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Sewickley Creek Watershed Assessment, Restoration, and Implementation Plan

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I. Introduction

Overview

Natural resource extraction-related industries have played a key role in the rapid growth of Southwestern Pennsylvania. Coal mining in Pennsylvania began during the 1700's and by the mid 1800's, coal was the primary energy source fueling the growth of Western Pennsylvania's steel industry. The coal industry reached its peak production in the early 1900's. As technology advanced and the work became less labor intensive and more efficient, employment in the industry began to decline. Competition from other energy sources replaced coal as the primary fuel in many industries and the demand for coal fell. Although coal was redirected for use in the electricity industry, many mines closed as reserves were depleted, leaving the Pennsylvania landscape and its waterways stained by its legacy of inadequate environmental regulation.

Sewickley Creek main stem within the Upper Sewickley subwatershed.

The story of Sewickley Creek, scarred by the effects of past coal mining activities, is a familiar one that is shared by many other watersheds in Southwestern Pennsylvania. Water polluted with metals and acid from flooded abandoned coal mines drains into the stream and stains its waters orange as it flows through backyards, towns, and farmlands alike. As a result of inadequate or non-existent treatment facilities, the stream is also polluted by sewage from rural residences and communities. Poor agricultural practices add additional nutrients. Coal waste piles, remnants from the heyday of coal mining, when environmental regulation was practically non-existent, continue to shed tons of sediment into the stream. Aquatic life throughout the watershed has been significantly degraded by metals, acid, sediment and excessive nutrients. Many segments of the creek do not meet their designated use under Pa. Code, Title 25, Chapter 93, Water Quality Standards. Although some water quality improvements have been made over the past several decades, there is still much work to be done to improve the quality of water and life within the Sewickley Creek watershed.

In 1992 an industrious group of local citizens decided to assert a positive influence within their environment and their watershed, forming the local non-profit, Sewickley Creek Watershed Association (SCWA). The initial interest of the group was to focus on abandoned mine drainage (AMD) remediation, which is the main source of pollution in the watershed. Their mission is to "promote the conservation of natural resources, monitor and improve water quality, and advocate wise land-use practices in the Sewickley Creek watershed." As the group grew to include a greater diversity of people, they realized the importance of taking a more holistic approach to their watershed community. With that in mind, and as part of its mission, the SCWA decided to formulate a long-range plan for the watershed through the Pennsylvania Department of

Conservation and Natural Resources (DCNR) Rivers Conservation Program. Using the DCNR planning process, they developed the Sewickley Creek Watershed Conservation Plan. This plan identified the environmental, cultural, and socio-economic characteristics within the watershed. From there it identified related issues and concerns and developed management options to address those concerns.

Since its inception, the SCWA has implemented a number of notable projects including AMD remediation projects, stream bank stabilization projects, rails to trails expansions, beautification projects, and the development of a biotic study area at the Westmoreland County Community College. Examples of future projects that the group would like to implement include enhancement of environmental education programs and recreational opportunities, as well as additional stream bank stabilization projects and additional AMD treatment. The group hopes to expand its efforts by having a multi-focused approach, creating new partnerships, increasing membership, and adding paid staff.

The Sewickley Creek Watershed Assessment, Restoration, and Implementation Plan was developed as a key component of an effort to address the pollution problems that currently affect Sewickley Creek and its tributaries. SCWA, in cooperation with numerous partners, created this plan to provide users with valuable information that will help to guide future restoration and implementation activities within the watershed. This assessment project is part of the group's continuing efforts to improve the Sewickley Creek watershed.

The SCWA contracted with Western Pennsylvania Conservancy (WPC) to gather available data, perform the field assessment, monitor AMD sites, and develop the implementation plan. In addition, WPC has provided technical assistance to SCWA on matters outside the specific scope of the Sewickley Creek Watershed Assessment, Restoration, and Implementation Plan.

The restoration of the Sewickley Creek watershed presents many challenges and users of this plan should understand that the recommendations identified within are based on the best information on restoration technologies available at the time of tis creation. Due to the evolving techniques and technologies used in watershed restoration, changing priorities of the government agency programs, and the availability of various funding sources used in restoration activities, a periodic review and updating of the plan is highly recommended.

As a result of this assessment being funded through the Pennsylvania Department of Environmental Protection, Bureau of Watershed Management's Section 319 Non-Point Source Pollution Program, the study is also developed to consider requirements of the U.S. Environmental Protection Agency (EPA) Section 319 program.

Public Information and Participation

Long-term local support is necessary if the Sewickley Creek watershed is to be restored and SCWA has made every effort to create the partnerships necessary to sustain current and future restoration efforts. SCWA has teamed up with local citizens, non-profit groups, local and county government, and state and federal government agencies to strengthen this support.

SCWA typically holds monthly meetings, encouraging all of their partners and interested local citizens to attend, assuring an open line of communication within the community. During this assessment, the watershed association asked WPC to provide regular updates on the progress of the assessment and to provide articles for their newsletter on progress. In addition, as the assessment proceeded, initiating personal contact with landowners to gain their support was a priority.

Assessment Methodology

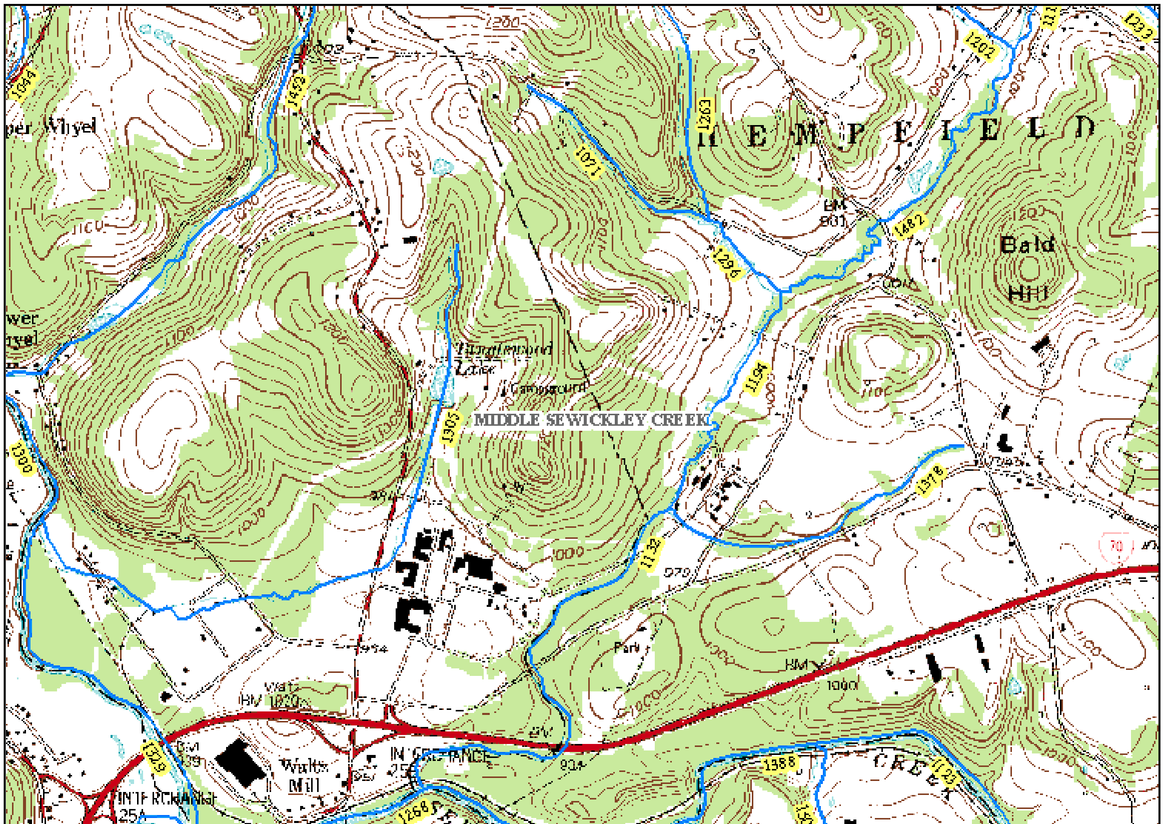
Sewickley Creek watershed assessment display and watershed activity at the 2010 Saint Vincent's Earth Day.

One of the most important factors in the development of the assessment, restoration, and implementation plan is the proper balancing of time, effort, and funding necessary to meet the goal of the plan. Within each suggested method there are limits to the type and amount of information that can be gathered, based on the goals, objectives, priorities, and the level of funding available for its development. The goals and objectives themselves are driven by different and sometimes competing priorities, established first by the organization for which the plan is developed and secondly, but often just as importantly, the funding source, which usually carries its own requirements or priorities.

The comprehensive assessment approach taken for Sewickley Creek under this study was primarily based on the desires of SCWA and cooperating partners to fulfill the requirements of an EPA approved Watershed Implementation Plan (WIP).

To fully assess the physical condition of the watershed, the stream channels and adjoining streamside areas (riparian zones) of all stream segments within Sewickley Creek as listed by the Pennsylvania Department of Environmental Protection 305b Report were assessed. A stream segment is considered to be a reach of stream bracketed by the intersection with an adjoining tributary or tributaries. The length of stream segments varies, depending on the distance between intersecting tributaries. Some sections are long, while others could be quite short.

All of the 305b stream segments of the watershed were given a computer-generated four digit GIS identification number, which relates directly to the 305b Report stream segment ID number. The GIS numbers are non-sequential due to the nature of their computer generation. However, order was kept by filing the score sheets for each tributary in sequence they were assessed, usually from the mouth to the headwaters.



Computer-generated GIS stream segment identification numbers (yellow highlighted four-digit number) projected on topographic maps to assist with data collection and storage during the assessment.

In order to assist in maintaining order of the collected data, the Sewickley Creek watershed was broken into five sub-watersheds for the purpose of this assessment. They are, starting at the headwaters and working downstream:

- Upper Sewickley
- Jack's Run
- Middle Sewickley
- Little Sewickley
- Lower Sewickley

Sewickley Creek Sub-Watersheds
Stream
Jacks Run
Upper Sewickley
Middle Sewickley
Lower Sewickley
Little Sewickley
0 0.5 1 2 3 4
Miles
Western Pennsylvania Conservancy
water, land, life.
JACKS RUN
LITTLE SEWICKLEY CREEK
LOWER SEWICKLEY CREEK
MIDDLE SEWICKLEY CREEK
UPPER SEWICKLEY CREEK
Westmoreland County
Fayette County
Arnold Palmer Regional Airport
Circleville
Shafton
Manor
Penn
Jeannette
Grapeville
Adamsburg
Lincoln Heights
Luxor
Bovard
Georges Station
Donohoe
Greensburg
Carbon
Fort Allen
South Greensburg
Denison
Youngstown
Hostetter
Baggaley
Whitney
Marguerite
Humphreys
Pleasant Unity
Trauger
Lippus
Mutual
Armbrust
Brinkerton
United
Norvelt
Weltytown
Mammoth
Southwest
Carpentertown
Kecksburg
Alice
Standard Shaft
Standard
Mount Pleasant
Laurelville
Bridgeport
Sunset Valley
Robbins
Guffey
Yohoghany
Rillton
Edna Number One
Edna Number Two
Herminie Number 2
Arona
Darragh
Herminie
Middletown
Cowansburg
Lowber
Madison
Centerville
Youngwood
Upper Whyel
Hutchinson
New Stanton
Yukon
Waltz Mill
West Newton
Hunker
Wyano
Reduction
Mendon
Central
Ruffs Dale
Tarrs
Port Royal
Centerville
Smithton
Lauffer
Reagantown
Alverton
Jacobs Creek

It was necessary to have a consistent way to compare stream segments and quantify conditions within and among them. As such, a modified version of the EPA Rapid Bioassessment Protocol for Streams and Wadeable Rivers was used during the development of the Sewickley Creek Watershed Assessment, Restoration, and Implementation Plan. The EPA protocol assigns a numeric value to ten different stream characteristics, or "assessment elements," in order to evaluate the overall stream quality. The assigned assessment scores range from zero to twenty, twenty being the highest in quality, and are based on specific conditions associated with each assessment element. An example of the assessment sheets that were used in the field can be found in Chapter VIII. Each of the ten individual assessment scores for each segment was totaled and averaged to yield an overall visual assessment score. This average score was then broken into four quality ranking categories:

- Optimal: Average score ranging 16-20
- Suboptimal: Average score ranging 11-15
- Marginal: Average score ranging 6-10
- Poor: Average score ranging 0-5

Using these four categories as a reference, a GIS-based map was developed to identify the quality rating of each stream segment for the entire watershed and is included within the report.

In conjunction with the visual assessment work, ten individual AMD locations were identified for detailed monitoring. AMD discharge monitoring sites were selected based on the amount of pollution they produce and the effect on the stream caused by the individual discharge. In general, those with the largest flows and impacts to the stream were chosen for monitoring.

Monitoring included chemical as well as flow data for each site. AMD water samples were collected as grab samples and then transported to Skyview Laboratory in Jennerstown, Pa. Samples were tested in the lab for pH, hot acidity, alkalinity, total suspended solids (TSS), total iron, total aluminum, total manganese, and total sulfates. Flow-measuring devices were installed by SCWA partners and volunteers on AMD sites where possible and included notched weirs or collection pipes that were measured using a bucket and stop watch to determine flow. AMD flow measurements, along with associated water quality sampling, were performed on a monthly basis for roughly one year.

To help identify on which side of the stream pollution sources are located, a designation of "river right" or "river left" is used. This is the standard practice that is used by the American Canoe Association when describing locations on a stream. It is very important to understand that these directions are given in relationship to the observer always facing "downstream." In this way, the directional references of north, south, east, and west directions are minimized as streams are constantly shifting the direction in which they flow.

In addition to monitoring 10 AMD discharges, 11 stream locations on Sewickley Creek and its tributaries were also sampled. Flow measurements and chemical samples were taken to establish in-stream pollution loads. Flow measurements were performed to determine the volume of water per unit of time that is flowing through a stream segment. By measuring flow volume and collecting a chemical sample at the same time, the total "load" of each in-stream pollutant analyzed can be determined.

Measuring stream flow relies on an area-velocity method to determine the volume of water flowing through a gaging station per unit time. The method requires that for each monitoring location a cross-section area and water velocity be measured. The flow of a stream location or station can be calculated when the cross-sectional area (square feet) is multiplied by velocity (ft/second) of the flowing water, thus the discharge units are in terms of cubic feet per second (ft^3/sec). Generally, the cross-section at a particular monitoring station is divided into incremental cross sections or rectangles. Incremental cross-sections are established by stretching a tape measure perpendicularly across the stream (from water edge to water edge) and determining an incremental distance (width) that will yield a minimum of 12 divisions. For example, if a stream was 12 feet wide, then there would be 12 one-foot divisions. In practice, each incremental division (12 for this study) with a calculated width is measured for depth and has a velocity measurement associated with it. Establishing the width of an incremental division at a gaging station is an important aspect of stream flow measurement, and although the same stations will be repeatedly measured, changing water levels in the stream channel can result in a change of the incremental width. Therefore, at each gaging event the stream width is measured and the incremental cross section calculated at each monitoring event.

By monitoring various points of the stream for AMD impacts throughout the watershed, average pollution loads were established for stream segments being affected by abandoned mine drainage. These measured pollution loads are useful in comparing pollution loads developed through computer-generated models used to develop the total maximum daily load (TMDL) for Sewickley Creek. A discussion of the results is presented within the study.

SCWA Restoration Priorities

The SCWA's priorities are to:

- Assess the Sewickley Creek watershed to identify sources of pollution causing impairments to water quality.
- Develop and implement restoration plans for major pollution sources affecting water quality.
- Identify all AMD locations and abandoned mine areas directly affecting the quality of the stream.
- Identify resources that will assist SCWA in meeting water quality improvement goals.
- Monitor changes in water quality and stream biology as restoration efforts proceed.

- Educate the public about the mission of SCWA, its ongoing involvement in restoration activities, and the importance of conserving the watershed's unique natural and cultural assets through sound land-use practices.
- Improve water quality enough to ultimately remove all impaired stream segments from Pennsylvania's Integrated Waters List.

II. Watershed Description

Overview

The Sewickley Creek watershed is located in the southwestern region of Pennsylvania in central Westmoreland County. The watershed drains into the northward flowing Youghiogheny River which, in turn, drains into the Monongahela River shortly before it joins with the Allegheny River in Pittsburgh to form the Ohio River.

The headwaters of Sewickley Creek begin as a series of springs that form Welty Run on Chestnut Ridge, above the community of Welty Town. Sewickley Creek's main stem begins north of Pleasant Unity and joins with Welty Run in Norvelt. From there it flows in a west-southwest direction through the communities of Youngwood, New Stanton, Hunker, Yukon, and Lowber, to its confluence with the Youghiogheny River at Gratztown just north of West Newton.

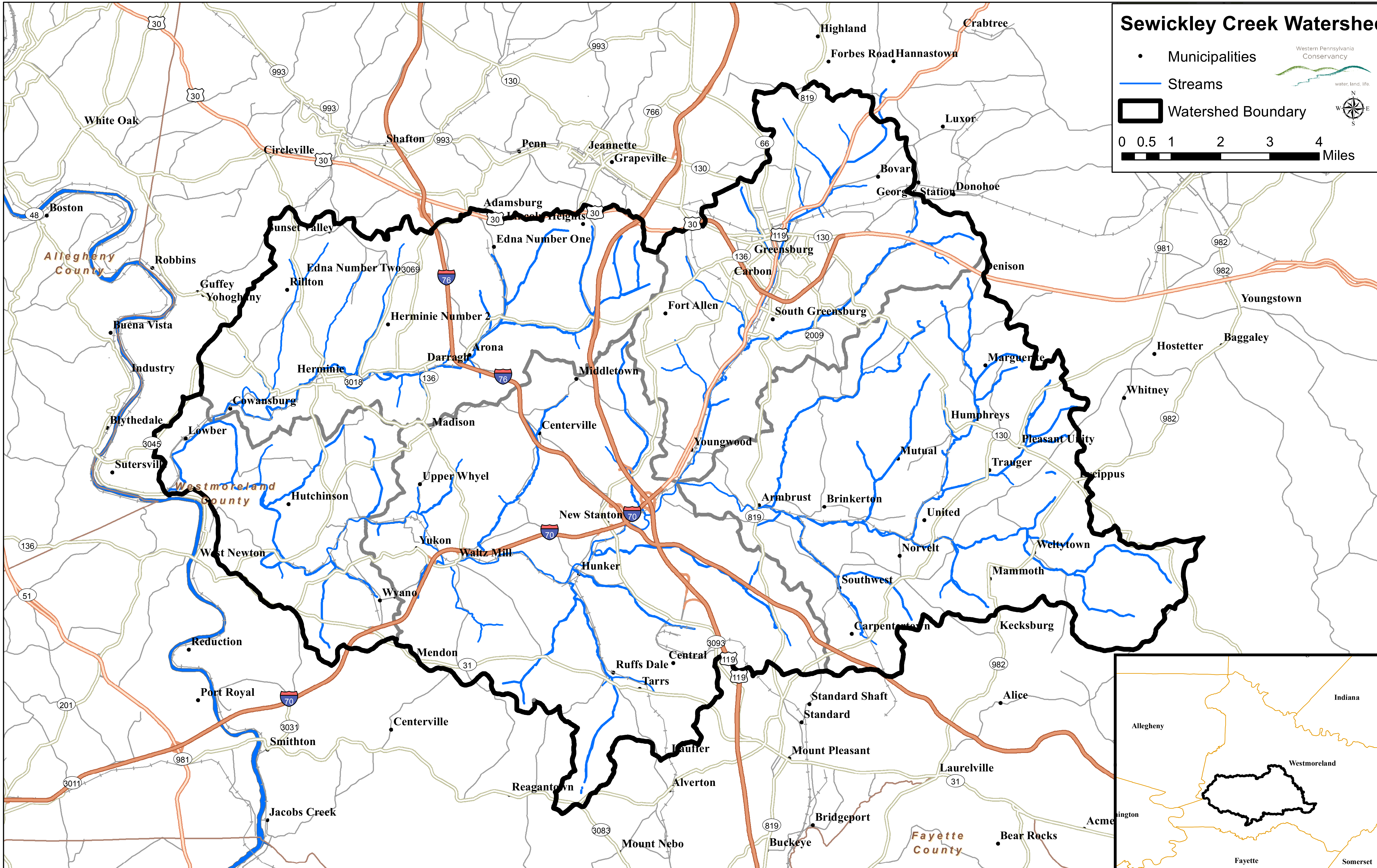
The temperate climate of the Sewickley Creek watershed has an average annual mean temperature of 50 degrees Fahrenheit and an average annual precipitation of 40-44 inches (weather.com/Scarlift, 1971).

The Sewickley Creek watershed is comprised of 19 named tributaries, numerous unnamed tributaries, and main stem Sewickley Creek, which flows approximately 30 miles (47 km) in length. The named sub-watersheds range in size from 1.64 square miles to 30.8 square miles. The largest tributaries to Sewickley Creek are Little Sewickley Creek (30.8 square mile drainage), which enters Sewickley Creek at Cowansburg near its mouth, and Jacks Run (28.6 square mile drainage) which joins the main stem at Youngwood. The entire Sewickley Creek watershed drains 168 square miles.

In 1994, the Sewickley Creek Watershed Conservation Plan reported that over 85% of the land use within the Sewickley Creek watershed fell into the categories of either agricultural operations or forestland. A vast majority of non-rural land use such as urban residential, non-rural mixed use, and industry occur within and adjacent to the city of Greensburg and, to some extent, along the Route 30 and Route 119 corridors. Rural residential and/or mining uses are significant in a few townships such as Mt. Pleasant, South Huntingdon, and Unity.

Geography

Main stem Sewickley and its tributaries dissect the hills into a dendritic or branching (similar to tree roots) drainage pattern. Two physiographic sections partition the Sewickley Creek watershed. The majority of the land consists of gently rolling hillsides with an increasingly mountainous terrain rising towards the eastern boundary. The rounded hills and open valleys characterize the Pittsburgh Low Plateau section, while the broad ridges and valleys of the extreme eastern portion lie within the Allegheny Mountain Section of the Appalachian Plateau. The underlying rock of these sections is comprised mainly of sandstone, siltstone, shale,


Sewickley Creek Watershed
Municipalities
Streams
Watershed Boundary
0 0.5 1 2 3 4
Miles
Western Pennsylvania Conservancy
water, land, life.
N
W
E
S
Highland
Crabtree
Forbes Road
Hannastown
Luxor
White Oak
Shafton
Penn
Jeannette
Grapeville
Circleville
Bovar
Georges Station
Donohoe
Boston
Adamsburg
Sunset Valley
Edna Number One
Allegheny County
Robbins
Edna Number Two
Greensburg
Carbon
Denison
Guffey
Rillton
Yohoghany
Fort Allen
South Greensburg
Youngstown
Buena Vista
Herminie Number 2
Hostetter
Baggaley
Arona
Darragh
Industry
Herminie
Middletown
Cowansburg
Whitney
Humphreys
Blythedale
Lowber
Madison
Centerville
Youngwood
Pleasant Unity
Mutual
Trauger
Sutersville
Upper Whyel
Westmoreland County
Hutchinson
Armbrust
Brinkerton
United
New Stanton
Yukon
Norvelt
Weltytown
West Newton
Waltz Mill
Hunker
Mammoth
Southwest
Wyano
Carpentertown
Kecksburg
Reduction
Mendon
Central
Ruffs Dale
Tarrs
Standard Shaft
Alice
Port Royal
Standard
Centerville
Smithton
Mount Pleasant
Laurelville
Alverton
Reagantown
Jacobs Creek
Bridgeport
Acme
Mount Nebo
Buckeye
Fayette County
Bear Rocks
Allegheny
Indiana
Westmoreland
Fayette
Somerset

limestone, and coal. Elevations range from approximately 2,180 feet above sea level in the eastern portion of the watershed to 764 feet at the confluence of Sewickley Creek and the Youghiogheny River.

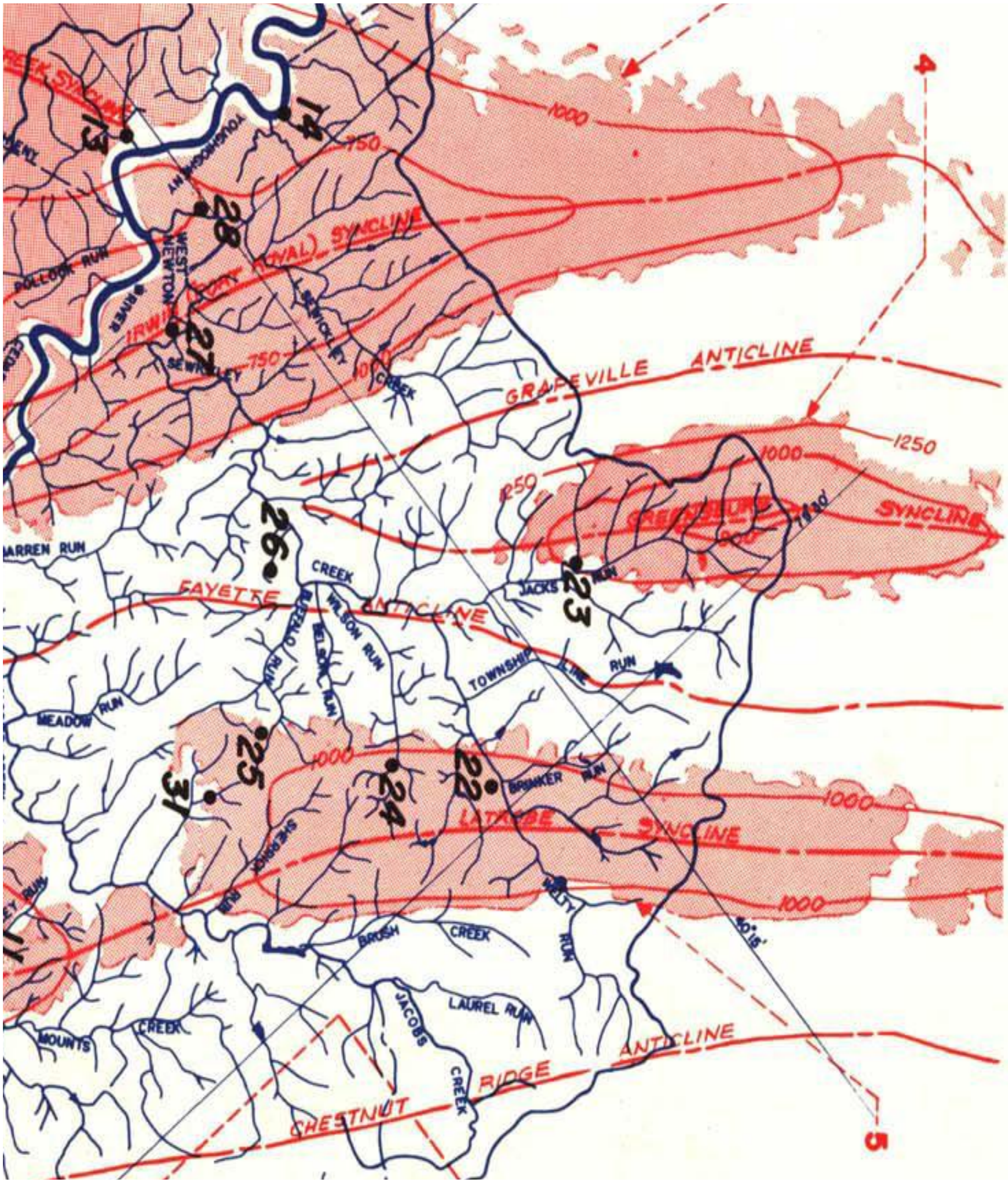
Geology

The Appalachian Plateau Physiographic Province of Pennsylvania is the geological locality of the Sewickley Creek watershed. The Appalachian Plateau covers the greatest extent of any physiographic province in Pennsylvania, extending from Greene and Somerset Counties in the southwest to Erie County in the northwest and to Wayne and Pike Counties in the northeast. Although the Plateau is a highland area, it has been deeply dissected by stream systems, creating a landscape of deep valleys and rolling hills [Pennsylvania Department of Conservation and Natural Resources (DCNR), 1996].

