

Determining which environmental characteristics that should be preserved is an important step in the development of a municipal or regional comprehensive plan. Due to the relatively small area of this regional project (Greenville Borough and Hempfield Township have a combined land area of approximately 16 square miles), it is essential to identify these natural features and develop recommendation for their protection and conservation.

## **Existing Conditions**

### Topography and Steep Slopes

Rolling hills and sometimes steep topography characterizes this portion of Pennsylvania as a result of the many streams and creeks cutting through the rugged plateau. The topographic relief, or slope of the region, ranges from 1,373 ft on the highest hilltop to 930 ft at the Shenango River.

Slopes greater than 25% are located throughout the study corridor. In Greenville, they are primarily located along the left downstream bank (ldb) of the Little Shenango and Shenango Rivers. In Hempfield Township, steep slopes are located along both banks of the Little Shenango River, along both banks of Saul Run just east of the Greenville/Hempfield Township boundary, along both banks of Mathay Run just southeast of the Greenville/Hempfield Township boundary, and several isolated areas in Hempfield Township. Refer to Figure 8-1 for detailed steep slope locations.

### Geology

Pennsylvania is divided into numerous physiographic provinces. A province is defined as a region in which all parts are similar in geologic structure, climate, relief, and have a unified geomorphic history. The study area is located in the Northwestern Glaciated Plateau Section of the Appalachian Plateau Province. This province covers much of western and southwestern Pennsylvania including all of Mercer, Erie, Crawford, Butler Counties and most of the numerous other counties within the region.

Deep, steep-sided, linear valleys that are partially filled with glacial deposits characterize this section. The uplands are broad and rounded.

The geological formations underlying the study area province can be broken into three periods: Pennsylvanian, Mississippian, and Mississippian and Devonian. Each of these periods represents a different time period in the Earth's geologic history. The specific rock groups and their locations are as identified in Table 8-1:

Table 8- 1 Specific Rock Groups and Formations

Period	Formation	Description	Location
Pennsylvanian	Pottsville Group	Predominantly gray sandstone and conglomerate; also contains thin beds of shale, claystone, limestone, and coal; includes Olean and Sharon conglomerates of northwestern Pennsylvania; thin marine limestones present in Beaver, Lawrence, and Mercer Counties; minable coals and commercially valuable high-alumina clays present locally.	Small scattered areas along SR 358 and in the southeastern portion of the study area.
Mississippian	Shenango Formation	Light-gray sandstone and some beds of medium-gray shale and siltstone; upper third of formation is more shaly; contains a few marine fossils.	Northern and western areas of the study area.
Mississippian	Cuyahoga Group	Medium-gray siltstone and dark-gray shale containing interbedded light-gray, flaggy sandstone. Includes, in descending order: Meadville Shale, Sharpsville Sandstone, and Orangeville Shale; marine fossils common.	Central portion of study area.
Mississippian and Devonian	Berea Sandstone Through Venango Formation, Undivided	Greenish-yellow and gray sandstone, siltstone, and shale succession, becoming more shaly and more gray downward; bottom of interval is bottom of Panama Conglomerate; Includes, in descending order: Berea sandstone, Bedford Shale, Cussewago Sandstone, Riceville Shale, and Venango Formation equivalent; contains marine fossils.	Along the Shenango River valley.

### Mine Subsidence

Mine subsidence is defined by the Pennsylvania Department of Environmental Protection (PADEP) as the movement of the ground surface as a result of the collapse or failure of underground mine workings. In active underground mining methods, subsidence can occur

concurrently with the mining operation in a predictable manner; however, in abandoned mines, it is virtually impossible to predict if, and when, subsidence would occur.

According to the PADEP, if a site or area has been undermined, there is always potential for mine subsidence. Currently, no methods exist to accurately predict the probability of an area to subside. More general information regarding mine subsidence, including information on mine subsidence insurance, is available on the PADEP Mine Subsidence Internet site ([www.pamsi.org](http://www.pamsi.org)).

### Soils

Soil is produced through the interaction of five natural forces: climate, plant and animal life, parent material, topographic relief, and time. The degree and influence of each of these factors differ from place to place and influence characteristics of the soil.

General knowledge of the soil associations within an area is useful for planning. These associations can provide background information for determining suitable land uses for land tracts. In addition, this information is useful for watershed management, forestland management, and community development.

Two soil associations exist within the project area. The area along the Shenango River is within the Canfield-Ravenna association. This association is moderately well drained and somewhat poorly drained, gently sloping to moderately steep soils underlain by glacial till. This type of soil is typically found on strongly sloping parts of uplands near major streams. Most of the steeper areas are forested, while the less steep parts are used for farming. Some constraints related with this association include slowly permeable subsoil in the major soils and a seasonal high water table in some areas. However, the steeper areas along the streams could offer possibilities for passive recreation.

