennsylvania Forest Stewardship Program and/or the Tree Farm Program.	DCNR, Landowners, Conservation Groups, Planning Departments	DCNR, Private Sources, Foundations	Medium
5. Develop detailed management plans for landowners of biologically diverse areas, including inventories of natural features and invasive or exotic species monitoring and control plans.	Conservation Groups, Landowners, PGC, DCNR, PNHP	DCNR, PGC, Private Sources	Medium
6. Develop wildlife management plans.	Conservation Groups, Landowners, PGC, DCNR	DCNR, PGC, Private Sources	Medium
7. Encourage landowners to contact a Pennsylvania Game Commission biologist to develop a wildlife management plan for their property.	Conservation Groups, Landowners, PGC, DCNR	PGC, Private Sources	Low
8. Conduct a more detailed assessment of the Kojancic tract and develop a plan to manage the site.	Conservation Groups, DCNR, PNHP, PGC, PFBC	DCNR, Private Sources, Foundations	Low

Goal 4-11: Implement strategies to conserve rare and unique plant and animal communities.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Conduct an eastern hellbender salamander survey on Driftwood Branch, initially, and continue investigation to other streams of the watershed to determine population distribution.	Pittsburgh Zoo, Conservation Groups, Conservation Districts, PFBC	PFBC, USFWS, Sinnemahoning settlement funds, Private Sources, Foundations	High
2. Further investigate the unique features of the cranberry bogs, sundew colonies, and pitcher plants near Wallace Run and Beaver Dam Run.	Conservation Groups, Conservation Districts, DCNR	DCNR, USFWS, PFBC, Private Sources, Foundations	Medium
3. Study biodiversity and habitat features and foster an appreciation of the old growth forest areas within the watershed, including the Johnson Run Natural Area, Lower Jerry Run Natural Area, and the Wykoff Run Natural Area within the Quehanna Wild Natural Area.	Conservation Groups, Conservation Districts, DCNR, PFBC, PGC	DCNR, USFWS, Private Sources, Foundations	Medium
4. Further investigate the palustrine forest habitat found in the headwaters of Medix Run.	Conservation Groups, Conservation Districts, DCNR, PGC	DCNR, USFWS, Private Sources, Foundations	Low
5. Identify and study unique wildflower communities, such as those in the Cowley Run subwatershed.	Conservation Groups, Conservation Districts, DCNR	DCNR, USFWS, Private Sources, Foundations	Low
6. Conduct biological surveys for and restore native species of the watershed, including but not limited to native aquatic species, such as American eel, shad, and salmon.	Conservation Groups, Conservation Districts, DCNR, PGC, PFBC, Schools	DCNR, USFWS, Private Sources, Foundations, Sinnemahoning settlement funds	N/A*

Cultural Resources

Goal 5-1: Encourage environmentally sound practices when operating recreational vehicles, and enforce existing laws to minimize intrusions on private lands.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Prohibit the use of recreational vehicles in areas at risk of being affected by their use, such as steep slopes, streambanks, stream crossings, and habitat for rare, threatened, or endangered species.	Conservation Groups, Police Departments, Municipalities, Counties, PGC, DCNR	DCNR, PGC, Private Sources, Foundations	High
2. Increase enforcement of illegal off-road vehicle use on private and public lands.	Municipalities, Counties, Police Departments, DCNR	Police Departments, Municipalities	High
3. Monitor the use of recreational vehicles to minimize their impacts on the environment.	Conservation Groups, Conservation Districts, Municipalities, DEP	DCNR, DEP, Private Sources, Foundations	High
4. Establish off-road vehicle rider education courses.	Conservation Groups, Riding Clubs, DCNR	DCNR, Private Sources, Foundations	Medium
5. Establish environmentally sound public trails or parks for off-road vehicles.	Conservation Groups, Counties, Recreational Vehicle Riding Clubs, Municipalities, DCNR	DCNR, DEP, Private Sources, Foundations	Medium
6. Conduct feasibility studies for the development of recreational areas and trails for off-road vehicles.	Recreational Vehicle Riding Clubs, Counties, Conservation Groups, Municipalities, DCNR	DCNR, Private Sources, Foundations	Medium
7. Work with dealerships to offer incentives for customers attending riding etiquette and safety programs.	Businesses, Riding Clubs, Recreational Vehicle Conservation Groups, DCNR	DCNR, Businesses, Private Sources, Foundations	Low

Goal 5-2: Highlight and preserve historical sites and promote an appreciation for local history.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Install informative and interpretive signage to promote education and stewardship and deter vandalism. In particular, install signage at the site of 400 coke ovens in the Bennett Branch subwatershed.	Municipalities, Citizens, Historical Societies, DCNR	DCNR, Private Sources, Foundations	Medium
2. Increase awareness of the watershed's historical Native American culture and lumbering heritage.	Historical Societies, Ancestors, Schools	Private Sources, Foundations	Medium
3. Establish driving, walking, and/or biking tours that highlight local history.	Municipalities, Citizens, Historical Societies, DCNR	Private Sources, Foundations	Medium
4. Preserve historical sites and landmarks, and educate about historical significance through interpretive signage.	Municipalities, Citizens, Historical Societies, PHMC	Private Sources, Foundations	Medium

Goal 5-2: Highlight and preserve historical sites and promote an appreciation for local history (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
5. Incorporate local history into classes taught at local school districts to foster an appreciation and understanding of cultural and historical legacies.	Schools, Historical Societies	Private Sources, Foundations	Medium
6. Inventory historical sites throughout the watershed.	Municipalities, Historical Societies	Private Sources, Foundations	Medium
7. Work with Pennsylvania Historical and Museum Commission, individuals, and agencies to determine if local historical sites and structures would qualify for the National Register.	Municipalities, Historical Societies, PHMC	Private Sources, Foundations	Medium

Goal 5-3: Promote and manage tourism.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Support local tourism promotion agencies' efforts to highlight recreational opportunities, as well as cultural tourism and local businesses.	Conservation Groups, DCNR, TPA	TPA, DCNR, Private Sources, Foundations	Medium
2. Conduct an economic impact study of recreational activities to determine revenue from tourism.	Conservation Groups, Businesses, DCNR, TPA	DCNR, Private Sources, Foundations	Medium
3. Support the efforts of PA Wilds Planning Team and Cameron County Chamber of Commerce in their efforts to establish a co-op with the artisan network connection to natural resources.	Artisans, PA Wilds Workgroups, TPA	Private Sources, Foundations	Medium
4. Promote the new tourism centers, Elk Country Visitor Center and Sinnemahoning State Park Education Center, and market locally-made products and services. Use the PA Wilds Resource Center for assistance (Appendix Q).	Conservation Groups, Businesses, PA Wilds Artisan Workgroup, TPAs, DCNR	DCNR, Private Sources, Foundations	N/A*

Goal 5-4: Link recreational facilities.

Method to achieve goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop highway bike/hike trails, connecting communities by enhanced existing roadways.	Conservation Groups, Counties, Municipalities, PennDOT	DCNR, PennDOT. Private Sources, Foundations	Medium
2. Explore the possibility of connecting railroad corridors and trails from surrounding areas to existing trails.	Municipalities, Conservation Groups, Counties	DCNR, Private Sources, Foundations	Medium
3. Establish a network of multi-use trails by connecting existing and new recreational trails.	Municipalities, Conservation Groups, Counties	DCNR, DCED, Private Sources, Foundations	Medium
4. Establish greenway corridors and trails in the watershed to connect activity hubs and greenways for public use.	Conservation Groups, Conservation Districts, Counties	DCNR, Private Sources, Foundations	Low

Goal 5-5: Establish a balanced tourism industry, supplying adequate infrastructure to cover demand without changing the character of the region.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Establish a visitor's guide, informing potential visitors about what resources are available and where they are located, including gas stations, public restrooms, restaurants, hospitals, fire stations, police stations, and pay phones.	Counties, Chambers of Commerce, Planning Departments, Municipalities, DCNR, TPA, PennDOT	DCNR, TPA, Private Sources, Foundations	Medium
2. Establish small, locally-owned businesses, as opposed to chain franchises, to address the needs of residents and visitors to the region. Utilize the PA Wilds Resource Center for assistance (Appendix Q).	Citizens, Chambers of Commerce, Planning Departments, Municipalities	Private Sources, Foundations	Medium
3. Enhance visitor resources, such as restaurants, gas stations, motels, and public restrooms and their availability.	Citizens, Chambers of Commerce, Planning Departments, Municipalities, DCNR	DCNR, Private Sources, Foundations	Medium
4. Establish an environmental education center at Sinnemahoning State Park.	Conservation Groups, DCNR	DCNR, Private Sources, Foundations	Low

Goal 5-6: Enhance recreational opportunities for sportsmen and outdoor enthusiasts.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Establish a water trail by identifying and establishing public access points for canoeing and kayaking, along Bennett Branch, First Fork, Driftwood Branch, and Sinnemahoning Creek mainstem that includes maps and signage.	Conservation Groups, Citizens, Businesses, Municipalities, PFBC, DCNR, TPA	PFBC, DCNR, Private Sources, Foundations, Settlement Funds	Medium
2. Encourage private landowners to participate in programs, opening their land to public hunting or to allow hunting by written permission on their property.	Conservation Groups, Sportsmen, Landowners, PGC	PGC, Private Sources, Foundations	Medium
3. Work with private landowners to provide access to waterways for anglers and small, non-powered watercraft.	Conservation Groups, Landowners, PFBC, DCNR	PFBC, DCNR, Private Sources, Foundations, Settlement Funds	Medium
4. Establish a public waterway access plan by working with elected officials, municipalities, sportsmen, conservation groups, state agencies, landowners, and railroad officials.	Municipalities, Conservation Groups, Elected Officials, Planning Departments, Railroad Officials, PFBC, PGC, DCNR, PennDOT	PFBC, Private Sources, Foundations, Settlement Funds	Medium
5. Expand educational programs and recreational opportunities at Sinnemahoning, Sizerville, Parker Dam, and Hemlock Springs to provide services year-round.	Conservation Groups, Environmental Education Facilities, DCNR	DCNR, Private Sources, Foundations	Low
6. Enhance camping experiences through facility and program updates, encouraging more visitors to experience the natural environment.	Conservation Groups, Businesses, DCNR	PFBC, DCNR, Private Sources, Foundations	Low

Goal 5-6: Enhance recreational opportunities for sportsmen and outdoor enthusiasts (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
7. Establish a Pennsylvania Wilds Explorer recognition award after completing a set of criteria, such as Susquehannock Trail Club's Circuit Hiker Award or Allegheny Geocoin.	Conservation Groups, PA Wilds Planning Team, DCNR, TPA	TPA, DCNR, Private Sources, Foundations	N/A*

Goal 5-7: Improve recreational facilities, and ensure availability and access.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage and educate visitors to utilize recreational resources available to the public and respect private property owner rights. Establish friends groups of state parks, state forests, and natural areas.	Conservation Groups, Municipalities, Sportsmen, Landowners	DCNR, Private Sources, Foundations, Settlement Funds	Medium
2. Provide and enhance amenities, such as bathrooms and parking lots, at recreational facilities, including trail heads and municipal parks.	Community Groups, Municipalities, PFBC, DCNR	DCNR, PFBC, Private Sources, Foundations, Settlement Funds	Medium
3. Utilize Sinnemahoning Creek, First Fork, Driftwood Branch, and Bennett Branch resources for recreational opportunities.	Conservation Groups, Businesses	DCNR, Private Sources, Foundations, Settlement Funds	Medium
4. Maintain existing public lands for recreational purposes and closely monitor the impacts of the local communities before adding additional public lands to the state.	Conservation Groups, Citizens, DCNR, PGC, PFBC	DCNR, Private Sources, Foundations, Settlement Funds	Low
5. Redevelop recreational facilities for multiple uses, providing a variety of activities and amenities.	Municipalities, Park and Recreation Authorities, Citizens, DCNR	DCNR, Private Sources, Foundations	Low
6. Update equipment and safety features at existing community and state parks.	Municipalities, Park and Recreation Authorities, Citizens, DCNR	DCNR, Private Sources, Foundations	Low

Goal 5-8: Enhance and expand trails.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Conduct a feasibility study, investigating the preservation of railroad corridors for uses, such as rails-to-trails, that preserve these corridors and offer recreational opportunities.	Conservation Groups, Historical Societies, Municipalities, Civic Groups, Landowners, Trail Groups	DCNR, Private Sources, Foundations	Medium
2. Establish a rail tour highlighting scenery and history of the railroad.	Historical Societies, Conservation Groups, Railroad Companies	DCNR, Private Sources, Foundations	Medium
3. Increase maintenance to provide trail corridors free of debris and hazards for a safer recreational opportunity.	Trail Groups, Civic Groups, Conservation Groups, DCNR	DCNR, Private Sources, Foundations	Low

Goal 5-8: Enhance and expand trails (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Establish well-defined trailheads, including amenities, such as parking lots and restrooms.	Trail Groups, Civic Groups, Conservation Groups, DCNR	DCNR, DCED, Private Sources, Foundations	Low
5. Develop or designate certain areas of trails for specific uses, such as off-road vehicle riding, snowmobiling, hiking, biking, and horseback riding.	Conservation Groups, Trail Groups, Civic Groups, Riding Clubs, DCNR, PGC	DCNR, Private Sources, Foundations	Low

Goal 5-9: Expand awareness, appreciation, and support for the arts.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Increase awareness for the visual and performing arts, especially as it relates to nature art.	Businesses, Schools, Universities, Cultural Council, Local Artists	Private Sources, Foundations	Low
2. Broaden quantity and quality of the volunteer pool to support the arts.	Citizens, Schools, Universities	Private Sources, Foundations	Low

Education and Funding

Goal 6-1: Educate recreation users about proper and safe practices.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate off-road vehicle operators to recreate in an environmentally sound manner.	Conservation Groups, Recreational Vehicle Riding Clubs, DCNR	DCNR, Private Sources, Foundations	High
2. Educate hunters, fishermen, and other outdoor enthusiast on the importance of land etiquette.	Conservation Groups, Sportsmen Groups, PFBC, PGC, DCNR	PFBC, PGC, Private Sources, Foundations	Medium
3. Educate sportsmen about areas open to public usage, providing detailed maps of public-use areas.	Conservation Groups, Sportsmen Groups, PFBC, PGC, DCNR	PFBC, PGC, Private Sources, Foundations	Medium

Goal 6-2: Increase awareness about the benefits of riparian corridors.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate landowners about the value of riparian buffers.	Conservation Groups, DEP, NRCS, PFBC, PGC, USDA, EPA	EPA, DCNR, NRCS, PFBC, PGC, USDA, Private Sources, Foundations	High
2. Conduct outreach, education, and implementation programs on cost share and easements for streamside corridor conservation.	Conservation Groups, DEP, NRCS, PFBC, PGC, USDA, EPA	EPA, DCNR, NRCS, PFBC, PGC, USDA, Private Sources, Foundations	High
3. Promote the preservation and enhancement of vegetated streamside buffers through education about their benefits for wildlife, water quality, and flood prevention.	Conservation Groups, DEP, NRCS, PFBC, PGC, USDA, EPA	EPA, DCNR, NRCS, PFBC, PGC, USDA, Private Sources, Foundations	High

Goal 6-2: Increase awareness about the benefits of riparian corridors (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
4. Educate watershed stakeholders about the importance of riparian corridors, and encourage establishment of riparian buffers.	Conservation Groups, DEP, NRCS, PFBC, PGC, USDA, EPA	EPA, DCNR, NRCS, PFBC, PGC, USDA, Foundations	Medium

Goal 6-3: Increase awareness about water quality, quantity, and conservation practices.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate citizens on the importance of water quantity and the benefits of water conservation.	Conservation Districts, Conservation Groups, DCNR, Penn State	DEP, Private Sources, Foundations	High
2. Develop and implement educational outreach programs for private well owners, specifically concerning sole source aquifer protection programs and protecting ground water supplies.	Conservation Groups, Conservation Districts, Landowners, DEP, RWA, DCNR, Penn State	DEP, Private Sources, Foundations	High
3. Educate homeowners about the effects of the overuse of fertilizers, pesticides, and herbicides on groundwater.	Conservation Groups, Conservation Districts, Landowners, DCNR, Penn State	DEP, Private Sources, Foundations	High
4. Promote groundwater quality awareness when conducting education and outreach programs, and provide information about potential threats to water supplies.	Conservation Groups, Municipalities, Water Suppliers, Penn State, Conservation Districts, DCNR	DEP, DCED, EPA, Private Sources, Foundations	Medium
5. Educate community residents and water suppliers about potential threats to the public water supply.	Conservation Groups, Conservation Districts, Water Suppliers, DCNR, Penn State	DEP, Private Sources, Foundations	Medium
6. Educate homeowners about the significance of water-use designations and ways to minimize non-point source pollution.	Conservation Groups, Conservation Districts, Citizens, Penn State	DEP, Private Sources, Foundations	Medium

Goal 6-4: Educate stakeholders about the value and importance of wetlands.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop or expand outreach programs on the function and value of wetlands.	Conservation Groups, DEP, EPA	DEP, EPA, Private Sources, Foundations	Medium
2. Educate municipal, county, state, and federal officials about planning and implementation of wetland mitigation.	Conservation Groups, Municipalities, DEP, EPA	DEP, EPA, Private Sources, Foundations	Medium
3. Partner with local conservation districts to educate stakeholders about ways to reduce erosion and sedimentation through wetland development.	Conservation Groups, Conservation Districts, Citizens, DEP, NRCS	DEP, EPA, NRCS, Private Sources, Foundations	Medium
4. Develop an education program addressing flood issues, flood prevention, flood recovery, and floodplain protection.	Conservation Groups, Municipalities, PEMA	DEP, EPA, PEMA, FEMA, Private Sources, Foundations	Medium

Goal 6-5: Increase awareness of services available to assist agricultural and forest landowners in managing their lands effectively.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate loggers, landowners, and municipal officials about forestry best management practices, sustainable forestry management, and sustainable forestry certification through workshops and other programs.	Conservation Groups, Landowners, Foresters, DCNR, USFS	DCNR, Private Sources, Foundations	Medium
2. Educate agricultural landowners, through workshops and other programs, to manage lands in a sustainable and financially efficient way, by utilizing best management practices and new technology.	Conservation Groups, Conservation Districts, Landowners, NRCS, PDA, USDA	DEP, Private Sources, Foundations	Medium
3. Educate forestland owners, by providing them with accurate information regarding sound silviculture practices, forest management plan development, and insect and disease management.	Conservation Groups, Landowners, Foresters, DCNR	DCNR, Private Sources, Foundations	Medium

Goal 6-6: Educate stakeholders how land-use planning can be effective.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Provide public education and awareness programs about the economic benefits and importance of watershed protection.	Citizens, Conservation Groups, Conservation Districts	DEP, DCNR, Private Sources, Foundations	High
2. Encourage and provide education sessions for municipal officials on integrated land-use planning, habitat conservation, and biodiversity.	Municipalities, Conservation Groups, DCED, PSAT, PSAB	DCED, PSAT, PSAB, Private Sources, Foundations	High
3. Host workshops to educate and encourage municipal officials to create, review, update, and enforce ordinances that support watershed-wide planning; provide sample ordinances to municipalities.	Municipalities, DCED, PSAT, PSAB	DCED, PSAT, PSAB, Private Sources, Foundations	Medium
4. Conduct workshops, seminars, and demonstrations for decision-makers, from developers to government leaders, emphasizing best management practices.	Municipalities, Developers, Conservation Groups, DEP, DCNR	DEP, DCNR, Private Sources, Foundations	Medium
5. Increase municipal awareness of the values of preserving, protecting, and restoring the natural resources within the watershed, and promote inter-municipal cooperation.	Municipalities, Conservation Groups, Conservation Districts	DCED, DCNR, DEP, Private Sources, Foundations	Medium
6. Provide required workshops and/or training sessions on sustainable maintenance practices.	Municipalities, Conservation Groups, DCED, PSAT, PSAB	DCED, PSAT, PSAB, Private Sources, Foundations	Medium
7. Educate residents and developers about environmentally friendly development practices, such as Smart Growth or Conservation by Design.	Municipalities, Developers, Citizens, Conservation Groups, DEP, DCNR	DEP, Private Sources, Foundations	Medium

Goal 6-6: Educate stakeholders how land-use planning can be effective (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
8. Provide educational programs for municipal and county officials about land-use planning and other tools that incorporate conservation goals into making communities more attractive and protecting biodiversity.	Conservation Groups, Conservation Districts, Municipal and County Officials	DEP, Private Sources, Foundations	Medium
9. Educate taxpayers about the connection between taxes and available services and how their tax dollars are being spent.	Citizens, Elected Officials, Municipalities, DCED, PSAT, PSAB	DCED, PSAT, PSAB, Private Sources, Foundations	Medium

Goal 6-7: Increase awareness of the importance of biodiversity and protecting wildlife habitats.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate citizens about biological diversity and the vital importance of conserving habitats and protecting species.	Conservation Groups, PGC, DCNR, USFWS	DCNR, Private Sources, Foundations	Medium
2. Provide educational field trips to elected officials, emphasizing natural resources and the value of those resources to the region.	Conservation Groups, Elected Officials, PGC, DCNR, USFWS	DCNR, Private Sources, Foundations	Medium

Goal 6-8: Increase funding to address issues important to Sinnemahoning Creek watershed communities.

Project Area

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Increase lobbying and funding support for watershed projects and the environment in federal and state budgets.	Conservation Groups, Legislators, DEP, DCNR	DEP, DCNR, Conservation Groups, Legislature, Private Sources	High
2. Increase funding available to provide sustainable maintenance practices on roadways, including the dirt and gravel roads program.	Municipalities, Penn State Dirt & Gravel Road Program, Conservation Groups, PennDOT	DEP, PennDOT, Private Sources	High
3. Increasing funding available to support the administrative needs of watershed organizations.	Conservation Groups, DEP, DCNR	Privates Sources, Foundations	Medium
4. Increase funding for libraries, so services can be expanded, and establish bookmobile routes to rural areas.	Municipalities, Citizens	Private Sources, Foundations	Medium
5. Identify additional funding to install dry hydrants.	Municipalities, Fire Departments, DEP, EPA	DCED, DEP, EPA, Private Sources, Foundations	Medium

Goal 6-8: Increase funding to address issues important to Sinnemahoning Creek watershed communities (continued).

Land Resources

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Identify additional local, state, and federal funding for the implementation of agricultural best management practices.	Conservation Groups, NRCS, USDA, PDA	DEP, NRCS, USDA, PDA, EPA, Private Sources, Foundations	Medium
2. Identify and secure funding to adequately support efforts to identify and remove illegal dumpsites, address waste disposal needs, and assist curbside recycling programs.	Conservation Groups, PA CleanWays, Municipalities, Civic Groups	DEP, Private Sources, Foundations	Medium
3. Increase funding to assist groups in hosting cleanup events, educating residents about illegal dumping and expanding recycling programs.	Conservation Groups, PA CleanWays, Municipalities, Civic Groups	DEP, Private Sources, Foundations	Medium
4. Increase funding to establish conservation easements and secure their continual existence as a conservation tool.	Conservation Groups, DEP, DCNR	DEP, Private Sources, Foundations	Medium
5. Increase financial and technical assistance to small-scale agriculture operations to increase economic viability and environmental responsibility.	Conservation Groups, NRCS, USDA, PDA	DEP, NRCS, USDA, PDA, EPA, Private Sources, Foundations	Medium

Water Resources

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Identify funding for stream restoration, including riparian buffer establishment, streambank stabilization, and invasive species removal.	Conservation Groups, DEP, EPA, NRCS, USDA, PGC, PFBC	DEP, EPA, Cost-share Programs, Private Sources, Foundations	Medium
2. Lobby for increased state and federal funding for the implementation of adequate sewage treatment facilities and septic upgrade programs.	Sewage Authorities, Landowners, Municipalities, Conservation Groups, DEP, EPA, DCED	DCED, DEP, EPA, Private Sources, Foundations	Medium
3. Increase local and state funding to continue watershed monitoring efforts.	Conservation Groups, DEP, EPA, PFBC	DEP, EPA, Private Sources, Foundations	Medium
4. Establish and/or continue cost-share programs and grants to assist homeowners in septic repair, maintenance, and replacement.	Municipalities, Sewage Authorities, DCED, DEP	DCED, DEP, EPA, Private Sources, Foundations	Medium

Biological Resources

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop incentives to encourage the forestry industry to utilize best management practices.	Landowners, Conservation Groups, USFS, DCNR	USFS, DCNR, Private Sources, Foundations	Medium
2. Increase funding to implement invasive species control strategies.	Conservation Groups, USFS, DCNR	USFS, DCNR, Private Sources, Foundations	Medium

Goal 6-8: Increase funding to address issues important to Sinnemahoning Creek watershed communities (continued).

Cultural Resources

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Identify additional unrestricted funding for development and projects of Bennett Branch, Bucktail, and First Fork watershed associations.	Conservation Groups, Conservation Districts	Private Sources, Foundations	Medium
2. Secure local, state, federal, and private funding to provide environmental education programs for elected officials, watershed residents, businesses, and school-aged children.	Conservation Groups, School Districts, Citizens	DEP, EPA, Private Sources, Foundations	Medium
3. Determine needs and find ways to support local environmental educators.	Conservation Groups, Conservation Districts, Schools	DEP, EPA, Private Sources, Foundations	Medium
4. Advocate increased funding for environmental education.	Conservation Groups, Schools	DEP, EPA, Private Sources, Foundations	Medium

Goal 6-9: Increase funding to maintain and enhance existing recreational facilities and opportunities.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Increase funding for maintaining multi-use recreation.	Municipalities, Counties, Park & Recreation Authorities	DCNR, Private Sources, Foundations	Medium
2. Increase funding for establishing and maintaining trails and trail heads.	Municipalities, Counties, Park & Recreation Authorities	DCNR, Private Sources, Foundations	Medium
3. Increase funding to establish and maintain waterway access points.	Municipalities, Counties, Park & Recreation Authorities	DCNR, Private Sources, Foundations	Medium

Goal 6-10: Increase awareness of water quality issues affecting communities.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate municipal and county officials about planning for stormwater best management practice implementation.	Conservation Groups, Municipalities, Counties, DEP	DEP, Private Sources, Foundations	Medium
2. Encourage school districts to work with conservation groups and agencies to educate students about watersheds.	Conservation Groups, Conservation Districts, School Districts, DCNR	Private Sources, Foundations	Medium
3. Educate homeowners about alternative sewage treatment systems, proper testing, and maintenance of existing on-lot sewage systems.	Municipalities, Conservation Groups, Municipal Authorities, SEO, DEP, DCED	DEP, DCED, Private Sources, Foundations	Medium
4. Conduct outreach campaigns to educate watershed residents about land uses in their communities.	Conservation Groups, Conservation Districts, Cooperative Extensions	DEP, Private Sources, Foundations	Medium

Goal 6-10: Increase awareness of water quality issues affecting communities (continued).

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
5. Expand the environmental education roles of Bennett Branch, Bucktail, and First Fork watershed associations.	Conservation Groups, Conservation Districts, School Districts	Private Sources, Foundations	Medium
6. Utilize media, such as newspapers, radio stations, and television stations, to recruit increased public participation in projects and promote educational messages.	Conservation Groups, Conservation Districts, Media	DEP, Private Sources, Foundations	Medium
7. Promote environmental education campaigns, such as "Everybody Lives Downstream" and storm drain stenciling.	Conservation Groups, Conservation Districts, DEP	Private Sources, Foundations	Medium

Goal 6-11: Increase awareness of impacts from litter, illegal dumps, and abandoned vehicles.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Encourage proper disposal of household hazardous waste, by providing recycling workshops and other educational outreach programs.	Conservation Groups, PA CleanWays, Municipalities, DEP, DCNR	DEP, Private Sources, Foundations	Medium
2. Educate citizens about traditional and innovative ways to reduce, reuse, and recycle.	Conservation Groups, PA CleanWays, Citizens, DCNR	DCNR, Private Sources, Foundations	Medium
3. Renew public interest in litter control education.	Conservation Groups, Civic Groups, Citizens, School Districts, Municipalities, PA CleanWays, DEP, DCNR	DEP, Private Sources, Foundations	Medium
4. Educate citizens about the impacts illegal dumping has on water quality and the environment, aesthetics, health and human safety, and the economy.	Conservation Groups, PA CleanWays, Municipalities, DEP, DCNR	DEP, Private Sources, Foundations	Medium
5. Educate residents about safety, human health, and environmental impacts caused by unlicensed or abandoned vehicles, and encourage proper disposal.	Conservation Groups, Municipalities, PA CleanWays	Private Sources, Foundations	Medium
6. Educate the public to utilize practices, such as "leave no trace."	Conservation Groups, PA CleanWays, Citizens, DCNR	DCNR, Private Sources, Foundations	Medium
7. Develop public service announcements about proper waste disposal.	Conservation Groups, PA CleanWays, Municipalities, Media, DEP, DCNR	DEP, Private Sources, Foundations	Medium

Goal 6-12: Establish ongoing environmental education programs and utilize existing facilities.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Develop and implement locally-based environmental/social educational programs that focus on Sinnemahoning Creek watershed.	Conservation Groups, Conservation Districts, Cooperative Extensions, DCNR	DEP, Private Sources, Foundations	Medium
2. Develop and implement education programs for schools about abandoned mine drainage and other sources of non-point source pollution.	Conservation Groups, Conservation Districts, WPCAMR, DEP, OSM, EPA	DEP, EPA, Private Sources, Foundations	Medium
3. Develop and implement education workshops and/or outreach programs about point source pollution, how to report point source violations, and how to research permit information.	Conservation Groups, Sportsmen's Groups, Citizens, DEP, EPA	EPA, DEP, Private Sources, Foundations	Medium
4. Increase awareness of watershed-related issues through the distribution of materials and educational programs.	Conservation Groups, Conservation Districts, Cooperative Extensions	DEP, Private Sources, Foundations	Medium
5. Host stream monitoring workshops or trainings for adult and student volunteers.	Conservation Groups, Stakeholders, DEP, DCNR, Conservation Districts	DEP, Private Sources, Foundations	Medium

Goal 6-13: Educate stakeholders about impacts associated with poor air quality.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Educate residents about the impacts that acid precipitation and mercury have on the environment.	Conservation Groups, EPA, DEP	DEP, EPA, Private Sources, Foundations	Medium

Goal 6-14: Educate stakeholders about the importance of wildlife and natural resources.

Method to Achieve Goal:	*Potential Partners*	*Potential Funding*	*Priority*
1. Sponsor outreach programs to educate landowners about wildlife management practices.	Sportsmen Groups, PGC	PGC, Private Sources, Foundations	Medium
2. Educate the public about the use and purpose of Natural Heritage Inventories in planning, with an additional focus on the importance of existing natural resources.	Municipalities, Conservation Groups, Counties, PNHP	DCNR, Private Sources, Foundations	Medium

CHAPTER 8. REFERENCES

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APPENDIX A. GLOSSARY

Acidity	The capacity of water for neutralizing a basic solution.
Agricultural Preservation Areas	Lands enrolled in a statewide program that has been established to promote the conservation and preservation of agricultural lands and the agricultural community.
Air Pollutant	Any substance in the air that causes damage to life, ecosystems, or property.
Airsheds	Geographic areas responsible for emitting 75 percent of the air pollution reaching a body of water.
All Terrain Vehicle	A small, open motor vehicle having one seat and three or more wheels fitted with large tires. It is designed chiefly for recreational use over roadless, rugged terrain.
Atmospheric Deposition	The process of airborne pollutants falling to the ground.
Basicity	The extent to which a substance is a base, which is defined as having a pH over seven.
Bedrock	The solid rock that underlies the soil and other unconsolidated material, or that is exposed at the surface.
Best Management Practices	Refer to the most environmentally appropriate techniques for agriculture, forestry, mining, development, urban storm water management, and other practices that are potential threats to natural resources.
Biological Diversity	The number and variety of organisms found within a specific geographic region, or a particular habitat; the variability among living organisms on the earth, including the variability within and between species and within and between ecosystems.
Biological Diversity Area	An area of land recognized as supporting populations of state, nationally, or globally significant species or natural communities, high-quality examples of natural communities or ecosystems, or natural exceptional native diversity.
Canal	A man-made waterway that is usually used to connect existing bodies of water.
Carbon Monoxide	A colorless, odorless, poisonous gas that results from the incomplete burning of carbon fuels.

Comprehensive Plans	A general policy guide for the physical development of a municipality, taking into account many factors including locations, character, and timing of future development.
Concentrated Animal Feeding Operation	A farm where large quantities of livestock or poultry are housed inside buildings or a confined area and all units of production, including feed, wastes and dead animals are concentrated in one area.
Conservation	The maintenance of environmental quality and resources; resources include physical, biological, or cultural. Ecosystem management within given social and economic constraints; producing goods and services for humans without depleting natural ecosystem diversity, and acknowledging the natural character of biological systems.
Conservation Lands	Public or private lands with management plans that include the protection of natural areas as a primary objective.
Dedicated Area	An area of land recognized because of an owner's specific intention to protect it, which could result in the improving to become either a biological diversity area in the future or an even better high-quality area within an already designated biological diversity area.
Degradation	A degeneration to a poorer quality, condition or state.
Direct Deposition	Occurs when pollutants enter a waterway by falling directly into it.
Drainage Pattern	The arrangement of streams in a landscape in response to local topography and subsurface geology.
Easement	A deed restriction that landowners may voluntarily place of their property to protect its future uses.
Eco-region	A geographical unit based on associations of those biotic and environmental factors that directly affect or indirectly express energy, moisture, and nutrients regulating the structure and function of ecosystems.
Ecosystems	An area and its living and non-living components.
Environmental Education	A learning process that increases knowledge and awareness of the environment and associated challenges, develops skills and expertise to address these challenges, and fosters attitudes, motivation, and commitment to make informed decisions and take responsible actions.
Erosion	The processes by which solids are displaced from the earth's surface; includes weathering, dissolution, abrasion, corrosion, and transportation.

Factory Farms	Larger, corporate-based farms that emphasize high volume and profit.
Family Farms	Smaller farms that have been in operation for several generations.
Floodplain	The level land among the course of a river or stream formed by the deposition of sediment during periodic floods.
Forest Management	The art and science of treating a forest to promote a desired outcome.
Geology	Geology is the science that deals with the study of the earth and its history, and is the name of the natural features of our plant.
Ground-level Ozone	A harmful secondary pollutant formed in the atmosphere when nitrogen oxide (NOx) combines and reacts with volatile organic compounds in the presence of sunlight and warm temperatures.
Groundwater	Water beneath the earth's surface; found in pore spaces in rock material. Supplies wells and springs as a source of drinking water for many; also
High-Grading	Involves cutting of only the biggest, most profitable trees in a stand; considered a non-sustainable practice.
Hydric Soils	Soils that are adequately moist in the upper section to cultivate anaerobic conditions during the growing season.
Hydrologic Unit Code	A system for organizing watersheds of the United States that divides and subdivides the watershed into successively smaller hydrologic units and is then assigned an identifying number.
Hydrology	The study of movement of water on the earth; includes surface water and groundwater.
Indirect Deposition	Occurs when a pollutant enters a waterway by falling onto land and being washed into waterbodies as runoff.
Invasive species	Environmentally noxious weeds that grow aggressively, spread easily, and displaces other plants.
Karst	An area of limestone marked by irregularities such as sinkholes, fissures, caves, and underground streams, which are created by erosion.
Landscape Conservation Area	A larger area of land that contains minimal human disturbance and allows ecosystems to function on a landscape level.
Landslide	Ground movements that change the stability of slope from stable to unstable are landslides

Lichens	A symbiosis between a fungal and algal life form that usually grows on trees or rocks.
Major Employers	Companies having a minimum of 200 employees.
Management Recommendations	Non-regulatory suggestions to improve the quality of life.
Methylmercury	A neurotoxin formed by the transformation of mercury by certain microorganisms; it is highly toxic and easily accumulates in fish, shellfish and animals that eat fish.
Natural Heritage Inventories	A method of assessing areas of important plants, animals, and ecological communities.
Natural Resources	A naturally-occurring material with economic value.
Nonpoint Source	Pollutants that have no readily visible source and often require detailed analysis and research to discern the source.
Ozone	A colorless, odorless, gas that forms in the atmosphere.
Ozone Layer	A colorless, odorless, gas located in the upper atmospheric layer that filters the sun's harmful ultraviolet rays.
Particular Matter	Tiny drops of liquid or small particles of dust, metal or other materials that float in the air.
Physiographic Provinces	A region with a particular type of landscape and geology.
Point Source	Pollutants that can be easily traced to their source.
Precipitation	Any form of water that falls from the sky, including, rain, snow, sleet, fog, and hail.
Preservation	The act or process of keeping something safe from harm or injury; the act of maintaining or reserving.
Prime Agricultural Soils	Soils that are extremely well suited for agricultural uses and meet certain physical, chemical, and slope characteristics.
Red beds	Stratosphere of reddish-colored sedimentary rocks, such as sandstone, siltstone, and shale.
Restoration	Returning to its original state or condition.
Riparian Areas	Areas of protective vegetation next to a body of water that serves as a barrier against polluted runoff and provides habitat corridors for wildlife.
Runoff	Rainfall or snowmelt not absorbed by soil that flows over the surface of the ground to a receiving waterway.

Secondary Pollutant	A new air pollutant formed when primary pollutants react in the atmosphere.
Sedimentary Rock	Rocks formed by the deposition of sediment.
Sedimentation	The deposit of particles moved by erosion.
Silviculture	The art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands.
Smart Growth Practices	A current movement that focuses on redevelopment of established urban areas and other ways to reduce sprawl pressures on undeveloped countrysides.
Soil Associations	A classification of soil types that comprise two to three major soil types and a few minor soil types.
Stormwater	Water that runs off the land into surface waters during and immediately following periods of precipitation.
Stormwater Management Plan	Planning for surface runoff into streams and river systems during rain and/or snowmelt events.
Streambed	The channel base of a stream or river or creek; it serves as an interchange between groundwater and surface water.
Subsidence	The downward movement of surface material involving little or no horizontal movement.
Sustainable	The ability to provide for the needs of the world's current population without damaging the ability of future generations to provide for themselves. When a process is sustainable, it can be carried out over and over without negative environmental effects or impossibly high costs to anyone involved.
Symbiosis	An alliance between two or more species that benefits each member.
Synthetic Processes	Human-controlled processes, such as burning fossil fuels.
Temperate Continental Climate	A climate without extremes of temperatures or precipitation.
Topography	Describes landscape features of an area.
Total Maximum Daily Load (TMDL)	A limit for pollutant load placed on a waterway by Department of Environmental Protection. TMDLs are determined for a waterway based on how much pollutant it is determined that the waterway can assimilate and still meet its designated use criteria. TMDLs will be used to regulate the percentage of total pollutant load that each source in a watershed can contribute.
Unemployment Rate	The percentage of people of the total labor force that are actively seeking a job but cannot find employment.

Value Added	The additional value added to a product at a stage of production.
Water Gap	An opening or notch which occurs when a section of a ridge has a weaker geological structure and a stream essentially cuts through a ridge to end up
Water Quality Trading	A program which allows facilities with higher pollution control costs to purchase the right to pollute from facilities that have reduced their pollution output below their required limits.
Watershed	The area of land that drains to a particular point along a stream. Each stream has its own watershed. Topography is the key element affecting this area of land. The boundary of a watershed is defined by the highest elevations surrounding the stream. A drop of water falling outside of the boundary will drain to another watershed.
Wetland	An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
Wildlife Management Areas	Areas dedicated to wildlife management activities and low-intensity, wildlife-related recreation, including hunting and wildlife observation.
Zoning	A legal mechanism by which government bodies, for the sake of protecting public health, safety, morals and general welfare, can limit a landowner's right to use privately owned land by dividing land into districts and creating land-use regulations.

APPENDIX B. PLANNING COMMITTEES

Sinnemahoning Creek Watershed Conservation Plan Steering Committee

Lisa Bainey	DCNR Bureau of State Parks - Sinnemahoning State Park
Kim Bonfardine	Elk County Conservation District
Josh Bruce	Sizerville State Park
Eric Cavazza	DEP Bureau of Abandoned Mine Reclamation
R. Dana Crisp	DCNR Park Region 1 PA Wilds Recreation Team
William Crisp	Pennsylvania Fish and Boat Commission Bucktail Watershed Association Bennett Branch Watershed Association
Todd Deluccia	Cameron County Conservation District
Jason Fellon	DEP Northcentral Regional Office
Steve Fisanick	DEP Bureau of Abandoned Mine Reclamation
Jack Fleckenstein	Potter County Conservation District
Jackie M. Flynn	DCNR Bureau of State Parks - Sinnemahoning State Park
Beth Grove	Parker Dam State Park
Harry "Chip" Harrison	Patterson State Park Prouty Place State Park Cherry Springs State Park
Kim McCullough	DCNR - Region 6 - Northwest - Erie Regional Office
Bob Merrill	Moshannon State Forest
Richard Nicka	First Fork Watershed Association
Joe Parr	First Fork Watershed Association
Ken Rowe	Bennett Branch Watershed Association
Shirley Sholtis	DEP Bureau of Abandoned Mine Reclamation
John Sidelinger	DCNR Bureau of Forestry - Elk State Forest
Jennifer Staumbaugh	Hemlock Springs
Ken Straub	Bucktail Watershed Association Cameron Planning Commission Northern Tier Community Action Corporation
Jeanne Wambaugh	DCNR Bureau of Forestry - Elk State Forest
Jim Zoschg, Jr.	Bucktail Watershed Association

Sinnemahoning Creek Watershed Conservation Plan Advisory Committees

Project Area Characteristics

Charlotte Dietrich	Potter County Planning Commission
David Brooks	Potter County Visitor's Association
Douglas D'Amore	Sproul State Forest
Don Hegberg	DEP Knox District Office
Don Chiappelli	Resident
Dr. Peter Ryan	Trout Unlimited ~ God's Country
Joe Parr	First Fork Watershed Associations
Joseph Hummer	Penn State DuBois E.C.O. Club
Wes Fahringer	DCNR - Region 4 - Northcentral - Williamsport Regional Office
Matt Marusiak	Northcentral Regional Planning & Development Commission
Matthew Quesenberry, Sr.	Elk County Planning Department
Michael Wennin	PA Lumber Heritage Region
	Cameron County Historical Society
Tim Horner	Sinnemahoning Sportsmen's Association, Inc.
Phil Burkhouse	PA Elk Range Adventures
	NWPA Great Outdoors Visitor's Bureau
Renee Carey	Northcentral PA Conservancy
	West Branch Region of the Susquehanna Greenways Partnership
Todd Sparks	Hancock Timber Resource Group
Kirt Colkitt	First Fork Watershed
Jodi Brennan	Clearfield County Planning Commission
Bob Imhof	Northcentral PA Regional Planning & Development Commission
	PA Wilds Planning Team

Land Resources

Charlotte Dietrich	Potter County Planning Commission
David Brooks	Potter County Visitor's Association
Douglas D'Amore	Sproul State Forest
Don Hegberg	DEP Knox District Office
Don Chiappelli	Resident
Dr. Peter Ryan	Trout Unlimited ~ God's Country
Joe Parr	First Fork Watershed Associations
Joseph Hummer	Penn State DuBois E.C.O. Club
Wes Fahringer	DCNR - Region 4 - Northcentral - Williamsport Regional Office
Matt Marusiak	Northcentral Regional Planning & Development Commission
Matthew Quesenberry, Sr.	Elk County Planning Department
Michael Wennin	PA Lumber Heritage Region
	Cameron County Historical Society
Tim Horner	Sinnemahoning Sportsmen's Association, Inc.
Phil Burkhouse	PA Elk Range Adventures
	NWPA Great Outdoors Visitor's Bureau
Renee Carey	Northcentral PA Conservancy
	West Branch Region of the Susquehanna Greenways Partnership
Todd Sparks	Hancock Timber Resource Group
Kirt Colkitt	First Fork Watershed
Jodi Brennan	Clearfield County Planning Commission
Tina Lorson	Cameron County Chamber of Commerce
Daryl Jackson	Old Alth Farm
Fred Berry	Clearfield County Conservation District
Michele DePhilip	The Nature Conservancy in PA
Heather McKean	McKean County Conservation District
Tom Clark	Susquehanna River Basin Commission
Paul Lilja	Black Forest Conservation Association
Gary Fleeger	PA Geological Survey
Donald "Stretch" Reed	Emporium Borough

Sinnemahoning Creek Watershed Conservation Plan Advisory Committees

Water Resources

Charlotte Dietrich	Potter County Planning Commission
David Brooks	Potter County Visitor's Association
Douglas D'Amore	Sproul State Forest
Don Hegberg	DEP Knox District Office
Don Chiappelli	Resident
Dr. Peter Ryan	Trout Unlimited ~ God's Country
Joe Parr	First Fork Watershed Associations
Joseph Hummer	Penn State DuBois E.C.O. Club
Wes Fahringer	DCNR - Region 4 - Northcentral - Williamsport Regional Office
Matt Marusiak	Northcentral Regional Planning & Development Commission
Matthew Quesenberry, Sr.	Elk County Planning Department
Michael Wennin	PA Lumber Heritage Region
	Cameron County Historical Society
Tim Horner	Sinnemahoning Sportsmen's Association, Inc.
Phil Burkhouse	PA Elk Range Adventures
	NWPA Great Outdoors Visitor's Bureau
Renee Carey	Northcentral PA Conservancy
	West Branch Region of the Susquehanna Greenways Partnership
Todd Sparks	Hancock Timber Resource Group
Kirt Colkitt	First Fork Watershed
Jodi Brennan	Clearfield County Planning Commission
Tina Lorson	Cameron County Chamber of Commerce
Daryl Jackson	Old Alth Farm
Fred Berry	Clearfield County Conservation District
Michele DePhilip	The Nature Conservancy in PA
Heather McKean	McKean County Conservation District
Tom Clark	Susquehanna River Basin Commission
Paul Lilja	Black Forest Conservation Association
Gary Fleeger	PA Geological Survey
Kirk Bainey	Resident
Kelley Flaherty	Bucktail Watershed Association
Steve VanEerden	Bucktail Watershed Association
Jane Headrick	Lakeview Store

Biological Resources

Charlotte Dietrich	Potter County Planning Commission
David Brooks	Potter County Visitor's Association
Douglas D'Amore	Sproul State Forest
Don Hegberg	DEP Knox District Office
Don Chiappelli	Resident
Dr. Peter Ryan	Trout Unlimited ~ God's Country
Joe Parr	First Fork Watershed Associations
Joseph Hummer	Penn State DuBois E.C.O. Club
Wes Fahringer	DCNR - Region 4 - Northcentral - Williamsport Regional Office
Matt Marusiak	Northcentral Regional Planning & Development Commission
Matthew Quesenberry, Sr.	Elk County Planning Department
Michael Wennin	PA Lumber Heritage Region
	Cameron County Historical Society
Tim Horner	Sinnemahoning Sportsmen's Association, Inc.
Phil Burkhouse	PA Elk Range Adventures
	NWPA Great Outdoors Visitor's Bureau
Renee Carey	Northcentral PA Conservancy
	West Branch Region of the Susquehanna Greenways Partnership
Todd Sparks	Hancock Timber Resource Group
Kirt Colkitt	First Fork Watershed

Sinnemahoning Creek Watershed Conservation Plan Advisory Committees

Biological Resources (continued)

Jodi Brennan	Clearfield County Planning Commission
Tina Lorson	Cameron County Chamber of Commerce
Daryl Jackson	Old Alth Farm
Michele DePhilip	The Nature Conservancy in PA
Heather McKean	McKean County Conservation District
Paul Lilja	Black Forest Conservation Association
Kelley Flaherty	Bucktail Watershed Association
Steve VanEerden	Bucktail Watershed Association
Jane Headrick	Lakeview Store
Colleen Shannon	Pennsylvania Game Commission

Cultural Resources

Charlotte Dietrich	Potter County Planning Commission
David Brooks	Potter County Visitor's Association
Douglas D'Amore	Sproul State Forest
Don Hegberg	DEP Knox District Office
Don Chiappelli	Resident
Dr. Peter Ryan	Trout Unlimited ~ God's Country
Joe Parr	First Fork Watershed Associations
Joseph Hummer	Penn State DuBois E.C.O. Club
Wes Fahringer	DCNR - Region 4 - Northcentral - Williamsport Regional Office
Matt Marusiak	Northcentral Regional Planning & Development Commission
Matthew Quesenberry, Sr.	Elk County Planning Department
Michael Wennin	PA Lumber Heritage Region
	Cameron County Historical Society
Tim Horner	Sinnemahoning Sportsmen's Association, Inc.
Phil Burkhouse	PA Elk Range Adventures
	NWPA Great Outdoors Visitor's Bureau
Renee Carey	Northcentral PA Conservancy
	West Branch Region of the Susquehanna Greenways Partnership
Todd Sparks	Hancock Timber Resource Group
Kirt Colkitt	First Fork Watershed
Jodi Brennan	Clearfield County Planning Commission
Tina Lorson	Cameron County Chamber of Commerce
Daryl Jackson	Old Alth Farm
Paul Lilja	Black Forest Conservation Association
Steve VanEerden	Bucktail Watershed Association
Jane Headrick	Lakeview Store
Sandy Fink Barrett	Clearfield County Recreation and Tourism Authority
Bill Callahan	PA Historical & Museum Comm.