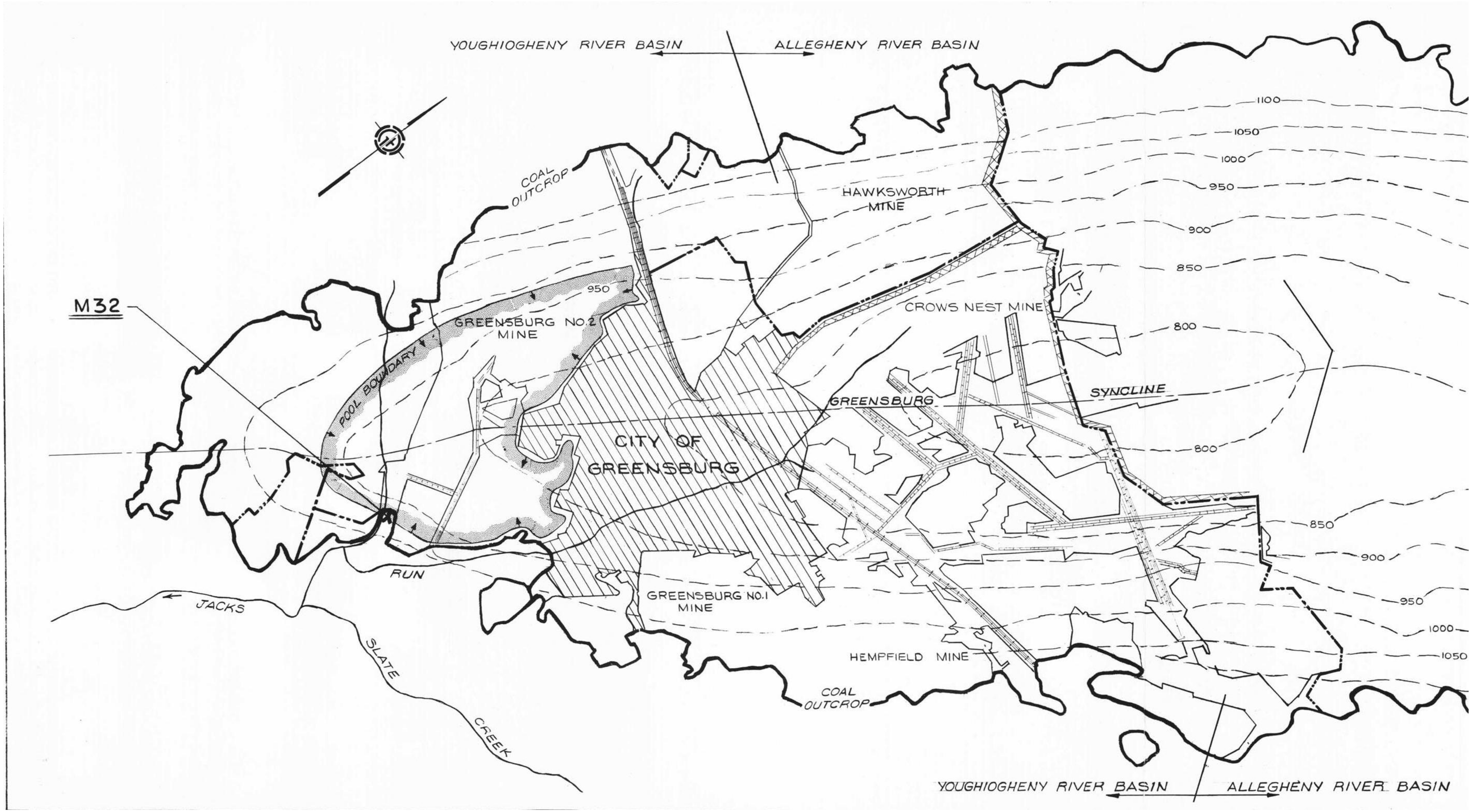
Chestnut Ridge borders the Allegheny Mountain Section of the watershed in the eastern extreme of the watershed. This physiographic section is made up of broad ridges separated by broad valleys (DCNR/Pa. Geologic Survey, 1996). Rocks within this section are comprised mainly of shale, siltstone, sandstone and conglomerate, some limestone, and coal.

Perhaps the most significant geological features within the Sewickley Creek watershed are the synclinal basins. These structural basins are particularly significant because of the major coal seams within them. The major structural features within the watershed include the Latrobe Syncline, Greensburg Syncline, Irwin (Port Royal) Syncline, and the Fayette Anticline [Pennsylvania Department of Environmental Resources (DER), 1971]. All of the geologic structures associated with the watershed comprise the Monongahela Group, which contains the Pittsburgh Coal Seam. The Pittsburgh Coal Seam is the thickest coal seam within the synclinal basins and was extensively mined. Presently, all underground mining of the seam has ceased and all the mines are abandoned and flooded.

The Irwin (Port Royal) Syncline is located in the northwestern portion of the watershed near Little Sewickley Creek and is comprised primarily of Monongahela Group structural components, with additional portions of the Washington Group scattered throughout the structure above the Monongahela Group. Beginning in the 1860’s, the Irwin (Port Royal) syncline was the most intensively mined syncline in the region. The outcrop line of the Pittsburgh Coal Seam in the syncline (where the coal structure rises to meet the surface) encompasses approximately 150 square miles. Approximately two thirds of this area drains to the main stem of the Youghiogheny River and Sewickley Creek. The exposed coal seam near the mouth of Sewickley Creek is the



This map, clipped from the PA DER Scarlift Report for the Youghiogheny, shows the three geologic synclines that underlie the Sewickley Creek watershed and is presented here only as a reference. The areas shaded areas show the extents of the Pittsburgh Coal Seam with relation to the synclinal basins. These areas were heavily deep mined, abandoned and are now flooded. Most major AMD discharges drain from points along the edge of the syncline where the coal "outcrops" to the surface. The numbers refer to figures in the Scarlift Report.



Greensburg Syncline Map – PA DER Scarlift Report – Youghiogheny River 1971

Latrobe Syncline Map – PA DER Scarlift Report – Youghiogheny River 1971

Irwin Syncline Map – PA DER Scarlift Report – Youghiogheny River 1971 lowest outcrop in the syncline basin and mine drainages from the syncline are mostly in this vicinity [Pennsylvania Department of Environmental Resources (DER), 1971].

The Greensburg Syncline, which also contains a portion of the Pittsburgh Coal Seam, is located, as its name suggests, near the city of Greensburg and mostly within the Jacks Run sub basin in the northeastern part of the watershed. Surface strata are primarily the Monongahela group, and the outcrop line of the Pittsburgh Coal Seam encompasses 26.5 square miles. Pittsburgh Coal outcrops at elevation 950 to 1300 ft. and is deepest at elevation 750 in the center of the basin [Pennsylvania Department of Environmental Resources (DER), 1971]. In the past several decades, water quality in Jacks Run has declined due to a substantial amount of mine drainage discharging from a drift opening in the Pittsburgh coal outcrop within the Greensburg Syncline basin.

The Latrobe Syncline is located in the southeastern portion of the watershed near Brinker Run and Welty Run. Surface strata are almost entirely Monongahela Group [Pennsylvania Department of Environmental Resources (DER), 1971]. The outcrop line of the Pittsburgh Coal Seam encompasses approximately 75 sq. miles within the syncline. The Pittsburgh Coal Seam within this syncline is 7 feet thick near Mammoth and 8 feet thick near Mt. Pleasant. The Redstone Seam, located within the Brinkerton area and partially located within the Latrobe Syncline, has also been extensively strip-mined. The northern half of the basin drains to Loyalhanna Creek of the Allegheny River and the southern half drains to Sewickley Creek and Stauffer Run (Jacobs Creek) of the Youghiogheny River system [Pennsylvania Department of Environmental Resources (DER), 1971].

Soil Characteristics

The consideration of soil types and associations is important when determining the best particular land-use activity for a specific area, keeping in mind that certain land uses are not always suitable for a specific soil type. Soil associations are comprised of two to three major soil types along with a few minor types. Local variations in characteristics and types occur as a result of relief, depth to bedrock, slope, and drainage quality. Descriptions of the soil associations located within the Sewickley Creek watershed are as follows:

- The Dormont-Guernesy-Culleoka soil association consists of soils that are formed in materials weathered from predominantly calcareous shale and limestone. These soils are typically found on rolling summits, shoulders, and side slopes.
- The Gilpin-Warton-Ernest soil association is formed in materials weathered from acid shale, siltstone residuum, and colluvium. These soils are generally found on undulating ridge tops and hilly to steep slopes.
- The Upshur-Gilpin-Vandergrift soil association is comprised of soils formed in colluvium and residual materials weathered from red clay and shale and are found on ridges and hill slopes in intermountain valleys. This association is particularly susceptible to landslides.

- The Laidig-Buchanan-Hazleton association is formed in colluvium and residual materials weathered from sandstone, siltstone, and shale. This association is generally found on ridge tops and on the upper to middle side slopes of mountains.
- The Monongahela-Weinbach soil association is formed in materials weathered dominantly from old stream and river alluvium, and is commonly found on smooth to rolling summits, shoulders, terraces, and side slopes.
- The Meckesville-Keck Kill soil association is formed in colluvium and residual materials weathered from red shale, siltstone, and sandstone. Soils are steep and well drained from the upper part of mountains and ridges.

Water Quality Standards

The Chapter 93 Water Quality Standards of the Pennsylvania Code, Title 25, Department of Environmental Protection reports protected water uses, statewide water uses, and the water quality standards that protect water uses. The headwaters of Sewickley Creek, including the Welty Run tributary system, are classified as a High Quality Cold Water Fishery (HQ CWF) to just below the town of United. From this point to its confluence with the Youghiogheny River, Sewickley Creek is designated as a Warm Water Fishery (WWF).

Watershed Impairments

Sewickley Creek watershed is affected by a variety of point and non-point source pollutants including:

- AMD pollution and sediment from past coal mining
- Increased nutrient and sediment loads from poor agriculture practices
- Sewage contamination from failing or non-existent septic systems
- Uncontrolled stormwater drainage
- Sediment from dirt and gravel road runoff
- Erosion issues from poor streamside vegetation management
- Flooding from urban channelization
- Acid deposition at the headwaters of the watershed

Of all of these impairments, AMD is the most prevalent. Evidence of past mining activities is present throughout the watershed, from rural areas to those more urbanized. Although both surface and underground mining has taken place, abandoned underground mines have had the largest effect on water quality in Sewickley Creek. AMD discharging from underground mines accounts for the majority of water pollution within the watershed. The largest discharges flow at rates of over 1,000 gallons per minute and sometimes several thousands. Also associated with abandoned underground coal mines is erosion from mine spoil piles, the waste product of coal mining and processing. Often these piles were located near streams, and because many are un-vegetated due to the material they are made of, they can easily erode into waterways. Surface mining has also caused water pollution problems in some instances. Of particular note are those developed before modern day mining regulations required pollution controls. Often these older surface mines create AMD high in acid and aluminum, which are particularly harmful to aquatic life. Thankfully, there are far fewer water quality problems created by poorly reclaimed surface mines than underground mines in Sewickley Creek.

Agricultural practices in some areas of the watershed add nutrients and sediment loads to the streams as well. Some stream segments are directly accessible by cattle, which can trample streambanks and expose the water to animal waste. Direct runoff from barnyards can also impair receiving streams with the same pollution sources. Runoff from agricultural fields can enter waterways when little or no streamside vegetation is present to act as a buffer.

Other sources of non-point source pollution also affect areas of the watershed. Poorly functioning or non-existent septic systems, uncontrolled stormwater, sediment from dirt and gravel roads, poor forest harvesting practices, and poor streamside vegetation cover all affect the watershed. Several stream segments have severe erosion and sedimentation problems related to land-use activities in the more residential areas of the watershed. Acid deposition affects the watershed's streams with little buffering capacity. However, none are as widespread or destructive as the problem caused by abandoned underground coal mines and their associated AMD.

Extraction of natural gas has also been common throughout many areas within the Sewickley Creek watershed, and has led to some erosion and sediment problems. With the increased production of gas from deep shale deposits using hydraulic fracturing (fracking) pollution issues associated with those activities is also a concern. Sediment from well pad construction and pipeline installation can be significant issues if erosion and sediment controls are either improperly installed or not installed at all. Surface pills of toxic materials during truck transfer or accidents at well pads, improper waste disposal, and migration of methane into water sources are causes for concern.

Studies of Sewickley Creek

Previous studies have identified AMD pollution problems throughout the Sewickley Creek watershed. Two examples are the DER's 1971 Operation Scarlift Report and a 1999 collaborative study by the United States Geological Survey (USGS), the U.S. Department of Energy (USDOE) and the National Energy Technology Lab (NETL) - Water-Quality Conditions During Low Flow in the Lower Youghiogheny River Basin, Pennsylvania, October 5-7, 1998.

The Operation Scarlift Report found fourteen major discharge sources of AMD within the boundaries of the watershed, citing eleven abandoned mine sites responsible for the discharges. According to this report, at the time, Sewickley Creek was considered to be the most polluted sub-basin within the Youghiogheny River watershed with the main stem of Sewickley Creek contributing more acidity and iron than any other Youghiogheny River tributary. Additionally, the report found that the tributaries of Little Sewickley Creek and Township Line Run also were polluted by AMD but to a lesser degree. Over the years, many of the mine discharges that produced acid water have turned net alkaline due to flooding of the mines and other naturally occurring processes. However, pollution from metals, primarily iron, still pollute Sewickley Creek and many of its tributaries.

The USGS/USDOE/NETL study was a geophysical investigation of the Lower Youghiogheny River, which includes Sewickley Creek. It used airborne remote sensing to identify water pollution sources using infrared and electromagnetic conductivity sensing equipment suspended from a helicopter, which flew regular transects of the entire Sewickley Creek watershed. Ground-truthing of remote sensing data identified AMD sources. In addition, a water quality synopsis of the Lower Youghiogheny River watershed was performed. From the data collected, it was determined that 60% of the AMD pollution load within the Youghiogheny River came from abandoned coal mines in the river's tributaries and that 44% of that load came from Sewickley Creek. It was also found that 40% of the pollution load in the Youghiogheny River came from artesian flow directly into the river from abandoned underground mines.

Because of the many underground mines were located within Sewickley Creek, the watershed also contains numerous areas associated with those mines that contain abandoned piles of mine waste, or "gob" piles of various sizes. Because these large un-vegetated mine waste piles often contain acid bearing rock, they sometimes serve as additional pollution sources to Sewickley Creek. In addition to acidic runoff during rainstorms, they also produce sediment as they erode over time. Evidence of this erosion can be seen within the substrate of numerous stream segments throughout the watershed. However, over the many years since the underground mines ceased operation, many of the mine spoil piles have been "reprocessed" to remove the coal that was discarded along with the waste rock because of old inefficient mining practices. Once the coal was removed, the reprocessed waste piles were then "reclaimed" by covering them with soil and planting them with grasses, significantly reducing their ability to pollute. *Project Gob Pile* was a study completed in 2001 by the Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCAMR) to evaluate the feasibility of removing, reprocessing, or reclaiming the remaining coal waste piles in Westmoreland County. It identified 42 gob piles of various sizes throughout Sewickley Creek. Today, some of those mine waste piles have been addressed but the many that remain very likely contain low amounts of usable coal, which make them unlikely candidates for reprocessing or removal. Those remaining will likely be reclaimed over time as funding becomes available to address them or market conditions change to make them more valuable to reprocess and reclaim.

Restoration

Restoration efforts for improving water quality within the Sewickley Creek watershed should focus on reducing the variety of impacts affecting the watershed. The implementation of restoration efforts should lead to an improvement in water quality, which would in turn lead to the removal of impaired stream segments from the integrated waters list. A potential for increased recreational activities and marketability for residential and industrial areas could follow. Current restoration efforts include several active and passive AMD treatment systems as well as enrollment of private land in the Conservation Reserve Enhancement Program (CREP) to install stream bank fencing on farmland.

Recreation, which is becoming an increasingly valuable economic resource, could become a major source of revenue within the region once degraded areas within the watershed are addressed and water quality improves. Much of the streamside land remains wooded and riparian conditions and in-stream habitat is generally of good quality throughout most of the watershed. Restoration of degraded stream water quality would likely lead to higher recreational use for recreational fishing and other activities. An abandoned railroad traverses some of Sewickley Creek and could be developed as a rail trail and serve as another recreational resource.

III. Problem Identification

Overview

The Sewickley Creek watershed is impaired by several types of non-point source (NPS) pollution. NPS gets its name from the way that the pollution is produced and/or how it is transported to waterways. NPS pollution is usually created over a broad area and often pollutes in the same manner, emanating from many individual sources within that area. Within the city of Greensburg and its surrounding suburbs, for example, a significant portion of the area is paved with asphalt or concrete and used as parking for multiple businesses. When vehicles park on the paved areas, oil, grease, gas, and other various toxic fluids leak from these vehicles and collect on the pavement. Then, during a rain event, these fluids are washed from all of the paved surfaces and transported to the drainage ways that eventually lead to nearby streams. The resultant dirty runoff water is NPS pollution that comes from a broad area and reaches the stream from many sources that can collectively have substantial negative impacts on the stream.

NPS pollution is usually classified under the general categories of silviculture (forestry-related), agriculture, nutrients, roads, highways and bridges, urban areas (low impact development) - stormwater and construction runoff, resource extraction, atmospheric deposition, and hydro-modification and habitat alteration. Over the years, a variety of “best management practices” (BMPs) have been developed to address NPS stemming from these various sources. A good source of information on NPS pollution and the methods of managing its impacts can be found on the U.S. Environmental Protection Agency website and that of the Pennsylvania Department of Environmental Protection, Bureau of Conservation and Restoration.

Nutrient Pollution

Nutrient pollution is the presence of unnaturally high concentrations of nutrients, primarily nitrogen and phosphorous, in surface or groundwater. Sources of nutrient pollution include:

- Agricultural runoff from fields, pastures, feedlots, and barnyards
- Discharges from septic tanks
- Faulty leech fields and sewage treatment systems
- Atmospheric deposition from combustion sources such as coal and oil-fired power plants
- Urban runoff
- Runoff from golf courses

Nutrient pollution from faulty septic systems is a potential source of excessive phosphorus to streams.

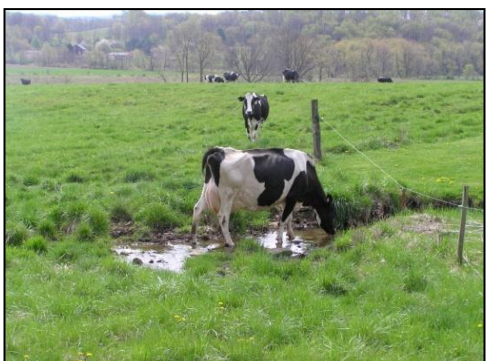
Nutrient pollution can cause excessive algal growth which then causes oxygen depletion which can then, in more extreme cases, lead to fish kills. The main source of nitrogen pollution is atmospheric deposition, with agriculture being the second leading source. The chief source of phosphorous pollution comes from agricultural activities with septic discharges contributing to the next greatest proportion.

Each of the five subwatersheds of Sewickley Creek show signs of having nutrient pollution concerns. Evidence of faulty septic systems at rural homes as well as broken wastewater lines in communities was present throughout the watershed.

A more detailed study of the nutrient pollution problems within the entire watershed should be conducted. One of the difficulties with identifying nutrient pollution sources in the watershed is the AMD problem, which can mask a nutrient pollution problem by overwhelming it. Once some of the AMD-impacted stream segments are addressed, it is likely that nutrient pollution concerns will become more apparent. Identifying these areas prior to AMD cleanup is very difficult and is beyond the scope of this study.

Agriculture

Farmland is an important resource for the Sewickley Creek watershed community. Agriculture is the predominate land use type in the area, covering 46% or roughly 77 square miles of the 168 square miles of the entire watershed.



Unrestricted livestock access to streams can cause sedimentation, erosion, and nutrient pollution.

Agriculture in and of itself is not categorized as a source of NPS pollution, but there are operations that use poor management practices when cultivating crops and livestock. Potential agricultural pollution can come from operations of any size. This includes the small farmette with a few random livestock animals (including horses) to the large, several hundred cow dairy operation. Pollution can come from these operations in the form of sediment and nutrients captured in runoff from cropland and pastures. Poorly planned tillage practices on cropland, such as plowing without consideration to land contours and drainage, can lead to erosion of excessive amounts of sediment during rain events. Similarly, grazing livestock with unrestricted access to streams can also increase sediment and erosion issues. As the animals travel to the streams to drink, they trample the stream bank and graze stabilizing vegetation, making banks vulnerable to storm events. Manure and fertilizer can be a source of nutrient pollution as well. Applying manure, chemical fertilizers, and lime to fields and pastures at higher rates than what soils and crops can absorb leaves the excess nutrients free to be carried away with runoff to near-by waterways. The installation of agriculture subsurface “tile” drainage is also a conduit for excess agricultural nutrients to enter streams. Tile drainage installed in crop fields can be a useful tool to allow agriculture operations earlier access to fields in the spring and after a rain but, unfortunately, these systems of shallow, perforated pipe are often installed to transform small headwater tributaries and wetlands from their natural state into more cropland. There are many negative effects to utilizing tile drainage in this manner. This type of drainage becomes a more likely source for nutrient runoff because the water that would typically percolate slowly through the substrate now has a solid pathway. This type of drainage also eliminates habitat for aquatic life as well as valuable flooding buffers.

Agriculture operations are prevalent throughout the watershed. Many of these operations were found to employ best management practices (BMP) on their operations. Some of these BMPs include:

Subsurface "tile" drainage installed to "control" the flow of headwater tributaries alter stream character and act as a conduit for nutrients to enter waterways.

- Stream bank fencing to control livestock access to streams
- Riparian buffer plantings to protect stream banks in both pastures and crop land
- Implementation of nutrient management plans to regulate the amount of manure and fertilizer added to fields
- Stabilized stream crossings
- Stabilized spring developments

Despite these BMPs in place on many operations within the watershed, there are still large operations and small farmettes in each of the subwatersheds on which poor management choices can be seen taking place. Specific operations are not cited in this plan, however, planning with the Westmoreland Conservation District should begin with approaching landowners about implementing BMPs. Part of this outreach should include ways in which to assist these operations with installing the suggested BMPs.

Urban Areas – Low Impact Development, Stormwater Runoff, and Construction

Under normal, unaltered conditions, a stream will operate within a state of equilibrium or "balance" that has been established during the formation of the stream over a very long period of time. This balance will remain even during times of natural storm events. If this balance is upset by outside forces such as the activities of humans that increase the amount of stormwater runoff, the stream will try to return to its natural state of balance by altering its character. Man-made changes may include:

- Widening of the stream channel

- Sleuthing of outside bends
- Down cutting of the streambed itself

Under normal, balanced conditions, streams will erode their banks naturally but not excessively. These and other man-made changes, however, affect the stream banks by forcing them to erode at a much higher rate than normal. Aside from sedimentation and erosion pollution, stormwater runoff is the major contributor of bio-hazardous bacteria entering the stream from manure lots and faulty sewage systems that are flooded during storm events.

The watershed's topography pattern of headwater steep slopes and multiple valleys makes stormwater flooding issues a prevalent and repeating occurrence in multiple communities throughout the watershed. Water velocities can become quite high during periods of very high flow and many areas of the watershed show signs of flood damage. Most of the flooding disturbance is located in areas where streams are parallel to roadways or where a stream has been altered by a bridge and at the end of a channelized section.

Closely related to stormwater runoff is stream bank stabilization. Stream bank failure often takes place when stormwater is released to a stream too quickly. This commonly occurs around construction sites and urban areas where the ground around a stream has lost its ability to absorb the stormwater and/or slow the water's entrance to the main stream channel. This rush of stormwater can quickly overwhelm the balance of a stream and its ability to dissipate the energy created by surging waters during high flows.

During accelerated stream bank erosion, excess sediment is deposited into the stream which can degrade habitat for aquatic animals and build up in low gradient areas, creating sediment dams that exacerbate flooding problems. Additionally, eroding banks can eventually encroach on structures located too close to the stream channel and compromise their integrity.

Construction and stream hydrologic/habitat modification appear to impact the watershed primarily in the most urbanized areas of the watershed. Greensburg is the largest urban area of the watershed and is the area that is most associated with these types of pollution. The Greensburg area is drained by the Jacks Run and Slate Creek sub-watersheds. As discussed previously in the introduction of this section, pollution is generated on paved surfaces and is washed into streams during periods of rain or snow melt. Some stream and tributary sections

Jack's Run, a subwatershed of Sewickley Creek, is enclosed within concrete channels in multiple sections throughout its drainage.

have been channelized with solid, usually concrete structures, for flood control to protect homes and businesses that have been built within the flood plain. Although these structures control water during periods of high flow, they are detrimental to natural stream conditions and functions. It is highly unlikely, though, that these concrete lined sections will be returned to their natural stream conditions so, for this assessment, these areas are solely noted as impacted sources.

The watershed is transected by several large highways including the Pennsylvania Turnpike and an additional toll road. The path in which these highways were built inevitably changed and altered the natural channel of multiple streams and tributaries of the watershed. In addition, construction work done along these highways can lead to additional sediment and runoff entering waterways.

Highway construction can have direct sediment impacts to streams when proper erosion and sediment plans are not followed.

Many of Pennsylvania's urban areas have ordinances that include stormwater management. Management includes the regulation of the size of culverts and ditches through which runoff water travels. It also includes the installation of slow draining catch basins to limit the amount of stormwater that enters waterways during a storm event. Another requirement is the use of pervious materials for sidewalks and parking lots in order to allow direct absorption of surface water.

Roads, Highways, and Bridges - Dirt and Gravel Roads and Abandoned Railroad Lines

Access to many of the more rural areas within the watershed is by way of dirt and gravel roads. Additionally, maintenance and access roads to the numerous gas wells are also constructed of dirt and gravel roads. By design, these types of roads hold the potential to pollute streams through erosion and sediment collected in runoff. In 1997, when the gas tax legislation was amended, Pennsylvania enacted the Dirt and Gravel Roads Program (DGRP). This innovative effort funds environmentally sound maintenance of unpaved roadway sections identified as sources of dust and sediment pollution through Section 9106 of the Pa. Vehicle Code (PACD website).

A headwater tributary of the North Fork of Sewickley has eroded its bank and travels along a paralleling mining site access road for several hundred feet before entering back into its original channel.