The remaining area of Greenville and Hempfield are within the Ravenna-Frenchtown association. This association is somewhat poorly drained to poorly drained, nearly level to gently sloping soils formed in glacial till. Many narrow streams dissect the scattered hills and rolling plains. Some areas within this association that are very wet and steep are forested areas, while some other areas have reverted to grass or scrubby trees. Constraints related to this association are a high water table and restricted permeability.

#### *Prime Agricultural*

Areas of prime agricultural land exist within the study area. The definition of “prime agricultural land” in Pennsylvania, according to Executive Order 2003-2 signed in 2003, is as follows:

- a) in active agricultural use (not including growing timber);
- b) lands devoted to active agricultural use the preceding three years; and
- c) fall into at least one of the categories of land – State agencies shall provide protection to “prime agricultural land” under this Executive Order based upon the following levels of

priority:

1. Preserved Farmland (Highest Priority)
2. Farmland in Agricultural Security Areas (Second Highest Priority)
3. Farmland enrolled in Act 319 of 1974, As Amended (Clean and Green) or Act 515 of 1996, As Amended (Third Highest Priority)
4. Farmland Planned for Agriculture Use and Subject to Effective Agricultural Zoning (Fourth Highest Priority)
5. Land Capability Classes I, II, III, and IV Farmland and Unique Farmland (Fifth Highest Priority)

Refer to Figure 8-1 for locations of prime agricultural soil.

### Streams

The major landscape feature for water resource studies is the watershed boundary. A watershed is defined by the US Environmental Protection Agency (USEPA) as the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake, or groundwater. Because watersheds are defined by natural hydrology, they represent the most logical basis for managing water resources. The resource becomes the focal point, and managers are able to gain a more complete understanding of overall conditions in an area and the stressors, which affect those conditions. This entails a strategy that crosses municipal boundaries and requires a great deal of coordination, cooperation, and communication within and between municipalities sharing the same watershed.

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. Watersheds are delineated based on topography and ridgelines. Every stream has an individual watershed. Large watersheds such as the Shenango River can be divided into smaller watersheds, such as the Little Shenango or Mathay Run watershed. If an unnamed tributary (UNT) flows directly into the Shenango River, then it is part of the Shenango River watershed. If an UNT flows into the Little Shenango River, then it is part of the Little Shenango River watershed. Therefore, the UNTs located on the mapping are all a part of the larger Shenango River watershed.

Within the two municipalities, a total of four watersheds exist and both Greenville and Hempfield share all four. Table 8-2 lists general characteristics of the watersheds:

**Table 8- 2 Streams in the Greenville Borough/Hempfield Township Study Area**

Stream Name	River Mile	Municipality	Drainage Area (mi <sup>2</sup> )	DEP Classification*
Shenango River	21.42	Greenville, Hempfield	1,062	WWF (TON addition)
Little Shenango River	59.14	Greenville, Hempfield	109	TSF
Mathay Run	57.94	Greenville, Hempfield	5.77	WWF
Saul Run	0.63	Greenville, Hempfield	1.85	WWF

\* As designated by Pennsylvania Department of Environmental Protection Chapter 93 Water Quality Standards; TSF = Trout Stocked Fishery; WWF = Warm Water Fishery; CWF = Cold Water Fishery; TON = Threshold Odor Number

The **Shenango River**, forming the largest watershed in the area, originates in Crawford County, flows south until it enters the Beaver River south of New Castle in Lawrence County. According to the Chapter 93 Water Quality Standards, the PADEP designates this river as a Warm Water Fishery (WWF), meaning that this type of stream maintains and propagates fish species and additional flora and fauna that are indigenous to a warm water habitat. The Shenango River also has maintains a specific criteria designation for its most sensitive critical use (recreational) – the Threshold Odor Number (TON) of 24 at 60 degrees Celsius.



**Shenango River – Excellent Riparian Buffer (Mackin, 2003)**

Riparian buffers, areas of vegetation on and near the shore of a body of water, are extremely important to the stability of the ecosystem for numerous reasons. Riparian buffers function to slow the rate of streambank erosion, reduce the sediment and pollution that enters the stream from the surrounding uplands, and provide cover and habitat for many plants and wildlife. In the less urbanized Hempfield Township, areas of stable riparian buffer exist along the Shenango River; however, where the Shenango flows through Greenville Borough, streambank vegetation is lacking to perform the aforementioned functions.



**Shenango River – Impaired Riparian Buffer (Mackin, 2003)**

Non-Point Source (NPS) pollution is the greatest source of water quality degradation within the United States because it is difficult to measure and highly variable. These are sources that cannot be traced to a specific point of discharge or origin. NPS pollution is typically the result of adjacent land uses including storm water runoff, sedimentation, abandoned mine drainage, and lack of vegetated stream banks. Some sort of NPS pollution impacts many of the streams in the project area, and specific sources are identified and addressed throughout this section of this plan.