APPENDIX C. AGRICULTURAL SOILS

Prime Farmland

Cameron and Elk counties

Map Symbol	Soil Name	Slope Character (% slope)
AbB	Albrights silt loam	3 to 8
Ba	Barbour fine sandy loam	
Bb	Basher silt loam	
BuB	Buchanan silt loam	3 to 8
CeB	Clymer channery loam	3 to 8
CoA	Cookport channery loam	0 to 3
CoB	Cookport channery loam	3 to 8
GpB	Gilpin silt loam	3 to 8
HoB	Hazleton channery loam	3 to 8
LeB	Leck Kill channery silt loam	3 to 8
Ph	Philo silt loam	
Po	Pope silt loam	
WaB	Wharton silt loam	3 to 8

Clearfield County

Map Symbol	Soil Name	Slope Character (% slope)
AlB	Allegheny silt loam	3 to 8
ClB	Clymer channery loam	3 to 8
CoB	Cookport channery loam	3 to 8
GlB	Gilpin channery silt loam	3 to 8
HcB	Hazleton-Clymer channery loams	3 to 8
Ph	Philo silt loam	
Po	Pope loam	
RaB	Rayne silt loam	3 to 8
WhB	Wharton silt loam	3 to 8

Clinton County

Map Symbol	Soil Name	Slope Character (% slope)
AgB	Allenwood gravelly silt loam	3 to 8
Ba	Barbour fine sandy loam	
Bc	Basher silt loam	
BhB	Buchanan gravelly loam	3 to 8
CcA	Chenango gravelly loam	0 to 3
CcB	Chenango gravelly loam	3 to 8
CdB	Clymer loam	3 to 8
CeA	Clymer channery loam	0 to 3
CeB	Clymer channery loam	3 to 8
CmA	Comly silt loam	0 to 3
CmB	Comly silt loam	3 to 8
CnB	Cookport silt loam	3 to 8

Clinton County (continued)

Map Symbol	Soil Name	Slope Character (% slope)
GpB	Gilpin silt loam	3 to 8
HeA	Hagerstown silt loam	0 to 3
HeB	Hagerstown silt loam	3 to 8
HfB	Hagerstown silty clay loam	3 to 8
HlB	Hazleton-Clymer channery loams	3 to 8
HuB	Hustontown silt loam	3 to 8
KrA	Kreamer silt loam	0 to 3
LaB	Laidig gravelly loam	3 to 8
LkB	Leck kill channery silt loam	3 to 8
Lo	Linden silt loam, occassionally flooded	
Lr	Linden silt loam, rarely flooded	
MeB	Meckesville silt loam	3 to 8
MoB	Morrison channery sandy loam	3 to 8
MuA	Murrill silt loam	0 to 3
MuB	Murrill silt loam	3 to 8
Pb	Philo silt loam	
Pc	Philo-Linden silt loams	
TaA	Tilsit silt loam	0 to 3
TmA	Timberville silt loam	0 to 3
TmB	Timberville silt loam	3 to 8
UnB	Ungers loam,	3 to 8
WaA	Watson silt loam	0 to 5
WbB	Wharton silt loam	3 to 8
WhA	Wheeling silt loam	0 to 3
ZoA	Zoar silt loam	0 to 3

McKean County

Map Symbol	Soil Name	Slope Character (% slope)
AbB	Albrights silt loam	3 to 8
Ba	Barbour loam	
Bb	Basher silt loam	
BeB	Braceville silt loam	3 to 8
BuB	Buchanan silt loam	3 to 8
CbB	Castile gravelly silt loam	3 to 8
ChB	Chenango gravelly loam	3 to 8
ClB	Clymer loam	3 to 8
CoA	Cookport loam	0 to 3
CoB	Cookport loam	3 to 8

Map Symbol	Soil Name	Slope Character (% slope)
McKean County		
GnB	Gilpin channery silt loam	3 to 8
HbB	Hazleton channery loam	3 to 8
KnB	Kinzua channery silt loam	3 to 8
LeB	Leck Kill channery silt loam	3 to 8
Ph	Philo silt loam	
Po	Pope loam	
WaB	Wharton silt loam	3 to 8
Potter County		
Ba	Barbour fine sandy loam	0 to 3
Bb	Barbour fine sandy loam, high bottom phase	0 to 3
Bc	Barbour gravelly fine sandy loam	0 to 3
Bd	Basher sandy loam	0 to 3
Be	Basher silt loam	0 to 3
Bf	Basher silt loam, high bottom phase	0 to 3
BhB	Bath channery silt loam	0 to 12
Bn	Braceville gravelly silt loam	0 to 5
CfB	Chenango gravelly loam	0 to 12
ClB	Clymer channery loam	0 to 12
CoB	Cookport channery loam	0 to 8
Ha	Holly sandy loam	0 to 3
HaB	Hartleton channery silt loam	3 to 15
HuB	Hustontown channery silt loam	3 to 8
HxB	Hazleton channery loam	3 to 15
LaB	Lackawanna channery loam	3 to 8
LdC	Laidig channery loam	0 to 15
LkB	Leck Kill channery loam	3 to 15
LoB	Lordstown channery silt loam	0 to 12
MaB	Mardin channery silt loam	0 to 8
Me	Middlebury sandy loam	0 to 3
Mf	Middlebury silt	0 to 3
Mg	Middlebury silt loam, high bottom phase	0 to 3
ScA	Scio fine sandy loam-silt loam	0 to 3
TaA	Tioga fine sandy loam	0 to 3
TgA	Tioga gravelly loam	0 to 3
CoA	Cookport loam	0 to 3
CoB	Cookport loam	3 to 8
ThA	Tioga fine sandy loam, high bottom phase	0 to 3
Potter County (continued)		
TuB	Tunkhannock gravelly loam	0 to 12
UfA	Unadilla fine sandy loam	0 to 3
UnA	Unadilla silt loam	0 to 3
WeB	Wellsboro channery silt loam	0 to 8
WhB	Wharton channery silt loam	0 to 12

Farmland of Statewide Importance

Map Symbol	Soil Name	Slope Character (% slope)
Cameron and Elk Counties		
AbC	Albrights silt loam	8 to 15
At	Atkins silt loam	
BuC	Buchanan silt loam	8 to 15
CaA	Cavode silt loam	0 to 3
CaB	Cavode silt loam	3 to 8
CaC	Cavode silt loam	8 to 15
CeC	Clymer channery loam	8 to 15
CoC	Cookport channery loam	8 to 15
Cr	Craigsville gravelly loam	
GpC	Gilpin silt loam	8 to 15
HaB	Hartleton channery silt loam	3 to 8
HaC	Hartleton channery silt loam	8 to 15
HoC	Hazleton channery loam	8 to 15
LeC	Leck Kill channery silt loam	8 to 15
WaC	Wharton silt loam	8 to 15
Clearfield County		
At	Atkins silt loam	
BeB	Berks shaly silt loam	3 to 8
BeC	Berks shaly silt loam	8 to 15
CaB	Cavode silt loam	3 to 8
CaC	Cavode silt loam	8 to 15
ClC	Clymer channery loam	8 to 15
CoC	Cookport channery loam	8 to 15
DeB	Dekalb channery loam	3 to 8
DeC	Dekalb channery loam	8 to 15
ErB	Ernest silt loam	3 to 8
ErC	Ernest silt loam	8 to 15
GlC	Gilpin channery silt loam	8 to 15
HcC	Hazleton-Clymer channery loams	8 to 15
HrB	Hartleton channery silt loam	3 to 8
HrC	Hartleton channery silt loam	8 to 15
MoB	Monongahela silt loam	3 to 8

Farmland of Statewide Importance

Map Symbol	Soil Name	Slope Character (% slope)
Clearfield County (continued)		
RaC	Rayne silt loam	8 to 15
TyA	Tyler silt loam	0 to 3
TyB	Tyler silt loam	3 to 6
WhC	Wharton silt loam	8 to 15
Clinton County		
AgC	Allenwood gravelly silt loam	8 to 15
At	Atkins silt loam	
Bb	Barbour-Craigsville complex	
BeB	Berks channery silt loam	3 to 8
BeC	Berks channery silt loam	8 to 15
BuB	Buchanan-Andover gravelly loams	3 to 8
BuC	Buchanan-Andover gravelly loams	8 to 15
CaB	Calvin channery silt loam	3 to 8
CeC	Clymer channery loam	8 to 15
CmC	Comly silt loam	8 to 15
Cr	Craigsville gravelly loam	
GpC	Gilpin silt loam	8 to 15
HeC	Hagerstown silt loam	8 to 15
HgC	Hagerstown-Opequon silty clay loams	8 to 15
HhA	Hartleton channery silt loam	0 to 3
HhB	Hartleton channery silt loam	3 to 8
HhC	Hartleton channery silt loam	8 to 15
HlC	Hazleton-Clymer channery loams	8 to 15
HuC	Hustontown silt loam	8 to 15
LaC	Laidig gravelly loam	8 to 15
LkC	Leck kill channery silt loam	8 to 15
MeC	Meckesville silt loam	8 to 15
Mn	Melvin and Newark silt loams	
MoC	Morrison channery sandy loam	8 to 15
MuC	Murrill silt loam	8 to 15
TaB	Tilsit silt loam	3 to 8
TaC	Tilsit silt loam	8 to 15
UnC	Ungers loam	8 to 15
WbC	Wharton silt loam	8 to 15
WyA	Wyoming very gravelly loam	0 to 3
WyB	Wyoming very gravelly loam	3 to 8

Map Symbol	Soil Name	Slope Character (% slope)
McKean County (continued)		
McKean County		
AbC	Albrights silt loam	8 to 15
BuC	Buchanan silt loam	8 to 15
CaA	Cavode silt loam	0 to 3
CaB	Cavode silt loam	3 to 8
CeC	Ceres channery silt loam	8 to 15
CoC	Cookport loam	8 to 15
EdB	Eldred silt loam	3 to 8
ElB	Elko silt loam	3 to 8
ElC	Elko silt loam	8 to 15
GnC	Gilpin channery silt loam	8 to 15
HaB	Hartleton channery silt loam	3 to 8
HaC	Hartleton channery silt loam	8 to 15
HbC	Hazleton channery loam	8 to 15
KnC	Kinzua channery silt loam	8 to 15
LeC	Leck Kill channery silt loam	8 to 15
MaB	Mandy channery silt loam	3 to 8
MaC	Mandy channery silt loam	8 to 15
OnC	Onoville silt loam	8 to 15
PoB	Portville silty clay loam	3 to 8
ReA	Rexford silt loam	0 to 3
ShB	Shongo silt loam	3 to 8
WaC	Wharton silt loam	8 to 15
Potter County		
AbA	Albrights silt loam	0 to 3
AbB	Albrights silt loam	3 to 8
AbC	Albrights silt loam	8 to 15
AbD	Albrights silt loam	15 to 35
At	Atkins silt loam	
BhD	Bath channery silt loam	12 to 20
CaB	Cavode silt loam	0 to 8
CaC	Cavode silt loam	8 to 15
CbB	Cavode channery silt loam	0 to 8
CbC	Cavode channery silt loam	8 to 15
CfD	Chenango gravelly loam	12 to 20
ClD	Clymer channery loam	12 to 20
CoC	Cookport channery loam	8 to 15

Farmland of Statewide Importance

Map Symbol	Soil Name	Slope Character (% slope)
Potter County (continued)		
CrA	Craigsville gravelly loam	
DfB	Dekalb fine sandy loam	0 to 12
DfD	Dekalb fine sandy loam	12 to 20
DkB	Dekalb channery loam, 10 to 25 inches deep	0 to 12
DkD	Dekalb channery loam, 10 to 25 inces deep	12 to 20
HaD	Hartleton channery silt loam	15 to 25
HuC	Hustontown channery silt loam	8 to 15
LaC	Lackawanna channery loam	8 to 15
LoD	Lordstown channery silt loam	12 to 20
LwB	Lehew silt loam	3 to 8
LwC	Lehew silt loam	8 to 15
LwD	Lehew silt loam	15 to 25

Map Symbol	Soil Name	Slope Character (% slope)
Potter County (continued)		
MaC	Mardin channery silt loam	8 to 15
MoA	Morris silt loam	0 to 3
MoB	Morris silt loam	3 to 8
MoD	Morris silt loam	15 to 25
OaB	Oquaga channery loam	0 to 12
OaD	Oquaga channery loam	12 to 20
SoB	Solon channery silt loam	0 to 15
SoD	Solon channery silt loam	15 to 35
TuD	Tunkhannock gravelly loam	12 to 20
VoA	Volusia channery silt loam	0 to 3
VoB	Volusia channery silt loam	3 to 8
VoC	Volusia channery silt loam	8 to 15
WeC	Wellsboro channery silt loam	8 to 15
WhD	Wharton channery silt loam	12 to 20

APPENDIX D. MINING PERMITS

Mine	Permit #	Permit Holder	Municipality	County	Status	Operation
Cameron County						
Reed Hollow Mine	12060101	Allegheny Enterprises Inc.	Lumber Township	Cameron	Active	Coal mining surface mine
Troncone Pit	12920801	Steven S. Troncone	Portage Township	Cameron	Active	Industrial mining small surface mine
1555 Mine	12040102	Allegheny Enterprises Inc.	Shippen Township	Cameron	Active	Coal mining surface mine
1556 Mine	12040101	Allegheny Enterprises Inc.	Shippen Township	Cameron	Active	Coal mining surface mine
Greenwald Quarry	12000801	George F. Brown Excav.	Shippen Township	Cameron	Active	Industrial mining small surface mine
R & S Stone Quarry	12990801	Robert V. Rupp Excav. Contr.	Shippen Township	Cameron	Active	Industrial mining small surface mine
Robert V. Rupp Excav.	12960802	Robert V. Rupp Excav. Contr.	Shippen Township	Cameron	Active	Industrial mining small surface mine
Clearfield County						
Buhler Quarry	17020801	Michael Buhler	Huston Township	Clearfield	Active	Industrial mineral small surface mine
Chagrin 1 Mine	17030109	Tamburlin Bros. Coal Co. Inc.	Huston Township	Clearfield	Active	Coal mining surface mine
L A Munn Quarry	17052801	Leslie A. Munn	Huston Township	Clearfield	Active	Industrial mineral small surface mine
Lady Jane Colleries Horning Run Passive Treat	17031701	Lady Jane Colleries Inc.	Huston Township	Clearfield	Active	Prep plant post mining treatment
Mine 1	17900105	Southwest Reclamation Inc.	Huston Township	Clearfield	Active	Coal mining surface mine
Penfield 1 Mine	17010301	Veolia ES Greentree LDFL LLC	Huston Township	Clearfield	Active	Industrial mineral small surface mine
Penfield Colliereis LLC/STOTT No 1	39-1964614-1	Penfield Collieries LLC	Huston Township	Clearfield	Active	Mineral preparation plant
Penfield Mine	17930109	WPS Empire State Inc., Floyd Mottery Coal Inc	Huston Township	Clearfield	Active	Coal mining surface mine
Penfield OPR	17860301	North Star Aggregates Inc.	Huston Township	Clearfield	Active	Large Surface Mining Permit
Rosebud Mining Penfield Mine	17041301	Rosebud Mining Co.	Huston Township	Clearfield	Active	Coal mining underground mine
Elk County						
McCullough 1 Mine	2479103	P & N Coal Co. Inc.	Benezette Township	Elk	Active	Coal mining surface mine
Moshannon Mine	24030102	Amfire Mining Co. LLC	Fox Township	Elk	Active	Coal mining surface mine
Buhler 1 Mine	4673SM15	Sky Haven Coal Inc.	Jay Township	Elk	Active	Coal mining surface mine
Caledonia 1 Mine	24-05-02	Tamburlin Bros. Coal Co. Inc., DC Guelich Explosives Co.	Jay Township	Elk	Active	Coal mining surface mine
Cardiff 2 Mine	24840106	Fairview Coal Co.	Jay Township	Elk	Active	Coal mining surface mine
Gardner Mine	24020803	Francis Gardner	Jay Township	Elk	Active	Industrial mining small surface mine
Red Hill Stone 2 Mine	24050802	M & M Contr.	Jay Township	Elk	Active	Industrial mining small surface mine
Red Hill Stone Mine	24030805	M & M Contr.	Jay Township	Elk	Active	Industrial mining small surface mine
Spring Run Mine	24970104	TDK Coal Sales Inc	Jay Township	Elk	Active	Coal mining surface mine
Strutt 1 Mine	4676SM1	Sky Haven Coal Inc.	Jay Township	Elk	Active	Coal mining surface mine
Potter County						
Southwoods Quarry	53060802	Cynthia M. & Robert F. Monroe	Homer Township	Potter	Active	Industrial mining small surface mine
Ludwig's Garage Quarry	53060803	James L. Ludwig	Keating Township	Potter	Active	Industrial mining small surface mine
Gordneir Quarry	53960805	Gordneir Excavating	Keating Township	Potter	Active	Industrial mining small surface mine

APPENDIX E. RESOURCE CONSERVATION RECOVERY ACT

Site	Permit	Type	City
AMER Sintered Tech	PAR000008904	CESQG	Emporium
Borough of Emporium	PAD987390499	CESQG	Emporium
Caldwell	PAD002124352	CESQG	Emporium
Commodore Homes of PA	PAD987401163	CESQG	Shippenville
Conrail Diesel Fueling Facility	PAD000799635	Not in a Universe	Emporium
Costal Well Service	PAD980714869	Not in a Universe	Emporium
Custom Ind. Products	PAD074013327	LQG	St. Marys
Dominion Transmission Ardell CS	PA0000008268	LQG	Benezette
E&G Auto Parts	PAD014071401	Not in a Universe	Emporium
E&G Auto Parts, Incorporated	PAR000043414	CESQG	Emporium
Easter Sintered Alloys	PAR000020719	SQG	St. Marys
Elk Power	PAD987346467	SQG	St. Marys
Emporium Specialty Ausin Metal Plant	PAD002101335	CESQG	Austin
Force Garage	PAD063983282	SQG	Force
GE Transportation System	PAD002124469	CESQG	Emporium
GKN Sinter Metals Fairview Rd Kersey	PAD094165586	SQG	Kersey
Greeley Max & Sons	PAD048388029	Not in a Universe	Austin
Kwikfill	PAD987333234	CESQG	Emporium
Mark Ramsey Trucking and Auto Realty	PA0001001155	CESQG	Emporium
Mercer Spring and Wire	PAD004319026	CESQG	Townville
National Fuel Gas Henderson Station	PAD987324365	SQG	Stoneboro
Pearsons Dry Cleaning	PAD982363830	Not in a Universe	Emporium
Penske Truck/Leasing Company L.P.	PAD982567968	Not in a Universe	Penfield
Pro American Manufacturing Corporation	PAD987362399	Not in a Universe	Emporium
Quality Dispersions Incorporated	PA0000014845	CESQG	Kersey
Shippen Township Plant 1	PAD002131837	CESQG	Emporium
Street Machines	PAD982580243	CESQG	Coudersport
Transcontinental Gas/Wharton Station 535	PAD085675460	CESQG	Austin
UPS Franklin Distribution Center.	PAD987373107	CESQG	Seneca

APPENDIX F. NPDES PERMITS

Site/Facility Name	Address 1	City	Zip	Permit #	Permit Description	Issue Date	Expire Date	Latitude	Longitude
Cameron County									
W Edward Badeau	RR 1	Driftwood	15832	PA0228699		7/24/2003	7/31/2008	41.595	-78.188055
Barren Street Plant	RR 2 Box 47	Emporium	15834	PAR204809	Primary metal products, not elsewhere classified	2/13/1997	2/28/2002	41.5075	-78.221388
Cameron Co Commiss	Cameron Co Court House	Emporium	15834	PAR404805	Refuse systems	11/12/1997	11/30/2002	41.454444	-78.226666
Embassy Powdered Metals	Airport Road	Emporium	15834	PA0228150	Primary metal products, not elsewhere classified	4/18/2005	4/30/2010	41.509866	-78.246624
GE Transp sys	55 Pine Street	Emporium	15834	PAR114804	Motors and generators	3/1/2002	2/28/2007	41.50898	-78.229685
Mid Cameron Authority	421 North Broad Street	Emporium	15834	PAL028631	Sewerage Systems	1/8/2003	1/31/2008	41.511777	-78.237762
PLT 6 Airport Road	1 Airport Road	Emporium	15834	PA0209449	Fabricated metal products, not elsewhere classified	11/27/2002	11/30/2007	41.510346	-78.247326
Pro American Manufacturing Cor	221 East Second Street	Emporium	15834	PA0112941	Hand and edge tools, except machine tools and handsaws	8/11/2005	8/31/2010	41.510185	-78.235
Shippen Twp PLT 1	Cameron Road	Emporium	15834	PA0010651	Primary metal products, not elsewhere classified	11/16/2004	11/30/2009	41.447706	-78.176598
Wennin Pallet	21063 CCC Memorial Highway	Emporium	15834	PAR224851	Ice cream and frozen deserts	12/1/2004	11/30/2009	41.447325	-78.175518
Grove Twp Crestline Stp	SR 2001, P.O. Box 43	Sinnemahoning	16861	PA0113743	Sewerage Systems	10/22/2003	10/31/2008	41.320083	-78.087888
Mary Keller - Keller Oil Company	Carey Country Store	Sinnemahoning	15861	PAG054811		9/12/2000	9/30/2005	41.318611	-78.095

Site/Facility Name	Address 1	City	Zip	Permit #	Permit Description	Issue Date	Expire Date	Latitude	Longitude
Clearfield County									
Thomas Frank	Hickory Lane	Dubois	15801	PAG045121	Operators of dwellings other than apartment buildings	9/13/2004	2/4/2009	41.178611	-78.648611
Camp Mountain Run	5091 Mt Run Rd	Penfield	15849	PA0031798	Sporting and recreation camps	2/1/2005	1/31/2010	41.191111	-78.6325
Clean Earth Dredging Tech Inc	Bark Camp Mine Complex	Penfield	15849	PAR304802	Anthracite mining	12/15/2005	12/31/2010	41.179166	-78.570833
Huston Twp Sew Auth WWTF	PA 255 S	Penfield	15849	PA0228346	Sewerage Systems	4/24/2006	4/30/2011	41.241944	-78.533611
PA DCNR	Parker Dam State Park	Penfield	15849	PA0044245	Museums and art galleries	7/2/2004	7/31/2009	41.201603	-78.51099
Pine Valley Court	21 Ponderosa Dr	Penfield	15849	PA0115282		4/11/2003	4/30/2008	41.195972	-78.594824
Elk County									
Benjamin Roberts	Benezette Store	Benezette	15821	PAG058347		2/5/2003	12/12/2007	41.314777	-78.384222
SMS Tank Disposal Co Inc	RR3 Box 291	Punxsutawney	15767	PAR608308	Scrap and waste materials	1/20/1999	1/19/2004	41.258888	-78.494444
Charles & Erica Miller	1554 Rosely Rd	Saint Marys	15857	PAG048420		9/12/2001	9/11/2006	41.427899	-78.495702
City Transf Garage	900 Brussells Street	Saint Marys	15857	PAR808329		4/3/2003	4/2/2008	41.428145	-78.542932
Gregory Meyer	558 Robin Road Ext	Saint Marys	15857	PA0239097		5/9/2003	5/8/2008	41.420833	-78.504444
Harvey Wolfe	1547 Rosely Road	Saint Marys	15857	PA0101176		4/14/2003	4/13/2008	41.428053	-78.49726
Joshua Kephart	RR2 Box 192		16830	PAG044850	Operators of dwellings other than apartment buildings	9/13/2004	2/4/2009	41.362777	-78.344166
Joshua Wendel	1237 East Eshbach Road	Saint Marys	15857	PA0239089		5/9/2003	5/8/2008	41.420538	-78.522242
Penn Pallet Inc	675 Fillmore Road	Saint Marys	15857	PAR228313		11/5/2002	11/4/2007	41.436245	-78.529204
Rodney Dinsmore	710 Theresa St	Saint Marys	15857	PAG048650		2/23/2000	2/22/2005	41.42964	-78.547219

Site/Facility Name	Address 1	City	Zip	Permit #	Permit Description	Issue Date	Expire Date	Latitude	Longitude
Elk County									
Rodney J. Dinsmore Property	S Michael Rd	Saint Marys	15857	PA0238732		5/14/2002	5/13/2007	41.414166	-78.504722
Timothy J. Herbstritt SFTF	Rosely Rd	Saint Marys	15857	PA0238627		8/8/2001	8/31/2006	41.438799	-78.468015
Jay Twp Weedville STP	Redwood Rd	Weedville	15868	PA0104141		9/17/2003	9/16/2008	41.273611	-78.49
Potter County									
Austin Boro Water Sys	Horn Hollow Road	Austin	16720	PA0208825	Sewerage Systems	4/15/2004	4/30/2009	41.634265	-78.103815
Emporium Specialty Austin Metal Plt	94 Foster Street	Austin	16720	PA0111830		4/16/2004	4/30/2009	41.625979	-78.092052
Demorgan Acres MHP	RR2 Box D38	Canton	17724	PA0114324	Sewerage Systems	12/12/2001	12/31/2006	41.6925	-77.851388

APPENDIX G. WATERWAY DESIGNATIONS

Stream Order	Waterway	Zones	County	Use Designation
4	Bennett Branch Sinnemahoning Creek	Main Stem, Source to Mill Run	Cameron	CWF
5	Unnamed Tributaries to Bennett Branch Sinnemahoning Creek	Basins	Clearfield-Elk-Cameron	CWF
5	McCracken Run	Basin	Clearfield	CWF
5	South Branch Bennett Branch	Basin	Clearfield	HQ-CWF
5	Heath Run	Basin	Clearfield	CWF
5	Bark Camp Run	Basin	Clearfield	CWF
5	Mountain Run	Basin	Clearfield	CWF
5	Matley Hollow	Basin	Clearfield	CWF
5	Wilson Run	Basin, Source to East Branch Wilson Run	Clearfield	CWF
6	East Branch Wilson Run	Basin	Clearfield	HQ-CWF
5	Wilson Run	Basin, East Branch Wilson Run to Mouth	Clearfield	CWF
5	Moose Run	Basin	Clearfield	CWF
5	Horning Run	Basin	Clearfield	CWF
5	Lamb Hollow	Basin	Clearfield	CWF
5	Horning Hollow	Basin	Clearfield	CWF
5	Mill Run	Basin	Clearfield	CWF
4	Bennett Branch Sinnemahoning Creek	Main Stem, Mill Run to Confluence with Driftwood Branch	Cameron	WWF
5	Tyler Run	Basin	Clearfield	CWF
5	Cherry Run	Basin, Source to Shawmut Dam	Elk	HQ-CWF
5	Cherry Run	Basin, Shawmut Dam to Mouth	Elk	CWF
5	Kersey Run	Basin, Source to Byrnes Run	Elk	CWF
6	Byrnes Run	Basin	Elk	EV

5	Kersey Run	Basin, Byrnes Run to Mouth	Elk	CWF
5	Laurel Run	Basin	Elk	HQ-CWF
5	Bakemans Run	Basin	Elk	CWF
5	Medix Run	Basin	Elk	HQ-CWF
5	Trout Run	Basin, Source to Spring Run	Elk	CWF
6	Spring Run	Basin, Source to UNT 24721	Elk	CWF
7	UNT 24721 to Spring Run	Basin	Elk	CWF
6	Spring Run	Basin, UNT 24721 to Stony Brook	Elk	HQ-CWF
7	Stony Brook	Basin	Elk	CWF

Stream Order	Waterway	Zones	County	Use Designation
6	Spring Run	Basin, Stony Run to Mouth	Elk	CWF
5	Trout Run	Basin, Spring Run to Mouth	Elk	CWF
5	Jimmy Run	Basin	Elk	CWF
5	Johnson Run	Basin	Elk	CWF
5	Wainwright Run	Basin	Elk	CWF
5	Charlies Run	Basin	Elk	CWF
5	Dents Run	Basin	Elk	HQ-CWF
6	East Branch Hicks Run	Basin Source to Confluence with West Branch	Elk	HQ-CWF
6	West Branch Hicks Run	Basin, Source to Confluence with East Branch	Elk	EV
5	Hicks Run	Basin, Confluence of East and West Branches to Mouth	Cameron	HQ-CWF
5	Hicks Hollow	Basin	Cameron	CWF
5	Beaverdam Run	Basin	Cameron	CWF
5	Stone Quarry Hollow	Basin	Cameron	CWF
5	Miller Run	Basin	Cameron	HQ-CWF
5	Water Plug Hollow	Basin	Cameron	CWF
5	Mix Run	Basin, Source to English Draft Run	Elk	EV
6	English Draft Run	Basin	Elk	HQ-CWF
5	Mix Run	Basin, English Draft Run to Mouth	Cameron	HQ-CWF
5	Little Dent Run	Basin	Cameron	CWF
5	Nanny Run	Basin	Cameron	CWF
5	Boyer Run	Basin	Cameron	CWF
4	Driftwood Branch Sinnemahoning Creek	Basin, Source to Elk Fork	Cameron	HQ-CWF
5	Elk Fork	Basin, Source to Nichols Run	Cameron	EV
6	Nichols Run	Basin	Cameron	HQ-CWF
5	Elk Fork	Basin, Nichols Run to Mouth	Cameron	HQ-CWF
4	Driftwood Branch Sinnemahoning Creek	Main Stem, Elk Fork to Confluence with Bennett Branch	Cameron	TSF
5	Unnamed Tributaries to Driftwood Branch Sinnemahoning Creek	Basins, Elk Fork to Confluence with Bennett Branch	Cameron	HQ-CWF
5	Big Run	Basin	Cameron	HQ-CWF
5	Bobby Run	Basin	Cameron	HQ-CWF
5	Cooks Run	Basin	Cameron	EV
5	Johns Run	Basin	Cameron	HQ-CWF
5	Britton Run	Basin	Cameron	HQ-CWF

Stream Order	Waterway	Zones	County	Use Designation
5	Clear Creek	Basin, Source to Mud Run	Cameron	EV
6	Mud Run	Basin	Cameron	HQ-CWF
5	Clear Creek	Basin, Mud Run to Mouth	Cameron	HQ-CWF
5	Ferguson Hollow	Basin	Cameron	HQ-CWF
5	North Creek	Basin	Cameron	HQ-CWF
5	Swesey Hollow	Basin	Cameron	HQ-CWF
5	Dodge Hollow	Basin	Cameron	HQ-CWF
5	Eddy Run	Basin	Cameron	HQ-CWF
5	Wheaton Hollow	Basin	Cameron	HQ-CWF
5	West Creek	Basin	Cameron	HQ-CWF
5	Sinnemahoning Portage Creek	Basin, Source to Cowley Run	Cameron	EV
6	Cowley Run	Basin	Cameron	EV
5	Sinnemahoning Portage Creek	Basin, Cowley Run to Mouth	Cameron	CWF
5	Bauer Hollow	Basin	Cameron	HQ-CWF
5	Canoe Run	Basin	Cameron	HQ-CWF
5	Hunts Run	Basin	Cameron	HQ-CWF
5	Stillhouse Run	Basin	Cameron	HQ-CWF
5	Square Timber Run	Basin	Cameron	HQ-CWF
6	Finley Run	Basin, Source to Unnamed Tributary at R.M. 1.7	Cameron	HQ-CWF
6	Finley Run	Basin, Unnamed Tributary at R.M. 1.7 to Confluence with Portable Run	Cameron	CWF
6	Portable Run	Basin, Source to Confluence with Finley Run	Cameron	CWF
5	Sterling Run	Basin, Confluence of Portable Run and Finley Run to Mouth	Cameron	CWF
5	Mason Grove Run	Basin	Cameron	HQ-CWF
5	Wash Mason Run	Basin	Cameron	HQ-CWF
5	John Mason Run	Basin	Cameron	HQ-CWF
5	Big Run	Basin	Cameron	HQ-CWF
5	Dry Run	Basin	Cameron	HQ-CWF
5	Tanglefoot Run	Basin	Cameron	HQ-CWF
5	Nelson Run	Basin	Cameron	HQ-CWF
5	Grindstone Hollow	Basin	Cameron	HQ-CWF
5	Johnson Run	Basin	Cameron	HQ-CWF
3	Sinnemahoning Creek	Main Stem, Confluence of Bennett and Driftwood Branches to Mouth	Clinton	WWF

Stream Order	Waterway	Zones	County	Use Designation
4	Unnamed Tributaries to Sinnemahoning Creek	Basins, Confluence of Bennett and Driftwood Branches to Mouth	Cameron-Clinton	HQ-CWF
4	Grove Run	Basin	Cameron	HQ-CWF
4	First Fork Sinnemahoning Creek	Basin, Source to Big Nelson Run	Cameron	HQ-CWF
4	First Fork Sinnemahoning Creek	Main Stem, Big Nelson Run to Stevenson Dam	Cameron	HQ-CWF
5	Unnamed Tributaries to First Fork Sinnemahoning Creek	Basins, Big Nelson Run to Stevenson Dam	Potter-Cameron	HQ-CWF
5	Fish Basket Hollow	Basin	Potter	HQ-CWF
5	Little Nelson Run	Basin	Potter	HQ-CWF
5	East Fork Sinnemahoning Creek	Basin, Source to Dolliver Trail	Potter	EV
5	East Fork Sinnemahoning Creek	Main Stem, Dolliver Trail to Mouth	Potter	HQ-CWF
6	Unnamed Tributaries to East Fork Sinnemahoning Creek	Basins, Dolliver Trail to Mouth	Potter	HQ-CWF
6	Shinglebolt Hollow	Basin	Potter	HQ-CWF
6	Horton Run	Basin	Potter	HQ-CWF
6	Stony Lick Run	Basin	Potter	EV
6	Wild Boy Run	Basin	Potter	HQ-CWF
6	Jackson Lick Run	Basin	Potter	HQ-CWF
6	Graveyard Hollow	Basin	Potter	HQ-CWF
6	Stony Run	Basin	Potter	HQ-CWF
6	Jamison Run	Basin	Potter	HQ-CWF
6	Little Joe Run	Basin	Potter	HQ-CWF
6	Camp Run	Basin	Potter	HQ-CWF
6	Gravel Lick Run	Basin	Potter	HQ-CWF
6	Mud Lick Run	Basin	Potter	HQ-CWF
6	Williams Run	Basin	Potter	HQ-CWF
6	Marvin Run	Basin	Potter	HQ-CWF
6	Birch Run	Basin	Potter	EV
6	Long Hollow	Basin	Potter	HQ-CWF
6	Jordan Hollow	Basin	Potter	HQ-CWF
6	Schoolhouse Run	Basin	Potter	HQ-CWF
6	Black Stump Hollow	Basin	Potter	HQ-CWF
6	Upper Vag Hollow	Basin	Potter	HQ-CWF
6	Hunter Hollow	Basin	Potter	HQ-CWF
6	Avery Hollow	Basin	Potter	HQ-CWF
6	Bentley Hollow	Basin	Potter	HQ-CWF
5	Elk Lick Run	Basin	Potter	HQ-CWF
5	Schoolhouse Run	Basin	Potter	HQ-CWF
5	Dry Hollow	Basin	Potter	HQ-CWF
5	Pine Island Run	Basin	Potter	HQ-CWF
5	Bailey Run	Basin, Source to Little Bailey Run	Potter	EV
6	Little Bailey Run	Basin	Potter	HQ-CWF

Stream Order	Waterway	Zones	County	Use Designation
5	Bailey Run	Basin, Little Bailey Run to Mouth	Potter	HQ-CWF
5	Barrett Slide	Basin	Potter	HQ-CWF
5	Mahon Run	Basin	Potter	HQ-CWF
5	Berge Run	Basin	Potter	HQ-CWF
5	Upper Logue Hollow	Basin	Cameron	HQ-CWF
5	Logue Run	Basin	Cameron	HQ-CWF
5	Owl Hollow	Basin	Cameron	HQ-CWF
5	Norcross Run	Basin	Cameron	HQ-CWF
5	Rattlesnake Run	Basin	Cameron	HQ-CWF
5	Muley Run	Basin	Cameron	HQ-CWF
5	Mill Run	Basin	Cameron	HQ-CWF
5	Lushbaugh Run	Basin	Cameron	EV
5	Brooks Run	Basin	Cameron	HQ-CWF
5	Little Bailey Run	Basin	Cameron	HQ-CWF
5	Short Bend Run	Basin	Cameron	HQ-CWF
4	First Fork Sinnemahoning Creek	Main Stem, Stevenson Dam to Mouth	Cameron	HQ-TSF
5	Unnamed Tributaries to First Fork Sinnemahoning Creek	Basins, Stevenson Dam to Mouth	Cameron	HQ-CWF
5	Woodrock Run	Basin	Cameron	HQ-CWF
5	Roaring Run	Basin	Cameron	HQ-CWF
5	Bronson Run	Basin	Cameron	HQ-CWF
5	Joes Run	Basin	Cameron	HQ-CWF
5	Guys Hollow	Basin	Cameron	HQ-CWF
5	Lick Island Run	Basin	Cameron	HQ-CWF
5	Pumpkin Hollow	Basin	Cameron	HQ-CWF
5	Arksill Run	Basin	Cameron	HQ-CWF
5	Pepperhill Run	Basin	Cameron	HQ-CWF
5	Riddles Hollow	Basin	Cameron	HQ-CWF
5	Whiteoak Run	Basin	Cameron	HQ-CWF
5	Board Rock Hollow	Basin	Cameron	HQ-CWF
5	Ellicott Run	Basin	Cameron	HQ-CWF
4	Wykoff Run	Basin	Cameron	HQ-CWF
4	Upper Jerry Run	Basin	Cameron	HQ-CWF
4	Lower Jerry Run	Basin	Cameron	HQ-CWF

APPENDIX H. IMPAIRED WATERS

Stream Name	Assessment Unit ID	Source	Cause	List Date	Total Miles	Use Assessed
Bell Draft	PA981014-0709-BPG2461908A	Abandoned Mine Drainage	pH, Metals	2004	1.75	Aquatic Life
Bennett Branch Sinnemahoning Creek	PA71442450808A	Abandoned Mine Drainage	Metals	2004	22.57	Aquatic Life
Bennett Branch Sinnemahoning Creek	PA20010906-1040-JLR2450808A	Abandoned Mine Drainage	pH	2004	4.87	Aquatic Life
Bennett Branch Sinnemahoning Creek	PA71452450808A	Abandoned Mine Drainage	Metals	2004	8.85	Aquatic Life
Bennett Branch Sinnemahoning Creek	PA981014-0909-BPG2450808A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	4.42	Aquatic Life
Bennett Branch Sinnemahoning Creek (UNT 24958)	PA981014-0909-BPG2495808A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	0.86	Aquatic Life
Bennett Branch Sinnemahoning Creek (UNT 24959)	PA981014-0909-BPG2495908A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	0.94	Aquatic Life
Bennett Branch Sinnemahoning Creek (UNT 24960)	PA981014-0909-BPG2496008A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	0.7	Aquatic Life
Bennett Branch Sinnemahoning Creek (UNT 24961)	PA981014-0909-BPG2496108A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	0.95	Aquatic Life
Cherry Run	PA981014-1845-BPG2489708A	Abandoned Mine Drainage	pH, Metals	2004	5.16	Aquatic Life
Cherry Run (UNT 24898)	PA981014-1845-BPG2489808A	Abandoned Mine Drainage	pH, Metals	2004	1.34	Aquatic Life
Cherry Run (UNT 24899)	PA981014-1845-BPG2489908A	Abandoned Mine Drainage	pH, Metals	2004	0.59	Aquatic Life
Cherry Run (UNT 24900)	PA981014-1845-BPG2490008A	Abandoned Mine Drainage	pH, Metals	2004	0.85	Aquatic Life

Stream Name	Assessment Unit ID	Source	Cause	List Date	Total Miles	Use Assessed
Cherry Run (UNT 24901)	PA981014-1845-BPG2490108A	Abandoned Mine Drainage	pH, Metals	2004	0.65	Aquatic Life
Cherry Run (UNT 24902)	PA981014-1845-BPG2490208A	Abandoned Mine Drainage	pH, Metals	2004	0.51	Aquatic Life
Cole Draft	PA981014-0709-BPG2462908A	Abandoned Mine Drainage	pH, Metals	2004	1.66	Aquatic Life
Cole Draft (UNT 24630)	PA981014-0709-BPG2463008A	Abandoned Mine Drainage	pH, Metals	2004	0.5	Aquatic Life
Dents Run	PA981014-0709-BPG2461208A	Abandoned Mine Drainage	pH, Metals	2004	5.89	Aquatic Life
Dents Run	PA990504-0905-BPG2461208A	Abandoned Mine Drainage	pH	2004	1.32	Aquatic Life
Dents Run (UNT 24613)	PA981014-0709-BPG2461308A	Abandoned Mine Drainage	pH, Metals	2004	0.65	Aquatic Life
Dents Run (UNT 24616)	PA981014-0709-BPG2461608A	Abandoned Mine Drainage	pH, Metals	2004	1.37	Aquatic Life
Dents Run (UNT 24617)	PA981014-0709-BPG2461708A	Abandoned Mine Drainage	pH, Metals	2004	0.94	Aquatic Life
Dents Run (UNT 24628)	PA981014-0709-BPG2462808A	Abandoned Mine Drainage	pH, Metals	2004	0.47	Aquatic Life
Dents Run (UNT 24631)	PA981014-0709-BPG2463108A	Abandoned Mine Drainage	pH, Metals	2004	0.85	Aquatic Life
Dents Run (UNT 24632)	PA981014-0709-BPG2463208A	Abandoned Mine Drainage	pH, Metals	2004	0.95	Aquatic Life
Dents Run (UNT 24644)	PA981014-0709-BPG2464408A	Abandoned Mine Drainage	pH, Metals	2004	0.54	Aquatic Life
Dents Run (UNT 24645)	PA981014-0709-BPG2464508A	Abandoned Mine Drainage	pH, Metals	2004	0.54	Aquatic Life
Driftwood Branch Sinnemahoning Creek	PA20020111-1224-FIT2496308A	Source Unknown	Arsenic	2004	9.59	Fish Consumption
Finley Run	PA990824-0745-LMS2500008A	Abandoned Mine Drainage	pH, Metals	2004	0.76	Aquatic Life
Finley Run (UNT 25001)	PA990824-0745-LMS2500108A	Abandoned Mine Drainage	pH, Metals	2004	0.31	Aquatic Life
First Fork Sinnemahoning Creek	PA20020111-1225-FIT2406608A	Source Unknown	Arsenic	2004	8.03	Fish Consumption
Little Bear Run	PA981014-0709-BPG2461408A	Abandoned Mine Drainage	pH, Metals	2004	0.95	Aquatic Life
Little Bear Run (UNT 24615)	PA981014-0709-BPG2461508A	Abandoned Mine Drainage	pH, Metals	2004	0.41	Aquatic Life
McCracken Run	PA981014-0909-BPG2496208A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	0.98	Aquatic Life
McDonald Run	PA981014-0709-BPG2461808A	Abandoned Mine Drainage	pH, Metals	2004	2.07	Aquatic Life
McDonald Run (UNT 24627)	PA981014-0709-BPG2462708A	Abandoned Mine Drainage	pH, Metals	2004	0.48	Aquatic Life
Mill Run	PA981014-0842-BPG2491308A	Abandoned Mine Drainage	pH, Metals	2004	1.98	Aquatic Life
Mill Run (UNT 24915)	PA981014-0842-BPG2491508A	Abandoned Mine Drainage	pH, Metals	2004	1.21	Aquatic Life

Stream Name	Assessment Unit ID	Source	Cause	List Date	Total Miles	Use Assessed
Mill Run (UNT 24916)	PA981014-0842-BPG2491608A	Abandoned Mine Drainage	pH, Metals	2004	0.61	Aquatic Life
Moose Run	PA981014-0838-BPG2492008A	Abandoned Mine Drainage	pH, Metals	2004	1.65	Aquatic Life
Porcupine Hollow	PA990504-1035-BPG2463308A	Abandoned Mine Drainage	pH, Metals	2004	2.51	Aquatic Life
Porcupine Hollow (UNT 24634)	PA990504-1035-BPG2463408A	Abandoned Mine Drainage	pH, Metals	2004	0.75	Aquatic Life
Porcupine Hollow (UNT 24634)	PA981014-0718-BPG2463408A	Abandoned Mine Drainage	pH, Metals	2004	0.48	Aquatic Life
Porcupine Hollow (UNT 24635)	PA981014-0718-BPG2463508A	Abandoned Mine Drainage	pH, Metals	2004	0.37	Aquatic Life
Porcupine Hollow (UNT 24636)	PA990504-1035-BPG2463608A	Abandoned Mine Drainage	pH, Metals	2004	0.44	Aquatic Life
Porcupine Hollow (UNT 24637)	PA990504-1035-BPG2463708A	Abandoned Mine Drainage	pH, Metals	2004	0.62	Aquatic Life
Porcupine Hollow (UNT 24638)	PA990504-1035-BPG2463808A	Abandoned Mine Drainage	pH, Metals	2004	0.48	Aquatic Life
Sinnemahoning Creek	PA20020111-1235-FIT2400808A	Source Unknown	Arsenic	2004	9.12	Fish Consumption
South Branch Bennett Branch	PA981014-0909-BPG2495008A	Drainage/Filling/Loss of Wetlands, Highway/Road/ Bridge Runoff (Non Construction Related)	Sedimentation/ Siltation	2004	2.24	Aquatic Life
Spring Run	PA981014-0728-BPG2468508A	Abandoned Mine Drainage	pH, Metals, Other Inorganics	2004	1.88	Aquatic Life
Sterling Run	PA990824-0745-LMS2498908A	Abandoned Mine Drainage	pH, Metals	2004	0.21	Aquatic Life
West Creek		Abandoned Mine Drainage		Advisory Focus Group		
Parker Run	minor impacts	Abandoned Mine Drainage		Advisory Focus Group		
Canoe Run	minor impacts	Abandoned Mine Drainage		Advisory Focus Group		

APPENDIX I. FISH AND WILDLIFE SPECIES

Common Name	Scientific name	Status
Amphibians		
American toad	*Bufo americanus*	
bullfrog	*Rana catesbeiana*	
dusky salamander	*Desmognathus fuscus*	
eastern hellbender	*Cryptobranchus alleganiensis*	Near Threatened
eastern newt	*Notophthalmus viridescens*	
four-toed salamander	*Hemidactylium scutatum*	
gray treefrog	*Hyla versicolor*	
green frog	*Rana clamitans*	
longtail salamander	*Eurycea longicauda*	
mountain dusky salamander	*Desmognathus ochrophaeus*	
northern slimy salamander	*Plethodon glutinosus*	
northern two-lined salamander	*Eurycea bislineata*	
pickerel frog	*Rana palustris*	
red salamander	*Pseudotriton ruber*	
redback salamander	*Plethodon cinereus*	
spotted salamander	*Ambystoma maculatum*	
spring peeper	*Pseudacris crucifer*	
spring salamander	*Gyrinophilus porphyriticus*	
valley & ridge salamander	*Plethodon hoffmani*	
Wehrle's salamander	*Plethodon wehrlei*	
wood frog	*Rana sylvatica*	
Birds		
Acadian flycatcher	*Empidonax virescens*	
alder flycatcher	*Empidonax alnorum*	
American bittern	*Botaurus lentiginosus*	
American black duck	*Anas rubripes*	
American coot	*Fulica americana*	
American crow	*Corvus brachyrhynchos*	
American goldfinch	*Carduelis tristis*	
American kestrel	*Falco sparverius*	
American redstart	*Setophaga ruticilla*	
American robin	*Turdus migratorius*	
American tree sparrow	*Spizella arborea*	

Common Name	Scientific name	Status
Birds (continued)		
American woodcock	*Scolopax minor*	
bald eagle	*Haliaeetus leucocephalus*	
Baltimore oriole	*Icterus galbula*	
bank swallow	*Riparia riparia*	
barn swallow	*Hirundo rustica*	
barred owl	*Strix varia*	
belted kingfisher	*Ceryle alcyon*	
black vulture	*Coragyps atratus*	
black-and-white warbler	*Mniotilta varia*	
black-billed cuckoo	*Coccyzus erythropthalmus*	
Blackburnian warbler	*Dendroica fusca*	
black-capped chickadee	*Poecile atricapillus*	
black-crowned night-heron	*Nycticorax nycticorax*	
blackpoll warbler	*Dendroica striata*	
black-throated blue warbler	*Dendroica caerulescens*	
black-throated green warbler	*Dendroica virens*	
blue grosbeak	*Passerina caerulea*	
blue Jay	*Cyanocitta cristata*	
blue-gray gnatcatcher	*Polioptila caerulea*	
blue-headed vireo	*Vireo solitarius*	
blue-winged teal	*Anas discors*	
blue-winged warbler	*Vermivora pinus*	
bobolink	*Dolichonyx oryzivorus*	
bohemian waxwing	*Bombycilla garrulus*	
Brewer's blackbird	*Euphagus cyanocephalus*	
broad-winged hawk	*Buteo platypterus*	
brown creeper	*Certhia americana*	
brown thrasher	*Toxostoma rufum*	
brown-headed cowbird	*Molothrus ater*	
bufflehead	*Bucephala albeola*	
Canada goose	*Branta canadensis*	
Canada warbler	*Wilsonia canadensis*	
canvasback	*Aythya valisineria*	
Carolina chickadee	*Poecile carolinensis*	
Carolina wren	*Thryothorus ludovicianus*	
cedar waxwing	*Bombycilla cedrorum*	
cerulean warbler	*Dendroica cerulea*	Vulnerable
chestnut-sided warbler	*Dendroica pensylvanica*	
chimney swift	*Chaetura pelagica*	
chipping sparrow	*Spizella passerina*	
cliff swallow	*Petrochelidon pyrrhonota*	

Common Name	Scientific name	Status
Birds (continued)		
common goldeneye	*Bucephala clangula*	
common grackle	*Quiscalus quiscula*	
common merganser	*Mergus merganser*	
common moorhen	*Gallinula chloropus*	
common nighthawk	*Chordeiles minor*	
common redpoll	*Carduelis flammea*	
common snipe	*Gallinago gallinago*	
common yellowthroat	*Geothlypis trichas*	
Cooper's hawk	*Accipiter cooperii*	
dark-eyed junco	*Junco hyemalis*	
downy woodpecker	*Picoides pubescens*	
eastern bluebird	*Sialia sialis*	
eastern kingbird	*Tyrannus tyrannus*	
eastern meadowlark	*Sturnella magna*	
eastern Phoebe	*Sayornis phoebe*	
eastern screech-owl	*Otus asio*	
eastern towhee	*Pipilo erythrophthalmus*	
eastern wood-pewee	*Contopus virens*	
evening grosbeak	*Coccothraustes vespertinus*	
field sparrow	*Spizella pusilla*	
fish crow	*Corvus ossifragus*	
glossy ibis	*Plegadis falcinellus*	
golden eagle	*Aquila chrysaetos*	
golden-crowned kinglet	*Regulus satrapa*	
golden-winged warbler	*Vermivora chrysoptera*	Near Threatened
grasshopper sparrow	*Ammodramus savannarum*	
gray catbird	*Dumetella carolinensis*	
gray-cheeked thrush	*Catharus minimus*	
great blue heron	*Ardea herodias*	
great crested flycatcher	*Myiarchus crinitus*	
great egret	*Ardea alba*	
great horned owl	*Bubo virginianus*	
green-winged teal	*Anas crecca*	
hairy woodpecker	*Picoides villosus*	
Henslow's sparrow	*Ammodramus henslowii*	Near Threatened
hermit thrush	*Catharus guttatus*	
herring gull	*Larus argentatus*	
hooded merganser	*Lophodytes cucullatus*	
hooded warbler	*Wilsonia citrina*	
horned lark	*Eremophila alpestris*	
house finch	*Carpodacus mexicanus*	
house wren	*Troglodytes aedon*	

Common Name	Scientific name	Status
Birds (continued)		
indigo bunting	*Passerina cyanea*	
Kentucky warbler	*Oporornis formosus*	
killdeer	*Charadrius vociferus*	
Lapland longspur	*Calcarius lapponicus*	
lark sparrow	*Chondestes grammacus*	
least bittern	*Ixobrychus exilis*	
least flycatcher	*Empidonax minimus*	
lesser scaup	*Aythya affinis*	
little blue heron	*Egretta caerulea*	
loggerhead shrike	*Lanius ludovicianus*	
long-eared owl	*Asio otus*	
Louisiana waterthrush	*Seiurus motacilla*	
magnolia warbler	*Dendroica magnolia*	
mallard	*Anas platyrhynchos*	
marsh wren	*Cistothorus palustris*	
mourning dove	*Zenaida macroura*	
mourning warbler	*Oporornis philadelphia*	
Nashville warbler	*Vermivora ruficapilla*	
northern bobwhite	*Colinus virginianus*	Near Threatened
northern cardinal	*Cardinalis cardinalis*	
northern flicker	*Colaptes auratus*	
northern goshawk	*Accipiter gentilis*	
northern harrier	*Circus cyaneus*	
northern mockingbird	*Mimus polyglottos*	
northern parula	*Parula americana*	
northern rough-winged swallow	*Stelgidopteryx serripennis*	
northern saw-whet owl	*Aegolius acadicus*	
northern shoveler	*Anas clypeata*	
northern shrike	*Lanius excubitor*	
northern waterthrush	*Seiurus noveboracensis*	
olive-sided flycatcher	*Contopus cooperi*	Near Threatened
orchard oriole	*Icterus spurius*	
ovenbird	*Seiurus aurocapillus*	
pied-billed grebe	*Podilymbus podiceps*	
pileated woodpecker	*Dryocopus pileatus*	
pine grosbeak	*Pinicola enucleator*	
pine siskin	*Carduelis pinus*	
pine warbler	*Dendroica pinus*	
prairie warbler	*Dendroica discolor*	
prothonotary warbler	*Protonotaria citrea*	
purple finch	*Carpodacus purpureus*	

Common Name	Scientific name	Status
Birds (continued)		
purple martin	*Progne subis*	
red crossbill	*Loxia curvirostra*	
red-bellied woodpecker	*Melanerpes carolinus*	
red-breasted nuthatch	*Sitta canadensis*	
red-eyed vireo	*Vireo olivaceus*	
redhead	*Aythya americana*	
red-headed woodpecker	*Melanerpes erythrocephalus*	Near Threatened
red-shouldered hawk	*Buteo lineatus*	
red-tailed hawk	*Buteo jamaicensis*	
red-winged blackbird	*Agelaius phoeniceus*	
ring-billed gull	*Larus delawarensis*	
rose-breasted grosbeak	*Pheucticus ludovicianus*	
rough-legged hawk	*Buteo lagopus*	
ruby-crowned kinglet	*Regulus calendula*	
ruby-throated hummingbird	*Archilochus colubris*	
ruddy duck	*Oxyura jamaicensis*	
ruffed grouse	*Bonasa umbellus*	
rusty blackbird	*Euphagus carolinus*	
savannah sparrow	*Passerculus sandwichensis*	
scarlet tanager	*Piranga olivacea*	
sedge wren	*Cistothorus platensis*	
sharp-shinned hawk	*Accipiter striatus*	
short-eared owl	*Asio flammeus*	
snow bunting	*Plectrophenax nivalis*	
snowy egret	*Egretta thula*	
song sparrow	*Melospiza melodia*	
sora	*Porzana carolina*	
spotted sandpiper	*Actitis macularia*	
Swainson's thrush	*Catharus ustulatus*	
swamp sparrow	*Melospiza georgiana*	
tree swallow	*Tachycineta bicolor*	
tricolored heron	*Egretta tricolor*	
tufted titmouse	*Baeolophus bicolor*	
turkey vulture	*Cathartes aura*	
upland sandpiper	*Bartramia longicauda*	
veery	*Catharus fuscescens*	
vesper sparrow	*Pooecetes gramineus*	
Virginia rail	*Rallus limicola*	
warbling vireo	*Vireo gilvus*	
whip-poor-will	*Caprimulgus vociferus*	

Common Name	Scientific name	Status
Birds (continued)		
white-breasted nuthatch	*Sitta carolinensis*	
white-crowned sparrow	*Zonotrichia leucophrys*	
white-eyed vireo	*Vireo griseus*	
white-throated sparrow	*Zonotrichia albicollis*	
white-winged crossbill	*Loxia leucoptera*	
wild turkey	*Meleagris gallopavo*	
willow flycatcher	*Empidonax traillii*	
winter wren	*Troglodytes troglodytes*	
wood duck	*Aix sponsa*	
wood thrush	*Hylocichla mustelina*	
worm-eating warbler	*Helmitheros vermivorus*	
yellow warbler	*Dendroica petechia*	
yellow-bellied sapsucker	*Sphyrapicus varius*	
yellow-billed cuckoo	*Coccyzus americanus*	
yellow-breasted chat	*Icteria virens*	
yellow-crowned night-heron	*Nyctanassa violacea*	
yellow-rumped warbler	*Dendroica coronata*	
yellow-throated vireo	*Vireo flavifrons*	
Fish		
lampreys: Family Petromyzontidae		
least brook lamprey	*Lampetra aepyptera*	Candidate
sea lamprey	*Petromyzon marinus*	
gars: Family Lepisosteidae		
longnose gar	*Lepisosteus osseus*	Candidate
bowfin: Family Amiidae		
bowfin	*Amia calva*	Candidate
eels: Family Anguillidae		
American eel	*Anguilla rostrata*	
herrings: Family Clupeidae		
alewife	*Alosa pseudoharengus*	
American shad	*Alosa sapidissima*	
gizzard shad	*Dorosoma cepedianum*	
minnows: Family Cyprinidae		
blacknose dace	*Rhinichthys atratulus*	
bluntnose minnow	*Pimephales notatus*	
bridle shiner	*Notropis bifrenatus*	Endangered
central stoneroller	*Campostoma anomalum*	
comely shiner	*Notropis amoenus*	
common carp	*Cyprinus carpio*	
common shiner	*Luxilus cornutus*	

