

4.0 WATERSHED TECHNICAL ANALYSIS

4.1 Watershed Modeling

Watershed analysis requires the integration of knowledge, data and simulation models to solve practical hydrological problems. Hydrologic models on this scale require detailed spatial information for the area under investigation. GIS technologies provide the tools to rapidly extract relevant data used to prepare model input files and evaluate model results. The modeling process chosen for this plan was the Hydrologic Modeling System (HEC-HMS). It is designed to simulate precipitation runoff processes of dendritic watershed systems. It is designed to be applicable in a wide range of geographic areas for solving the widest possible range of problems. This includes large river basin water supply and flood hydrology, and small urban or natural watershed runoff. Hydrographs produced by the program can be used directly or in conjunction with other software for studies of urban drainage, flow forecasting future urbanization impact and flood damage reduction.

PASDA with its cutting edge capabilities to utilize data resources, in conjunction local data collection would be the primary sources for the data necessary to run the models.

Information gathered for this for this plan is available on compact disc (CD) and can be requested at the following offices during normal business hours.

Mercer County Regional Planning Commission
2491 Highland Road
Hermitage, PA 16148
724-981-2412 ext.- 225

Wallace and Pancher, Inc.
1085 S. Hermitage Road
Hermitage, PA 16148
724-981-0155

Unfortunately, due to the reduced funding for the planning process by DEP, there was not sufficient time to address and analyze the capacities of the structures. This item should be a consideration in a future planning cycle.

4.2 Questionnaire Results

The questionnaire was developed to request information from participants concerning specific problems involving storm water management within their areas of jurisdiction. The questionnaire and a detailed map of the municipality were distributed to the corresponding participant during the initial WPAC meeting. The information from the questionnaire was not only used to determine the scope of planning for Phase II, but also as a means to determine levels of support from each municipality. Of the forty-eight (48) municipalities in Mercer County, thirty-six (36) returned their questionnaires. Additionally, three state agencies, one county agency, and one watershed group returned questionnaires. Overall, the primary stormwater concern in the County was increased runoff. Secondary issues were poor drainage and undersized culverts/structures. Following are the compiled results from the questionnaires by watershed. The actual questionnaires are included in Appendix C of the Phase I report.

4.3 French Creek Watershed

The following municipalities lie within the French Creek watershed: all of New Lebanon Township and portions of Mill Creek Township, French Creek Township, and Deer Creek Township.

Within the French Creek watershed, the primary stormwater related concern was increased runoff, with secondary issues being road flooding, erosion along roadways, and poor drainage.

The French Creek watershed is located in the northeast corner of Mercer County. It drains an area of approximately 430,665 acres (672.9 square miles), of which 21,409 acres (33.5 square miles) are located within Mercer County. This watershed's drainage flows out of the county to the east and into the Allegheny River watershed. In general, the French Creek watershed consists of poorly drained soils

and underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excess runoff. Following is a detailed description of the portion of the French Creek watershed that lies within Mercer County:

Soils – The French Creek watershed is dominated by the Canfield-Ravenna association. This soil type is typically found on gently sloping to moderately steep hillsides underlain by glacial till. The soil varies from moderately well drained to somewhat poorly drained, depending on its location. A small portion of French Creek is also underlain by the Chenango-Braceville-Halsey association, a soil type found mainly on stream terraces and moraines. This soil type is found on gently sloping to moderately steep hillsides and is underlain by sand and gravel, therefore it can range from being well drained to very poorly drained. The remainder of the watershed consists of the Ravenna-Frenchtown association. This soil association can be found on nearly level to gently sloping uplands within the watershed. It is a somewhat poorly drained to poorly drained soil association (Figure 9, page 36). The French Creek watershed within Mercer County also contains approximately 11,560 acres (18 sq. mi.) of prime farmland soils, most of which is currently forested (Figure 8, page 33).

Geology – The section of the French Creek watershed underlying French Creek itself contains approximately 1,288 acres (2.0 square miles) of the Corry Sandstone through Riceville Formation, undivided, composed mainly of shale. This bedrock type has a moderate porosity and a moderate to low permeability. Surrounding that formation is approximately 815 acres (1.3 square miles) of the Cuyahoga formation, composed of sandstone. This bedrock type has low porosity and low permeability. Approximately 6,039 acres (9.4 square miles) of the Shenango formation, composed of siltstone, can be found underlying Deer Creek and Mill Creek. The Shenango formation has moderate to low porosity and moderate to low permeability. Approximately 13,155 acres (20.6 square miles) within the watershed consist of the Pottsville formation, composed of shale, siltstone, claystone, limestone and coal. This formation has variable porosity and moderate to low permeability. The remainder of the watershed contains 109 acres (0.17 square miles) of the Allegheny formation, a

formation consisting mainly of limestone, clay and coal (Figure 5, page 28).

Slope – In general, the part of the French Creek watershed that lies within Mercer County is relatively hilly in topography. There are steeper slopes (9-15% and 16-25% grade) found around the streams, with relatively steep slopes (>25% grade) located along French Creek in the extreme northeast corner of the watershed. The western portion of the watershed is relatively flat, having 0-8% slopes (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Forested	11,790	18.4	55%
Farmland	8,073	12.6	38%
Wetland	416	0.7	<1%
Low Density Urban	167	0.3	<1%
High Density Urban	138	0.2	<1%
Water	117	0.2	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the French Creek Watershed:

Borough of New Lebanon:

- Manage stormwater and field runoff causing damage to roads and the overflow of ditches (especially along Gorden Road).
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control stream and street flooding, soil erosion, stream bed and bank erosion, and damage to bridges and culverts caused by increased runoff.
- Control property flooding and damage.

Deer Creek Township:

- Finding funding to respond to stormwater related issues within Deer Creek Township including road flooding and berm erosion caused by excessive runoff, especially along Deer Creek Road.
- Poor drainage and infiltration due to existing soil types.
- Control erosion caused by excessive runoff entering the stream along Deer Creek Road north of the stream. Deer

Creek Township is currently working with the county to improve road ditches.

- Stabilizing peak flow conditions.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Resolve street and stream flooding caused by increased runoff and poor drainage.

Agency Comments

- *Mercer County Conservation District:* North Deer Creek in French Creek Township along Creek Road to mouth has bank erosion, sedimentation, and flooding.
- *Mercer County Conservation District:* Powdermill Run in French Creek Township from the county line to the mouth has sedimentation, bank erosion, and flooding.

4.4 Sandy Creek Watershed

The following municipalities lie within the Sandy Creek watershed: all of Sandy Lake Borough, Sandy Lake Township, Sheakleyville Borough, and Stoneboro Borough, and portions of Deer Creek Township, New Vernon Township, Salem Township, Sandy Creek Township and Worth Township.

The primary stormwater concern in the Sandy Creek watershed was increased runoff. Secondary issues included poor drainage and road wash-outs. Other issues mentioned were: road flooding, undersized culverts, acid mine drainage, sedimentation, stream bank erosion, flooding and beaver dams.

The Sandy Creek watershed is located in the northeast corner of Mercer County. It drains an area of approximately 102,839 acres (160.7 square miles), of which 50,772 acres (79.3 square miles) are located within Mercer County. This watershed's drainage flows out of the county to the east and into the Allegheny River watershed. In

general, the watershed is flat in topography, with some steeper slopes around streams. It consists of moderately drained to poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excessive pooling and runoff. Areas of high density urban land use within the watershed include Sandy Lake and Stoneboro, and small areas adjacent to Routes 258 and 358. This urban land use predisposes the area to increased runoff, flooding, sedimentation, and water pollution. The remainder of the Sandy Creek watershed consists mainly of farmland to the northwest and forested area to the east. The northern portion of the watershed is dotted with wetlands, some considerable in size. These wetlands provide flood storage and help water to infiltrate into the groundwater rather than running off into and flooding nearby creeks. Following is a detailed description of the portion of the Sandy Creek watershed that lies within Mercer County:

Soils – Sandy Creek is dominated by the Wayland, coarse variant-Papakating-Red Hook soil association. This association is found on nearly level slopes within the floodplains, is underlain by alluvium, and ranges from very poorly drained to moderately drained. The Sandy Creek floodplain consists of the Chenango-Braceville-Halsey association, a soil association found on gently sloping to moderately steep terraces and moraines underlain by glacial till. It ranges from well drained to very poorly drained. The remainder of the watershed consists of the Ravenna-Frenchtown association, a somewhat poorly drained to poorly drained association found on nearly level to gently sloping uplands (Figure 9, page 36). The Sandy Creek watershed within Mercer County also contains approximately 24,037 acres (37.56 square miles) of prime farmland soils, the majority of which remain forested (Figure 8, page 33).