The DGRP is a cooperative effort between local township municipalities and the conservation districts. The program assists a township in identifying problem roads and implementing BMPs that reduce or eliminate sediment from runoff.

An abandoned railroad line can be seen at the confluence of Sewickley Creek and Welty Run.

In addition to the many dirt and gravel roads, historic railroad lines also interlace the watershed, often paralleling Sewickley Creek and its major tributaries. These lines were the primary transportation system to move coal and coke from sites within the watershed to Pittsburgh and rail placement along waterways allowed for easier transfer of materials to barges. With the decline of the coal industry, the railways have been gradually abandoned over the decades. These abandoned railways have had the metal rails and most of the wooden ties removed from the foundation bed and have been left alone to be reclaimed by the environment. Most of the lines now sit vacant with shrubs taking advantage of the unused space. In some areas, the paralleling streams are encroaching on the rail beds and eroding them away. The underlying structural composition of the rail beds makes them susceptible to erosion.

Both dirt and gravel roads and abandoned railroad lines are sources of sediment pollution throughout the watershed. Due to the rural nature of these areas, they are also utilized by all-terrain vehicles (ATVs), which can exacerbate erosion issues.

Illegal Dump Sites

Another occurrence in the remote areas of the watershed, including headwater streambeds, rural hillsides, back roads, and old coal mines, is the unauthorized and illegal dumping of garbage and/or debris. These dump sites are often littered with old tires, appliances, furniture, and other random bulky items that people no longer want. These sites seem to perpetuate themselves over time and with continued use can cause a variety of environmental and health problems such as chemical intrusion, erosion, and aesthetic concerns.

Silviculture

Forests provide a variety of resources and services to the watershed including:

- Timber production
- Wildlife habitat
- Water filtration
- Ground stabilization
- Landscape aesthetics
- Recreation
- Employment through management and harvesting

With forestland being the second most abundant land use type (as listed in the Sewickley Creek Watershed Conservation Plan) at just under forty percent and second to agriculture, the timber industry plays a significant role within the watershed. Log removal involves the use of equipment that requires the construction of numerous roads and staging areas for storage and loading. Excessive erosion and sediment can be generated if roads and staging areas are not properly constructed using BMPs.

Logging operations also often necessitate the crossing of streams. To assure minimal impacts, the construction of stabilized stream crossings is necessary. Proper construction of these crossings is critical in limiting erosion and sediment loss as well as protecting in-stream habitats. Logging roads should be constructed in a manner that limits erosion. Erosion problems can be limited by utilizing techniques that follow the natural land contours and prevent water from flowing long distances down steep slopes. They can additionally be limited with the frequent use of road cross drains including water bars, dips, or culverts.

Acid Deposition

Acid precipitation NPS affects all of Pennsylvania and results in streams and waterways that are much more acidic than normal. Parts of Welty Run in the upper Sewickley Creek subwatershed display characteristics of acid deposition. The following information, obtained from the website of the Pennsylvania Fish and Boat Commission, is an excellent description of this airborne pollution source.

Note: The following is a text-only file of a Fish and Boat Commission publication that includes graphics and a map. Contact the PFBC if you would like a free copy of the complete publication.

Acid Precipitation

Pennsylvania is blessed with thousands of miles of freshwater streams ranging from high mountain headwater tributaries to the slower moving lowland varieties. All are affected to some degree by acid deposition. The purpose of this brochure is to acquaint the reader with the causes, effects and the need to reduce its effect on our aquatic environment. "The creek is a symbol of our greatest resource; as the creek flows, so flows mankind."

During the past couple of decades, thousands of scientific reports have documented the serious effects of acid deposition in North America and Europe. The control of the air pollutants that cause acid rain and deposition has become a battle cry for conservation-minded citizens in many industrialized countries. Because Pennsylvania waters receive the highest amount of acid deposition of any state in the nation, the Pennsylvania Fish and Boat Commission is particularly concerned about this problem.

Acid deposition is primarily the result of human-made emissions from burning fossil fuel, automotive exhausts and other industrial processes, which emit sulfur dioxide (SO_2) and nitrogen oxide (NO_x) gases. These pollutants are transported in the atmosphere, chemically transformed, and deposited either as wet deposition (such as rain, sleet or snow) or in the form of sulfuric and nitric acids, or as dry deposition in the form of sulfate and nitrate particles. This deposition has been shown to have adverse effects on streams, lakes, forests, buildings, drinking water and human health.

Pennsylvania receives the most acid deposition of any state in the nation because, in addition to being the third highest producer of the gases that cause acid deposition, we are also located downwind from the highest concentration of air pollution emitters. Monitoring stations located throughout the Commonwealth reveal that the pH of our rainfall averages an incredible 4.0 to 4.1, which is many times more acidic than unpolluted rain.

Different areas of the state may respond differently to acid deposition, depending on the region's natural ability to "buffer" or neutralize the incoming acidity. This ability of a body of water to neutralize acids is called its "acid neutralizing capacity," and depends on the dissolved mineral content in the water, which, in turn, depends on the composition of the soils and bedrock in the watershed. If sandstone or igneous rocks such as granite or basalt primarily underlie the watershed, then the streams and lakes in the region will have low acid-neutralizing capacity. If soils and waters of an area continually receive acid deposition, their neutralizing capacity will decrease. With little or no neutralizing capacity, the water will gradually acidify and fish and other aquatic life forms will be adversely affected.

The acid-neutralizing capacity of a waterway is measured by a test called alkalinity, which can be expressed as milligrams per liter (mg/I), or parts per million (ppm) of calcium carbonate. According to international standards, streams and lakes are considered vulnerable to acid deposition if base flow alkalinity values are 10 mg/l or less. These waters are especially susceptible to effects of the continued influx of atmospheric acids. Using this criterion, about one-third of the 4,800+ miles of stocked trout streams in Pennsylvania are considered vulnerable. These streams are indicated on the accompanying map and county lists. In addition to the stocked trout streams on the map, there are even more miles of un-stocked waters throughout the Commonwealth that are vulnerable to acid deposition. Some of these vulnerable waters in Pennsylvania are lakes, but most are high-quality small, mountain streams that support naturally reproducing trout populations.

What is the effect of acidification on vulnerable streams and lakes? As a waterway becomes acidified, algae and rooted aquatic plants die off, reducing the available food supply for aquatic insects and fish. Healthy aquatic insect communities are replaced by acid-tolerant individuals, which are not as desirable or abundant a food supply for higher organisms such as certain species of fish. More tolerant fish species may begin to replace the original populations, or the fish may disappear entirely from a waterway.

Fish populations can also be directly affected in several ways. Acidity can stress a fish's basic body function, because it upsets the fish's ability to regulate its blood chemistry. Toxic metals, such as aluminum, can be leached from the soils and delivered to the lakes and streams by acidic rainfall. For example, small amounts of dissolved aluminum can cause mortality in fish by damaging their gills and decreasing sodium in their bloodstream. Finally, fish eggs and fry are very susceptible to high acidity and toxic metals. Partial or entire year classes can perish, leaving older, more resistant individuals to maintain a remnant population.

Over the years, the Fish and Boat Commission has been forced to change many of its stocking patterns on streams receiving increased acidity from acid deposition. In the beginning stages of acidification, it might be possible to change a stocking pattern simply by using a different species of fish. For example, one pattern change may be to change from the stocking of acid-sensitive rainbow trout to the more acid-tolerant brook trout. Another strategy is to change stocking schedules, so that the sensitive fish are not stocked preseason, when the heavy spring rains and winter snowmelt increase the acid and aluminum content of the streams.

Finally, the Fish and Boat Commission may be forced to discontinue stocking altogether when even the brook trout cannot live in the acid runoff. A review of the stocking records in Pennsylvania indicates that since the late 1950s, more than 90 streams have been subject to trout stocking management changes as a result of increasing acidity. Since 1969, the Fish and Boat Commission has had to remove

18 waterways from the trout-stocking list, because of degraded water quality caused by increasing acidity and toxic aluminum.

Currently Fish and Boat Commission managers test water samples from known vulnerable streams every year during March and April. To make future management decisions, fisheries management personnel have also conducted studies on the chemical characteristics and survivability of trout stocked in sensitive water.

Numerous government and university studies have also been conducted in Pennsylvania. Studies conducted by the U.S. Environmental Protection Agency indicate that the Pocono lakes region is the second most negatively affected lakes region in the country. A Lehigh University study determined that out of 160 lakes in the Pocono region for which there were data, 70 percent were sensitive to acid deposition and 8 percent were already acidified. Scientists from the Pennsylvania State University and from California University of Pennsylvania conducted many watershed studies on the Laurel Hill Ridge, which contains the majority of the natural trout streams in southwestern Pennsylvania. One of their studies revealed that 10 of the 61 watershed samples were fishless and concluded "26 percent of the headwater streams on the Laurel Hill are severely impacted by acidification episodes." The National Academy of Science has stated that protection or recovery would occur on 80 percent of the nation's affected waters if sulfate deposition were reduced to 17 kg/ha/year (15 pounds/acre/year). In Pennsylvania, sulfate deposition ranges from 25 to 45 kg/ha/year (23 to 41 pounds/acre/year), so a reduction of approximately 50 percent would be required.

The Pennsylvania Fish and Boat Commission have actively sought legislation to control acid deposition since 1978. Our 1986 "Policy on Acid Precipitation" urged the federal and state governments to reduce SO_2 and NO_x emissions by 50 percent. After 13 years of study, deliberation and hearings, Congress approved the Clean Air Act Amendments of 1990. Many provisions including acid deposition were new to the Clean Air Act. One of the goals of the acid deposition provision is to reduce annual SO_2 emissions by 10 million tons/year from the 1980 emission levels and cap the annual utility SO_2 emission rate at approximately 8.9 million tons by the year 2010. Another important goal of the provision is to reduce annual NO_x levels by two million tons from the 1980 levels, but unfortunately no caps were put in place. The Congressional findings and passage of the Clean Air Act Amendments were historic in a sense that the long debate about the cause and effect of acid rain was ended.

The Pennsylvania Fish and Boat Commission was pleased that Congress finally passed the necessary legislation that will hopefully end the acid rain crisis. Scientists are optimistic that the 1990 Amendments will benefit Pennsylvania's affected waterways. A National Acid Precipitation Assessment Program (NAPAP) report speculates that because the major emission sources are located along the Ohio River Valley, Pennsylvania should experience a reduction of SO_2

emissions by greater than 50 percent and a SO2 deposition rate of less than 17 kg/ha/year. Although NAPAP will continue to monitor deposition rates and test water quality, we will not know the final results of the Clean Air Act Amendments until the year 2010.

The passage of the 1990 Amendments is a credit to all the concerned anglers, citizens and scientists who took the time to voice their opinions for cleaner air. However, our work is not done. Attempts will continuously be made to weaken the current legislation. We all must remind our Congressional leaders that acid deposition is still a major concern and that complete enforcement of the 1990 regulations is a must. We can also do our part to limit air pollution by conserving energy, promoting mass transit and supporting strict automobile emission inspections. Future generations of Pennsylvanians are counting on us to protect, conserve and enhance the water resources of our state.

Acid Activity

Many people not familiar with chemistry have a hard time understanding the pH scale. The scale represents the potential hydrogen ion activity of a water environment and therefore its relative corroding action. Although the scale contains 15 numbers (0 to 14), the acid activity at a pH of 7 and above is not very significant. Numbers below a pH of 7 represent increased acid activity and potential harm to the environment. Most organisms live in environments where the pH ranges between 6 and 9. At pH levels below 4.5, the acid activity is too toxic for most organisms to survive.

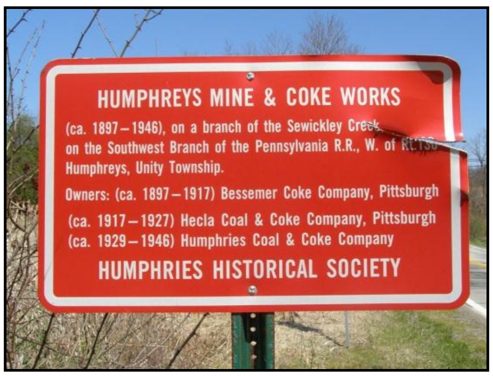
A pH number is a negative logarithm, so the number is a decimal part of a whole number. A change from one whole pH number to another represents a tenfold increase or decrease in the acid potential of a water environment. The chart above shows several ways to present the concept of acid potential (pH) and some pH levels for common liquids in our environment. [Note: Chart is omitted in this "text only" version.]

Although all Pennsylvania waters receive acid deposition, the locations of the most vulnerable streams are directly related to the geology and physical features of the state. By comparing the larger map above with the smaller one to the right, it becomes apparent that most of our vulnerable streams are located in the sandstone mountainous regions of Pennsylvania. [Note: Maps are omitted in this "text only" version.]

As mentioned at the start of this section, some portions of Sewickley Creek show depressed pH levels and elevated aluminum levels. The areas in which these characteristics are observed have had very limited or no mining done nearby, leading to the conclusion that the low pH levels and the high aluminum levels in these areas are a result of acid precipitation. Some stream segments within Welty Run draining Chestnut Ridge are suspected to be impaired by acid rain impacts.

Resource Extraction

Resource extraction is the development of minerals such as coal, limestone, sand, shale, gravel, oil, and/or natural gases from underground sources for commercial use. Primary methods of recovering these minerals include surface and subsurface mining as well as the drilling of shallow and deep wells. Strip mining, quarrying, open-pit mining, and mountain top removal are examples of surface mining techniques used to reach these underground mineral resources. With these methods, the overlaying land surface and bedrock is removed to provide access to the minerals. Subsurface or underground mining utilizes the digging of tunnels or shafts into the earth's surface to access and remove the minerals. Longwall, room and pillar, drift, slope, and shaft mining are all examples of underground mining techniques.



Gas well drilling differs slightly in technique depending on the depth of targeted natural gas, but involves boring and casing a hole drilled into the ground several hundred to thousands of feet then capturing and extracting the encased gas. The surface pad needed for any well drilling ranges in size from 4-6 acres.

Erosion and sedimentation, forest fragmentation, and water pollution from abandoned and active mining and drilling sites are all impacts associated with resource extraction activities.

The Sewickley Creek watershed is host to multiple types of resource extraction. Some of these types of extraction include surface and subsurface coal mining and shallow and deep Marcellus Shale gas drilling. Impairment from mining-related resource extraction has been identified as the number one NPS pollution problem of the area. Evidence of coal mining was observed in almost every community throughout the watershed. Examples of this evidence included large, several thousand ton refuse or "boney" piles sitting within the riparian zone of the streams, reclaimed strip mining sites, and historic coke ovens dotting the landscape. Additionally, both shallow and deep gas wells are also prevalent in the watershed in both the rural and urban areas.

Abandoned Mine Drainage

The most prevalent pollution problem within the Sewickley Creek watershed stems from past resource extraction.

Abandoned mine drainage (AMD) is a term given to water that has been polluted due to mining activities. A mineral called pyrite, which is often contained between coal and shale seam layers, produces sulfuric acid through a series of complex chemical reactions when it is exposed to oxygen and water. Under normal and undisturbed ground conditions, little or no chemical reactions occur. After mining, whether surface or underground mining, the pyrite layer is exposed to oxygen and water at which point the chemical reaction that forms AMD begins.

Several portions of the Sewickley Creek watershed exhibit the orange coloration that is indicative of AMD impairment.

Depending on the chemical makeup of the rock layers, highly acidic water can be produced. The acidic water often leaches toxic metals from the rock layers it migrates through, carrying them suspended in solution until it reaches stream water of more neutral pH. As these metals drop out of solution, they often discolor the waterway or streambed and become deposited in the stream channel.

Metal precipitation in AMD is highly dependent on pH. At very low pH, AMD-polluted water can look clear and clean because the metals are completely dissolved in the water. As a general rule, as water pH rises and acidity decreases, the metals will begin to precipitate. At a 4.5 pH, aluminum will usually begin to precipitate from AMD and will impart a white cast to the water or rocks that it comes in contact with. Approaching pH 6, iron begins to precipitate and will color the water or stain the stream bed orange. This orange color is the signature characteristic associated with a stream that is impaired with AMD.

Miles of stream in the Sewickley Creek watershed display the tell-tale orange coloration of AMD and can be seen in both residential as well as forested areas. The Operation Scarlift Report, a major effort by the Pennsylvania Department of Environmental Resources (DER-1971), found fourteen major sources of AMD within the watershed, citing eleven abandoned mine sites responsible for the discharges.

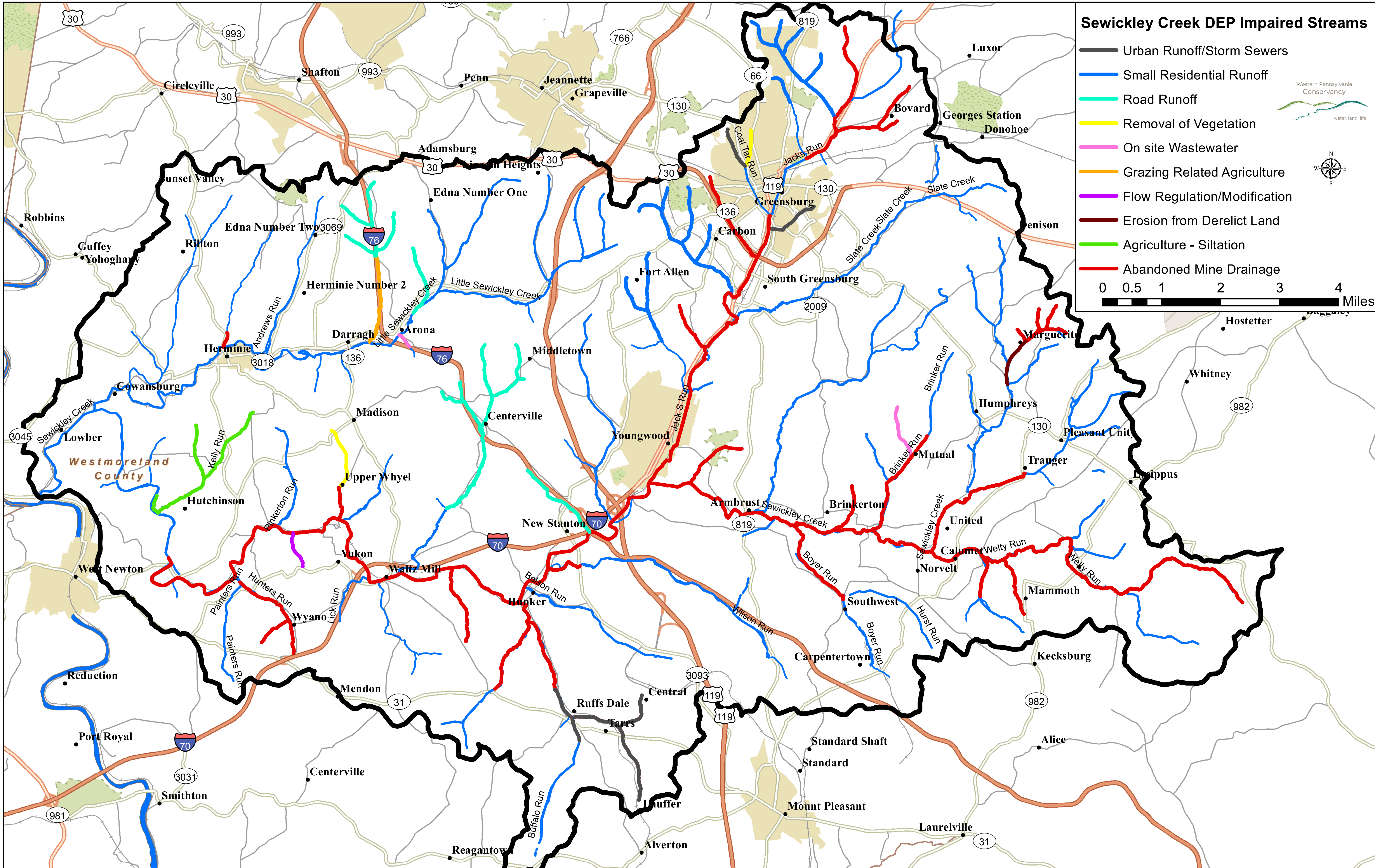
Impairment of Water Quality and Aquatic Life

NPS pollution has the most profound impact on the plant and animal life that live within the streams. AMD, sedimentation and nutrients are the main pollution sources affecting life in the streams of Sewickley Creek watershed, often causing them to be devoid or diminished of fish and other aquatic life diversity. The primary pollutants from AMD are metals (usually iron, aluminum, and manganese) and acidity. Pennsylvania established in-stream water quality standards for iron, aluminum, and manganese, which are published in the Pennsylvania Code, Chapter 93 Water Quality Standards. Many stream segments within Sewickley Creek do not meet water quality standards because of elevated metals. In the vast majority of those instances, water draining from abandoned coal mines is the source of the impairment.

When metals from abandoned coal mines enter the stream they have different effects on aquatic life, depending on their nature. Aluminum is usually associated with acidic discharges and has a profound effect on aquatic macroinvertebrates and fish. Aluminum will coat the gills of these animals and prevent them from extracting oxygen from the water, causing them to die. Iron, the metal that is usually associated with AMD pollution, settles to the bottom of streams, coating the substrate and severely degrading the habitat in which many aquatic organisms live. Manganese, a metal that looks black when it precipitates in the stream also can coat the stream substrate if present in very high concentrations, though it is rare in Sewickley Creek.

Sedimentation impairs the stream by settling to the bottom of streams and severely degrading the habitat in which aquatic organisms live. It essentially smothers the bottom of the stream, limiting the types and numbers of organisms that can inhabit the stream bottom, or its biodiversity. When fewer types of aquatic animals are present, the entire food chain of the stream is disrupted and only those animals and plants that can survive in such conditions are present.

Nutrients, from human and animal waste, fertilizers, and from the atmosphere can have significant impacts on aquatic life. The main two nutrients affecting streams are nitrogen and phosphorous. As on land, nutrients within a stream cause the plants to grow. This can lead to low levels of oxygen as the plants use up the oxygen within the water. When dissolved oxygen levels are low, aquatic organisms that require higher levels of oxygen are no longer able to survive and perish. The plants can also affect the habitat of the steam by coating the rocks and substrate and affecting the places where organisms live. Similar to sedimentation, this causes fewer types of aquatic animals to be present within the stream and degrades the entire food chain.



Sewickley Creek DEP Impaired Streams
Urban Runoff/Storm Sewers
Small Residential Runoff
Road Runoff
Removal of Vegetation
On site Wastewater
Grazing Related Agriculture
Flow Regulation/Modification
Erosion from Derelict Land
Agriculture - Siltation
Abandoned Mine Drainage
0 0.5 1 2 3 4
Miles
Western Pennsylvania Conservancy
Westmoreland County
Sewickley Creek
Little Sewickley Creek
Slate Creek
Jacks Run
Coal Tar Run
Jack S Run
Brinker Run
Welty Run
Boyer Run
Hurst Run
Wilson Run
Belson Run
Hunters Run
Painters Run
Lick Run
Kelly Run
Pinkerton Run
Andrews Run
Buffalo Run
Greensburg
South Greensburg
Carbon
Fort Allen
Youngwood
New Stanton
Hunker
Ruffs Dale
Tarrs
Central
Armbrust
Brinkerton
Mutual
Humphreys
Marguerite
United
Calumet
Norvelt
Mammoth
Southwest
Carpentertown
Kecksburg
Trauger
Pleasant Unity
Lippus
Hostetter
Whitney
Bovard
Georges Station
Donohoe
Luxor
Jeannette
Grapeville
Penn
Shafton
Circleville
Adamsburg
Edna Number One
Edna Number Two
Herminie Number 2
Herminie
Darragh
Arona
Middletown
Centerville
Madison
Upper Whyel
Yukon
Waltz Mill
Wyano
Hutchinson
Cowansburg
Lowber
West Newton
Rillton
Robbins
Guffey
Yohoghany
Sunset Valley
Mendon
Reduction
Port Royal
Smithton
Reagantown
Alverton
Stauffer
Standard Shaft
Standard
Mount Pleasant
Laurelville
Alice

IV. Problem Definition

Overview

This section addresses the specific abandoned mine drainage (AMD) problems found during the assessment. This assessment attempts to identify as many of the problem sites as possible, but assumes it does not capture them all.

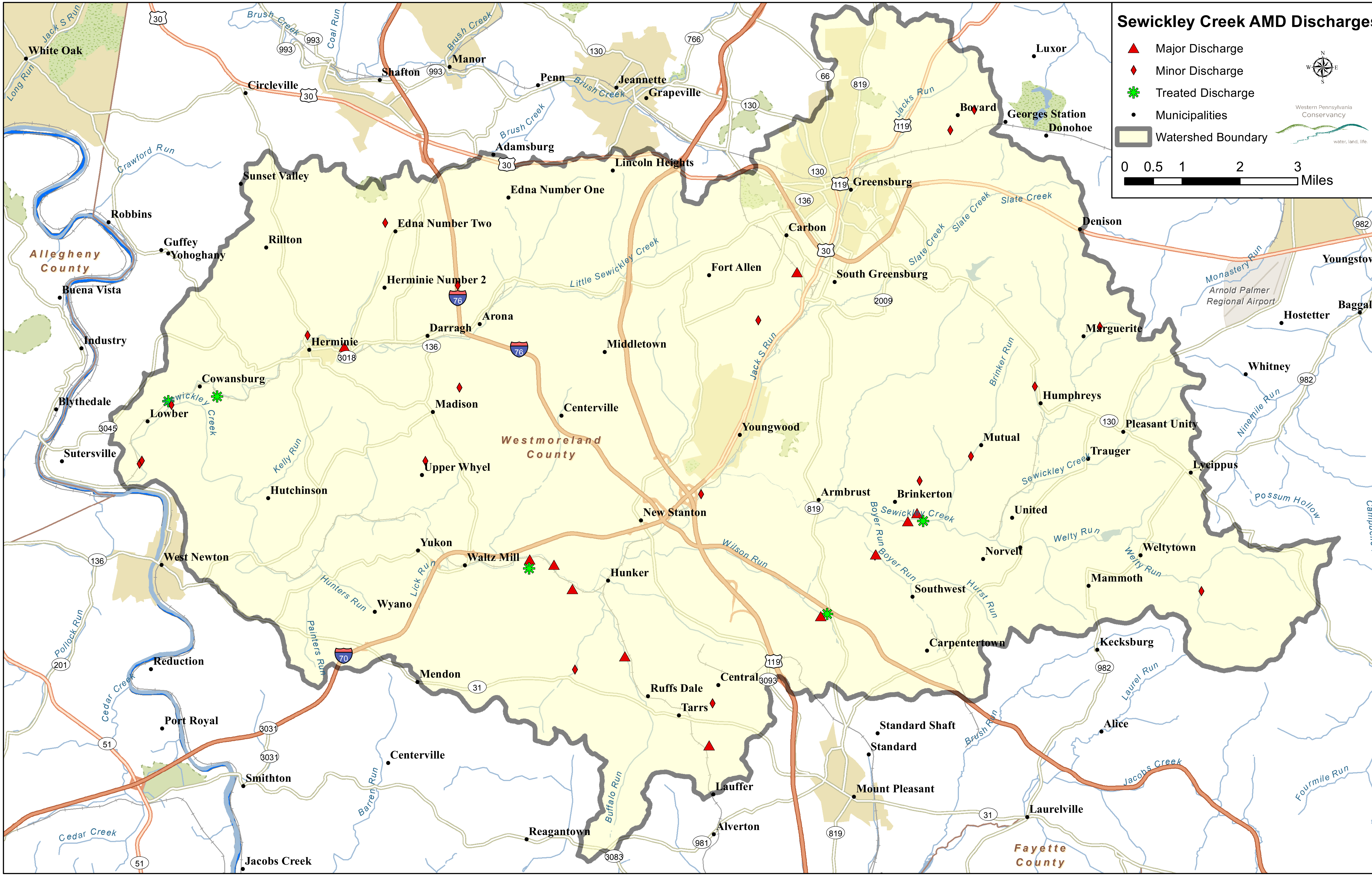
Because AMD is the main cause of impairment on most degraded stream segments, descriptions of the discharge locations are identified by sub-watershed and the stream segment initially affected. Because of the nature of coal mining, pinpointing the exact site of the pollution source sometimes proves difficult, due to the fact that the AMD can occur over large and diffuse areas. When a specific AMD source is identified, GPS is used to record the source. The location of the source is also listed under the segment GIS ID.