Common Name	Scientific name	Status
Fish (continued)		
minnows: Family Cyprinidae (continued)		
creek chub	*Semotilus atromaculatus*	
cutlips minnow	*Exoglossum maxillingua*	
eastern silvery minnow	*Hybognathus regius*	
fallfish	*Semotilus corporalis*	
fathead minnow	*Pimephales promelas*	
golden shiner	*Notemigonus crysoleucas*	
goldfish	*Carassius auratus*	
grass carp	*Ctenopharyngodon idella*	
hornyhead chub	*Nocomis biguttatus*	Candidate
longnose dace	*Rhinichthys cataractae*	
mimic shiner	*Notropis volucellus*	
northern redbelly dace	*Phoxinus eos*	
pearl dace	*Margariscus margarita*	
redside dace	*Clinostomus elongatus*	
river chub	*Nocomis micropogon*	
rosyface shiner	*Notropis rubellus*	
rosyside dace	*Clinostomus funduloides*	
satinfin shiner	*Cyprinella analostana*	
silverjaw minnow	*Ericymba buccata*	
spotfin shiner	*Cyprinella spiloptera*	
spottail shiner	*Notropis hudsonius*	
swallowtail shiner	*Notropis procne*	
suckers: Family Catostomidae		
creek chubsucker	*Erimyzon oblongus*	
northern hogsucker	*Hypentelium nigricans*	
quillback	*Carpiodes cyprinus*	
shorthead redhorse	*Moxostoma macrolepidotum*	
silver redhorse	*Moxostoma anisurum*	
white sucker	*Catostomus commersoni*	
catfishes: Family Ictaluridae		
brown bullhead	*Ameirus nebulosus*	
channel catfish	*Ictalurus punctatus*	
margined madtom	*Noturus insignis*	
stonecat	*Noturus flavus*	
tadpole madtom	*Noturus gyrinus*	Endangered
white catfish	*Ameirus catus*	
yellow bullhead	*Ameirus natalis*	
pikes: Family Esocidae		
Amur pike	*Esox reicherti*	
chain pickerel	*Esox niger*	
muskellunge	*Esox masquinongy*	

Common Name	Scientific name	Status
Fish (continued)		
pikes: Family Esocidae (continued)		
northern pike	*Esox lucius*	
redfin pickerel	*Esox americanus americanus*	
smelt: Family Asmeridae		
rainbow smelt	*Osmerus mordax*	
trout: Family Salmonidae		
Atlantic salmon	*Salmo salar*	
brook trout	*Salvelinus fontinalis*	
brown trout	*Salmo trutta*	
lake trout	*Salvelinus namaycush*	
rainbow trout	*Oncorhynchus mykiss*	
killifishes: Family Cyprinodontidae		
banded killifish	*Fundulus diaphanus*	
mummichog	*Fundulus heteroclitus*	
sticklebacks: Family Gasterosteidae		
brook stickleback	*Culaea inconstans*	Candidate
fourspine stickleback	*Apeltes quadracus*	
sculpins: Family Cottidae		
mottled sculpin	*Cottus bairdi*	
Potomac sculpin	*Cottus girardi*	
slimy sculpin	*Cottus cognatus*	
temperate basses: Family Percichthydae		
striped bass	*Morone saxatilis*	
white bass	*Morone chrysops*	
white perch	*Morone americana*	
sunfishes: Family Centrarchidae		
banded sunfish	*Enneacanthus obesus*	Endangered
black crappie	*Pomoxis nigromaculatus*	
bluegill	*Lepomis macrochirus*	
bluespotted sunfish	*Enneacanthus gloriosus*	
green sunfish	*Lepomis cyanellus*	
largemouth bass	*Micropterus salmoides*	
longear sunfish	*Lepomis megalotis*	Endangered
pumpkinseed	*Lepomis gibbosus*	
redbreast sunfish	*Lepomis auritus*	
redear sunfish	*Lepomis microlophus*	
rock bass	*Ambloplites rupestris*	
smallmouth bass	*Micropterus dolomieu*	
white crappie	*Pomoxis annularis*	
perches: Family Percidae		
banded darter	*Etheostoma zonale*	
fantail darter	*Etheostoma flabellare*	

Common Name	Scientific name	Status
Fish (continued)		
perches: Family Percidae (continued)		
greenside darter	*Etheostoma blennioides*	
logperch	*Percina caprodes*	
shield darter	*Percina peltata*	
tessellated darter	*Etheostoma olmstedi*	
walleye	*Sander vitreus*	
yellow perch	*Perca flavescens*	
cichlids: Family Cichlidae		
blue tilapia	*Oreochromis aureus*	
Mammals		
American badger	*Taxidea taxus*	Lower Risk
American beaver	*Castor canadensis*	Lower Risk
American black bear	*Ursus americanus*	Lower Risk
American mink	*Mustela vison*	
Appalachian cottontail	*Sylvilagus obscurus*	
big brown bat	*Eptesicus fuscus*	Lower Risk
bobcat	*Lynx rufus*	
cinereus shrew	*Sorex cinereus*	Lower Risk
coyote	*Canis latrans*	
deer mouse	*Peromyscus maniculatus*	Lower Risk
eastern chipmunk	*Tamias striatus*	Lower Risk
eastern cottontail	*Sylvilagus floridanus*	Lower Risk
eastern fox squirrel	*Sciurus niger*	Lower Risk
eastern gray squirrel	*Sciurus carolinensis*	Lower Risk
eastern mole	*Scalopus aquaticus*	Lower Risk
eastern pipistrelle	*Pipistrellus subflavus*	Lower Risk
eastern small-footed myotis	*Myotis leibii*	Lower Risk
eastern woodrat	*Neotoma floridana*	Lower Risk
elk	*Cervus canadensis*	
ermine	*Mustela erminea*	Lower Risk
gray fox	*Urocyon cinereoargenteus*	
hairy-tailed mole	*Parascalops breweri*	Lower Risk
hoary bat	*Lasiurus cinereus*	Lower Risk
Indiana bat	*Myotis sodalis*	Endangered
least shrew	*Cryptotis parva*	Lower Risk
least weasel	*Mustela nivalis*	Lower Risk
little brown bat	*Myotis lucifugus*	Lower Risk
long-tailed shrew	*Sorex dispar*	Lower Risk
long-tailed weasel	*Mustela frenata*	Lower Risk
meadow jumping mouse	*Zapus hudsonius*	Lower Risk
meadow vole	*Microtus pennsylvanicus*	Lower Risk

Common Name	Scientific name	Status
Mammals (continued)		
muskrat	*Ondatra zibethicus*	Lower Risk
North American porcupine	*Erethizon dorsatum*	Lower Risk
northern flying squirrel	*Glaucomys sabrinus*	Lower Risk
northern long-eared myotis	*Myotis septentrionalis*	Lower Risk
northern raccoon	*Procyon lotor*	Lower Risk
northern river otter	*Lontra canadensis*	
northern short-tailed shrew	*Blarina brevicauda*	Lower Risk
pygmy shrew	*Sorex hoyi*	Lower Risk
red bat	*Lasiurus borealis*	Lower Risk
red fox	*Vulpes vulpes*	
red squirrel	*Tamiasciurus hudsonicus*	Lower Risk
rock vole	*Microtus chrotorrhinus*	Lower Risk
Seminole bat	*Lasiurus seminolus*	Lower Risk
silver-haired bat	*Lasionycteris noctivagans*	Lower Risk
smoky shrew	*Sorex fumeus*	Lower Risk
snowshoe hare	*Lepus americanus*	Lower Risk
southern bog lemming	*Synaptomys cooperi*	Lower Risk
southern flying squirrel	*Glaucomys volans*	Lower Risk
southern red-backed vole	*Clethrionomys gapperi*	Lower Risk
star-nosed mole	*Condylura cristata*	Lower Risk
striped skunk	*Mephitis mephitis*	Lower Risk
Virginia opossum	*Didelphis virginiana*	Lower Risk
water shrew	*Sorex palustris*	Lower Risk
white-footed mouse	*Peromyscus leucopus*	Lower Risk
white-tailed deer	*Odocoileus virginianus*	Lower Risk
woodchuck	*Marmota monax*	Lower Risk
woodland jumping mouse	*Napaeozapus insignis*	Lower Risk
woodland vole	*Microtus pinetorum*	Lower Risk
Reptiles		
coal skink	*Eumeces anthracinus*	
common garter snake	*Thamnophis sirtalis*	
eastern box turtle	*Terrapene carolina*	Lower Risk
five-lined skink	*Eumeces fasciatus*	
milk snake	*Lampropeltis triangulum*	

Common Name	Scientific name	Status
Reptiles		
northern brown snake	*Storeria dekayi*	
northern water snake	*Nerodia sipedon*	
painted turtle	*Chrysemys picta*	
racer	*Coluber constrictor*	
rat snake	*Elaphe obsoleta*	
red-bellied snake	*Storeria occipitomaculata*	
ring-necked snake	*Diadophis punctatus*	
short-headed garter snake	*Thamnophis brachystoma*	
smooth green snake	*Opheodrys vernalis*	
snapping turtle	*Chelydra serpentina*	
timber rattlesnake	*Crotalus horridus*	
wood turtle	*Clemmys insculpta*	Vulnerable
worm snake	*Carphophis amoenus*	

Sources: World Wildlife Fund Species Finder, http://gis.wwfus.org/wildfinder/ & PA Fish and Boat Commission, http://www.fish.state.pa.us/pafish/fishhtms/chap2.htm

APPENDIX J. SPECIES OF CONCERN

Common Name	Scientific Name	Global Rank	State Rank	State Status	Proposed State Status	Federal Status
Birds						
bald eagle	*Haliaeetus leucocephalus*	G5	S2B	PT	PT	
great blue heron	*Ardea herodias*	G5	S3S4B, S4N			
northern goshawk	*Accipiter gentilis*	G5	S2S3B,S3N		CR	
Swainson's thrush	*Catharus ustulatus*	G5	S2S3B,S5N		CR	
Fish						
No fish species of concern						
Geologic Features						
erosional remnant		GNR	SNR			
Invertebrates						
Appalachian jewelwing	*Calopteryx angustipennis*	G4	S1S2			
brook floater	*Alasmidonta varicosa*	G3	S2		PE	
common claybank tiger beetle	*Cicindela limbalis*	G5	S3			
forcipate emerald	*Somatochlora forcipata*	G5	S2			
green floater	*Lasmigona subviridis*	G3	S2		CU	
Maine snaketail	*Ophiogomphus mainensis*	G4	S3			
northern pygmy clubtail	*Lanthus parvulus*	G4	S3S4			
ocellated darner	*Boyeria grafiana*	G5	S3			
ski-tailed emerald	*Somatochlora elongata*	G5	S2			
spine-crowned clubtail	*Gomphus abbreviatus*	G3G4	S2			
superb jewelwing	*Calopteryx amata*	G4	S2S3			
West Virginia white	*Pieris virginiensis*	G3G4	S2S3			
white-faced meadowhawk	*Sympetrum obtrusum*	G5	S3S4			
Mammals						
Allegheny woodrat	*Neotoma magister*	G3G4	S3	PT	PT	
Appalachian cottontail	*Sylvilagus obscurus*	G4	SU			
long-tailed or rock shrew	*Sorex dispar*	G4	S3			
northern myotis (bat)	*Myotis septentrionalis*	G4	S3B,S3N		CR	
water shrew	*Sorex palustris albibarbis*	G5T5	S3		CR	

Common Name	Scientific Name	Global Rank	State Rank	State Status	Proposed State Status	Federal Status
Natural Community Types						
high-gradient clearwater creek		GNR	S3			
hemlock- mixed hardwood palustrine forest		GNR	S3S4			
hemlock (white pine) forest		GNR	S4			
sycamore- (river birch)- box-elder floodplain forest		GNR	S4			
sphagnum- beaked rush peatland		GNR	S3			
hemlock palustrine forest		GNR	S3			
big bluestem- indian grass river grasssland		GNR	S3			
Plants						
Appalachian blue violet	*Viola appalachiensis*	G3	S2	PT	TU	
Case's ladies'-tresses	*Spiranthes casei*	G4	S1	PE	PE	
cattail sedge	*Carex typhina*	G5	S2	PE	PT	
creeping snowberry	*Gaultheria hispidula*	G5	S3	PR	PR	
downy lettuce	*Lactuca hirsuta*	G5?	S3	N	TU	
downy willow-herb	*Epilobium strictum*	G5?	S3	PE	PR	
drooping bluegrass	*Poa languida*	G3G4Q	S2	TU	PT	
fringe-tree	*Chionanthus virginicus*	G5	S3	N	PT	
great-spurred violet	*Viola selkirkii*	G5?	S3S4	N	PR	
large toothwort	*Cardamine maxima*	G5	S2	N	PT	
lupine	*Lupinus perennis*	G5	S3	PR	PR	
marsh bedstraw	*Galium trifidum*	G5	S2	N	PR	
meadow willow	*Salix petiolaris*	G5	S4	TU	WATCH	
mountain starwort	*Stellaria borealis*	G5	S1S2	N	TU	
northern water-plantain	*Alisma triviale*	G5	S1	PE	PE	
queen-of-the-prairie	*Filipendula rubra*	G4G5	S1S2	TU	TU	
screw-stem	*Bartonia paniculata*	G5	S3	N	PR	
slender wheatgrass	*Elymus trachycaulus*	G5	S3	N	TU	
small bristleberry	*Rubus setosus*	G5	SH	TU	PE	
spike sedge	*Carex ormostachya*	G4	S2	N	PT	
stalked bulrush	*Scirpus pedicellatus*	G4	S1	PT	PT	
veiny-lined aster	*Symphyotrichum praealtum*	G5	S3	N	TU	
Reptiles and Amphibians						
coal skink	*Eumeces anthracinus*	G5	S3			
hellbender	*Cryptobranchus alleganiensis*	G3G4	S3			
moutain earth snake	*Virginia pulchra*	G5T3T4	S3			
shorthead garter snake	*Thamnophis brachystoma*	G4	S3			
timber rattlesnake	*Crotalus horridus*	G4	S3S4	PC	CA	

Basic Global Rank Codes and Definitions

Rank Code	Description	Definition
GX	Presumed Extinct	Believed to be extinct throughout its range. Not located despite intensive searches of historic sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
GH	Possibly Extinct	Known from only historical occurrences. Still some hope of rediscovery.
G1	Critically Imperiled	Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).
G2	Imperiled	Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).
G3	Vulnerable	Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G4	Apparently Secure	Uncommon but not rare, and usually widespread. Possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	Secure	Common, typically widespread and abundant. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
G#G#	Range Rank	A numeric range rank (e.g., G2G3) is used to indicate uncertainty about the exact status of a taxon.
T	Infraspecific Taxon (trinomial)	The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species= basic rank (e.g.., a G1T2 subrank should not occur). A population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T rank to denote the taxon's questionable taxonomic status.

Global Rank Qualifiers

Qualifier	Description	Definition
?	Inexact Numeric Rank	Denotes inexact numeric rank.
Q	Questionable Taxonomy	Taxonomic status is questionable; numeric rank may change with taxonomy.
C	Captive or Cultivated Only	Taxon at present is extant only in captivity or cultivation, or as a reintroduced population not yet established.

State Rank Codes and Definitions

Rank Code	Description	Definition
SX	Extirpated	Element is believed to be extirpated from the "state" (or province or other subnational unit).
SH	Historical	Element occurred historically in the state (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 years, and suspected to be still extant. Naturally, an element would become SH without such a 20-year delay if the only known occurrences in a state were destroyed or if it had been extensively and unsuccessfully looked for. Upon verification of an extant occurrence, SH-ranked elements would typically receive an S1 rank. The SH rank should be reserved for elements for which some effort has been made to relocate occurrences, rather than simply ranking all Elements not known from verified extant occurrences with this rank.
S1	Critically Imperiled	Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals or acres.
S2	Imperiled	Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals or acres.
S3	Vulnerable	Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences.
S4	Apparently Secure	Uncommon but not rare, and usually widespread in the state. Usually more than 100 occurrences.
S5	Secure	Demonstrably widespread, abundant, and secure in the state, and essentially ineradicable under present conditions.
S?	Unranked	State rank is not yet assessed.

State Rank Codes and Definitions (continued)

Rank Code	Description	Definition
SU	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible, the most likely rank is assigned and a question mark added (e.g.., S2?) to express uncertainty, or a range rank (e.g.., S2S3) is used to delineate the limits (range) of uncertainty.
S#S#	Range Rank	A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the Element. Ranges cannot skip more than one rank (e.g.., SU should be used rather than S1S4).
HYB	Hybrid	Element represents an interspecific hybrid.
SE	Exotic	An exotic established in the state; may be native in nearby regions (e.g.., house finch or catalpa in eastern U.S.).
SE#	Exotic Numeric	An exotic established in the state that has been assigned a numeric rank to indicate its status, as with S1 through S5.
SA	Accidental	Accidental or casual in the state (i.e., infrequent and outside usual range). Includes species (usually birds or butterflies) recorded once or only a few times. A few of these species may have bred on the one or two occasions they were recorded. Examples include European strays or western birds on the East Coast and vice-versa.
SZ	Zero Occurrences	Not of practical conservation concern in the state because there are no definable occurrences, although the taxon is native and appears regularly in the state. This rank will generally be used for long distance migrants whose occurrences during their migrations have little or no conservation value for the migrant as they are typically too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped, and protected. Typically, the SZ rank applies to a non-breeding population in the subnation -- for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population, for example certain Lepidoptera which regularly die out every year with no significant return migration. Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ only applies when the migrants occur in an irregular, transitory, and dispersed manner.
SP	Potential	Potential that Element occurs in the state but no extant or historic occurrences reported.

State Rank Codes and Definitions (continued)

Rank Code	Description	Definition
SR	Reported	Element reported in the state but without a basis for either accepting or rejecting the report. Some of these are very recent discoveries for which the program hasn't yet received first-hand information; others are old, obscure reports.
SRF	Reported Falsely	Element erroneously reported in the state (e.g., misidentified specimen) and the error has persisted in the literature
SSYN	Synonym	Element reported as occurring in the state, but state does not recognize the taxon; therefore the Element is not ranked by the state.
*		S rank has been assigned and is under review. Contact the individual state Natural Heritage program for assigned rank.
Not Provided		Species is known to occur in this state. Contact the individual state Natural Heritage program for assigned rank.

State Rank Qualifiers

Qualifier	Description	Definition
B	Breeding	Basic rank refers to the breeding population of the Element in the state.
N	Non-breeding	Basic rank refers to the non-breeding population of the Element in the state.
?	Inexact or Uncertain	Denotes inexact or uncertain numeric rank. For SE denotes uncertainty of exotic status. (The ? qualifies the character immediately preceding it in the SRANK.)
C	Captive or Cultivated	Element is presently extant in the state only in captivity or cultivation, or as a reintroduced population not yet established.
NOTE - A breeding status subrank is only used for species that have distinct breeding and/or non-breeding populations in the state. A breeding-status SRANK can be coupled with its complementary non-breeding-status SRANK. The two are separated by a comma, with the higher-priority rank listed first in		

Pennsylvania State Status - Invertebrates

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

Pennsylvania Status Definitions - Plants

Status	Description	Definition
PE	Pennsylvania Endangered	Plant species which are in danger of extinction throughout most of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.
PT	Pennsylvania Threatened	Plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not maintained to prevent their future decline, or if the species is greatly exploited by man.
PR	Pennsylvania Rare	Plant species, which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.
	Disjunct	Significantly separated from their main area of distribution
	Endemic	Confined to a specialized habitat.
	Limit of Range	At or near the periphery of their natural distribution
	Restricted	Found in specialized habitats or habitats infrequent in Pennsylvania.
PX	Pennsylvania Extirpated	Plant species believed by the Department to be extinct within this Commonwealth. These plants may or may not be in existence outside the Commonwealth.
PV	Pennsylvania Vulnerable	Plant species which are in danger of population decline within Commonwealth because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.
TU	Tentatively Undetermined	A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxanomic uncertainties, limited evidence within historical records, or insufficient data.
N		No current legal status exists, but is under review for future listing.

Pennsylvania State Status - Wild Birds and Mammals

Status	Description	Definition
PE	Pennsylvania Endangered	Species in imminent danger of extinction or extirpation throughout their range in Pennsylvania if the deleterious factors affecting them continue to operate. These are: 1) species whose numbers have already been reduced to a critically low level or whose habitat has been so drastically reduced or degraded that immediate action is required to prevent their extirpation from the Commonwealth; or 2) species whose extreme rarity or peripherality places them in potential danger of precipitous declines or sudden extirpation throughout their range in Pennsylvania; or 3) species that have been classified as "Pennsylvania Extirpated", but which are subsequently found to exist in Pennsylvania as long as the above conditions 1 or 2 are met; or 4) species determined to be "Endangered" pursuant to the Endangered Species Act of 1973, Public Law 93 205 (87 Stat. 884), as amended.
PT	Pennsylvania Threatened	Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".
N		No current legal status but is under review for future listing.

Pennsylvania State Status - Fish, Amphibians, Reptiles, and Aquatic Organisms

Status	Description	Definition
PE	Pennsylvania Endangered	All species declared by: 1) the Secretary of the United States Department of the Interior to be threatened with extinction and appear on the Endangered Species List or the Native Endangered Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission, Executive Director to be threatened with extinction and appear on the Pennsylvania Endangered Species List published by the Pennsylvania Bulletin.
PT	Pennsylvania Threatened	All species declared by: 1) the Secretary of the United States Department of the Interior to be in such small numbers throughout their range that they may become endangered if their environment worsens, and appear on a Threatened Species List published in the Federal Register; or 2) have been declared by the Pennsylvania Fish Commission Executive Director to be in such small numbers throughout their range that they may become endangered if their environment worsens and appear on the Pennsylvania Threatened Species List published in the Pennsylvania Bulletin.
PC		Animals that could become endangered or threatened in the future. All of these are uncommon, have restricted distribution or are at risk because of certain aspects of their biology.
N		No current legal status, but is under review for future listing.

Pennsylvania Biological Survey Suggested Status Definitions

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

Pennsylvania Biological Survey Suggested Status Definitions

Status	Description	Definition
PT	Pennsylvania Threatened	Species that may become endangered within the foreseeable future throughout their range in Pennsylvania unless the casual factors affecting the organism are abated. These are: 1) species whose populations within the Commonwealth are decreasing or have been heavily depleted by adverse factors and while not actually endangered, are still in critical condition; 2) species whose populations may be relatively abundant in the Commonwealth but are under severe threat from serious adverse factors that have been identified and documented; or 3) species whose populations are rare or peripheral and in possible danger of severe decline throughout their range in Pennsylvania; or 4) species determined to be "Threatened" pursuant to the Endangered Species Act of 1973, Public Law 93205 (87 Stat. 884), as amended, that are not listed as "Pennsylvania Endangered".
PR	Pennsylvania Rare	Plant species which are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.
	Disjunct	Significantly separated from their main area of distribution
	Endemic	Confined to a specialized habitat.
	Limit of Range	At or near the periphery of their natural distribution
CP	Candidate Proposed	Species comprising taxa for which the Pennsylvania Biological Survey (PBS) currently has substantial information on hand to support the biological appropriateness of proposing to list as
CA	Candidate at Risk	Species that although relatively abundant now are particularly vulnerable to certain types of exploitation or environmental modification.
CR	Candidate Rare	Species which exist only in one of a few restricted geographic areas or habitats within Pennsylvania, or they occur in low numbers over a relatively broad area of the Commonwealth.
CU	Condition Undetermined	Species for which there is insufficient data available to provide an adequate basis for their assignment to other classes or categories.
PX	Pennsylvania Extirpated	Species that have disappeared from Pennsylvania since 1600 but still exist elsewhere.
DL	Delisted	Species which were once listed but are now cited for delisting.
N		No current legal status, but is under study for future listing.

Federal Status Codes and Definitions

LE	Listed Endangered	A species which is in danger of extinction throughout all or a significant portion of its range.
LT	Listed Threatened	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
LELT	Listed Endangered in part of range; listed Threatened in the remaining part.	
PE	Proposed Endangered	Taxa proposed to be listed as endangered.
PT	Proposed Threatened	Taxa proposed to be listed as threatened
PEPT		Proposed Endangered in part of range; proposed Threatened in the remaining part.
C	Candidate for listing.	
E(S/A)		Treat as Endangered because of similarity of appearance.
T(S/A)		Treat as Threatened because of similarity of appearance.
XE	Essential Experimental population	
XN	Nonessential Experimental population	
"xy" (mixed status)		Status varies for different populations or parts of range.
"x" NL		Status varies for different populations or parts of range with at least one part not listed.

APPENDIX K. RECREATIONAL FACILITIES

Campgrounds, Cabins, and Lodges	*Sites*	*Amenities*
Austin Campground	128	Open year round, cabin rentals, water, electric, sewage, shower house, camp store, pets welcome, fire rings, organized activities, recreation area, hunting and fishing, river access, and snowmobiling
Austin Dam		Open year round primitive camping
Benezett Store and Campground		Primitive and modern camping with dump station, restrooms, showers, sleep rooms, restaurant, and canopies
Cherry Springs State Park	30	Open April-Dec, fire rings, picnic table, lantern hanger, star gazing field
Elk Country Hideaway	1	Privately owned three bedroom lodge located in Benezette
Elk Mountain Homestead	1	Three bedroom lodge owned and operated by the Rocky Mountain Elk Foundation on 245 acres in Benezette
Elk Terrace Lodge	1	Privately owned three bedroom lodge located in Benezette
Hilltop Lodge	1	Privately owned lodge located in Emporium with 116 acres that can accommodate up to 18 people
Geist Mountain Creek Campground and Cabins		Privately-owned campground located near the village of Sinnemahoning
MacDarvey Castle	1	Privately owned in the middle of the Elk Range the Mac Darvey Castle can accommodate up to 10 guest
Medix Run Lodges and Camping	12	Located in the Medix Run valley are 3 lodges and 12 campsites
Old Charm Bed and Breakfast		Located in St. Marys six rooms are available to accommodate visitors
Parker Dam State Park	110	Open April-Dec, water, electric, pay phone, fire rings, organized activities, pets welcome, recreation areas, hunting, fishing, lake, sledding, and cross-country skiing. CCC interpretive center, environmental center, and 16 rental cabins are located within the park
Patterson State Park		Provides primitive camping
Prouty Place State Park		Provides primitive camping
Sinnemahoning State Park	35	Open April-Dec, water, electric, pay phone, fire rings,
Sizerville State Park	23	Open April-Dec, electric, pay phone, shower house, fire rings, camp store, hunting and fishing, river, and snowmobiling
Sleeping Elk Lodge	1	Privately owned lodge located in Benezette

The Big Elk Lick		Primitive camping in the heart of the Elk range catering to horse groups with access to Thunder Mountain Equestrian Trail

Campgrounds, Cabins, and Lodges	***Sites***	***Amenities***
Tuts Huts		Efficiency cabins located on Winslow Hill in Benezette
Wapiti Woods	6	Located in Benezette each cabin has a wood burning fire place and varies in size and amenities
Winslow Hill Bed and Breakfast		Three rooms available to accommodate visitors
Winslow Meadow Lodge	1	Privately owned three bedroom lodge located in Benezette

Golf Courses	***Size***	***Description***
Bavarian Hills Golf Course		18-hole private golf course located outside of St. Marys
Emporium Country Club	6.291 acres	18-hole golf course established in 1953

Hiking Trails	***Size***	***Description***
Abbot Hollow Trail	1.7 miles	hiking, wildlife watching
Beaver Dam Trail	2.3 miles	hiking, wildlife watching
Bottomlands Trail		Sizerville State Park trail
Bucktail Path	34 miles	Travels through Elk State Forest from Sizerville State Park to the village of Sinnemahoning
Campground Trail		Sizerville State Park trail
Donut Trail	90 miles	Travels from Sinnemahoning to Farrandsville interconnecting with the Susquehannock trail, Quehanna trail, and Bucktail path
East Cross Connector		Detour trail of the Quehanna Trail
Elk State Forest	64 miles	Not entirely located in project area
Elk State Forest Trails	97 miles	Not entirely located in project area
Elk Trail	16 miles	Crosses various terrains including railroad grades, pipelines, logging roads with a chance of seeing free roaming elk
Fred Woods Trail	4.5 miles	Loop trail to scenic vistas and unique area of large boulders
Laurel Run Trail	1 mile	hiking, wildlife watching
Logslide Trail	0.5 miles	history, trail connector
Low Lands Trail		Sinnemahoning State Park trail
Moshannon State Forest	178 miles	Not entirely located in project area
Moshannon State Forest Trails	168 miles	Not entirely located in project area
Nady Hollow Trail - Nady Hollow Connector		Sizerville State Park trail
Northslope Trail		Sizerville State Park trail
Parker Dam State Park	7 miles	Access to additional 32 miles of trail
Pine Tree Trail	1.75	Self-guided interpretive trail through the Pine Tree Natural Area

Hiking Trails	***Size***	***Description***
Quehanna Trail	75 miles	A hiking and backpacking trail looping through Moshannon and Elk State Forest crossing through Quehanna Wild Area and Marion Brooks Natural Area
Red Spruce Trail		Sinnemahoning State Park trail
Shawmut Trail		Borders the watershed in State Game Lands 25
Sinnemahoning State Park	5 miles	Access to additional 82 miles of trail
Sinnemahoning Trail		
Sizerville Nature Trail		A self guided trail located on Elk State Forest across from Sizerville State Park
Sizerville State Park	2 miles	Access to additional 82 miles of trail
Skunk Trail	1.4 miles	hiking, trail connector
Snow Trail	1.6 miles	hike, snowmobile
Souders Trail	0.75 miles	hiking
Sproul State Forest Trails	204 miles	Not entirely located in project area
Spurline Trail	3.5 miles	hiking
State Game Lands 25	11 miles	Not entirely located in project area
Stumpfield Trail	0.5 miles	hiking
Sullivan Ridge Trail	1.4 miles	hiking
Susquehannock State Forest Trails	220 miles	Not entirely located in project area
Susquehannock Trail	85 miles	A backpacking and hiking trail looping around the Susquehannock State Forest
Tornado Alley Trail	0.5 miles	hiking
Trail of New Giants	1 mile	hiking, scenic vista, windstorm preserve
West Cross Connector		Detour trail of the Quehanna Trail

Historical Sites	***Description***
Austin Dam	Listed on the National Register - Remnants of the Austin Dam that broke in 1911
Austin Historical Society	Austin Historical Society museum
Bucktail Monument	Historical monument dedicated to the members of the Bucktail Regiment
Cherry Springs Picnic Pavilion	Listed on the National Register - Picnic shelter that was built by members of Civilian Conservation Corps
Civilian Conservation Corps Interpretive Center	Museum dedicated to the history of the men who served in the Civilian Conservation Corps
Little Museum	Cameron County Historical Society
Noble-Chambers Memorial Forest	Located in the Quehanna Wild area this silviculture demonstration site is dedicated to the memories of James Knoble, Jr. and Lester Chambers, foresters killed in an explosion near the site in 1967
Parker Dam State Park Dam District	Listed on the National Register - dam built by members of the Civilian Conservation Corps

Parker Dam State Park Family Cabin District	Listed on the National Register - Cabins built by members of the Civilian Conservation Corps

Historical Sites	***Description***
Parker Dam State Park Octagonal Lodge	Listed on the National Register - Lodge built by members of the Civilian Conservation Corps
Tom Mix Comes Home Museum and Memorial Outhouse	Museum and memorial outhouse where Tom Mix, famous western actor grew up
Wayside Memorial Spring	Commemorates the efforts of eight Civilian Conservation Crops fire fighters who died while battling a forest fire at Pepperhill

Parks	***Size***	***Description***
Austin Dam Memorial Park	76 acres	Remnants of Austin Dam, picnic areas, hiking trails, primitive tent camping
Jay Township Community Park		School playground
Bucktail State Park	75 miles	Scenic drive along Route 120
Howards Zimmer Memorial Park		Cameron County Fairgrounds
Cherry Springs State Park	48 acres	Campsites, picnic area, CCC pavilion, Stars-n-Park program, PA first Dark Sky Preserve
Driftwood Park		Playground
Parker Dam State Park	968 acres	Campground, cabins, Quehanna Trail, boating, fishing, swimming, sledding, cross-country skiing, playground, wildlife watching, CCC museum, 20-acre lake, environmental education center, windstorm preserve
Patterson State Park	10 acre	Picnic pavilions, primitive campsites, and trailhead for Susquehannock Trail
Penfield Elementary School Playground		School playground
Prouty Place State Park	5 acre	Passive park providing access for hunting, fishing, wildlife watching, and hiking
Sinnemahoning State Park	1,910 acres	Wildlife viewing area, 142-acre lake, campground, boating, playground, picnic areas, picnic pavilions, 5 miles of trail, and 4.2 miles of snowmobile trails
Sizerville State Park	386 acres	Campground, picnic pavilions, picnic areas, outdoor amphitheater, playground, swimming pool, wading pool, environmental education programs, hiking trails, snowmobile trails
Sterling Run Playground		Playground and picnic pavilion
Thunder Mountain Park		Playground, restrooms, skate park
Woodland Elementary School Playground		School Playground

State Forest Lands	***Size***	***Description***
Elk State Forest	198,000 acres	Located in Cameron and Elk counties

Moshannon State Forest	187,000 acres	Located in Clearfield and Elk counties in the Bennett Branch watershed
Sproul State Forest	305,000 acres	Located in Clinton County portion of Sinnemahoning Creek

State Forest Lands	***Size***	***Description***
Susquehannock State Forest	262,000 acres	Located in headwaters of First Fork Sinnemahoning Creek and the Freeman Run subwatershed

State Game Lands	***Size***	***Description***
State Game Lands 14	13,819 acres	Howard Siding
State Game Lands 25	23,136 acres	Johnsonburg; not entirely located in project area
State Game Lands 30	11,572 acres	Norwich; not entirely located in project area
State Game Lands 34	8,800 acres	Medix Run; not entirely located in project area
State Game Lands 93	4,876 acres	Sabula; not entirely located in project area
State Game Lands 293	2,284 acres	Swissmont
State Game Lands 311	1,730 acres	Benezette

Approved Trout Waters	***County***
Brooks Run	Cameron
Clear Creek	Cameron
Driftwood Branch Sinnemahoning Creek	Cameron
East Branch Cowley Run	Cameron
East Branch Hicks Run	Cameron
First Fork Sinnemahoning Creek	Cameron
Hicks Run	Cameron
Mix Run	Cameron
North Creek	Cameron
Sinnemahoning Portage Creek	Cameron
Stevenson Reservoir	Cameron
Upper Jerry Run	Cameron
West Branch Cowley Run	Cameron
West Branch Hicks Run	Cameron
Wykoff Run	Cameron
Bennett Branch Sinnemahoning Creek	Clearfield
Jack Dent Branch	Clearfield
Parker Lake	Clearfield
Wilson Run	Clearfield
Byrnes Run	Elk
East Branch Hicks Run	Elk
Hicks Run	Elk
Medix Run	Elk
Mix Run	Elk
Powers Run	Elk
West Branch Hicks Run	Elk
Bailey Run	Potter
Big Moores Run	Potter

East Branch Cowley Run	Potter
East Fork Sinnemahoning Creek	Potter
First Fork Sinnemahoning Creek	Potter
Freeman Run	Potter
South Woods Branch	Potter

APPENDIX L. INTERVIEW AND SURVEY QUESTIONS

Key Individual Interview Questions

1. How has the watershed* changed in the past 10 years? Were these changes good, bad, indifferent? *Note: "watershed" includes landscape features, ecological communities, & human infrastructure.

2. How do the following currently meet the needs of the watershed community? (Are the quantities sufficient, insufficient, or satisfactory? Are they in good condition?) Please include your solution recommendations.

    a. Transportation –area roads, public transportation
    b. Infrastructure – water and sewer lines
    c. Employment Opportunities
    d. Educational Opportunities
    e. Land Use Ordinances

3. Do the recreational opportunities currently meet the needs of the watershed community? (Are there too many, not enough, or a sufficient number? What condition are they in? Are they easy to access? Please include your solution recommendations.)

    a. Parks/Picnic Sites
    b. Hiking/Biking Trails
    c. Off- Road Vehicle Riding
    d. Scenic Vistas/Photography
    e. Wildlife/Bird Watching _
    f. Hunting/Fishing
    g. Boating/Swimming
    h. Historical Sites/Structures
    i. Golf Courses and other
    j. Winter Recreation

4. What are some of the positive features of the watershed? (Please consider both the ecological and social community in your answer, from water quality to economics.)

5. What are some of the negative impacts currently affecting the land, water, and biological resources?

6. Do you have any specific projects or type of projects you would like to see identified in the plan?

7. What must the watershed conservation plan say to be successful?

8. What must the watershed conservation plan *not* say to be successful?

9. Do you know of any other people we should interview?
   Name _____ Phone _____
   Address _____

10. Do you have any other questions or comments before we conclude this interview?

Municipal Survey

1.) What county and municipality do you represent?

County _____ Municipality _____

2.) In what watershed(s) is your municipality located? Note: watersheds include the area of land surrounding the mentioned tributaries and all minor tributaries draining into them.

□ First Fork, including Freeman Run and East Fork
□ Driftwood Branch, including Sinnemahoning Portage Creek and West Creek
□ Bennett Branch
□ Sinnemahoning Creek mainstem, including Wykoff Run
□ Don't Know
□ Other _____

3.) What do you think are the two most common land uses in your area?

□ Residential
□ Commercial/Industrial
□ Water/Wetlands
□ Forested
□ Agricultural
□ Recreational
Other_____

4.) Please indicate the importance of the following watershed values.

	Very Important	Somewhat Important	Neutral	Not likely Important	Not Important
Attractive Natural Settings	5	4	3	2	1
Preserving Historic Sites	5	4	3	2	1
Recreation Opportunities	5	4	3	2	1
Water Quality Improvement	5	4	3	2	1
New Business/Jobs	5	4	3	2	1
Community Activities	5	4	3	2	1
Residential Development	5	4	3	2	1
Educational Opportunities	5	4	3	2	1
Other _____	5	4	3	2	1

5.) Please indicate the importance of the following recreational activities in the watershed.

	Very Interested	Somewhat Interested	Neutral	Not-likely Interested	Not Interested
Boating	5	4	3	2	1
Hiking	5	4	3	2	1
Fishing	5	4	3	2	1
Canoeing/Kayaking	5	4	3	2	1
Horseback Riding	5	4	3	2	1
Swimming	5	4	3	2	1
Hunting	5	4	3	2	1
Bird Watching	5	4	3	2	1
Picnicking	5	4	3	2	1

	Very Interested	Somewhat Interested	Neutral	Not-likely Interested	Not Interested
Visiting Scenic Vistas	5	4	3	2	1
Organized Sports	5	4	3	2	1
Photography	5	4	3	2	1
Visiting Public Parks	5	4	3	2	1
ATV Riding	5	4	3	2	1
Biking	5	4	3	2	1
Other _____	5	4	3	2	1

6.) Does your municipality have a comprehensive plan? □ YES or □ NO
If yes, what is the name of the plan(s) and when was it adopted?

7.) Do you currently utilize zoning and/or subdivision ordinances? □ YES or □ NO
If yes, what types of ordinances do you have?
□ Zoning
□ Subdivision ordinances
□ Both

8.) Does your municipality have floodplain ordinances? □ YES or □ NO If yes, how are they enforced?

9.) What are the three most critical needs or challenges in your county or municipality that affect the Sinnemahoning Creek watershed?

10.) Are there any municipal parks in your watershed? If yes, please list them.

11.) *a.* Does your municipality have public water services in the Sinnemahoning Creek watershed area? □ YES or □ NO If yes, please list the name and capacity of each facility.

b. Do you foresee the need to upgrade or establish a public water supply in your municipality within the next ten years? □ YES or □ NO

12.) *a.* Does your municipality have public sewage systems in the Sinnemahoning Creek watershed area? □ YES or □ NO If yes, please list the name and capacity of each facility.

b. Do you foresee the need to upgrade or establish a public sewage in your municipality within the next ten years? □ YES or □ NO

13.) What projects would you like to see implemented in your area that could be included in the Sinnemahoning Creek Watershed Conservation Plan? Please list short-term and long-term projects and goals.

a.) Land Use/Land Resources (farmland preservation, development, planning, etc.)
b.) Water Resources (quality, quantity, etc.)
c.) Biological Resources (plant, animal, terrestrial, aquatic, areas of concern, etc.)
d.) Cultural Resources (historical, recreational, environmental education, etc.)
e.) Other (roads/other transportation, economy/jobs, population & demographic trends)

Public Survey

General Questionnaire

*** Please use the following scale for the next three questions, each number can be used more than once.**

5 = Very Important
4 = Somewhat Important
3 = Neutral
2 = Not very Important
1 = Not Important

3. Please indicate the importance of the following watershed values.

_____ Attractive Natural Settings
_____ Community Activities
_____ Educational Opportunities
_____ New Business/Jobs
_____ Preserving History/Culture
_____ Recreation Opportunities
_____ Residential Development
_____ Water Quality
_____ Other _____

4. Please indicate the importance of the following recreational activities in the watershed.

_____ ATV Riding
_____ Biking
_____ Bird/Wildlife Watching
_____ Boating
_____ Canoeing/Kayaking
_____ Fishing
_____ Hiking
_____ Horseback Riding
_____ Hunting
_____ Organized Sports
_____ Photography
_____ Picnicking
_____ Snowmobiles
_____ Swimming
_____ Visiting Public Parks
_____ Visiting Public Vistas
_____ Other _____

General Questionnaire

5. Please indicate the importance of addressing the following watershed issues.

_____ Preserving Agricultural Lands
_____ Eliminating Illegal ATV/Snowmobile Use and Conflicts
_____ Providing ATV/Snowmobile Recreation Facilities
_____ Improving Infrastructure (i.e. roads, water, sewage, etc.)
_____ Enhancing Economic Development
_____ Increasing Environmental Education
_____ Reducing Erosion & Sedimentation
_____ Reducing Flooding
_____ Improving Forestry Techniques
_____ Preserving Historical & Cultural Heritage
_____ Preventing Illegal Dumping & Clean up Litter
_____ Controlling Invasive Species
_____ Reclamation of Mine Drainage/Mine Lands
_____ Reducing Storm Water Runoff
_____ Addressing Tourism Impacts
_____ Managing Waste Sites/Hazardous Spills
_____ Improving Water Quality
_____ Ensuring Adequate Water Quantity
_____ Improving Wildlife/Fisheries Habitats
_____ Other _____

6. What are the top 3 services/amenities that are lacking within the watershed? (i.e. restaurants, public restrooms, gas stations, emergency services, etc.)

1. _____
2. _____
3. _____

7. Other comments or concerns.

_____
_____
_____

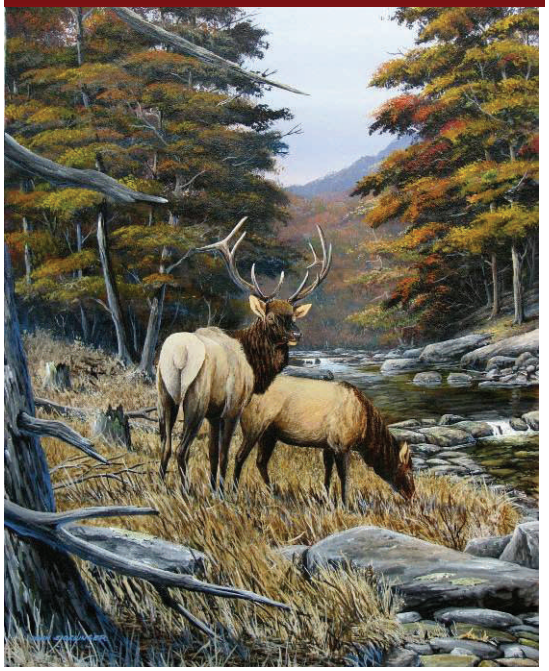
Thank you very much for completing this survey. Please return the survey within two weeks.

<u>Return Options</u>:
Refold the pamphlet, tape (do not staple), and place it in the mail with proper postage. Or, drop off at Parker Dam State Park, Sinnemahoning State Park, or the Barbara Mascato Brown Memorial Library.

Revised 9/07

Voice Your Opinion

Sinnemahoning Creek
Watershed Conservation Plan



By completing and returning the survey, you will have a chance to win this John Sidelinger original painting, more information inside.

The goal of the Sinnemahoning Creek Watershed Conservation Plan is to assess past and present conditions of resources to develop a plan for the future of the watershed, which will:

- promote responsible recreation
- educate and encourage stewardship to protect and restore natural resources
- foster an appreciation and understanding of cultural and historical legacies

Residents Questionnaire

For Individuals with Permanent Residence within the Watershed

Please Mark One

1. **In what county and municipality do you reside?**
   County _____
   Municipality _____

2. **Near what part of the Sinnemahoning Creek watershed do you reside?**

◊ Bennett Branch
◊ Driftwood/Sinnemahoning Portage
◊ First Fork
◊ Sinnemahoning Mainstem
◊ Don't Know
◊ Other _____

3. **How long have you lived in the area?**

◊ Less than 1 year
◊ 1-10 years
◊ 11-20 years
◊ 21-30 years
◊ 31-40 years
◊ 41-50 years
◊ 51-60 years
◊ 60+ years

4. **How far do you travel to work?**

◊ Less than 1 mile
◊ 1-15 miles
◊ 16-30 miles
◊ 31-45 miles
◊ 46-60 miles
◊ Farther _____

5. **How often do you visit state parks and state forests in your area?**

◊ Frequently (6 or more times a year)
◊ Occasionally (2-5 times a year)
◊ Sporadically (once every year)
◊ Rarely (once every few years)
◊ Never

* Please Continue with the General Questionnaire

Visitors Questionnaire

Please Mark One

1. **Do you own property in the watershed?**

◊ Yes ◊ No

2. **How far did you travel to visit?**

◊ Less than 1 mile
◊ 1-30 miles
◊ 31-60 miles
◊ 61-90 miles
◊ 91-120 miles
◊ 121-150 miles
◊ 151-180 miles
◊ Farther _____

3. **How long did you stay on this trip?**

◊ Less than one day
◊ 1-2 days
◊ 3-4 days
◊ 5-6 days
◊ One week
◊ A week and a half
◊ Two weeks
◊ Longer _____

4. **Approximately how much money did you spend?**

◊ Less than 100 dollars
◊ 100-500 dollars
◊ 500-1,000 dollars
◊ 1,000-2,000 dollars
◊ 2,000-3,000 dollars
◊ 3,000-5,000 dollars
◊ 5,000+ dollars

5. **What were your two biggest expenses?**

◊ Food/Lodging
◊ Recreation/Supplies
◊ Souvenirs
◊ Travel/Gas
◊ Other _____

6. **What was your reason for visiting?**

◊ Business
◊ Family/Friends
◊ Passing through
◊ Recreation/Vacation
◊ Visiting
◊ Other _____

7. **How often do you visit?**

◊ First time
◊ Seasonal
◊ Yearly
◊ Occasionally (every 2-5 years)
◊ Every 5+ years

General Demographics

(Optional)

1. **What is your gender?**

◊ Male ◊ Female

2. **What is your age?**

◊ 17 & under
◊ 18-25
◊ 26-45
◊ 46-65
◊ 66 & up

General Questionnaire

For Residents and Visitors

1. **What do you think are the two most important land uses in the Sinnemahoning Creek watershed area?**

◊ Agricultural
◊ Commercial
◊ Forested
◊ Other _____
◊ Industrial
◊ Recreation
◊ Residential

2. **Where did you obtain this survey?**

◊ Business/Restaurant
◊ Event _____
◊ State park/state forest
◊ Watershed group
◊ Website
◊ Other _____

* Please Continue on Reverse

* **If you would like to be entered to win the original (16x20") painting pictured on the front cover of the survey and receive project updates, please complete the information below. Entrees must be received by October 31, 2008.**

Name _____
Address _____
_____
E-mail _____
Home Phone _____
Work Phone _____

APPENDIX M. FOCUS GROUP MEETING RESULTS

Project Area Characteristics

What areas currently lack infrastructure needs (sewage, water, telephone, internet, roads, etc)?

- Water and sewage cooperative systems
- Newer technology for sewage
- Cell phones for emergency access – satellite (?)
- Need more gas stations
- Open forestry roads when appropriate
- Limestone on dirt roads to prevent soil run-off
- Allow ATVs of forestry roads (?)
- Emergency services
- Telecommunications
- Keep development on the periphery
- Prevent sprawl
- Keep road building to a minimum
- Context-sensitive development
- More campgrounds and B&Bs

Where is infrastructure failing or need to be improved (dirt and gravel road issues, pull-offs for tourist, safe passing lanes, sewage/septic, water supply)?

- Water system (Driftwood)
- Useable areas for pull-offs?
- Dirt roads
- More pull offs are needed
- Septic
- Sign pollution prevention

What areas need additional services for tourism (food, lodging, fuel, souvenirs, and restrooms)?

- Driftwood and Wharton areas
- Rest areas
- Souvenirs quality befitting of area
- Bike Trails

Where can business/economic development opportunities be improved? How and what types of business development can be supported to sustain the watershed?

- Bike Trails
- Rentals
- Bed and Breakfasts
- Outfitters
- Sporting Goods
- Restaurants

Land Resources

What issues and concerns do you have regarding current land-use policies on public lands?

- PA WILDS – use proper development in the initiative.
- Don't change the character/ local culture by making the area a 'tourist attraction'.
- Keep businesses locally owned.
- Gas well site development – road maintenance
- More coordination among public landowners (DCNR and PGC)
- Quehanna Wild area – Forestry needs active management of the timber.

Are there any brownfield sites, if so where are they located?

- The 'Tyler area' was noted
- A site near Driftwood at the Castle Garden Bridge
- DCED site finder lists 11 sites:
  - *Carey's Store, Grove Twp, Cameron Co*
  - *Wittman Property, St. Mary's*
  - *Hunt Oil Products, St. Mary's*
  - *Stackpole Complex, St. Mary's*
  - *Huston Twp Water Auth Bldg, Penfield*
  - *Penfield Commercial Lot, Penfield*

- *Former Auto Dealership, Shippen Twp.*
- *Former Machine shop & Laundry, Emporium*
- *Pro-America, Emporium*
- *Former Tri-Fac Property, Emporium*
- *Emporium borough Taylor St. Property, Emporium*

Are there any auto salvage or scrap yards, if so where are they located?

- These were located on the map
- Route 255 at Force
- At Force across Bennett Branch on hillside
- Route 46 north Emporium

What hazardous areas are of concern in the watershed?

- Two features were considered: Abandoned Mine Lands (AML) with dangerous highwalls and Abandoned Landfills
- AML sites: numerous sites in Bennett Branch watershed, much remediation being done. Comprehensive list was provided by BAMR (Eric Cavazza). Sterling Run area has abandoned sites with Priority 2 status including the following Problem Areas (PA): 3310,4749,6070,3309,6071
- Three abandoned landfills were located on the map: Shippen Twp; Huston Twp; East Fork

What critical areas are threatened, by what, and where are they located?

- Wind farms
- Steep slopes (erosion impact) – 4- wheelers; horses
- Logging industry – education or courses on logging & sustainable forestry.

Do you have any other issues or concern?

- Need for a place to properly dispose of appliances, etc to prevent illegal dumping
- Concern about increased tourism and development of the area
- Preserve the natural area – it is a unique feature; don't lose the 'big woods'

Water Resources

What streams are the most critically impaired and what type of impairment is degrading it? Please prioritize.

- Abandoned Mine Drainage
  - Bennett's Branch
  - Sterling Run *Minimal impacts
  - West Creek
  - Parker Run*
  - Canoe Run*
- Dirt and Gravel Roads bordering streams
  - Includes many streams in Cameron, Clearfield, Elk, Potter, and McKean counties
  - Particularly Big Morris Run, Hunts Run, Bark Shanty, Hicks Run, Salt Run, Sizer Run, 4mile Run, Waldy Run
  - Includes oil and gas sites and the onslaught of new oil and gas sites coming to the area
  - Includes logging roads as problem particularly in our headwater streams
- Acid Rain Problems – Mix Run, Medix Run, and other headwater streams
- Lack of Vegetative Riparian Corridors – Driftwood, First Fork, and Portage Creek
- Stevenson Dam filling with sediment

What areas in the watershed are most impacted by stormwater issues? Where is Stormwater planning most urgently needed?

- Emporium – storm drains enter directly into streams
- Saint Marys – The town is basically built on top of the stream. West Creek flows under ground and streets for several miles

Where are erosion and sedimentation concerns the most pronounced?
Areas lacking riparian vegetation - Dirt and gravel roads, logging, and oil and gas road sites
Areas of development such as Clear Creek, North Creek, Portage Creek, Driftwood, and First Fork

Are there any abandoned dams affecting recreation and ecology? Please indicate their location and rate the potential for removal.
Pickrick Dam located at the Fly Fishing Only Section of Driftwood. PFBC wants to remove it but the landowner does not want to allow access.

What areas are most impacted by or vulnerable to floodplain/wetland development/degradation?
Due to the topography, all housing in Cameron County is located in the valleys affecting wetlands and floodplains. Logging, oil and gas, and mining sites influence wetlands as well.

Are there any concerns over the available supply of water/groundwater; if so, what areas seem to be of the greatest concern?
Driftwood Borough had quantity issues this past summer in Nanny Run, their source water. Also noted was the amount of bacteria in groundwater wells.

What high quality streams are in the direst need of protection?
- There was a large agreement of protection of HQ and EV streams
- Portage Creek
- Cooks Run
- Big Moores Run

Please indicate areas where forestry or agricultural practices are affecting water quality.
- Farms are next to the streams because that is the only area of flat ground.
- Cooks Run and Clear Creek have been degraded from logging.