Geology – Approximately 7,012 acres (11.0 square miles) of the Cuyahoga formation can be found underlying Sandy Creek in the northwest. This formation is composed of sandstone and has low porosity and low permeability. The Shenango formation makes up the floodplain of Sandy Creek, approximately 14,349 acres (22.4 square miles). This formation is composed of siltstone and has moderate to low porosity and moderate to low permeability. The Pottsville formation, composed of shale, siltstone, claystone, limestone, and

coal, makes up the majority of the east, approximately 23,796 acres (37.2 square miles), has variable porosity and moderate to low permeability. The Pottsville formation is intermixed with approximately 5,579 acres (8.7 square miles) of the Allegheny formation, a formation composed of limestone, clay, and coal (Figure 5, page 28).

Slope – The watershed is relatively flat with 0-8% slopes in the southeast; however, steeper slopes (>25% in grade) can be found along Sandy Creek. The northern part of the watershed is relatively hilly, with slopes of 9-15% grade throughout. Some of the smaller streams are surrounded by slopes of 16-25% grade (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Forested	27,206	42.5	54%
Farmland	15,747	24.6	31%
Wetland	2,271	3.5	<1%
Water	1,852	2.9	<1%
Low Density Urban	779	1.2	<1%
High Density Urban	718	1.1	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Sandy Creek Watershed:

Deer Creek Township

- Finding funding to respond to stormwater related issues within Deer Creek Township
- Road flooding and berm erosion along roadways in Deer Creek Township caused by excessive runoff.
- Poor drainage and soil infiltration caused by existing soil types.
- Stabilizing peak flow conditions.

- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Resolve street and stream flooding caused by increased runoff and poor drainage.

New Vernon Township

- Stormwater controls and best management practices.
- Increased runoff entering Lake Wilhelm along Creek Road between Lake Wilhelm Road and Borland Road.
- Increased runoff from Tributary 58632 to Sandy Creek in the vicinity of the intersection of Borland Road and Irish Ridge Road.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Stabilizing peak flow conditions.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Regulate and monitor overbank flows associated with extreme storm events.

Salem Township

- Control the erosion associated with roadways and keeping culverts free of obstructions.
- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate stream flooding, soil erosion, stream bed and bank erosion, in-stream sedimentation, and bridge/culvert damage caused by increased runoff.

Sandy Creek Township

- Control stream bank erosion along Sandy Creek in the vicinity of Armour Road and Old Perry Road.
- Control stream bank erosion along Tributary 58652 to Sandy Creek in the Vicinity of Larimer Road.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate stream flooding, soil erosion, stream bed and bank erosion, and bridge/culvert damage caused by increased runoff, undersized structures, and floodplain development.

Borough of Sandy Lake

- Sandy Lake Borough is situated in a low area, affected not only by situations within the borough, but also by conditions outside their corporate boundaries.
- Sandy Lake outlet to Sandy Creek – The Borough of Sandy Lake has suggested that the outlet is in need of dredging.
- Culverts under Pintree Drive have been plugged by a beaver. Pennsylvania Game Commission and PennDOT have been made aware of the problem.
- McCutchoen Run at Broad Street and Laura Drive – The box culvert under Broad Street has been obstructed. During storms the runoff along the course of Laura Drive can reach sufficient velocity to cause considerable damage.
- Hamilton Hill – Undersized culverts have caused culvert clogging and street flooding.
- Unnamed wet weather stream entering Sandy Lake Borough from the south – This stream originates at the outlet of a pond on the east side of SR 173 south of town. This stream catches water from Lakeview and Oakview School properties, possibly two (2) churches, and state highway runoff. If one walks south from Elbow Street in the Borough, severe stream bank erosion will be observed. The Borough of Sandy Lake has suggested that a storm retention device and a trash rack upstream from Elbow Street would alleviate this situation.
- Flooding and property damage (basement flooding) has occurred in the vicinity of Elbow Street.

- Sandy Lake Borough has recently replaced approximately 250' of pipe and a box culvert at a crossing of Mercer Street.
- High Street – A wet weather stream crossing under High Street has the potential for washing out due to trash in the culvert crossing.
- Patton Road, (aka Coal Hill) – Patton Road is a one quarter (1/4) mile, of steep, paved roadway that has a high potential for wash out. The runoff contributes to storm water on North Main Street.
- Mill Street – Mill Street has the potential for washing due to its long, steep gradient and the collection of runoff from adjacent properties. Its ditches have been enclosed with culvert pipes with inlets at intervals along its length.
- Main Street – The elevation of the pavement on Main Street is 6"–8" higher than it was 40+ years ago. Currently, no curb exists on North Main Street (north of the traffic light). As a result, ponding occurs at many of the intersections. PennDOT storm sewers at the traffic light (intersection of SR 0062, SR 0358, and SR 0173) are inadequate. The Borough of Sandy Lake has suggested that a major storm water study be performed by PennDOT and appropriate action taken.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate and monitor overbank flows associated with extreme storm events.

Sandy Lake Township

- Haun Hill Road often washes out due to excessive runoff.

- Triple Link Road frequently floods due to obstructions in the stream. Sandy Lake Township has suggested the re-routing and cleaning of the stream.
- Regulate stream flooding, street flooding, soil erosion, in-stream sedimentation, property damage, pollution, and bridge/culvert damage caused by increased runoff, undersized structures, and floodplain development.

Borough of Stoneboro

- In-stream obstructions cause pooling and prevent water transport downstream.
- Stream flooding exists in the vicinity of the intersection of Mercer Road and Mine Road. The Borough of Stoneboro has suggested a rerouting of the stream.
- A beaver dam exists east of Sandy Lake in the vicinity of Linden Road backing up water and preventing normal drainage. The Borough of Stoneboro has suggested the removal of the beaver dam.
- A beaver dam exists south of Sandy Lake in the vicinity of Franklin Road backing up water and preventing normal drainage. The Borough of Stoneboro has suggested the removal of the beaver dam.
- A beaver dam exists south of Sandy Lake along Sawmill Run backing up water and preventing normal drainage. The Borough of Stoneboro has suggested the removal of the beaver dam.
- Regulate stream, street, and property flooding, in-stream sedimentation, and property damage caused by poor drainage.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.

Worth Township

- Regulate moderate stream bed and bank erosion.

Agency Comments

- *DCNR Bureau of State Parks:* "Yellow Boy" in seep run located 500 feet west of dam breast on Creek Road.
- *DCNR Bureau of State Parks:* Creek road is un-paved and the terrain to the south of the road is steep. Sediment is carried by small runs and road ditches directly into the lake.
- *DCNR Bureau of State Parks:* Considerable sedimentation enters the lake from existing tributaries, especially Dugan's Run and James Run. Need for the development of new Conservation Plans for farming in the park.
- *DCNR Bureau of State Parks:* Monitor the development of proposed natural gas wells within the park.
- *Mercer County Conservation District:* In Stoneboro Borough, Sawmill Run has sedimentation and bank erosion.
- *Mercer County Conservation District:* Un-named tributary of Sandy Creek from Lakeview High School to mouth experiences flooding and sedimentation. In the Borough of Sandy Lake, an un-named tributary to Sandy Creek from Oakview Elementary to US 62 has erosion, sedimentation, and flooding.
- *Mercer County Conservation District:* Stoneboro Lake at SR 845 has flooding issues.
- *Mercer County Conservation District:* McCutcheon Run from Lara Lane to mouth in Borough of Sandy Lake has sedimentation and flooding.