Upper Sewickley

AMD site	GIS ID	Sub-basin	Type	Ranking	Notes
Welty Run	1328	Upper Sewickley	AMD	Minor	Iron AMD discharge located at lower end of section
Brinkerton 1	1040	Upper Sewickley	AMD	Major Treated	AMD treated partially with wetland. Insufficient area
Brinkerton 2	1040	Upper Sewickley	AMD	Major	Large AMD south of current system
Brinkerton Acid Trib	1151	Upper Sewickley	AMD	Minor	Drainage from surface mine area – diffuse area
Brinkerton Acid Seep	1040	Upper Sewickley	AMD	Major	Discharge from mine tunnels likely connected to surface mines
Humphreys	1496	Upper Sewickley	AMD	Minor	Low pH Iron AMD found outside Humphreys
Boyer Run AMD right bank	1288	Upper Sewickley	AMD	Minor	Iron AMD
Boyer Run AMD left bank	1288	Upper Sewickley	AMD	Major	Iron AMD on pasture side
Marguerite Small AMD	1596	Upper Sewickley	AMD	Minor	Near Marguerite
AMD Brinker Run	1211	Upper Sewickley	AMD	Minor	AMD below Mutual

Welty Run

The Upper Sewickley Creek sub-watershed contains several AMD discharges, three being ranked as major pollution sources, while several others were considered as minor. Welty Run, designated as a High Quality Cold Water Fishery (HQ-CWF), has the highest elevation of the watershed, beginning as springs on Chestnut Ridge. Some surface mining has occurred within the headwaters on Chestnut Ridge, but no distinct discharges that impair the stream were



Sewickley Creek AMD Discharges
Major Discharge
Minor Discharge
Treated Discharge
Municipalities
Watershed Boundary
0 0.5 1 2 3
Miles
Western Pennsylvania Conservancy
water, land, life.
Allegheny County
Westmoreland County
Fayette County
White Oak
Circleville
Shafton
Manor
Penn
Jeannette
Grapeville
Adamsburg
Lincoln Heights
Sunset Valley
Edna Number One
Edna Number Two
Robbins
Rillton
Guffey
Yohoghany
Buena Vista
Herminie Number 2
Arona
Darragh
Herminie
Industry
Cowansburg
Blythedale
Lowber
Madison
Centerville
Sutersville
Upper Whyel
Hutchinson
Yukon
Waltz Mill
West Newton
Hunker
Wyano
Mendon
Reduction
Port Royal
Smithton
Jacobs Creek
Reagantown
Ruffs Dale
Central
Tarrs
Lauffer
Alverton
Standard Shaft
Standard
Mount Pleasant
Laurelville
Alice
Kecksburg
Carpentertown
Southwest
Mammoth
Weltytown
Norvell
United
Brinkerton
Armbrust
New Stanton
Youngwood
Middletown
Fort Allen
Carbon
Greensburg
South Greensburg
Luxor
Bovard
Georges Station
Donohoe
Denison
Youngstown
Hostetter
Baggaley
Marguerite
Whitney
Humphreys
Pleasant Unity
Mutual
Trauger
Lycippus
Arnold Palmer Regional Airport
Sewickley Creek
Little Sewickley Creek
Brush Creek
Coal Run
Jack S Run
Long Run
Crawford Run
Kelly Run
Hunters Run
Lick Run
Painters Run
Buffalo Run
Jacks Run
Slate Creek
Brinker Run
Boyer Run
Wilson Run
Hurst Run
Welty Run
Possum Hollow
Campbelle Run
Ninemile Run
Monastery Run
Laurel Run
Jacobs Creek
Fourmile Run
Cedar Creek
Pollock Run
Barren Run

located in the headwaters area. However, it is assumed that the surface mines are affecting groundwater negatively. During assessment, pH readings within the stream would fall and rise as springs, seeps, and base flow would enter the stream. In addition, sporadic signs of aluminum coating on stream substrate would appear and then abate, indicating groundwater of low pH entering the stream. The geology of Chestnut Ridge is such that it does not possess a great deal of acid neutralizing potential. With its geology, the older reclaimed surface mines, and acid precipitation providing additional low pH water to the headwaters area, it is understandable that aluminum is being leached out of the rocks and soils and is sometimes seen on the substrate of the stream.

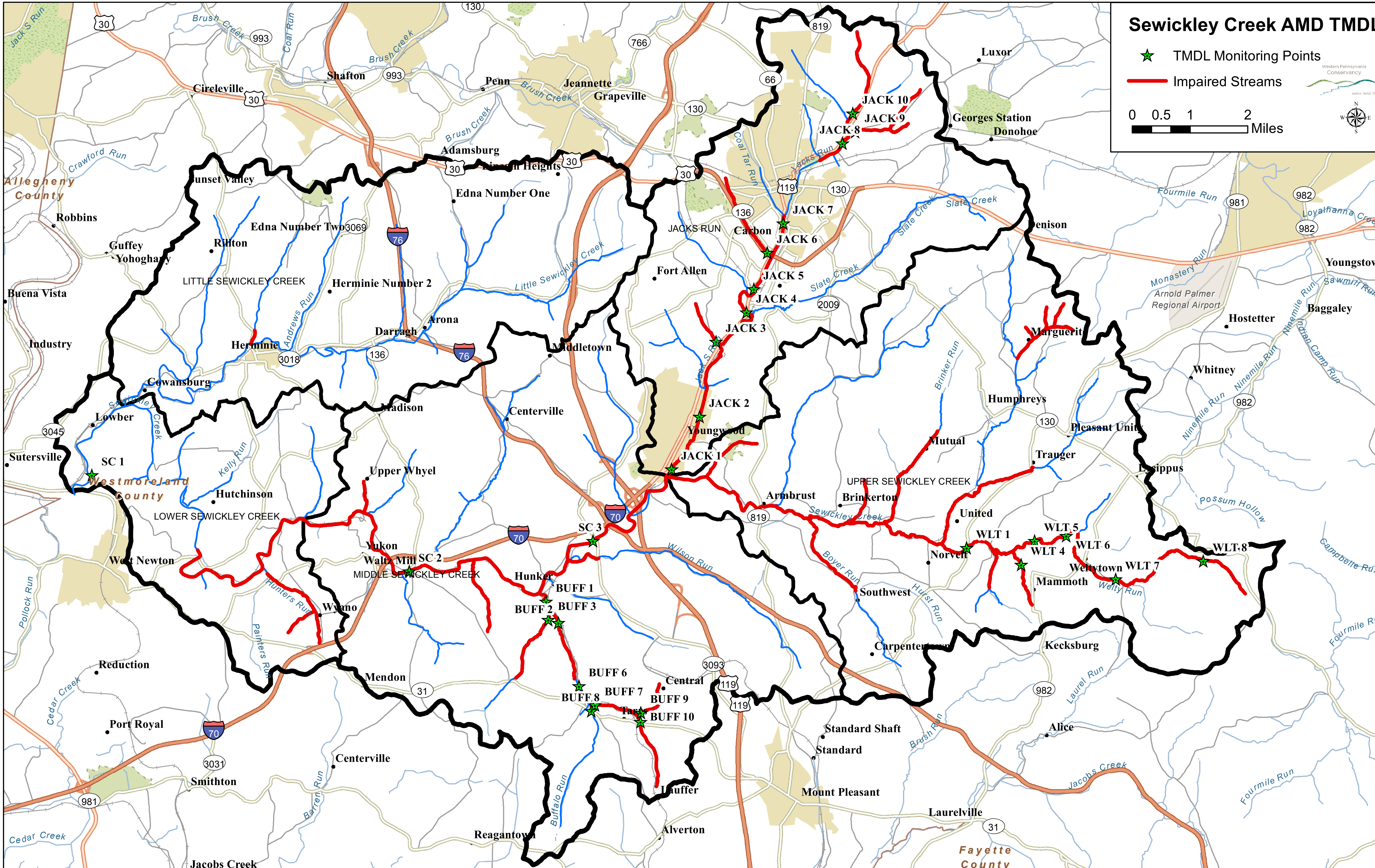
Welty Run has a notable iron discharge along the southernmost headwater tributary as it flows at the base of Chestnut Ridge, near Welty Town. However, the discharge is net alkaline and the flow is not large enough to significantly affect the stream. As the water in Welty Run mixes with the other tributaries, all signs of the metals disappear by the time the flow reaches Mammoth Lake, just downstream of Welty Town.

Below Mammoth Lake to the confluence with the main stem of Sewickley Creek some AMD was identified flowing from a tributary that flows along a large coal waste pile from the abandoned Mammoth Mine. Other areas along the stream were identified as being additional sites of former coal waste piles (near Calumet) that have been reprocessed and reclaimed. These areas, though reclaimed, were still eroding some coal waste into the stream when adjacent to it and likely are leaching some pollution. Alkalinity in Welty Run was sufficient enough to neutralize any acidity entering into the stream. Immediately below Mammoth Lake the stream was channelized and straightened on what appears to be an old strip mining operation. This has created a very unstable channel with high vertical banks and numerous erosion areas causing sedimentation to the stream.

In addition to the problems caused by mining in the watershed, numerous stream segments, mostly those associated with older small mining communities, were observed being degraded by raw sewage. As the assessment was being written, some areas affected by sewage were being address by the construction of a new sewage treatment plant. Also during the assessment in 2009, Western Pennsylvania Conservancy took part in an assessment of bacteria pollution on the upper Sewickley Creek, upstream of the confluence of Welty Run and Sewickley Creek. As a result of the monitoring, the upper Sewickley Creek was designated as impaired in 2011 by bacteria and does not meet its designated use for recreation. A subsequent TMDL will be developed for this section of the stream.

Sewickley Creek AMD TMDL

In 2009, DEP completed an AMD TMDL for the Sewickley Creek watershed. The AMD TMDL used a statistical method to determine allowable in-stream concentrations to meet water quality standards for metals and pH at various monitoring locations on the stream reaches of interest. They then did a mass balance of the pollution loads, based on annual flows, as the pollutants pass through the watershed. The loads at the monitoring points are for all the watershed area above the sampling point, so the monitoring points downstream include those from above. From water samples taken at the selected monitoring points, the model (Monte


Sewickley Creek AMD TMDL
TMDL Monitoring Points
Impaired Streams
0 0.5 1 2
Miles
JACK 10
JACK 9
JACK 8
JACK 7
JACK 6
JACK 5
JACK 4
JACK 3
JACK 2
JACK 1
SC 1
SC 2
SC 3
BUFF 1
BUFF 2
BUFF 3
BUFF 6
BUFF 7
BUFF 8
BUFF 9
BUFF 10
WLT 1
WLT 4
WLT 5
WLT 6
WLT 7
WLT 8
JACKS RUN
LITTLE SEWICKLEY CREEK
LOWER SEWICKLEY CREEK
MIDDLE SEWICKLEY CREEK
UPPER SEWICKLEY CREEK
Allegheny County
Westmoreland County
Fayette County
Luxor
Georges Station
Donohoe
Jeannette
Grapeville
Penn
Shafton
Circleville
Adamsburg
Lincoln Heights
Sunset Valley
Edna Number One
Edna Number Two
Rillton
Herminie Number 2
Arona
Darragh
Herminie
Cowansburg
Lowber
Sutersville
Robbins
Guffey
Yohoghany
Buena Vista
Industry
Madison
Middletown
Centerville
Carbon
Fort Allen
Youngwood
Denison
Youngstown
Baggaley
Hostetter
Whitney
Marguerite
Humphreys
Pleasant Unity
Trauger
Mutual
Armbrust
Brinkerton
United
Norvelt
Mammoth
Weltytown
Kecksburg
Southwest
Carpentertown
Alice
Standard Shaft
Standard
Mount Pleasant
Laurelville
Upper Whyel
Hutchinson
West Newton
Yukon
Waltz Mill
Hunker
Wyano
Mendon
Central
Tarrs
Stauffer
Alverton
Reagantown
Reduction
Port Royal
Smithton
Centerville
Jacobs Creek
Arnold Palmer Regional Airport
Sewickley Creek
Little Sewickley Creek
Brush Creek
Jacks Run
Slate Creek
Coal Tar Run
Andrews Run
Kelly Run
Hunters Run
Painters Run
Buffalo Run
Wilson Run
Boyer Run
Hurst Run
Welty Run
Brinker Run
Fourmile Run
Monastery Run
Ninemile Run
Sawmill Run
Indian Camp Run
Possum Hollow
Loyalhanna Creek
Crawford Run
Jack S Run
Coal Run
Pollock Run
Cedar Creek
Barren Run
Laurel Run
Jacobs Creek
Campbells Run
Western Pennsylvania Conservancy
30
993
130
766
66
819
136
119
3069
76
3018
70
3045
31
3093
982
981
2009
3031

Carlo) calculated the allowable concentration of pollutant, or load allocation, to meet water quality standards 99% of the time at each sampling location (on waters designated as other than High Quality or Exceptional Value) and determined the required load reduction in the pollutant to meet that standard.

Applicable Water Quality Criteria for WWF Stream Segments		
Parameter	Criterion Value (mg/L)	Total Dissolved/Recoverable
Aluminum (Al)	0.75	Total Recoverable
Iron (Fe)	1.5	Total Recoverable
Manganese (Mn)	1	Total Recoverable
pH*	6.0 - 9.0	N/A

**The pH values shown will be used when applicable. In the case of freestone streams with little or no buffering capacity, the TMDL endpoint for pH will be the natural background water quality*

For High Quality or Exceptional value waters, the allocation and reductions were based on water-quality criteria of an unimpaired segment of the TMDL water or the 95th percentile of a reference Water Quality Network (WQN) stream. (For further details about how the AMD TMDL for Sewickley Creek was determined, please review the Sewickley Creek TMDL at: http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/tmdl/SewickleyCreekFinalTMDL.pdf)

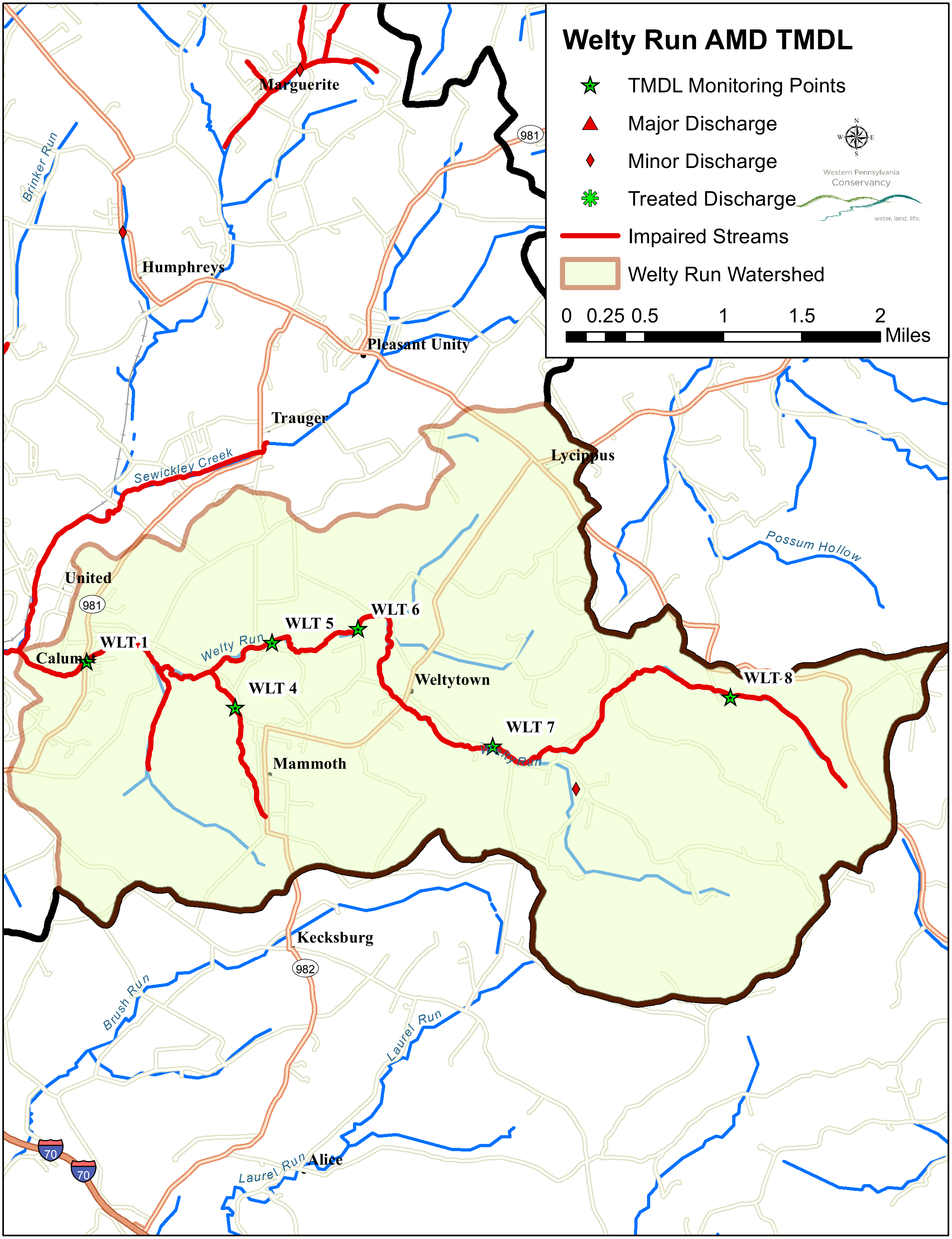
The upper Sewickley Creek from the confluence of Brinker Run to the headwaters are classified as High Quality Cold Water Fishery. Therefore, the TMDL used a Water Quality Network stream as a reference stream to establish load allocations and reductions (WQN865 on McLaughlin Creek (SWP16E) is used as the reference water).

Reference McLaughlin Creek Criteria	
Parameter	Criterion Value
Aluminum (Al)	0.0783 mg/L
Iron (Fe)	0.247 mg/L
Manganese (Mn)	1.0 mg/L
Area	8 square miles
Alkalinity	50 mg/L

Welty Run AMD TMDL

For Welty Run, the AMD TMDL monitored 6 stations within the sub-basin and established TMDL criteria for each location. The following table shows the pollution loads and load reductions established for Welty Run. Because the assessment did not consider the pollution to Welty Run as major factors to the pollution loads of Sewickley Creek in comparison to others further downstream with much higher pollution load rates, all sources were considered as minor sources. It is recommended Welty Run be targeted once other major sources are addressed.

Parameter	Existing load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
WELTY8 - Welty Run near headwaters						
Aluminum (lbs/day)	3.47	0.14	-	0.14	3.33	96%
Iron (lbs/day)	1.35	1.35	-	1.35	NA	NA
Manganese (lbs/day)	0.23	0.23	-	0.23	NA	NA
Acidity (lbs/day)	-74.41	-74.41	-	-74.41	NA	NA
WELTY7 - Welty Run 1/2 mile east of Weltytown						
Aluminum (lbs/day)	14.98	1.2	-	0.92	10.45*	90%*
Iron (lbs/day)	11.68	2.34	-	1.21	9.34*	80%*
Manganese (lbs/day)	3.22	3.22	-	3.22	NA	NA
Acidity (lbs/day)	-1143.39	-1143.39	-	-1143.39	NA	NA
WELTY6 - Welty Run upstream of Mammoth Lake						
Aluminum (lbs/day)	18.19	5.82	-	5.82	0*	0%
Iron (lbs/day)	10.92	10.92	-	10.92	NA	NA
Manganese (lbs/day)	2.67	2.67	-	2.67	NA	NA
Acidity (lbs/day)	-3917.39	-3917.39	-	-3917.39	NA	NA
WELTY5 - Welty Run 1/2 mile downstream of Mammoth Lake						
Aluminum (lbs/day)	19.27	6.17	-	6.17	0.73*	11%*
Iron (lbs/day)	11.56	11.56	-	11.56	NA	NA
Manganese (lbs/day)	6.94	6.94	-	6.94	NA	NA
Acidity (lbs/day)	-1753.59	-1753.59	-	-1753.59	NA	NA
WELTY4 - Unnamed tributary to Welty Run 1/2 mile northeast of village of Mammoth						
Aluminum (lbs/day)	1.15	0.37	-	0.37	0.78*	69%*
Iron (lbs/day)	0.69	0.69	-	0.69	NA	NA
Manganese (lbs/day)	0.91	0.91	-	0.91	NA	NA
Acidity (lbs/day)	-655.8	-655.8	-	-655.8	NA	NA
WELTY1 - Welty Run at bridge in Calumet						
Aluminum (lbs/day)	25.06	8.02	-	8.02	3.16*	29%*
Iron (lbs/day)	48.06	6.73	-	6.73	41.33*	86%*
Manganese (lbs/day)	65.29	16.32	-	16.32	48.97*	75%*
Acidity (lbs/day)	-	-7198.62		-	NA	NA


Welty Run AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Welty Run Watershed
0 0.25 0.5 1 1.5 2
Miles
Western Pennsylvania Conservancy
water, land, life.
Marguerite
Humphreys
Pleasant Unity
Trauger
Lycippus
United
Calumet
WLT 1
WLT 4
WLT 5
WLT 6
WLT 7
WLT 8
Weltytown
Mammoth
Kecksburg
Alice
Brinker Run
Sewickley Creek
Welty Run
Possum Hollow
Brush Run
Laurel Run
981
982
70

	7198.62	7198.62

NA-not applicable
**Takes into account load reductions from upstream sources*

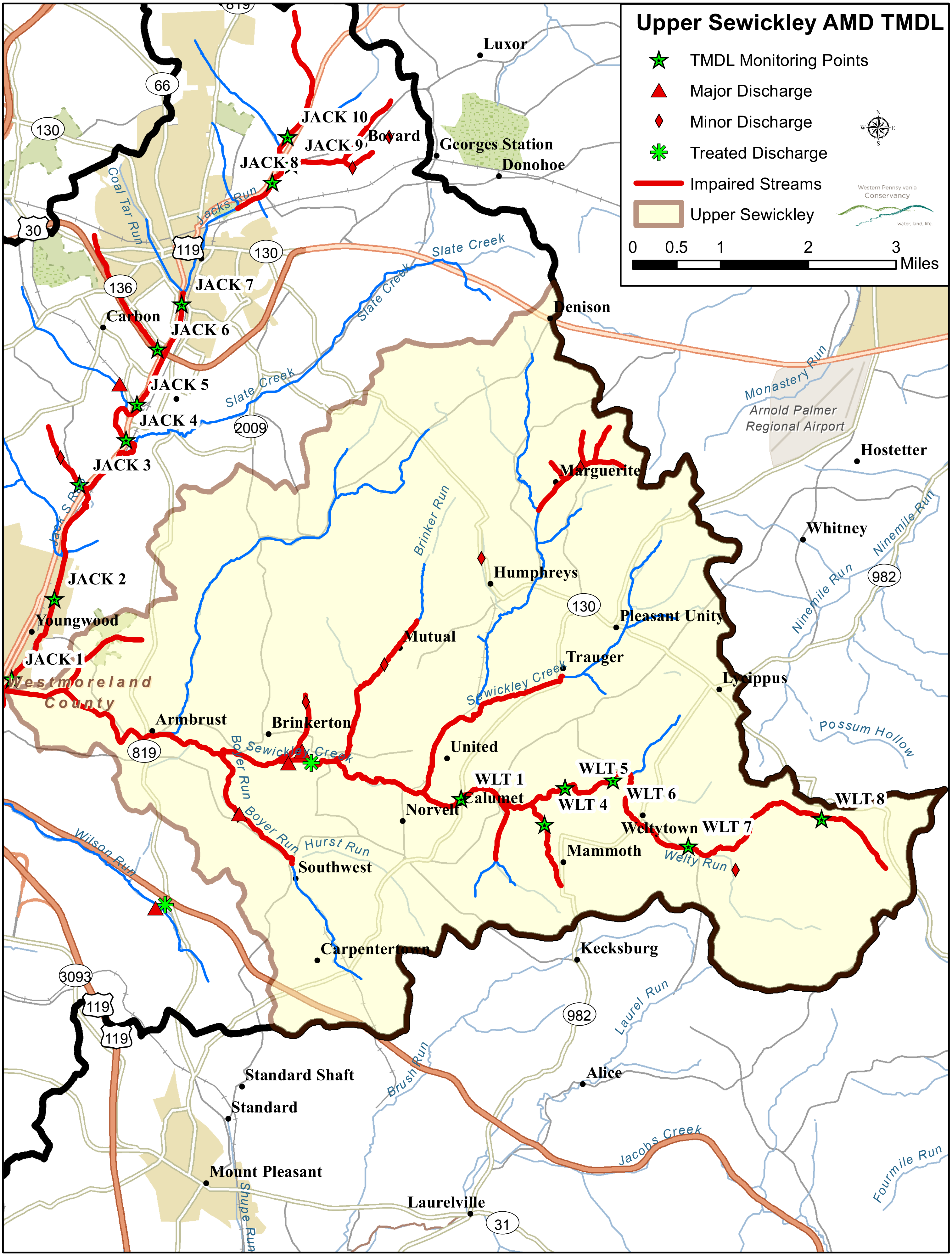
Upper Sewickley Creek Main Stem

The headwaters of the Sewickley Creek main stem begin north of the town of Pleasant Unity, east of the old mining community of Marguerite. As with most of the Sewickley Creek watershed, former small mining communities are present throughout the headwaters area. Near Marguerite, a small acid discharge was observed negatively affecting an unnamed tributary near a reclaimed boney pile. The flow of the discharge was small enough that after a short distance the discharge was apparently neutralized by the alkalinity in the stream. Some aluminum staining could be observed in the stream. Because of the short term effects, the discharge was considered to be minor. It does add to the aluminum load of the stream within these upper reaches.

More small coal mining communities are located along the main stem headwaters of Sewickley Creek and its tributaries upstream of confluence with Welty Run, United and Trauger being the largest. These areas also contain mine spoil piles, most of which have been reprocessed and reclaimed, but as on Welty Run, some remnants do remain. The main stem of Sewickley Creek meets Welty Run just north of Norvelt. Downstream of Norvelt, Brinker Run enters from the north. Brinker Run is also somewhat impacted by AMD. It drains past the old mining community of Mutual, which is likely the source of the AMD. However, no distinct major discharges were identified and this area is considered a minor source of AMD.