Do you have any other issues or concerns?
- Mention of Alternative Energy
- Very large agreement on Public Access along the Driftwood with the Railroad

Biological Resources

Which areas of the watershed are impacted most severely by disease and pests, including invasive species?
- Current Impacts
  - Beetle Pest (Kills Willows) Big Moore's Run
  - Multiflora Rose – throughout watershed
  - Hemlock wooly adelgid
  - Buckthorn
  - Japanese knotweed

  - Mile-A-Minute weed
  - Tree of Heaven
  - Asian lady bug beetles
  - Purple loostrife
  - Anthrancnose (Sycamores)
- Possible Future Impacts
  - Elm spanworm
  - Gypsy moth
  - Rusty crawfish
  - Emerald ash borer

What wildlife management issues exist in the watershed, how effectively are they being managed?

- Elk
- Restoration of Driftwood Branch
- Bald Eagle population
- Pros and cons of white-tailed deer population
- Deer management effective for regenerating forests
- Overabundance of ferns and consequences of herbicide treatments
- Trout stocking – introduced species/ maintaining brook trout populations
- Timber rattlesnakes – management techniques (?) Surveys (?)

Based on the map, are there any additional biological diversity areas that should be identified/investigated further?

- Old growth areas (Johnson Run, Lower Jerry Run)
- Unique wildflower areas (Cowley Run)
- Palustrine Forests (Head of Medix Run)
- Quehanna wild area
- Cranberry bogs, sundew colonies, pitcher plant (Wallace Run, Beaver Dam Run)
- Hellbenders (where are they?)

Eighty-nine percent of the watershed is forested; where are poor forestry practices impacting the natural resources and does this seem to be more of a problem on private or public lands.

- Seneca
- Gas exploration
- Lot of small logging outfits may not be using BMPs
- Enforcement of BMPs
- More problems on private lands
- Stricter requirements for using BMPs when doing forestry management
- High grading, especially on private lands, less diversity

What unique biological features are found in the watershed?

- Headwater areas
- 89 % forested
- Forested watershed
- Rock outcroppings
- Some areas not impacted by abandoned mine drainage
- Abundant native species
- Clean water
- Waterfall
- Elk

What programs are currently offered to assist landowners with conservation, habitat creation, and best management practices implementation?

- PLAP – private landowner assistance program
- WHIP (wildlife habitat incentives program) – USDA, NRCS, PGC
- EQUIP – Environmental Quality Incentives Program
- Habitat management section – PFBC
- Norfolk settlement – PFBC, DEP
- CREP – PGC, USDA
- Service forester program – DCNR

Do you have any other issues or concerns?
- ATVs
- PA Wilds – end result
- OGM – mandatory PNDIs to get permits
- Threatened and or endangered species
- Gas exploration
- Invasive species

Cultural Resources

Where are the local (community) parks located?
- Cultural resources have already been inventories through Lumber Heritage Region, state parks, state forests, DCNR recreation plan, elk watching and nature tourism.

According to the map, are there any recreational facilities not included or incorrectly located or named?
- Cultural resources have already been inventories through Lumber Heritage Region, state parks, state forests, DCNR recreation plan, elk watching and nature tourism.
- Hiking trail systems are greatly under utilized and promoted

Where do the people access the creek for canoeing, fishing, swimming? Is it public or privately owned?
- Cultural resources have already been inventories through Lumber Heritage Region, state parks, state forests, DCNR recreation plan, elk watching and nature tourism.
- Railroad right-or-way from Emporium to Driftwood access to streams and coke ovens is blocked.
- Stream access and amenities along first fork from Wharton down
- Stream access and amenities along all navigable waterways in watershed

What sites have the best potential for establishing stream access?
- Cultural resources have already been inventories through Lumber Heritage Region, state parks, state forests, DCNR recreation plan, elk watching and nature tourism.

What additional recreational needs are currently not available?
- Designated trail systems for ATVs
- State forest roads open for ATV use. Trail system (roads) exists but not currently open legally.

Are there any historical features of the watershed that are important to preserve and highlight?
- Cultural resources have already been inventories through Lumber Heritage Region, state parks, state forests, DCNR recreation plan, elk watching and nature tourism.
- Austin Dam

Do you feel environmental education opportunities are lacking/adequate?

- Environmental education needs should be evaluated on a broad approach and then broken out and expanded upon specific topic bases.
- Saint Marys School District covers a wide array of environmental issues, professions, and experiences, including green energy, PGC, forestry, hunting, fishing, and trap shooting?
- What do other school districts do?

Do you have any other issues or concerns?

- Blend of culture and industrial heritage with technological advancement.
- Health care and medical facilities
- Lack of cell phone coverage
- Lack of governmental leadership in the role of community identify and personal accountability (welfare reform, low income housing reform, etc.)
- Prouty park rehabilitation and promotion due to its location near Susquehanna Trail system
- Identify culture/history and develop connection to these designations through local residents and professionals. (Fun way to get there!)

APPENDIX N. PUBLIC COMMENTS

Issue, concern, or comment	Action Taken
Public Meeting Comments *(Austin, Pennsylvania, November 11th, 2009)*	
Install real-time stream water quality monitoring devices. They cost about $22,000 initially, plus $4,000 in annual maintenance fees. These devices may help monitor streams for early detection and rapid response to impacts, such as gas fracking water discharges.	"Install real-time water quality monitoring devices" was added to water monitoring related recommendations.
Restore native aquatic populations to the watershed, including American eel, shad, and salmon.	Recommendation added.
Conduct biological surveys for American eel, shad, and salmon, as well as hellbender salamanders.	Recommendation added.
Identify the historic rangers of American eel, shad, salmon and hellbender salamanders.	Recommendation added.
Public Meeting Comments *(Emporium, Pennsylvania, November 12th, 2009)*	
Specify projects that would be eligible for settlement money.	"Sinnemahoning settlement funds" was added to the list of potential funding sources with the management recommendations.
DCNR announced 32,000 acres opened for new exploration of gas wells; address scope of Marcellus Shale and impacts and recommendations associated with it.	Additional information was added to the Marcellus shale section in Chapter 2, as well as specific recommendations regarding Marcellus shale gas exploration.
Public Meeting Comments *(Parker Dam State Park, Penfield, Pennsylvania, November 13th, 2009)*	
Install interpretive signage at the site of 400 coke ovens recently acquired by DCNR.	Recommendation added.
Friends of Parker Dam was recently established; add information about friends groups and their benefits to parks.	Additional information regarding friends groups was added to Chapter 5.
Establish more friends groups of State Parks/Natural Areas.	Recommendation added.
Restore American chestnut populations; use on reclamation sites	Recommendation added.
Clearfield County Planning and Community Development *(Jodi Brennan, Director)*	
The 5-2 map shows more high quality streams than other stream quality maps.	Map corrected.
The 5-3 pdf map for snow mobile trials does not show any trails located in the Moshannon State Forest.	GIS format data unavailable; state forest trail maps are available at forest offices and online.

Issue, concern, or comment	Action Taken

DCNR
(Monica Hoffman, CPRP, Recreation & Parks Advisor, Grants Projects Management Division)

The plan must acknowledge **Environmental Stewardship Funding** by including the following citation "This project was financed in part by a grant from The Community Conservation Partnerships Program, Environmental Stewardship Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation."	The acknowledgement of Environmental Stewardship Funding was added to the back cover, executive summary, and cover page of the final plan.
Be sure to check the entire document for typographical errors.	The document was checked for errors.
Please consider adding more information to the section describing the Marcellus Shale formation on page 2-10 that addresses the specific impact(s) that drilling in this formation will have on the Sinnemahoning Watershed. If there are any management recommendations for this topic, please add them to Chapter 7.	Additional Marcellus shale information was added to Chapter 2, as well as the management recommendations section of the plan.
It is recommended that you reference Appendices O, P, and Q in Chapter 7, Management Recommendations.	Specific reference to Appendices O, P, and Q was added to Chapter 7.
Action plan regarding cultural, recreation, Marcellus Shale and fish-spill settlement monies needs to be developed, and/or added to/highlighted in the recommendations.	Recommendations regarding cultural, recreation, Marcellus shale, and Portage Creek spill settlement monies was added to the management recommendations.
Show more evidence of what was done in the public participation process: a more specific accounting of the public participation process/an outline or textual summary of what was done/possibly names of key persons, etc.	The public participation process is detailed in Chapter 6; comments received and addressed on the draft plan are detailed in Appendix N; key contributors are acknowledged in the acknowledgements section of the plan.

First Fork Watershed Association
(Joe Parr)

On page 3-14, the East Fork is listed as EV water. This is curious, especially since drilling giant PGE was routinely withdrawing frac water during the summer of '08.	East Fork Sinnemahoning is designated EV. Water quality monitoring in anticipation and/or response to gas exploration is recommended.
The snowmobile map (figure 5-3) is rather incomplete. Bureau of Forestry roads are open to over-snow travel. Included are also the many miles of railroad grades on Forestry land that are also open and groomed by Forestry personal and equipment as well.	GIS data for snowmobile trails is incomplete or unavailable. Snowmobile users are encouraged to obtain maps through the Bureau of Forestry.
The Plan is outstanding in virtually every aspect.	Comment noted and appreciated.

Fox Township
(Randy Gradizzi, Fox Township Supervisor/Public Works Director)

Fox Township does have a Zoning Ordinance and a Floodplain Ordinance.	Information corrected.
This was a job well done, and I enjoyed reviewing the plan. Nice Work.	Comment noted; thank you.

Issue, concern, or comment	Action Taken

Individual Comments
(Paul Lilja, Black Forest Conservation Association, Sinnemahoning Creek Watershed Conservation Plan Advisor)

Fox Township does have a Zoning Ordinance and a Floodplain Ordinance.	Information corrected.
This was a job well done, and I enjoyed reviewing the plan. Nice Work.	Comment noted and appreciated.
Population change amounts missing in project area.	Population change noted in Table 1-3.
Water resources and forestry: condemns clear-cutting = specify differences between commercial clear-cutting and high-grading versus modern approaches.	Language was changed to more delicately encourage sustainable forestry practices versus more intensive practices.
Flood BMPs: wet and dry ponds due reduce flooding, but they have been discourage recently due to the outbreak of West Nile Virus; PennDOT often gets flack because of low sluice pipes that may collect standing water.	Comment noted.
19th Century harvest references harvesting for high-quality wood; in the Sinnemahoning region, the first timber was for white pine in the lower end of the watershed, then the railroad came in and hemlock was the primary wood timbered.	Comment noted.
Chapter 5 states that Cherry Springs State Park was named for the stands of black cherry, while that may be true; it also harbored the only natural spring (Coudersport/Jersey Shore Park?)	Comment noted.
Chapter 7: I don't feel combining the municipal and dirt and gravel road maintenance programs is a good idea.	Comment noted.
Chapter 7: It may be difficult to plant high-quality hardwoods on reclaimed strip mines without significant addition of soil amendments to ensure their growth.	Comment noted.
Chapter 7: We and DCNR need to get a handle on commercial high-grading of forestland; they are butchering high-value hardwoods stands just for a profit; we're at the point where we're not making wise investments, just extracting resources and hoping for the best; = We need better education and government regulations.	Comment noted.
An abstract or executive summary would help to condense the information in the report; there is a lot of redundancy; reduce main ideas to 2-3 pages.	An executive summary will be published with the final plan.

Issue, concern, or comment	Action Taken
Individual Comments *(Fred Novisher)*	
DCNR use of herbicide on state forests and state park lands should be carefully regulated.	Recommendation added to encourage DCNR to use integrated pest management techniques to reduce herbicide use.
Mutant frogs have been found just outside the Sinnemahoning watershed in Lyman Run Lake.	Comment noted.
Amphibian mutations have been linked to herbicide and chemical pollutants.	Comment noted.
Multiflora rose and autumn olive are extensive near Broadhead Road.	Comment noted.
Three of the biggest Marcellus Shale wells east of the Mississippi are found in the region.	Comment noted.
I witnessed hundreds of trucks, mostly active between 1:00–5:00 a.m., back and forth from the area.	Monitoring of such activities is encouraged; concerns may be directed to your DEP regional office (Appendix Q).
We can't ruin the quality of water to become energy independent.	Comment noted.
There are thousands of undocumented gas wells that have left unplugged; what impact might Marcellus gas well fracking have on those; it could cause gas migration.	Potential Marcellus shale gas exploration issues and concerns are addressed specifically in Chapter 2, as well as throughout the plan.
I have also noticed less fish, no minnows or crabs.	Comment noted.
Acid Rain = losing maple trees.	Comment noted.
Individual Comments *(PJ Piccirillo)*	
Pertaining to: "Recreational areas for snowmobile use are more available than those for ATVs. Public facilities for the exclusive use of ATVs are needed in the Sinnemahoning region. It is illegal to ride ATVs on state game lands, except by disabled hunters. West of Sinnemahoning Creek watershed, the Allegheny National Forest offers more than 70 miles of trails for riders. Environmentally sound public trails or an ATV park would provide riders with legal opportunities to ride, and thereby reduce and increase safety for riders." What data supports the claim that public trails will reduce damages to private property? In fact, data obtained by the PA Forest Coalition supports the opposite. If this claim can't be supported, the entire paragraph should be struck. As it stands, it is conjecture.	Recommendations are included to conduct a feasibility study for a public ATV facility in the region.

Jones Township
(Russ Braun, Sewage Enforcement Officer)

Issue, concern, or comment	Action Taken
The report fails to mention in 2000, the Elk County Solid Waste Authority hired an Illegal Dumping Enforcement Officer. Since then the County has been very aggressive in patrolling Elk County for these activities and has prosecuted several individuals caught in the act of illegal dumping. Through the cooperation of the Elk County Conservation District, the Authority has been able to maintain this as a full-time staff position.	Information added to Chapter 2.
The Elk County Solid Waste Authority, in 2004, began operation of the first permanent electronics recycling drop-off site in the Commonwealth. This was done, initially, to help reduce the volume of electronics that were being discarded unlawfully. Since that time the Authority now accepts electronic items, but also florescent lamps, alkaline batteries, CFL light bulbs, and oil based paint. Collections are held the third Saturday of each month.	Information amended in Appendix T.
In your report, you indicate that it is the responsibility of each municipality to identify and clean-up illegal dumpsites. I do not believe that this is fully accurate. It is the responsibility of the property owner where an illegal dumpsite is located to clean up the site. Often times the municipality may own a site such as an old "town dump" where the municipality may be responsible. Otherwise the property owner, or someone who is actually caught dumping is held responsible. Just last month, the Authority and Pa Clean Ways partnered together and cleaned up a major old town dumpsite in Weedville, Jay Township. Grant monies were obtained to do this.	Section corrected in Chapter 2.
Any questions concerning illegal dumping in Elk County may be directed to Ms. Bekki Titchner at 814-776-5373.	Contact information for all county solid waste and recycling departments can be found in Appendix Q.
Benezette Township has just completed an Act 537 Sewage Facilities Plan that will provide public sewage treatment to the village of Benezette area within the next five years. The plan calls for a sewage treatment plant to be constructed in Benezette and public sewers to serve the Village, the Elk Country Visitors Center, and a major subdivision on Winslow Hill.	Information noted within Chapter 3.

Issue, concern, or comment	Action Taken

Jones Township (continued)
(Russ Braun, Sewage Enforcement Officer)

As a result on ongoing problems with unlawful sewage disposal, the Medix Inn Restaurant in Medix Run has just been granted a permit from the Pa. DEP to construct a sewage treatment facility to handle the large volume of wastewater from the establishment. Previous to this, wildcat sewers that allowed untreated sewage to be discharged into the Bennett's Branch had served both the village of Benezette and the Medix Inn.	Information added to Chapter 3.
Wildcat sewers continue to serve the villages of Sterling Run, Driftwood, and Sinnemahoning. These communities continue to allow untreated wastewater to enter the Driftwood Branch of the Sinnemahoning. At this time, there are no plans being formulated to address these issues. Problems in these areas are usually addressed by installing holding tanks. Holding tanks are very expensive to maintain and is a major reason to the lack of development in these villages.	Information added to Chapter 3.
DCNR just recently installed public restroom facilities at the Hicks Run Wildlife Viewing area and also at the Hoover Farm Wildlife Viewing Area along the Quehanna Highway.	Information added to Chapter 5.
The Plan indicates a low priority goal of establishing an environmental education center at the Sinnemahoning State Park. My office approved a sewage permit for the Visitors Center at the park near the Cameron / Potter county line. From my understanding the Visitors Center just went out for bidding in October of 2009.	The project steering committee and general public prioritized the recommendations based on several factors. The fact that this project was already under way at the time of prioritization could have resulted in the lower priority rating.

The Lumber Heritage Region of Pennsylvania
(Michael S. Wennin, Executive Director)

I am concerned that the recommendations are almost identical to the recommendations in the Connoquenessing Creek, Red Bank Creek, and Sewickley Creek Watershed Conservation Plans completed by the Western Pennsylvania Conservancy. The Sinnemahoning Creek Watershed is distinctly unique compared to these other creeks in its rural character, lack of urban areas, lack of significant agriculture, and the state ownership of the majority of the land which I do not see being addressed in these recommendations. Of the 332 "methods to achieve the goals", only 22 are Sinnemahoning Creek specific. This looks like a canned report and does not reflect the $150,000+ investment by DCNR and others.	A baseline template of management recommendations applicable to most watersheds was developed to ensure that common conservation practices are included in all watershed conservation plans developed through WPC. This template is reviewed and amended for each plan to eliminate non-applicable recommendations. Recommendations suggested by the study committees and public are added to address the specific concerns or projects unique to the watershed.

Issue, concern, or comment	Action Taken
The Lumber Heritage Region of Pennsylvania (continued) *(Michael S. Wennin, Executive Director)*	
The recommendations and methods are unbelievably broad and not specific to the area at all – many are not even appropriate to the area. Many are "pie-in-the-sky" recommendations that will never happen – 23 "increase funding" and dozens of "further studies" for example. Many of the conservation related recommendations are already in process by DCNR, the various conservation districts, watershed organizations, and others, but this is not recognized by what is presented here. Other recommendations are already mandated by state and federal laws, especially those relating to mining and gas well drilling and are monitored by DEP. So why are you "planning" for work already in progress? Why was this work not recognized with specific recommendations for furthering and/or enhancing the existing work? At least acknowledge existing work so someone is not reinventing the wheel.	Recommendations within watershed conservation plans may be specific or broad. Broad recommendations are intended to allow room for interpretation for any group to support their need for funding for a project. Specific recommendations were identified by the local community as a need for the watershed.
The watershed has access to several MILLION dollars in fines resulting from the chemical spill, but there are no recommendations for specific projects that could be pursued with those funds, nor recommendations on how to take advantage of this significant funding opportunity.	"Sinnemahoning settlement funding" was added to several recommendations in the potential funding sources column. It should be noted that this is not an all-inclusive list, but should be used as a starting point in the search for project funding.
There is a need and opportunity for specific interpretive signage and historical markers not addressed by these recommendations, nor are specific recommendations made to the Lumber Heritage Region and the various County Historical Societies on how to share the history and culture of the area.	A recommendation identifying the need to "preserve historical sites and landmarks, and educate about historical significance through interpretive signage" is included under "*Goal 5-2. Highlight and preserve historical sites and promote an appreciation for local history*."
While tourism is briefly addressed, the recommendations miss the mark on the significance of nature based tourism to the watershed and the future positive economic impact it could have on the communities. There are no specific recommendations on how to take advantage of this opportunity being nurtured and expanded by the Pennsylvania Wilds Initiative and the LHR. There are also no recommendations on utilizing the impact of the Sinnemahoning Nature Visitors Center being built in Sinnemahoning State Park or the Rocky Mountain Elk Foundation/DCNR visitor center being built in Elk County. Both will have huge impacts to the watershed bringing in thousands of visitors.	"*Goal 5-5. Establish a balanced tourism industry, supplying adequate infrastructure to cover demand without changing the character of the region*." "*Goal 1-3. Support the Pennsylvania Wilds initiative to encourage growth of tourism and tourism related businesses enhancing visitors' experience, while protecting the natural resources that make this region unique*." There are five recommendations listed to achieve that goal, including several references to the *Pennsylvania Wilds Design Guide*.
It does not take a study to know that a ski resort is not feasible as there is not enough snow or a property available to build one. However a winter resort with snowmobiling, cross country skiing, winter wild life viewing, ice fishing, hunting, and other winter activities was not addressed.	The recommendation for a ski resort was the result of several instances of public input suggesting such a facility.

Issue, concern, or comment	Action Taken
The Lumber Heritage Region of Pennsylvania (continued) *(Michael S. Wennin, Executive Director)*	
I see no specific recommendations for the goal of "fostering an appreciation and understanding of cultural and historical legacies" nor have I seen where these legacies have been identified.	Culture and history were discussed in Chapter 5 and addressed in the corresponding management recommendations (Goals 5-1 through 5-9).
There are no specific recommendations for boat launches, trail development or other opportunities to develop outdoor recreation venues.	Specific recommendations can be found in Goals: 1-4.3, 5-1.5, 5-1.6, 5-3.1, 5-3.2, and all methods under Goals 5-4, 5-6, 5-7, 5-8, and 6-9.
Given that more than 70% of the Watershed is owned by the Commonwealth, I see no reference to or acknowledgement of the DCNR plans already in place for forest management, nor specific recommendations to DCNR for conservation or recreation opportunities that may be missing in those plans.	Within the plan, DCNR land managers are referred to in the same category as land managers, in general; although, there are some specific references to public land managers. Many management recommendations refer to DCNR as a potential partner.
The overly broad recommendations for business development are of no use to the only two communities in the watershed with a workforce that are currently experiencing double digit unemployment. Nor are there specific recommendations on how to pursue potential tourism business opportunities.	More specific recommendations were added.
The broad recommendations do not assign responsibility to anyone to measure the accountability for implementing them.	The potential partners should work cooperatively to implement projects.
Private funds are repeatedly listed as a source of funding. What private funds were identified in your research?	Private foundations and other funding opportunities are listed in Appendix O.
I have more than a 100 "which ones", "where", "how" and other questions regarding these recommendations. Most are so vague that they are of no use-others are so obvious that they are already being implemented.	Comment noted.
Over all I am very disappointed that the Western Pennsylvania Conservancy has squandered this opportunity to produce a useful document that would have shared your expertise in conserving natural and cultural assets and really made a difference in utilizing and conserving those assets. You had the opportunity to make an impact on the people and communities in the area; to help create an outdoor recreation destination, and other opportunities that were missed with the recommendations of this plan.	Comment noted.
As a resident, a tax payer and a key stakeholder in the watershed, this has been a major letdown and an incredible missed opportunity.	Comment noted.
I am extremely disappointed in the final plan.	Comment noted.
I found numerous errors, omissions, and dated information in the data- starting with our name, which is the Lumber Heritage Region of Pennsylvania and not the Pennsylvania Lumber Heritage Region; to wrong addresses and contact information for various resources; to dated employment data.	Additional grammar and spelling errors have been corrected. Incorrect references of the Lumber Heritage Region of Pennsylvania were corrected.

The Lumber Heritage Region of Pennsylvania (continued)
(Michael S. Wennin, Executive Director)

Issue, concern, or comment	Action Taken
Our management action plan was quoted explaining the function of the LHR where that function has changed significantly with the advent of the Pennsylvania Wilds Initiative several years ago. No one asked.	LHR was invited to and attend the focus group meeting to supplement the project committee with current data and resources.
The list of financial resources in the appendices is useless, as a good 95% or more of those grants are not available for projects within the watershed. Some are not even available in the state of Pennsylvania. Local funding sources and foundations are not even listed.	The appendix was amended with current and local funding sources.
Only 3 cultural resources are listed for the entire watershed. The LHR Interpretive Plan lists a minimum of 15 cultural assets for each of the counties located in the watershed.	Numerous cultural resources are identified in Chapter 5. This study focuses on resources within the watershed area.
I cannot find where any of the specific concerns of the participants brought up in the public meetings were addressed in the recommendations at all.	Specific management recommendations were derived from input from the public and project committees.
As a major stakeholder in the watershed, I was appalled to hear it said at the Emporium meeting on November 12 that there is no intention for the implementation of this plan and that it was just a resource for students doing projects.	That was heard incorrectly or misinterpreted; this plan is intended to be implemented by watershed stakeholder groups, and it can also be used as a resource for local schools and students to initiate projects.
There is no useful information or specific plan in it, that I could find which would be useful for any project involving the watershed. As far as being used to justify a funding opportunity, there are significantly more detailed plans available, such as the Pennsylvania Wilds Planning Study that would make more sense to use for that purpose.	Comment noted.
As a major stakeholder in the region, I find your disregard for the people's concerns for the watershed and your unwillingness to make this a useful document that could have had a positive impact on the communities with in the watershed to be unconscionable.	Comment noted.
This was an incredible missed opportunity.	Comment noted.

McKean County Conservation District
(Sandy Thompson, District Manager)

Issue, concern, or comment	Action Taken
Chapter 3, page 21, the acronym for the Environmental Quality Incentives Program should be listed as EQIP not EQUIP.	Corrected.
Goal 1-2 – 1. Implement best management practices that protect water resources when improving and upgrading dirt and gravel roads, secondary, and rural roadways. Bureau of Forestry should be added as a potential partner instead of PFBC – this should also be the same for #3 and #6.	Recommendation amended.
Goal 1-2 – 2. Educate road masters about best management practices and techniques for dirt and gravel roadways maintenance. Conservation Districts should be listed as potential partners.	Recommendation amended.
Goal 1-2 – 9. Establish dirt and gravel road legislation for coldwater fisheries and lower quality streams. Legislators should be added as a potential partner.	Recommendation amended.
Goal 2 -1 – 4. Protect prime farmlands from conversion to other uses by purchasing conservation easements, assisting in the multi-generation transfer of ownership, or utilizing farmland preservation programs. Conservation Districts should be added as a potential partner and Department of Ag should be listed as a potential funding source.	Recommendation amended.
Goal 2-3 – 2. Monitor cumulative impacts of oil and gas wells to protect watershed resources and rural character of the region. Penn State Extension should be added as a potential partner as well as to #7.	Recommendation amended.
Goal 2-4 – Trout Unlimited should be added as a potential partner to all items discussed in this goal.	Chapters of Trout Unlimited are included in the general categorization of *conservation groups*.
Goal 2-5 – 2. Implement a riparian restoration program to install streambank fencing to exclude livestock from streams, stabilize stream crossings, provide alternative watering sources, and enhance riparian corridors with plantings of native species. I don't think PennDOT should be listed as a potential partner.	Recommendation amended.
Goal 2-5 – 3. Encourage agricultural landowners to develop nutrient management plans to boost activity and protect water resources. Penn State should be added as a potential partner as well as PDA and NRCS should be added as a potential funding source.	Recommendation amended.

Issue, concern, or comment	Action Taken
McKean County Conservation District (continued) *(Sandy Thompson, District Manager)*	
Goal 2-6 - 1. Enforce forestry and logging laws. Conservation District, because of E&S regulations, and Bureau of Forestry should be added as potential partners.	Recommendation amended.
Goal 2-6 - 2. Forestland owners should work with a professional forester to manage their land in a sustainable way. Penn State Extension should be added as a potential partner.	Recommendation amended.
Goal 3-1 2. Incorporate environmentally sensitive construction and maintenance techniques on dirt and gravel roads. Bureau of Forestry should be added as a potential partner.	Recommendation amended.
Goal 3-6 1. Study and monitor the effects of well drilling and fracing on surface water and groundwater to determine impacts on water quality and quantity, and work to minimize those impacts. Penn State should be added as a potential partner as well as all the items discussed in this Goal.	Recommendations amended.
Goal 3-9 – Penn State should be added as a potential partner with all items discussed in this goal.	Recommendations amended.
Goal 3-13 – Trout Unlimited should be added as a potential partner to all items discussed in this goal.	Chapters of Trout Unlimited are included in the general categorization of *conservation groups*.
Goal 4-1 – Penn State should be added as a potential partner with all items discussed.	Recommendations amended.
Goal 4-3 – Conservation Districts should be added as potential partners with all items.	Recommendations amended.
Goal 6-3 – Penn State should be added as a potential partner with all items.	Recommendations amended.
Goal 6-12 – Conservation Districts should be added as potential partners with all items.	Recommendations amended.
Thanks for all of your hard work.	Thank you; comment noted.
McKean County Planning Commission *(Deborah L. Lunden, Director)*	
Page 1-8 Figure 1-3 – McKean County should be no for floodplain ordinance. Norwich Township should be yes for floodplain ordinance.	Information corrected.
Page 1-9 Subdivision Regulations – McKean County has countywide subdivision regulations.	Information corrected.
Page 1-15 Roadways – second paragraph – spelling – By-way	Information corrected.
Page 3-8 Table 3-2 – McKean County has no floodplain ordinance. Norwich Township does have a floodplain ordinance.	Information corrected.

Issue, concern, or comment	Action Taken

McKean County Planning Commission (continued)
(Deborah L. Lunden, Director)

Page 3-12 second paragraph – McKean County has completed Phase I study. We are now doing Phase II which includes the development of the countywide stormwater management plan and ordinance for municipalities to adopt. Should be complete by June 30, 2010. Also, Delete "...by developing county-wide stormwater management plans…"	Information corrected.

Parker Dam State Park
(Elizabeth Grove, Park Manager)

On 5-3 you're missing the snowmobile trails for Parker Dam. There are a lot of trails here that start here and at S.B. Elliott and go off onto Moshannon State Forest.	GIS data availability for snowmobile trails is incomplete; trail users should obtain maps for the areas they intend to ride.
On 3-8 you missed Parker Dam. Built by the CCC's in 1938.	Information added.
On 3-7 the key is a bit confusing with the impaired streams. You have other items listed under that heading.	Map revised.
On 2-4 did you list any of the Marcellus wells?	Map revised to include Marcellus wells.

Pennsylvania Natural Heritage Program
(Christopher Tracey, Charles Eichelberger, & Staff)

Executive Summary: ES-4 - it would be good not to mention the mountain lions as its doubtful these are natural populations if they exist at all. Also, this could add to the Black Helicopter conspiracy--one of the current versions is that the PGC and the UN are working together dropping mountain lions into the wilderness from these helicopters.	Information omitted.
Appendixes: Remove "Dedicated Area" as described in Chapter 4 comments.	Dedicated Area definition removed from Chapter 4.
Appendix I - There seems to be a lot of problems with the list the WWF site generated for the watershed. A couple that stood out include: striated heron = not a North American species; queen snakes = not in watershed; also, the following species are not in the watershed = smooth earth snakes, king rails, Say's phoebe, Barn owls, white ibis.	Species were removed from appendix.
Change first sentence in Chapter 4 to "Ecosystems are groups of plants, animals, and their physical environments that interact together."	Sentence changed.
First paragraph, Chapter 4: add "Plants clean water, air and regulate temperatures."	Sentence added.
First paragraph, Chapter 4: Bats are not pollinators in North America.	Bats removed from sentence.

Pennsylvania Natural Heritage Program (continued)
(Christopher Tracey- Ecologist / Conservation Planner, Charles Eichelberger, & Staff)

Issue, concern, or comment	Action Taken
Chapter 4, under "Ecoregion Characteristics:" we tend to use the TNC ecoregions in most of our heritage work, but this works as well.	Comment noted.
Chapter 4, under "Ecoregion Characteristics:" Beaver were actually reintroduced to this area. See Merritt's book.	Comment noted.
Chapter 4, under "Ecoregion Characteristics:" the terms Warblers and Hawks really represent groups of species and not individual species as the first part of this list does. Could we list an example one of each? Or maybe say "...and several species of warblers and hawks."	Sentence corrected.
Chapter 4, under "Ecoregion Characteristics:" the sentence "The red-backed, spotted, marbled, and northern dusky salamanders, as well as eastern hellbender salamanders can be found in woodlands, wetlands, and streams of the Sinnemahoning watershed" is a little confusing and we kept on thinking it refers to the Hellbender being a woodland type. It doesn't, of course, but might benefit from some rewording. Also, there are no marbled salamanders in the watershed.	Section reworded for clarification.
Chapter 4, under "Ecoregion Characteristics:" Brown and Rainbow trout aren't native and we should make an effort to make people aware of this. Where was this data collected from? Was the Aquatic Community Classification used?	Sectioned clarified.
Chapter 4, under "Natural Habitat:" Urban Forestry is not a natural habitat and it's confusing to lead off the Natural habitats section with this.	The section was rearranged so that Urban Forestry is after Forestry.
Chapter 4, under "Natural Habitat:" Backyard habitat isn't really natural habitat. Could these be moved somewhere else in the document?	The section was rearranged.
Chapter 4, under "Natural Habitat, Forest Habitat," remove the following: "Though most of the forests today are not old-growth, seeing as they were timbered at some point in the early nineteenth century."	Segment removed.
Chapter 4, concerning the Wykoff Run Natural Area and Quehanna Wild Area: Most natural openings in these two areas are peatlands. Other openings have been created by PGC for elk staging areas and wildlife food plots. We don't think there is any known old growth within their boundaries.	Information corrected.

Issue, concern, or comment	Action Taken
Pennsylvania Natural Heritage Program (continued) *(Christopher Tracey- Ecologist / Conservation Planner, Charles Eichelberger, & Staff)*	
Chapter 4, concerning the image on page 4-5, E. purpurea isn't native to PA.	Noted and corrected in caption.
Chapter 4, under “Forest Habitat” on page 4-5, Brush piles are getting less and less recommended as they may be increasing the number of songbird and small mammal kills as feral cats, raccoons, and other "pest" species are using them as cover as well. Ecological interactions are crazy sometimes!!!	Comment noted.
Chapter 4, concerning the mention of the EAB on page 4-5, Are there ash plantations? Aren't most plantations in this region conifers for Pulpwood?	It was intended to explain the devastating effects invasives like EAB can have on one species, not necessarily meant to state that ash monocultures are present.
Chapter 4, under “Successional Forest Habitat,” move the sentence “Succession is the natural process of forest regeneration over time.” To the beginning of the paragraph.	Sentence moved accordingly.
Chapter 4, on page 4-6, in the paragraph about early-successional habitat, specific warbler species should be noted as some of them avoid edge habitat.	Section amended.
Chapter 4, on page 4-6, in the first paragraph under “Grassland Habitat,” remove the phrase “and inhumane traps.”	Phrase removed.
Chapter 4, on table 4-2, Amphibians, remove the following species: Cope’s gray treefrog, Jefferson salamander, marbled salamander, northern leopard frog, western chorus frog, Woodhouse’s toad.	Species removed from list in Chapter 4, as well as from Appendix I.
Chapter 4, on page 4-9, rework the numbers in the first paragraph under “Amphibians” to reflect new data.	Number corrected.
Chapter 4, Table 4-3, remove the following species: Bog turtle, common map turtle, common musk turtle, Decay’s brown snake (change to Northern Brown Snake), eastern fence lizard, eastern hognose snake, eastern mud turtle, eastern ribbon snake, Queen snake, smooth earth snake, spotted turtle.	Species removed from list in Chapter 4, as well as from Appendix I.

Issue, concern, or comment	Action Taken
Pennsylvania Natural Heritage Program (continued) *(Christopher Tracey- Ecologist / Conservation Planner, Charles Eichelberger, & Staff)*	
Chapter 4, on page 4-9, rework the numbers in the first paragraph under "reptiles" to reflect new data.	Number changed.
Chapter 4, on page 4-10, timber rattle snakes are listed as a candidate species.	Information added.
Chapter 4, rework the first sentence under "Mammals" so it does not sound like there are 59 species of elk.	Sentence reworded.
Chapter 4, on page 4-11, remove the first sentence under "Elk."	Sentence reworded.
Chapter 4, on page 4-11, under "Bats," not involved with pollen or fruit in PA or the US.	Information corrected.
Chapter 4, on page 4-11, under "Bats," in Pa, Bats only hibernate in caves, mines or rock outcrops.	Information corrected.
Chapter 4, on page 4-11, under "Bats," because of WNS, USFWS recommends caving moratorium.	Information corrected.
Chapter 4, on page 4-12, under "Fish and Freshwater Mussels," concerning the first sentence, there are Many degraded streams in the watershed.	Information corrected.
Chapter 4, on page 4-12, under "Fish and Freshwater Mussels," confirm the number 93 for species of fish.	Comment noted; that number is for the entire West Branch Susquehanna drainage.
Chapter 4, under "Fish and Freshwater Mussels," mussels are fairly rare in the watershed.	Comment noted
Chapter 4, under "Fish and Freshwater Mussels," one species. Pyganodon, is no longer tracked.	Comment noted.
Chapter 4, on page 4-12, concerning the first paragraph under "Species of Special Concern," This paragraph has some issues. The G-ranks and S-ranks are more complicated than just number of occurrences. PNHP should be talked about before here as this is a lot of what we do.	Comment noted.
Chapter 4, on page 4-14, under species of special concern, clarify that the Endangered Species Act of 1973 is Federal, and that the rankings that PGC deals with are referring to the state level laws.	Section clarified.

Issue, concern, or comment	Action Taken
Pennsylvania Natural Heritage Program (continued) *(Christopher Tracey- Ecologist / Conservation Planner, Charles Eichelberger, & Staff)*	
Chapter 4, under "Species of Special Concern," move the information about PNHP to the beginning of the section. PNHP is involved in all of this.	Section rearranged.
Chapter 4, under "Species of Special Concern," in some cases finding a species of concern in an environmental assessment of a property can stop development altogether.	Comment noted.
Chapter 4, concerning Appendix J, referenced at the top of page 4-13, it only appears to define the ranks, not list them.	Appendix J was corrected to include the species list and ranks.
Chapter 4, on tables 4-4 and 4-5, change the term "County" to "Local" when it comes to significance ranking on CNHIs. It is the new term.	All references to County significance were changed to Local significance.
Chapter 4, on page 4-14, remove the entire section about Dedicated areas, we have discontinued the use of the DA.	Section removed.
Chapter 4, on table 4-5, remove the name of the species listed in the "Important Features" column for both the Boone Mountain LCA and the Upper Clear Creek LCA. We cannot currently release this species due to data sensitivity rules.	Species removed.
Chapter 4, in the last row of table 4-5, change the term "Special Animal" to "Animal Species of Concern."	Wording corrected.
Chapter 4, on page 4-16, concerning the first paragraph under "Invasive Species," This definition can be improved. There is a pretty good one in the Fulton CNHI.	Comment noted.
Chapter 4, concerning the figure on page 4-17, The wording on this figure legend reads weird. I initially thought the snails in the photo are the native ones, they are *Bellamya chinensis malleata* – Chinese mysterysnail.	Caption changed.
Chapter 4, on page 4-17 in the first paragraph under "Plants," sometimes the species prefer native vegetation, Other times, the native animals prefer the invasive plants.	Comment noted.

Issue, concern, or comment	Action Taken

Pennsylvania Natural Heritage Program
(William "Rocky" Gleason, County Inventory Coordinator)

You should probably include some information on the invasive plant – goatsrue (*Galega officinalis*). It is a federally designated noxious weed that has been found recently in McKean & Cameron Counties. There is high potential for it to be spread through the area due to heavy equipment movement and infrastructure construction associated with the Marcellus Shale gas extraction in the counties.	Information added.

Potter County Conservation District
(Jack Fleckenstein, Watershed Specialist)

The draft looks really good. The maps will help the District out. Nice Job!	Thank you, comment noted.

Potter County Visitors Association
(David Brooks, Executive Director)

I think you did a great job on identifying the issues and identifying the goals.	Comment noted.
Overall, none of the issues are really new, neither are the goals or how to achieve them, compared with the numerous other plans that have done in the region.	Comment noted.
How realistic is this plan, can it be done reasonably?	The plan is intended to be used as a tool for numerous groups to implement a wide variety of projects over time to ultimately benefit the people and resources of the watershed.
I think in an effort to not leave anyone out the plan turned out to be vague and general.	Comment noted.
The economic goals such as the need for a website to promote business-- who does that? Most of those partners listed already have operating websites, there are also regional sites pawilds.com and paroute6.com, etc.	The partners are listed for that reason; they have the resources available to contribute to achieving that particular goal. Additional information can be found in Appendices O, P, and Q.
Encourage private landowners to participate in programs, opening their land to public hunting or to allow hunting by written permission on their property. Which programs, do they already exist, who operates the program, any specific areas in the region where this should be focused on… where do you start?	More specific information on the programs available to landowners is detailed within the corresponding chapters.

Issue, concern, or comment	Action Taken
Potter County Visitors Association (continued) *(David Brooks, Executive Director)*	
There are a lot more general and vague methods. What I would like to see: Education and public outreach are suggested on a wide variety of topics. A specific task would be: Encourage state agencies that have active outreach established in the region, to incorporate information on the Watershed Issues and Goals. Fish and Boat/ Game Commission have conservation officers (WCOs) that visit schools etc, they should be incorporating the local plans into their talk.	Comment noted. The introductory section of the Management Recommendations was amended to clarify the purpose of partners listed and to encourage the use of this plan as a starting point for such discussion, and not an all-inclusive list of partners and funders.
I think arranging them by priority is a mistake- each task is a priority to somebody. It needs to be organized with suggested time frames (whether it's a high priority or low. (Example: Goal X: 6 months- 1 year.) Giving people date ranges to accomplish tasks, that they agree on and are realistic, gives them ownership and confidence they are not wasting their time.	Comment noted. The recommendations were prioritized by the general public and project steering and advisory committees.
Listing a task that is a low priority gives people the excuse to ignore it.	Comment noted.
No mention of specific programs for funding, some may exist some may not.	Specific funding programs are mentioned within chapters, as well as within Appendix O.
Does the priority level meet the priority level of those suggested partners? If it's not a priority to the agency, it may serve the Watershed committee to work on another task that overall may be less of a priority but ready to be accomplished. Maybe identify the main partner and then list subsequent partners?	The recommendations were prioritized by the general public and project steering and advisory committees.
In 2011, we get a new governor, you've identified a lot of state agencies, but everything will change. Is there any mention of outreach to the new administration to get this plan on their radar?	Educating newly elected government officials is mentioned in the plan's recommendations.
I think overall you are leaving a lot of leg work up to the Watershed committee, which may or may not have the knowledge to even know where to get started.	The partners identified for each task should come together to begin dialog to coordinate efforts to accomplish the goals and objectives identified.
You need to work from the perspective of accomplishing the plan as if it were up to you to do so.	Comment noted.
Sinnemahoning State Park *(Lisa Bainey, Park Manager)*	
We hope with improved interpretive signage and our new center coming on line we can make some of the locals a little happier.	Comment noted

Western Pennsylvania Conservancy Land Stewardship
(Andrew Zadnik, Land Stewardship Coordinator)

Issue, concern, or comment	Action Taken
The plan is very thorough and informative.	Comment noted; thank you.
Page XIV, second sentence: Add an "s" to "other."	Corrected.
ES-1: The 4th bullet is incomplete.	Bullet corrected.
4-1, second sentence under Ecoregion: I assume you mean "physiographic" province.	Sentence corrected.
4-6: Under the Grassland section, you refer to vermin. Unfortunately, many people consider certain native species to be vermin. You may wish to define that term, or give specific examples of how some species may be problematic.	Sentence reworded.
4-10: Under the section on mammals, you may want to reword the sentence "...59 species of elk, deer..." to "59 species, including elk, white-tailed deer," etc. Otherwise it sounds like there are multiple species of elk and deer.	Sentence reworded.
4-10: Under the section on bats, all of PAs bats are insectivores, so they don't provide much benefit as pollinators or seed dispersers.	Information corrected.
6-2: Under AMD, you may want to reference the new treatment system being built by DEP on Bennett Branch near Force.	Information was added to Chapter 3.
A general comment about the use of the word, "habitat:" This word tends to be used in a very general sense, e.g., "forest habitat." However, features within a particular area (natural community, ecosystem, etc.) that benefit one species could be detrimental to another. Usually, the term habitat is best used when referring to particular species or groups of species, e.g., white-tailed deer habitat, grassland bird habitat, waterfowl habitat.	Comment noted.

APPENDIX O. FUNDING SOURCES

Sponsoring Organization	Description / Restrictions	Contact
BMP		
State Conservation Commission-Dirt and Gravel Roads Maintenance	Available to local municipalities and state agencies for projects dealing with the BMPs for erosion and sedimentation control problems and fugitive dust in watersheds; dirt and gravel road jurisdiction required.	www.pacd.org
Community		
Pittsburgh Foundation	Economic, community development and the environment. Activities that increase employment, build strong neighborhoods, and promote civic engagement by all segments of the population. Funds for quality of life.	www.pittsburghfoundation.org
Energy		
DEP - Alternative Fuels	The Alternative Fuels Incentive Grants program continues to fund a considerable number of projects that use alternative fueled energy sources to reduce air pollution and our dependence on foreign oil. Alternative fuels include compressed natural gas	www.dep.state.pa.us
Environmental		
Beldon II Fund	Support environmental organizations working at the state-level. Some grants are made to regional and national organizations for efforts that support the work of state level groups.	www.beldon.org
Ben & Jerry's Foundation	Grant applications need to demonstrate that the project will lead to environmental change, address the root causes of environmental problems, and must help ameliorate an unjust or destructive situation by empowering constituents and facilitating leadership	www.benjerry.com
Eddie Bauer	Fund projects in certain local areas that support environmental goals such as clean rivers and streams or beautifying parks and school grounds. Must be 501(c) 3 and proposal should be kept between 2-3 pages.	www.eddiebauer.com

Environmental (continued)

Sponsoring Organization	Description / Restrictions	Contact
Howard Heinz Endowment	This program promotes environmental quality and sustainable development by supporting efforts to eliminate waste, harness the power of the market, and create a restorative economy. Should Promote sustainable urban design. Concentrated in Western Pennsylvania.	www.heinz.org
Raymond Proffitt Foundation	The foundation's purpose is to protect and restore the quality of the natural and human environment by informing and educating the general public about the impact of human endeavors upon the natural environment. The RPF strives to advance this understanding	www.rayproffitt.org
Surdna Foundation	The foundation's goal is to prevent damage to the environment and to promote more efficient, economically sound, environmentally beneficial, and equitable use of land and natural resources. Does not fund environmental education, sustainable agriculture, food production or toxic and hazardous waste.	www.surdna.org
Vira I Heinz Endowment	This program promotes environmental quality and sustainable development by supporting efforts to eliminate waste, harness the power of the market, and create a restorative economy. The program's goal is to promote sustainable urban design. Western Pennsylvania watersheds only.	www.heinz.org

Environmental/Watershed

EPA-Clean Water State Revolving Fund	May also contact: Beverly Reinhold (717) 783-6589. Infrastructure Investment Authority, Keystone Building 22 South Third Street, Harrisburg, PA 17101. email: breinhold@state.pa.us or Peter Slack, (717) 772-4054; DEP 400 Market Street, Harrisburg, PA 17105	(717) 772-4054
WREN - Conference/Training Scholarships	The activities funded must be educational and relate to drinking water source protection or watershed education. Applicant is required to provide a five percent match.	www.pa.lwv.org/wren
River Network Watershed Assistance Grants	Watershed projects and group start-ups.	www.rivernetwork.org
Foundation for Pennsylvania Watersheds	Provides funding to grassroots organizations and watershed associations for specific watershed remediation in Pennsylvania.	