4.4 Wolf Creek Watershed

The following municipalities lie within the Wolf Creek watershed: all of Grove City Borough and , Pine Township , and portions of Liberty Township, Springfield Township, Wolf Creek Township, and Worth Township.

The primary stormwater concern in the Wolf Creek watershed was increased runoff. Secondary issues included poor drainage and stream

flooding. Other issues mentioned were: bank erosion, inadequate stormwater facilities, and clogged culverts.

The Wolf Creek watershed makes up the southeast corner of Mercer County. It drains approximately 63,870 acres (99.8 square miles), of which 50,078 acres (78.2 square miles) are located within Mercer County. This watershed's drainage flows out of the county to the south and into Slippery Rock Creek which flows into the Beaver River, part of the Ohio River watershed. In general, the Wolf Creek watershed is relatively flat in topography. It consists of poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excess runoff. Areas of high density urban land use within the watershed include Grove City and East Lackawannock. As development continues in these areas and in areas in the headwaters of the Wolf Creek watershed, runoff will increase due to the increase of impermeable surface (paving, structures, etc.) coupled with the impermeable soils and bedrock. The remainder of the watershed consists mainly of a mixture of forest and farmland. Wetlands are also noted in the vicinity of Wolf Creek. These wetlands provide flood storage and help water to infiltrate into the groundwater rather than running off into and flooding nearby creeks. Following is a detailed description of the French Creek watershed within Mercer County:

Soils – The primary soil association is the Ravenna-Frenchtown association. This association is found on nearly level to gently sloping uplands within the watershed and ranges from somewhat poorly drained to poorly drained. The Chenango-Braceville-Halsey association is prevalent along Wolf Creek and Swamp Run. This association can range from being well drained to very poorly drained and is found on gently sloping to moderately steep moraines and stream terraces and is underlain by sand and gravel deposits. A small portion of the Canfield-Ravenna association can be found in the extreme south along Wolf Creek. This soil association can be moderately well drained and somewhat poorly drained, and is found on gently sloping to moderately steep uplands underlain by glacial till (Figure 9, page 36). This watershed also contains 25,250 acres (39.5 square miles) of prime farmland soils, of which approximately 1/3 are currently used for farming (Figure 8, page 33).

Geology – The main bedrock feature in this watershed is the Pottsville formation, encompassing 30,835 acres (48.2 square miles). This formation is composed of shale, siltstone, claystone, limestone, and coal. It has variable porosity and a moderate to low permeability. The northern part of the watershed contains 3,844 acres (6.0 square miles) of the Shenango formation, consisting of siltstone, and having moderate to low porosity and permeability. Approximately 15,400 acres (24.1 square miles) of the Allegheny formation, composed of limestone, clay and coal, and having low porosity and moderate to low permeability can be found in the southeast (Figure 5, page 28).

Slope – Though the majority of the watershed is relatively flat, having 0-8% grade, some of the areas around streams have steeper slopes ranging from 9%-25% grade. These areas are found mainly in the north (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Forested	22,363	34.9	45%
Farmland	18,187	28.4	36%
Wetland	2,752	4.3	<1%
High Density Urban	1,932	3.0	<1%
Low Density Urban	940	1.5	<1%
Water	568	0.9	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Wolf Creek Watershed

Borough of Grove City

- Completion of the East Pine Street storm water collection system to alleviate localized flooding and ponding concerns.
- Management of flooding increased by development and inadequate storm facilities. The construction of a new storm

sewer from CN Railroad along East Pine Street to Wolf Creek may solve this problem.

- Stabilization of peak flow conditions.
- Control of stream, street, and property flooding issues associated with extreme storm events.
- Management of sediment transport issues including scour at outfalls, property damage, and in-stream sedimentation.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.

Liberty Township

- Extreme storm events cause street flooding, soil erosion, and damage to bridges/ culverts. Increased runoff has caused these problems to escalate in particular in the areas of Old Mill Road and Plain Grove Road.

Pine Township

- Maintenance and control of culverts that have occasionally been clogged.
- Property flooding, property damage, and stream bed/bank erosion caused by increased surface runoff and poor drainage.
- Stabilization of peak flow conditions.
- Control the erosion of stream banks and beds, causing undercut roads and utilities, damage to in-stream habitat, and clogging to culverts and bridges.

Springfield Township

- Maintenance and control of stormwater caused by increased runoff along Route 208, near Prime Outlet Mall.
- Extreme storm events cause stream flooding, property damage, erosion of stream banks and beds, and bridge/culvert damage caused by increased surface runoff and poor drainage.
- Stabilization of peak flow conditions.
- Control the erosion of stream banks and beds, causing undercut roads and utilities, damage to in-stream habitat, and clogging to culverts and bridges.

- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.

Wolf Creek Township

- Find and implement a solution to the Beaver Dam problem on Scrub Grass Road. This is a potentially very dangerous situation and lowering the Beaver Dam and installing guide rails may alleviate the danger.
- Maintenance and control of flooding associated with small tributaries during extreme storm events.
- Low areas prone to flooding exist at: Sophen Road near the eastern most tributary of the East Branch of Wolf Creek, at Patterson School Road at the southernmost tributary to the East Branch of Wolf Creek, and at Creek Road at a northern tributary to Wolf Creek.
- General stream flooding due to heavy rainfall occurs along Centertown Road at the East Branch of Wolf Creek.

Worth Township

- Regulate moderate stream bed and bank erosion.

Agency Comments

- *PA Fish & Boat Commission:* Direct access of storm drain into creek at Oregon Road in Springfield Township.
- *PA Fish & Boat Commission:* Wolf Creek is full of sediment downstream from site of dam removal.
- *Mercer County Conservation District:* Wolf Creek upstream of SR 108 through the Borough of Grove City to the Borough line has bank erosion and sedimentation.

4.5 Slippery Rock Creek

Only a small portion of Mercer County lies within Slippery Rock Creek watershed, including: portions of Liberty Township, and Springfield Township.

Within the Slippery Rock Creek watershed, the primary stormwater related concern was increased runoff, with the secondary issue being stream flooding.

A small portion of the Slippery Rock Creek watershed is located in the southeast part of the county. It drains an area of approximately 194,340 acres (303.7 square miles), of which 2,892 acres (4.5 square miles) are located within Mercer County. This watershed's drainage flows out of the county to the south into the Beaver River, part of the Ohio River watershed. In general, the Slippery Rock Creek watershed is relatively flat in topography with few slightly steeper slopes. The watershed consists of poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excess runoff. Aside from a few small areas of low density urban areas, the majority of the Slippery Rock Creek watershed that lies within Mercer County consists primarily of forest and farmland. Following is a detailed description of the Slippery Rock Creek watershed within Mercer County.

Soils – The Canfield-Ravenna association makes up the small part of the Slippery Rock Creek watershed that lies within Mercer County. This association can be found on gently sloping to moderately steep uplands, and is underlain by glacial till. This association ranges from moderately well drained to somewhat poorly drained (Figure 9, page 36). The Slippery Rock Creek watershed also contains 1,508 acres (2.4 square miles) of prime farmland soils, the majority of which are currently forested (Figure 8, page 33).

Geology – The majority of this watershed is composed of approximately 2,171 acres (3.4 square miles) of the Allegheny formation. This formation consists of limestone, clay, and coal and has low porosity and moderate to low permeability. The remainder of the watershed is composed of the Pottsville formation, which consists of shale, siltstone, claystone, limestone, and coal. It has variable porosity and moderate to low permeability (Figure 5, page 28).

Slope – In general, the part of the Slippery Rock Creek watershed that lies within Mercer County is relatively flat having a 0-8% grade. A

small portion of the northern aspect of the watershed is hilly in topography, having a grade of 16%-25% (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Forested	1,290	2.0	45%
Farmland	1,165	1.8	40%
Wetland	186	0.3	<1%
Low Density Urban	60	0.1	<1%
High Density Urban	38	0.1	<1%
Water	39	0.1	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Slippery Rock Creek Watershed

Liberty Township

- There were no comments related to this watershed.