Just downstream of the confluence of Brinker Run and Sewickley Creek is the location of the first major discharges to enter Sewickley Creek, near the community of Brinkerton, another former coal mining community. There are three major discharges in the Brinkerton area and it is at this point Sewickley Creek becomes significantly impaired by AMD. There are a few other minor discharges in the Brinkerton area but none have the significant impacts on the stream as do the large discharges from the underground mines. The major discharges are believed to be draining water from the Brinkerton, Hecla #1 and #3 mines, Mammoth, United, and Calumet mines. For this study, the discharges at Brinkerton are identified as Brinkerton1, Brinkerton 2, and Brinkerton 3. Brinkerton 1 & 2 are large alkaline discharges, #1 being on the river-right side of the stream, and #2 nearby on river-left (directions refer to facing downstream). Brinkerton 3 is a much smaller acid discharge which is believed to draining from mine tunnels leading to a drier portion of the Brinkerton mine that has also been surface mined up gradient of the discharge, perhaps on the Redstone coal seam above the deep mine workings.

The majority of the Brinkerton 1 discharges are being partially treated by a passive wetland treatment system. The system was designed to maximize the available area on site. Adjacent good quality wetlands limited the space to treat the discharge to approximately 7 acres, significantly smaller than necessary for completely passive treatment. The system was designed as a semi-passive system, with a Maelstrom Oxidizer ® installed at the head of the wetland to provide active oxidization of the AMD discharge through the use of two large blowers and a patented air delivery system. At the time of the assessment, electrical power was not yet available for the blowers so the system was only being aerated passively. Also, at high flows, the



Upper Sewickley AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Upper Sewickley
0
0.5
1
2
3
Miles
JACK 10
JACK 9
JACK 8
JACK 7
JACK 6
JACK 5
JACK 4
JACK 3
JACK 2
JACK 1
WLT 1
WLT 4
WLT 5
WLT 6
WLT 7
WLT 8
Luxor
Bovard
Georges Station
Donohoe
Denison
Carbon
Youngwood
Westmoreland
County
Armbrust
Brinkerton
Mutual
Humphreys
Marguerite
Pleasant Unity
Trauger
Lycippus
United
Norvelt
Calumet
Weltytown
Mammoth
Southwest
Carpentertown
Kecksburg
Alice
Standard Shaft
Standard
Mount Pleasant
Laurelville
Hostetter
Whitney
Arnold Palmer
Regional Airport
Coal Tar Run
Jacks Run
Jack's Run
Slate Creek
Sewickley Creek
Brinker Run
Boyer Run
Hurst Run
Wilson Run
Welty Run
Monastery Run
Ninemile Run
Possum Hollow
Laurel Run
Brush Run
Jacobs Creek
Fourmile Run
Shupe Run
66
130
30
119
136
2009
819
982
3093
31

mine discharge overwhelms the system's ability to flow all of the discharge water through the system's piping and a significant portion is bypassed around the system. Plans were being developed to address the situation. Until the treatment system is fully functional, it will be difficult to determine if additional treatment will be necessary.

Brinkerton 2 is another large net alkaline discharge (approximately 1,500 gpm) that presently is not being treated. It is approximately half the flow of Brinkerton 1 and contains roughly half the iron content. A study was done by Hedin Environmental through a Trout Unlimited Technical Assistance Grant to evaluate whether the discharge water could be transferred elsewhere, since little room exists between the discharge location and Sewickley Creek. Options included moving the discharge across the stream to the present treatment system for Brinkerton 1 and combining the treatment, moving the discharge downstream to an area more suitable for treatment, pumping the discharge to nearby areas suitable for treatment, and raising the level of the discharge and treating it at a higher elevation on nearby property. It is clear that treating the Brinkerton 2 discharge will be challenging due to its location. However, projects similar to those described in the study have been done elsewhere and some could be feasible. It's clear that without treating Brinkerton 2, Sewickley Creek will continue to be polluted downstream of the discharge.

Brinkerton 3, the acid discharge, was not being treated at the time of the assessment. Presently the discharge is routed around the Brinkerton 1 discharge into an unnamed tributary that is also polluted with AMD. It is likely this discharge will be channeled into the Brinkerton 1 treatment system, where the excess alkalinity of the large discharge should neutralize the acidity and the capacity of the system will help collect its metals.

Boyer Run

Downstream of the Brinkerton area, the next major discharges to impact the watershed come from two sources on Boyer Run. From past sampling, the Boyer Run discharges were net alkaline and had high levels of iron. For this assessment, landowner permission to monitor the discharges could not be obtained so only stream samples were taken. This allowed for a total pollution load to be calculated but does not gather the necessary information to properly calculate cost estimates for treatment of the discharge.

TMDL for Upper Sewickley Creek

As previously mentioned, TMDLs were established for Upper Sewickley Creek on Welty Run by the AMD TMDL Study. All other TMDL's for Sewickley Creek were established lower in the watershed within other assessment sub-basins and will be addressed in those sections.

Jacks Run

Jacks Run begins just north of the city of Greensburg and flows in a southwesterly direction until its confluence with Sewickley Creek in Youngwood. Jacks Run and its main tributary, Slate Creek, are both heavily influenced by the city of Greensburg and its suburbs. Jacks Run is impacted somewhat by AMD in its headwaters north of the city near Bovard, but the stream is able to assimilate the discharge rather quickly and fish are present in the stream before it reaches Greensburg. Jacks Run's major AMD pollution source occurs in South Greensburg, where a large untreated discharge from the Greensburg Syncline and the Greensburg #2 mine enters the stream. There is a large un-reclaimed mine spoil pile near the discharge as well. Several other minor discharges were identified in Jacks Run upstream of the major discharge and a few downstream as well. Because of the size of the discharge and the apparent impacts, only the major discharge was monitored for this assessment.

AMD site	GIS ID	Sub-basin	Type	Ranking	Notes
Greensburg Mine#2 AMD	1410	Jack's Run	AMD	Major	Discharge is just upstream from boney pile
Coke Oven AMD	1159	Jack's Run	AMD	minor	AMD on right bank emerging from coke ovens and hill side
King's AMD	1179	Jack's Run	AMD	minor	Small low pH aluminum seep
Bovard AMD East	1155	Jack's Run	AMD	minor	Low pH aluminum seep
Bovard AMD South	1155	Jack's Run	AMD	minor	Low pH aluminum seep
Mouth of Jack's Run	1423	Jack's Run	In-Stream		
Above Big AMD	1434	Jack's Run	In-Stream		
Below Big AMD	1159	Jack's Run	In-Stream		
Above 1216 Bovard AMDs	1517	Jack's Run	In-Stream		
Below 1216 Bovard AMDs	1065	Jack's Run	In-Stream		

Jacks Run AMD TMDL

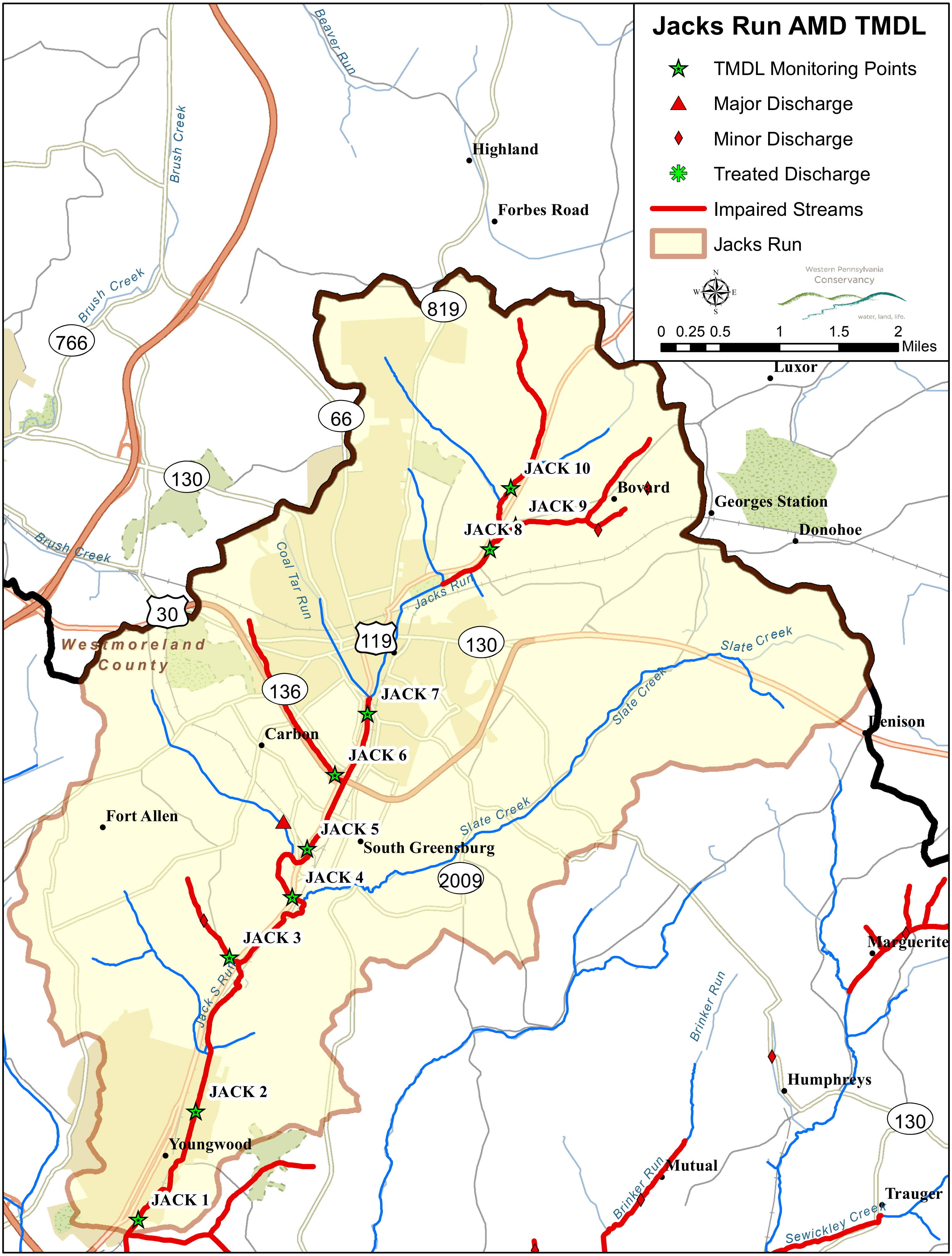
TMDLs were established for 10 monitoring locations by the DEP AMD TMDL Study.

Parameter	Existing load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
JACK10 - Unnamed tributary to Jacks Run upstream of Greensburg						
Aluminum (lbs/day)	7.9	3.87	0.28	3.59	4.03	51%
Iron (lbs/day)	6.79	5.64	1.13	4.51	1.15	17%
Manganese (lbs/day)	1.03	1.03	0.75	0.28	NA	NA
Acidity (lbs/day)	-2888.05	-2888.05	-	-2888.05	NA	NA

JACK9 - Unnamed tributary to Jacks Run upstream of Greensburg						
Aluminum (lbs/day)	43.11	2.59	0.28	2.31	40.52	94%
Iron (lbs/day)	47.7	6.2	1.13	5.07	41.5	87%
Manganese (lbs/day)	25.22	3.03	0.75	2.28	22.19	88%
Acidity (lbs/day)	-112.83	-112.83	-	-112.83	NA	NA
JACK8 - Jacks Run upstream of Greensburg						
Aluminum (lbs/day)	29.6	7.7	0.56	7.14	0*	0%*
Iron (lbs/day)	29.73	22.3	2.26	20.04	0*	0%*
Manganese (lbs/day)	27.29	10.1	1.5	8.6	0*	0%*
Acidity (lbs/day)	-5517.97	-5517.97	-	-5517.97	NA	NA
JACK7 - Jacks Run downstream of Coal Tar Run						
Aluminum (lbs/day)	53.17	15.95	1.13	14.82	15.32*	49%*
Iron (lbs/day)	42.24	24.08	4.5	19.58	10.73*	31%*
Manganese (lbs/day)	15.09	15.09	3	12.09	NA	NA
Acidity (lbs/day)	-8588.88	-8588.88	-	-8588.88	NA	NA
JACK6 - Zellers Run near mouth						
Aluminum (lbs/day)	4.45	2.54	-	2.54	1.91	43%
Iron (lbs/day)	2.17	2.17	0.75	1.42	NA	NA
Manganese (lbs/day)	0.42	0.42	0.38	0.04	NA	NA
Acidity (lbs/day)	-1359.57	-1359.57	-	-1359.57	NA	NA
JACK5 - Jacks Run downstream of Zellers Run						
Aluminum (lbs/day)	56.87	26.73	1.13	25.6	0*	0%*
Iron (lbs/day)	37.08	37.08	4.5	32.58	NA	NA
Manganese (lbs/day)	13.14	13.14	3	10.14	NA	NA
Acidity (lbs/day)	-1101.31	-1101.31	-	-11101.3	NA	NA
JACK4 - Jacks Run upstream of Slate Creek						
Aluminum (lbs/day)	103.88	44.67	1.13	43.54	29.07*	40%*
Iron (lbs/day)	1715.67	85.78	4.5	81.28	1629.89*	95%*
Manganese (lbs/day)	97.62	71.26	3	68.26	26.36*	27%*
Acidity (lbs/day)	-6809.46	-6809.46	-	-6809.46	NA	NA
JACK3 - Unnamed tributary to Jacks Run in South Greensburg						
Aluminum (lbs/day)	2.28	1.21	-	1.21	1.07	47%
Iron (lbs/day)	1071	1.71	-	1.71	NA	NA
Manganese (lbs/day)	2.08	1.27	-	1.27	0.81	39%
Acidity (lbs/day)	-211.07	-211.07	-	-211.07	NA	NA
JACK2 - Jacks Run in Youngwood						
Aluminum (lbs/day)	153.08	64.29	1.13	63.16	28.51*	31%*
Iron (lbs/day)	811.75	259.76	4.5	255.26	0*	0%*
Manganese (lbs/day)	96.67	96.67	3	93.97	NA	NA
Acidity (lbs/day)	-14214	-14214.01	-	-14214	NA	NA
JACK1 - Jacks Run at mouth						
Aluminum (lbs/day)	107.27	59	1.13	57.87	0*	0%*
Iron (lbs/day)	320.49	185.89	4.5	181.39	0*	0%*
Manganese (lbs/day)	78.06	78.06	3	75.06	NA	NA
Acidity (lbs/day)	-15394.6	-15394.56	-	-15394.6	NA	NA

NA-not applicable

**Takes into account load reductions from upstream sources*


Jacks Run AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Jacks Run
Western Pennsylvania Conservancy
water. land. life.
0 0.25 0.5 1 1.5 2 Miles
Highland
Forbes Road
Luxor
Bovard
Georges Station
Donohoe
Denison
Carbon
Fort Allen
South Greensburg
Youngwood
Marguerite
Humphreys
Mutual
Trauger
Westmoreland County
JACK 1
JACK 2
JACK 3
JACK 4
JACK 5
JACK 6
JACK 7
JACK 8
JACK 9
JACK 10
Beaver Run
Brush Creek
Coal Tar Run
Jacks Run
Slate Creek
Brinker Run
Sewickley Creek
819
766
66
130
30
119
136
2009

This study monitored one major AMD discharge within Jacks Run, the Greensburg Mine#2 discharge- DMP-JR1. The other pollution sources identified by the TMDL upstream of the major discharge were considered minor because of much smaller flows and apparent smaller impacts to the stream. It is recommended that areas identified on Jacks Run by the TMDL be addressed after the major discharge. TMDL monitoring points JACK3 and JACK 4 will identify pollution load reductions from addressing the major discharge DMP-JR1

Middle Sewickley Creek

For this study, Middle Sewickley Creek was identified as the watershed from the confluence of Jack Run and Sewickley Creek in Youngwood to the confluence of Pinkerton Run with Sewickley Creek, approximately 2 miles downstream from Yukon. Major named tributaries include Wilson Run, Belson Run, Buffalo Run, and Lick Run. Several other modest-sized unnamed tributaries also enter the stream in this section.

AMD site	GIS ID	Sub-basin	Type	Ranking	Notes
Small Acid seep by church	1099	Middle Sewickley	AMD	Minor	Main stem left side
Wilson Run 1 AMD	1134	Middle Sewickley	AMD	Treated	Wilson Run at Rt. 819 and Turnpike intersection
Wilson Run 2 AMD	1134	Middle Sewickley	AMD	Major	Wilson Run at Rt 819 and Turnpike intersection
Buffalo Run Big AMD	1443	Middle Sewickley	AMD	Major	Buffalo Run
Acid above RuffsDale	1526	Middle Sewickley	AMD	Major	Buffalo Run
AMD by bus garage	1033	Middle Sewickley	AMD	Minor	Buffalo Run
AMD by trailer park	1207	Middle Sewickley	AMD	Minor	Buffalo Run
Soberdash 1 Acid	1123	Middle Sewickley	AMD	Major	Mainstem left on hillside below quarry near boney pile
Soberdash 2 Alkaline	1123	Middle Sewickley	AMD	Major	Mainstem on right opposite boney pile
Soberdash 3	1503	Middle Sewickley	AMD	Major	AMD near mouth of Small UNT 1503
Upper Whyel AMD	1044	Middle Sewickley	AMD	minor	Off Yukon Road
Top of Mid Sewickley	1099	Middle Sewickley	In-Stream		below New Stanton
Bottom of Mid Sewickley	1388	Middle Sewickley	In-Stream		Above Waltz Mills by nursery
Buffalo Run Mouth	1343	Middle Sewickley	In-Stream		Buffalo Run near mouth

Middle Sewickley Creek AMD TMDLs

The TMDL for Middle Sewickley were concentrated in the Buffalo Run watershed. Eight monitoring locations were identified throughout the watershed. An additional TMDL monitoring point is located on the main stem of Sewickley Creek, SC3. This assessment focused its monitoring on the major AMD pollution source, identified as DMP-BUF1, with SMP-BUF1 corresponding to TMDL point BUFF1. SMP-SC3 corresponds to TMDL - SC3 and will similarly monitor load reductions within the main stem of Sewickley Creek. SMP-SC3 also will also identify load reductions from the three Soberdash discharges identified in this assessment as minor sources.

Parameter	Existing load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reductio n
BUFF10 - Unnamed tributary to Buffalo Run downstream of Route 31 in Tarrs						
Aluminum (lbs/day)	133.55	5.34	0.56	4.78	128.16	96%
Iron (lbs/day)	93.89	8.45	2.26	6.19	85.44	91%
Manganese (lbs/day)	18.71	8.42	1.5	6.92	10.29	55%
Acidity (lbs/day)	1276.84	6.38	-	6.38	1270.46	99.50%
BUFF9 - Unnamed tributary to Buffalo Run near mouth in Snydertown						
Aluminum (lbs/day)	71.98	0.72	-	0.72	71.26	99%
Iron (lbs/day)	17.49	1.4	-	1.4	16.09	92%
Manganese (lbs/day)	27.26	0.82	-	0.82	26.44	97%
Acidity (lbs/day)	-625.27	-625.27	-	-625.27	NA	NA
BUFF8 - Buffalo Run at Route 31 bridge near Ruffs Dale						
Aluminum (lbs/day)	7.13	5.99	0.28	5.71	1.14	16%
Iron (lbs/day)	14.17	13.32	1.13	12.19	0.85	6%
Manganese (lbs/day)	2.95	2.95	0.75	2.2	NA	NA
Acidity (lbs/day)	-1693.56	-1693.56	-	-1693.56	NA	NA
BUFF7 - Unnamed tributary to Buffalo Run at T688 bridge in Ruffs Dale						
Aluminum (lbs/day)	142.48	7.12	0.56	6.56	0*	0%*
Iron (lbs/day)	65.08	12.36	2.26	10.1	0*	0%*
Manganese (lbs/day)	27.61	12.97	1.5	11.47	0*	0%*
Acidity (lbs/day)	717.37	78.91	-	78.91	0*	0%*
BUFF6 - Buffalo Run at SR3089 bridge downstream of Ruffs Dale						
Aluminum (lbs/day)	116.44	13.97	1.13	12.84	0*	0%*
Iron (lbs/day)	67.43	24.95	4.5	20.45	0*	0%*
Manganese (lbs/day)	38.85	24.48	3	21.48	0*	0%*
Acidity (lbs/day)	-933	-933	-	-933	NA	NA

BUFF3 - Unnamed tributary to Buffalo Run (Thomson Run) off of T678						
Aluminum (lbs/day)	43.95	2.2	0.28	1.92	41.75	95%
Iron (lbs/day)	10.27	5.34	4.13	4.21	4.93	48%
Manganese (lbs/day)	24.48	3.52	0.75	2.77	19.96	85%
Acidity (lbs/day)	459.87	32.19	-	32.19	427.68	93%
BUFF2 - Buffalo Run at T678 Bridge						
Aluminum (lbs/day)	65.19	13.04	1.13	11.91	0*	0%*
Iron (lbs/day)	704.88	35.24	4.5	30.74	627.16*	95%*
Manganese (lbs/day)	58.49	26.9	3	23.9	17.22*	39%*
Acidity (lbs/day)	-249.73	-249.73	-	-249.73	NA	NA
BUFF1 - Buffalo Run at SR3089 bridge near Hunker						
Aluminum (lbs/day)	70.62	19.77	1.13	18.64	0*	0%*
Iron (lbs/day)	626.29	50.1	4.5	45.6	0*	0%*
Manganese (lbs/day)	72.88	33.52	3	30.52	0*	0%*
Acidity (lbs/day)	-856.52	-856.52	-	-856.52	NA	NA
SC2 - Sewickley Creek downstream of Buffalo Run						
Aluminum (lbs/day)	639.93	364.76	7.39	357.37	62.61	15%*
Iron (lbs/day)	1370.64	712.73	33.69	679.04	72.72	10%*
Manganese (lbs/day)	393.28	393.28	19.68	373.6	NA	NA
Acidity (lbs/day)	-74055.3	-74055.3	-	-74055.3	NA	NA

NA-not applicable

**Takes into account load reductions from upstream sources*

Wilson Run

Wilson Run begins two miles north of Mt. Pleasant and flows in a northwesterly direction, roughly paralleling the Pennsylvania Turnpike, until its confluence with Sewickley Creek near New Stanton. Two major net alkaline discharges, Wilson Run 1 and Wilson Run 2, enter the stream near its junction with the turnpike and impair the stream for most of its length. Oddly, Wilson Run is not identified in state GIS layers as being impaired for much of its reach. Wilson Run 1 is believed to emanate from the Standard and Stewart mines near Mt. Pleasant and Wilson Run 2 is believed to come from the Central Mine in Central. A large wetland area downstream of the discharges and adjacent to the turnpike is influenced by mine drainage and it is difficult to determine if additional mine water is entering Wilson Run from polluted groundwater within the wetland.

Sewickley Creek Watershed Association has been actively involved in restoration efforts on Wilson Run since its beginnings. A number of efforts with a variety of agencies and organizations have been developed at the Wilson Run 1 site, including a number of experimental projects to pretreat the mine water with aeration to speed the settling of iron. In the recent past, a two acre pond, into which the mine discharge flows, was cleaned of its iron sludge and reconfigured to improve detention. Additionally, a Maelstrom Oxidizer was installed at the head of the discharge into the pond to oxygenate the water. Although the aeration has improved treatment at high flows, iron continues to enter Wilson Run from WR1 due to the limited size of the pond and its lack of enough detention time to reduce the iron to acceptable levels. It is recommended that additional wetland treatment areas be developed for the Wilson Run 1 treatment system to reduce iron to acceptable water quality standards.

The Wilson Run 2 discharge enters Wilson just downstream from that of the Wilson Run 1 treatment system outflow. This discharge has been especially difficult to measure flows on because the discharge pipe enters the stream under water. No efforts have been made to address this significant discharge into Wilson Run to date. However, without addressing the discharge in some way, it is unlikely the stream will meet its designated use and any load reduction goals when established.

Buffalo Run

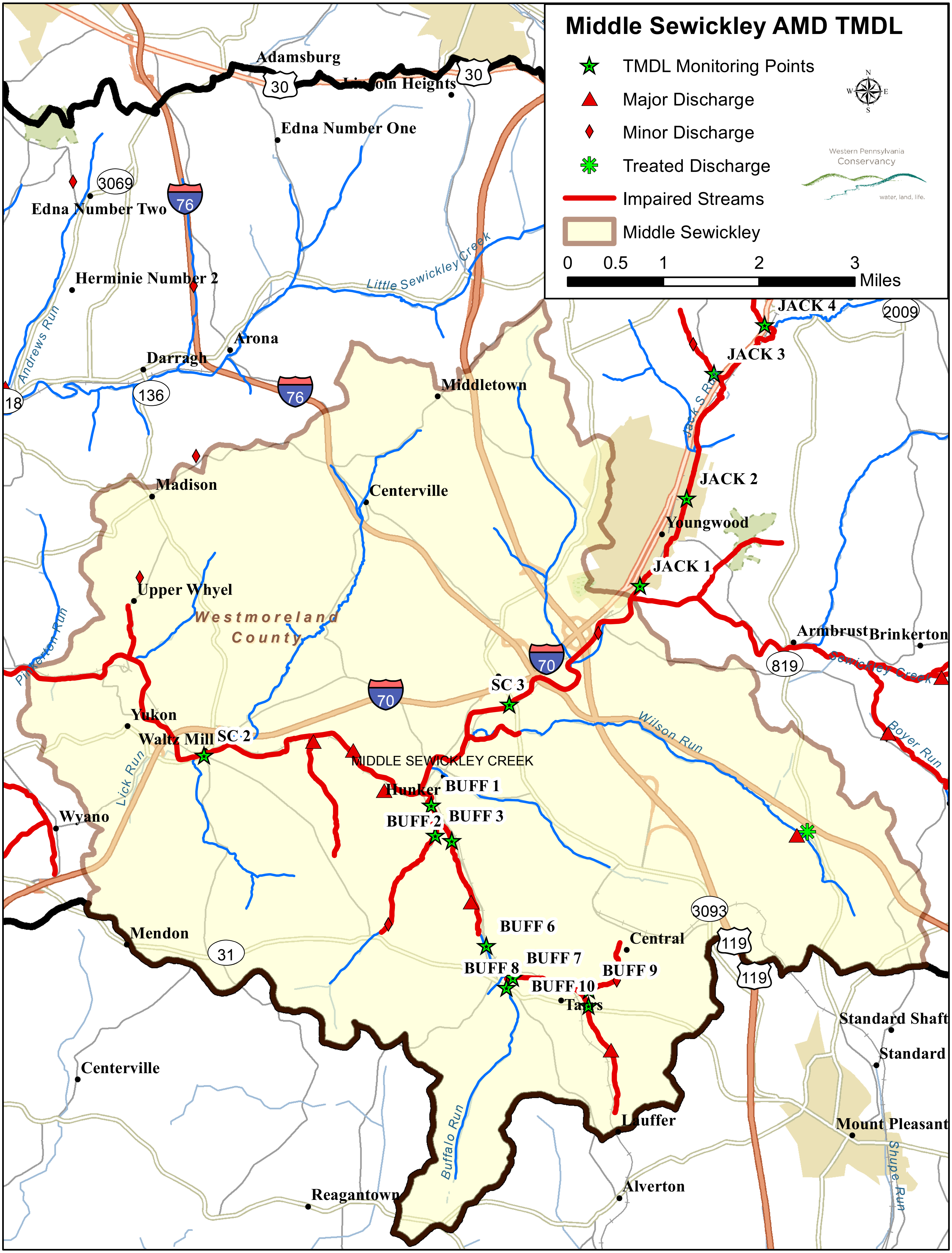
The headwaters of Buffalo Run begin near the communities of Tarrs and Ruffs Dale, in East Huntingdon Township, south of PA Route 31. Several minor AMD discharges enter Buffalo Run and contribute to its pollution load in the headwaters. The stream is able to assimilate the pollution from these minor discharges. However, one major net acidic discharge located downstream of Ruffs Dale is the most significant to enter the stream and seriously degrades water quality and habitat. When this discharge enters Buffalo Run, the substrate becomes smothered in oxide and it remains that way for its entire length. Additionally, another unnamed tributary which flows adjacent to Potoka Mine Road is impaired by a few acidic discharges and enters Buffalo Creek downstream of the large discharge. This tributary will likely need addressed to remove Buffalo Run from the impaired list completely but the difficulty in addressing the individual discharges were beyond the scope of this study. It is recommended that a more detailed study of the tributary be undertaken to determine the best course of action sometime in the future.