Environmental Education

Sponsoring Organization	Description / Restrictions	Contact
Captain Planet	Supports hands-on environmental projects for children and youth to encourage innovative programs that empower children and youth around the world to work individually and collectively to solve environmental problems. Only for environmental education of children. Online only.	www.turner.com/cpf
DEP Environmental Education Grants	Open to schools, conservation districts, and non-profits. Open in summer, awarded in spring. Final application due dates vary. Application available online. Requires twenty percent match and reimbursement program.	www.dep.state.pa.us
Education Mini Projects Program	Small grants for Pennsylvania-based grassroots educational projects that address non-point source watershed concepts.	(717) 236-1006
Emerson Charitable Trust	Strong emphasis on cultural aspects and youth education, also science and education.	(314) 553-3722
EPA Environmental Education Grants Region III	Grants awarded to small non-profit groups for various projects in Region III.	(215) 566-5546
National Environmental Education and Training Foundation	To increase environmental awareness, environmental education, partnerships, etc. May also be reached at (202) 261-6464. Proposal deadlines: Jan. 1, March 1, July 15, and Sept. 1	(202) 833-2933
PACD - Mini Projects	The objectives of the Educational Mini-Project must promote the We All Live Downstream message by: stimulating an awareness of and interest in Pennsylvania's non-point source water pollution problems and solutions; salaries are not an approved expenditure.	www.pacd.org
Project Wild	Project Wild is an interdisciplinary supplementary environmental and conservation program for educators of children in grades K-12. Small grants only.	www.projectwild.org
The Dunn Foundation	Promote the issues of the negative effect that sprawl, visual pollution, and poorly planned development have on the visual environment of communities and the resulting loss of quality of life. Encourage dialogue within and between communities. Do not fund property acquisition, capital improvement projects, capital campaigns, endowments, individuals, religious groups, or political organizations.	www.dunnfoundation.org

Environmental Education (continued)

Sponsoring Organization	Description / Restrictions	Contact
The Pathways to Nature Conservation Fund National Fish and Wildlife Foundation	A partnership between the more than 270 Wild Birds Unlimited, Inc. franchises and the National Fish and Wildlife Foundation. The Pathways to Nature Conservation Fund offers grants to enhance environmental education activities and bird and wildlife viewing opportunities at significant sites.	www.nfwf.org
Water Resources Education Network - LWV	Funding to develop education programs for water issues facing communities. Local contact is shrerenehess@yourinter.net, Indiana PA, 724-465-2595. Must be 501(c)3	www.pa.lwv.org/wren
WREN - Opportunity Grants	The activities funded must be educational and relate to drinking water source protection or watershed education.	www.pa.lwv.org/wren

Environmental Justice

EPA-Environmental Justice Small Grant Program	The program provides financial assistance to eligible affected local community-based organizations working on or planning to work on projects to address local environmental and/or public health concerns.	(202) 564-0152
Nathan Cummings Foundation	The foundation's purpose is to facilitate environmental justice and environmentally sustainable communities by supporting the accountability of corporations, governments, and other institutions for their environmental practices. Does not fund individuals, scholarships, or capital or endowment campaigns	www.ncf.org
Norman Foundation	Support efforts that strengthen the ability of communities to determine their own economic, environmental, and social well-being, and that help people control those forces that affect their lives. Only fund in U.S. They do not fund individuals, universities, conferences, scholarships, research, films, media, arts projects, capital campaigns, fundraising drives, or direct social service programs	www.normanfdn.org

Environmental Planning

Coldwater Heritage Partnership	Grants for prioritizing watersheds in need of protection, for assessment of coldwater ecosystems, and for the development of watershed conservation plans.	(717) 787-2316

Sponsoring Organization	Description / Restrictions	Contact
Environmental Planning (continued)		
DEP Nonpoint Source Control	Grants for planning and non-point source pollution control projects.	(717) 787-5259
DCNR - Community Conservation Partnership Program	Available to organizations that conserve and enhance river resources. Planning grants are available to identify significant natural and cultural resources, threats, concerns, and special opportunities, and the development of river conservation	www.dcnr.state.pa.us
NRCS Watershed Surveys and Planning	Providing assistance for planning in water and coordinated water and related land resource programs in watersheds and river basins. Types of surveys and plans funded include watershed plans, river basin surveys and studies, flood hazard analyses, and floodplain studies.	www.nrcs.usda.gov
Flood Protection		
DEP Flood Protection Grant Program	Open to communities that need to perform non-routine maintenance or improvements to already existing flood protection projects. Also applies to the purchase of specialized equipment. Open to communities that have flood protection projects that are deemed operable.	(717) 787-7432
General		
Archer-Daniels-Midland Foundation	Proposals can be sent in letter form containing: 1) Description of the organization applying. 2) Description of the project/What funding would be used for. 3) A budget including how much is going to administrative costs. Emphasis is given to corporate operating locations.	www.admworld.com
Audrey Hillman Fisher Foundation, Inc.	Must refer to Application Procedures for more information. Preference given to southwestern Pennsylvania and central New Hampshire.	(412) 338-3466
Eureka Company	No specific interest, but, general focus is on social services, health, and the environment (wildlife, fisheries, habitat, and sustainable community development)	www.electrolux.se
Henry Hillman Foundation	Preference is given to organizations in the Pittsburgh/southwestern Pennsylvania area.	www.guidestar.org
Patagonia, Inc. Environmental Grants Program	Supports small grassroots organizations. Does not fund land acquisition.	www.patagonia.com

General (continued)

Sponsoring Organization	Description / Restrictions	Contact
The Boeing Company	Provides contributions for capital campaigns, seed money (one-time grants) for new programs or projects that address community needs and priorities, and one-time grants to buy equipment, improve facilities, or enable special projects	www.boeing.com/community
The Education Foundation for America	EFA's priorities include supporting the monitoring of the utility restructuring process as it impacts the environment, combating the growth of the "wise-use" movement, opposing large-scale live-stock confinement, and cutting federal "pollution." Letter limited to two pages.	www.efaw.org
The Prospect Hill Foundation	The foundation's environmental grant making concentrates on habitat and water protection in the northeastern region of the United States. Must have 501(c)3. The organization does not fund individuals, basic research, sectarian religious	http://fdncenter.org/grantmaker/prospecthill/

GIS

DEP-GIS Software Grant	The grants consist of the latest commercial release of ArcView GIS software; several texts about utilizing GIS for environmental applications and land-use planning; CD-ROM containing spatial data about the commonwealth. Only issue 10 per quarter.	www.dep.state.pa.us

Habitat

General Challenge Grant Program -National Fish and Wildlife Foundation	Requires non-federal match of 2:1. Address actions promoting fish and wildlife conservation and habitat; should involve conservation and community interest; leverage available funding and evaluate project outcomes.	www.nfwf.org
Keep the Wild Alive (KWA) Species Recovery Fund	Fund on-the-ground projects that directly improve conditions for the endangered species highlighted in the KWA campaign. Current National Wildlife Federation employees are ineligible and applications must be submitted in English.	www.nwf.org/wildalive
Small Grants Program - National Fish and Wildlife Foundation	Address priority actions promoting fish and wildlife conservation and the habitats on which they depend; work proactively to involve other conservation and community interest; leverage available funding, and evaluate project outcomes. A 2:1 match of non-federal funds is required.	www.nfwf.org

Historical and Cultural Preservation

Sponsoring Organization	Description / Restrictions	Contact
Keystone Historic Preservation Grants	Funds the preservation, restoration and/or rehabilitation of historic resources listed in or eligible for listing in the National Register of Historic Places.Requires a 50/50 cash match. Cancelled for 2009-2010 year.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/keystone_historic_preservation_grant_program/417951
National Center for Preservation Technology & Training	Funds projects that developm new technologies or adapt existing technologies to preserve cultural resources	http://www.ncptt.nps.gov/grants/
National Parks Service-Native Americans Graves Protection and Repatriation Grants	Award grants to museums and Native American Tribes to assist in consultation, documentaion, and repatriation of human Native American remains and cultural items.	http://www.nps.gov/history/nagpra/GRANTS/
National Parks Service-American Battlefield Grants	Provide grant funding for preservation and protection of battlefield land and sites associated with battlefields	http://www.nps.gov/history/hps/abpp/funding.htm
National Parks Service-Preserve America	Matching grant program that provides planning funding to designate Preserve American Communities in order to support preservation efforts through heritage tourism, education, and historic preservation planning.	http://www.nps.gov/history/hps/hpg/PreserveAmerica/index.htm
National Parks Service-Tribal Heritage Grants	Authorizes grants to federally recognized Native American Tribes for cultural and historic preservation projects.	http://www.nps.gov/history/hps/hpg/tribal/index.htm
National Parks Service-Save America's Treasures	Grants are available for preservation and/or conservation work on nationally significant intellectual and cultural artifacts and historic structures and sites.	http://www.nps.gov/history/hps/treasures/index.htm
Hart Family Fund for Small Towns	Assist small town preservation and revitalization initiatives around the country.	http://www.preservationnation.org/resources/find-funding/npe05.pdf
Johanna Favort Fund for Historic Preservation	Provides matching grants for projects that contribute to preservation or recapture an authentic sense of plance.	http://www.preservationnation.org/resources/find-funding/npe05.pdf
Cynthia Woods Mitchell Fund for Historic Interiors	Provides matching gratns to assit in planning for preservation, restoration, and interpretation of historic interiors.	http://www.preservationnation.org/resources/find-funding/npe05.pdf
Richard and Julie Moe Fund for Statewide and Local Partners	Provide grants to organizations that participate in the National Trust's Statewide and Local Partners Program.	http://www.preservationnation.org/resources/find-funding/npe05.pdf
National Trust Preservation Grants	Provide matching grants for preservation planning and education efforts and Intervetion funds for preservation emergencies.	http://www.preservationnation.org/resources/find-funding/nonprofit-public-funding.html

Historical and Cultural Preservation (continued)

Sponsoring Organization	Description / Restrictions	Contact
Pennsylvania Historic-Museum Commission-Keystone Historic Grant Program	Matching grants available for preservation, restoration, and rehabilitation of historic resources listed in or eligible for listing in the National Register. The 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/keystone_historic_preservation_grant_program/417951
Pennsylvania Historic-Museum Commission-General Operating Support Grants for Museums	Competitive grant fundings that are restricted to museums with annual operating budgets exceeding $100,000 exceeding capital and in-kind services.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/general_operating_support_grants_for_museums/426627
Pennsylvania Historic-Museum Commission-General Operating Support Gratns for County Historical Societies	Matching grants, funds are restricted to officially designated County Historical Socieites and must receive funding assistance from the county to be eligible.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/general_operating_support_grants_for_official_county_historical_societies/426628
Pennsylvania Historic-Museum Commission-Historical Marker Grants	Historical Marker grants are awarded according to the rules of the Pennsylvania Historical Markers Program. For more information and an application form, visit the Pennsylania Historical Markers Program	http://www.portal.state.pa.us/portal/server.pt?open=512&objID=2539&&SortOrder=200&level=2&parentCommID=1586&menuLevel=Level_2&mode=2
Pennsylvania Historic-Museum Commission-Statewide Conference Grants	Funds are awarded as "seed" money to organizations that plan and hold conferences relating to issues concerning the history, museum, historic preservation and cultural communities of Pennsylvania.However, the 2009-2010 funding cycle was cancelled	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/statewide_conference_grants/426630
Pennsylvania Historic-Museum Commission-Statewide Organization Grants	Funds are awarded to organizations that function in a statewide capacity to the history, museum, historic preservation and cultural communities of Pennsylvania. Funding is used for a variety of activities to benefit these communities	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/statewide_organization_grants/426631
Pennsylvania Historic-Museum Commission-Technical Assistance Grants	Technical Assistance Grants (TAG) are available to assist organizations in solving problems, increasing professionalism and building capacity.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/technical_assistance_grants/426632

Historical and Cultural Preservation (continued)

Sponsoring Organization	Description / Restrictions	Contact
Pennsylvania Historic-Museum Commission-Archives and Records Management Grants	Archives and Records Management Grants are designed to enhance the preservation and improve the accessibility of historically valuable records. The grants are available to support projects in the categories of Documentary Heritage Projects and Local Government Records Projects. However, the 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/archives_and_records_management_grants/426633
Pennsylvania Historic-Museum Commission-Collections Management Grants	Collections Management Grants are available in two different amounts to support projects in the categories of Educational and Interpretive Programs, Exhibit Planning and Design, Management and Conservation. However, the 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/collections_management/426653
Historic Preservation Grants	Provide community preservation and archaeology funding. Community preservation activities, such as cultural resource surveys, national register and historic district nominations, municipal planning and development assistance are eligible. Archaeology activities eligible include regional site sensitivity modeling, prearation of regional and/or temporal syntesis, research, and rtifact analysis, problem oriented excavation projects. However the 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/historic_preservation_grants/426654
Hope IV Main Street	Provide grants to small communities to assist in the rejuvenation of an historic or traditional central business district or "Main Street" area.	http://www.hud.gov/offices/pih/programs/ph/hope6/grants/mainstreet/
Public History Grants	Education, Public and Local History Program Grants are available in two different amounts to support projects in the categories of Public Programs, Research and Writing, and Educational Programs. However, the 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/public_history_grants/426655
Organizational Development Grants	Legally organized, non-profit institutions that are education oriented with professional staff that utilize tangible objects, cares for the objects, and exhibits them to the public on a regular schedule are eligible for funding. However, the 2009-2010 funding cycle was cancelled.	http://www.portal.state.pa.us/portal/server.pt/community/grants/3794/organizational_development/426656
National Endowments for the Arts-Access to Artistic Excellence	To foster and preserve excellence in the arts and provide access to the arts for all Americans, including conservation of public sculpture	http://www.heritagepreservation.org/Programs/SOS/sosfundraising.htm
National Endowments for the Arts-Challenge America: Reaching Every Community Fast-Track Review Grants	To support projects that extend the reach of the arts to underserved populations	http://www.heritagepreservation.org/Programs/SOS/sosfundraising.htm

National Endowments for the ArtsLearning in the Arts for Children and Youth	To advance arts education for children and youth	http://www.heritagepreservation.org/Programs/SOS/sosfundraising.htm

Sponsoring Organization	Description / Restrictions	Contact
Historical and Cultural Preservation (continued)		
National Endowments for the Humanities-Preservation and Access	Grants are made to projects "that preserve collections and create intellectual access to collections that, because of their intellectual content and value as cultural artifacts, are considered highly important for research, education, and public programming in the humanities	http://www.heritagepreservation.org/Programs/SOS/sosfundraising.htm
National Endowments for the Humanities-Public Programs	Grants for projects that foster public understanding and appreciation of the humanities through interpretive exhibitions, radio and television programs, lectures, symposia, multimedia projects, printed materials, and reading and discussion groups	
Getty Foundation-Conservation Grants	Provides grants that support museums and other cultural organizations for a wide range of projects focused on the conservation and management of artwork collections as well as historic buildings, districts, landscapes, and archaeological sites	http://www.getty.edu/grants/
History Channel Save our History Grant Program	Grants are available to history organizations that design and execute local history education and preservation projects in collaboration with schools or youth groups. Projects must be unique and hands-on, teach students about important aspects of their local history, and actively engage participants in the preservation of significant and potentially endangered pieces of their local heritage. Applicants must link their projects to students' in-class (or extracurricular) education through the Save Our History Educator's Manual	http://www.history.com/content/saveourhistory/grant-program
Internship		
Office of Surface Mining Intern Program	Candidates must organize their work, work well with community groups and on their own, quickly internalize the requirements of acid mine drainage remediation and the national Clean Streams program, write well and enjoy public presentations. Academic credit. Can be undergraduate or graduate student. Positions available in AL, IL, IN, IA, KY, MD, MS, OH, OK, PA, TN, VA, WV. Must provide housing for interns	(202) 208-2836

Sponsoring Organization	Description / Restrictions	Contact
Land Protection		
DCNR Community Conservation Partnership Program	Conserve and enhance river resources by offering planning grants, technical assistance, implementation grants, development grants, and acquisition grants.	www.dcnr.state.pa.us
Lowes Charitable Foundation	Environmental initiatives that support the continued enhancement of the natural landscape, natural environment enhancers, and/or park improvement projects. Must apply online. Must be a 501(c)3.	www.lowes.com
Michael D. Ferguson Charitable Foundation	General environment, wildlife, fisheries, habitat, sustainable community, and development.	n/a
Nationals Parks Service - Land & Water Conservation Fund	Provide federal grants for land acquisition and conservation to federal and state agencies.	(303) 969-2500
The Wilderness Society	To preserve wilderness and wildlife, protect America's prime forest, parks, rivers, and shore lands, and foster an American land ethic. Alternate address Montana Regional Office, 105 West Main St., Suite E, Bozeman, MT 59715-4689	www.wilderness.org
Town Creek Foundation	Environmental issues of interest to the foundation include: 1) Preserving the ecological richness of our natural heritage, with a major focus on our federal public lands. 2) Promoting policies and practices to protect the land, estuaries, and coastal bays	www.towncreekfdn.org
Loan		
Environmental Loan Fund	The loan can be used for membership development, creating and implementing a workplace giving program, cause-related marketing, donor development, special events, direct mail campaigns, mission related business enterprises, or capital campaign work	www.envsc.org
Pennsylvania Infrastructure Investment Authority Drinking Water Loans	Must show water quality impact, must have qualified loan candidate. Loans to stormwater projects and non-point source projects. Interest is 1-2.8 percent over 20 years.	(717) 787-813

Sponsoring Organization	Description / Restrictions	Contact
Multiple		
Acorn Foundation	Interested in small and innovative community-based projects which preserve and restore habitats supporting biological diversity and wildlife, and advocate for environmental justice. Does not fund the following: direct services, capital expenditure, construction or renovation programs, programs undertaken by tax-supported institutions or government initiatives, emergency funding, scholarship funds, or other individual aid.	www.commoncounsel.org/ pages/foundation.html
Allegheny Foundation	The Allegheny Foundation concentrates its giving in the western Pennsylvania area and confines its grant awards to programs for historic preservation, civic development, and education. No event sponsoring. Does not fund individuals.	www.scaife.com
Anne & George Clapp Charitable & Educational Trust	Fields of interest include education, social services, youth and child welfare, and aging. Limited support for cultural programs, historic preservation, and conservation. Southwestern Pennsylvania only; grants are not made to individuals. No grants are made for medical research, research projects, filmmaking, conferences, or field trips.	(412) 234-1634
Charlotte and Donald Teast Foundation	Sustainable communities, arts, humanities, civic and public affairs, education, the environment, health, and social services.	(214) 373-6039
Ford Foundation	Interested in general/operating support, continuing support, endowment funds, program development, conferences/seminars, professorships, publication, seed money, fellowships, internships, research, technical assistance, consulting services, and program-related investments.	http://jefferson.village.virginia. edu/readings/ford.html

Multiple (continued)

Sponsoring Organization	Description / Restrictions	Contact
Max and Victoria Dreyfus Foundation	Consider support for museums, schools, educational and skill training projects, programs for youth, seniors, and the handicapped. Must be located in the U.S.	(914) 682-2008
National Fish and Wildlife Fund -Five Star Restoration Challenge	Projects must involve diverse partnerships of, ideally, five organizations that contribute funding, land, technical assistance, workforce support, and/or other in-kind services. Projects involving only research, monitoring, or planning are not eligible. No mitigation work.	www.nfwf.org
National Parks Foundation	Education, training, preservation, and conservation. The grants that are available change often. See the website for current funding opportunities. Projects must connect with National Parks, be located on or next to National	www.nationalparks.org
Native Plant Conservation Initiative - National Fish and Wildlife Foundation	Through this initiative, grants of federal dollars will be provided to non-profit organizations and agencies at all levels of government to promote the conservation of native plants. There is a strong preference for "on-the-ground" projects that involve local communities and citizen volunteers in the restoration	www.nfwf.org
Public Welfare Foundation	The Public Welfare Foundation supports organizations that address human needs in disadvantaged communities, with strong emphasis on organizations that include service, advocacy and empowerment in their approach: service that remedies specific problems; advocacy that addresses those problems in a systemic way through changes in public policy; and strategies to empower	www.publicwelfare.org
Robert Shaw Charitable Foundation	Money to assist those organizations who work to enhance the educational, health and welfare, cultural, youth development, social welfare, and community development needs of the area. Only one grant per year will be awarded to any	(724) 832-7578
Scaife Family Foundation	Grants awarded will support programs that strengthen families, address the health and welfare of women and children, or promote animal welfare. No event sponsorships, endowments, capital campaigns, renovations, or government agencies. No grants to individuals.	www.scaife.com
The French Foundation	Environment, and natural resources	n/a
The Lawrence Foundation	The mission of The Lawrence Foundation is to make a difference in the world by providing contributions and grants to organizations that are working to solve pressing educational, environmental, health, and other issues.	wwwthelawrencefoundation.org

Sponsoring Organization	Description / Restrictions	Contact
Multiple (continued)		
The Max and Anna Levinson Foundation	Interested in the environment, including preservation of ecosystems and biological diversity, but also environmental justice, alternative energy, alternative agriculture, and toxics. Must have 501(c)3 status. Rarely fund organizations with budgets in excess of $500,000	www.levinsonfoundation.org
Turner Foundation	Supports activities to preserve the environment, conserve natural resources, protect wildlife, and develop and implement sound population policies. Interested in protecting rivers, lakes, wetlands, aquifers, oceans. Does not provide funding for buildings, land acquisition, endowments, start-up funds, films, books, magazines, or other specific media projects. Alternate Phone: 404-681-0172.	www.turnerfoundation.org
Natural Resources		
Beneficia Foundation	Only applications for projects focusing on conservation of the environment or the arts will be considered. Beneficia has no geographic preferences, but favors requests for project support over general support and does not look favorably	n/a
Canaan Valley Institute	Promotes the development and growth of local associations committed to improving or maintaining the natural resources of their watersheds in the Mid-	www.canaanvi.org
Charles A. and Anne Morrow Lindburgh Foundation	Grants awarded for the conservation of natural resources and water resource management. Grants are awarded to individuals for research and educational programs, not to organizations for institutional programs.	www.lindberghfoundation.org
Dana Corporation	Will consider funding air quality, environment, general, and water resources projects. Emphasis is given to areas where the corporation operates.	www.dana.com
Home Depot	Assistance is provided to non-profit organizations that direct effort toward protecting our natural systems. The grant program focuses on forestry and ecology, clean up, and recycling, green building design, and lead poisoning prevention	www.homedepot.com
W. Alton Jones Foundation, Inc.	The goals of the foundation are to build a sustainable world by developing new ways for humanity to interact responsibly with the planet's ecological systems, and build a secure world by eliminating the possibility of nuclear war by	www.wajones.com

Natural Resources (continued)

Sponsoring Organization	Description / Restrictions	Contact
Leo Model Foundation	Grants for habitat conservation, watershed conservation, and species preservation in the U.S.	(215) 546-8058
National Fish and Wildlife Foundation Challenge Grants for Conservation	The foundation, in partnership with the NRCS and NACD (National Association of Conservation Districts) provides challenge grants. Primary goal of the program is to support model projects which positively engage private landowners.	www.nfwf.org
Rivers, Trails and Conservation Assistance Program	Grants to work with National Park Service to conserve land and river resources, and provides funding for various projects dealing with the conservation of these resources, including the development of trails and greenways.	(215) 597-1581
The River Restoration - NOAA	Submittal by email whenever possible. Encourage contact to discuss project prior to submitting application. Formal non-federal matches not required, but encouraged. Dam removal and fish passage. Available in northeast, Mid-Atlantic, and California.	www.amrivers.org/feature/restorationgrants.htm
The Watershed Protection and Flood Prevention Act	Plan development for natural resource concerns within a watershed area; cost sharing available to carry out plan.	(717) 782-4429
The William C. Kenney Watershed Protection Foundation	Protecting the remaining wild rivers of the west and ensuring the effectiveness of small environmental organizations.	www.kenneyfdn.org

Other

Charles Stewart Mott Foundation	The environmental program is devoted to reform of international lending and trade policies. Projects must be part of a national demonstration when out of the Flint, Michigan area.	www.mott.org
North American Fund for Environmental Cooperation	Funds community based projects in Canada, Mexico and the U.S. to enhance regional co-operation, prevent environmental and trade disputes, and to promote	(514) 350-4357
PA DEP Brownfields Inventory	Grantees will be paid $1,000 for each site registered into the PA Site finder. Municipalities and economic development agencies may apply for the grant by submitting an application.	(717) 783-7816
Retired and Senior Volunteer Program (RSVP)	Provides a variety of opportunities for people aged 55+ to volunteer in the management of trails, rivers, and open space. Grants can be used for staff	www.nationalservice.org/senior/index.html

Plantings

Sponsoring Organization	Description / Restrictions	Contact
National 4-H Council	Grants are used to stimulate community tree planting and/or reforestation projects. Awarded to communities in support of on-going community planting/reforestation project or to stimulate new and creative youth-led projects. Organization must secure matching funds or in-kind contributions from other sources equal to the amount requested.	www.fourhcouncil.edu
National Gardening Association	One hundred grants to be awarded to start-up programs involving children, and 300 will be awarded to established programs. Covers tools, seeds, plant materials, products, and educational resources. Grant restricted to programs involving children. There is a $10.00 administrative fee.	www.kidsgardening.com
Plant Material Centers	American Indian Liaison Resource Conservation and Community Assistance Division of USDA/NRCS. PMC select and grow plants that grow naturally and provide them to those people who wish to grow native plants.	(202) 720-8576

Recreation

Home Depot Building Healthy Communities Grant Program	Grants, up to $2,500, are now available to registered 501(c)(3) nonprofit organizations, public schools or tax-exempt public service agencies in the U.S. who are using the power of volunteers to improve the physical health of their community. Grants are made in the form of The Home Depot gift cards for the purchase or tools or materials.	http://corporate.homedepot.com/wps/portal/!ut/p/c1/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gDdwNHH0sfE3M3AzMPJ8MAVxcDKADKR2LKmxrD5fHr9vPIz03VL8iNKAcASzGzVw!!/dl2/d1/L2dJQSEvUUt3QS9ZQnB3LzZfMEcwQUw5TDQ3RjA2SEIxUE9E
National Parks Service-Land & Water Conservation Fund	Provides grants to states and local governments to acquire and develop outdoor, public recreation areas and faciliites.	http://www.nps.gov/ncrc/programs/lwcf/
National Parks Service-Rivers, Trails, & Conservation Assistance Program	Provide technical assistance to locally-led natural resources conservation and outdoor recreation projects.	http://www.nps.gov/ncrc/programs/rtca/contactus/cu_apply.html
National Trails Fund	National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools, and materials to protect America's cherished hiking trails.	http://www.americanhiking.org/our-work/national-trails-fund/
National Transportaion Enhancements Clearinghouse	Funds from the federal government to expand travel choice, strengthen the local economy, improve the quality of life, and protect the environment.	http://www.enhancements.org/

Recreation (continued)

Sponsoring Organization	Description / Restrictions	Contact
U.S. Federal Highway Administration-Recreational Trails Program	Funds states to develop and maintain recreation trails and trail related facilities for motorized and nonmotorized uses.	http://www.fhwa.dot.gov/environment/rectrails/
Pennsylvania Recreation and Park Societies-RecTAP Program	Provides advice and technical assistance to municipalities aout specific recreational issues when a municipality does not have in-house expertise.	http://www.prps.org/grantsrectap.htm
Pennsylvania Recreational Trails Program	Provides funds to develop and maintain recreational trails and trail related facilities for motorized and nonmotorized recreational trail use.	http://www.dcnr.state.pa.us/brc/grants/rectrails.aspx
American Hiking Society-National Trails Fund	Funds grassroots organizations working towards establishing, protecting, and maintaining foot trails in the U.S.	http://www.americanhiking.org/our-work/national-trails-fund/
Pennsylvania Fish and Boat Commission-Boating Facilities Grant Program	Funds counties and municipalities for planning, aquistion, development, expansion, and rehabilitation of public boating facilities.	http://www.fish.state.pa.us/promo/grants/boat_fac/00boatfac.htm
Pennsylvania Fish and Boat Commission-Boaing Infrasturcuture Grant Program	Provides grants for transient moorage (tie-ups) serving recreational motorboats 26 feet and longer.	http://www.fish.state.pa.us/promo/grants/boat_infra/00big.htm
Pennsylvania Fish and Boat Commission-Clean Vessel Act	The Grant will reimburse recipients for up to 75% of the installation cost of pumpout and dump stations. This includes the cost of new equipment, or the renovation or upgrading of existing equipment, as well as necessary pumps, piping, fitting, lift stations, on-site holding tanks, pier or dock modifications, signs, permits and other miscellaneous equipment needed for a complete and efficient station.	http://www.fish.state.pa.us/promo/grants/cleanvessel/00clean_vessel.htm
Pennsylvania Fish and Boat Commission-Cooperative Nursery Grants	Funding is available to organizations who are involved in Pennsylvania Fish and Boat Commissions Cooperative Nursery Program	http://www.fish.state.pa.us/promo/grants/coop/00coop.htm
Pennsylvania Fish and Boat Commission Landowner Incentive Program	Provides grants to establish or supplement programs that protect and restore wildlife habitats on private lands. Grants are awarded to benefit species of special conservation concern as determined in Pennsylvania through the State Wildlife Action Plan. This program provides technical and financial assistance to private landowners for habitat protection and restoration.	http://www.fish.state.pa.us/promo/grants/lip/00lip.htm
Pennsylvania Fish and Boat Commission-Sinnemahoning Creek Watershed Restoration Grant Program	Funds to develop and implement projects that benefit fishing, boating, and aquatic resources in Cameron, Elk, Potter and McKean counties, with primary emphasis on projects within the Sinnemahoning Creek Watershed upstream from the confluence of the First Fork of Sinnemahoning Creek.	http://www.fish.state.pa.us/promo/grants/sinn/00sinn.htm
Pennsylvania Fish and Boat Commission - Sportfishing and Aquatic Resource Education Grant Program	Funds up to $5,000 per grantee for fishing and aquatic education programs in need of financial assistance. Grant applications are accepted from organizations and local agencies involved in offering sportfishing and aquatic resource education programming.	http://www.fish.state.pa.us/promo/grants/sportfishing/00sportfishing.htm

Recreation (continued)

Sponsoring Organization	Description / Restrictions	Contact
Western Pennsylvania Conservancy-Colcom Revolving Fund for Local Land Trust	Short term loans providing access to funds for ciritical conservation purchases	http://www.paconserve.org/281/colcom-revolving-fund-for-local-land-trusts
Pennsylvania Land Trust Association-Conservation Easement Assistance Program	Provides reimbursement grants to qualifieid organization for completing conservation and trail easements, amending and srestating older easements, establishing or updating baseline documentation, and installing signs on eased properties	http://www.conserveland.org/ceap/
Shade Structure Program	The American Academy of Dermatology's Shade Structure Program awards grants in the amount of $8,000 each for the purchase of permanent shade structures designed to provide shade and ultraviolet (UV) ray protection for outdoor areas	http://www.aad.org/public/sun/grants.html

Remediation/Restoration

Abandoned Mine Land Reclamation Program - Office of Surface Mining	Applications accepted anytime. Provides for the restoration of eligible lands and waters that have been mined, abandoned, or left inadequately restored. Two different grants are available. Protects land and corrects environmental damage caused by coal mining	www.osmre.gov
AMD Watershed Assessment - Bureau of Mining and Reclamation	Must be a municipality, municipal authority or incorporated non-profit. AMD projects only.	(717) 787-7007
American Canoe Association CFS Grants	For grassroots organizations to improve waterways. Cleanups, riparian corridor, and water quality monitoring projects. Very flexible as long as it is improving waterways and fish habitat. Can not be used to pay staff. However, it can be used to pay a contractor. Must use volunteer help	www.acnet.org
PA DEP - BAMR Abandoned Mine Reclamation Grants	Funds must be used for project development, design, construction, and directly related expenses. Site chosen must be located in a watershed or area with an approved rehabilitation plan . No administrative cost. Must be a municipality, municipal authority, or incorporated 501(c)3	(814) 472-1800
Bring Back the Natives - National Fish and Wildlife Foundation	Supports on-the-ground habitat restoration projects that benefit native aquatic species in their historic range.	www.nfwf.org

Remediation/Restoration (continued)

Sponsoring Organization	Description / Restrictions	Contact
Community Foundation	Projects related to abandoned mine drainage remediation, alkaline discharges, streambank preservation, removal of spoil piles, and other issues related to water quality are of interest to the foundation's board of advisors.	(814) 669-4847
EPA - Nonpoint Source Implementation Grants	Funds are provided to the state to carry out non-point source projects and programs pursuant to Section 319 of the Clean Water Act as amended by the Water Quality Act of 1987. Grants are awarded to a single agency in each state, designated by the governor. 40 percent non-federally funded match required. Only one administered to each state.	www.cfda.gov/static/p66460.htm
NOAA Fish Habitat Restoration Program	Financial assistance for community-based habitat restoration projects, to restore	n/a
Office of Surface Mining Clean Stream Initiative	This grant is used to treat AMD. Design and administration is covered but the bulk of funding must go into construction. Must have funding partners. Applications available upon request. Review period takes 2.5-3 months, depending on eligibility. Must be a cooperative agreement.	(717) 782-2285
PA DEP -Stream Improvement Project Reimbursements	Provides assistance in an instance where a stream is posing a treat to structures, such as homes or businesses. Must pose threat to structure. Must be applied for by a conservation group or municipality.	(717) 783-7480
PA Fish and Boat Commission	Habitat improvement and technical assistance.	(814) 359-5158
Partnership with the U.S. Army Corps of Engineers	To foster cooperation on projects of mutual interest, such as fish and wildlife habitat restoration, non-structural flood control opportunities, wetland restoration, and endangered species protection.	www.nfwf.org
Pinellas County Environmental Foundation - National Fish and Wildlife Foundation	A partnership between Pinellas County and the National Fish and Wildlife Foundation. These two groups share the common goals of actively pursuing the protection, restoration and enhancement of fish and wildlife habitat, and developing creative and sustainable solutions to natural resource issues.	www.nfwf.org

Research

Sponsoring Organization	Description / Restrictions	Contact
Conservation & Research Foundation at Connecticut College	The conservation and enlightened use of the earth's resources to encourage research to deepen the understanding of the intricate relationship between people and the environment. Will support higher education, individuals, museums, non-profits, and research. Unsolicited proposals are not accepted; however, letters of inquiry including a budget may be sent.	n/a
USDA - Nutrient Science for Improved Watershed Management	Funds for integrated research in extension management of nutrients on a watershed level. Nutrients of interest are nitrogen and phosphorous. Please note that a research foundation maintained by a college or university is not eligible. These grants are for research.	http://www.reeusda.gov/1700/funding/ourfund.htm

Stormwater Management

DEP Stormwater Management Program	Watershed planning for stormwater control and implementation of programs at local levels.	(717) 772-4048

Streambank Fencing

Ducks Unlimited - PA Stewardship Program	Provides strong incentives to landowners to create wooded stream buffers, create wider than minimum buffers, and fence cattle out of the stream. Grant is available for fencing and tree planting.	(814) 386-3458
Fish America Foundation	Grants awarded for streambank stabilization materials, instream habitat improvements, contracted heavy equipment, and stream morphology work. Match not required, but is highly recommended.	www.asafishing.org
Partners for Fish and Wildlife Program	The Partners for Fish and Wildlife Program provides technical and financial assistance to private landowners for habitat restoration on their lands. A variety of habitats can be restored to benefit Federal trust species (for example, migratory birds and fish and threatened and endangered species.) Normally the cost share is 50 percent (the Service and the landowner each pay half of the project costs), but the percentage is flexible. Services or labor can qualify for cost-sharing.	(724) 938-4215
US Fish and Wildlife Service	Assists landowners in installation of high-tensile electric fence to exclude livestock from streams and wetlands. No buffer requirements.	www.fws.gov

Sponsoring Organization	Description / Restrictions	Contact
Streambank Fencing		
USDA Conservation Reserve Program	Statewide costshare program for creating stream buffers. A 40 percent practice incentive as well as a $10/acre incentive. Buffers of 35-180 feet per side of the stream. Land must have been pasture.	Regional USDA office
USDA - Environmental Quality Incentives Program	A statewide program based on environmental problems. It addresses all environmental problems on a farm. They fund BMPs.	Regional USDA office
USDA Project Grass	A co-operative effort of local farmers, conservation districts, with assistance from USDA, to improve agriculture productivity in southwestern Pennsylvania. For local contacts see information brochure on file. Contact: james.harrold@pasomerset.fsc.usda.gov	Regional USDA office
Technical Assistance		
Watershed Assistance Grants	Funding supports organizational development and capacity building for watershed partnerships with diverse membership. Match requested but not required. Non-profits, tribes, and local government only.	www.rivernetwork.org
Volunteers		
3M Foundation	3M sponsors a volunteer program called Community Action Retired Employee Service (CARES). Company favors projects that impact 3M communities. Alternate Phone: 612-737-3061	www.mmm.com
Wetlands		
U.S. Fish and Wildlife Service	For wetland Conservation projects. Must have 50 percent non-federal match in small-grant program with North American Wetlands Conservation Council.	www.fws.gov
Wetlands Reserve Program USDA Natural Resources Conservation Service	Restore and protect wetlands on private property; provide landowners with financial incentives to enhance wetlands in exchange for retiring marginal agricultural land.	Regional USDA office

APPENDIX P. USEFUL WEBSITES

Source	Data	Website
Project Area Characterisitics		
Bureau of Labor Statistics	Unemployment Rate	http://www.bls.gov/home.htm
Free Demographics	Population and Economic Data	http://www.freedemographics.com
Green Media Toolshed	Pollution in Your Community	http://www.scorecards.com
Natural Lands Trust	Conservation by Design	http://www.natlands.org
Pa. Department of Community and Economic Development	Zoning and Comprehensive Planning	http://www.elibrary.state.pa.us
Pa. Department of Education	School Report Cards	http://www.paprofiles.org
Smart Growth Partnership	Smart Growth	http://www.smartgrowth.org
United States Census Bureau	Population and Economic Data	http://www.census.gov
Land Resources		
Conservation Reserve Enhancement Program	Conservation Practices	http://www.creppa.org
Natural Resources Conservation Service	Soil Characteristics	http://www.nrcs.usda.gov/technical/efotg
Pa. Department of Environmental Protection	Permits, Violations	http://www.dep.state.pa.us/efacts/default.asp
Pa. Geological Survey	Environmental Geology	http://www.dcnr.state.pa.us/topogeo/pub/environmental.aspx
Pa. Geological Survey	Geological Characteristics	http://www.dcnr.state.pa.us/topogeo/index.aspx
Pa. Geological Survey	Mineral Resources	http://www.dcnr.state.pa.us/topogeo/pub/mineral.aspx
Pa. Geological Survey	Environmental Geology for Land Use Planning	http://www.dcnr.state.pa.us/topogeo/education/landuse/landuseplan.aspx
Pa. Spatial Data Access (PASDA)	Geographic Information System Data	http://www.pasda.psu.edu/
Penn State Extension	Natural Gas Impacts	http://www.naturalgas.extension.psu.edu
United States Environmental Protection Agency	Brownfields	http://www.epa.gov/brownfields
United States Environmental Protection Agency	Superfund	http://www.epa.gov/superfund
United States Environmental Protection Agency - ECHO	Enforcement and Compliance History	http://www.epa-echo.gov/echo/
United States Environmental Protection Agency - Envirofacts	Federal Permits, Violations, Wastesites	http://www.epa.gov/enviro/
Water Resources		
Center for Dirt & Gravel Road Studies		http://www.mri.psu.edu/centers/cdgrs/Index.html
Coldwater Heritage Partnership		http://www.coldwaterheritage.org/
Environmental Protection Agency	Surf Your Watershed	http://cfpub.epa.gov/surf/huc.cfm?huc_code=05030105

Federal Emergency Management Agency	National Flood Insurance Program	http://www.fema.gov/business/nfip/
Keystone Chapter Soil and Water Conservation Society		http://www.keystoneswcs.com/index.html

Source	Data	Website
Water Resources (continued)		
League of Women Voters	Groundwater Primer for Pa.ns	http://pa.lwv.org/wren/pubs/primer.html
Pa. American Water		http://www.amwater.com/awpr1/paaw/default.html
Pa. Department of Environmental Protection	Stormwater Management Program	http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1437&Q=518682&PM=1
Pa. Department of Environmental Protection	Water Resources Plan	http://www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/WaterResources/docs/WaterResourcesExecutiveSummary.htm
Pa. Department of Environmental Protection	Watershed Management	http://www.depweb.state.pa.us/watershedmgmt/site/default.asp
Pa. Department of Environmental Protection	State Water Planning Resource Center	http://www.dep.state.pa.us/dep/deputate/watermgt/wc/act220/default.htm
Pa. Fish and Boat Commission	Wild Trout Waters	http://www.fish.state.pa.us/classa98.htm
Pa. Geological Survey:	Water Resources Reports	http://www.dcnr.state.pa.us/topogeo/groundwater/gwlist.aspx
Pa. Geological Survey:	Geology of Groundwater in Pa.	http://www.dcnr.state.pa.us/topoeo/education/es3.pdf
Pa. Geological Survey:	Hydrogeologic and well-construction characteristics of the rocks of Pa.	http://www.dcnr.state.pa.us/topogeo/pub/w69recent.aspx
Pa. Geological Survey:	Pa. Groundwater Information System	http://www.dcnr.state.pa.us/topogeo/groundwater/PaGWIS/PaGWISMenu.asp?c=t
Pa. Trout	Wilderness Trout Streams	http://www.patrout.org/wildernesstroutstreams.htm
Stroud Water Research Center		http://www.stroudcenter.org/
U.S. Geological Survey	Water Resources Links	http://water.usgs.gov/lookup/getwatershed?05030105
United States Environmental Protection Agency	Water Quality Trading	http://www.epa.gov/owow/watershed/trading.htm
University of Pittsburgh	Regional Water Management Task Force	http://www.iop.pitt.edu/water/index.htm

Biological Resources

Biodiversity

Ecological Society of America	Biodiversity	http://www.esa.org/
NatureServe	Biodiversity	http://www.natureserve.org/
Pa. Biodiversity Partnership	Biodiversity	http://www.pabiodiversity.org/index.html
Pa. Biological Survey (PABS)	Biodiversity	http://alpha.dickinson.edu/prorg/pabs/index.htm
Pa. GAP Analysis Project	Biodiversity	http://www.orser.psu.edu/PAGAP/gappage.htm

Invasive Species

Aquatic Invasive Species of Pa.	Invasive Species	http://www.pserie.psu.edu/seagrant/ais/

Common Invasive Plant in Riparian Areas	Invasive Species	http://www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/streamreleaf/Docs/Invasive%20Plants.pdf

Biological Resources (continued)

Invasive Species

Source	Data	Website
Invasive Plants of Pa.	Invasive Species	http://www.dcnr.state.pa.us/forestry/wildplant/invasive.aspx
Invasive Plants of the Eastern United States	Plant Invaders of Mid-Atlantic Natural Areas	http://www.invasive.org/eastern/midatlantic/intro.html
Invasive Species	Invasive Species	www.invasive.org
Invasive Species in Pa.	Invasive Species	http://www.biodiversitypartners.org/invasive/factsheets/PA.pdf
Mid-Atlantic Exotic Pest Plant Council		http://www.ma-eppc.org/
U.S. Department of Agriculture:	National Agricultural Library – Pa. Invasive Species Resources	http://www.invasivespeciesinfo.gov/unitedstates/pa.shtml

Native Plants and Landscaping

American Chestnut Foundation	Pa. Chapter	www.patacf.org
Arbor Day Foundation	Backyard Woods	http://www.arborday.org/backyardwoods/guide.cfm
Arbor Day Foundation	Tree City U.S.A.	http://www.arborday.org/programs/treeCityUSA.cfm
Carnegie Library of Pittsburgh	Books on Native Plants	http://www.carnegielibrary.org/subject/gardening/nativeplants.html
Ernst Conservation Seeds	Native Plant Sales and Landscaping Information	www.ernstseed.com
Pa. Department of Conservation and Natural Resources	Pa. Community Forests	http://www.dcnr.state.pa.us/forestry/pucfc/
Pa. Flora Database		http://www.paflora.org/Web3/Speciesbywatershed_search_form.asp
Pa. Native Plant Society	Useful Links and Information Regarding Native Plants	http://www.pawildflower.org/04_links/links.htm
Sylvania Natives	Native Plant Sales	www.sylvanianatives.com
U.S. Department of Energy	Energy Efficient Landscaping	http://www.eere.energy.gov/consumer/your_home/landscaping/index.cfm/mytopic=11910
Western Pa. Audubon Society	List of plants native to Allegheny County and surrounding region	http://www.aswp.org/files/allegheny_county_Pa._native_plants_aswp.pdf
Pa. Invertebrate Biodiversity Project		http://www.ento.psu.edu/home/frost/pinbiop/about.html
Pa. Natural Heritage Program		http://www.naturalheritage.state.pa.us/
U.S. Environmental Protection Agency	Ecoregions	http://www.epa.gov/wed/pages/ecoregions/reg3_eco.htm

Biological Resources (continued)

Wildlife

Source	Data	Website
Animal Rescue League of Western Pa.	Wildlife Rehabilitation	http://www.pawildlifecenter.org/about-pwc.htm
Audubon Society	Important Bird Areas	http://pa.audubon.org/iba/maps.html
Carnegie Museum of Natural History	2nd Pa. Breeding Bird Atlas	http://www.carnegiemnh.org/atlas/about_book.htm
Carnegie Museum of Natural History	Pa. Mammals	http://www.carnegiemnh.org/mammals/index.html
Field Guides		http://www.enature.com/fieldguides/index.asp
National Biological Information Infrastructure		http://www.nbii.gov/portal/server.pt
National Wildlife Federation		http://www.nwf.org/nationalwildlife/article.cfm?articleid=292&issueid=31
North American Pollinator Protection Campaign		http://www.nappc.org/
Pa. Audubon		http://pa.audubon.org/
Pa. Biological Survey	Important Mammal Areas	http://www.pawildlife.org/imap.htm
Pa. Department of Conservation and Natural Resources	Endangered and Threatened Species of Pa.	http://www.dcnr.state.pa.us/wrcf/contents.aspx
Pa. Fish and Boat Commission	Pa. Fishes	http://www.fish.state.pa.us/pafish/fishhtms/chapindx.htm
Pa. Wildlife Federation		http://www.pawildlife.org/
Species Profiles		http://www.fcps.edu/StratfordLandingES/Ecology/mpages/organism_menu.htm
The Wildlife Society		http://joomla.wildlife.org/?CFID=13824013&CFTOKEN=85052420
Wildbird Recovery	Songbird Rehabilitation Center	http://www.stormpages.com/wildbird/index.html

Cultural Resources

National Parks Service	National Register of Historic Places	http://www.nps.gov/history/nr/research/nris.htm
PA Roots	Historical Information	http://www.pa-roots.com/
Pa. Department of Education	Environment and Ecology Standards	http://www.pde.state.pa.us/k12/lib/k12/envec.pdf
Pa. Fish and Boat Commission	Fishing Regulations	http://www.fish.state.pa.us/regs_fish.htm

APPENDIX Q. RESOURCE GUIDE

Conservation Groups

Allegheny Chapter of Trout Unlimited
P.O. Box 541
DuBois, PA 15801

Alliance for the Chesapeake Bay
3310 Market Street
Camp Hill, PA 17011
Phone: 717-737-8622
Website: www.acb-online.org

American Chestnut Foundation
Penn State University
206 Forest Resources Lab
University Park, PA 16802-4704
Phone: 814-863-7192
Website: www.acf.org

Bennett Branch Watershed Association
P.O. Box 99
Benezette, PA 15821
Phone: 814-787-8787

Black Forest Conservation Association
Back Road
Coudersport, PA 16915
Phone: 814-274-0424
Website: www.pottercountybfca.com

Bucktail Watershed Association
3072 Rich Valley
Emporium, PA 15834
Phone: 814-486-1161

Cameron County Conservation District
20 East Fifth Street
Room 105
Emporium, PA 15834
Phone: 814-486-9354

Chesapeake Bay Program
410 Severn Avenue, Suite 109
Annapolis, MD 21403
Phone: 800-968-7229
Website: www.chesapeakebay.net

Clearfield County Conservation District
650 Leonard Street
Clearfield, PA 16830
Phone: 814-765-2629
Website: www.clfdccd.com

Clearfield - Jefferson Counties Forest Stewardship Committee
c/o Gary Gilmore
1514 Route 28
Brookville, PA 15825

Clinton County Conservation District
45 Cooperation Lane
Mill Hall, PA 17751
Phone: 570-726-3798

Elk County Conservation District
300 Center Street
P.O. Box 448
Ridgway, PA 15853
Phone: 814-776-5373
Website: www.co.elk.pa.us

Elk County Fishermen
HCR 1, Box 199A
Ridgway, PA 15853
Phone: 814-776-6831

Elk County Freshwater Association
10 Erie Avenue
St. Marys PA 15857
Phone: 814-834-3701
Website: www.elkcountyfreshwater.org

First Fork Watershed Association
850 East Fork Road
Austin, PA 16720
Phone: 814-647-8338

Kettle Creek Watershed Association
P.O. Box 317
Cross Fork, PA 17729

Keystone Elk Country Alliance
Phone: 814-866-6421
Website: www.experienceelkcountry.com

Keystone Trails Association
107 North Front Street
Suite 112
Sunbury, PA 17101

Lycoming Audubon Society
P.O. Box 4053
Williamsport, PA 17701

McKean County Conservation District
17137 Route 6
Smethport, PA 16749
Phone: 814-887-4001

Conservation Groups (continued)

National Wild Turkey Federation Northwestern PA Region
133 Timberline Road
Saint Marys, PA 15857
Phone: 814-834-6492
Website: www.panwtf.org

Northcentral PA Conservancy
330 Government Place
P.O. Box 2083
Williamsport, PA 17701
Phone: 570-323-6222
Website: www.npcweb.org

North Central Pennsylvania Regional Planning and Development Commission
651 Montmorenci Road
Ridgway, PA 15853
Phone: 814-773-3162
Website: www.ncentral.com

PA CleanWays of Elk County
Courthouse Annex
300 Center Street
P.O. Box 448
Ridgway, PA 15853
Phone: 814-776-5373

PA Parks and Forests Foundation
105 North Front St., Suite 305
Harrisburg, PA 17101
Phone: 717-236-7644
Website: www.paparksandforests.org

Potter County Conservation District
107 Market Street
Coudersport, PA 16915
Phone: 814-274-8411
Website: www.pottercd.com

Quehanna Area Trails Club
882 Rolling Stone Road
Morrisdale, PA 16858
Phone: 814-345-5949

Saint Marys Sportsmen's Club
1339 Glen Hazel Road
P.O. Box 958
Saint Marys, PA 15857
Phone: 814-834-4375
Website: www.stmaryssportsmen.org

Sinnemahoning Sportsmen's Association, Inc.
15 Club Road, P.O. Box 102
Sinnemahoning, PA 15861
Phone: 814-546-2835
Website: www.sinnsports.com

The Susquehanna Greenway Partnership
201 Furnace Road
Lewisburg, PA 17837
Phone: 570-522-7211
Website: www.susquehannagreenway.org

Susquehannock Trail Club
5003 US 6 West
Ulysses, PA 16948

Tiadaghton Audubon Society
P.O. Box 605
Wellsboro, PA 16901

Trout Unlimited - God's Country
820 Route 49
Coudersport, PA 16915
Phone: 814-274-8718

Trout Unlimited Northwest Region Elk County #427
1339 Glenhazel Road
Saint Marys, PA 15857

Upper Alleghany Watershed Association
PO Box 146
Coudersport, PA 16915
Phone: 814-544-7365

Western Pennsylvania Conservancy Watershed Conservation Program
159 Main Street
Ridgway, PA 15853
Phone: 814-776-1114
Website: www.waterlandlife.org

Historical Societies

Austin Dam Memorial Association
State Route 872 North
P.O. Box 136
Austin, PA 16720
Phone: 814-647-3318
Website: sunnyhill.biz/austindamindex.html

Cameron County Genealogy Club
West Greenwood Street
Emporium, PA 15834
Website: www.cameroncountygenealogy.org

Historical Societies (continued)

Cameron County Historical Society
Cameron County Courthouse
20 East Fifth Street
Emporium, PA 15834
Website: www.thelittlemuseum.org

Clearfield County Historical Society
104 East Pine Street
Clearfield, PA 16830
Website: www.clfdhistory.org

Clinton County Historical Society
362 East Water Street
Lock Haven, PA 17745
Phone: 570-748-7254
Website: www.clintoncountyhistory.com

Elk County Historical Society
109 Center Street
P.O. Box 361
Ridgway, PA 15853
Phone: 814-776-1032
Website: www.elkcountyhistoricalsociety.org

E.O. Austin Home & Historical Society
One Town Square
P.O. Box 412
Austin, PA 16720
Phone: 814-647-8358
Website: www.austinhistoricalsociety.com

Lumber Heritage Region of Pennsylvania
20 East Fifth Street
Emporium, PA 15834
Phone: 814-486-0213
Website: www.lumberheritage.org

McKean County Historical Society and Old Jail Museum
502 West King Street
Smethport, PA 16749
Phone: 814-887-5142

Potter County Historical Society
P.O. Box 605
308 North Main Street
Coudersport, PA 16915
Phone: 814-274-4410
Website: www.history.pottercountypa.net

State Agencies

Department of Conservation and Natural Resources (DCNR) Executive Office
Rachel Carson State Office Building, 7th Floor
400 Market Street, P.O. Box 8767
Harrisburg, PA 17105
Phone: 717-787-2869
Fax: 717-772-9106
Website: www.dcnr.state.pa.us

DCNR Northcentral Region (Cameron, Clinton and Potter Counties)
208 West Third Street, Suite 101
Williamsport, PA 17701

DCNR Northwest Region (Clearfield, Elk and McKean Counties)
230 Chestnut Street
Meadville, PA 16335

Elk State Forest
258 Sizerville Road
Emporium, PA 15834
Phone: 814-486-3353

Moshannon State Forest
3372 State Park Road
Penfield, PA 15849
Phone: 814-765-0821

Sproul State Forest
15187 Renovo Road
Renovo, PA 17764
Phone: 570-923-6011

Susquehannock State Forest
P.O. Box 673
Coudersport, PA 16915
Phone: 814-274-3600

Cherry Springs State Park
c/o Lyman Run
454 Lyman Run Road
Galeton, PA 16922
Phone: 814-435-5010

Parker Dam State Park
28 Fairview Road
Penfield, PA 15849
Phone: 814-765-0630

State Agencies (continued)

Patterson State Park
c/o Lyman Run
454 Lyman Run Road
Galeton, PA 16922
Phone: 814-435-5010

Prouty Place State Park
c/o Lyman Run
454 Lyman Run Road
Galeton, PA 16922
Phone: 814-435-5010

Sinnemahoning State Park
8288 First Fork Road
Austin, PA 16720
Phone: 814-647-8401

Sizerville State Park
199 East Cowley Run Road
Emporium, PA 15834
Phone: 814-486-5605

Department of Environmental Protection (DEP)
Headquarters
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101
Phone: 717-783-2300
Website: www.dep.state.pa.us

DEP Northcentral Regional Office
(Cameron, Clinton and Potter Counties)
208 West Third Street, Suite 101
Williamsport, PA 17701
Phone: 570-327-3636

DEP Northwest Regional Office
(Clearfield, Elk and McKean Counties)
230 Chestnut Street
Meadville, PA 16335
Phone: 814-332-6945
Fax: 814-332-6125

PA Fish and Boat Commission
Northcentral Region
(Serves all counties in region)
P.O. Box 5306
Pleasant Gap, PA 16823
Phone: 814-359-5193
Website: www.fish.state.pa.us

PA Game Commission
Northcentral Region
(Serves all counties in region)
P.O. Box 5038
Jersey Shore, PA 17740
Phone: 570-398-4744
Website: www.pgc.state.pa.us

PA Department of Agriculture
Region 1 Office
(Elk and McKean County)
13410 Dunham Road
Meadville, PA 16335
Phone: (814) 332-6890
Website: www.argiculture.state.pa.us

PA Department of Agriculture
Region 2 Office
(Cameron, Clinton and Potter County)
542 County Farm Road, Suite #102
Montoursville, PA 17754
Phone: 570-433-2640
Website: www.argiculture.state.pa.us

PA Department of Agriculture
Region 5 Office
(Clearfield County)
1307 Seventh Street
Cricketfield Plaza
Altoona, PA 16601
Phone: 814-946-7315
Website: www.argiculture.state.pa.us

PA Department of Transportation
Penn DOT Central Office
Keystone Building
400 North Street
Harrisburg, PA 17120
Phone: 717-787-2838
Website: www.dot.state.pa.us

PA Department of Transportation
Region 2 Office
1924 Daisy Street
P.O. Box 342
Clearfield, PA 16830
Phone: (814) 765-0400

PA Governor Edward G. Rendell
Northwest Office
100 State Street, Suite 202
Erie, PA 16507
Phone: 814-878-5719
Website: www.governor.state.pa.us

State Agencies (continued)

PA State Conservation Commission
2301 North Cameron Street
Harrisburg, PA 17110
Phone: 717-787-8821
Fax: 717-705-3778
Website: www.pascc.state.pa.us

Federal Agencies

Environmental Protection Agency (EPA)
EPA Region 3 Regional Office
1650 Arch Street
Philadelphia, PA 19103
Phone: 1-800-438-2474
Website: www.epa.gov

Headwaters RC&D
478 Jeffers Street
Bldg 3, Suite D
DuBois, PA 15801
Phone: 814-375-1372 x.4
Fax: 814-375-2453
Website: www.headwaterspa.org

United States Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715
Phone: 410-962-7608
Website http://www.nab.usace.army.mil/

U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) – Pennsylvania Wildlife Services
P.O. Box 60827
Harrisburg, PA 17106
Phone: 717-236-9451
Fax: 717-236-9454
Website: www.aphis.usda.gov/wildlife_damage

USDA Farm Service Agency
Pennsylvania State Farm Service Agency
1 Credit Union Place
Harrisburg, PA 17110
Phone: 717-237-2117
Website: www.fsa.usda.gov

USDA Farm Service Agency
Clearfield County Farm Service Agency
478 Jeffers Street
Dubois, PA 15801
Phone: 814-375-1297
Website: www.fsa.usda.gov

USDA Farm Service Agency
Potter County Farm Service Agency
105 Market Street
Coudersport, PA 16915
Phone: 814-274-8522
Website: www.fsa.usda.gov

USDA Farm Service Agency
Clinton-Centre County Farm Service Agency
216 Spring Run Road
Mill Hall, PA 17751
Phone: 814-355-2447
Website: www.fsa.usda.gov

USDA Natural Resources Conservation Service (NRCS) Pennsylvania State Office
One Credit Union Place, Suite 340
Harrisburg, PA 17110
Phone: 717-237-2100
Fax: 717-237-2238
Website: www.pa.nrcs.usda.gov

USDA-NRCS Coudersport Field Office (Potter and McKean County)
105 Market Street
Coudersport, PA 16915
Phone: 814-274-8166

USDA-NRCS Dubois Field Office (Cameron, Clearfield and Elk County)
478 Jeffers Street
Dubois, PA 15801
Phone: 814-375-2125

USDA-NRCS Mill Hall Field Office (Clinton County)
216 Spring Run Road
Mill Hall, PA 17751
Phone: 570-726-3196 ext. 4

USDA-NRCS Headwaters RC&D
478 Jeffers Street
Dubois, PA 15801
Phone: 814-375-2125
Website: www.headwaterspa.org

Federal Agencies (continued)

USDA-NRCS Soil Survey Office
216 Spring Run Road
Mill Hall, PA 17751
Phone: 570-726-3196 ext. 122

USDA Rural Development
Clinton Area Office
216 Spring Run Road
Mill Hall, PA 17751
Phone: 570-726-3196 ext. 4
Website: www.rurdev.usda.gov/pa

United States Department of Energy
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
PO Box 3265
Harrisburg, PA 17105
Website: www.puc.state.pa.us

United States Department of Energy
National Energy Technology Laboratory
Pittsburgh Research Center
626 Cochrans Mill Road, P.O. Box 10940
Pittsburgh, PA 15236
Phone: 412-386-6569
Fax: 412-386-5917
Website: www.netl.doe.gov

United States Fish and Wildlife Service
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, PA 16801
Phone: 814-234-4090
Fax: 814-234-0748
Website: www.fws.gov

Cameron County

Cameron County Commissioners
20 East Fifth Street
Emporium, PA 15834
Phone: 814-486-2315
Fax: 814-486-3176
Website:.www.cameroncountypa.com/Cameron_County_Commissioners.htm