Springfield Township

- Extreme storm events cause stream flooding, property damage, erosion of stream banks and beds, and bridge/culvert damage caused by increased surface runoff and poor drainage.
- Stabilization of peak flow conditions.
- Control the erosion of stream banks and beds, causing undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.

4.6 Neshannock Creek Watershed

The following municipalities lie within the Neshannock Creek watershed: all of Coolspring Township, Findley Township, Fredonia Borough, Jackson Center Township, Jackson Township and Mercer Borough, and portions of Delaware Township, East Lackawannock Township, Fairview Township, Jefferson Township, Lake Township, a Otter Creek Township, Perry Township, Springfield Township, Wilmington Township, Wolf Creek Township, and Worth Township.

Within the Neshannock Creek watershed, the primary stormwater related concern was increased runoff, with secondary issues being undersized culverts and poor drainage. Other issues included: stream flooding, stream erosion, ponding and road flooding, and floodplain development.

The Neshannock Creek watershed is located in the southeast portion of Mercer County, adjacent to and to the west of the Wolf Creek watershed. It drains an area of approximately 123,406 acres (192.8 square miles), of which 92,815 acres (145.0 square miles) are located within Mercer County. This watershed's drainage flows out of the county to the south and drains into the Beaver River, part of the Ohio River watershed. In general, the Neshannock Creek watershed is relatively flat in topography with some steep slopes along the southern reach of Neshannock Creek. The watershed consists of poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excess runoff. High density urban areas exist in Mercer and Fredonia. There are several high density urban areas dotted along Route 62, and a low density urban/commercial area around Lake Latonka. All of the urban areas can cause increased runoff due to increased pavement from parking lots and roads. When mismanaged, this runoff will flood Neshannock Creek and its tributaries. The remainder of the watershed is forested in the south central portion and consists primarily of farmland in the north. Following is a detailed description of the Neshannock Creek watershed within Mercer County:

Soils – Neshannock Creek is underlain by the Wayland, coarse variant-Papakating-Red Hook association, found on nearly level floodplains underlain by alluvium. This soil association ranges from very poorly

drained to moderately drained. The Chenango-Braceville-Halsey association is found in the south in the floodplain of the creek. This association consists of well drained to very poorly drained soils found on gently sloping to moderately steep stream terraces and moraines underlain by sandy and gravelly deposits. In the north, the Canfield-Ravenna association is common. This association is moderately drained to somewhat poorly drained and is found on gently sloping to moderately steep uplands underlain by glacial till. The remainder of the watershed contains the Ravenna-Frenchtown association, somewhat poorly drained to poorly drained soils found on nearly level to gently sloping uplands (Figure 9, page 36). The Neshannock Creek watershed within Mercer County also contains 53,655 acres (83.8 square miles) of prime farmland soils, the majority of which are being farmed, especially in the north (Figure 8, page 33).

Geology – Underlying Neshannock Creek is approximately 12,046 acres (18.8 square miles) of the Shenango formation. This formation is composed of siltstone and has moderate to low porosity and moderate to low permeability. Approximately 1,358 acres (2.1 square miles) of the Cuyahoga group also underlies a small portion of the creek. This association is composed of sandstone and has low porosity and low permeability. Approximately 60,041 acres (93.81 square miles) of the Pottsville formation underlie this watershed. This formation consists of shale, siltstone, claystone, limestone, and coal. It has variable porosity and moderate to low permeability. Only 1,358 acres (2.1 square miles) of the Cuyahoga formation are found within this watershed. This formation is composed of sandstone and has low porosity, and low permeability (Figure 5, page 28).

Slope – In general, the part of the Neshannock Creek watershed that lies within Mercer County is somewhat flat with rolling hills having 0%-15% grade. There are some slopes >25% along the southern reach of Neshannock Creek (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Farmland	39,832	62	43%
Forested	39,366	62	42%
Wetland	3,244	5.1	<1%
Low Density Urban	1,891	3.0	<1%
High Density Urban	1,512	2.4	<1%
Water	825	1.3	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Neshannock Creek Watershed

Coolspring Township

- The maintenance of debris transported and collected by Tributary 35698 to Otter Creek. Coolspring Township has suggested cleaning the creek channel.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate and monitor overbank flows associated with extreme storm events.

Delaware Township

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Stabilizing peak flow conditions.

- Regulate and monitor overbank flows associated with extreme storm events.
- Property damage, bridge/culvert damage, and street flooding have occurred along Redfoot Road as a result of poor drainage and undersized structures insufficiently transporting stormwater.
- Property damage, bridge/culvert damage, street flooding, and scour at outfalls has occurred along Kelso Road as a result of poor drainage and undersized structures insufficiently transporting stormwater.
- Delaware Township feels that current practices need to be made friendlier when replacing existing structures (i.e. bridges, large culverts); for instance, the permit process needs to be waived or expedited.

East Lackwanna Township

- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation, habitat/resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Monitor and management of increased runoff from Gabany's proposed development near the borough of Mercer.

Findley Township

- The dredging and cleaning of the Pine Run tributary in several areas where they run adjacent to a township or state road.
- Noted a severe runoff issue one mile north of the intersection of Elliott Road and Springfield Church Road, on Springfield Church Road.
- Culverts or bridges are clogged due to increased runoff and poor drainage in Pine Run, Tributary 63829 to Pine Run, and

Tributary 35770 to Mill Creek. Findley Township proposes clearing or dredging debris from Pine Run.

- A runoff problem exists on the properties between McMillan Road, Mariacher Road, Clintonville Road, Scrubgrass Road, and Route 58. Findley Township proposes the implementation of a SWMP.
- Stormwater leaching from mismanaged driveways and private property during and after construction.
- Inadequate drainage culverts on state highways causing flooding during severe storm events.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Stream flooding, increased sedimentation in streams, and bed and bank erosion caused by increased runoff and poor drainage.
- Findley Township would like to discuss the regulations associated with cleaning the streams, and would like to have a copy of the current watershed management procedures.

Borough of Fredonia

- Moderate stream flooding caused by increased runoff.

Jackson Township

- The property adjoining logged areas near intersection of Cape Horn Road and Cottage Road is prone to severe flooding and property damage after storm events. Jackson Township has contacted the DEP, the property owner, and the logging company with no result.
- The property surrounding Tributary 35820 to Cool Spring Creek has experienced flooding and property damage after severe storm events. Jackson Township has replaced and enlarged a culvert pipe and redirected the flow of water.
- Sewage drainage from Jackson Center Borough Sewer Plant has entered Yellow Creek creating concerns surrounding fish

and wildlife health. Jackson Township has contacted the DEP, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, and the Jackson Center Borough with no result.

- Flooding, bank erosion, property damage, and surface water/bridge concerns occur on South Foster Road following severe storm events.
- Flooding and bridge concerns occur on Millbrook Road following severe storm events.
- Water runoff following severe storm events causes safety concerns associated with culverts, berms, and ditches along South Foster Road. Jackson Township has attempted to fill ditches with oversized rock for drainage.
- Controlling runoff and stream erosion.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Regulate and monitor overbank flows associated with extreme storm events.

Jefferson Township

- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.

Borough of Mercer

- Frequent flooding specific to inadequate state highway drainages exemplified by Maple Street. Storm culverts have been installed by the state in few areas.
- Poor stormwater controls surrounding the school. Stormwater (catch basin) facilities installed by the school.
- Management of stream, street, and property flooding caused by the natural terrain and topography of the eastern portion of Mercer Borough.

- Stabilizing peak flow conditions.
- Controlling stormwater from bordering municipalities.
- Controlling stormwater from the school district.

Otter Creek Township

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Stabilizing peak flow conditions.
- Regulate and monitor overbank flows associated with extreme storm events.
- Property damage, bridge/culvert damage, stream, street, and property flooding have occurred as a result of poor drainage and undersized structures insufficiently transporting stormwater.

Springfield Township

- Extreme storm events cause stream flooding, property damage, erosion of stream banks and beds, and bridge/culvert damage caused by increased surface runoff and poor drainage.
- Stabilization of peak flow conditions.
- Control the erosion of stream banks and beds, causing undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.

Wilmington Township

- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges

caused by increased runoff, poor drainage, and undersized structures.