Sedimentation, a form of NPS pollution, may result from stream bank agricultural runoff, construction site encroachments, stream bank erosion, and sewage effluent. An excess of sediments can cause severe damage to aquatic ecosystems. Stream channels accumulate sediments resulting in an increased potential for flood events, which in turn creates an increase in stream bank erosion. Sediments can also result in increased turbidity or cloudiness of the waterway. Damage to aquatic life is also a result of sedimentation, including destruction of habitats, smothering of plant life, and clogging of gills on fish. Water treatment plants can also be affected by this accumulation through a reduction in storage capacity, a decrease in water quality, and blockage of pipes in the system.

Point source pollution, also known as end of the pipe discharge, occurs when the pollutant involved can be traced to one definable source. Typically these pollutants include industrial discharges and sewage discharges. Since there are areas without sewage service within these municipalities, there is a possibility that point source pollution affects the streams in the area.

The Shenango River lies within the Shenango River Biological Diversity Area (BDA) as designated by the Western Pennsylvania Conservancy in the Mercer County Natural Heritage Inventory. A discussion of this BDA follows in the Ecological Habitats section of this plan.

The **Little Shenango River** originates in New Vernon Township, Mercer County. It flows west where it enters the Shenango River north of Greenville Borough. According to the PADEP Chapter 93 Water Quality Standards, the Little Shenango holds a designation of Trout Stocked Fishery (TSF), meaning that this stream provides for the maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna, which are indigenous to a warm water habitat. It is also designated as Approved Trout Water by the Pennsylvania Fish and Boat Commission (PFBC), which means that the stream meets criteria qualifying it to be stocked with trout by the PFBC.



Little Shenango River (Mackin, 2003)

The riparian buffer along much of the Little Shenango River in Greenville Borough and Hempfield Township appears to have sufficient vegetation to provide the necessary functions to maintain the quality of the water. Streambank erosion does not appear to be an issue on the Little Shenango River.

The section of the Little Shenango River in Greenville Borough and Hempfield Township is also within the Shenango BDA as designated by the Mercer County Natural Heritage Inventory.



**Mathay Run (Mackin, 2003)**

**Mathay Run** is a small watershed with a 5.77 square mile drainage area. The headwaters begin in Otter Creek Township and flow west for approximately 4.5 miles where they enter the Shenango River south of the former Trinity Industries site. PADEP Chapter 93 Water Quality Standards designate this stream as a WWF.

A field view was conducted to review the stream conditions of Mathay Run. Sediment deposition is minimal; gravel, cobble, and boulder particles are evident. Little to no signs of streambank erosion are present. In addition, the riparian buffer area contains sufficient vegetation to protect the streambank and the quality of the water.

**Saul Run** is the smallest watershed in the project area with a drainage area of 1.85 square miles. The headwaters begin in the eastern area of Hempfield Township and flow west for approximately 2.5 miles where it enters Mathay Run south of the Greenville Borough boundary. The PADEP has classified Saul Run as a WWF.

A field view was conducted to review the stream conditions of Saul Run. The streambed is in good condition with little sediment deposition and an abundance of gravel, cobble, and boulder particles. The riparian buffer has adequate vegetation to provide streambank stabilization and toxicant retention. Several all terrain vehicle (ATV) trails were noted adjacent to Saul Run.



**Saul Run (Mackin, 2003)**

### Floodplains

The one hundred and five hundred-year floodplains are generally narrow and restricted by the steep slopes that border some of the corridor. Still, there are areas at great risk for flooding at locations adjacent to the Shenango River, especially east of the river in Greenville and east Hempfield Township. In addition, flood prone areas are located along both banks of the Little Shenango River and along an unnamed tributary (UNT) to Mathay Run in Hempfield Township.

Flood management and insurance rates are coordinated through the National Flood Insurance Program. This program, which was established by the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973, was an effort to reduce the damage and hazards associated with flood events. To accomplish these goals, the Federal Emergency Management Agency (FEMA) conducts routine flood insurance studies, which investigate the severity and

existence of flood hazards throughout the country. The results of these studies are then used to develop risk data that can be applied during land use planning and floodplain development.

In addition to the flood hazard data provided by FEMA, the National Weather Service (NWS) operates river forecast points at several locations along the River. River stage information is available through recorded messages, the NWS Internet site ([www.nws.noaa.gov/er/pitt](http://www.nws.noaa.gov/er/pitt)), and the National Oceanic and Atmospheric Administration (NOAA) weather radio. Army Corps of Engineers (ACOE) also maintains copies of FEMA studies and related flood hazard investigations. This information as well as other flood hazard assistance is available through the ACOE, Pittsburgh District Office.