Sewickley Creek below Buffalo Run

Slightly downstream of the mouth of Buffalo Run, Sewickley Creek is impacted by three major discharges. Collectively for this study they are known as the Soberdash discharges. One of the major discharges is net alkaline and two are acidic, one being highly acidic but with a much smaller flow. A very large mine spoil pile is also located in this segment of stream and has been the target of numerous efforts to address the pollution coming from the pile, none of which have been successful.

Soberdash 1 is the highly acidic discharge and it emanates from an abandoned deep mine. Immediately above the discharge is a new rock quarry, believed to be serving the Marcellus Shale industry. The discharge flows untreated from the mine, down a steep bank, and then into a large wetland area adjacent to the mine spoil. It then flows directly into the main stem of Sewickley Creek untreated.

Soberdash 2 is a large, untreated net acidic discharge from a bore hole into an abandoned underground mine. The discharge flows from the borehole, through a 60° V-notch weir, into a mine spoil area where a wetland has been created by the discharge and then into an unnamed tributary, which immediately flows into the main stem of Sewickley Creek. Presently there is



Middle Sewickley AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Middle Sewickley
0 0.5 1 2 3 Miles
Western Pennsylvania Conservancy
water, land, life.
Adamsburg
Lincoln Heights
Edna Number One
Edna Number Two
Herminie Number 2
Arona
Darragh
Little Sewickley Creek
Andrews Run
Middletown
Madison
Centerville
Upper Whyel
Westmoreland County
Youngwood
JACK 4
JACK 3
JACK 2
JACK 1
Jack S Run
Armbrust
Brinkerton
Sewickley Creek
Boyer Run
SC 3
Wilson Run
Yukon
Waltz Mill
SC 2
Lick Run
Pinkerton Run
MIDDLE SEWICKLEY CREEK
Hunker
BUFF 1
BUFF 2
BUFF 3
Wyano
BUFF 6
BUFF 7
BUFF 8
BUFF 9
BUFF 10
Central
Tarrs
Mendon
Standard Shaft
Standard
Centerville
Buffalo Run
Lauffer
Mount Pleasant
Shupe Run
Alverton
Reagantown
30
3069
76
136
70
819
2009
3093
119
31

also an active treatment system operated by the Eastern Associated Coal Corporation and called the Delmont Water Treatment Plant adjacent to Soberdash 2. Its discharged water flows into the same unnamed tributary as Soberdash 2. Soberdash 2 has been ranked as a high priority site for restoration by this study.

Soberdash 3 is a large untreated net alkaline discharge from an underground mine located on the opposite side of Sewickley Creek from the large spoil pile. It flows into a wetland area, created by the discharge, before flowing into the Sewickley Creek main stem. It too is has been identified as a priority for restoration.

Lower Sewickley Creek

For this study, the Lower Sewickley Creek is considered all the water entering the Sewickley Creek main stem from the confluence of Pinkerton Run to the confluence of Sewickley Creek with the Youghiogheny River. Named tributaries in this section include Pinkerton Run, Hunters Run, Painters Run and Kelly Run. Little Sewickley Creek also enters Sewickley Creek in the Lower Sewickley. However, it was designated as a separate sub basin for this study.

AMD site	GIS ID	Sub-basin	Type	Ranking	Notes
Acid seep	1016	Lower Sewickley	AMD	minor	At lower end of section
Lowber	1016	Lower Sewickley	AMD	Treated	Marchand Mine passive treatment system
Left bank AMD by Lowber	1511	Lower Sewickley	AMD	minor	Iron discharge from hillside
Left bank AMD by pasture	1016	Lower Sewickley	AMD	minor	Iron discharge from hillside
Hillside below Lowber	1016	Lower Sewickley	AMD	minor	acid seep from hill above Lowber Rd
Mouth of Sewickley Creek	1016	Lower Sewickley	In-Stream		

There is one large net alkaline AMD discharge (1,600 gpm) located within the area of the watershed designated as the Lower Sewickley Creek, adjacent to the old mining community of Lowber. This discharge is presently being successfully treated by a large passive treatment system through the efforts of Sewickley Creek Watershed Association and numerous partners. The treatment system removes nearly all of the iron from the discharge (usually around 1 mg/L remains in the discharge) before it is released into Sewickley Creek. In addition, the treatment system was designed to recover the iron oxide that is produced during treatment. After removal and preliminary drying, the iron oxide sludge is sold to a pigment manufacturer for further processing into pigments for a variety of uses. The discharge was not sampled as part of this study but is being monitored under an agreement with Hedin Environmental, Inc. and Iron Oxide Recovery.

Lower Sewickley Creek AMD TMDL

There is one TMDL monitoring location within the Lower Sewickley Creek, SC1, which is at the mouth of Sewickley Creek. SC1 corresponds well with this assessment's monitoring point SMP-SC1, which is located approximately ½ mile above the mouth of Sewickley Creek.

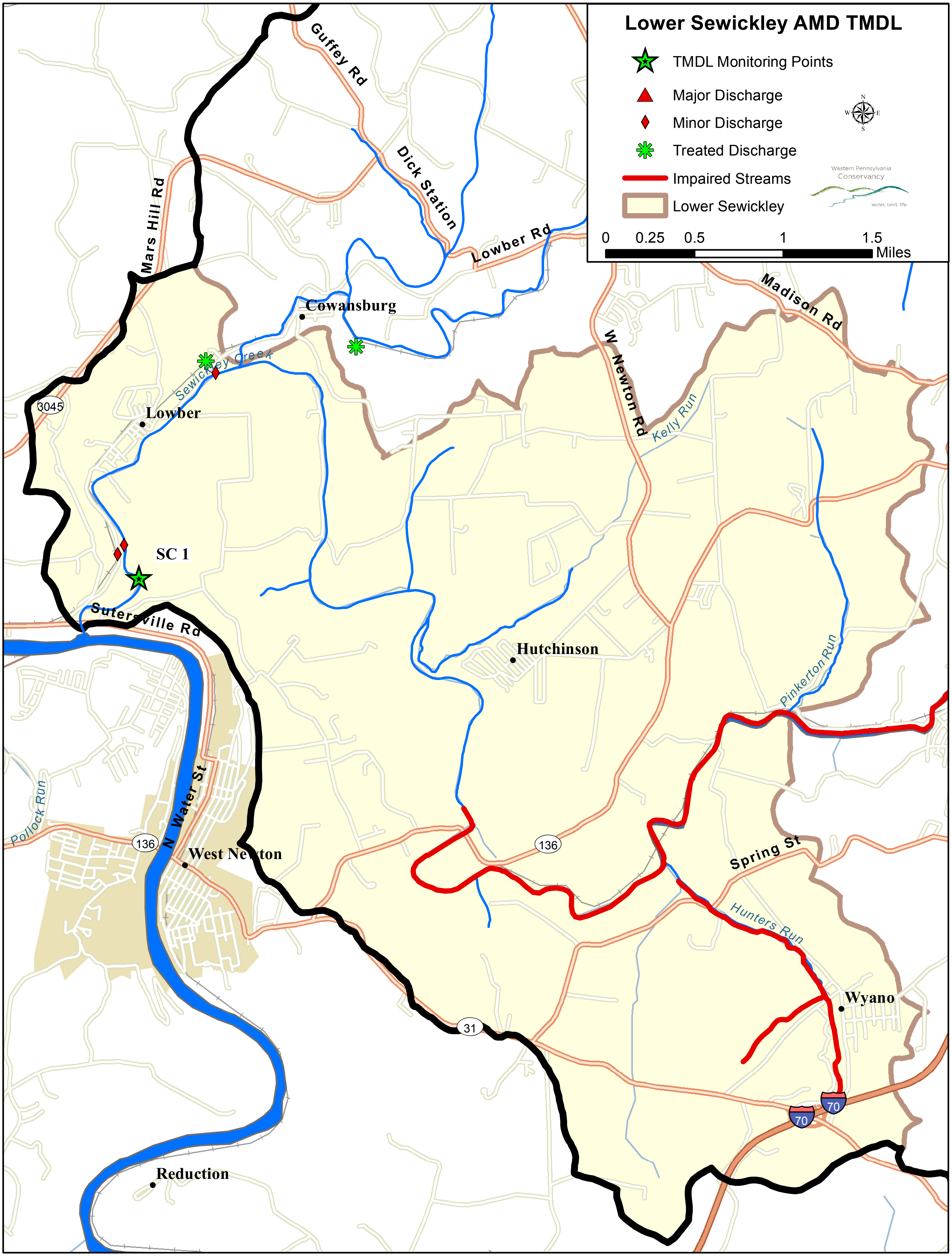
Parameter	Existing load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
SC1 - Sewickley Creek at confluence with Youghiogheny River						
Aluminum (lbs/day)	643.49	456.88	6.12	450.76	0*	0%*
Iron (lbs/day)	1669.61	500.88	23.32	477.56	510.82	49%*
Manganese (lbs/day)	576.83	576.83	10.09	566.74	NA	NA
Acidity (lbs/day)	-125285	-125285	-	-125285	NA	NA

NA-not applicable
**Takes into account load reductions from upstream sources*

Little Sewickley Creek

Little Sewickley Creek is the largest sub-basin of Sewickley Creek. The headwaters begin in southwest Greensburg and the main stem of the stream flows in a westerly direction through the communities of Arona, Darraugh, Herminie and Cowansburg before its confluence with Sewickley near Lowber, Sewickley Township. Route 30 roughly defines the northern border of Little Sewickley Creek west of Greensburg. Within the watershed are two named streams, Andrews Run and Herminie Run.

AMD site	GIS ID	Sub-basin	Type	Ranking	Notes
Keystone Mine Discharge	1058	Little Sewickley	AMD	major	Andrews Run, trib to Little Sewickley, discharge very close to mouth
Andrews Run small seeps	1429	Little Sewickley	AMD	Minor	
BP Discharge AMD	1426	Little Sewickley	AMD	minor	
Turn Pike AMD	1217	Little Sewickley	AMD	minor	Little Sewickley, UNT
Treated Wetland	1217	Little Sewickley	AMD	Treated	Hutchinson Mine Discharge upstream of Cowansburg
Madison Tributary AMD	1502	Little Sewickley	AMD	minor	
Mouth of Little Sewickley	1463	Little Sewickley	In-Stream		



Lower Sewickley AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Lower Sewickley
Western Pennsylvania Conservancy
0
0.25
0.5
1
1.5
Miles
Guffey Rd
Dick Station
Lowber Rd
Mars Hill Rd
Madison Rd
Cowansburg
Sewickley Creek
W Newton Rd
Kelly Run
3045
Lowber
SC 1
Sutersville Rd
Hutchinson
Pinkerton Run
Pollock Run
N Water St
136
West Newton
Spring St
Hunters Run
Wyano
31
70
Reduction

Within Little Sewickley Creek are several untreated minor discharges and one large discharge that is presently being treated with a passive wetland treatment system under an agreement with Consolidated Coal Company. Several smaller discharges are located in the vicinity of the Pennsylvania Turnpike as it traverses the Little Sewickley Creek watershed. Near the old mining towns of Edna No. 1 and Edna No. 2 are several minor seeps apparently associated with the old mining operations located there. A series of acidic seeps along the Pennsylvania Turnpike north of Arona pollute an unnamed tributary to the stream with high levels of aluminum. The tributary is also heavily impaired by agriculture practices just to the south of the discharges on the west side of the turnpike. There are two minor AMD discharges near the town of Herminie, both of which have been studied by Hedin Environmental to identify treatment possibilities. One discharge flows at approximately 100 gpm at its highest and another, which emanates from what appears to be an abandoned mine air shaft that is about 300 gpm at its highest flow. This discharge is near a reclaimed boney pile just outside Herminie. Although the discharge flows at a high rate periodically, it is intermittent, ceasing to flow during dry periods. During the periods of high discharge rates and average stream flow, iron staining can be observed in Little Sewickley Creek nearly to its mouth.

As Little Sewickley Creek nears Cowensburg and its confluence with Sewickley Creek, a large passively-treated abandoned mine discharge drains into a created wetland before flowing to the stream. The discharge emanates from the now closed Hutchinson Mine, previously operated by Consolidated Coal Company. The wetland does a good job of removing most of the iron from the discharge. Some iron does escape the treatment system, but the stream quickly assimilates its impacts. Some additional measures to improve retention time within the wetland may improve the treatment efficiencies of the system.

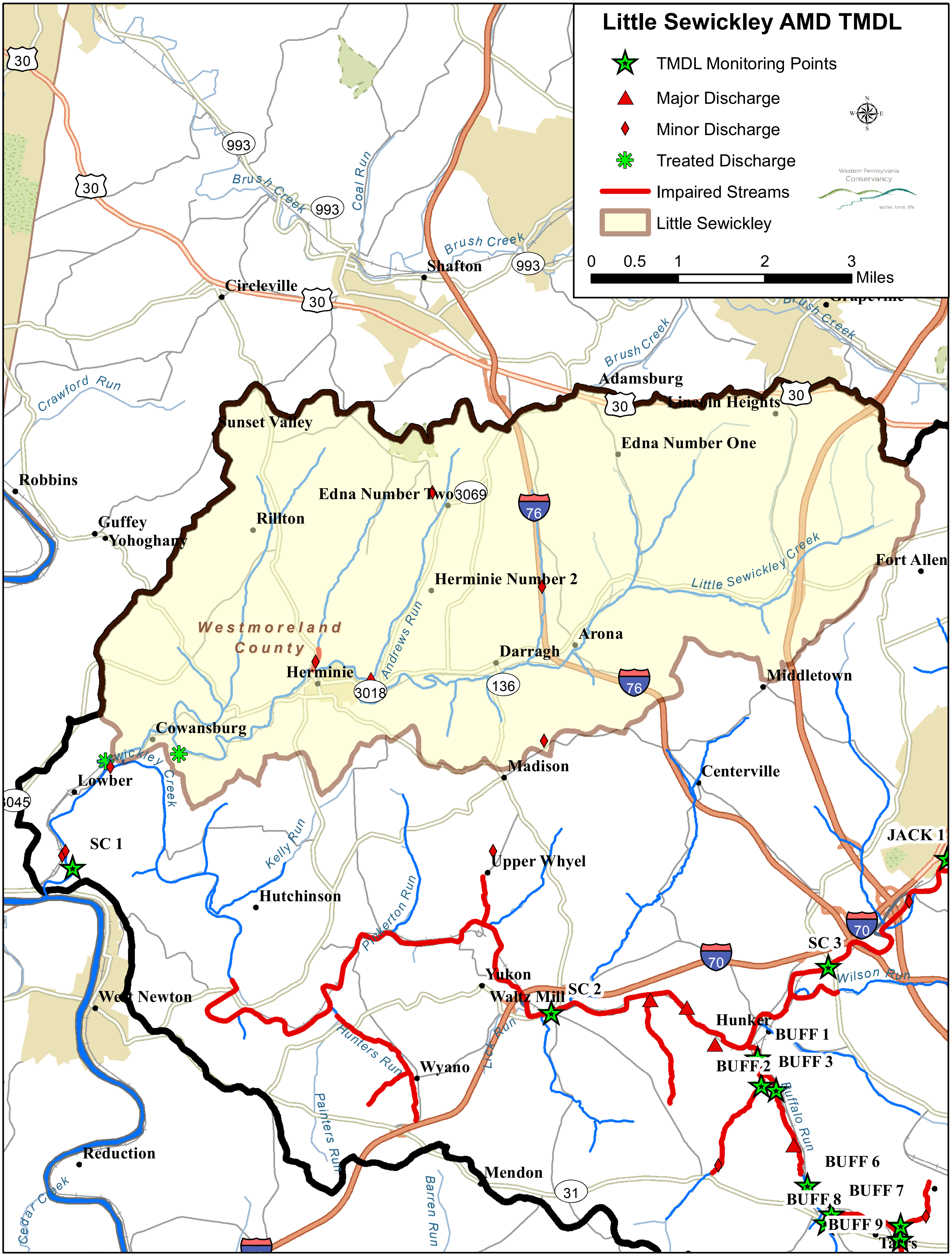
Little Sewickley Creek AMD TMDL

No AMD TMDL was developed for Little Sewickley Creek. Any pollution load from Little Sewickley Creek is captured in the TMDL monitoring point at the mouth of Sewickley Creek, SC1.

Parameter	Existing load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
SC1 - Sewickley Creek at confluence with Youghiogheny River						
Aluminum (lbs/day)	643.49	456.88	6.12	450.76	0*	0%*
Iron (lbs/day)	1669.61	500.88	23.32	477.56	510.82	49%*
Manganese (lbs/day)	576.83	576.83	10.09	566.74	NA	NA
Acidity (lbs/day)	-125285	-125285	-	-125285	NA	NA

NA-not applicable

**Takes into account load reductions from upstream sources*


Little Sewickley AMD TMDL
TMDL Monitoring Points
Major Discharge
Minor Discharge
Treated Discharge
Impaired Streams
Little Sewickley
0 0.5 1 2 3 Miles
Western Pennsylvania Conservancy
water, land, life.
30
993
Brush Creek
Coal Run
Shafton
Circleville
Crawford Run
Adamsburg
Lincoln Heights
Sunset Valley
Edna Number One
Robbins
Edna Number Two
3069
76
Guffey
Rillton
Yohoghany
Fort Allen
Herminie Number 2
Little Sewickley Creek
Westmoreland County
Andrews Run
Arona
Darragh
Herminie
3018
136
Middletown
Cowansburg
Madison
Centerville
Lowber
Sewickley Creek
SC 1
Kelly Run
JACK 1
Upper Whyel
Hutchinson
Pinkerton Run
70
SC 3
Yukon
Wilson Run
West Newton
Waltz Mill
SC 2
Hunker
BUFF 1
Hunters Run
Lick Run
Wyano
BUFF 2
BUFF 3
Buffalo Run
Painters Run
Reduction
BUFF 6
Mendon
31
Barren Run
BUFF 7
BUFF 8
BUFF 9
Cedar Creek

V. Priorities for Restoration

Overview

A successful approach to the restoration of an impaired watershed is to establish a set of priorities for the necessary improvements. Typically, restoration priorities first determine which sites are causing the most impairment to the watershed based on pollution loads. Most often, in AMD impaired watersheds, pollution load has been used as a key factor in determining priority. Metal or acid concentration levels in an AMD discharge alone should not be used as a sole priority indicator in themselves. Flow must also be considered. The volume of flow must be coupled with the amount of pollutant in the water to determine the total amounts of pollution being produced by a discharge, usually measured in pounds per day. Flow is determined by using techniques that will assure reasonably accurate measurement. Common examples of ways to measure the flow of a discharge are by using a weir (such as a V-notch or rectangular style), a flume, capturing a discharge in a pipe to measure flow by means of a bucket and stopwatch, or using a flow meter if the discharge is very large. Once a flow measurement is matched with the amount of pollutant in the water, a total load of pollutant in pounds per day can be calculated. The assessment team utilized these basic methods while collecting AMD data in the Sewickley Creek watershed.

AMD impact is not the only factor that can play a role in determining a final restoration prioritization scheme. Other influences may include (but are not limited to):

- Site conditions
- Landowner cooperation
- Site location and accessibility
- Cost of treatment (both initial and long term)
- Ease of construction
- Likelihood of success
- Expected environmental results
- Operation and maintenance requirements
- Funding availability
- Re-mining potential
- Local priorities and support

As stated above, the initial prioritization for Sewickley Creek is based on pollution load and then refined based on other factors. Flexibility is the key to successful restoration efforts. Often the worst discharges cannot be tackled immediately so other circumstances help to determine what can be done, where it can be done, and in what order.

In the case of the Sewickley Creek watershed, some restoration efforts were done prior to the undertakings of the watershed assessment. SCWA, through a collaborative effort of numerous partners, was able to obtain funding to design and build three AMD treatment systems. The Wilson Run, Brinkerton, and Lowber systems were all projects of necessity, good planning, opportunity, timing, and funding.

Wilson Run

The Wilson Run treatment system (Wilson Run 1) was the first effort by SCWA to address the AMD pollution in the Sewickley Creek Watershed. Two major discharges pollute Wilson Run for its entire length and therefor the stream was a priority for restoration. Wilson Run 1, which is a net alkaline discharge and flows at an average of approximately 1,200 gpm, was the site of many years of research on the treatment of AMD through enhanced aeration of the mine water. Research was conducted in cooperation with the former U.S. Bureau of Mines and other agencies, organizations, and individuals. The site was selected because of its easy access, cooperation from the landowner, and access to electrical power. Although the aeration devices used in the research efforts were effective in oxidizing the AMD, all required significant maintenance because of clogging with iron oxide and were abandoned.

In 2007 a treatment system was constructed by reconfiguring an existing pond for a settling basin. Site and funding constraints limited the size of the treatment system and to improve oxidization and iron precipitation a different type of aeration system called a Maelstrom Oxidizer ® that reduces maintenance requirements was installed. Although the aeration improves treatment at higher flows, the size of the pond is too small to allow for proper precipitation of the iron in the AMD. In order to successfully treat the discharge, the treatment system must be enlarged and should include wetland at the end of the system. SCWA continues to explore options to improve the treatment system efficiency.

A second discharge also enters Wilson Run the site (Wilson Run 2). It is particularly difficult in that the discharge enters the stream under water, preventing accurate flows from being determined. SCWA continues to develop strategies for addressing this second discharge. Without treating the second discharge, restoration of Wilson Run will not happen.

Brinkerton

Brinkerton is the site of SCWA's second AMD treatment system (Brinkerton 1). The Brinkerton 1 discharge is the largest in the watershed flowing upwards of 4,000 gpm at high flow. It is the first major discharge to enter Sewickley Creek and significantly impairs the stream. Two other major discharges enter Sewickley Creek there as well. Both as of this assessment were not being treated. Since this discharge is the largest in the watershed and is the first to enter the stream it has been a top priority for SCWA since its inception.

In 2006, after many years of planning and investigation, SCWA procured enough funding from a variety of sources to build a treatment system for Brinkerton 1. Because of site constraints, the treatment system is undersized for its flow, based on passive AMD design criteria. Three large settling basins were constructed using techniques to maximize treatment area and detention time. No wetland was incorporated into the treatment system, again because of site constraints. In order to improve treatment efficiency, a Maelstrom Oxidizer was placed at the inflow of the system. As of this assessment, power for the two blowers had not been installed but SCWA was actively working toward that goal. The system has not been able to reduce iron levels to discharge standards due to a number of factors, including oxidation, and SWCA continues to pursue ways to increase its treatment efficiency.

Lowber

The Lowber discharge, from the abandoned Marchand Mine, is the largest discharge in lower Sewickley Creek. The discharge flows at an average of about 1,800 gpm. It enters the stream approximately one mile from the confluence with the Youghiogheny River. For over fifty years, the Lowber discharge polluted Sewickley Creek and miles of the Youghiogheny River. Because of its impacts to the stream and the river, the Lowber discharge was a high priority for restoration. After many years of planning and assessment, in 2006 SCWA completed a passive AMD treatment system for the Lowber discharge. The treatment system consists of 6 settling ponds and a large wetland. Since its construction, the system has consistently reduced the iron in the discharge from 75 mg/L to about 2 mg/L. The system was designed to expedite the removal of the iron oxide sludge that collects in the system for use as a marketable byproduct. Once removed, the sludge is recycled and processed into a material usable as pigment for paints, stains, and other products.

As has been stated earlier, previous studies had identified many of the major AMD pollution sources within the watershed and established restoration priorities. Examples of these studies include the Scarlift Report as well as TMDL studies. The following information details these studies and how restoration priorities were listed as a result.

Scarlift Report Priorities

The first prioritization of AMD problems in Sewickley Creek was conducted during the Scarlift Report project study for the Youghiogheny River basin in 1971. Problem areas were prioritized based on the following:

- Relative acid load
- Cost of reclamation
- Relative benefit to the receiving stream
- Effectiveness of the proposed reclamation measures
- Possibility of future mining activity in the area

Reclamation focused primarily on low cost passive AMD treatment projects. At the time, the thought was that by flooding underground mine pools, AMD pollution would be reduced. Many restoration projects focused on installing mine seals at the entrances of the mines in order to flood them. The listed project costs were fairly low because this technique was relatively simple. Subsequent studies have found that this technique was only partially successful, depending on many factors. Though diminished somewhat, the pollution from these discharges has continued for decades

The Scarlift Report lists 14 major sources of AMD in the Sewickley Creek watershed. It reports that the watershed had 43 miles of streams polluted with coal mine drainage with a net acidic load of 50,580 pounds per day and a projected abatement cost totaling $790,000. The report considers Sewickley Creek as the most polluted sub-basin within the Youghiogheny River watershed, contributing more acidity and iron than any other tributary.

A remediation prioritization list was recommended by the Scarlift Report for the Sewickley Creek watershed. The 14 discharges were listed under seven priority areas beginning with Buffalo Run, followed by the Marchand (Lowber) discharge, then Jacks Run, Brinkerton, Fayette Anticline (near Hunker), Hutchison, and Wilson Run discharges. The following table lists the discharges in addition to their loading.

Scarlift Study findings for Sewickley Creek Watershed

Scarlift Study Priorities						
Priority	**Area**	**Scarlift Discharge No.**	**Location**	**Load, lbs per day**		
				Net Acid	**Iron**	**Sulfate**
I	Buffalo Run	M05	Buffalo Run	6,600	680	4300
		M52	Fayette Anticline	40	20	50
II	Marchand (Lowber)	M14	Sewickley Creek	12,000	5,170	28,000
III	Jack's Run	M32	Jack's Run	7,200	1,260	9,500
IV	Brinkerton Overflow	M12	Sewickley Creek	8,400	6,000	26,800
		M11	Sewickley Creek	1,640	140	2,100
		M10	Sewickley Creek	(-)3,000	1,600	7,000
		M19	Boyer Run	(-)1,400	260	2,800
		M08	Boyer Run	200	40	500
V	Fayette Anticline	M51	Sewickley Creek	3,500	480	6,500
		M50	Sewickley Creek	23,200	300	9,900
VI	Hutchinson	M13	Sewickley Creek	11,000	2,990	49,600
	Wilson Run	M07	Wilson Run	(-)450	30	1,600
VII	Wilson Run	M06	Wilson Run	(-)580	640	8,400

The reports completed throughout the coal fields of Pennsylvania under Operation Scarlift serve as excellent resources for the restoration work that continues today. The reports often include information that would be difficult to gather today and having it in a concise report is of great value. However, in the many years that have passed since the reports were completed, conditions have changed considerably within Sewickley Creek, and the chemistry of the mine discharges has changed as well. Many of the discharges listed in the chart above are no longer acidic and are now net alkaline. This is generally believed to have been caused by the mines being flooded and the neutralization of acidic water by limestone in the geologic formation associated with the coal. In addition, some of the discharges identified are presently being treated.