- Control the erosion of farmland soils in the vicinity of White Chapel Road.
- Control the erosion of stream banks and beds, and scour at outfalls along Indian Run in the vicinity of Indian Run Road.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Stabilizing peak flow conditions.

Wolf Creek Township

- Maintenance and control of flooding associated with small tributaries during extreme storm events.
- Regulate and monitor overbank flows associated with extreme storm events.
- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff.

Worth Township

- Regulate moderate stream bed and bank erosion.

Agency Comments

- *PA Game Commission*: Acid Mine Drainage on State Game Land #284 east of Pennsy Road in Springfield Township.
- *PA Game Commission*: Possible runoff, pollution from the Old Fredonia Dump on State Game Lands #294 in Fairview Township.
- *PA Game Commission*: Potential Acid Mine Drainage from Old Mine #2 (out of Mercer County) could enter the county.
- *Shenango River Watchers*: Runoff from Auto Auction reached Coolspring Creek and caused trout kill.
- *PA Fish & Boat Commission*: Fertilizer run-off into Coolspring Creek and flowing into Lake Latonka is causing algae in the lake.

- *PA Fish & Boat Commission:* Acid Mine drainage in Neshannock Creek Watershed into Otter Creek near Scrubgrass Road.
- *Mercer County Conservation District:* Un-named tributary of Munnell Run from Lamor Road in East Lackawannock Township to mouth has flooding and sedimentation.
- *Mercer County Conservation District:* Un-named tributary of Neshannock Creek from US 62 to Brandy Springs Park in Mercer Borough has flooding and sedimentation.
- *Mercer County Conservation District:* Munnell Run from US 19 to mouth has flooding and bank erosion.
- *Mercer County Conservation District:* Otter Creek from ITT Reznor to mouth in Mercer Borough has flooding and bank erosion.
- *Mercer County Conservation District:* Coolspring Creek at SR 58 in Mercer Borough has flooding.
- *Mercer County Conservation District:* Neshannock Creek from SR 58 in Mercer Borough to Blacktown Road has bank erosion and flooding.
- *Mercer County Conservation District:* Coolspring Creek upstream of Lake Latonka has sedimentation and bank erosion.

4.7 Little Neshannock Creek Watershed

The following municipalities lie within the Little Neshannock Creek watershed: portions of East Lackawannock Township, City of Hermitage, Jefferson Township, Lackawannock Township, Shenango Township, and Wilmington Township.

The primary stormwater concern within the Little Neshannock Creek watershed was increased runoff. Secondary issues were undersized culverts, and poor drainage. Other issues mentioned included development within floodplains, field flooding, and stream bank erosion.

The Little Neshannock Creek watershed is located adjacent to and just west of the Neshannock Creek watershed. It drains an area of 32,410 acres (50.6 square miles), of which 26,768 acres (41.8 square miles)

are located within Mercer County. This watershed's drainage flows out of Mercer County to the south and into Neshannock Creek which flows into the Beaver River, part of the Ohio River watershed. In general, the Little Neshannock Creek watershed is somewhat flat in topography, becoming steeper along Little Neshannock Creek. It consists of poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to excess runoff. Areas of high density urban land use within the watershed include New Wilmington and small areas of high and low density urban land use dotted along Route 518. The remainder of the watershed consists mainly of a mixture of forest and farmland. Wetlands are also noted in the vicinity of Little Neshannock Creek. These wetlands provide flood storage and help water to infiltrate into the groundwater rather than running off into and flooding nearby creeks. Following is a detailed description of the Little Neshannock Creek watershed within Mercer County:

Soils – Little Neshannock Creek is surrounded by the Canfield-Ravenna association, found on gently sloping to moderately steep uplands underlain by glacial till. It is a moderately well drained and somewhat poorly drained soil association. Parts of this watershed also contain a small amount of the Chenango-Braceville-Halsey association, a well drained to very poorly drained soil type found on gently sloping to moderately steep stream terraces and moraines underlain by sandy and gravelly deposits. The remainder of the watershed contains the Ravenna-Frenchtown association, somewhat poorly drained to poorly drained soils found on nearly level to gently sloping uplands (Figure 9, page 36). This watershed also contains approximately 14,598 acres (22.8 square miles) of prime farmland soils, the majority of which are being farmed (Figure 8, page 33).

Geology – At the northern tip of the watershed is a small, 32 acre (.05 square mile) section of the Shenango formation, composed of siltstone, and having moderate to low porosity and moderate to low permeability. The majority of the watershed, 23,951 acres (37.4 square miles), is composed of the Pottsville formation, composed of shale, siltstone, claystone, limestone, and coal. This formation has variable porosity and moderate to low permeability. Approximately 2,794 acres (4.4 square miles) of the Allegheny formation is found

within the Little Neshannock Creek watershed. This formation has moderate to low porosity and moderate to low permeability (Figure 5, page 28).

Slope – The majority of the watershed is flat, having 0%-8% grade. The watershed becomes relatively hilly around Little Neshannock Creek and its West Branch, having 16-25% grade. Part of the land along Little Neshannock Creek, is very steep and has a >25% grade (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Farmland	12,642	19.8	47%
Forested	10,065	15.7	38%
Wetland	1,176	1.8	<1%
Low Density Urban	791	1.2	<1%
High Density Urban	326	0.5	<1%
Water	48	0.1	<1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Little Neshannock Creek Watershed.

East Lackwannock Township

- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation, habitat/resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased

groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.

- Monitor and management of increased runoff from Gabany's proposed development near the borough of Mercer.

City of Hermitage

- Moderate stream flooding caused by increased runoff.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat.
- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation, habitat/resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Maintenance and control of flooding associated with small tributaries during extreme storm events.
- Allocating the funding to maintain the existing stormwater system and to make improvements.

Jefferson Township

- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.

Shenango Township

- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures.
- Monitor and management of increased runoff and field flooding on Fennel Road.

- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.

Wilmington Township

- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures, especially along Bend Road, Garrett Road, Orchard Road, Means Road, and Ferris Road.
- East and West branch of Little Neshannock Creek have flooding, erosion, and sediment deposition issues, especially at the Gilliland and Campbell properties.
- Scouring at outfalls along Garrett Road, with soil erosion and culvert problems also noted.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Stabilizing peak flow conditions.
- Monitor and manage the potential for soil runoff, animal waste and fertilizer contamination into streams due to primary land use within the township being agricultural.

Agency Comments

- *Mercer County Conservation District:* Little Neshannock Creek in Wilmington Borough from SR 158 south to county line has bank erosion, sedimentation, and flooding.

4.8 Little Shenango River Watershed

The following municipalities lie within the Little Shenango River watershed: Portions of Fairview Township, Greene Township, Greenville Borough, Hempfield Township, Lake Township, New Vernon

Township, Otter Creek Township, Perry Township, Salem Township, Sandy Creek Township, and all of Sugar Grove Township.

Within the Little Shenango River watershed, the primary stormwater related concern was increased runoff, with secondary issues being undersized culverts, development in the floodplains, poor drainage, and ponding on roads. Other issues included stream flooding, and sediment buildup in streams.

The Little Shenango River watershed is in the north central portion of the county. It drains an area of 69,240 acres (108.2 square miles), of which 47,309 acres (73.9 square miles) are within Mercer County. This watershed's drainage flows into the county from the north and drains into the Shenango River, which merges with the Beaver River to form the Mahoning River, part of the Ohio River watershed. In general, the Little Shenango River watershed is relatively flat in topography with some steep slopes along the river. The watershed consists of poorly drained to moderately drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to runoff. High density urban land uses are dotted along Route 358 intermixed with small areas of low density urban land use (residential areas). Only a small portion of Greenville lies within the Little Shenango River watershed. Greenville is a moderately sized, high density, urban area. The portion of Greenville within the Little Shenango watershed lies on relatively flat topography; therefore, it does not have the same runoff issues that the western portion of the municipality has. The remainder of the Little Shenango River watershed consists of mainly forested area and farmland. A considerable amount of wetlands can be found in the northwest section of the watershed. These wetlands are important because they provide flood storage and help water to infiltrate into the groundwater rather than running off into and flooding nearby creeks. Following is a detailed description of the Little Shenango River watershed within Mercer County:

Soils – The River itself is surrounded by the Wayland, course variant-Papakating-Red Hook association. This association consists of very poorly drained to moderately drained soils, found on nearly level floodplains and underlain by alluvium. Immediately surrounding that association is the Chenango-Braceville-Halsey association. This

association can be well drained to very poorly drained, and is found on gently sloping to moderately steep stream terraces and moraines. It can range from being well drained to very poorly drained. A small amount of the Canfield-Ravenna association is found in the northeast, on gently sloping to moderately steep uplands underlain by glacial till. The remainder of the watershed consists of the Ravenna-Frenchtown association, somewhat poorly drained to poorly drained soils, found on nearly level to gently sloping uplands (Figure 9, page 36).