Cameron County Conservation District
20 East Fifth Street
Room 105
Emporium, PA 15834
Phone: 814-486-9353
Fax: 814-486-9392

Cameron County Cooperative Extension
20 East Fifth Street
Emporium, PA 15834
Phone: 814-486-3350
Fax: 814-486-9391
Website: www.cameron.extension.psu.edu

Cameron County Planning
20 East Fifth Street
Emporium, PA 15834
Phone: 814-486-2315
Fax: 814-486-3176

Cameron County Recycling Coordinator
Cameron County Office of Emergency Services
20 East 5th Street
Emporium, PA 15834
Phone: 814- 486-1137 ext. 352

Driftwood Borough
7129 Third Street
P.O. Box 235
Driftwood, PA 15832
Phone: 814-546-2426
Fax: 814-546-2331

Emporium Borough
421 North Broad Street
Emporium, PA 15834
Phone: 814-486-0768, ext 22
Fax: 814-486-1849
Website: http://emporium.boroughs.org/

Gibson Township
Castle Gardens Road
Driftwood, PA 15832
Phone: 814-546-2315

Grove Township
P.O. Box 43
Sinnemahoning, PA 15861
Phone: 814-546-2408
Fax: 814-486-1617
Website: http://richland.pa.us

Lumber Township
213 Rocky Road
Emporium, PA 15834
Phone: 814-486-1788

Portage Township
P.O. Box 96
Emporium, PA 15834
Phone: 814-486-1166

Cameron County (Continued)

Shippen Township
P.O. Box 349
Emporium, PA 15834
Phone: 814-486-0727
Fax: 814-486-3583

Clearfield County

Clearfield County Commissioners
230 East Market Street
Clearfield, PA 16830
Phone: 814-765-2629
Fax: 814-765-1336
Website: www.clearfieldco.org

Clearfield County Planning Commission
650 Leonard Street
Clearfield, PA 16830
Phone: 814-765-6056
Website: www.planning.clearfieldco.org

Clearfield County Conservation District
650 Leonard Street
Clearfield, PA 16830
Phone: 814-765-2629
Fax: 814-765-1336
Website: www.clfdccd.com

Clearfield County Cooperative Extension
650 Leonard Street
Suite 210
Clearfield, PA 16830
Phone: 814-765-7878
Fax: 814-765-3236
Website: clearfield.extension.psu.edu/

Clearfield County Recycling Coordinator
Clearfield County SWA
650 Leonard Street, Suite 110
Clearfield, PA 16830
Phone: 814-765-5149
Website: www.ccswa.org

Clearfield County Tourism
12 North Front Street
Clearfield, PA 16830
Phone: 814-765-5734
Fax: 814-765-4130
Website: www.visitclearfieldcounty.org

Goshen Township
P.O. Box 143
Shawville, PA 16873
Phone: 814-765-4800
Fax: 814-765-0146

Huston Township
P.O. Box 38
Penfield, PA 15849
Phone: 814-637-5771
Fax: 814-637-5773

Lawrence Township
P.O. Box 508
Clearfield, PA 16830
Phone: 814-765-4551
Fax: 814-765-5258

Clinton County

Clinton County Commissioners
232 East Main Street
Garden Building, 3rd Floor
Lock Haven, PA 17745
Phone: 570-893-4043
Fax: 570-893-4354
Website: www.clintoncountypa.com

Clinton County Planning Commission
232 East Main Street
Lock Haven, PA 17745
Phone: 570-893-4082
Fax: 570-893-4122
Website: www.clintoncountypa.com

Clinton County Conservation District
45 Cooperation Lane
Mill Hall, PA 17751
Phone: 570-726-3798
Fax: 570-726-7977
Website: www.clintoncountypa.com

Clinton County Cooperative Extension
Clinton County Resource & Education Center
47 Cooperation Lane
Mill Hall, PA 17751
Phone: 570-726-0022
Fax: 570-726-2237
Website: www.clinton.extension.psu.edu

Clinton County (continued)

Clinton County Economic Partnership
212 North Jay Street
Lock Haven, PA 17745
Phone: 570-748-5782
Fax: 570-893-0433
Website: www.clintoncountyinfo.com

Clinton County Recycling Coordinator
Clinton County SWA
PO Box 209
McElhattan, PA 17748
Phone: 570-769-7802
Website: www.waynetwplandfill.com

East Keating Township
3 Miller Lane
Westport, PA 17778
Phone: 570-923-2591
Fax: 570-923-2037

West Keating Township
P.O. Box 21
Pottersdale, PA 16871
Phone: 814-263-7225
Fax: 814-263-7225

Elk County

Elk County Commissioners
Elk County Courthouse Annex
300 Center Street
P.O. Box 448
Ridgway, PA 15853
Phone: 814-776-1161
Website: www.co.elk.pa.us

Elk County Planning Department
Elk County Courthouse Annex
300 Center Street
P.O. Box 448
Ridgway, PA 15853
Phone: 814-776-5335
Website: www.co.elk.pa.us

Elk County Conservation District
Elk County Courthouse Annex
300 Center Street, P.O. Box 448
Ridgway, PA 15853
Phone: 814-776-5373
Fax: 814-776-5379
Website: www.co.elk.pa.us

Elk County Cooperative Extension
Courthouse Basement
240 Main Street
Ridgway, PA 15853
Phone: 814-776-5331
Fax: 814-776-5332
Website: www.elk.extension.psu.edu

Elk County Recycling & Solid Waste
Elk County Courthouse Annex
300 Center Street, PO Box 448
Ridgway, PA 15853
Phone: 814-776-5373
www.co.elk.pa.us/recycling/

Benezette Township
P.O. Box 10
Benezette, PA 15821
Phone: 814-787-8811
Fax: 814-787-4393

Fox Township
116 Irishtown Road
Kersey, PA 15846
Phone: 814-885-8450
Fax: 814-885-6158
Website: www.foxtownship.com

Jay Township
81 East Teaberry Street
P.O. Box 216
Weedville, PA 15868
Phone: 814-787-4646
Fax: 814-787-4646

Jones Township
320 Faries Street
P.O. Box 25
Wilcox, PA 15870
Phone: 814-929-5417
Website: www.jonestownship.com

Saint Marys Township
11 Lafayette Street
Saint Marys, PA 15857
Phone: 814-781-1718
Fax: 814-834-1304

McKean County

McKean County Commissioners
500 West Main Street
Smethport, PA 16749
Phone: 814-887-3202
Fax: 814-887-2242
Website: www.mckeancountypa.org

McKean County Planning Department
17137 Route 6
Smethport, PA 16749
Phone: 814-887-2754
Fax: 814-887-3234
Website: www.mckeancountypa.org

McKean County Conservation District
17137 Route 6
Smethport, PA 16749
Phone: 814-887-4001
Website: www.mckeancountypa.org

McKean County Cooperative Extension
P.O. Box 1504
17129 Route 6
Smethport, PA 16749
Phone: 814-887-5613
Fax: 814-887-5645
Website: www.mckean.extension.psu.edu

McKean County Recycling Coordinator
17137 Route 6
Smethport, PA 16749
Phone: 814-887-4004

Norwich Township
3853 West Valley Road
Smethport, PA 16749
Phone: 814-887-2732
Fax: 814-887-2732

Potter County

Potter County Commissioners
Gunzburger Building
One North Main Street
Coudersport, PA 16915
Phone: 814-274-8290
Fax: 814-274-8284
Website: www.pottercountypa.net

Potter County Planning Department
24 Buffalo Street
Coudersport, PA 16915
Phone: 814-274-8254
Fax: 814-274-8307
Website: www.pottercountypa.net

Potter County Conservation District
107 Market Street
Coudersport, PA 16915
Phone: 814-274-8411 ext. 4
Fax: 814-274-0396
Website: www.pottercountypa.net

Potter County Cooperative Extension
24 Maple View Lane
Coudersport, PA 16915
Phone: 814-274-8540
Fax: 814-274-7891
Website: www.potter.extension.psu.edu

Potter County Solid Waste Authority
2504 State Route 49 W
Ulysses, PA 16948
Phone: 814-848-9610

Potter County Tourism
118 North Main Street
P.O. Box 245
Coudersport, PA 16915
Phone: 814-274-3365
Fax: 814-274-4334
Website: www.pottercountypa.org

Austin Borough
81 Scoville Street
P.O. Box 297
Austin, PA 16720
Phone: 814-647-8613
Fax: 814-647-8975
Website: www.simplesite.com/Austin-Borough

East Fork Township
Rural Route #1 Box 229
Austin, PA 16720
Phone: 814-647-8834

Eulalia Township
1160 East Second Street
Coudersport, PA 16915
Phone: 814-274-8102
Fax: 814-274-7127

Potter County (continued)

Homer Township
348 Southwoods Road
Coudersport, PA 16915
Phone: 814-274-7624
Fax: 814-274-7127

Keating Township
P.O. Box 385
Austin, PA 16720
Phone: 814-642-2291

Portage Township
61 Slate Street
P.O. Box 392
Austin, PA 16720
Phone: 814-647-5359
Fax: 814-647-8358

Summit Township
1073 Cherry Springs Road
Coudersport, PA 16915
Phone: 814-274-9087

Sylvania Township
P.O. Box 66
Austin, PA 16720
Phone: 814-647-5540

West Branch Township
533 Germania Road
Galeton, PA 16922
Phone: 814-435-7898
Fax: 814-435-7889

Wharton Township
3262 Wharton Road
Austin, PA 16720
Phone: 814-647-5553
Fax: 814-647-5500

Tourism Promotion Agencies

Benezette Hotel
95 Winslow Hill Road
Benezette, PA 15821
Phone: 814-787-4240
Website: www.benezettehotel.com

The Center for Rural Pennsylvania
625 Forster Street
Harrisburg, PA 17120
Phone: 717-787-95553
Fax: 717-772-3587
Website: www.ruralpa.org

Clearfield County Tourism
12 North Front Street
Clearfield, PA 16830
Phone: 814-765-5734
Fax: 814-765-4130
Website: www.visitclearfieldcounty.org

Clinton County Economic Partnership
212 North Jay Street
Lock Haven, PA 17745
Phone: 570-748-5782
Fax: 570-893-0433
Website: www.clintoncountyinfo.com

Elk Country Hideaway
State Highway 555
Benezette, PA 15821
Phone: 724-388-1007
Website: www.elkcountryhideaway.com

Elk Country Visitor Center
134 Homestead Drive
Benezette, PA 15821
Phone: 814-787-5167
Website: www.elkcountryvisitorcenter.com

Mid State Trail Association of Pa
Phone: 570 655-4979
Website: www.hike-mst.org

North Central Pennsylvania Regional Planning and Development Commission
651 Montmorenci Road
Ridgway, PA 15853
Phone: 814-773-3162
Website: www.ncentral.com

Northern Tier Cultural Alliance
One Washington Street, Suite A
Towanda, PA 18848
Phone: 570-265-7455
Website: www.ntculturalalliance.org

Tourism Promotion Agencies (continued)

Northwestern Pennsylvania Great Outdoors Visitors Bureau
175 Main Street
Brookville, PA 15825
Phone: 800-348-9393
Phone: 814-849-5197
Website: www.visitpago.com

Pennsylvania Wilds
Website: www.pawilds.com

PA Wilds Resource Center
P.O. Box 285
Sugar Grove, PA 16350
Phone: 814-757-9190
Website: www.pawildsresources.org

Pennsylvania Wildlife Habitat Unlimited
P.O. Box 851
DuBois PA 15801
Phone: 814-371-1327
Website: www.pwhu.org

Potter County Visitors Association
118 North Main Street
P.O. Box 245
Coudersport, PA 16915
Phone: 814-274-3365
Fax: 814-274-4334
Website: www.pottercountypa.org

Saint Marys Area Chamber of Commerce
53 South Saint Marys Street
Saint Marys, PA 15857
Phone: 814-781-3804
Fax: 814-781-7302
Website: www.stmaryschamber.org

APPENDIX R. NATIVE PLANT GUIDE

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
balsam fir	*Abies balsamea*																X		
fraser fir	*Abies fraseri*																X		
box-elder	*Acer negundo*	X	X		X			X				X	X						
Norway maple	*Acer platanoides*																X		
red maple	*Acer rubrum*				X											X	X		
silver maple	*Acer saccharinum*		X	X		X	X		X			X							
sugar maple	*Acer saccharum*										X				X				
mountain maple	*Acer spicatum*			X	X	X		X	X		X		X						
maple	*Acer* spp											X					X		
common yarrow	*Achillea millefolium*				X														
monkshood	*Aconitum uncinatum*										X								
sweetflag	*Acorus americanus*	X			X											X			
doll's eyes, white bugbane, white baneberry	*Actaea pachypoda*		X		X	X						X							
black cohosh, black bugbane, black	*Actaea racemosa*											X	X			X			
red baneberry	*Actaea rubra*									X									
northern maidenhair fern, maidenhair fern	*Adiantum pedatum*				X														
bottlebrush buckeye	*Aesculus parviflora*				X														
red buckeye, buckeye	*Aesculus pavia*	X			X	X				X			X	X		X			
false foxglove	*Agalinis purpurea*											X	X						

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
blue giant hyssop, anise hyssop	*Agastache foeniculum*	X			X							X		X					
yellow giant hyssop	*Agastache nepetoides*		X																
giant purple hyssop	*Agastache scrophulariifolia*	X			X			X					X	X	X	X			
white snakeroot	*Ageratina altissima*												X						
small agrimony	*Agrimonia parviflora*				X	X					X					X			
red top	*Agrostis alba*	X			X														
hollyhock	*Alcea rosea*																X		
northern water plantain	*Alisma triviale*												X						
nodding onion, wild onion/leek	*Allium cernuum*									X									X
ramps, wild leeks	*Allium tricoccum*												X						
speckled alder	*Alnus rugosa*									X							X		
smooth alder	*Alnus serrulata*								X			X					X		
azalea	*Alnus serrulata*																X		
ragweed	*Ambrosia*																X		
downy serviceberry	*Amelanchier arborea*	X			X									X		X			
serviceberry, shadblow serviceberry, shadbush	*Amelanchier canadensis*														X			X	
allegheny serviceberry	*Amelanchier laevis*				X	X					X					X			
serviceberries, shadbush	*Amelanchier* spp.															X	X		
lead plant	*Amorpha canescens*			X	X		X		X			X				X			
Arkansas blue star flower	*Amsonia hubrectii*												X						
blue star, common blue star, eastern blue	*Amsonia tabernaemontana*						X					X						X	

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
big bluestem grass, turkeyfoot	*Andropogon gerardii*	X	X		X	X					X	X	X			X	X		
little bluestem grass	*Andropogon scoparius*	X			X	X		X				X	X	X	X	X			
broom sedge	*Andropogon virginicus*				X								X				X		
meadow anemone, Canada anemone	*Anemone canadensis*		X									X							
pasque flower	*Anemone patens*		X		X	X		X	X		X	X	X			X			
wood anemone	*Anemone quinguefolia*												X			X			
thimbleweed, tall anemone	*Anemone virginiana*		X		X														
pussytoes, woman's tobacco, plantain-leaved pussytoes	*Antennaria plantaginifolia*		X																
wild columbine, eastern columbine, Canadian columbine, indianhemp	*Aquilegia canadensis*										X						X	X	X
wild sarsaparilla	*Aralia nudicaulis*				X	X			X		X								
spikenard	*Aralia racemosa*					X									X	X	X		
bearberry	*Arctostaphylos uva-ursil*				X														
redtop grass	*Argostis gigantean*	X	X	X	X								X						
jack-in-the-pulpit	*Arisaema triphyllum*					X													
dutchmans pipevine	*Aristolochia macrophylla*														X			X	
red chokeberry	*Aronia arbutifolia*				X														
black chokeberry	*Aronia melanocarpa*											X							
goatsbeard, bride's feathers	*Aruncus dioicus*									X									
wild ginger	*Asarum canadense*		X									X							
poke milkweed, tall milkweed	*Asclepias exaltata*		X								X		X					X	

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swamp milkweed, pink milkweed, white swamp milkweed	*Asclepias incarnata*	X																X	
purple milkweed	*Asclepias purpurascens*	X			X	X		X										X	
common milkweed	*Asclepias syriaca*		X											X			X	X	
butterflyweed, butterfly flower	*Asclepias tuberosa*					X					X					X		X	
whorled milkweed, horsetail milkweed	*Asclepias verticillata*		X				X					X						X	
pawpaw	*Asimina triloba*	X			X							X	X	X		X		X	
ebony spleenwort	*Asplenium platyneuron*				X	X		X					X	X					
blue wood aster, wood aster	*Aster cordifolius*					X					X		X		X			X	
white wood aster	*Aster divaricatus*	X	X								X	X						X	
heath aster	*Aster ericoides*				X						X							X	
smooth aster	*Aster laevis*	X						X					X						
dark leaf calico aster	*Aster lateriflorus*		X								X							X	
stiff-leaf aster, flaxleaf whitetop aster	*Aster linariifolius*										X			X					
big leaf aster	*Aster macrophyllus*		X		X				X										
New England aster	*Aster novae-angliae*				X						X		X			X	X	X	
New York aster	*Aster novi-belgii*					X					X							X	
aromatic aster	*Aster oblongifolius*		X									X	X					X	
purple-stemmed aster	*Aster puniceus*	X			X													X	
silky aster	*Aster sericeus*				X														
aster	*Aster* spp								X		X							X	
flat-topped aster	*Aster umbellatus*		X					X				X	X		X	X		X	

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lady fern	*Athyrium filix-femina*				X	X					X								
white wild indigo	*Baptisia alba*		X				X					X							
blue false indigo, wild indigo, false blue indigo	*Baptisia australis*												X					X	
cream wild indigo	*Baptisia leucophaea*		X										X			X			
dwarf wild indigo	*Baptisia minor*		X									X							
flare false indigo	*Baptisia solar*		X			X												X	
yellow wild indigo	*Baptisia sphaerocarpa*				X														
prairieblues wild indigo	*Baptisia starlite*		X									X	X	X		X		X	
yellow birch	*Betula alleghaniensis*																X		
birch	*Betula lenta*															X	X		
river birch	*Betula nigra*															X	X		
gray birch	*Betula populifolia*	X	X									X			X		X		
cross Vine	*Bignonia capreolata*	X			X			X					X	X		X			
boltonia, false aster	*Boltonia asteroides*	X			X														
sideoats grama	*Bouteloua curtipendula*												X				X		
bluejoint reedgrass	*Calamagrostis canadensis*	X	X		X								X						
American beautyberry	*Calicarpa americana*															X			
purple poppy mallow, winecups	*Callirhoe involucrata*							X											
bottlebrush	*Callistemon* spp.				X						X								
marsh marigold, marsh yellow marigold, cowslip	*Caltha palustris*				X	X	X				X		X		X				

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sweetshrub, Carolina allspice	*Calycanthus floridus*		X		X											X			
tall bellflower	*Campanula americana*				X														
creeping bellflower	*Campanula rapunculoides*	X	X		X	X						X	X			X		X	
trumpet vine, trumpet-creepe	*Campsis radicans*				X												X		
cut-leaf toothwort	*Cardamine concatenata*											X							
creek sedge	*Carex amphibola*											X			X				
appalachian sedge	*Carex appalachica*	X	X		X	X		X	X			X	X		X	X			
fringed sedge	*Carex crinita*	X	X		X			X				X							
bristleleaf sedge	*Carex eburnea*														X				
blue wood sedge	*Carex glaucoidea*														X				
gray's sedge	*Carex grayi*					X					X								
Ohio sedge	*Carex muskingumensis*								X										
Pennsylvania sedge	*Carex pensylvanica*				X	X					X								
plantainleaf sedge, seersucker sedge	*Carex plantaginea*				X														
silver sedge	*Carex platyphylla*					X					X								
broad-leaf sedge	*Carex siderosticha*	X			X								X	X					
sedges	*Carex spp.*				X												X		
owl-fruit sedge	*Carex stipata*				X											X			
upright sedge, tussock sedge	*Carex stricta*		X																
fox sedge	*Carex volpinoidea*		X		X					X			X				X		
American hornbeam, ironwood	*Carpinus caroliniana*		X		X		X					X	X		X				
hornbeam	*Carpinus* spp.				X													X	

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sweet pignut hickory	*Carya glabra*															X			
shagbark hickory	*Carya ovata*				X	X					X					X	X	X	
hickories	*Carya* spp.		X	X			X					X	X		X		X		
mockernut hickory	*Carya tomentosa*		X									X						X	
blue cohosh, papoose root	*Caulophyullum thalictroides*															X			
wild lilac or New Jersey tea	*Ceanothus americanus*				X													X	X
American bittersweet	*Celastrus scandens*		X	X	X	X			X		X	X	X				X	X	
hackberry, sugarberry	*Celtis occidentalis*	X			X				X		X		X				X	X	
buttonbush	*Cephalanthus occidentalis*		X		X	X		X	X		X		X	X		X	X		
eastern redbud	*Cercis canadensis*				X								X				X		
partridge pea	*Chamaecrista fasciculata*											X							
wild sensitive-plant	*Chamaecrista nictitans*				X			X						X					
atlantic white cedar	*Chamaecyparis thyoides*	X			X														
leatherleaf	*Chamaedaphne calyculata*	X																	
river oats, northern sea oats, indian woodoats	*Chasmanthium latifolium*		X										X			X			
white turtlehead	*Chelone glabra*															X			X
pink turtlehead	*Chelone lyonii*		X	X			X					X	X						
turtlehead	*Chelone* spp.	X			X	X		X	X		X		X		X				
fringetree	*Chionanthus virginicus*									X									
green-and-gold, gold star	*Chrysogonum virginianum*			X		X						X	X						
southern green and gold	*Chrysogonum virginianum var. australe*				X								X						

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Maryland golden aster, golden aster	*Chrysopsis mariana*		X								X	X	X						
hairy golden aster	*Chrysopsis villosa*											X							
chicory	*Cichorium intybus*		X		X	X				X			X	X		X			
mountain bugbane, American bugbane	*Cimicifuga americanus*	X	X					X	X					X					
fairy candles	*Cimicifuga racemosa*		X								X								
field thistle	*Cirsium discolort*		X									X	X			X			
spring beauty	*Claytonia virginica*	X	X				X						X		X			X	
virgin's bower, devil's darning needles, clematis	*Clematis virginiana*											X							
summersweet, sweet pepperbush	*Clethra alnifolia*	X			X														
bluebeard-lily, corn-lily	*Clintonia borealis*	X																	
blue-eyed mary	*Collinsia verna*		X		X	X			X		X	X	X			X		X	
sweet-fern	*Comptonia peregrina*		X									X	X			X			
blue mistflower	*Conoclinium coelestinum*											X							
sand coreopsis, lanceleaf tickseed	*Coreopsis lanceolata*										X							X	
passion tickseed	*Coreopsis limerock*												X					X	
prairie coreopsis	*Coreopsis palmata*		X		X	X			X		X	X	X			X			
tickseed	*Coreopsis pubescens*												X			X		X	
pink coreopsis, pink tickseed	*Coreopsis rosea*										X								
tickseed	*Coreopsis* spp.										X					X			
coreopsis, tall tickseed	*Coreopsis tripteris*		X				X		X			X	X		X				

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threadleaf coreopsis, threadleaf tickseed, whorled coreopsis	*Coreopsis verticillata*															X			
pagoda dogwood	*Cornus alternifolia*	X																	
silky dogwood	*Cornus amomum*	X			X								X				X		
flowering dogwood	*Cornus florida*												X				X		
swamp dogwood, stiff dogwood	*Cornus foemina*	X			X	X		X			X		X						
cornelian	*Cornus mas*																X		
gray dogwood, red panicled dogwood	*Cornus racemosa*		X									X	X			X	X		
red osier dogwood, redtwig dogwood	*Cornus sericea*	X	X				X				X	X	X	X		X	X		
dogwoods	*Cornus* spp.																X		
yellow harlequin	*Corydalis flavula*															X			
rock harlequin	*Corydalis sempervirens*															X			
American hazelnut, American filbert	*Corylus americana*															X			
cockspur hawthorn	*Crataegus crusgalli*															X			
Washington hawthrorn	*Crataegus phaenopyrum*	X			X											X			
dotted hawthorn	*Crataegus punctata*			X	X						X	X	X						
hawthorn	*Crataegus* spp.												X				X		
crocus	*Crocus* spp.																X		
orchard grass	*Dactylis glomerata*																X		
white prairie clover	*Dalea candida*		X		X	X		X	X		X	X	X		X				
tall larkspur	*Delphinium exaltatum*															X			
dwarf larkspur	*Delphinium tricorne*								X		X								

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hayscented fern	*Dennstaedtia punctilobula*							X											
hairgrass	*Deshampias flexuosa*		X				X					X	X						
sweet william	*Dianthus barbatus*				X	X										X			
squirrel corn	*Dicentra canadensis*	X										X				X			
dutchmans breeches	*Dicentra cucullaria*	X			X					X						X			
wild bleeding heart, turkeycorn, fringed bleeding heart	*Dicentra exemia*	X			X					X						X			
bush honeysuckle	*Diervilla lonicera*				X	X							X	X	X				
persimmon	*Diospyros virginiana*				X	X										X	X	X	
leatherwood	*Dirca palustris*				X	X					X		X			X			
shooting-star, American cowslips	*Dodecatheon meadia*	X													X				
parasol whitetop aster	*Doellingeria umbellata*				X						X								
goldie's wood fern	*Dryopteris goldiana*											X							
leather wood fern, marginal wood fern, evergreen wood fern, eastern wood fern	*Dryopteris marginalis*	X			X								X					X	
shield fern	*Dryopteris* spp.				X								X			X			
pale coneflower	*Echinacea pallida*											X	X						
yellow coneflower	*Echinacea paradoxa*					X							X						
purple coneflower	*Echinacea purpurea*			X	X	X							X		X	X	X		
coneflower	*Echinacea* spp.	X															X	X	
wild millet	*Echinochloa crus-galli*															X			
Canada wildrye	*Elymus canadensis*				X								X						

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bottlebrush grass	*Elymus hystrix*	X			X	X		X					X	X					
riverbank wild rye grass	*Elymus riparius*		X									X			X				
wild rye	*Elymus virginicus*	X																	
fireweed	*Epilobium angustifolium*				X														
horsetail	*Equisetum species*	X			X					X			X			X			
blue love grass	*Eragrostis elliottii*	X			X							X	X						
purple love grass, showy love grass	*Eragrostis spectabilis*										X							X	
daisy fleabane	*Erigeron strigosus*		X		X	X					X								
rattlesnake master	*Eryngium yuccifolium*				X	X		X			X	X	X			X		X	
trout lily, dogtooth violet, yellow trout lily, adder's tongue	*Erythronium americanum*																	X	
strawberry-bush	*Euonymus americanus*					X			X		X		X		X			X	
joe-pye weed, trumpetweed	*Eupatoriadelphus fistulosus*		X															X	
mistflower, blue mistflower, hardy ageratum	*Eupatorium coelestinum*				X	X		X			X		X		X			X	
little joe-pye weed	*Eupatorium dubium*				X	X					X		X		X	X		X	
hyssop-leaved boneset, thoroughwort	*Eupatorium hyssopifolium*	X			X			X						X				X	
gateway	*Eupatorium maculatum*											X							
spotted joe-pye weed	*Eupatorium maculatum*		X									X	X		X				
boneset, thoroughwort	*Eupatorium perfoliatum*												X			X			
purple joe-pyeweed, joe pye flower, sweetcented joe-pyeweed	*Eupatorium purpureum*		X		X	X							X			X			
snakeroot	*Eupatorium rugosm*		X			X					X		X						

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joe-pye-weed	*Eupatorium* spp.		X				X					X					X	X	
flowering spurge	*Euphorbia corollata*	X			X	X			X				X	X	X				
white wood aster	*Eurybia divaricata*				X							X	X		X			X	
flat-top goldentop	*Euthamia graminifolia*	X					X					X	X			X			
American beech	*Fagus grandiflora*		X			X		X	X			X	X				X		
beech	*Fagus* spp.	X															X		
queen-of-the-prairie	*Filipendula rubra*	X	X									X	X	X					
dwarf fothergilla	*Fothergilla gardenii*				X								X			X			
wild strawberry	*Fragaria virginiana*					X					X								
white ash	*Fraxinus americana*				X												X		
black ash	*Fraxinus nigra*															X			
green ash	*Fraxinus pennsylvanica*		X		X											X			
ash	*Fraxinus* spp.	X			X		X						X						
wandflower, beetleweed	*Galax urceolata*		X			X										X		X	
wintergreen, eastern teaberry	*Gaultheria procumbens*				X	X		X			X	X	X			X			
windflower	*Gaura lindheimeri*		X					X				X	X						
huckleberry	*Gaylussacia baccata*												X			X			
boxhuckleberry	*Gaylussacia brachycera*	X			X	X						X							
evening trumpet flower, Carolina jessamine	*Gelsemium sempervirens*		X		X						X	X				X			

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bottle gentian, closed gentian, blind gentian	*Gentiana clausa*				X	X										X			
wild geranium, wild cranesbill, wood geranium	*Geranium maculatum*				X													X	
cranesbill geranium	*Geranium sanguineum*																X		
prairie smoke	*Geum triflorum*	X			X	X		X					X			X		X	
American ipecac	*Gillenia stipulata*		X	X								X	X			X			
honey locust	*Gleditsia triacanthos*			X	X	X					X		X		X			X	
fowl mannagrass	*Glyceria striata*																X		
downy rattlesnake plantain	*Goodyera pubescens*		X									X						X	
Carolina silverbell	*Halesia caroliana*	X	X		X								X			X		X	
witchhazel, American witch hazel	*Hamamelis virginiana*				X											X		X	
english ivy	*Hedera helix*																X		
helen's flower; common sneezeweed, dog-tooth daisy	*Helenium autumnale*		X												X				
sneezeweed, purple-headed helen's flower	*Helenium flexuosum*		X		X	X					X		X			X		X	
swamp sunflower	*Helianthus angustifolius*	X			X	X							X		X	X		X	
thin-leaf sunflower	*Helianthus decapetalus*	X														X		X	
woodland sunflower	*Helianthus divaricatus*	X	X		X		X					X		X		X			
tall sunflower, giant sunflower	*Helianthus giganteus*		X									X	X						
small-headed sunflower	*Helianthus microcephalus*				X														
western sunflower	*Helianthus occidentalis*				X							X			X				
dwarf perennial sunflower	*Helianthus salicifolius*		X																

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sunflower	*Helianthus* spp.	X	X									X	X	X			X		
oxeye daisy, smooth oxeye, false	*Heliopsis helianthoides*	X			X								X			X		X	
swamp pink	*Helonias bullata*		X		X								X						
daylily	*Hemerocallis*																X		
roundlobe hepatica, sharplobe hepatica	*Hepatica acutiloba*	X																	
alumroot, coral bells	*Heuchera americana*		X									X							
hairy alum root	*Heuchera villosa*	X																	
shuttleworth's ginger	*Hexastylis shuttewortii*				X	X			X				X						
scarlet rose mallow	*Hibiscus coccenius*				X	X					X		X			X			
swamp rose mallow, marsh hibiscus	*Hibiscus moscheutos*			X					X		X	X	X				X		
rattlesnake weed	*Hieracium venosum*											X							
bluets	*Houstonia caerulea*				X						X								
wood hyacinth	*Hyacinthoides hispanica*																X		
wild hydrangea	*Hydrangea arborescens*				X											X			
oakleaf hydrangea	*Hydrangea quercifolia*		X																
goldenseal, yellow root	*Hydrastis canadensis*						X					X		X					
maple-leaved waterleaf, broad-leaved waterleaf	*Hydrophyllum canadense*										X		X						
Virginia waterleaf, eastern waterleaf	*Hydrophyllum virginianum*		X						X			X	X						
saint john's wort	*Hypericum calycinum*			X	X	X					X		X	X		X			
dense hypericum	*Hypericum densiflorum*		X			X							X			X			
shrubby saint john’s wort	*Hypericum prolificum*		X	X		X					X		X			X			

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great saint john's wort	*Hypericum pyramidatum*		X				X	X				X	X						
yellow star-grass	*Hypoxis hirsuta*		X	X	X				X					X		X			
inkberry	*Ilex glabra*				X	X											X		
American holly	*Ilex opaca*				X	X		X	X		X		X	X			X		
winterberry	*Ilex verticillata*						X					X	X				X		
jewelweed	*Impatiens capensis*														X				
pale jewelweed, touch-me-not	*Impatiens pallida*															X			
impatiens	*Impatiens* spp.																X		
crested iris	*Iris cristata*		X		X						X	X				X			
white crested iris	*Iris cristata alba*	X			X								X						
slender blue flag	*Iris prismatica*	X			X								X	X		X			
iris	*Iris* spp.																X		
blue flag iris, northern blue flag	*Iris versicolor*										X								
Virginia sweetspire, tassle-white	*Itea virginiana*	X			X						X			X		X			
twinleaf	*Jeffersonia diphylla*				X	X			X	X	X					X			
butternut	*Juglans cinerea*																X		
black walnut	*Juglans nigra*	X	X									X							
Canada rush	*Juncus canadensis*			X	X				X						X				
soft rush	*Juncus effusus*	X																	
eastern red cedar	*Juniperus virginiana*				X											X	X		
mountain laurel	*Kalmia latifolia*				X											X			
june grass	*Koehleria cristata*	X								X									

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false boneset	*Kuhnia eupatorioides*				X														
flatpea	*Lathyrus sylvestris*	X			X	X									X				
rice cutgrass	*Leersia oryzoides*					X							X			X	X		
round headed bush clover	*Lespedeza capitata*				X				X	X									
fetterbush	*Leucothoe racemosa*			X	X	X		X	X		X							X	
rough blazing star	*Liatris aspera*	X			X								X						
cylindrical blazing star	*Liatris cylindracea*				X	X					X		X			X			
meadow blazing star	*Liatris ligulistylis*		X	X								X	X					X	
appalachian blazing star	*Liatris microcephala*			X			X												
prarie blazing star	*Liatris pycnostachya*	X			X							X	X	X				X	
northern blazing star	*Liatris scariosa*														X				
dense blazing-star, gayfeather, spike gayfeather	*Liatris spicata*				X													X	X
blazing-star, gayfeather	*Liatris* spp.	X	X															X	
button blazing star, scaly blazing star, gayfeather	*Liatris squarrosa*											X							
wood lily	*Lilium philadelphicum*				X													X	
lily	*Lilium* spp.																X		
turk's cap lily	*Lilium superbum*				X	X					X		X			X			
Canada lily, wild yellow	*Lillium canadense*			X					X							X		X	
spicebush	*Lindera benzoin*														X				
sweetgum	*Liquidambar styraciflua*	X			X		X						X	X					
tuliptree	*Liriodendron tulipifera*															X			X

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cardinal flower, red cardinal flower	*Lobelia cardinalis*														X		X		X
beechwood blend	*Lobelia cardinalis x siphilitica*	X	X									X	X					X	X
indian tobacco	*Lobelia inflata*	X																	
great blue lobelia	*Lobelia siphilitica*							X											X
pale spiked lobelia	*Lobelia spicata*		X		X								X			X			
trumpet honeysuckle, coral honeysuckle	*Lonicera sempervirens*					X			X	X	X					X	X		X
birdsfoot trefoil	*Lotus corniculatus*																X		
seedbox	*Ludwigia alternifolia*	X			X	X		X			X		X			X			
wild lupine, indian beet, old maids bonnets, blue lupine, sundial lupine	*Lupinus perennis*	X		X		X									X				
hairy woodrush, woodrush	*Luzula acuminata*	X			X							X	X		X				
magnolia	*Magnolia* spp.		X													X			
sweetbay magnolia	*Magnolia virginiana*	X																	
Canada mayflower	*Maianthemum canadense*	X	X				X					X	X			X			
feathery false lily of valley	*Maianthemum racemosum*		X		X											X			
American crabapple	*Malus glaucescens*																X		
apple	*Malus* spp.																X		
barbara's buttons	*Marshallia grandiflora*				X								X			X		X	
ostrich fern	*Matteuccia struthiopteris*		X		X	X			X			X	X	X				X	
meehan's mint, creping ground mint	*Meehania cordata*											X						X	
Virginia bluebells	*Mertensia virginica*				X													X	

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sharpwing monkeyflower, winged monkey	*Mimulus alatus*		X									X	X						
monkey flower, square-stemmed monkey flower	*Mimulus ringens*															X		X	
partridgeberry	*Mitchella repens*				X														
bishops cap, mitrewort	*Mitella diphylla*		X		X						X			X					
basil balm	*Monarda clinopodia*	X			X														X
bee balm, oswego tea, bergamot, scarlet bee balm	*Monarda didyma*	X										X						X	X
wild bergamot, lavendar bergamot, bee balm	*Monarda fistulosa*		X	X	X	X				X	X		X	X		X			X
purple bergamot	*Monarda media*		X	X		X		X	X			X	X						X
spotted bee balm	*Monarda punctata*				X	X			X		X		X						
beebalm, monarda	*Monarda* spp.	X															X		X
red mulberry	*Morus rubra*				X			X									X		
pink muhly grass	*Muhlenbergia capillaris*					X							X						
bayberry, northern bayberry	*Myrica pennsylvanica*		X								X	X					X		
black gum, tupelo, sour gum	*Nyssa sylvatica*	X															X		
sharp-leaved aster, whorled aster	*Oclemena acuminatus*		X	X			X					X	X						
evening primrose, common evening	*Oenothera biennis*											X							
sundrops, fireworks	*Oenothera fruticosa*				X				X	X									
stiff goldenrod	*Oligoneuron rigidum*				X											X			
sensitive fern	*Onoclea sensibilis*															X			

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pricklypear, eastern pricklypear cactus, devil's tongue	*Opuntia humifusa*				X				X		X		X			X			
aniseroot	*Osmorhiza longistylis*	X			X	X	X					X	X	X					
cinnamon fern	*Osmunda cinnamomea*				X														
interrupted fern	*Osmunda claytoniana*				X	X			X		X		X		X				
royal fern	*Osmunda regalis*	X				X							X						
hop-hornbeam	*Ostrya virginiana*											X				X			
sourwood	*Oxydendrum arboreum*															X			
allegheny pachysandra, allegheny spurge	*Pachysandra procumbens*				X														
goldenragwort	*Packera aurea*		X					X											
peony	*Paeonia* spp.																X		
American ginseng	*Panax quinquefolius*				X											X			
atlantic costal panic grass	*Panicum amarulum*															X			
panic grass	*Panicum* spp.																X		
switch grass, panic grass	*Panicum virgatum (amarum)*				X	X											X		
wild quinine	*Parthenium integrifolium*	X	X																
Virginia creeper	*Parthenocissus quinquefolia*		X								X		X				X		
wild passion vine	*Passiflora incarnata*				X	X							X		X			X	
passionflower	*Passiflora* spp.		X															X	
arrow arum	*Peltandra virginica*																X		
beardtongue, foxglove, white beardtongue, talus slope penstemon	*Penstemon digitalis*											X							X

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hairy beardtongue	*Penstemon hirsutus*				X													X	X
small's beardtongue	*Penstemon smallii*	X	X						X			X	X						
beardstongue	*Penstemon* spp.		X																X
ditch stonecrop	*Penthorum sedoides*				X														
Carolina phlox	*Phlox carolina*															X			
woodland phlox, wild sweet william, meadow phlox, blue wood phlox	*Phlox divaricata*	X	X						X			X	X						
meadow phlox	*Phlox maculata*											X							
summer phlox, garden phlox, perennial phlox	*Phlox paniculata*															X			X
downy phlox	*Phlox pilosa*	X			X	X					X				X	X			X
phlox	*Phlox* spp.																X		
creeping phlox, summer phlox	*Phlox stolonifera*															X			
moss phlox, mountain phlox, moss pink	*Phlox subulata*												X						
ninebark	*Physocarpus opulifolius*				X	X					X			X		X			
obedient plant, false dragonhead	*Physostegia virginiana*			X					X			X	X						
pokeweed	*Phytolacca dodecandra*																X		
shortleaf pine	*Pinus echinata*				X	X					X				X				
pond pine	*Pinus palustris*						X					X			X				
pitch pine	*Pinus rigida*	X			X			X					X		X	X	X		
pines	*Pinus* spp.	X															X		
eastern white pine	*Pinus strobus*														X		X		
Virginia pine	*Pinus virginiana*							X											

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American sycamore	*Platanus occidentalis*		X								X	X							
Kentucky blue-grass	*Poa pratensis*																X		
roughstalk bluegrass	*Poa trivialis*										X								
mayapple, mandrake	*Podophyllum peltatum*		X					X				X	X				X		
greek valerian, jacob's ladder, greek valerian, spreading jacob's ladder	*Polemonium reptans*			X	X	X			X		X		X						
variegated native jacob's ladder	*Polemonium* spp.				X	X													
smooth solomon seal	*Polygonatum biflorum*				X														
solomon's seal, giant solomon's seal	*Polygonatum canaliculatum*		X		X				X		X		X						
downy solomon's seal	*Polygonatum pubescens*	X														X			
Pennsylvania smartweed	*Polygonum pensylvanicum*																X		
christmas fern	*Polystichum acrostichoides*															X			
tassel fern	*Polystichum polyblepherum*															X			
pickerelweed	*Pontederia cordata*															X		X	
aspen	*Populus* spp.																X		
bowman's root, indian physic, American ipecac	*Porteranthus trifoliata*															X			
long-leaf pondweed	*Potamogeton nodosus*																X		
sago pondweed	*Potamogeton pectinatus*																X		
prairie cinquefoil	*Potentilla arguta*				X														
bush cinquefoil, shrubby cinquefoil	*Potentilla fruticosa*				X	X					X					X			
Norwegian cinquefoil	*Potentilla norvegicia*	X			X								X	X		X			
three-toothed cinquefoil	*Potentilla tridentata*		X								X		X					X	

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common selfheal	*Prunella vulgaris*			X					X			X							
wild plum	*Prunus americana*	X										X							
pin cherry	*Prunus pensylvanica*		X											X					
black cherry, wild cherry	*Prunus serotina*				X					X	X					X	X		
cherries	*Prunus* spp.			X			X		X			X	X				X		
choke cherry	*Prunus virginiana*		X										X			X	X		
hoary mountain mint	*Pycnanthemum incanum*				X	X		X				X	X	X	X	X			
showy mountain mint, clustered mountain mint, mountain mint	*Pycnanthemum muticum*									X									
slenderleaf mountain mint	*Pycnanthemum tenuifolium*		X										X			X			
Virginia mountain mint	*Pycnanthemum virginianum*				X														
white oak	*Quercus alba*				X	X											X		
swamp oak, swamp white oak	*Quercus bicolor*	X			X		X						X		X		X		
scarlet oak	*Quercus coccinea*					X											X		
bur oak	*Quercus macrocarpa*	X																	
pin oak	*Quercus palustris*												X				X		
willow oak	*Quercus phellos*															X	X		
chestnut oak	*Quercus prinus*																X		
red oak	*Quercus rubra*				X	X		X	X		X		X			X	X		
oaks	*Quercus* spp.																X		
black oak	*Quercus velutina*															X			
prairie coneflower	*Ratibida pinnata*	X	X																
Maryland meadow beauty	*Rhexia mariana*				X										X				

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meadow beauty, handsome hairy	*Rhexia virginica*	X			X						X								
sweet azalea	*Rhododendron arborescens*					X					X								
rosebay rhododendron	*Rhododendron maximum*		X									X						X	
swamp azalea	*Rhododendron viscosum*	X			X								X	X		X			
rhododendron	*Rhododendron* spp.																X		
swamp azalea	*Rhododendron viscosum*	X			X								X	X		X			
rhododendron	*Rhododendron* spp.																X		
fragrant sumac	*Rhus aromatica*															X			
dwarf-winged sumac	*Rhus copalina*				X					X							X		
smooth sumac	*Rhus glabra*				X												X		
sumacs	*Rhus* spp.	X			X			X						X		X	X		
staghorn sumac	*Rhus typhina*		X									X					X		
pasture rose, Carolina rose	*Rosa Carolina*		X		X		X					X	X	X	X		X		
swamp rose	*Rosa palustris*					X							X				X	X	
rose	*Rosa* spp.																X		
Virginia rose	*Rosa virginiana*	X	X											X			X		
common blackberry	*Rubus allegheniensis*		X									X	X				X		
flowering raspberry	*Rubus odoratus*	X			X			X						X			X		
thimbleberry	*Rubus parviflorus*		X			X					X		X			X			
blackberry, raspberry	*Rubus* spp.																X		
eastern coneflower, organe coneflower	*Rudbeckia fulgida*		X																
black-eyed susan	*Rudbeckia hirta*		X	X					X		X	X	X			X			

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green-headed coneflower, cutleaf coneflower	*Rudbeckia lanciniata*											X							
great coneflower	*Rudbeckia maxima*														X				
sweet coneflower	*Rudbeckia subtomentosa*	X	X		X		X					X	X	X				X	
brown-eyed-susan, three lobed coneflower	*Rudbeckia triloba*		X										X			X			
Carolina wild petunia	*Ruellia caroliniensis*										X								
fringe-leaved petunia, hairy wild petunia, wild petunia	*Ruellia humilis*		X				X		X		X	X	X		X				
limestone petunia	*Ruellia strepens*	X			X														
pussy willow	*Salix discolor*		X				X					X	X	X					
sandbar willow	*Salix exigua*		X					X				X	X			X			
black willow	*Salix nigra*			X	X			X				X	X	X			X		
silky willow	*Salix sericea*									X	X				X		X		
willow	*Salix* spp.															X			
lyreleaf sage, purple knockout	*Salvia lyrata*				X											X			
elderberry, American elder, common elderberry	*Sambucus canadensis*	X	X		X		X	X				X	X	X	X	X	X		
red-berried elder	*Sambucus racemosa ssp. pubens*	X																X	
bloodroot	*Sanguinaria canadensis*		X																
swamp burnet	*Sanguisorba canadense*	X																	
sassafras	*Sassafras albidum*										X							X	
water dragon, swamp lily, lizards tail	*Saururus cernuus*	X			X							X							
swamp saxifrage	*Saxifraga pensylvanica*														X				
early saxifrage	*Saxifraga virginiensis*				X	X		X	X		X				X				

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little bluestem	*Schizachyrium scoparium*					X			X		X		X				X	X	
hardstem bullrush	*Scirpus acutus*		X		X												X		
black bullrush, green bullrush	*Scirpus atrovirens*		X									X							
wool grass, wool rush	*Scirpus cyperinus*				X														
three-square bullrush	*Scirpus pungens*											X					X		
softstem bullrush	*Scirpus tabermontanii*									X	X						X		
hoary skullcap, hyssop skullcap, skullcap	*Scutellaria incana*								X			X							
hyssop skullcap	*Scutellaria integrifolia*															X			
Allegheney skullcap	*Scutellaria serrata*				X	X			X		X								
sedum	*Sedum* spp.																X		
wild stonecrop, woodland stonecrop, stonecrop	*Sedum ternatum*															X			
golden ragwort, golden groundseal, squaw-weed	*Senecio aureus*											X						X	
northern wild senna, wild senna, American	*Senna hebecarpa*	X	X									X	X		X				
Maryland senna	*Senna marilandica*	X																	
bristlegrass	*Setaria* spp.																X		
wild pink, pink campion	*Silene caroliniana*				X	X				X			X			X		X	
royal catchfly	*Silene regia*	X																X	
starry campion	*Silene stellata*		X	X	X						X	X	X						
fire pink	*Silene virginica*		X									X	X						
compass plant	*Silphium laciniatum*												X						
cup plant	*Silphium perfoliatum*	X	X		X								X						

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prairie dock	*Silphium terebinthinaceum*														X				
whorled rosenweed	*Silphium trifoliatum*				X											X		X	
blue-eyed grass, select blue-eyed grass	*Sisyrinchium angustifolium*	X										X							
false solomon's seal	*Smilacina racemosa*						X					X						X	
greenbriar	*Smilax* spp.																X		
silverrod, white goldenrod	*Solidago bicolor*				X												X		
bluestem goldenrod, wreath goldenrod	*Solidago caesia*				X											X	X		
zigzag goldenrod	*Solidago flexicaulis*		X		X											X	X	X	
flat top goldenrod	*Solidago graminifolia*	X	X	X	X							X	X		X	X			
early goldenrod	*Solidago juncea*												X						
gray goldenrod	*Solidago nemoralis*				X														
anisescented goldenroad	*Solidago odora*		X				X												
roughleaf goldenrod	*Solidago patula*				X													X	
riddell's goldenrod	*Solidago reddellii*												X						
stiff goldenrod	*Solidago rigida*					X							X					X	
wrinkleleaf goldenrod, rough-stemmed goldenrod	*Solidago rugosa*				X												X		
seaside goldenrod	*Solidago sempervirens*												X						
blue-stemmed, grey, or showy goldenrod	*Solidago speciosa*			X			X					X							
short-pappus goldenrod, autumn goldenrod	*Solidago sphacelata*		X									X	X						
goldenrod	*Solidago* spp.	X			X								X				X	X	
American mountain ash	*Sorbus americana*																X		
indian grass	*Sorghastrum nutans*															X	X		

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
American bur-reed	*Sparganium americanum*			X								X	X			X			
giant bur-reed	*Sparganium eurycarpum*									X							X		
prairie cord grass	*Spartina pectinata*		X	X							X	X	X		X	X			
indian pink	*Spigelia marilandica*				X				X		X								
meadowsweet	*Spiraea alba*		X									X							
steeplebush	*Spiraea tomentosa*	X																	X
nodding ladies tresses	*Spiranthes cernua*										X								
fragrant lady's tresses	*Spiranthes cernua var. odorata*	X			X									X	X			X	
lady's tresses orchid	*Spiranthes odorata*	X	X		X	X	X			X		X	X	X	X	X		X	
narrow-leaved meadowsweet	*Spirea alba*				X	X					X			X		X		X	
broad-leaved meadowsweet	*Spirea latifolia*		X																
tall dropseed, rough dropseed, meadow dropseed	*Sporobolus compositus*				X								X						
prairie dropseed	*Sporobolus heterolepis*															X		X	
American bladdernut	*Staphylea trifolia*															X			
porcupine grass	*Stipa spartea*				X											X			
stokes' aster	*Stokesia laevis*								X	X	X								
wood poppy, celandine poppy	*Stylophorum diphyllum*				X														
snowberry	*Symphoriacarops*	X			X							X		X					
coralberry	*Symphoricarpos orbiculatus*		X									X					X		
blue heart-leaved aster	*Symphotrichum cordifolium*				X											X			
crooked-stem aster	*Symphotrichum prenanthoides*				X											X		X	
purple-stemmed aster	*Symphotrichum puniceum*	X			X														

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
short's aster	*Symphotrichum shortii*					X					X	X		X	X	X			
reclining aster	*Symphyotrichum ericoides*									X									
calico aster	*Symphyotrichum lateriflorum*														X				
white or frost aster	*Symphyotrichum porteri*											X	X						
skunk cabbage	*Symplocarpus foetidus*				X	X			X	X						X			
bald cypress	*Taxodium distichum*	X			X							X							
yew	*Taxus* spp.																X		
meadow rue	*Thalictrum aquilegifolium*																X		
early meadow rue	*Thalictrum dioicum*				X						X								
tall meadow rue	*Thalictrum pubescens*				X											X			
rue anemone	*Thalictrum thalictroides*										X								
New York fern	*Thelypteris noveboracensis*	X			X								X		X	X			
foamflower, creeping foamflower	*Tiarella cordifolia*					X													
American linden or basswood	*Tilia americana*					X											X		
Mexican sunflower	*Tithonia rotundifolia*																X		
poison ivy	*Toxicodendron radicans*																X		
Ohio spiderwort, spiderwort	*Tradescantia ohiensis*				X											X			
spiderwort, Virginia spiderwort, common spiderwort	*Tradescantia virginiana*				X														
tassel rue	*Trautvetteria caroliniensis*		X																
blue curls	*Trichostema dichotomum*	X	X		X		X			X			X	X					
purple-top	*Tridens flavus*		X		X											X			
red clover	*Trifolium pratense*																X		

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
white dutch clover	*Trifolium repens*																X		
southern trillium	*Trillium cuneatum*	X										X							
purple trillium, red trillium, wake robin, stinking benjamin, squawroot	*Trillium erectum*				X							X	X			X		X	
declined trillium, white wake-robin, drooping trillium	*Trillium flexipes*															X			
showy trillium, large flowering trillium	*Trillium grandiflorum*	X	X		X		X						X	X					
yellow trillium, southern	*Trillium luteum*			X								X							
prairie trillium, bloody noses	*Trillium recurvatum*		X			X					X	X	X			X			
toadshade, toad trillium	*Trillium sessile*	X	X		X	X		X			X		X	X	X	X		X	
trillium	*Trillium* spp.				X				X	X							X		
spreading globeflower	*Trollius laxus*	X														X			
eastern hemlock	*Tsuga canadensis*				X											X	X		
hemlock	*Tsuga Carrière*																X		
tulip	*Tulipa* spp.																X		
showy merrybells, large-flowered bellwort, wild oats	*Uvularia grandiflora*		X															X	
bellwort, merrybells	*Uvularia perfoliata*	X		X	X	X										X		X	
wild oats	*Uvularia sessilifolia*				X								X						
lowbush blueberry	*Vaccinium angustifolium*				X								X				X		
highbush blueberry	*Vaccinium corymbosum*				X								X			X	X		
blueberries	*Vaccinium* spp.												X				X		
deerbery	*Vaccinium staminium*				X	X					X					X	X		