### Wetlands

Wetlands can be defined as transitional layers between terrestrial and aquatic environments where the water table often exists at or near the surface, or the land is inundated by water (Cowardin, Carter, Golet, LaRoe, 1979). As such, wetlands frequently exhibit a combination of physical and biological characteristics of each system. Three factors are recognized as criteria for wetland classification: the presence of hydric soils; inundation or saturated conditions during part of the growing season; and a dominance of water-loving vegetation (Environmental Laboratory, 1987). Wetlands perform many valuable functions for a community, such as water retention, sediment trapping, toxic material retention, flood flow alteration, and wildlife and aquatic habitat.



**Open Water Wetland (Mackin, 2003)**

Over 20 National Wetlands Inventory (NWI) wetlands are located within the study area. The Shenango River itself is designated as a riverine wetland. Riverine wetlands can occur on floodplains and riparian corridors that are closely associated with waterways. Within Hempfield Township, a large wetland system is located adjacent to the intersection of Williamson Road and Hadley Road. This large wetland system is located on property presently owned by the Greenville Water Authority; however, the water authority is currently attempting to sell this property.

### Ecological habitats

Because Greenville Borough is mostly developed, wooded forestland is almost non-existent. However, Hempfield Township has an abundance of agricultural and forested areas. Both municipalities fall within the Great American Hardwood Forest – Appalachian Region. Large forested areas provide the backbone that link habitats and allow plant and animal populations to shift and move across sizable portions of the landscape.

In addition to large forested tracts being essential to wildlife habitats, riparian buffers are crucial to the quality of a stream. A riparian forest buffer is defined as an area of trees, usually accompanied by a scrub/brush component and other vegetation that is adjacent to a body of water. Many of these buffers have been eliminated from streams and rivers in the region.

According to the Mercer County Natural Heritage Inventory, two areas in both Greenville Borough and Hempfield Township are identified as “Natural Heritage Areas”: the Shenango River Biological Diversity Area (BDA) and the Shenango River Landscaped Conservation Area (LCA). A BDA is an area containing plants or animals of special concern at state or federal levels, exemplary natural communities, or exceptional native diversity. An LCA is a large contiguous area that is important because of its size, open space, habitats, and/or inclusion of one or more BDAs.

The Shenango River BDA covers a linear swath along the Shenango River and the Little Shenango River in Greenville Borough and Hempfield Township. Because of the various land uses along these rivers in the two municipalities, habitat discontinuities exist along the riparian corridor. Greenville Borough contributes to urban runoff to the river in the form of roads and industrial sites. In addition, agricultural areas contribute to run off as well. Fifteen species of special concern have been known to occur within the Shenango River BDA. Their identity and location will not be identified in this comprehensive plan to protect the species and their habitats.

The species of special concern known to occur in Mercer County are identified in Table 8-3.

Table 8-3 Special Concern Plants and Animals of Mercer County

SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME	COMMON NAME
<i>Agalinus paupercula</i>	Small Flowered False Foxglove	<i>Culea inconstans</i>	Brook Stickleback
<i>Alopecurus aequalis</i>	Short-awn Meadow Foxtail	<i>Epioblasma triquetra</i>	Snuffbox
<i>Alisma triviale</i>	Broad-leaved Water Plantain	<i>Etheostoma camurum</i>	Bluebreast Darter
<i>Carex diandra</i>	Lesser Panic Led Sedge	<i>Etheostoma maculatum</i>	Spotted Darter
<i>Carex disperma</i>	Soft-Leaved Sedge	<i>Etheostoma Tippecanoe</i>	Tippecanoe Darter
<i>Carex prairea</i>	Prairie Sedge	<i>Fusconiaia subrotunda</i>	Long-Solid
<i>Carex typhina</i>	Cat-tail Sedge	<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Cypripedium parviflorum</i>	Yellow Lady's Slipper	<i>Ichthyomyzon bdellium</i>	Ohio Lamprey
<i>Eleocharis elliptica</i>	Elliptic Spike Rush	<i>Ichthyomyzon greeleyi</i>	Mountain Brook Lamprey
<i>Eleocharis quadrangulata</i>	Four-Angled Spike Rush	<i>Ixobrychus exilis</i>	Least Bittern
<i>Epilobium strictum</i>	Downy Willowherb	<i>Labidesthes sicculush</i>	Brook Silverside
<i>Filipendula rubra</i>	Queen-of-the-Prairie	<i>Lasmigona compressa</i>	White Heelsplitter
<i>Juncus torreyi</i>	Torrey's Rush	<i>Lepomis gulosus</i>	Warmouth
<i>Najas gracillima</i>	Bushy Naiad	<i>Ligumia nastuta</i>	Eastern Pondmussel
<i>Najas marina</i>	Grassy Pondweed	<i>Moxostoma carinatum</i>	River Redhorse
<i>Phyla lanceolata</i>	Lance Fog-Fruit	<i>Noturus eleutherus</i>	Mountain Madtom
<i>Poa paludigena</i>	Bog Bluegrass	<i>Noturus miurus</i>	Brindled Madtom
<i>Potamogeton illinoensis</i>	Illinois Pondweed	<i>Obovaria subrotunda</i>	Round Hickorynut
<i>Potamogeton richardsonii</i>	Red-Head Pondweed	<i>Pandion haliaetus</i>	Osprey
<i>Salix serissima</i>	Autumn Willow	<i>Percina macrocephala</i>	Longhead Darter
<i>Salix x subsericea</i>	Meadow Willow	<i>Pleuroblema clava</i>	Club Shell
<i>Scheonoplectus subterminalis</i>	Walter bulrush	<i>Pleuroblema sintoxia</i>	Round Pigtoe
<i>Solidago purshii</i>	Pursh's Goldenrod	<i>Quadrula cylindrical</i>	Rabbitsfoot
<i>Swertia caroliniensis</i>	American Columbo	<i>Rallus elegans</i>	King Rail
<i>Viburnum trilobum</i>	High-bush Cranberry	<i>Rallus limicola</i>	Virginia Rail
<i>Amblema plicata</i>	Three-ridge Mussel	<i>Sisturus catenatus</i>	Massasauga Rattlesnake
<i>Ardea herodias</i>	Great Blue Heron	<i>Tritogonia verrucosa</i>	Pistogrip Mussel
<i>Cistothorus palustris</i>	Marsh Wren	<i>Umbra limi</i>	Central Mudminnow