Geology – The Little Shenango River is underlain by 5,226 acres (8.2 square miles) of the Berea sandstone through Venango formation, undivided. This bedrock formation is composed of a shale conglomerate and has moderate to low porosity and moderate to low permeability. Approximately 12,371 acres (19.3 square miles) of the Cuyahoga formation can be found underlying the floodplains. This formation is comprised of sandstone and has low porosity and low permeability. Surrounding the Cuyahoga formation is approximately 14,686 acres (23.0 square miles) of the Shenango formation, composed of siltstone and having moderate to low porosity and moderate to low permeability. The east is composed of 14,672 acres (23.0 square miles) of the Pottsville formation. This formation is composed of shale, siltstone, claystone, limestone, and coal and has variable porosity and moderate to low permeability (Figure 5, page 28).

Slope – This watershed is very flat, having 0%-8% grade throughout the majority of the north. Along the river, the watershed becomes relatively hilly with some steeper slopes 16%-25% grade to the south. Directly around the river can be found some slopes that have >25% grade (Figure 7, page 31).

Land Use – The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Farmland	19,314	30.2	28%
Forested	21,441	33.5	31%
Wetland	1,702	2.7	2%
Low Density Urban	1,058	1.7	2%
High Density Urban	888	1.4	1%
Water	124	0.2	>1%

Stormwater Management Issues Identified as Significant by Each Municipality within the Little Shenango River Watershed

Borough of Greenville

- Funding to upgrade existing storm water system.
- Controls and standards for issues that affect the runoff, erosion.
- Erosion of outflow drainage at Penn Power sub station off North Mercer Street – Replace outflow pipe and stabilize outflow area.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate and monitor overbank flows associated with extreme storm events.

Hempfield Township

- New commercial development and stormwater runoff from PennDOT owned and maintained roadways.
- Stabilizing peak flow conditions.

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.

New Vernon Township

- Stormwater controls and best management practices.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Stabilizing peak flow conditions.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Regulate and monitor overbank flows associated with extreme storm events.

Otter Creek Township

- Control road flooding and ponding north of the intersection of Route 358 and Freeland/Henry Road during heavy rain events.
- Control road flooding and ponding on Hughley Road north of the intersection of Hughley Road and Lyn Tyro Road during heavy rain events.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Stabilizing peak flow conditions.
- Regulate and monitor overbank flows associated with extreme storm events.
- Property damage, bridge/culvert damage, stream, street, and property flooding have occurred as a result of poor drainage and undersized structures insufficiently transporting stormwater.

Salem Township

- Because of the hills in Salem Township, the most important issues are wash outs on the roads and keeping the culverts open.
- Regulate stream flooding, soil erosion, stream bed and bank erosion, in-stream sedimentation, and bridge/ culvert damage caused by increased runoff.
- Control the erosion associated with roadways and keeping culverts free of obstructions.
- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.

Sandy Creek Township

- Control stream bank erosion along Tributary 36226 to Morrison Run along Pearson Road south of the intersection of Pearson Road and Petersburg Road.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate stream flooding, soil erosion, stream bed and bank erosion, and bridge/ culvert damage caused by increased runoff, undersized structures, and floodplain development.

Agency Comments

- *PA Fish & Boat Commission:* Erosion and flooding on Werner Road and Leech Road. Pasture flooding onto the road.
- *Mercer County Conservation District:* Flooding problems on Log Cabin Road and Leech Road in Sugar Grove Township.

4.9 Shenango River Watershed

The following municipalities lie within the Shenango River watershed: portions of Delaware Township, Greene Township, Greenville Borough, Hempfield Township, East Lackawannock Township, City of Hermitage, Jefferson Township, Lackawannock Township, Shenango Township, Wilmington Township and all of Jamestown Borough, Pymatuning Township, West Salem Township, Clark, City of Farrell, City of Sharon,

Sharpsville Borough, South Pymatuning Township, West Middlesex Borough and Wheatland Borough.

The primary stormwater concern in the Shenango River watershed was increased runoff. Secondary issues included poor drainage, stream erosion, street flooding, and undersized culverts. Other issues mentioned were development in the floodplains, field flooding, and scouring at outfalls.

The Shenango River watershed drains approximately the western 1/3 of the county, an area of 279,107 acres (436.1 square miles) of which 144,500 acres (226.0 square miles) lie within Mercer County. In general, the Shenango River watershed is very flat in topography, becoming steeper along the river, with some very steep slopes along the southern portion of the river. It consists of moderately drained to poorly drained soils with underlying bedrock that has moderate to low porosity and permeability, predisposing the area to runoff. Areas of high density urban land use within the northern half of the watershed include the majority of Greenville, the Transfer/Reynolds area, and small areas dotted along route 18. The highest density of urban and commercial land use in the county is found in the southern half of the watershed in an area called the "Shenango Valley", containing the Cities of Sharon, Hermitage, and Farrell, and the Boroughs of Sharpsville, Wheatland and West Middlesex. This dense urban land use predisposes an area to increased runoff, flooding, sedimentation, and water pollution. Because the Shenango River flows through the western portion of the Borough of Greenville, the topography is steeper along the river than in the remainder of the municipality. Route 18 into Greenville closely follows the Shenango River; therefore, that portion of Greenville has steeper slopes and extreme runoff problems after rain events. The remainder of the northern Shenango River watershed consists mainly of farmland with some forested areas, especially around the Shenango Lake Reservoir. The northwest corner of the watershed contains wetlands, some considerable in size. These wetlands provide flood storage and help water to infiltrate into the groundwater rather than running off into and flooding nearby creeks. The area surrounding the Shenango Valley consists mainly of farmland and forest, with some low density urban areas adjacent to the major county and state roads.

Municipal Separate Storm Sewer Systems (MS4s) are designed to collect polluted storm water runoff and discharge it, untreated, into local streams and rivers. The Environmental Protection Agency established Phase I of the National Pollutant Discharge Elimination System (NPDES) stormwater program in 1990 to implement a stormwater management program as a means to control polluted discharges. Phase I of NPDES requires the operators of MS4s that serve populations of 100,000 or greater to implement a stormwater management program as a means to control polluted discharges from those MS4s.

The Stormwater Phase II Rule extends coverage of the NPDES stormwater program to certain "small" MS4s but takes a slightly different approach to how the stormwater management program is developed and implemented.

EPA's Stormwater Phase II Rule establishes an MS4 stormwater management program that is intended to improve the Nation's waterways by reducing the quantity of pollutants that stormwater picks up and carries into storm sewer systems during storm events. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers, and plastic bottles. When deposited into nearby waterways through MS4 discharges, these pollutants can impair the waterways, thereby discouraging recreational use of the resource, contaminating drinking water supplies, and interfering with the habitat for fish, other aquatic organisms, and wildlife (Environmental Protection Agency Website).

The DEP is responsible for administering the state's stormwater management program. Under this program, operators of small MS4 systems are required to develop and implement storm water management plans to reduce pollutant loadings to the maximum extent practicable, and must investigate and eliminate illicit connections to the storm sewer system. Implementation of the storm water management plan typically requires the development of BMP's and the achievement of measurable goals to satisfy each of the

following six (6) minimum control measures: Public Education and Outreach, Public Participation and Involvement, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Runoff Control, and Pollution Prevention/Good Housekeeping. The Phase II Model Ordinance details BMP's that are effective in Mercer County and suggests recommendations on how the municipalities with MS4 NPDES permits can amend their current ordinances to incorporate BMP's that will be consistent with the specific requirements of their MS4 NPDES permit.