Total Maximum Daily Load (TMDL) Study Priorities

In 2009, an AMD Total Maximum Daily Load (TMDL) report was prepared for Sewickley Creek by the Pennsylvania Department of Environmental Protections for the streams in the watershed impaired by mine drainage. It was noted that a separate TMDL study to address siltation would be done at a later date. The TMDL addresses the three primary metals that are associated with AMD; iron, manganese, and aluminum, plus pH. The results of the TMDL report present a summary table of 27 sampled locations scattered throughout the watershed, showing the existing and allowable load for that site in addition to the NPS percent pollution reduction needed to meet the allowable load. For each site farther downstream, the values take in account load reductions from upstream sources and the over-all end result of the report shows that at the sampling point at the confluence of Sewickley Creek and the Youghiogheny River, there is a NPS percent reduction need of 49% for iron and a 0% reduction needed for aluminum.

Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	NPS Load Reduction (lbs/day)	NPS % Reduction
WELTY8 – Welty Run near headwaters						
Aluminum (lbs/day)	3.47	0.14	-	0.14	3.33	96%
Iron (lbs/day)	1.35	1.35	-	1.35	NA	NA
Manganese (lbs/day)	0.23	0.23	-	0.23	NA	NA
Acidity (lbs/day)	-74.41	-74.41	-	-74.41	NA	NA
WELTY7 – Welty Run ½ mile east of Weltytown						
Aluminum (lbs/day)	14.98	1.20	-	0.92	10.45*	90%*
Iron (lbs/day)	11.68	2.34	-	1.21	9.34*	80%*
Manganese (lbs/day)	3.22	3.22	-	3.22	NA	NA
Acidity (lbs/day)	-1143.39	-1143.39	-	-1143.39	NA	NA
WELTY6 – Welty Run upstream of Mammoth Lake						
Aluminum (lbs/day)	18.19	5.82	-	5.82	0*	0%*
Iron (lbs/day)	10.92	10.92	-	10.92	NA	NA

Manganese (lbs/day)	2.67	2.67	-	2.67	NA	NA
Acidity (lbs/day)	-3917.39	-3917.39	-	-3917.39	NA	NA
WELTY5 – Welty Run ½ mile downstream of Mammoth Lake						
Aluminum (lbs/day)	19.27	6.17	-	6.17	0.73*	11%*
Iron (lbs/day)	11.56	11.56	-	11.56	NA	NA
Manganese (lbs/day)	6.94	6.94	-	6.94	NA	NA
Acidity (lbs/day)	-1753.59	-1753.59	-	-1753.59	NA	NA
WELTY4 – Unnamed tributary to Welty Run ½ mile northeast of village of Mammoth						
Aluminum (lbs/day)	1.15	0.37	-	0.37	0.78*	69%*
Iron (lbs/day)	0.69	0.69	-	0.69	NA	NA
Manganese (lbs/day)	0.91	0.91	-	0.91	NA	NA
Acidity (lbs/day)	-655.80	-655.80	-	-655.80	NA	NA
WELTY1 – Welty Run at bridge in Calumet						
Aluminum (lbs/day)	25.06	8.02	-	8.02	3.16*	29%*
Iron (lbs/day)	48.06	6.73	-	6.73	41.33*	86%*
Manganese (lbs/day)	65.29	16.32	-	16.32	48.97*	75%*
Acidity (lbs/day)	-7198.62	-7198.62	-	-7198.62	NA	NA
JACK10 – Unnamed tributary to Jacks Run upstream of Greensburg						
Aluminum (lbs/day)	7.90	3.87	*0.28*	3.59	4.03	51%
Iron (lbs/day)	6.79	5.64	*1.13*	4.51	1.15	17%
Manganese (lbs/day)	1.03	1.03	*0.75*	0.28	NA	NA
Acidity (lbs/day)	-2888.05	-2888.05	-	-2888.05	NA	NA
JACK9 – Unnamed tributary to Jacks Run upstream of Greensburg						
Aluminum (lbs/day)	43.11	2.59	*0.28*	2.31	40.52	94%
Iron (lbs/day)	47.70	6.20	*1.13*	5.07	41.50	87%
Manganese (lbs/day)	25.22	3.03	*0.75*	2.28	22.19	88%
Acidity (lbs/day)	-112.83	-112.83	-	-112.83	NA	NA
JACK8 – Jacks Run upstream of Greensburg						

Aluminum (lbs/day)	29.60	7.70	*0.56*	7.14	0*	0%*
Iron (lbs/day)	29.73	22.30	*2.26*	20.04	0*	0%*
Manganese (lbs/day)	27.29	10.10	*1.50*	8.60	0*	0%*
Acidity (lbs/day)	-5517.97	-5517.97	-	-5517.97	NA	NA
JACK7 – Jacks Run downstream of Coal Tar Run						
Aluminum (lbs/day)	53.17	15.95	*1.13*	14.82	15.32*	49%*
Iron (lbs/day)	42.24	24.08	*4.50*	19.58	10.73*	31%*
Manganese (lbs/day)	15.09	15.09	*3.00*	12.09	NA	NA
Acidity (lbs/day)	-8588.88	-8588.88	-	-8588.88	NA	NA
JACK6 – Zellers Run near mouth						
Aluminum (lbs/day)	4.45	2.54	-	2.54	1.91	43%
Iron (lbs/day)	2.17	2.17	0.75	1.42	NA	NA
Manganese (lbs/day)	0.42	0.42	0.38	0.04	NA	NA
Acidity (lbs/day)	-1359.57	-1359.57	-	-1359.57	NA	NA
JACK5 – Jacks Run downstream of Zellers Run						
Aluminum (lbs/day)	56.87	26.73	*1.13*	25.60	0*	0%*
Iron (lbs/day)	37.08	37.08	*4.50*	32.58	NA	NA
Manganese (lbs/day)	13.14	13.14	*3.00*	10.14	NA	NA
Acidity (lbs/day)	-11101.31	-11101.31		-11101.31	NA	NA
JACK4 – Jacks Run upstream of Slate Creek						
Aluminum (lbs/day)	103.88	44.67	*1.13*	43.54	29.07*	40%*
Iron (lbs/day)	1715.67	85.78	*4.50*	81.28	1629.89*	95%*
Manganese (lbs/day)	97.62	71.26	*3.00*	68.26	26.36*	27%*
Acidity (lbs/day)	-6809.46	-6809.46	-	-6809.46	NA	NA
JACK3 – Unnamed tributary to Jacks Run in South Greensburg						
Aluminum (lbs/day)	2.28	1.21	-	1.21	1.07	47%
Iron (lbs/day)	1.71	1.71	-	1.71	NA	NA
Manganese (lbs/day)	2.08	1.27	-	1.27	0.81	39%

Acidity (lbs/day)	-211.07	-211.07	-	-211.07	NA	NA
JACK2 – Jacks Run in Youngwood						
Aluminum (lbs/day)	153.08	64.29	*1.13*	63.16	28.51*	31%*
Iron (lbs/day)	811.75	259.76	*4.50*	255.26	0*	0%*
Manganese (lbs/day)	96.67	96.67	*3.00*	93.97	NA	NA
Acidity (lbs/day)	-14214.01	-14214.01		-14214.01	NA	NA
JACK1 – Jacks Run at mouth						
Aluminum (lbs/day)	107.27	59.00	*1.13*	57.87	0*	0%*
Iron (lbs/day)	320.49	185.89	*4.50*	181.39	0*	0%*
Manganese (lbs/day)	78.06	78.06	*3.00*	75.06	NA	NA
Acidity (lbs/day)	-15394.56	-15394.56		-15394.56	NA	NA
SC3 – Sewickley Creek downstream of Jacks Run						
Aluminum (lbs/day)	317.07	155.36	*1.13*	154.23	113.44	43%
Iron (lbs/day)	255.73	255.73	*4.50*	251.23	NA	NA
Manganese (lbs/day)	57.71	57.71	*3.00*	54.71	NA	NA
Acidity (lbs/day)	-74418.25	-74418.25		-74418.25	NA	NA
BUFF10 – Unnamed tributary to Buffalo Run downstream of Route 31 in Tarrs						
Aluminum (lbs/day)	133.55	5.34	*0.56*	4.78	128.16	96%
Iron (lbs/day)	93.89	8.45	*2.26*	6.19	85.44	91%
Manganese (lbs/day)	18.71	8.42	*1.50*	6.92	10.29	55%
Acidity (lbs/day)	1276.84	6.38	-	6.38	1270.46	99.5%
BUFF9 – Unnamed tributary to Buffalo Run near mouth in Snydertown						
Aluminum (lbs/day)	71.98	0.72	-	0.72	71.26	99%
Iron (lbs/day)	17.49	1.40	-	1.40	16.09	92%
Manganese (lbs/day)	27.26	0.82	-	0.82	26.44	97%
Acidity (lbs/day)	-625.27	-625.27	-	-625.27	NA	NA
BUFF8 – Buffalo Run at Route 31 bridge near Ruffs Dale						
Aluminum (lbs/day)	7.13	5.99	*0.28*	5.71	1.14	16%
Iron	14.17	13.32	*1.13*	12.19	0.85	6%

(lbs/day)						
Manganese (lbs/day)	2.95	2.95	*0.75*	2.20	NA	NA
Acidity (lbs/day)	-1693.56	-1693.56	-	-1693.56	NA	NA
BUFF7 – Unnamed tributary to Buffalo Run at T688 bridge in Ruffs Dale						
Aluminum (lbs/day)	142.48	7.12	*0.56*	6.56	0*	0%*
Iron (lbs/day)	65.08	12.36	*2.26*	10.10	0*	0%*
Manganese (lbs/day)	27.61	12.97	*1.50*	11.47	0*	0%*
Acidity (lbs/day)	717.37	78.91	-	78.91	0*	0%*
BUFF6 – Buffalo Run at SR3089 bridge downstream of Ruffs Dale						
Aluminum (lbs/day)	116.44	13.97	*1.13*	12.84	0*	0%*
Iron (lbs/day)	67.43	24.95	*4.50*	20.45	0*	0%*
Manganese (lbs/day)	38.85	24.48	*3.00*	21.48	0*	0%*
Acidity (lbs/day)	-933.00	-933.00	-	-933.00	NA	NA
BUFF3 – Unnamed tributary to Buffalo Run (Thompson Run) off of T678						
Aluminum (lbs/day)	43.95	2.20	*0.28*	1.92	41.75	95%
Iron (lbs/day)	10.27	5.34	*1.13*	4.21	4.93	48%
Manganese (lbs/day)	24.48	3.52	*0.75*	2.77	19.96	85%
Acidity (lbs/day)	459.87	32.19	-	32.19	427.68	93%
BUFF2 – Buffalo Run at T678 bridge						
Aluminum (lbs/day)	65.19	13.04	*1.13*	11.91	0*	0%*
Iron (lbs/day)	704.88	35.24	*4.50*	30.74	627.16*	95%*
Manganese (lbs/day)	58.49	26.90	*3.00*	23.90	17.22*	39%*
Acidity (lbs/day)	-249.73	-249.73	-	-249.73	NA	NA
BUFF1 – Buffalo Run at SR3089 bridge near Hunker						
Aluminum (lbs/day)	70.62	19.77	*1.13*	18.64	0*	0%*
Iron (lbs/day)	626.29	50.10	*4.50*	45.60	0*	0%*
Manganese (lbs/day)	72.88	33.52	*3.00*	30.52	0*	0%*
Acidity (lbs/day)	-856.52	-856.52	-	-856.52	NA	NA
SC2 – Sewickley Creek downstream of Buffalo Run						

Aluminum (lbs/day)	639.93	364.76	7.39 (6.26+*1.13*)	357.37	62.61*	15%*
Iron (lbs/day)	1370.64	712.73	33.69 (29.19+*4.50*)	679.04	72.72*	10%*
Manganese (lbs/day)	393.28	393.28	19.68 (16.68+*3.00*)	373.60	NA	NA
Acidity (lbs/day)	-74055.30	-74055.30		-74055.30	NA	NA
SC1 – Sewickley Creek at confluence with Youghiogheny River						
Aluminum (lbs/day)	643.49	456.88	6.12 (4.99+*1.13*)	450.76	0*	0%*
Iron (lbs/day)	1669.61	500.88	23.32(18.82 *+4.50)*	477.56	510.82*	49%*
Manganese(lbs/day)	576.83	576.83	10.09 (7.09+*3.00*)	566.74	NA	NA
Acidity (lbs/day)	-125285.00	-125285.00	-	-125285.00	NA	NA

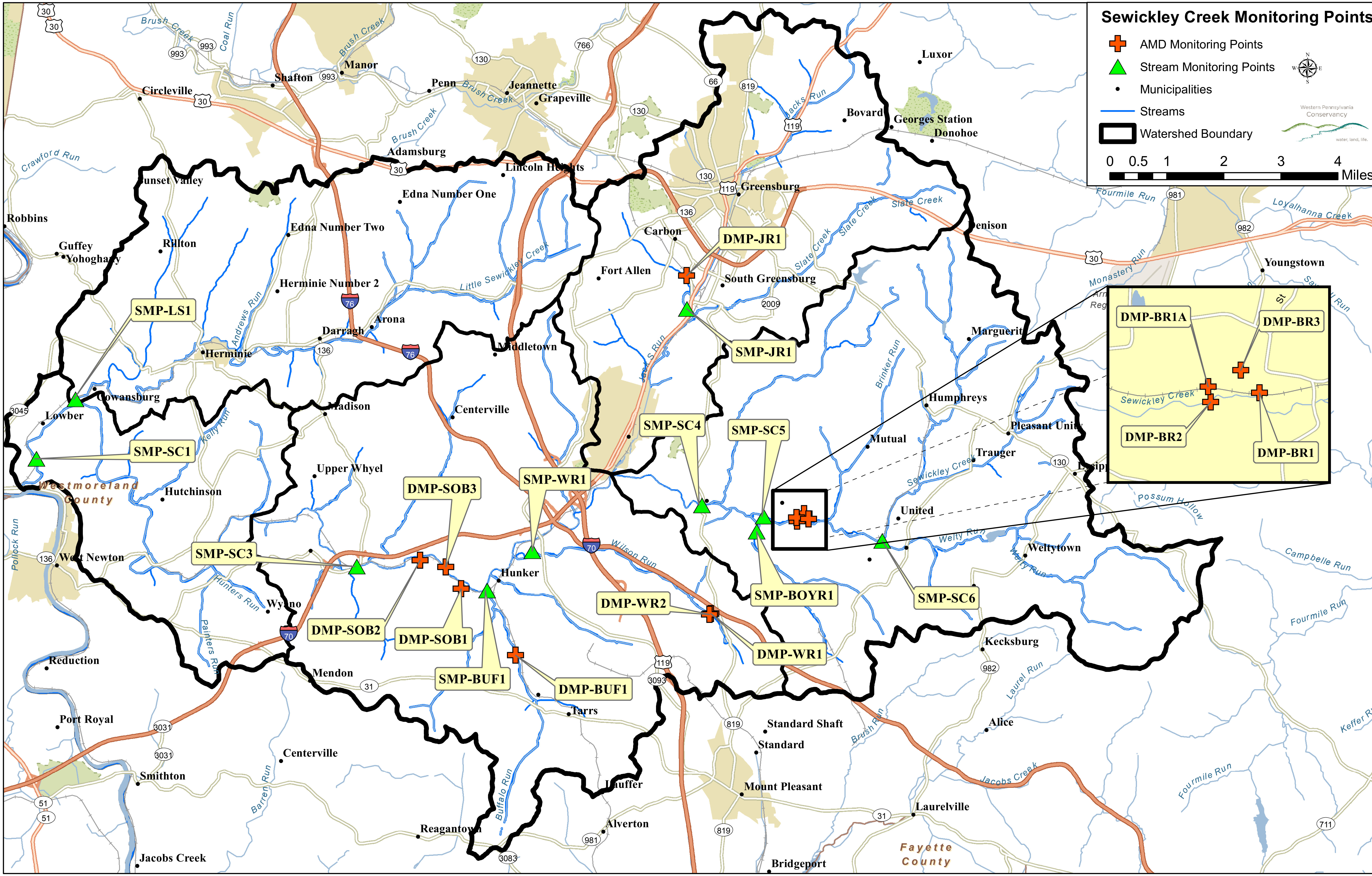
NA = not applicable
* Takes into account load reductions from upstream sources.
Waste loads in italics are reserved for future mining operations.

Sewickley Creek Watershed Association Assessment Priorities

As mentioned previously, the best approach to the restoration of an impaired watershed is to establish a set of priorities for the necessary work. Usually, restoration priorities first determine which sites are causing the most impairment to the watershed based on pollution load. With AMD impaired watershed, water chemistry of the mine discharges plays an important role as well. If a discharge is acidic and contains aluminum, it may degrade a stream even if the pollution load from the discharge is not as high as other discharges. This is because aluminum is very toxic to aquatic life. For this study, chemistry and flow were used to determine pollution load for the top 10 discharges in the watershed.

Many other factors can play a role in determining a final restoration prioritization scheme. These factors may include site conditions, landowner cooperation, site location or access to the site, cost of treatment (both initial and long term), ease of construction, likelihood of success, expected environmental results, operation and maintenance requirements, funding availability, remining potential, local priorities and support, and many other. Often the initial prioritization is based on pollution load and then is refined based on the other factors. Flexibility is the key to successful restoration efforts. Often the worst discharges cannot be tackled immediately so other factors help determine what to do and when.

In the case of Sewickley Creek, the watershed association tried to address its AMD problems by cooperating with agencies and organizations familiar with treatment and restoration techniques. It focused on two areas in the watershed, the upper and lower, in order to gain support for restoration efforts throughout the watershed. The discharges they focused on were



Sewickley Creek Monitoring Points
AMD Monitoring Points
Stream Monitoring Points
Municipalities
Streams
Watershed Boundary
0 0.5 1 2 3 4 Miles
Western Pennsylvania Conservancy
DMP-JR1
SMP-JR1
SMP-LS1
SMP-SC1
SMP-SC3
SMP-SC4
SMP-SC5
SMP-SC6
SMP-WR1
SMP-BOYR1
SMP-BUF1
DMP-SOB1
DMP-SOB2
DMP-SOB3
DMP-BUF1
DMP-WR1
DMP-WR2
DMP-BR1
DMP-BR1A
DMP-BR2
DMP-BR3
Westmoreland County
Fayette County
Greensburg
Jeannette
Grapeville
Manor
Penn
Shafton
Circleville
Adamsburg
Lincoln Heights
Edna Number One
Edna Number Two
Herminie Number 2
Herminie
Arona
Darragh
Middletown
Madison
Centerville
Upper Whyel
Hutchinson
West Newton
Wyano
Hunker
Mendon
Tarrs
Lauffer
Alverton
Reagantown
Carbon
Fort Allen
South Greensburg
Humphreys
Mutual
Trauger
Pleasant Unity
United
Weltytown
Kecksburg
Alice
Standard Shaft
Standard
Mount Pleasant
Laurelville
Bridgeport
Smithton
Port Royal
Reduction
Jacobs Creek
Lowber
Cowansburg
Rillton
Sunset Valley
Robbins
Guffey
Yohoghany
Luxor
Bovard
Georges Station
Donohoe
Denison
Youngstown
Marguerite
Sewickley Creek
Little Sewickley Creek
Brush Creek
Coal Run
Crawford Run
Jacks Run
Slate Creek
Brinker Run
Welty Run
Wilson Run
Hunters Run
Painters Run
Buffalo Run
Barren Run
Pollock Run
Kelly Run
Andrews Run
Possum Hollow
Fourmile Run
Campbelle Run
Laurel Run
Keffer Run
Jacobs Creek
Loyalhanna Creek
Monastery Run

major contributors of pollution to the watershed. For this study, the prioritization has been refined to compare pollution loading of metals and including the various other factors as described above. In most instances, the largest pollution load was iron associated with discharges from abandoned underground coal mines.

Subwatershed Priorities

The priority restoration sites were also categorized according to the assessment designated sub-watershed into which they drained.

Upper Sewickley Creek

Within the upper Sewickley Creek, the priorities for restoration are the major untreated discharges and the enhancement of the present treatment system.

1. **Brinkerton 1 Discharge* (DMP-BR1)**

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
Combination														
DMP-BR1A&Overflow														
	Average	2708.0	6.3	91.5	-16.0	24.8	0.3	1.0		807.2	9.7	32.6	-520.8	2978.3

All values represent short-term averages for samples taken during the monitoring period of the assessment.

**This data represents a combined average from two separate flows, BR1A and BR1 bypass overflow*

2. **Brinkerton 2 Discharge (DMP-BR2)**

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-BR2														
	Average	1157.9	6.4	217.0	-125.0	16.7	0.2	0.2		232.4	2.8	17.0	-1739.7	3020.1

All values represent short-term averages for samples taken during the monitoring period of the assessment.

3. **Brinkerton 3 Discharge (DMP-BR3)**

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-BR3														
	Average	215.3	4.7	2.0	91.0	31.3	0.3	2.6		80.8	0.8	6.7	236.4	6.0

All values represent short-term averages for samples taken during the monitoring period of the assessment.

4. **Boyer Run Discharge* (SMP-BOYR1)**

Two mine discharges enter Boyer Run from what is believed to be the abandoned Hecla #1 mine. Because landowner permission could not be obtained to sample the Boyer Run Discharges, a stream sample and flow measurement were taken downstream of the discharges to establish a pollution load within the stream. By using this method, the true pollution load attributed to the discharges could not be measured. Loadings are based on the amount of metal remaining within the water at the monitoring location and does not account for the amount of metals precipitated within the stream bed. Based on observation of the stream bed, the amount of metals precipitating prior to the monitoring point on Boyer Run could be substantial.

Instream monitoring point SMP-BOYR1

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
Stream Sample														
SMP-BOYR1														
	Average	2109	7.2	188.9	-94.6	2.6	0	0.2		65	0.5	4.4	-2397	47866.3

All values represent short-term averages for samples taken during the monitoring period of the assessment.

Jacks Run

Within the Jacks Run Sub-basin, the priority for restoration is the Greensburg #2 Mine discharge – DMP-JR1.

1. **Greensburg #2 Mine Discharge (DMP-JR1)**

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-JR1														
	Average	1219.4	5.6	40.0	14.0	37.3	0.1	1.3		400.4	0.8	18.5	200.3	581.4

All values represent short-term averages for samples taken during the monitoring period of the assessment.

Middle Sewickley Creek

Within the Middle Sewickley Creek sub-basin are 6 priority mine discharges for restoration. Three flow directly into the main stem of Sewickley Creek, two flow into Wilson Run, and one flows into Buffalo Run. The priorities were chosen based on their metals loading and in the case of the Soberdash 1 discharge, DMP-SOB1, its acid load.

1. Buffalo Run Discharge (DMP-BUF1)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manganese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-BUF1														
	Average	440.8	5.8	62.0	46.0	60.5	0.8	5.4		320.7	4.4	28.6	242.0	330.3

All values represent short-term averages for samples taken during the monitoring period of the assessment.

2. Acid Pool Borehole Discharge (DMP-SOB2)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manganese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-SOB2														
	Average	220.5	4.3	0.0	343.0	95.6	2.3	9.0		253.3	6.0	24.0	908.3	0.8

All values represent short-term averages for samples taken during the monitoring period of the assessment.

3. Wilson Run 2 Discharge (DMP-WR2)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manganese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-WR2														
	Average	1017.4	6.3	149.0	-0.6	17.1	0.1	0.4		208.5	1.4	4.9	-778.6	1826.3

All values represent short-term averages for samples taken during the monitoring period of the assessment.

4. Soberdash 3 Discharge (DMP-SOB3)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-SOB3														
	Average	180.5	6.6	154.0	-39.0	7.9	0.2	1.0		17.1	0.4	21.8	-85.3	333.3

All values represent short-term averages for samples taken during the monitoring period of the assessment.

5. Wilson Run 1 Discharge (DMP-WR1)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga-nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-WR1														
	Average	1163.2	6.6	191.0	-97.0	8.4	0.0	0.6		73.4	0.2	7.9	-1351.5	2668.8

All values represent short-term averages for samples taken during the monitoring period of the assessment.

6. Soberdash Acid Discharge (DMP-SOB1)

Sample ID		Flow GPM	pH Lab	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Alum-inum mg/L	Manga nese mg/L		Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day
DMP-SOB1														
	Average	21.5	3.9	0.0	282.0	25.3	1.1	6.1		6.5	0.3	1.6	73.0	0.0

All values represent short-term averages for samples taken during the monitoring period of the assessment.

Lower Sewickley Creek

Within the lower Sewickley Creek, all remaining AMD sources were considered minor discharges and therefor ranked as low priorities for restoration. However, the discharges do provide some pollution loading to Sewickley Creek. The priority rankings for Lower Sewickley Creek are based on best professional judgment because none of the discharges were sampled or flow measurements taken to establish loading. Based on observation, the following minor discharges are listed by priority.

1. Acid seep from the hillside above Lowber Road just downstream of monitoring point SMP, SC1.
2. Second acid seep from the hillside adjacent the seep mentioned above.
3. Iron seep from the left bank near the pasture upstream of the Lowber treatment system
4. Iron seep from left stream bank adjacent to the Lowber treatment system.

Little Sewickley Creek

Little Sewickley Creek is a major tributary of Sewickley Creek and although several discharges were identified within the watershed, none were ranked as a major discharge, based on apparent impacts to the stream. Priority rankings given here should be undertaken after the major discharges are addressed or if special circumstances lend themselves to raising the priority of a Little Sewickley Creek discharge. Priority rankings for Little Sewickley Creek are based on best professional judgment because none of the discharges were sampled monthly as part of this assessment. Based on observation, the following minor discharges are listed by priority.

1. AMD discharge to Andrews Run, flowing from an air shaft of the abandoned Keystone Coal mine, located just upstream to the confluence with Little Sewickley Creek.
2. AMD piped discharge located behind the BP station on Herminie-Irwin Road.
3. Acid discharge to an unnamed tributary to Little Sewickley Creek adjacent to the PA Turnpike north of New Stanton.
4. Hutchinson Mine passive wetland treatment system (upgrades to improve detention time).
5. AMD discharge to an unnamed tributary draining from the community of Madison.

Technical and Financial Assistance Needs

Estimates of Remediation Costs

Estimates of costs to construct treatment systems are given for the top ten priority sites for restoration. The sites are listed under the sub-basin that they affect. Because all ten priority sites were considered treatable by passive means, costs estimates were developed only for passive treatment systems. Cost estimates for the treatment of the major sources of AMD within the Sewickley Creek watershed were developed using AMD Treat, a computer application which estimates the costs of constructing, operating, and maintaining either passive or active AMD treatment systems. AMD Treat was cooperatively developed by the Pennsylvania DEP, West Virginia DEP, the U.S. Geological Survey, and the U.S. Office of Surface Mining Regulation and Enforcement.