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
regal lingonberry	*Vaccinium vitiis-idaea*										X								
wild celery	*Vallisneria Americana*																X		
purple vervain	*Verbena canadensis*				X					X	X					X			
blue vervain, simpler's joy, swamp verbena, blue verbena	*Verbena hastata*			X									X		X				
hoary vervain	*Verbena stricta*															X			
tall ironweed	*Vernonia gigantea*				X						X					X			
tawny ironweed, upland ironweed	*Vernonia glauca*											X							
New York ironweed, broadleaf ironweed	*Vernonia noveboracensis*												X						
culver's root	*Veronicastrum virginicum*															X			
giant ironweed	*Verononia gigantea*														X	X			
mapleleaf viburnum	*Viburnum acerifolium*		X													X			
witherod, wild raisin	*Viburnum cassinoides*				X								X						
arrowood viburnum, southern arrowwood	*Viburnum dentatum*		X														X		
nannyberry viburnum	*Viburnum lentago*										X								
possumhaw, witherod viburnum	*Viburnum nudum*		X									X							
blackhaw viburnum, black haw	*Viburnum prunifolium*												X			X	X		
viburnums	*Viburnum* spp.		X			X										X	X		
cranberry bush, highbush cranberry	*Viburnum trilobum*			X	X							X					X		
white violet, Canada violet	*Viola canadensis*					X					X	X	X				X	X	
marsh blue violet	*Viola cucullaria*																	X	
halberdleaf yellow violet	*Viola hastata*																	X	
labrador violet	*Viola labradorica*																	X	

Common Name(s)	*Scientific Name*	Dry Area Plant	Shady Area Plant	Shady Rain Garden Plant	Sunny Area Plant	Sunny Rain Garden Plant	Plant well suited for Banks	Cut Flower Garden Plant	Plant for near Lakes, Ponds or Streams	Soil Stabilizing Plant	Wet Area Plant	Plant for Wooded Areas	Deer Resistant Plant	Drought Tolerant Plant	Bee Attractant Plant	Bird Attractant Plant	Wildlife Attractant Plant	Butterfly Attractant Plant	Hummingbird Attractant Plant
common blue birdfoot violet	*Viola pedata*																	X	
smooth yellow violet	*Viola pensylvanica*																	X	
downy yellow violet	*Viola pubescens*																	X	
long-spurred violet	*Viola rostrata*																X	X	
wild blue violet	*Viola sororia*																	X	
pansy	*Viola* spp.																X		
creamy violet	*Viola striata*																X	X	
grape, wild grape	*Vitis* spp.																X		
barren strawberry	*Waldsteinia fragarioides*																	X	
Virginia chain fern	*Woodwardia virginica*																	X	
yellow root	*Xanthorhiza simplicissima*																	X	
golden alexanders, zizia	*Zizia aurea*																	X	
hosta																	X		

APPENDIX S. SUMMARY OF HYDRAULIC FRACTURE SOLUTIONS-MARCELLUS SHALE

TABLE 1

SUMMARY OF HYDRAULIC FRACTURE SOLUTIONS - MARCELLUS SHALE

Product Vendor	Application Sequence	Product Name	Hazardous Components (From MSDS)	Hazardous Ingredient Weight %	Pounds of hazardous ingredient / pound water	Gallons of Frac solution per stage	Concentration in Frac Solution (ppm)	EPA Risk Based Concentration - Residential Tapwater (ppm)
BJS	1	HCl	Hydrochloric Acid	8%	0.015834	2000	83.68	
		CI-14	Propargyl Alcohol	5%	0.00004327	2000	0.23	0.073
			Methanol	68%	0.000588472	2000	3.11	18
		Ferrotrol 300L	Citric Acid	70%	0.0035	2000	18.50	
	2	XLW-32	Methanol	90%	0.001593	42000	176.79	18
			Boric Oxide	20%	0.000354	42000	39.29	
		GW-3LDF	Petroleum Distallate Blend	60%	0.00321	42000	356.24	
			Polysaccharide	60%	0.00321	42000	356.24	
		GBW-20C	no hazardous ingredients	0%	0	42000	0.00	
		BF-7L	Potassium Carbonate	100%	0.0005725	42000	63.53	
		GBW-15L	Sodium Chloride	14%	0.000154	42000	17.09	
	3	FRW-14	Hydrotreated light distillate	40%	0.000424	334000	374.20	
			Ethoxylated Alcohol	5%	0.000053	334000	46.77	
		Alpha 125	Glutaraldehyde	30%	0.0000798	334000	70.43	
Fractech	1	HCL	Hydrochloric Acid	8%	0.0168896	2000	89.26	
		40 HTL	Methanol	10%	0.0002	2000	1.06	18
		NE100	Methanol	5%	0.0000485	2000	0.26	18
		FE100L	no hazardous ingredients	0%	0	2000	0.00	
	2	HVG-04	no hazardous ingredients	0%	0	42000	0.00	
		B9	Potassium Hydroxide	20%	0.000206	42000	22.86	
		BXL-2	Potassium Hydroxide	10%	0.000117	42000	12.98	

SUMMARY OF HYDRAULIC FRACTURE SOLUTIONS - MARCELLUS SHALE								
Product Vendor	Application Sequence	Product Name	Hazardous Components (From MSDS)	Hazardous Ingredient Weight %	Pounds of hazardous ingredient / pound water	Gallons of Frac solution per stage	Concentration in Frac Solution (ppm)	EPA Risk Based Concentration - Residential Tapwater (ppm)
	3	ICI-3240	Dazomet	24%	0.0000696	334000	61.42	
			Sodium Hydroxide	4%	0.0000116	334000	10.24	
		ICI-150	Glutaraldehyde	50%	0.00014125	334000	124.66	
			Methanol	5%	0.000014125	334000	12.47	18
		FRW-50	Diesel (use discontinued)	20%	0.000194	334000	171.21	
		FRW-25	no hazardous ingredients (used in place of FRW-50)	0%	0	334000	0.00	
Universal	1	Iron Check	no hazardous ingredients	0%	0	2000	0.00	
		HCl	Hydrochloric Acid	8%	0.0168896	2000	89.26	
	2	Unilink 8.5	Ethylene Glycol	40%	0.00111	42000	123.19	73
			Boric Acid	7%	0.00019425	42000	21.56	
		GBL-8x	n/a	0%	0	42000	0.00	
		Unigel 19XL	no hazardous ingredients (guar gum)	0%	0	42000	0.00	
	3	FRP-21	no hazardous ingredients	0%	0	334000	0.00	
		Bioclear 200	2,2-Dibromo-3-Nitrilopropionamide	20%	0.0000625	334000	55.16	
			Polyethylene Glycol Mixture	60%	0.0001875	334000	165.48	
Halliburton	1	HAI-OS	Methanol	60%	0.001068	2000	5.64	18
			Propargyl Alcohol	10%	0.000178	2000	0.94	0.073
		FE-1A	Acetic Acid	60%	0.001235042	2000	6.53	
			Acetic Anhydride	100%	0.002184454	2000	11.54	
		HCl	Hydrochloric Acid	8%	0.0168896	2000	89.26	
	2	K-34	Sodium Bicarbonate	100%	0.001271735	42000	141.13	
		BC 140	Monoethanolamine	30%	0.000523988	42000	58.15	
			Ethylene Glycol	30%	0.000566485	42000	62.87	73
			Boric Acid	30%	0.000608982	42000	67.58	
		Delta Frac 140	no hazardous ingredients	0%	0	42000	0.00	

SUMMARY OF HYDRAULIC FRACTURE SOLUTIONS - MARCELLUS SHALE								
Product Vendor	Application Sequence	Product Name	Hazardous Components (From MSDS)	Hazardous Ingredient Weight %	Pounds of hazardous ingredient / pound water	Gallons of Frac solution per stage	Concentration in Frac Solution (ppm)	EPA Risk Based Concentration - Residential Tapwater (ppm)
	3	FR-46	Ammonium Bisulfate	30%	0.000375	334000	330.95	
		Aldacide G	Glutaraldehyde	30%	0.0000798	334000	70.43	
Superior	1	AI-2	Glycol Ether (ethylene glycol monobutylether)	30%	0.000291	2000	1.54	18
			Propargyl Alcohol	30%	0.000291	2000	1.54	0.073
			Isopropyl Alcohol	30%	0.000291	2000	1.54	
			Proprietary Component	7%	0.0000679	2000	0.36	
		IC-100L	Cirtic Acid	100%	0.00154	2000	8.14	
		OB-Fe	Propylene Glycol	40%	0.000452	2000	2.39	730
			Ferrous Sulfate, Heptahydrate	30%	0.000339	2000	1.79	
		Super OW-3	Isopropyl Alcohol	40%	0.00018	2000	0.95	
			Methanol	13%	0.0000585	2000	0.31	18
		Super Pen 2000	Ethylhexanol	70%	0.000322	2000	1.70	
			Proprietary Component	30%	0.000138	2000	0.73	
		Super 100NE	Isopropyl Alcohol	30%	0.00015525	2000	0.82	
			Glycol Ethers	7%	0.00007245	2000	0.38	18
		HCl	Hydrochloric Acid	8%	0.0168896	2000	89.26	
	3	Bioclear 200	2,2-Dibromo-3-Nitrilopropionamide	20%	0.0000625	334000	55.16	
			Polyethylene Glycol Mixture	60%	0.0001875	334000	165.48	
		SAS-2	Hydrotreated Light Distillate	30%	0.000306	334000	270.06	
			Mineral Spirits	25%	0.000255	334000	225.05	
			Propylene Glycol	25%	0.000255	334000	225.05	730
			Ethoxylated Alcohols	4%	0.0000408	334000	36.01	

Source: http://www.dep.state.pa.us/dep/deputate/minres/oilgas/FractListing.pdf

APPENDIX T. RECYCLING

Drop-off Site	Acceptable Materials	Address	City	State	Zip
Austin Area School	aluminum cans	138 Costello	Austin	PA	16720
Gore's Auto Sales	Motor Oil	340 West 4th Street	Emporium	PA	15834
E&G Auto Parts	Motor Oil	327 Portage Street	Emporium	PA	15834
Cameron Battery	Car Battery	205 South Maple Street	Emporium	PA	15834
Cameron County Drop-off Program	Aluminum, tine, or steel cans; cardboard; clear class; and mixed glass	677 Plank Road Hollow	Emporium	PA	15834
Auto Zone	Motor Oil * *Must take container with you*	953 South St. Marys Street	St. Marys	PA	15857
Benedictine Sisters	Aluminum cans, aluminum foil, car batteries, steel, iron, alum, copper, and brass	303 Church Street	St. Marys	PA	15857
Benezette Township Municipal Building Drop-off Site	Plastics (#1 and #2), aluminum cans, brown class, clear glass, and green glass **Containers must be rinsed and lids removed*	Route 555	Benezette	PA	15821
Bennetts Valley News	Brown, clear, and green glass **Containers must be rinsed and lids removed*	19259 Bennetts Valley Highway	Weedville	PA	15868
BiLo of St. Marys	Brown paper bags, plastic bags	846 South St. Marys Street	St. Marys	PA	15857
Elk County Drop-off Site	Aluminum cans; cardboard, computer paper, magazines and catalogs, mixed paper, newspaper, telephone books, white office paper **Plastics are now accepted at the Elk County Community Recycling Center in the Stackpole Complex in St. Marys, PA*	1259 South Michael Road	St. Marys	PA	15857
Elk County Electronics Recycling Center	Electronics, NiCd batteries, rechargeable batteries, televisions, flourescent bulbs, CFLs, and oil based paint	Stackpole Complex	St. Marys	PA	15857

Drop-off Site	Acceptable Materials	Address	City	State	Zip
GAP Enterprises	Aluminum, tin, and steel cans; steel, iron, alum, copper, and brass metals; metal clothes hangers; propane tanks; used motor oil; windows, non-reusable large appliances **Elk County residents can drop-off Freon containing appliances free of charge*	Intersection of Route 255 and Route 555	Weedville	PA	15868
Fox Township Drop-off	Plastics (#1 and #2); aluminum, tin, and steel cans; clear, brown, and green glass	Onyx Greentree Landfill	Kersey	PA	15846
Fox Township Municipal Building Drop-off	Plastics (#1 and #2); aluminum, tin, and steel cans; clear, brown, and green glass; magazines; catalogs; newspapers **Containers must be rinsed and lids removed. Bundle magazines/newspapers or place in brown paper bag and keep dry*	117 Irishtown Road	Kersey	PA	15846
Groll's Disposal	Cardboard, computer paper, used motor oil, and white office paper. **Call before dropping off oil. Will pick up from business and industry*	1085 South Michael Street	St. Marys	PA	15857
Industrial Steel and Pipe Company	Aluminum cans; steel, iron, alum, copper, and brass metals	294 Depot Street	St. Marys	PA	15857
J.R. Electronics	NiCd batteries	49 Erie Avenue	St. Marys	PA	15857
Jay Township Municipal Building Drop-off site	Plastics (#1 and #2), cardboard, magazines, catalogs, and newspaper **Containers must be rinsed and lids removed. Bundle magazines/newspapers or place in brown paper bag and keep dry*	Teaberry Road	Weedville	PA	15868
Murray K. Lilley Trucking	Aluminum, tin, and steel cans; steel, iron, alum, copper, and brass metals; autobodies, car batteries, metal clothes hangers, and non-reusable large appliances	1813 Redwood Avenue	Weedville	PA	15868
Radio Shack	NiCd batteries and rechargeable batteries	49 Erie Avenue	St. Marys	PA	15857
St. Mary's Auto Wrecker/Elk County Recycling Center	Aluminum, tin, and steel cans; car batteries; and steel, iron, alum, copper, and brass metals	1388 Million Dollar Highway	St. Marys	PA	15857
St. Mary's Equipment Company	Used motor oil **Do not mix used oil with other materials*	1300 Brusselles Street	St. Marys	PA	15857
Wal-Mart	Car batteries, NiCd batteries, and plastic bags	1102 Million Dollar Highway	St. Marys	PA	15857

Drop-off Site	Acceptable Materials	Address	City	State	Zip
Clearfield County - Penfield Area Drop-off Site (Penfield Fire Department)	Aluminum, tin, and steel cans; clear glass, and newspapers	Intersection of Route 255 and Route 153	Penfield	PA	15849
Wharton Township Drop-off Program	Plastic (#1 and #2), aluminum cans, cardboard, clear glass, green glass, magazines, catalogs, and newspapers	East Fork Road	Austin	PA	16720

(Source: DEP http://www.dep.state.pa.us/wm_apps/RecyclingLocations/default.asp)

Figure 1-1

Sinnemahoning Creek Watershed

Streams
Interstate
Highway
Major Road
State Park
Natural Wild Areas
State Forest
State Game Land
Towns and Boroughs
Township Boundaries
Counties of Pennsylvania
Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Eulalia Township
Sweden Township
Liberty Township
Keating Township
Homer Township
West Branch Township
Summit Township
Abbott Township
Norwich Township
Austin
Sylvania Township
Portage Township
Sergeant Township
Jones Township
Driftwood Branch
Portage Township
Emporium
Wharton Township
Shippen Township
West Creek
St Marys
Lumber Township
Leidy Township
Hicks Run
Trout Run
Dents Run
Driftwood
Grove Township
Bennett Branch
Byrnes Run
Jay Township
Benezette Township
Fox Township
Gibson Township
Wykoff Run
East Keating Township
Horton Township
Medix Run
Goshen Township
Lawrence Township
Huston Township
Laurel Run
Sandy Township
Pine Township
Union Township
West Keating

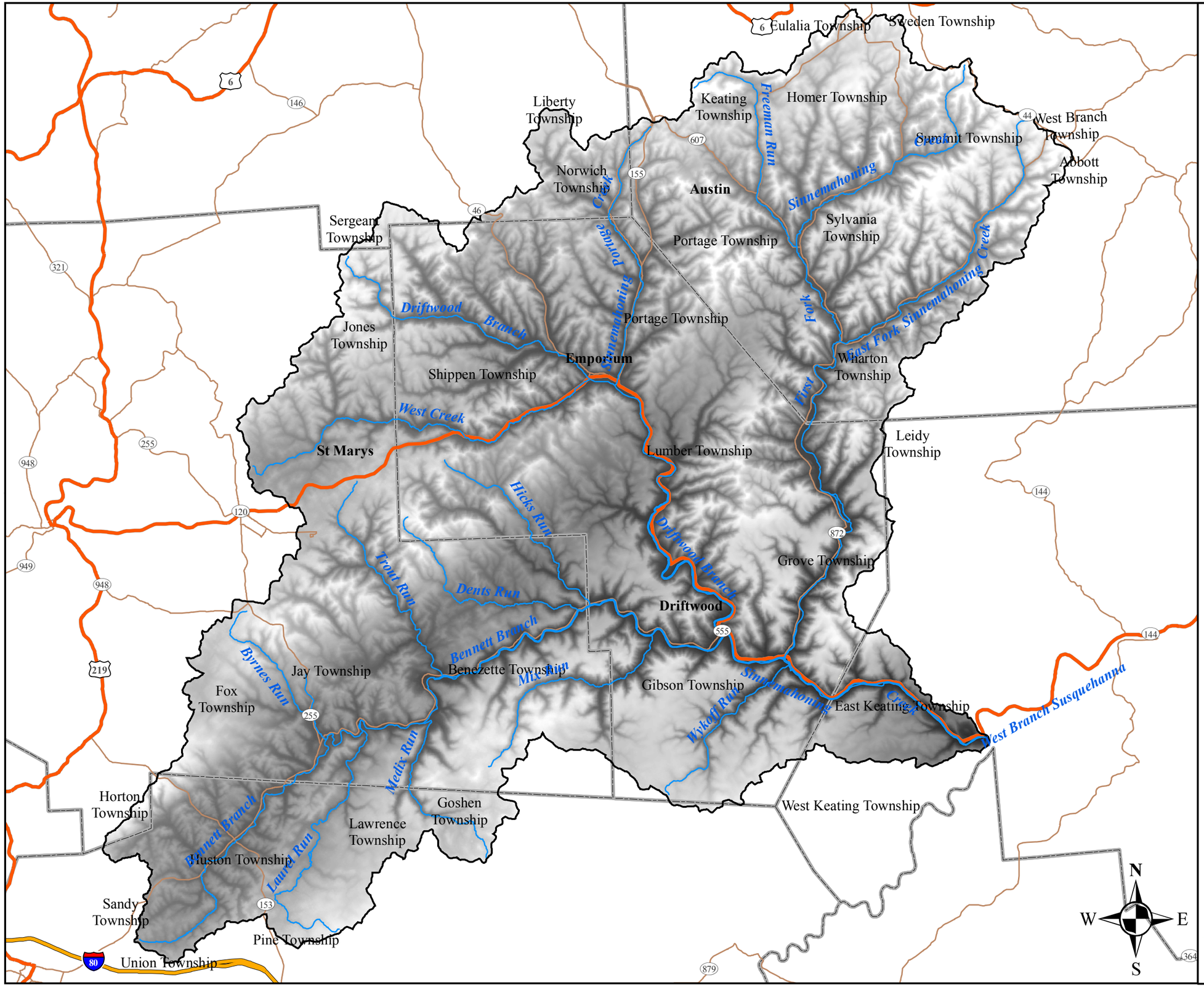
Freeman Run
Sinnemahoning Creek
Portage Creek
Sinnemahoning
First Fork
East Fork Sinnemahoning Creek
Driftwood Branch
Sinnemahoning
Clear Creek
West Branch Susquehanna

N
W
E
S

McKean County
Potter County
Elk County
Cameron County
Clinton County
Clearfield County
Centre County

Figure 1--2

Topography



Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Watershed Boundary

Elevation

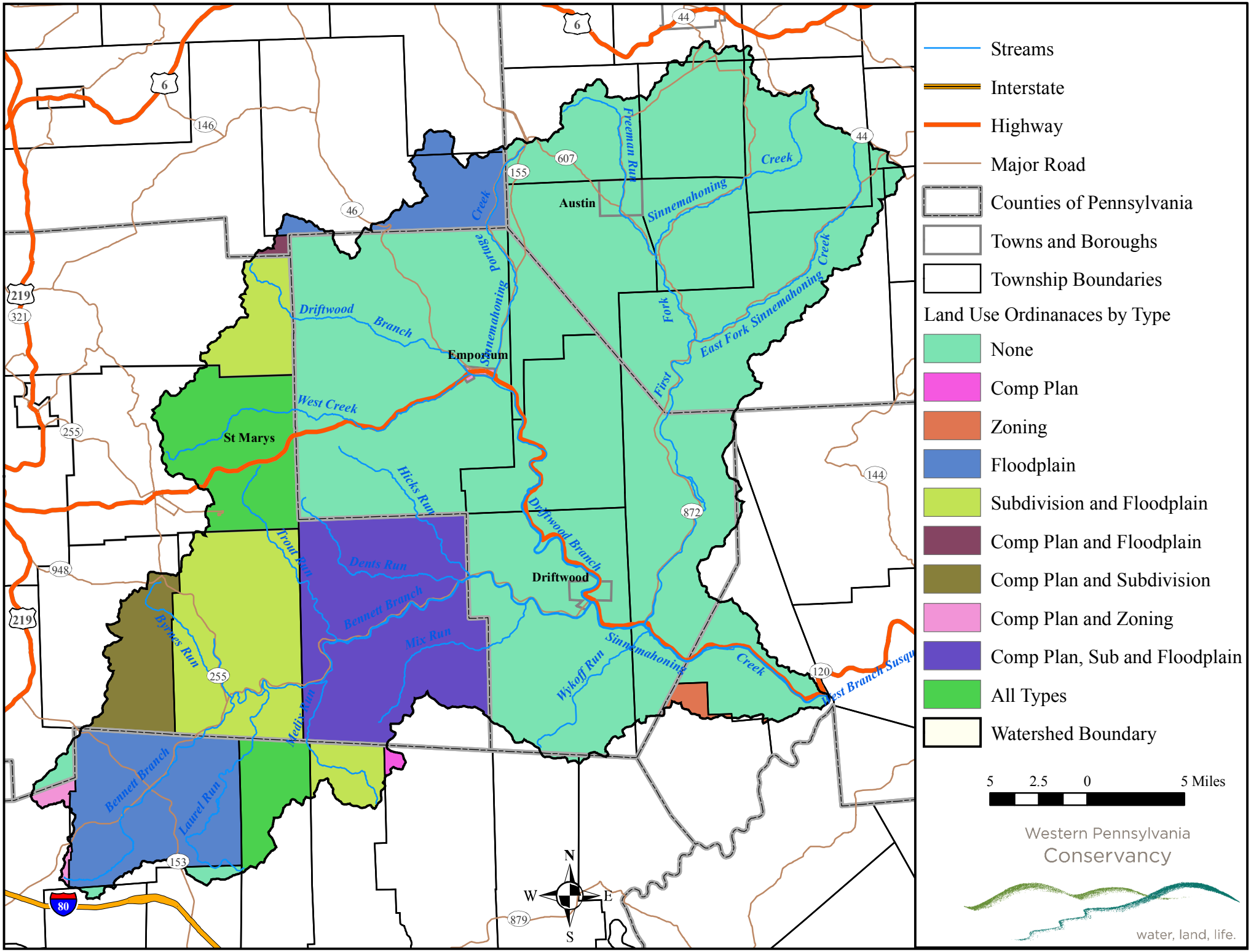
High : 2560 ft

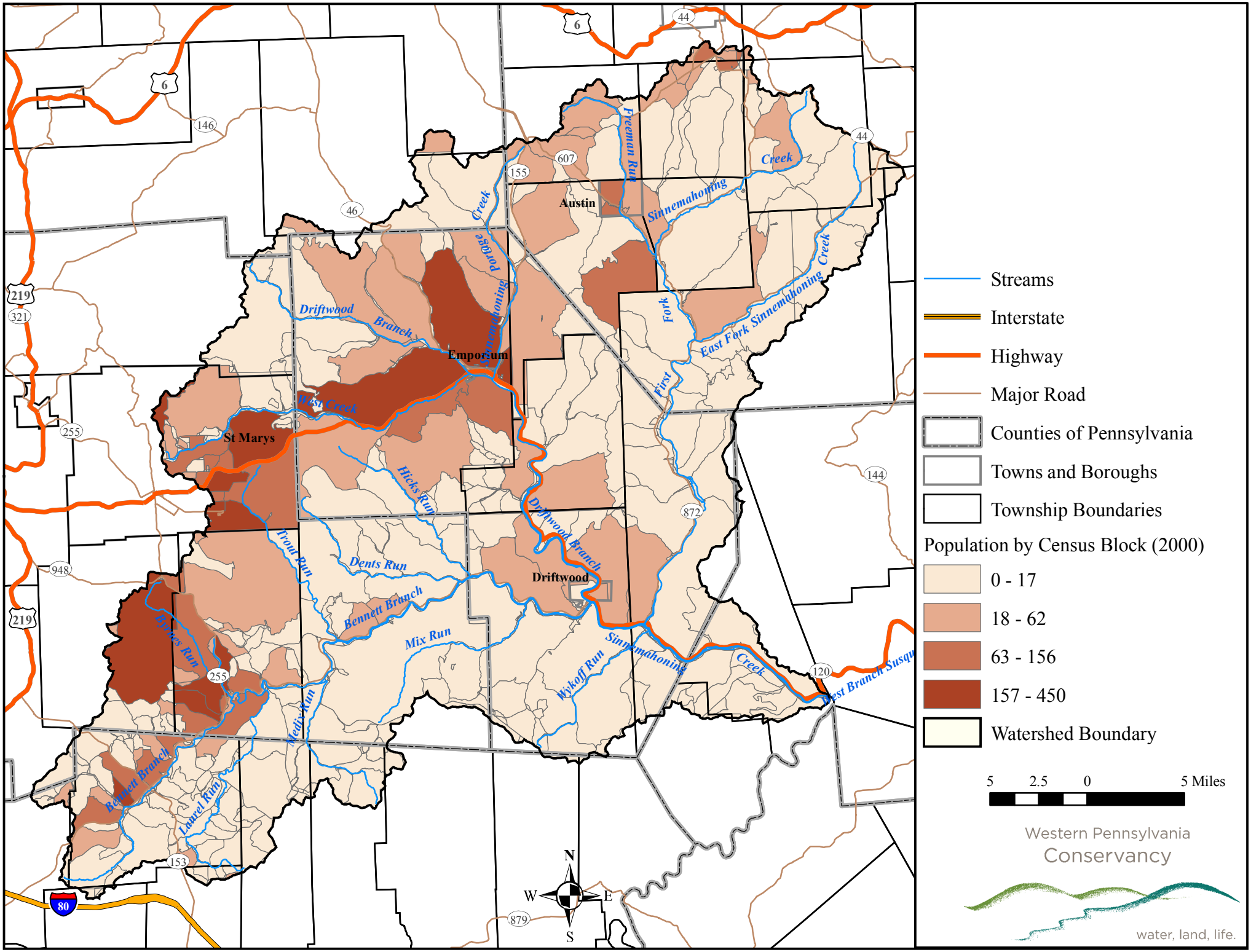
Low : 700 ft

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.


Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Land Use Ordinanaces by Type
None
Comp Plan
Zoning
Floodplain
Subdivision and Floodplain
Comp Plan and Floodplain
Comp Plan and Subdivision
Comp Plan and Zoning
Comp Plan, Sub and Floodplain
All Types
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
Austin
Emporium
St Marys
Driftwood
Driftwood Branch
Sinnemahoning Creek
Portage Creek
Freeman Run
Driftwood Branch
West Creek
Hicks Run
Trout Run
Dents Run
Bennett Branch
Mix Run
Byrnes Run
Medix Run
Laurel Run
Wykoff Run
First Fork
East Fork Sinnemahoning Creek
West Branch Susq
N
W
E
S


Austin
Emporium
St Marys
Driftwood
Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
First Fork
East Fork Sinnemahoning Creek
West Creek
Hicks Run
Trout Run
Dents Run
Bennett Branch
Mix Run
Wykoff Run
Sinnemahoning Creek
Byrnes Run
Medix Run
Laurel Run
West Branch Susq
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Population by Census Block (2000)
0 - 17
18 - 62
63 - 156
157 - 450
Watershed Boundary
5 2.5 0 5 Miles
N
W
E
S
Western Pennsylvania Conservancy
water, land, life.

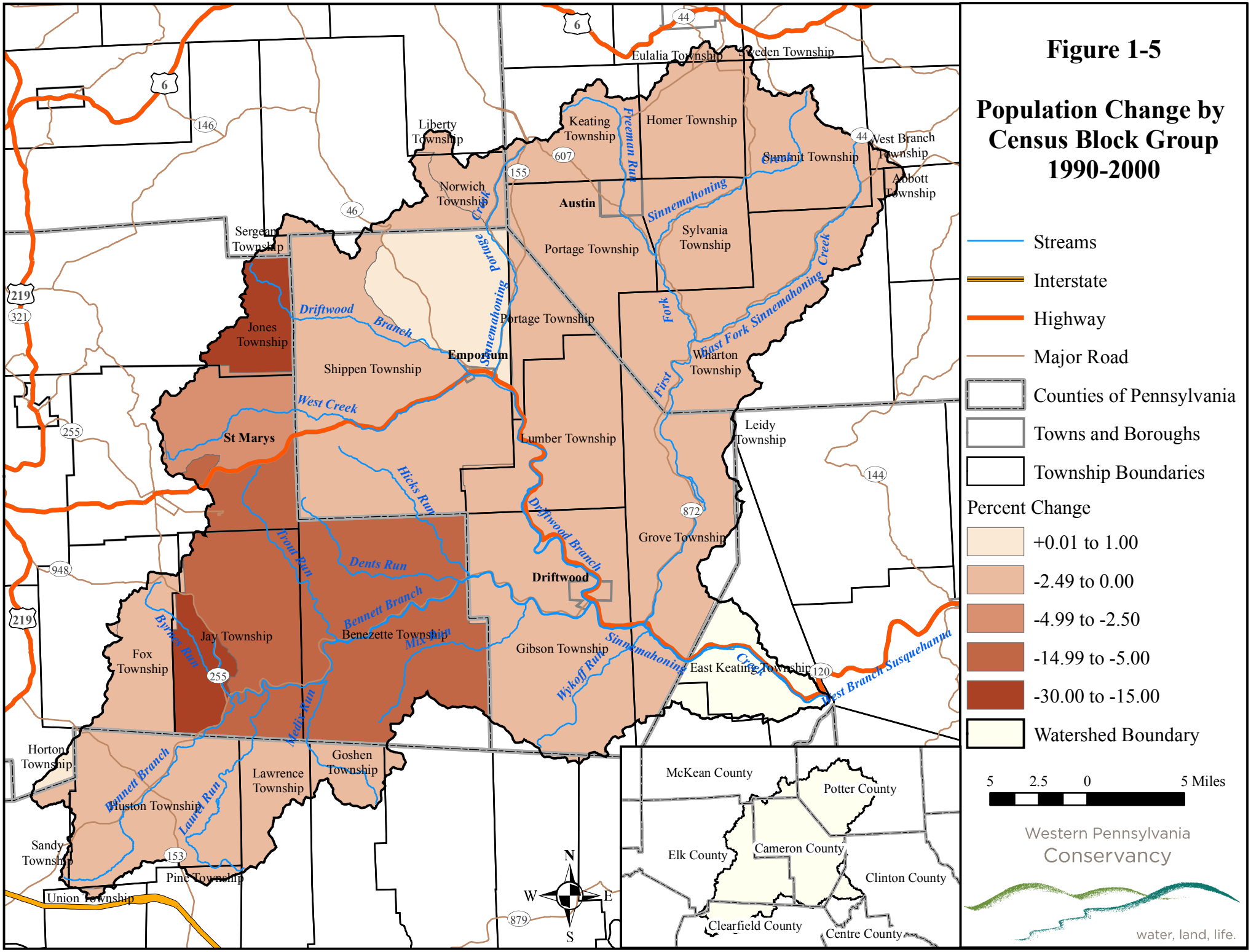


Figure 1-5
Population Change by Census Block Group 1990-2000
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Percent Change
+0.01 to 1.00
-2.49 to 0.00
-4.99 to -2.50
-14.99 to -5.00
-30.00 to -15.00
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
Eulalia Township
Sweden Township
Liberty Township
Keating Township
Homer Township
West Branch Township
Summit Township
Abbott Township
Norwich Township
Austin
Sergeant Township
Portage Township
Sylvania Township
Jones Township
Shippen Township
Emporium
Wharton Township
St Marys
Lumber Township
Leidy Township
Grove Township
Driftwood
Fox Township
Jay Township
Benezette Township
Gibson Township
East Keating Township
Horton Township
Lawrence Township
Goshen Township
Huston Township
Sandy Township
Pine Township
Union Township
McKean County
Potter County
Elk County
Cameron County
Clinton County
Clearfield County
Centre County
Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
West Creek
Hicks Run
Dents Run
Trout Run
Bennett Branch
Byrnes Run
Medix Run
Laurel Run
Wykoff Run
First Fork Sinnemahoning Creek
West Branch Susquehanna
N
S
E
W

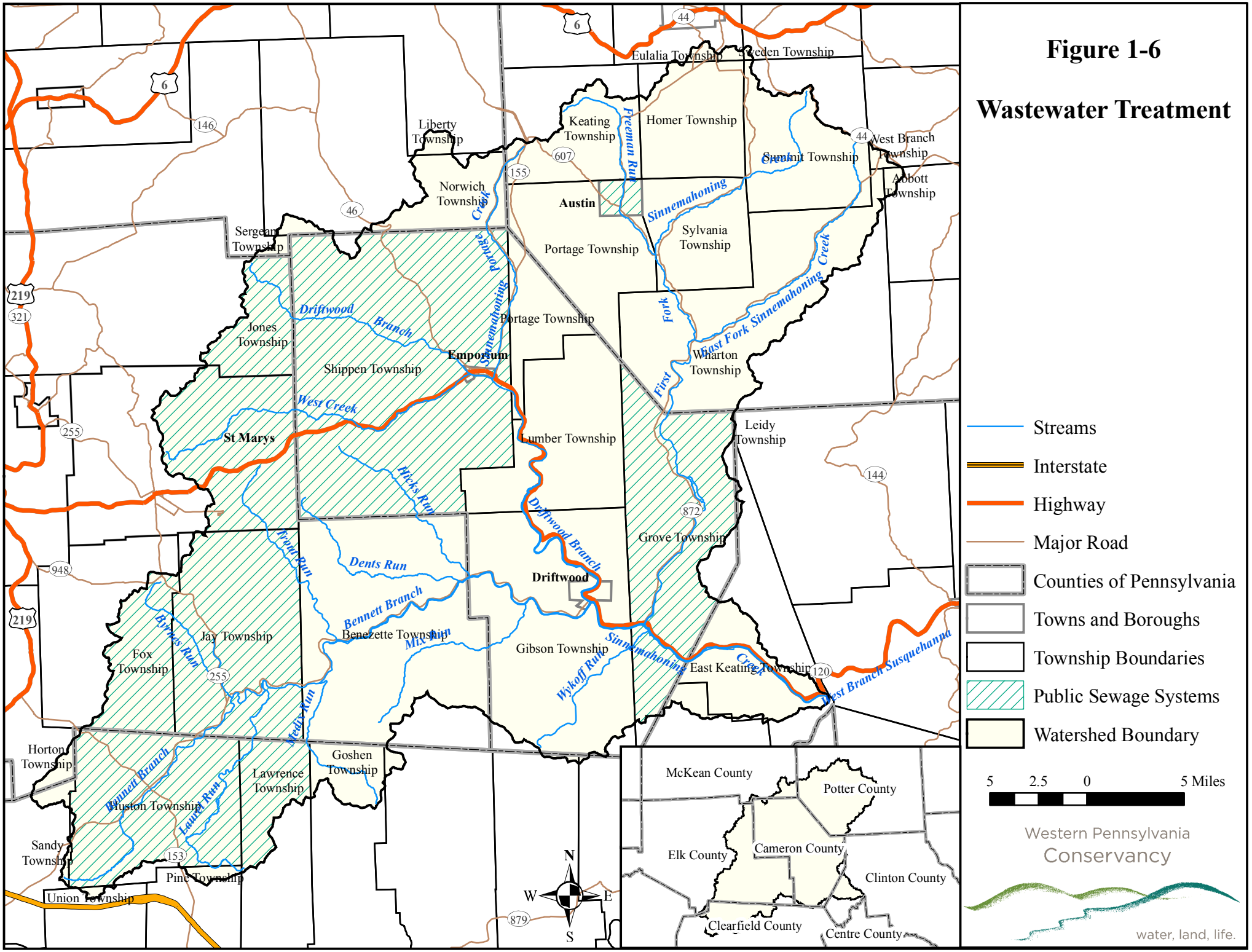


Figure 1-6
Wastewater Treatment
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Public Sewage Systems
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
Eulalia Township
Sweden Township
Liberty Township
Keating Township
Homer Township
West Branch Township
Summit Township
Abbott Township
Norwich Township
Austin
Sergeant Township
Portage Township
Sylvania Township
Jones Township
Shippen Township
Emporium
Wharton Township
St Marys
Lumber Township
Leidy Township
Grove Township
Driftwood
Fox Township
Jay Township
Benezette Township
Gibson Township
East Keating Township
Horton Township
Goshen Township
Lawrence Township
Huston Township
Sandy Township
Pine Township
Union Township
McKean County
Potter County
Elk County
Cameron County
Clinton County
Clearfield County
Centre County
Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
West Creek
Hicks Run
First Fork Sinnemahoning Creek
Trout Run
Dents Run
Bennett Branch
Byrnes Run
Mix Run
Wykoff Run
Medix Run
Laurel Run
West Branch Susquehanna
N
W
E
S

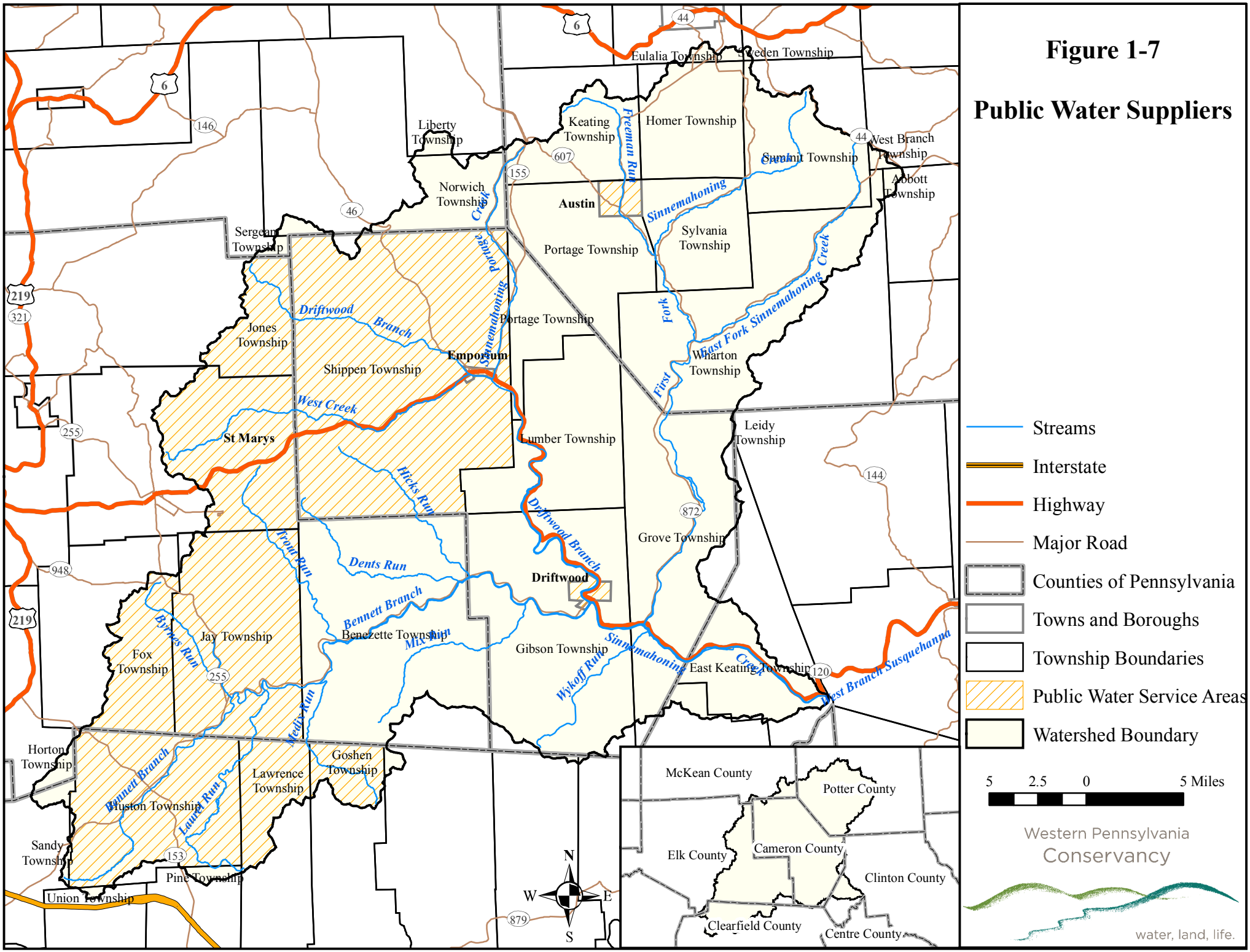


Figure 1-7
Public Water Suppliers
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Public Water Service Areas
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
Liberty Township
Eulalia Township
Sweden Township
Keating Township
Homer Township
West Branch Township
Summit Township
Abbott Township
Norwich Township
Austin
Sergeant Township
Portage Township
Sylvania Township
Jones Township
Shippen Township
Emporium
Wharton Township
St Marys
Lumber Township
Leidy Township
Grove Township
Driftwood
Fox Township
Jay Township
Benezette Township
Gibson Township
East Keating Township
Horton Township
Lawrence Township
Goshen Township
Huston Township
Sandy Township
Pine Township
Union Township
Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
West Creek
Hicks Run
Dents Run
Trout Run
Bennett Branch
Byrnes Run
Medix Run
Laurel Run
Mix Run
Wykoff Run
First Fork
East Fork Sinnemahoning Creek
West Branch Susquehanna
McKean County
Potter County
Elk County
Cameron County
Clinton County
Clearfield County
Centre County
N
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E
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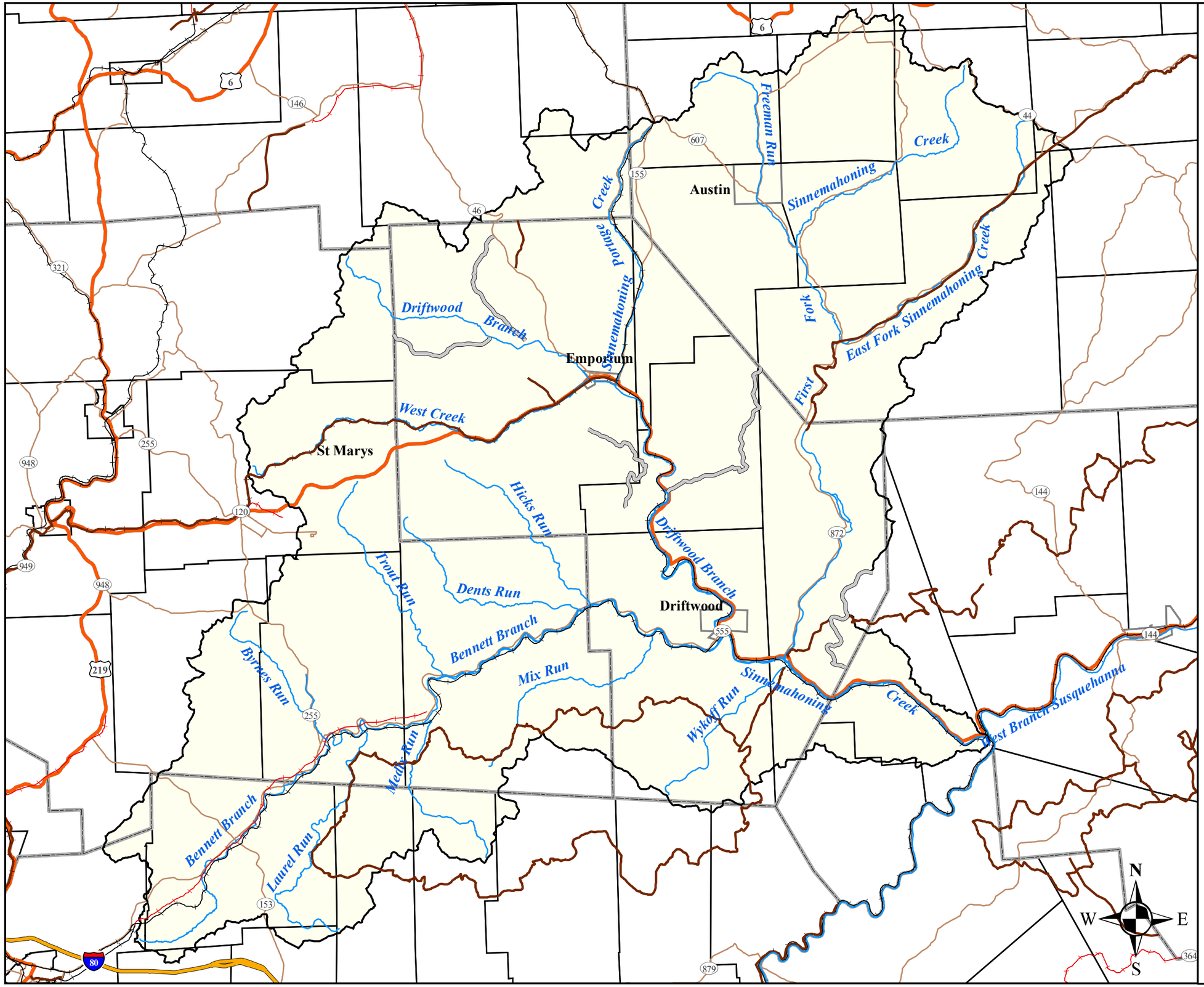
Figure 1-8
Transportation



- Snowmobile Trails
- Trails
- Active Railroads
- Inactive Railroads
- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Watershed Boundary

5 2.5 0 5 Miles

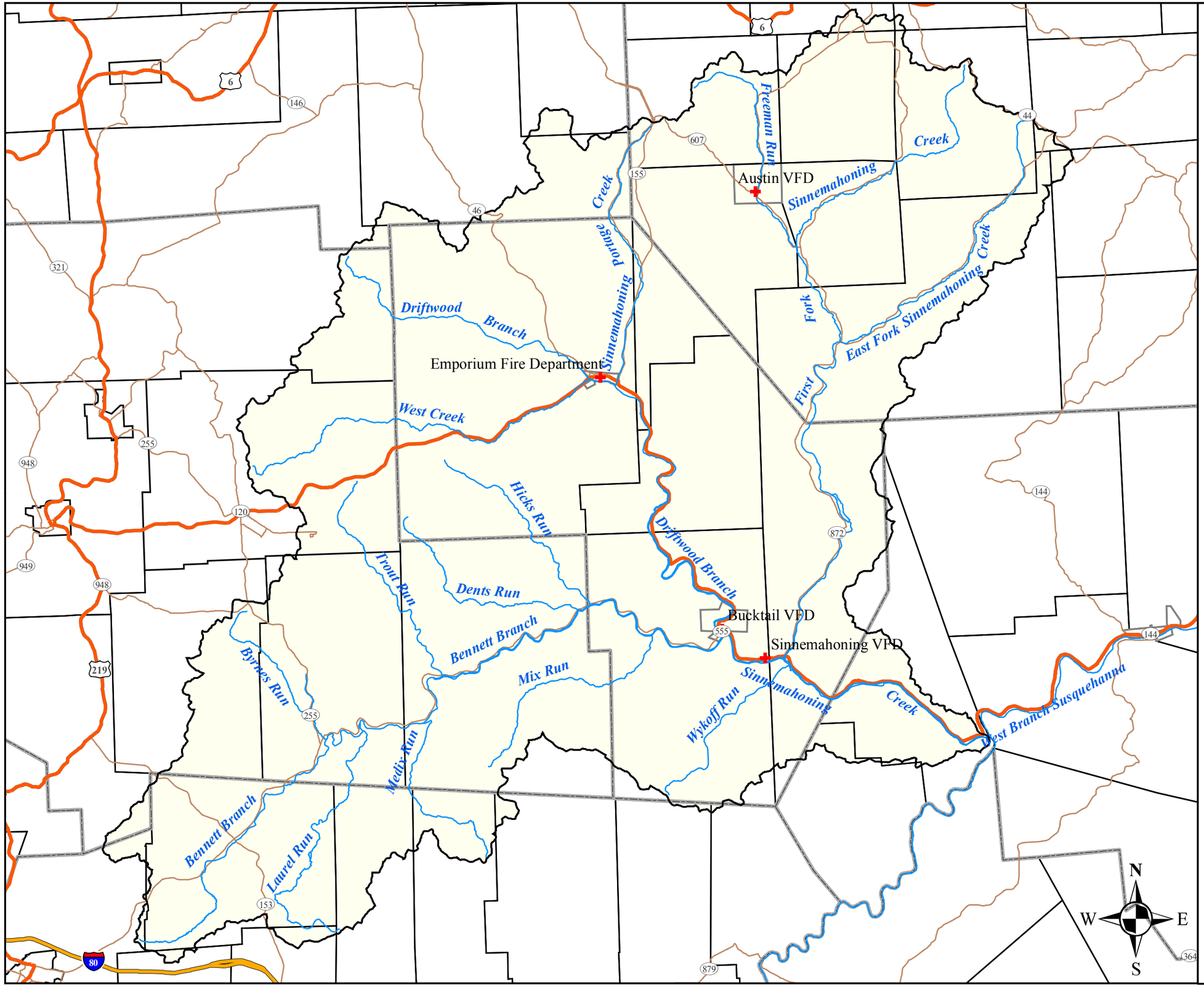
N W E S

Western Pennsylvania Conservancy

water, land, life.