The only MS4 municipalities within Mercer County lie within the Shenango River watershed. They include the Cities of Sharon, Farrell, and Hermitage, and the Borough of Sharpsville.

Following is a detailed description of the Shenango River watershed within Mercer County:

Soils – The soils surrounding the Shenango River in the north consist mainly of the Canfield-Ravenna association, a soil association that ranges from having moderately well drained to somewhat poorly drained characteristics. This association can be found on gently sloping to moderately steep uplands underlain by glacial till. Surrounding the Shenango River in the south is the Wayland, coarse variant-Papakating-Red Hook soil association, a very poorly drained to moderately drained association found on nearly level floodplains underlain by alluvium. Surrounding is the Canfield-Ravenna association, found on gently sloping and moderately steep uplands underlain by glacial till. This association ranges from being moderately well drained to being somewhat poorly drained. The far northern river and the southern river also are surrounded by the Wayland, coarse variant-Papakating-Red Hook association. This association consists of very poorly drained to moderately drained soils found on nearly level floodplains underlain by alluvium. The soils around Big Run, and in the floodplains of the southern portion of the Shenango River consist of the Chenango-Braceville-Halsey association, soils that range from being well drained to very poorly drained, and are found on gently sloping to moderately steep stream terraces and moraines and are underlain by sandy and gravelly deposits. The majority of the watershed consists of the Ravenna-Frenchtown association, a

composition that is somewhat poorly drained to poorly drained and is found on the nearly level to gently sloping uplands surrounding the rivers (Figure 9, page 36).

Geology – The northern part of the river and the Shenango Reservoir is underlain by 8,016 (12.5 square miles) of the Berea Sandstone through Venango formation, undivided. This formation is composed of a shale conglomerate and has moderate to low porosity and permeability. The remainder of the river and the streams in this watershed are underlain by 55,315 acres (86.4 square miles) of the Cuyahoga group, composed of sandstone. This formation has low porosity and low permeability. Approximately 30,430 acres (47.6 square miles) of the Shenango formation, composed of siltstone is found surrounding the Cuyahoga group. The Shenango formation has moderate to low porosity and moderate to low permeability. Approximately 50,429 acres (78.9 square miles) of the Pottsville formation is found in this watershed. This formation consists of shale, siltstone, claystone, limestone, and coal. This formation has variable porosity and moderate to low permeability (Figure 5, page 28).

Slope – The general topography of the watershed is very flat, having 0%-8% grade. The land around the river is hillier, having 16%-25% grade. These slopes become steeper along the Shenango River, especially in the south where slopes can exceed 25% grade in places (Figure 7, page 31).

Land Use – The Shenango River watershed contains the highest percentage of urban land use of any watershed in Mercer County as it contains the Shenango Valley, Greenville and the Transfer/Reynolds areas. The majority of the northern portion of the watershed is farmland, intermixed with forested areas, with a forested buffer around the Shenango Lake Reservoir to the south. In the rural areas surrounding the Shenango Valley, sprawl is occurring into farmland and forested areas. The following table presents coverage of the most dominant land uses within the watershed:

Land Use	Acres	Square Miles	Percent of Watershed
Farmland	55,324	86.0	38%
Forested	53,618	83.0	37%
High Density Urban	10,930	17.0	8%
Low Density Urban	4,798	7.5	3%
Wetland	3,298	5.2	3%
Water	4,185	6.6	2%

Stormwater Management Issues Identified as Significant by Each Municipality within the Shenango River Watershed

Clark Borough

- Regulate and monitor overbank flows associated with extreme storm events.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Monitor and management of increased runoff from upstream municipalities into the Borough and into the Shenango Reservoir.
- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation, habitat/resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.
- Finding the funding to pay for necessary improvements.
- Runoff causing channeling on properties between Charles Street and Valley View Road, between Charles Street and Milton Street, and between Nora Street and Winner Road. Also, noted problems on Route 258 at a culvert crossing (site shown on map).
- Flooding issues along Clay Furnace Road between Route 258 and Neshannock Road.

Delaware Township

- Property damage and soil erosion has occurred along Rock School Road, Beil Road, and Line Road as a result of increased runoff and poor drainage.
- Property damage and flooding has occurred along Stull Road as a result of poor drainage and undersized structures.
- Street flooding, bridge and culvert damage, and scour at outfalls has occurred along Quarry Road as a result of undersized structures.
- Bridge, culvert, and property damage has occurred along Heckman Road as a result of poor drainage and undersized structures.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Stabilizing peak flow conditions.
- Regulate and monitor overbank flows associated with extreme storm events.
- Delaware Township feels that current practices need to be made friendlier when replacing existing structures (i.e. bridges, large culverts); for instance, the permit process needs to be waived or expedited.

East Lackwannoek Township

- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation, habitat/resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Monitor and management of increased runoff from private golf course along Route 62.

City of Farrell

- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events. The Route 60 North storm sewer has a heavy accumulation of debris and partial obstruction of a 60" culvert pipe.
- Monitor and management of increased runoff between Pershing Drive, Landay Lane, and DeBrakeleer Avenue.
- Correction of significant ditch erosion between Pershing Drive and DeBrakeleer Avenue

Borough of Greenville

- Funding to upgrade existing storm water system.
- Controls and standards for issues that affect the runoff, erosion.
- Flooding of Stewart Avenue several times a year. Dredge the Erie Canal detention of runoff during the development of Trinity site.
- Flooding of Lancaster, Lebanon, and York Street area several times a year. Increasing drainage sizing and dredge Erie Canal.
- Flooding and erosion of road drainage in the area of East Greenville Drive and Hempfield Drive. Re-channel water upstream or detention of water, or increase and extend piping.
- Plum and Union Street - sewer cannot be cleared causing flooding. Replace old storm sewer.
- Bracken Alley - storm sewer is undermined and sink holes appear annually. Replace rusted out pipe.
- West Drive - erosion of the road side in the area west of Clarksville Street. Flooding of Clarksville Street. Dredge and drain ditches, riprap or possibility of piping ditch.
- Saul Run at Lancaster Bridge – silt and gravel build up. Could block bridge causing damage and flooding. Dredge Channel.

- Lebanon Avenue Bridge – silt and sand build up. Could block bridge causing damage and flooding. Dredge Channel.
- Saul Run – concrete channel, silt buildup; has to be dredged every couple of years.
- Henry Camp – road floods over banks every couple of years. Dike Saul Run banks to increase capacity.
- Flooding behind the Greenville Municipal building annually. Unknown solution.
- Flooding and silt and gravel build in small streams crossing North Third Street ext. Detention ponds up stream in West Salem Township.
- Flooding at the Borough line along Orangeville Road. Detention ponds up stream in West Salem Township.
- North Second Street 24" storm sewer is caving in. It could clog and cause flooding. Upgrade the old stone and clay pipe.
- Harrison Street Storm is old and undersized. Replace the sewer system in the area of Pringles.
- York Street Flooding. This will increase as the Trinity site is developed. Dredge the Erie Canal biannually; incorporate detention measures in any new development.
- Billing Alley drainage – The drainage goes onto private property in an undersized broken pipe. The pipe needs upgraded and put on a public easement.
- Stewart Avenue and Columbia Avenue – Ponding on Columbia every time it rains.
- East Avenue and Columbia Avenue – Ponding every time it rains.
- Main Street and Grant Street Ponding – Up size the pipe under the railroad crossing.
- Clinton Street and Canal Street - Up size the pipe under the railroad crossing.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Regulate and monitor overbank flows associated with extreme storm events.