**Japanese knotweed (*Polygonum cuspidatum*) (National Park Service, 2003)**

Invasive vegetation can take over an ecological habitat and destroy the natural habitats. Any plant growing where it is not wanted and having objectionable characteristics, such as aggressive growth, or noxious properties that cause allergic reactions or poisoning are considered as invasive vegetation. The introduction of these invasive species dates back to the earliest arrivals of explorers and settlers to the region. Their ships were carriers of a wide variety of seeds and invasive animals. Seeds were present in hay bales, natural packaging, and in food products.



**Multiflora Rose (*Rosa multiflora*) (USDA, 2003)**

When invasive species become established in forestlands, on stream banks, or in wetlands, they tend to suffocate out native vegetation. This leads to the reduction of the biological diversity of the area; decrease in wildlife habitat or the area, and in some situations, the degradation of water quality and reduction of the recreational value of an area.



**Common Reed Grass (*Phragmites australis*) (Invasive Organization, 2003)**

Japanese knotweed (*Polygonum cuspidatum*), multiflora rose bush (*Rosa multiflora*), common reed grass (*Phragmites australis*), and garlic mustard (*Alliaria petiolata*) thrive in disturbed situations and in edge areas where light levels are high and competition from woody plants is low. Japanese knotweed is most prevalent along riverbanks and riparian zones. Once established, it forms large monospecific stands, which displace all native vegetation. These stands, which are extremely persistent, have been found to be virtually impossible to eradicate. Japanese knotweed is known to be along the Shenango River and is expanding its range. It can also be found along Little Shenango River and other small tributaries in the area.

Purple loosestrife (*Lythrum salicaria*), probably more aggressive than Japanese knotweed, adapts readily to natural and disturbed wetlands. It forms dense, homogenous stands that restrict native wetland plant species.



**Garlic mustard (*Alliaria petiolata*)**  
(National Park Service, 2003)



**Purple loosestrife (*Lythrum salicaria*)**  
(Sea Grant Program, 2003)

A type of protected habitat area exists near the project area. An Important Bird Area (IBA) is a site that is recognized globally for its bird conservation value. The National Audubon Society administers this program in the United States and these areas are monitored by volunteer efforts. IBAs were established to promote habitat conservation by focusing attention on ways to avoid habitat fragmentation, suburban sprawl, and overbrowsing by deer. Although no IBAs exist within the project area, the Barrows Heronry and Brucker Sanctuary, an approximately 55 acre IBA, is located approximately 1.5 miles south of the Hempfield Township municipal boundary. Presently, this IBA contains the largest Great Blue Heron colony in Pennsylvania.

### Air Quality

Air pollution is the nation's largest environmental health risk. 200 million tons of toxic emissions pollute the air in the United States each year. Much of this pollution is created by human influences, such as industry, power plants, cars, and trucks. Since air pollution is not confined to a specific area, it affects everyone.

This project is in the Northwest Pennsylvania county group, but is not located within one of the 13 PADEP's designated air basins; however, it does fall within range of one of the three non-basin areas, the Shenango Valley. These monitoring stations are located in Farrell, approximately 15 miles southwest of Greenville. The Air Quality Index (AQI), which reports on levels of five major air pollutants: ozone, particulate matter, sulfur dioxide, carbon monoxide, and nitrogen dioxide, was below 50, signifying the highest rating (good) on PADEP's website. Numerous sources of air pollution including ozone (O<sub>3</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), methane, and fine particulates could affect this area. While each source is produced by different conditions, the burning of fossil fuels, automobile emissions, industries, and power plants are the primary producers of air pollution.