Figure 1-10

Safety Features



Fire Departments

Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 2-1

Surface Geology

Streams

Counties of Pennsylvania

Allegheny Formation

Burgoon Sandstone

Casselman Formation

Catskill Formation

Glenshaw Formation

Huntley Mtn Formation

Lock Haven Formation

Pottsville Formation

Shenango- Oswayo

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

N

W E

S

Freeman Run

Sinnemahoning Creek

Creek

Sinnemahoning Portage Creek

Driftwood Branch

Sinnemahoning Creek

First Fork

East Fork Sinnemahoning Creek

West Creek

Hicks Run

Driftwood Branch

Trout Run

Dents Run

Bennett Branch

Byrnes Run

Mix Run

Meadix Run

Myskoff Run

Sinnemahoning Creek

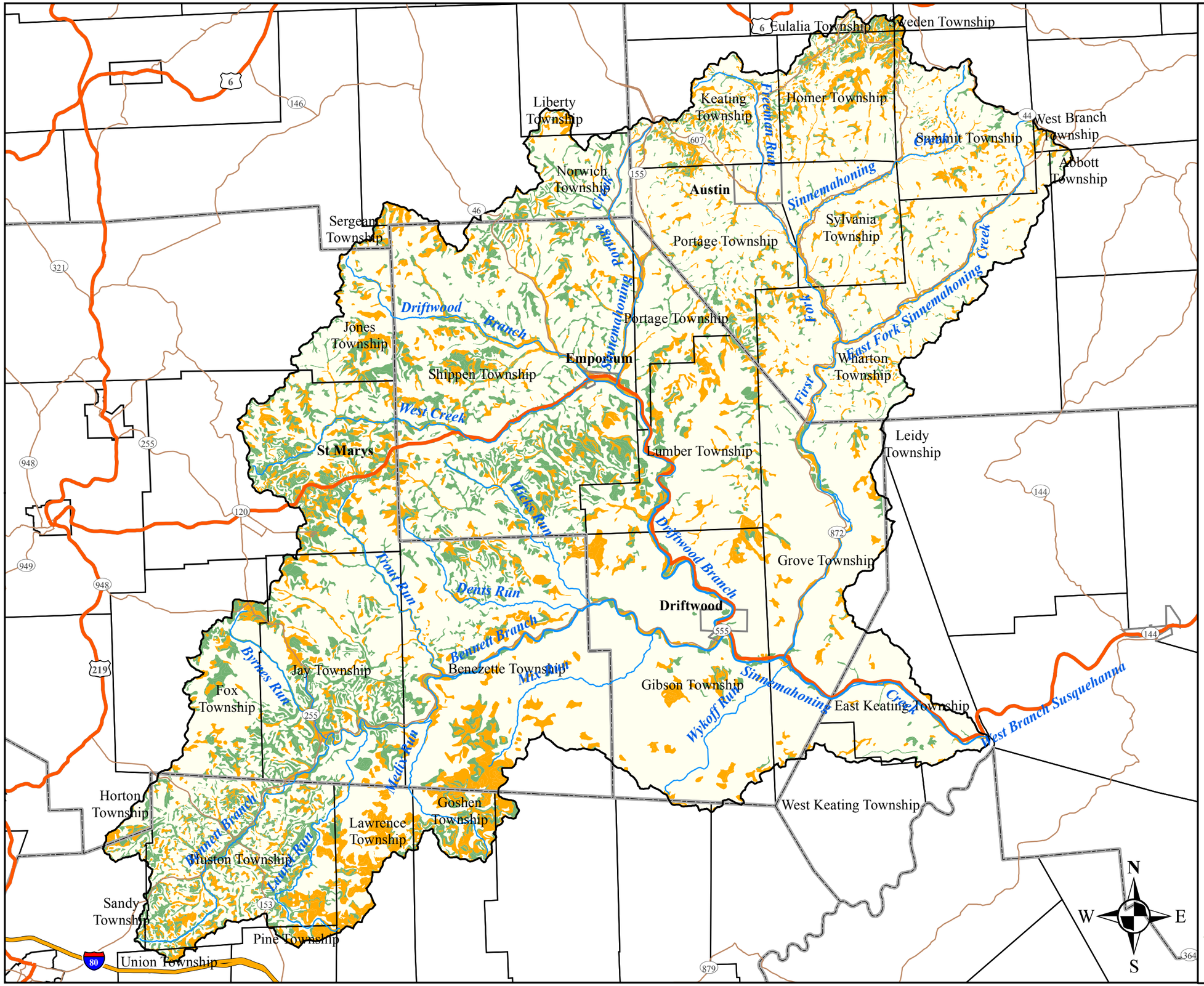
West Branch Susquehanna

Bennett Branch

Laurel Run

Figure 2-2

Agricultural Soils



Streams

Interstate

Highway

Major Road

Prime Farmland

Statewide importance

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 2-3

Land Use

- Streams
- Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Shrub
- Grasslands/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands
- Watershed Boundary

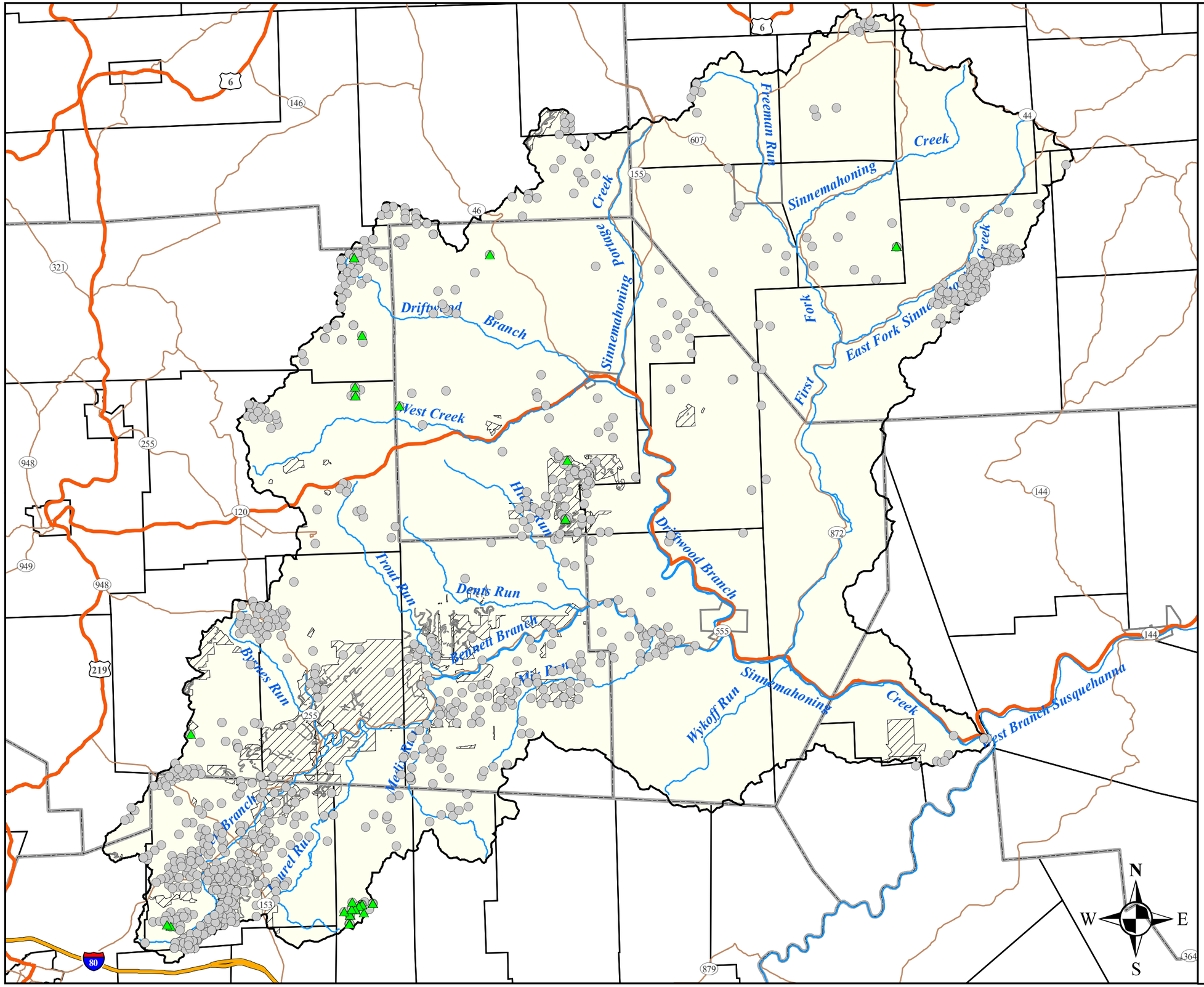
5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 2-4

Resource Extraction



- Recent Marcellus Wells
- Oil and Gas Wells
- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Abandoned Mine Lands
- Coal Mined Area
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 2-5

Managed Lands

Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

WPC Properties

State Park

Natural Wild Areas

State Forest

State Game Land

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

N

W E

S

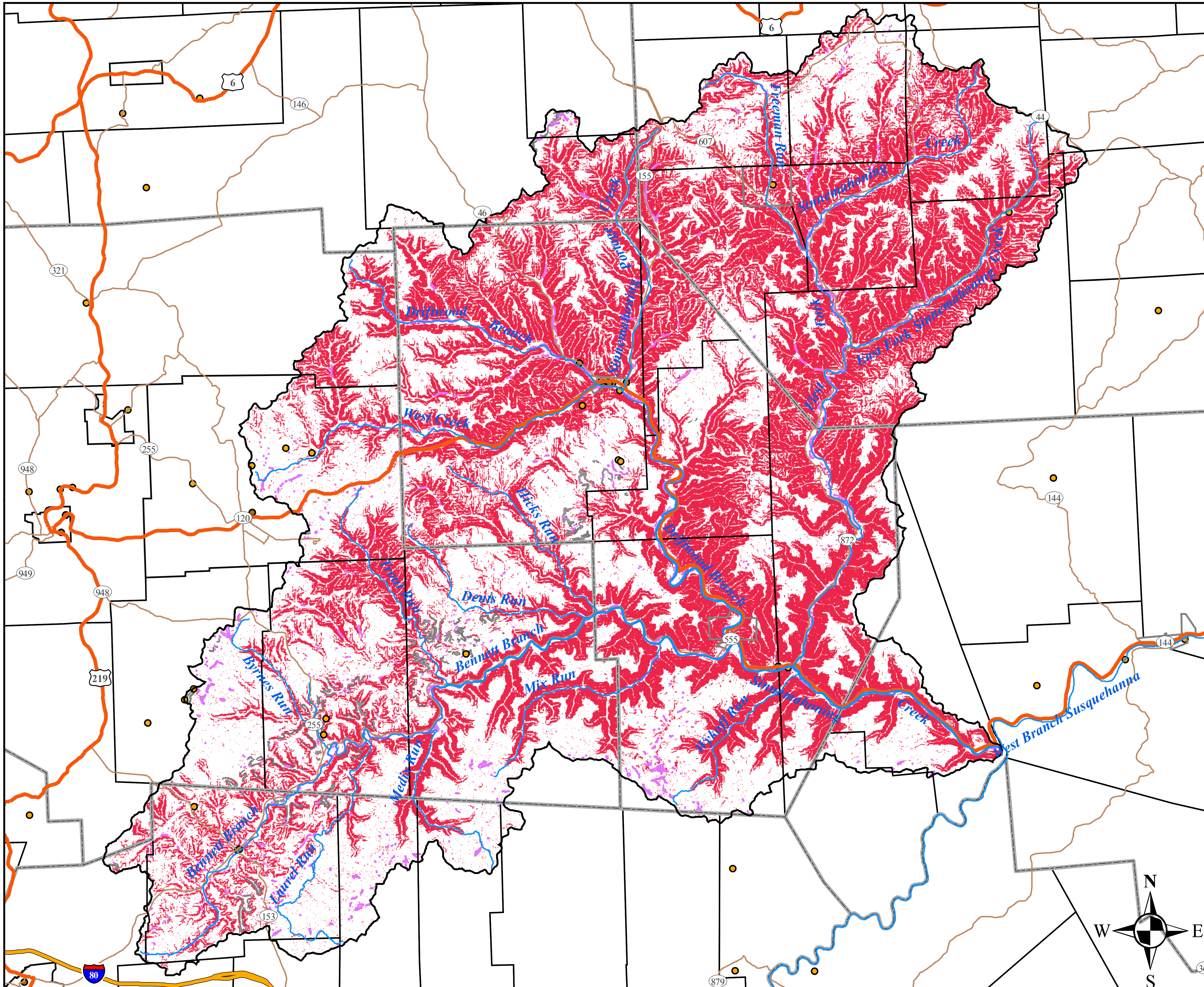


Figure 2-6

Environmentally Sensitive Areas

- Munic. Waste Operations
- Brownfields
- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Wetlands
- Abandoned Mine Lands
- Steep Slopes

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 3-1

Major Tributaries

Streams

Interstate

Highway

Major Road

Towns and Boroughs

Township Boundaries

Counties of Pennsylvania

Sinnemahoning Portage

Driftwood Branch

Bennett Branch

First Fork

Sinnemahoning Creek

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

N

W E

S

Eulalia Township

Sweden Township

Liberty Township

Keating Township

Homer Township

Summit Township

West Branch Township

Abbott Township

Norwich Township

Austin

Sylvania Township

Portage Township

Sergeant Township

Jones Township

Shippen Township

Emporium

Wharton Township

St Marys

Lumber Township

Leidy Township

Grove Township

Driftwood

Jay Township

Benezette Township

Gibson Township

East Keating Township

Fox Township

Horton Township

Huston Township

Lawrence Township

Goshen Township

West Keating Township

Sandy Township

Pine Township

Union Township

Freeman Run

Sinnemahoning Creek

Portage Creek

Driftwood Branch

Hicks Run

Trout Run

Dents Run

Bennett Branch

Byrnes Run

Medix Run

Laurel Run

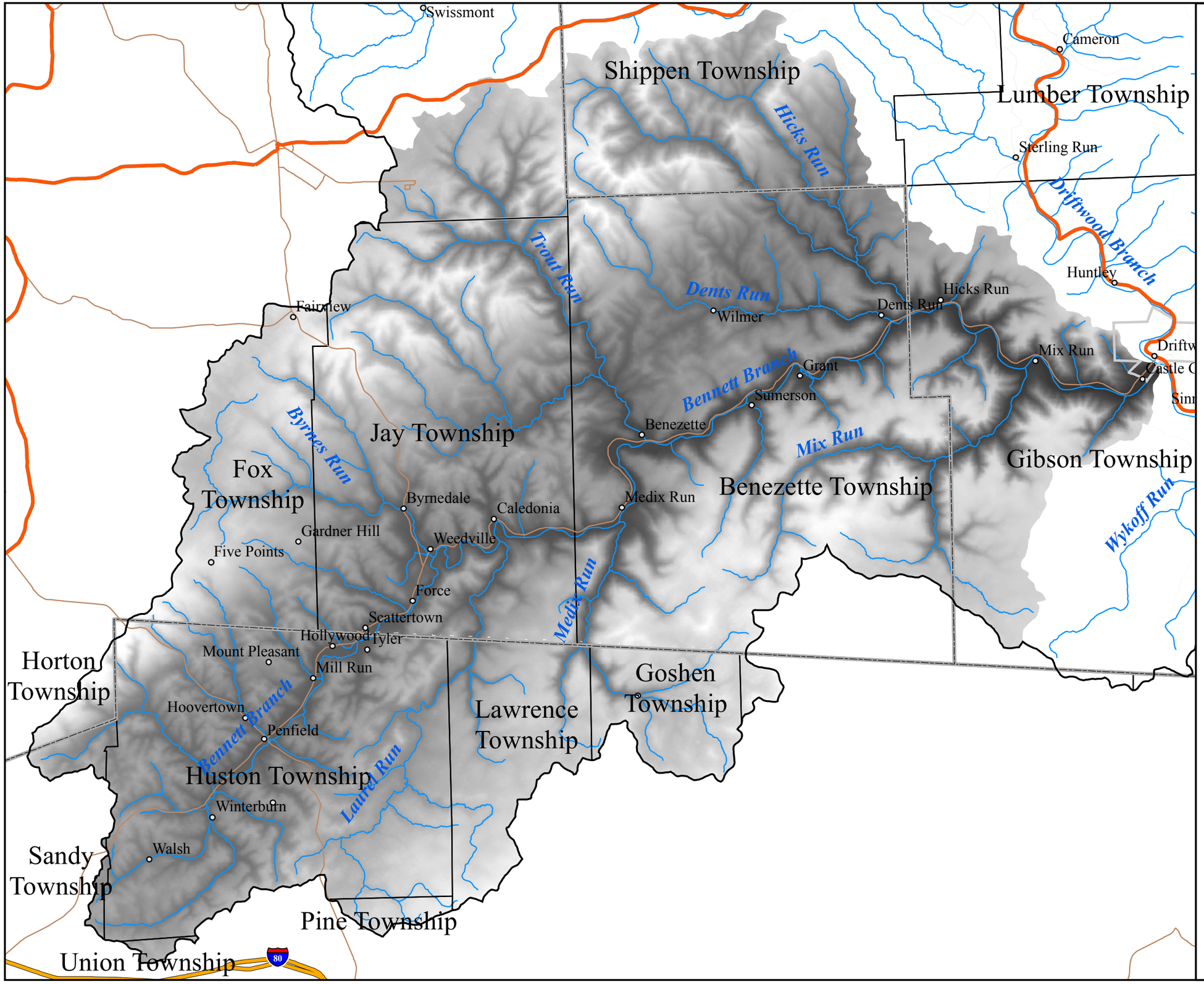
Wykoff Run

First Fork Sinnemahoning Creek

West Branch Susquehanna

Figure 3-2

Bennett Branch Subwatershed



Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

Watershed Boundary

3 1.5 0 3 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 3-3

Driftwood Branch Subwatershed

Liberty Township
Keating Township
Norwich Township
Sergeant Township
Portage Township
Jones Township
Wharton Township
Lumber Township
St. Marys
Shippen Township
Benezette Township
Gibson Township
Grove Township

Austin
Costello
Gardeau
Sizerville
Lawn View
Rich Valley
Lockwood
Emporium
Weber City
West Creek
Rathbun
Beechwood
Truman
Howard Siding
Swissmont
Cameron
Sterling Run
Driftwood
Castle Garden
Mix Run
Hicks Run
Dents Run
Wilmer
Grant
Fairview
Berge Run
First Fork
Lushba

Driftwood Branch
West Creek
Portage Creek
Sinnemahoning
Trout Run
Dents Run
Hicks Run
First Fork
Driftwood Branch

- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Watershed Boundary

3 1.5 0 3 Miles

N W E S

Western Pennsylvania Conservancy

water, land, life.

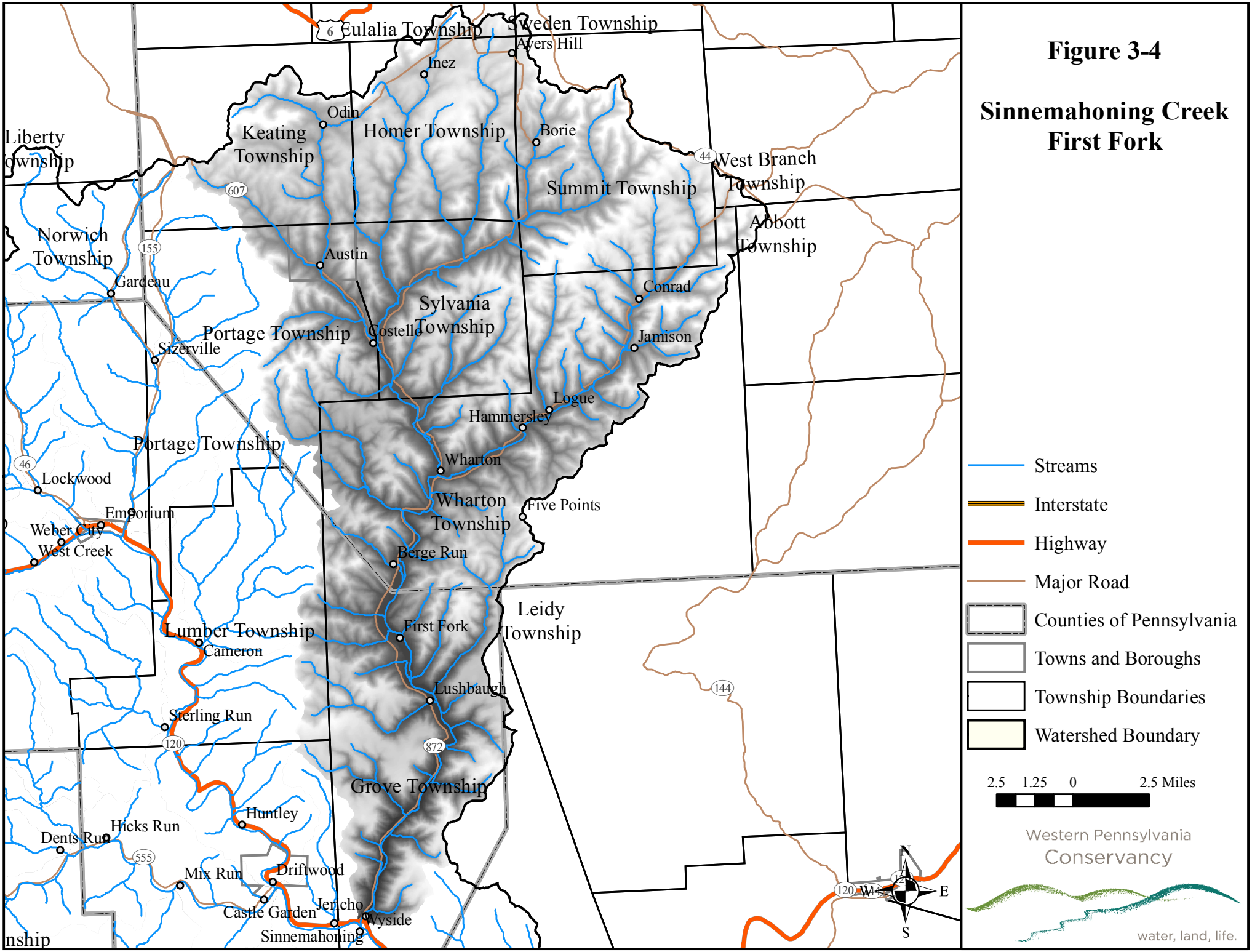


Figure 3-4
Sinnemahoning Creek
First Fork
Eulalia Township
Sweden Township
Ayers Hill
Inez
Odin
Keating Township
Homer Township
Borie
Liberty Township
West Branch Township
Summit Township
Abbott Township
Norwich Township
Austin
Gardeau
Conrad
Sylvania Township
Portage Township
Costello
Jamison
Sizerville
Logue
Hammersley
Portage Township
Wharton
Lockwood
Wharton Township
Five Points
Emporium
Weber City
West Creek
Berge Run
Leidy Township
Lumber Township
First Fork
Cameron
Lushbaugh
Sterling Run
Grove Township
Huntley
Hicks Run
Dents Run
Mix Run
Driftwood
Castle Garden
Jericho
Wyside
Sinnemahoning
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Watershed Boundary
2.5 1.25 0 2.5 Miles
N
W
E
S
Western Pennsylvania Conservancy
water, land, life.

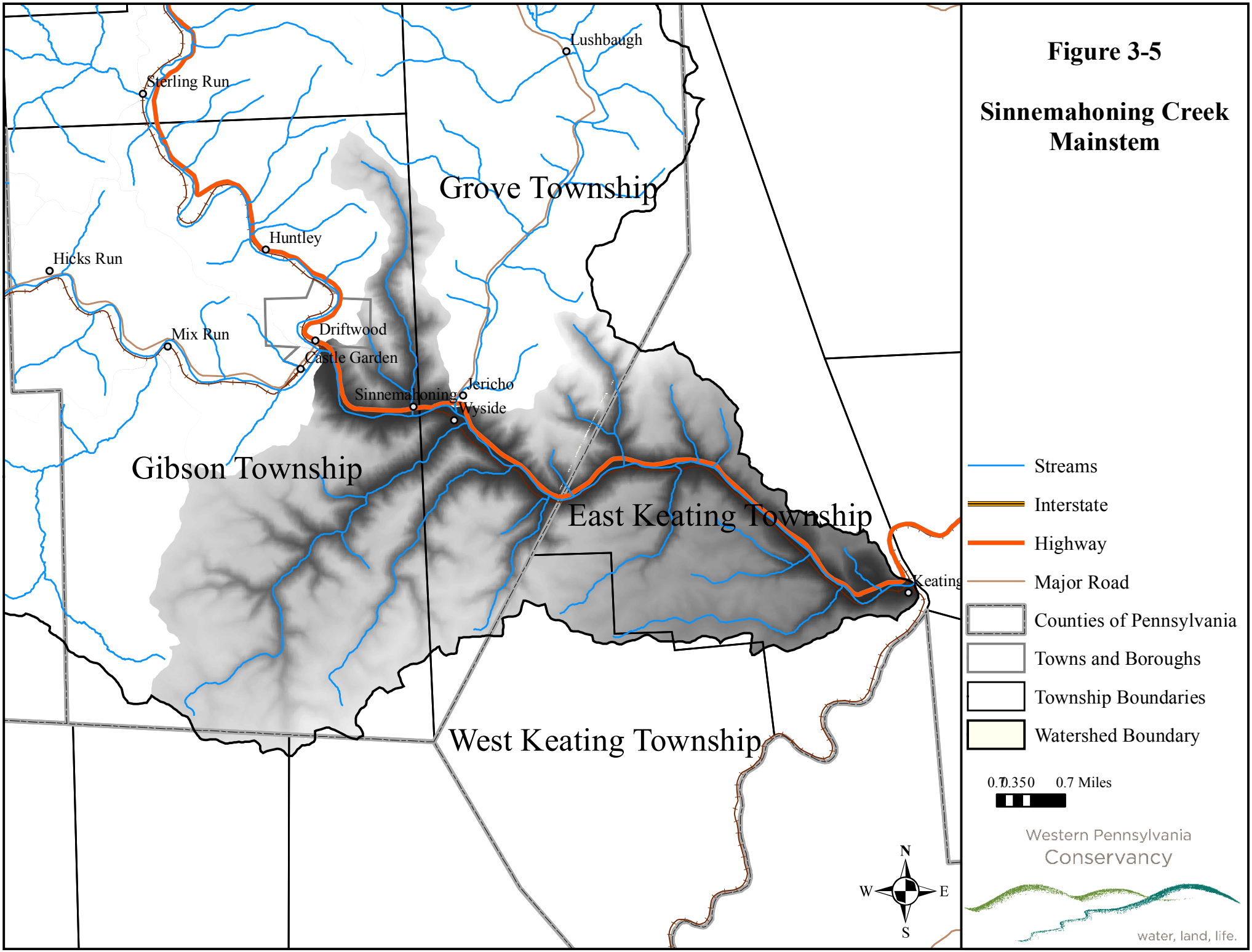
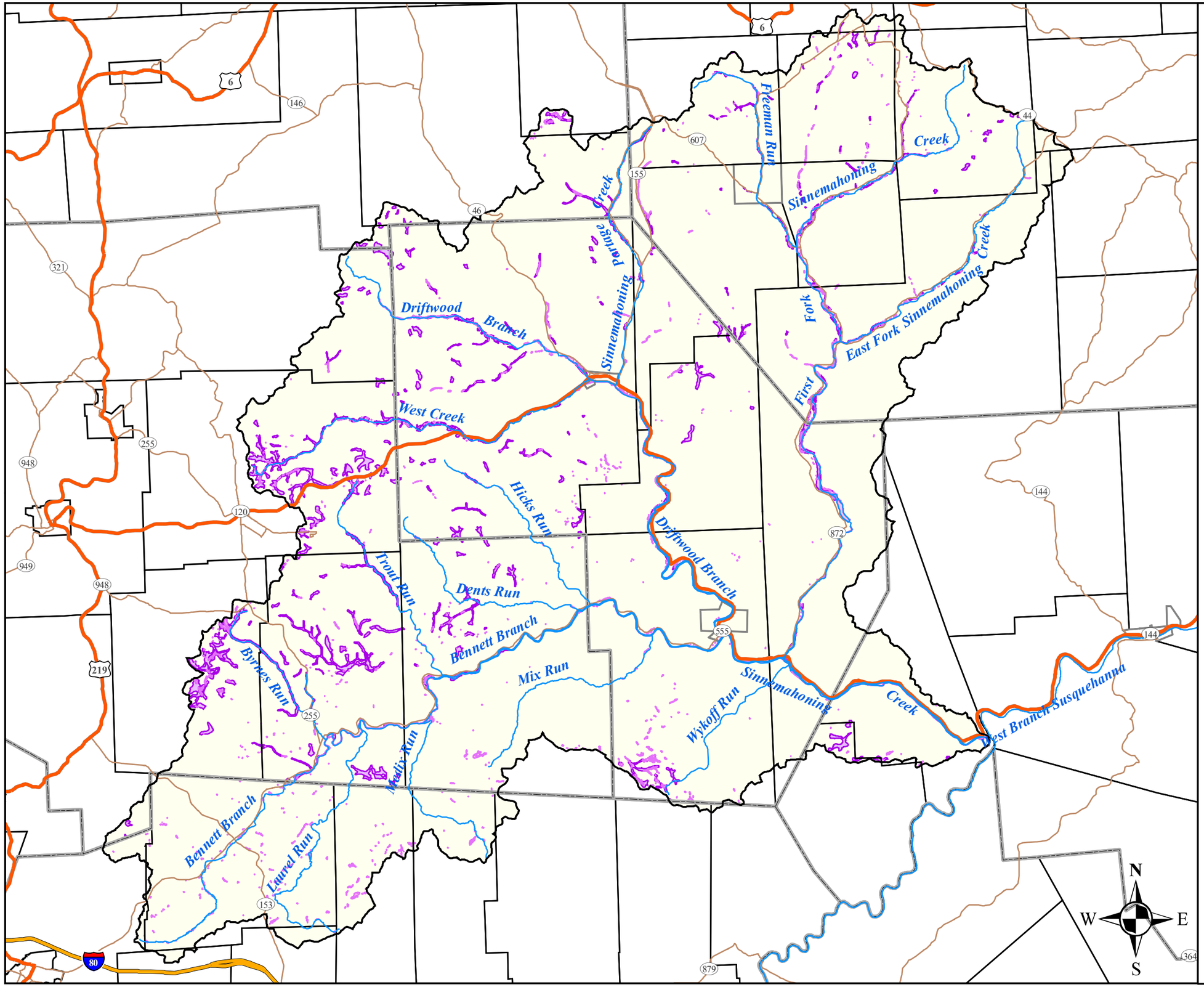


Figure 3-5
Sinnemahoning Creek Mainstem
Lushbaugh
Sterling Run
Grove Township
Huntley
Hicks Run
Mix Run
Driftwood
Castle Garden
Jericho
Sinnemahoning
Wyside
Gibson Township
East Keating Township
Keating
West Keating Township
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Watershed Boundary
0.7 0.35 0 0.7 Miles
N
W
E
S
Western Pennsylvania Conservancy
water, land, life.

Figure 3-6

Wetlands and Hydric Soils



- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Wetlands
- Hydric Soils
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 3-7

Impaired Waters

Impaired Streams

- Abandoned Mine Drainage
- Atmospheric Deposition
- Road Runoff - Siltation
- Mercury
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Unpaved Roads

Potential Agricultural Impacts

- Pasture/Hay
- Cultivated Crops
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

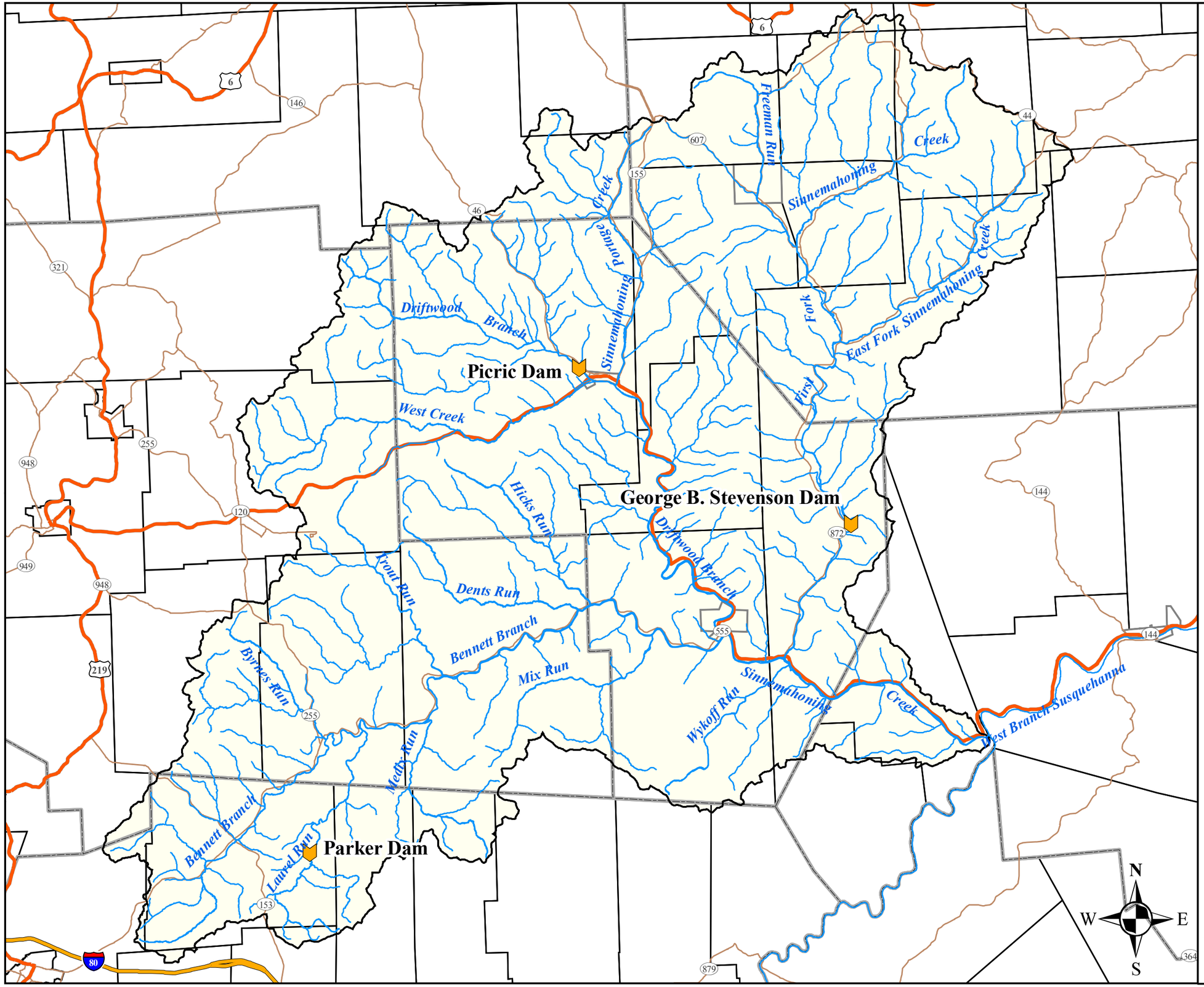
water, land, life.

N W E S

Freeman Run
Creek
Sinnemahoning
Portage Creek
Sinnemahoning
Driftwood Branch
First Fork
East Fork Sinnemahoning Creek
West Creek
Hicks Run
Driftwood Branch
Trout Run
Dents Run
Bennett Branch
Byrnes Run
Mix Run
Medix Run
Wykoff Run
Sinnemahoning Creek
West Branch Susquehanna
Bennett Branch
Laurel Run

Figure 3-8

Dams



Dams

Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

Watershed Boundary

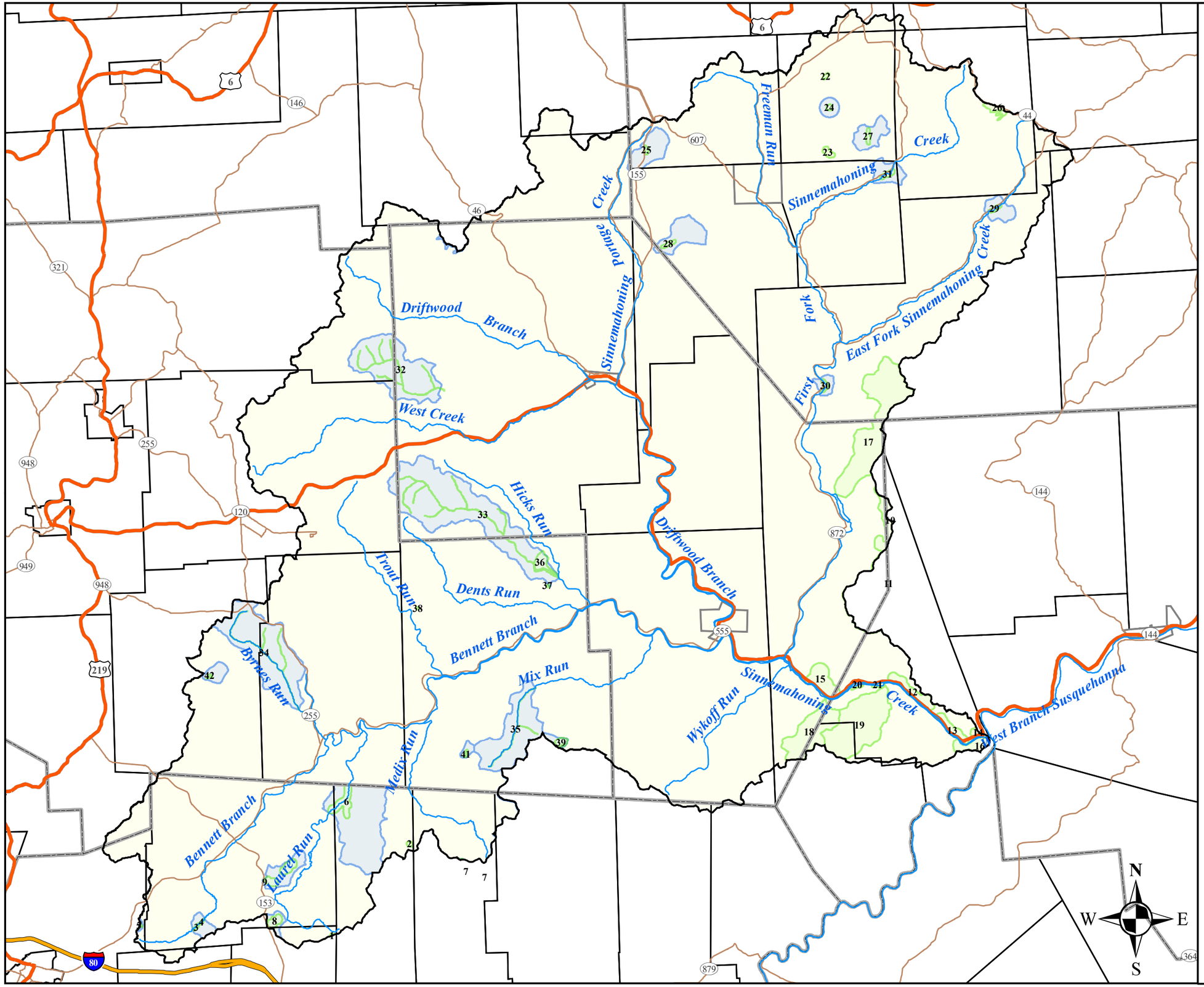
5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

Figure 4-1

Biological Diversity Areas



Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

BDA-Core

BDA-Supporting

Watershed Boundary

5 2.5 0 5 Miles

N

W E

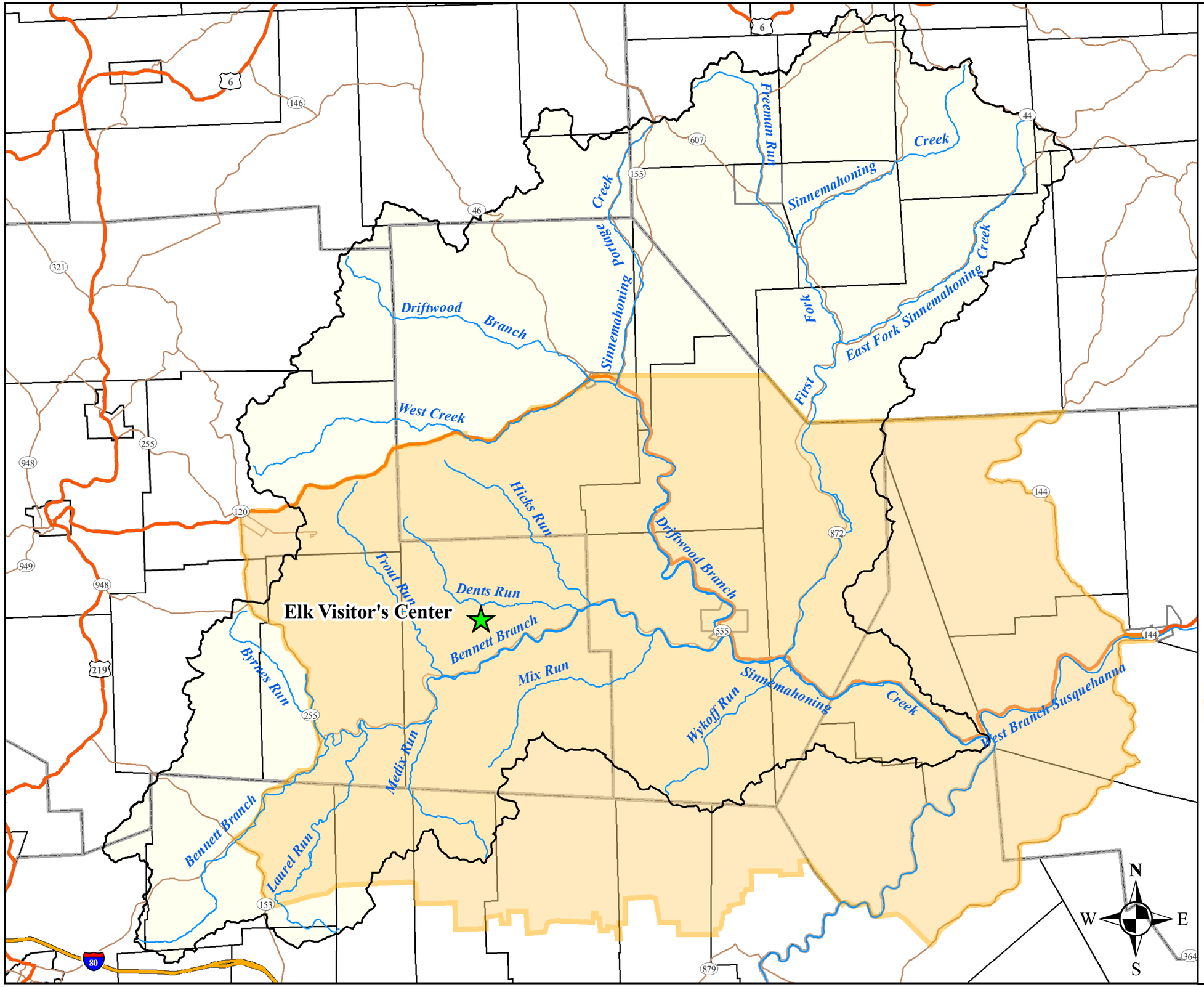
S

Western Pennsylvania Conservancy

water, land, life.

Figure 4-2

Pennsylvania Elk



Streams

Interstate

Highway

Major Road

Counties of Pennsylvania

Towns and Boroughs

Township Boundaries

Elk Herd Range

Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

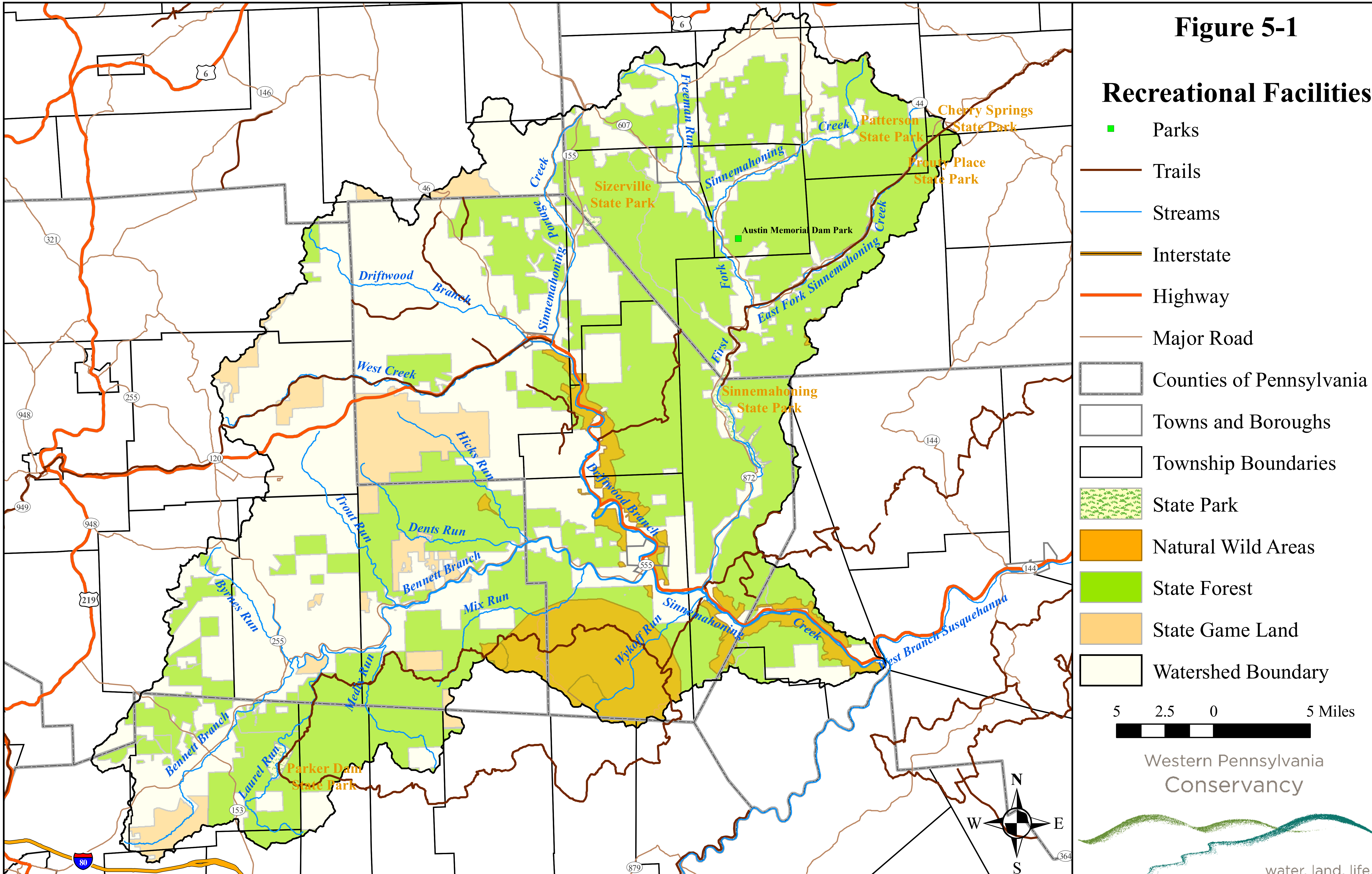


Figure 5-1
Recreational Facilities
Parks
Trails
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
State Park
Natural Wild Areas
State Forest
State Game Land
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
N
S
E
W
Cherry Springs State Park
Patterson State Park
Prouty Place State Park
Sizerville State Park
Austin Memorial Dam Park
Sinnemahoning State Park
Parker Dam State Park
Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
West Creek
Hicks Run
Trout Run
Dents Run
Bennett Branch
Mix Run
Byrnes Run
Medix Run
Laurel Run
Wykoff Run
Sinnemahoning Creek
East Fork Sinnemahoning Creek
First Fork
Driftwood Branch
West Branch Susquehanna
6
146
321
948
949
255
120
219
80
153
46
155
607
44
144
872
555
879
364

Figure 5-2

Fishing Opportunities

- Special Reg Streams
- Approved Trout Waters
- EV
- HQ
- CWF
- TSF
- WWF
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

N W E S

Austin
Emporium
St Marys
Driftwood
Freeman Run
Sinnemahoning Creek
East Fork Sinnemahoning Creek
First Fork
Driftwood Branch
Hicks Run
Dents Run
Bennett Branch
Mix Run
Wykoff Run
Trout Run
Byrnes Run
Medix Run
Bennett Branch
Laurel Run
West Branch Susquehanna

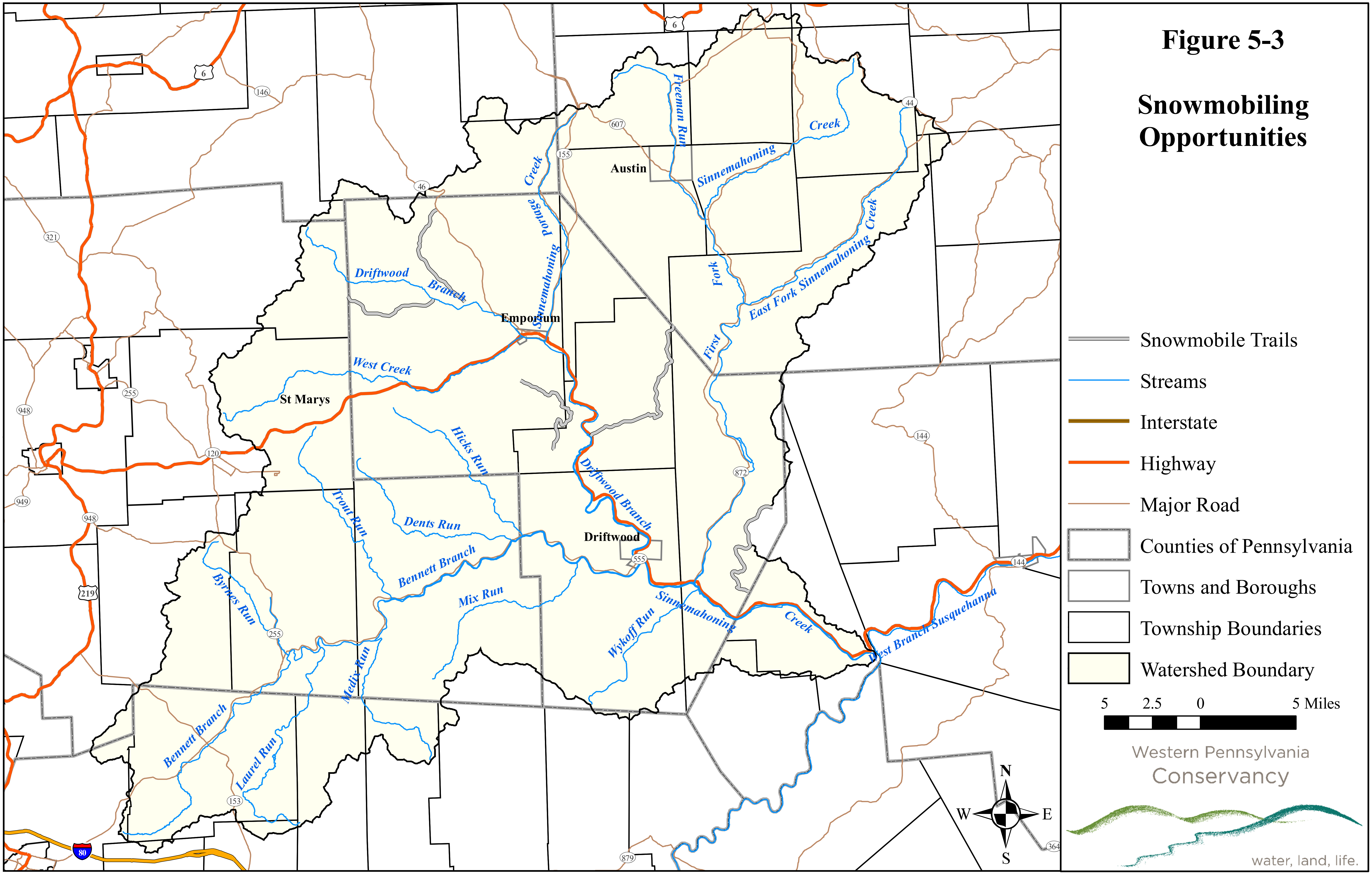


Figure 5-3
Snowmobiling Opportunities
Snowmobile Trails
Streams
Interstate
Highway
Major Road
Counties of Pennsylvania
Towns and Boroughs
Township Boundaries
Watershed Boundary
5 2.5 0 5 Miles
Western Pennsylvania Conservancy
water, land, life.
Austin
Emporium
St Marys
Driftwood
Driftwood Branch
West Creek
Hicks Run
Dents Run
Trout Run
Bennett Branch
Mix Run
Byrnes Run
Medix Run
Laurel Run
Wykoff Run
Sinnemahoning Creek
Portage Creek
Freeman Run
First Fork Sinnemahoning Creek
East Fork Sinnemahoning Creek
West Branch Susquehanna
N
S
E
W

Figure 5-4

Wildlife Viewing Areas

- Viewing Areas
- Elk Scenic Corridor
- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- State Park
- Natural Wild Areas
- State Forest
- State Game Land
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.

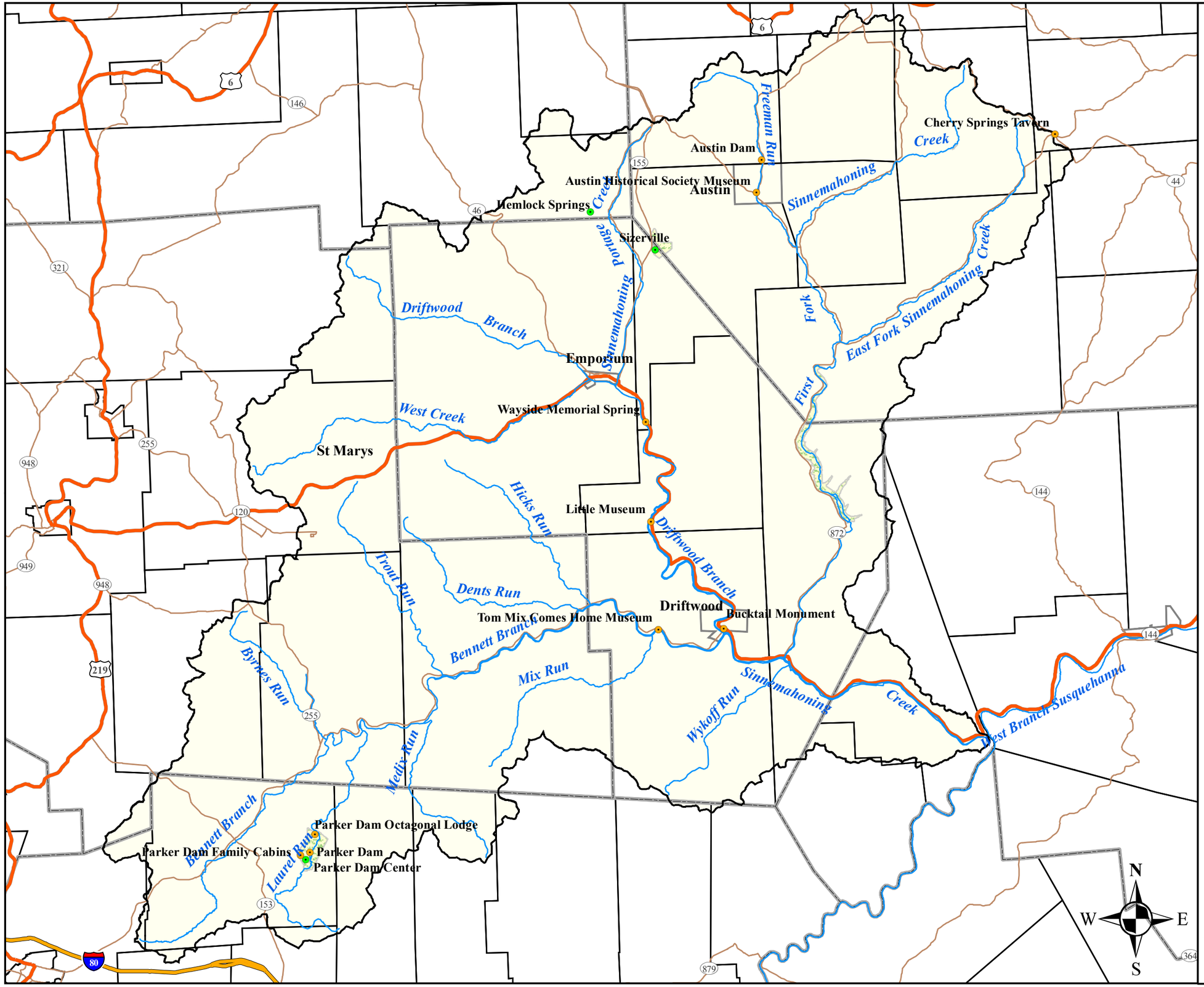
N W E S

Austin
Emporium
St Marys
Driftwood
Hicks Run
Winslow Hill
Shagger's Inn
Beaver Run Dam

Freeman Run
Sinnemahoning Creek
Portage Creek
Driftwood Branch
First Fork Sinnemahoning Creek
West Branch Susquehanna
Hicks Run
Dents Run
Trout Run
Bennett Branch
Mix Run
Byrnes Run
Medix Run
Wykoff Run
Laurel Run

Figure 5-5

Local Attractions and Historical Sites



- Environmental Ed. Sites
- Historic Sites
- Streams
- Interstate
- Highway
- Major Road
- Counties of Pennsylvania
- Towns and Boroughs
- Township Boundaries
- State Park
- Watershed Boundary

5 2.5 0 5 Miles

Western Pennsylvania Conservancy

water, land, life.