Hempfield Township

- New commercial development and stormwater runoff from PennDOT owned and maintained roadways.
- On Cedar Drive and Birch Drive: PennDOT has culverted the water off of Conneaut Lake Road under municipal roads and into municipal culverts. This has caused increased runoff of water into the ditches and is causing erosion of the ditches along these two residential roads. Residents are losing portions of their front yards due to wash-outs.
- Control the problem associated with the intersection of Donation and Eighth Avenue caused by an undersized pipe.
- Control ponding in the vicinity of Saul Avenue and Woodbine Avenue.
- Waugh Avenue is located in the flood plain of the Shenango River and is prone to flooding during extreme storm events.
- An undersized culvert causes problems along Saint Glory Road.
- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.

City of Hermitage

- Flooding, sedimentation and erosion of stream banks of Baker Run, washing out residential yards.
- Moderate stream flooding caused by increased runoff.
- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Control the flooding of streams and streets, soil erosion, stream bed and bank erosion, in-stream sedimentation,

habitat/ resource damage caused by increased runoff from the development of parking lots, yards, streets, and roads.

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Erosion of stream banks of Bobby Run.
- Maintenance and control of flooding associated with small tributaries during extreme storm events.
- Allocating the funding to maintain the existing stormwater system and to make improvements.

Jefferson Township

- Stabilizing peak flow conditions.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events. Erosion and culvert problems on Ballpark Road, Charleston Road, Skyline Drive, and Bend Road. Ponding on Ballpark Road and Skyline Drive.

City of Sharon

- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintenance and control of flooding associated with small tributaries during extreme storm events.
- Stabilizing peak flow conditions.
- Ponding noted at the Fire Station, at the corner of Dock Street and the entrance to the former Flower Lumber, on South Irvine Avenue, and at corner of East State Street and Forker Blvd. Erosion along Bay Way, along Pine Run, and beneath the 24" pipe at St. Joe's parking lot.
- A fallen tree lays across the outfall at Budd Street and Sterling Avenue.

Sharpsville Borough

- Monitor and management of increased runoff from upstream municipalities.
- Monitor and management of water quality at Buhl Farm Lakes.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events. Undersized culverts at Twitmeyer Avenue and along Thornton Run, and erosion along the channel at High Street.
- Stabilizing peak flow conditions.
- Regulate and monitor overbank flows associated with extreme storm events.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Allocating the funding to maintain the existing stormwater system and to make improvements.

Shenango Township

- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures.
- Monitor and management of increased runoff and field flooding on Koncar Road and road flooding on Frampton Road where a culvert is washing out.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts caused by increased surface runoff during extreme storm events.

South Pymatuning

- Flooding and erosion issues: Buckeye Drive between Tamarack Drive and Hunter Street, Springwood Drive, erosion on Colt Road and Town Line, Buckeye Drive and Calahan, McCullough Run flooding onto Tamarack Drive and onto private properties, flooding from fields onto Tamarack Drive, flooding on Buckeye Drive, erosion at Saranac Drive and Huron, flooding on Hartford Road, flooding on Seneca Road, undersized culverts on Kane Road Seneca Drive, Tamarack Drive, Hummingbird Way, Blue Jay Way, and Maplewood Drive.
- Stabilizing peak flow conditions.
- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Regulate and monitor overbank flows associated with extreme storm events.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.

West Middlesex Borough

- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Regulate and monitor overbank flows associated with extreme storm events.
- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures. Cited problems with erosion of the drainage ditch

at Penn Avenue, drainage problems at the West Middlesex United Methodist Church parking lot, problems on Rt. 318 between School Street and Kiwanis Road, drainage problems on Route 18 in front of the High School, and increased flow on Hogback Run.

- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Monitor and management of increased runoff from upstream municipalities.
- Allocating the funding to maintain the existing stormwater system and to make improvements.

West Salem Township

- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Control the erosion of stream beds and banks, undercut roads and utilities, damage to in-stream cover, and clogging of bridges and culverts during extreme storm events.
- Control stream and property flooding, soil erosion, in-stream sedimentation, stream bed and bank erosion, and scour at outfalls caused by increased runoff.
- Control habitat/ resource damage from unknown causes.

Wheatland

- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Regulate and monitor overbank flows associated with extreme storm events.

- Control flooding on Council Avenue just north of the Shenango River.

Wilmington Township

- Stabilizing peak flow conditions.
- Decrease watershed pollution including dissolved and undissolved pollutants from increased runoff causing negative impacts to recreation, aesthetics, and in-stream habitat
- Regulate and monitor overbank flows associated with extreme storm events.
- Control the erosion of stream banks and beds, soil erosion, in-stream sedimentation, undercut roads and utilities, damage to in-stream habitat, clogging to culverts and bridges caused by increased runoff, poor drainage, and undersized structures.
- Maintain groundwater supplies as increasing runoff decreases the amount of rain that becomes groundwater. Decreased groundwater supplies may have negative effects on well water supplies or dry up stream base flow in dry periods.
- Allocating the funding to maintain the existing stormwater system and to make improvements

Agency Comments

- *Shenango River Watchers*: Flooding across Route 18 North into Greenville after rain events.
- *Mercer County Conservation District*: Un-named tributaries to Big Run in Reynolds between 10th and 20th streets have flooding issues.
- *Mercer County Conservation District*: Lowango Run in New Hamburg from the mouth to SR 58 has sedimentation and bank erosion.
- *Mercer County Conservation District*: Saul Run in Greenville from CN RR to mouth has bank erosion, sedimentation, and flooding.
- *Shenango River Watchers*: Increased runoff – road flooding on State Street between Taylor Avenue and Stambaugh Avenue during rain events.
- *Shenango River Watchers*: Bank erosion issues on Shenango River near Budd Street and Shenango Valley Freeway.

- *Shenango River Watchers*: Sedimentation into river from construction of new waste water treatment plant in Sharon.
- *Shenango River Watchers*: Scrap metal along banks of river and runoff of oil into river from Mercer Company property in Sharon.
- *Shenango River Watchers*: Flooding at parking lot over Baker Run in Hermitage after every rain event.
- *Shenango River Watchers*: Flooding, bank erosion to Pine Hollow Run along Shenango Valley Freeway in Sharon.
- *Shenango River Watchers*: Flooding down streets on West Hill in Sharon during rain events.
- *Shenango River Watchers*: Flooding after every rain event at corner of Connelly Blvd. and Chestnut Street.
- *PA Fish & Boat Commission*: Flooding issues on Lamor Road in Jefferson Township.
- *PA Fish & Boat Commission*: River Road in Jefferson Township is washed out.
- *PA Fish & Boat Commission*: High sediment load in Booth Run, South Pymatuning Township.
- *PA Fish & Boat Commission*: Storm drain flows directly into stream causing erosion and pollution, especially at I-80 and Route 60 interchange, and on Dutch Lane in Hermitage.
- *PA Fish & Boat Commission*: Flooding on Edgewood Drive in Pymatuning Township.
- *Mercer County Conservation District*: Un-named tributary to the Shenango River in the west side of the campground in West Middlesex has increased sediment load, bank erosion and flooding.
- *Mercer County Conservation District*: Turkey Run in Shenango Township at Campground Road has bank erosion and increased sedimentation.
- *Mercer County Conservation District*: Hogback Run from source in Hermitage to mount has bank erosion, increased sediment load, and flooding.
- *Mercer County Conservation District*: Bobby Run from source to mount has bank erosion, sediment, and flooding.
- *Mercer County Conservation District*: In South Pymatuning Township east of Tamarack Road and Seneca Road down

slope from Dean Dairy and Brookfield Farms, flooding and sedimentation noted along roadway.

- *Mercer County Conservation District*: Booth Run in West Salem Township and South Pymatuning Township from source to mouth has sedimentation, bank erosion, and flooding.
- *PA Fish & Boat Commission*: Increased sedimentation in Pine Hollow Run in Hermitage.
- *US Army Corps of Engineers (Shenango Lake Reservoir)*: Extreme sedimentation problem entering reservoir from Pine Hollow Run in Hermitage.
- *Shenango River Watchers*: Ponding on Highland Road near corner of Highland Road and Boyd Drive.
- *Mercer County Conservation District*: Flooding of Pine Hollow Run at Shenango Valley Freeway near the Honda Shop.
- *Mercer County Conservation District*: Flooding on Dutch Lane near the entrance to the trailer park.