### Agricultural Land Preservation

The Agricultural Area Security Area Law (Act 43 of 1981) enables landowners to propose the creation of agricultural security areas (ASA) to local units of government. Agricultural security areas consist of 250 or more acres of viable farmland and may be comprised of multiple non-contiguous tracts of land at least ten acres in size. At least 50% of the soils on that land must have a soil capability class of I-IV, as determined by the USDA Soil Survey and zoning shall permit agricultural use, but need not exclude other uses. Incentives to encourage farming and to discourage development in these agricultural areas are provided by the Act. The Agricultural Area Security Area Law authorizes county governments to establish programs for the purchase of development easements. Another important feature of the act is that municipalities are prohibited from enacting laws / ordinances that unreasonably restrict farm practices within the agricultural security area.

Hempfield Township has 1,194.5 acres designated as ASA (shown in Figure 8-3) while there are no ASA in Greenville Borough.

## *Analysis of Existing Conditions*

### Topography and Steep Slopes

Slopes are significant factors when determining the extent and type of development to be planned. Land along the river and streams with very little slope is usually also determined to be floodplain, lacking good drainage and poor soils. Land with slopes in excess of 25 percent begins to present problems for development. Valley sides are usually moderately steep except on the upper reaches of streams where the side slopes are fairly gentle.

Steep slope regulations prevent buildings and structures from being built on areas identified as having a slope above 25%. The intent of such regulations is to prevent injury or financial loss and to maintain adequate foliage cover on hillsides and preserve open space. Steep slope regulations prevent construction on areas deemed landslide prone by the Municipalities engineer. Slopes of 25% or greater should be considered for development only if other environmental factors allow development. Slopes exceeding 40% should not be considered for development.

### Soils and Geology

In terms of planning efforts, soils are important in determining the suitability of a site for on-lot sewage disposal systems, development opportunities, and areas of high agricultural productivity. Soils usually vary throughout a given profile and are rarely uniform throughout a site. It should be noted that soil testing to determine the soil permeability, bearing capacity, and drainage should be conducted on every development site.

The make up of the soils and geology of a region have a large impact on the suitability of a site or area for development. Soils determine the ability of a site to absorb and filter the effluent from septic systems, the suitability for the construction of foundations or other types of structures, the cost of building roads, and the appropriate type of landscaping. The Soil Survey for Mercer County (USDA, 1971) should be checked for suitability with every development project, whether residential, commercial, or industrial in nature. In addition, detailed field investigations should be conducted prior to development.

### Streams

Water quality monitoring will help to identify the quantity and degree of pollutants and begin to focus on clean up efforts where needed most. Development along streams can result in major impacts to the water resources of the region. Riparian buffers should be maintained and replanted where feasible and reasonable. The removal of riparian buffers results in adverse affects on water quality, wildlife and aquatic habitat, stream bank stabilization, and aesthetics of the waterway.

Through Greenville Borough, the streambank along the Shenango River does not provide the desired functions of a riparian buffer. Vegetation exists along the banks; however, in many of these areas, a single grass species is present and it is mowed to the stream. The physical

conditions of the Little Shenango River, Mathay Run, and Saul Run all appear to be supporting a healthy riparian zone and stream.

### Floodplains

Whenever development occurs in close proximity of a stream, the developer must be aware of the designated floodplain. Buildings and other structures proposed within the floodplain should be either elevated or flood-proofed to or above the elevation of the floodplain. FEMA floodplain mapping should always be consulted prior to approving any development within the region.

Floodplain overlay districts are created to restrict development within areas that are designated as flood prone areas. A floodplain is defined as any land adjoining a river or stream that has or may be expected to be inundated by floodwaters in a 100-year frequency flood. Regional approaches are encouraged when addressing watershed flood plain planning as watershed boundaries cross municipal boundaries. Sections 604, 605 and 609 of the MPC address floodplain management and zoning. Flood plains should be classified as a separate zoning district. This classification regulates, restricts or prohibits certain uses within the flood plain.

### Wetlands

River wetlands perform several functions including the retention and gradual release of floodwaters and bank stabilization. Wetlands slow flooding by limiting the movement of water through the wetland, increasing retention time, and allowing water to infiltrate into the soil. When floodwaters recede, these wetlands function to gradually release stored water back into the river. Along with forested and riparian corridors, the root systems associated with herbaceous and scrub/shrub wetland vegetation anchors the otherwise unstable alluvial soils of the riverbank.

These ponds serve several functions: water retention, sediment trapping, toxic material retention, flood flow alteration, and wildlife and aquatic habitat. Due to increased development in the region, wetlands are being impacted and loss of habitat and functions is resulting. Efforts should be made to preserve and maintain these systems for future benefits.

The large wetland system in Hempfield Township located on Greenville Water Authority property probably is important in removing excess sediment and toxicants from runoff from the adjacent Hadley Road. The outlet to this wetland is an unnamed tributary (UNT) to the Little Shenango River; therefore, the wetland functions to protect the water quality of the Little Shenango River, a major tributary to the Shenango River.

### Ecological Habitats

Numerous areas, including both public and private lands, could be forged into ecological habitat dedicated protection areas through a variety of landowner agreements, easements, special programs (like the PGC Public access and safety zone programs) or a combination of methods. Ultimately, areas set aside now will be the exemplary natural areas of the future, and if planned well and of sufficient size, will become premier areas for biodiversity protection within the region.

Forest lands, stream valleys, and other natural areas will continue to be lost to development if no steps are taken to preserve them. Preserving and enhancing the ecological integrity of the region lies within the ability and commitment of the local governments, public and private agencies, citizens groups, and landowners to agree on specific conservation goals and work together to see them accomplished.

Riparian buffers, areas of vegetation that are maintained along the shore of a water body to protect stream water quality and stabilize stream channels and banks, are essential to good water quality and aquatic habitats. These areas of tree buffers surrounding bodies of water should be preserved or replanted where feasible. Riparian buffers provide additional benefits to landowners and the larger community by:

- Safeguarding water supplies by protecting groundwater recharge areas
- Providing flood control
- Providing stormwater management potential – natural vegetation provides a basis for innovative stormwater management systems. Stormwater flows from retention basins can be directed to, and allowed to flow through forested buffers to reduce nutrient and sediment loads.
- Improving the health of cities, boroughs, and townships by improving water and air quality.
- Stimulating economic opportunities such as by providing valuable open space, which may increase land values and, therefore, the tax base.
- Providing some federal tax incentives to landowners (depending on a landowner's financial situation) willing and able to place some of their lands under conservation easements.
- Cost savings by reducing grounds maintenance.
- Providing recreation opportunities, and associated economic benefits for recreation-related businesses.
- Providing educational and research opportunities for local schools and colleges.
- Providing windbreak, shade, and visual buffer.

### Air Quality

Another, more local producer of air pollution, particularly fine particulates, is residential open burning. Fine particulates are extremely small dust particulates that float in the air. These particles can cause health problems from coughing and eye irritation to damaging lungs, kidneys and the liver.

It is not uncommon across the Commonwealth to find burn barrels in back yards. This technique has been used for decades to reduce the waste in landfills and is legal under the Air Quality regulations. Open burning is allowed on the property of private residences where not more than two families are living. However, the waste can not include demolition waste, home insulation, shingles, treated wood, paint, painted or stained objects, tires, mattresses, box springs, metal, insulated rubber coated copper wire, television sets or appliances, automobiles or parts, and batteries. These items must be disposed of according to the solid-waste regulations.

Other issues related to open burning are left up to the municipal officials. The municipality, under state law, has the right to enact an ordinance with requirements that are equal to or more stringent than state regulations. In today's society, burning should be minimal. Most waste can be recycled or a commercial hauler can dispose of it properly.

### Agricultural Land Preservation

As stated earlier, Hempfield Township has 1,194.5 acres (non contiguous tracts of land) designated as Agricultural Security Areas (ASA), which is approximately eight percent of the total land acreage. Indirect benefits of land that is rural in nature contribute to community character, preservation of farmland, promotion of habitat preservation, and greenway corridors. In addition these types of land uses require less municipal services than uses such as housing.

ASA provide three main benefits to landowners:

1. The Township Supervisors agree to support agriculture by not passing nuisance laws that would restrict normal farming operations.
2. Limitations are placed on the ability of government to condemn farmland in the Agricultural Security Area for highways, parks, schools, or municipal projects.
3. Landowners will be eligible to voluntarily apply to sell a conservation easement to the Mercer County Agricultural Land Preservation Board. The conservation easement is a covenant on the land that states the land must be available for agricultural use in perpetuity. The value of the conservation easement is appraised and a landowner may sell an easement for cash to the county and/or the Commonwealth of Pennsylvania. The Agricultural Land Preservation Program requires that an owner may only sell the conservation easement if located within an ASA of 500 acres or more.

Another program available to assist landowners in farmland / open space preservation, is the Pennsylvania Farmland and Forest Land Assessment (Act 319 of 1974) also known as the "Clean and Green Program." This program is designed to provide incentives to landowners for preserving land devoted to agricultural use, agricultural reserve and/or forest reserve woodlots. When land owners apply to the program, parcels of 10 acres or more devoted to these uses, for general tax purposes, are taxed according to the "use value" (i.e. farmland) rather than the prevailing "market value".

Future planning initiatives including zoning amendments should ensure that agricultural uses are permitted and township officials would be well advised to work with the MCRPC to identify long range regional goals for agricultural uses and open space preservation. In this manner, planning initiatives such as infrastructure expansion will not harm existing ASA and can in fact support agricultural activities and encourage compatible development.

**NATURAL RESOURCES IMPLEMENTATION MATRIX**

**GOAL: Promote a sustainable community by ensuring that future development meets the economic and social needs of the residents in a manner that does not destroy the productivity or health of its natural systems**

Strategies	Responsible Party	Potential Partners	Funding Sources
Develop flood response education materials, flood awareness seminars for residents	Mercer County Planning Commission, Greenville Borough, Hempfield Township	Shenango River Watch, local emergency response, DEP, Mercer County EMA, Mercer County Conservation District, Municipal Water Authority, DEP, DCED	Rivers Conservation Program (DCNR), Growing Greener (DEP), Source Water Protection Grant Program (DEP), Non-Point Source Pollution Control (DPE), Stream Improvement Program (DEP), Western Pennsylvania Watershed Protection Program, Governor's Award for Watershed Stewardship Program (DEP), Flood Mitigation Assistance Program (PA EMA), The William Penn Program, Charles A. and Anne Morrow Lindburgh Foundation, Fish America Foundation, Coldwater Heritage Partnership (PA DCNR & PA Fish & Boat Commission)
Follow the recommendations of the Shenango Watershed Assessment	Mercer County Planning Commission, Greenville Borough, Hempfield Township		
Work with Shenango Conservancy, Shenango River Watchers, and volunteers to monitor river water quality locally	Mercer County Planning Commission		
Continue to enforce land use regulations to preserve floodplains	Mercer County Planning Commission, Greenville Borough, Hempfield Township	Greenville Borough Council and Code Enforcement Staff, Hempfield Township Supervisors and Code Enforcement Staff, Mercer County Regional Planning Commission	Municipal Budgets, CDBG
Review the feasibility of a river corridor overlay district to implement design	Planning Commissions, MCRPC, watershed groups	Mercer County Planning Commission, Municipal Planning Commissions, Local Governing Bodies	Governor's Center for Local Government Services (DCED), Local Government Academy, Sustainable Pittsburgh
Conduct a review of local ordinances to ensure the compatibility of regulations with the comprehensive plan	Greenville Borough Council & Hempfield Township Supervisors		Governor's Center for Local Government Services (DCED)

**NATURAL RESOURCES IMPLEMENTATION MATRIX**

**GOAL: Promote a sustainable community by ensuring that future development meets the economic and social needs of the residents in a manner that does not destroy the productivity or health of its natural systems (continued)**

Strategies	Responsible Party	Potential Partners	Funding Sources
Review zoning ordinances to protect agricultural areas to regional needs	Planning Commissions		US Dept. of Agriculture
Update flood plain designations - get local update to county / FEMA	Greenville Borough Council & Hempfield Township Supervisors	Mercer County Planning Commission, Municipal Planning Commissions, Local Governing Bodies	Flood Mitigation Assistance Program (PA EMA)
Encourage planting or enhancements of vegetative buffers along waterways, stream bank fencing, stream crossings	Mercer County Planning Commission, Greenville Borough, Hempfield Township	Shenango River Watch, local emergency response, DEP, Mercer County EMA, Mercer County Conservation District, Municipal Water Authority, DEP, DCED, Greenville Business & Professional Women, Greenville Lions, Kiwanis of Greenville, Moose Club, American Legion Post 140, Fraternal Order of Eagles, Eureka Lodge, Veterans of Foreign Wars, Lions Club, Knights of Columbus, Northwest Pennsylvania Cooperation Council, The Good Shepard, Greenville Area Ministerial Association	Rivers Conservation Program (DCNR), Growing Greener (DEP), Source Water Protection Grant Program (DEP), Non-Point Source Pollution Control (DPE), Stream Improvement Program (DEP), Western Pennsylvania Watershed Protection Program, Governor's Award for Watershed Stewardship Program (DEP), Flood Mitigation Assistance Program (PA EMA), The William Penn Program, Charles A. and Anne Morrow Lindburgh Foundation, Fish America Foundation, Coldwater Heritage Partnership (PA DCNR & PA Fish & Boat Commission),
Develop a volunteer steward program that would serve to encourage landowners to undertake their own riparian buffer improvement programs	Mercer County Planning Commission, Greenville Borough, Hempfield Township		Local Business and Private Sponsorships/Donations
Implement a volunteer effort for trash pick-up	Mercer County Planning Commission, Greenville Borough, Hempfield Township		
Designate community clean up days	Greenville Borough Council & Hempfield Township Supervisors		Local Business and Private Sponsorships/Donations