Estimated costs for the treatment of minor pollution sources were not made at the time of this study. Development and implementation of restoration projects on lower priority pollution sources are encouraged should favorable circumstances develop and funding becomes available for those sites. Any reduction in pollution load will have a positive impact on overall water quality within Sewickley Creek, and should be encouraged. Priorities should be reevaluated and revised as restoration proceeds.

Jacks Run Priorities – System Type/Estimated Costs

Jacks Run AMD Projects - Estimated AMD Treatment Costs					
Monitoring Site	Treatment Type	System Type	Estimated Cost of Construction	Operation, Maintenance, and Replacement*	Land Reclamation**
DMP-JR1	Passive	Anoxic Limestone Drain, Settling basin, Wetland	$358,848	$350,000	Moderate

*20yr life - Includes one-time replacement

**Land reclamation not included in cost estimation

Upper Sewickley Creek Priorities – System Type/Estimated Costs

Upper Sewickley Creek AMD Projects - Estimated AMD Treatment Costs					
Monitoring Site	Treatment Type	System Type	Estimated Cost of Construction	Operation, Maintenance, and Replacement*	Land Reclamation**
DMP-BR1	Passive	Present Treatment System Modifications	$70,400	$284,660	N/A
DMP-BR2	Passive	Settling Basin, Wetland	$663,932	$213,660	NA
DMP-BR3	Passive	Anoxic Limestone Drain - present settling ponds	$66,769	$26,060***	N/A
DMP-BOYR1	Passive	Settling Basin, wetland			
AMD discharge not monitored for this study					

**20yr life - Includes one-time replacement and iron sludge removal*

***Land reclamation not included in cost estimation*

**** Primary O&M included in DMP-BR1 costs*

Middle Sewickley Creek Priorities – System Type/Estimated Costs

Middle Sewickley Creek AMD Projects - Estimated AMD Treatment Costs					
Monitoring Site	Treatment Type	System Type	Estimated Cost of Construction	Operation, Maintenance, and Replacement*	Land Reclamation**
DMP-BUF1	Passive	Anoxic Limestone Drain, Settling Pond, Wetland	$770,960	$801,780	N/A
DMP-SOB2	Passive	Anoxic Limestone Drain, Settling Pond, Wetland	$711,875	$727,360	Minimal**
DMP-WR2	Passive	Settling Pond, Wetland	$1,013,431	$912,680	N/A
DMP-SOB3	Passive	Aerobic Wetland	$125,275	$177,240	N/A
DMP-WR1	Passive	Aerobic Wetland	$341,893	$217,560	N/A
DMP-SOB1	Passive	Anoxic Limestone Drain, Settling Pond, Wetland	$173,152	$168,940	Moderate**

**20yr life - Includes one-time replacement and iron sludge removal*
***Land reclamation not included in cost estimation*

Funding and Support Sources

No restoration/implementation funding was totally secured for any of the identified priority sites in any of the sub-basins at the time of the completion of the assessment report. To fully implement the priority recommendations with this plan, numerous funding sources will likely need to be utilized. Additional in-kind support from SCWA, Westmoreland Conservation District, Western PA Conservancy, various municipalities and other cooperating groups and agencies may be available.

Additional sources of funding and support for restoration efforts associated with the priority sites have been identified and include:

- EPA - Non-point source pollution funding, targeted watershed grants, state revolving funds, Brownfields Initiative, and environmental education grants
- OSM - Appalachian Clean Streams Initiative, summer internships, and Title IV AML programs
- PADEP - Growing Greener Environmental Stewardship/Watershed Protection and Technical Assistance Grant (TAG) program
- PADEP - Greensburg District Mining Office technical assistance and support
- PADEP - Bureau of Abandoned Mine Reclamation technical assistance and financial support
- PADEP - Bureau of Dams & Waterways Engineering technical assistance with permitting and wetlands issues
- PADEP - Bureau of Mining and Reclamation through reclamation planning
- PA Department of Conservation and Natural Resources - financial support
- PA Department of Community and Economic Development - financial support
- Western Pennsylvania Conservancy - technical assistance
- USDA Natural Resources Conservation Service PL-566 Watershed Protection and Flood Prevention Act - funding and technical services center assistance
  Penn's Corner Resource Conservation and Development Area - technical assistance and support
- Penn's Corner Charitable Trust - financial support
- Westmoreland Conservation District - technical support and monitoring
- Mt. Pleasant Township - in-kind construction assistance
- Mt. Pleasant Township Municipal Authority - monitoring & site access
- Foundation for PA Watersheds - financial support
- Western Pennsylvania Coalition for Abandoned Mine Reclamation - technical and financial support
- PA Fish and Boat Commission - technical assistance
- PA Trout Unlimited - technical assistance
- Mining Industry - support through cooperative remining and other initiatives
- Private Industry - support through cooperative financial and technology initiatives

VI. Implementation Schedule and Milestones

Overview

Implementation of the restoration priorities is dependent upon many factors. A primary factor will be the support of the landowner of the property on which the restoration activities will take place. Initial contacts have been made with most of the property owners of the priority sites and most have been initially supportive of implementing restoration activities. With landowners of priority sites that are opposed to cooperating with restoration goals, careful deliberations should be developed to persuade them to reconsider their position.

As implementation details increase, including details about the type and size of the proposed treatment systems, landowners may raise concerns and questions about installation and development. A primary concern of landowners is in regards to the issues of liability when it comes to having a treatment system on their property. In response to these concerns, it is explained to landowners that Pennsylvania has initiated a “Good Samaritan” statute which protects cooperative landowners from a number of liability issues. This law is expected to be referenced extensively as restoration activities progress throughout Sewickley Creek Watershed.

One of the goals of this assessment is to raise the priority for restoration of Sewickley Creek within Pennsylvania’s Bureau of Abandoned Mine Reclamation and have that bureau begin restoration efforts though their program. Because restoration activities will likely be implemented by SCWA, state agencies, and perhaps industry concurrently, reclamation projects will be spread throughout the watershed. A strictly regimented implementation schedule will be very difficult to initiate and follow. Planning an implementation schedule by sub-basins and based on the assessment priorities should help to make restoration activities more manageable. The implementation schedule must be flexible enough to account for variability in funding priorities and availability, agency priorities, market conditions, and SCWA and partnership management capabilities.

Funding is a major factor in implementing restoration activities. As previously stated, there are many different sources of support available to fund restoration efforts. As priority projects are developed, individual funding sources should be evaluated for their appropriateness to each project. Every effort should be made to use a variety of funding sources in order to provide for matching funds, which are always viewed favorably when requesting grant monies.

As a solely volunteer run organization, the SCWA may find it a challenge to administer multiple projects simultaneously, mostly due to the large budgets associated with each project. With the goal of implementing one project every three to four years, SCWA will likely find they are managing several projects concurrently, as restoration projects are typically multi-year undertakings. Careful consideration should be made by SCWA to evaluate how much effort will be required to manage multiple projects and plan accordingly. Additional consideration should also be given to how implemented projects will be managed on-site to assure work is performed as designed. SCWA may find it necessary to partner with additional organizations to serve as fiscal sponsors and on-site managers.

The implementation of the schedule must be flexible enough to account for variability in landowner cooperation and concern, funding priorities and availability, agency priorities, market conditions affecting industry efforts, and SCWA and partner management capabilities.

Based on the subwatershed approach and their priorities for restoration, the following implementation schedule should result in measurable pollution load reductions of metals within the individual subwatersheds and to Sewickley Creek itself.

Implementation Schedule for the Upper Sewickley Creek

Upper Sewickley Creek Sub-basin

Upper Sewickley Creek Sub-basin Implementation Schedule

		Project Implementation Milestones			
Priority Site	Responsible Party	Preliminary Planning	Design Phase	Build Phase	Monitoring Phase
Brinkerton 1 DMP-BR1	SCWA	Spring/Summer 2013	Fall/Winter 2013	2014/2015	2016
Brinkerton 2 DMP-BR2	SCWA	2016	2017	2018/2019	2019
Brinkerton 3 DMP-BR3	SCWA	Spring/Summer 2013	Fall/Winter 2013	2014/2015	2015
Boyer Run 1 BOYR1*	DEP	2019	2020	2021	2022

**With landowner permission*

Jacks Run Sub-basin

Jacks Sub-basin Implementation Schedule

		Project Implementation Milestones			
Priority Site	Responsible Party	Preliminary Planning	Design Phase	Build Phase	Monitoring Phase
Greensburg Mine #2 DMP-JR1	SCWA	2023	2024	2024/2025	2025

Middle Sewickley Creek Sub-basin

Middle Sewickley Creek Sub-basin Implementation Schedule

		Project Implementation Milestones			
Priority Site	Responsible Party	Preliminary Planning	Design Phase	Build Phase	Monitoring Phase
Buffalo Run DMP-BUF1	SCWA	2018/2019	Fall/Winter 2019	2020/2021	2021
Soberdash 2 DMP-SOB2	DEP	2021	2022	2023/2024	2024
Wilson Run 2 DMP-WR2	SCWA	2020/2021	Fall/Winter 2021	2022/2023	2023
Soberdash 3 DMP-SOB3	SCWA	2022	2023	2023/2024	2024
Wilson Run 1 DMP-WR1	SCWA	2020/2021	Fall/Winter 2021	2022/2023	2023
Soberdash 1 DMP-SOB1	DEP	2023	2024	2025	2026

VII. Load Reduction and Water Quality Evaluation

Overview

The primary objective of the monitoring activities of this report is to measure and assess the pollution loading from the identified AMD sources found during the assessment in order to generate a restoration plan that prioritizes restoration activities where they provide the greatest environmental benefit weighed against the cost of installing and maintaining an appropriate treatment system.

The main objective of the restoration-monitoring plan is to measure and assess changes in water quality, based on required TMDL load reductions within Sewickley Creek and its impaired sub-basins, as restoration projects are implemented and then progress long-term. Water quality and monitoring criteria established in the QA/QC plan for measuring pollution loads for this assessment should, at a minimum, be maintained for future monitoring. Because in-stream monitoring points for the assessment were established based on identifying impacts to the main stem of Sewickley Creek and within its sub-basins, those established points will also serve well for future restoration work. In addition to the established monitoring points, other monitoring points may also be required to better measure load reductions from the implementation of individual restoration projects.

Often, when treating AMD using passive methods, monitoring points are also established within the treatment system itself in order to measure the functionality of the individual treatment system components. Such monitoring protocol will be established for each treatment system constructed.

Depending on the location of the restoration project, varying numbers of instream monitoring locations will be necessary to properly determine load reductions. The number and locations of monitoring points will be established during the process of developing a restoration project. Each project will, at a minimum, establish an upstream and downstream monitoring point on the effected tributary and also a point or points on the next larger receiving stream or streams, depending on expected environmental results. A final point should also be established near the mouth of Sewickley Creek, and perhaps additional points along the main stem, to assess overall load reductions to the stream system. When possible, the monitoring locations established by this assessment or the TMDL study should be used during any future water quality monitoring. Doing so will help quantify long-term load reductions over time at consistent locations.

Using a predictive model in association with the EPA-certified monitoring plan originally developed for the assessment should provide sufficient accuracy and precision within the monitoring program to assure the quality of data while allowing for adaptations to the program over time. In addition, because projects will likely be implemented on a sub-basin approach, but also be part of an overall watershed restoration program, an adaptive management approach should be used to allow the focus of the restoration work within the watershed to shift as load reductions are achieved and biologic conditions improve.

Determining Success

Success of restoration efforts should be quantified by both chemical and biological monitoring performed in-stream at selected monitoring points based on the location of the implementation projects.

Either instream numeric load reduction or biological trigger points could be established to indicate success and when it would be appropriate to shift focus to other area of impairments within the system. Such an approach should maximize restoration efforts by focusing activities where they will provide the most benefit.

Water chemistry data will clearly indicate load reductions. The goal for chemical sampling should be to achieve water quality standards set forth in the Pennsylvania Code for each pollutant. For Sewickley Creek, two different criteria are established. The upper Sewickley Creek, upstream of Brinker Run, is a high quality cold water fishery (HQ-CWF). Downstream of Brinker Run, the remainder of the Sewickley Creek watershed is classified as a warm water fishery (WWF). As discussed in Chapter IV, the upper Sewickley Creek uses water quality criteria established by its reference stream, McLaughlin Creek, as its goal. The remainder of the watershed uses the WWF standard established in Pennsylvania Code as its goal. None the less, it may be unrealistic or unnecessary to meet these standards in order to prove success at restoring a stream segment to the point at which it supports its designated use. Biologic conditions should also be considered when quantifying water quality improvements in conjunction with the chemical data to help determine whether restoration efforts are successful.

The quality of the biological health of stream will often prove a better indicator of the true condition of a segment because macroinvertebrates and fish will often repopulate a stream and indicate a quality biodiversity prior to its meeting in-stream chemical standards.

The frequency and location of monitoring will vary depending on its purpose. In stream chemical and biological monitoring should be performed a minimum of every two years once restoration efforts have begun. Monitoring location points should be determined by the location of the BMPs that are being implemented. When possible, monitoring points established during this assessment should be used.

Should future monitoring efforts indicate that environmental improvements are not occurring as expected, then a reevaluation of the assessment, restoration, and implementation plan should be conducted and adjustments made to improve the plan and garner beneficial results. Adjustments may include, but are not limited to:

- The reprioritization of projects to better insure positive results
- Alteration of the previously implemented projects to make them more efficient
- Implementation of additional projects
- Installation of new technologies or techniques
- Reconsideration of the established TMDL, which may be incorrect and need revision

A long-term commitment to a monitoring program from the Sewickley Creek Watershed Association and its partners will assure that beneficial environmental results will be recorded over time. Assistance and financial support for the monitoring program should be sought from local, state, federal and private sources.

Overall Program Objectives

A key component of long-term success toward restoring impaired watersheds is to build local support for restoration efforts. One way to strengthen local support is through the implementation of restoration projects, and by actively creating public relations “success stories” related to those projects. SCWA has been very active in providing information about their activities by publishing information in their newsletter, local news media, displaying information in local businesses, and attending local events that are related to their watershed work. It is expected that such activities will continue and increase as implementation work proceeds.

Measuring local buy-in can be accomplished in many ways, including the number of articles regarding watershed activities appearing in news print, newsletters produced, new members joining the group, new partners supporting their efforts, new sponsors for group activities, public or government agencies actively engaged in watershed group related work, number of promotional events held, and others. It will be important for SCWA to keep an accurate record of such accomplishments in order to show success beyond environmental pollution reduction. Doing so will assure long-term support for their watershed work.

TMDLs and Expected Load Reductions

Measuring pollution load reductions will be a key component to indicating progress toward the goals established by the TMDL. Using the data gathered during the TMDL study and this assessment should provide a sound baseline for measuring progress. Because the Sewickley Creek AMD TMDL relied on modeling to establish flows and pollution load calculations, it will be important that those calculations are eventually compared to actual in-stream flow and pollution load measurements. This study performed in-stream measurements but the locations were chosen primarily to measure pollution loads in stream segments affected by the major AMD discharges. For instance, no monitoring points were established on Welty Run because no major discharges were discovered affecting the watershed. Periodic reviews of stream monitoring locations should be performed and adjustments made to the monitoring plan to assure the load reductions are captured properly and data is relevant to ongoing restoration efforts.

Performing water quality testing at site-specific implementation projects will provide accurate load reduction measurements for individual pollution sources, while in-stream monitoring at established or new monitoring points will measure load reductions to the overall system.

Based on the restoration priorities established for the watershed's sub-basins and the suggested treatment type, the following load reductions can be expected. Again, all load reductions are based on the pollution loads measured during this assessment rather than those developed through the TMDL process.

Implementation and Load Reduction										
W/S Name	**Site ID**	**BMP Action Treatment Type**	**Units**	**Goal Amounts**	**Implemented Amount # of Units**	**Pollutant ID**	**Total Load Reduction Target**	**Load Reduction Achieved**	**Unit (lbs/day)**	**% Load Reducttion Achieved**
Upper Sewickley	DMP-BR1	AMD Passive Treatment	Functioning System	1	1					
						Iron	923	116.3	lbs/day	12.6
						Aluminum	10.7	1	lbs/day	0.09
						Manganese	49.1	16.5	lbs/day	33.6
Upper Sewickley	DMP-BR2	AMD Passive Treatment	Functioning System	1	0					
						Iron	232.4	0	lbs/day	0
						Aluminum	2.8	0	lbs/day	0
						Manganese	17	0	lbs/day	0
Upper Sewickley	DMP-BR3	AMD Passive Treatment	Functioning System	1	0					
						Iron	80.8	0	lbs/day	0
						Aluminum	0.8	0	lbs/day	0
						Manganese	6.7	0	lbs/day	0
						Acidity	236.4	0	lbs/day	0
Upper Sewickley	SMP-BOYR1*	AMD Passive Treatment	Functioning System	1	0					
						Iron	65	0	lbs/day	0
						Aluminum	0.5	0	lbs/day	0
	* stream monitoring station					Manganese	4.4	0	lbs/day	0

Implementation and Load Reduction										
W/S Name	**Site ID**	**BMP Action Treatment Type**	**Units**	**Goal Amounts # of Units**	**Implemented Amount # of Units**	**Pollutant ID**	**Total Load Reduction Target**	**Load Reduction Achieved**	**Unit (lbs/day)**	**% Load Reducttion Achieved**
Jacks Run	DMP-JR1	AMD Passive Treatment	Functioning System	1	0					
						Iron	400.4	0	lbs/day	0
						Aluminum	0.8	0	lbs/day	0
						Manganese	18.5	0	lbs/day	0
						Acidity	200.3	0	lbs/day	0

Implementation and Load Reduction										
W/S Name	**Site ID**	**BMP Action Treatment Type**	**Units**	**Goal Amounts # of Units**	**Implemented Amount # of Units**	**Pollutant ID**	**Total Load Reduction Target**	**Load Reduction Achieved**	**Unit (lbs/day)**	**% Load Reducttion Achieved**
Middle Sewickley	DMP-BUF1	AMD Passive Treatment	Functioning System	1	0					
						Iron	320.7	0	lbs/day	0
						Aluminum	4.4	0	lbs/day	0
						Manganese	28.6	0	lbs/day	0
						Acidity	242	0	lbs/day	0
Middle Sewickley	DMP-SOB1	AMD Passive Treatment	Functioning System	1	0					
						Iron	6.5	0	lbs/day	0
						Aluminum	0.3	0	lbs/day	0
						Manganese	1.6	0	lbs/day	0
						Acidity	73	0	lbs/day	0
Middle Sewickley	DMP-SOB2	AMD Passive Treatment	Functioning System	1	0					
						Iron	253.3	0	lbs/day	0
						Aluminum	6	0	lbs/day	0
						Manganese	24	0	lbs/day	0
						Acidity	908.3	0	lbs/day	0
Middle Sewickley	DMP-SOB3	AMD Passive Treatment	Functioning System	1	0					
						Iron	17.1	0	lbs/day	0
						Aluminum	0.4	0	lbs/day	0
						Manganese	21.8	0	lbs/day	0
Middle Sewickley	DMP-WR1	AMD Passive Treatment	Functioning System	1	0					
						Iron	73.4	0	lbs/day	0
						Aluminum	0.2	0	lbs/day	0
						Manganese	7.9	0	lbs/day	0
Middle Sewickley	DMP-WR2	AMD Passive Treatment	Functioning System	1	0					
						Iron	208.7	0	lbs/day	0
						Aluminum	1.4	0	lbs/day	0
						Manganese	4.9	0	lbs/day	0

VIII. Visual Assessment

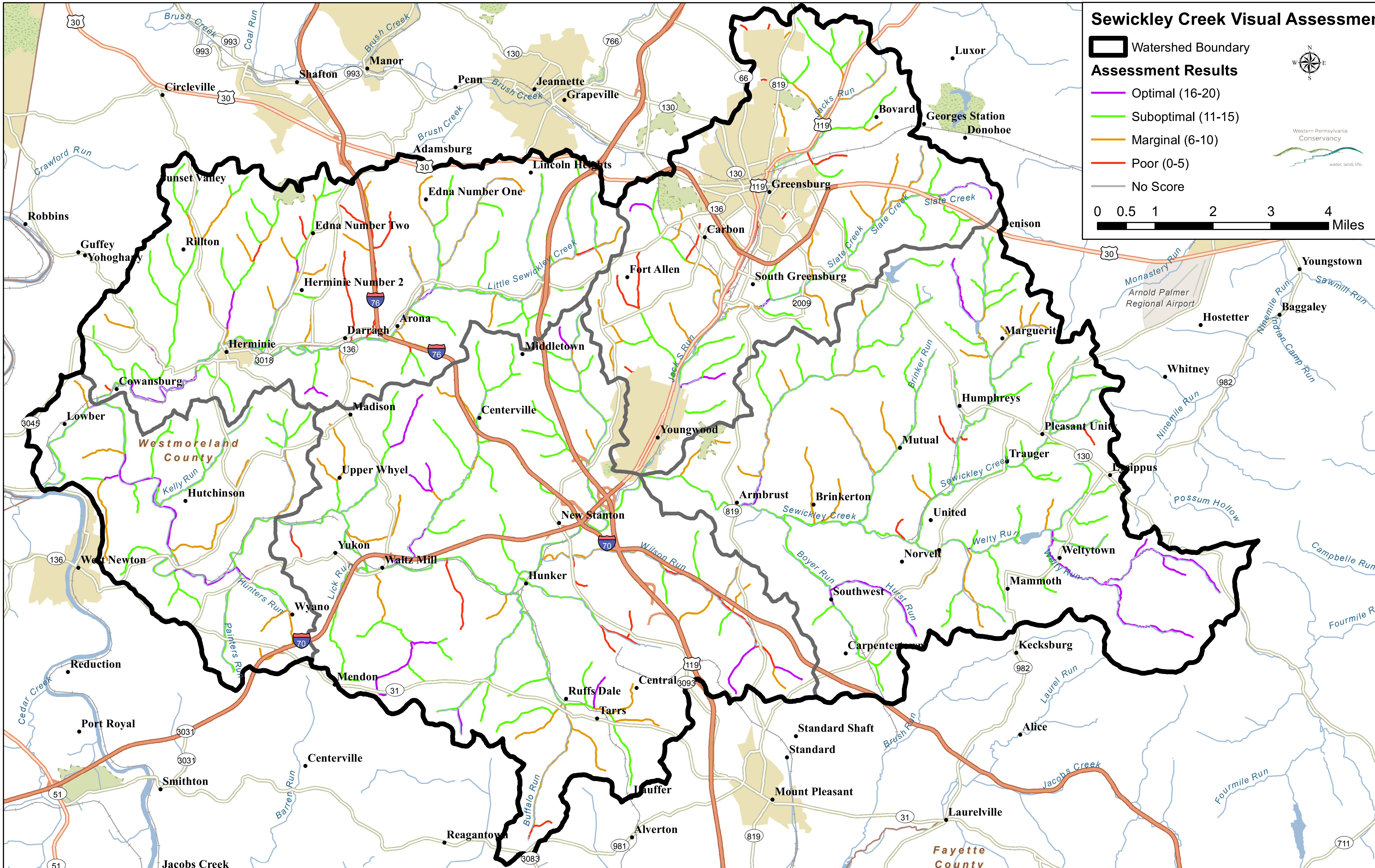
Overview

As part of the overall watershed assessment, a visual assessment of the in-stream and riparian conditions of all waterways of Sewickley Creek was performed. Data collected during the visual assessment was based on a modified version of the Environmental Protection Agency's (EPA) Rapid Bio-Assessment Protocol, which quantifies the conditions of the watershed's streams and develops an appropriate ranking. Data for the watershed was compiled into the five sub-watersheds to allow for better management. As discussed in chapter I, streams segments were assigned computer-generated numbers, which are linked to the DEP GIS statewide database. Sewickley Creek numbers assigned from this database are three digits. To assist with WPC data entry, these three digit numbers were arbitrarily assigned a number 1 to the beginning of the number to create a four digit number. WPC then developed maps of the sub-watersheds with the stream segments pre-assigned with this four-digit number. A stream segment is determined by the point at which a stream is joined with another tributary. Segment lengths varied depending on where another tributary joined with the segment under investigation. Each segment, regardless of length, was evaluated with the same criteria.

Stream segments were scored on the integrity of the habitat and physical condition of the stream segment, including both instream and riparian areas. Habitat evaluation included ten parameters: Epifaunal substrate/available cover, embeddedness, velocity/depth regimes, sediment deposition, channel flow status, channel alteration, frequency of riffles (or bends), bank stability, vegetative cover, and riparian vegetative zone width. Physical characterization included weather conditions, location and observed problems, stream type, watershed features, riparian vegetation, in stream features, large woody debris, aquatic vegetation, water quality, and sediment/substrate – including organic and inorganic components. In many instances, the size of the stream segment was physically too small to properly characterize the segment using the detailed assessment form. For those segments, a "short form" of the standard assessment data sheet was developed and used to score the segment. Examples of field data sheets are included at the end of this chapter.

The end result of the assessment process provides a ranking of each segment of the watershed into one of four categories based on a scale of one to twenty. The highest ranking category lists the segment in an excellent or optimal condition, followed by a good or sub-optimal condition, then a fair or marginal ranking, and lastly, a poor score.

Outcomes of the visual assessment indicate that the overall physical characteristics of the watershed's in-stream and riparian area conditions are relatively good. Some significant problem areas exist, particularly on Jack's Run, where there are significant anthropogenic impacts from business, homes, and roads. The primary sources of the AMD problems identified in the sub-watersheds were previously identified in Chapter IV – Problem Definition.


Sewickley Creek Visual Assessment
Watershed Boundary
Assessment Results
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0 0.5 1 2 3 4
Miles
Western Pennsylvania Conservancy
water, land, life.
Westmoreland County
Fayette County
Sewickley Creek
Little Sewickley Creek
Slate Creek
Jacks Run
Brush Creek
Coal Run
Crawford Run
Kelly Run
Hunters Run
Painters Run
Lick Run
Wilson Run
Boyer Run
Hurst Run
Welty Run
Brinker Run
Buffalo Run
Barren Run
Cedar Creek
Laurel Run
Jacobs Creek
Fourmile Run
Campbelle Run
Possum Hollow
Ninemile Run
Indian Camp Run
Sawmill Run
Monastery Run
Arnold Palmer Regional Airport
Circleville
Shafton
Manor
Penn
Jeannette
Grapeville
Adamsburg
Lincoln Heights
Edna Number One
Edna Number Two
Herminie Number 2
Sunset Valley
Robbins
Rillton
Guffey
Yohoghany
Herminie
Darragh
Arona
Middletown
Cowansburg
Lowber
Madison
Centerville
Upper Whyel
Hutchinson
New Stanton
Yukon
Waltz Mill
West Newton
Wyano
Hunker
Reduction
Mendon
Ruffs Dale
Tarrs
Central
Port Royal
Smithton
Centerville
Reagantown
Lauffer
Alverton
Jacobs Creek
Greensburg
Carbon
Fort Allen
South Greensburg
Youngwood
Armbrust
Brinkerton
United
Norvelt
Southwest
Carpentertown
Mutual
Humphreys
Marguerite
Pleasant Unity
Trauger
Lippus
Weltytown
Mammoth
Kecksburg
Alice
Standard Shaft
Standard
Mount Pleasant
Laurelville
Luxor
Bovard
Georges Station
Donohoe
Denison
Youngstown
Baggaley
Hostetter
Whitney

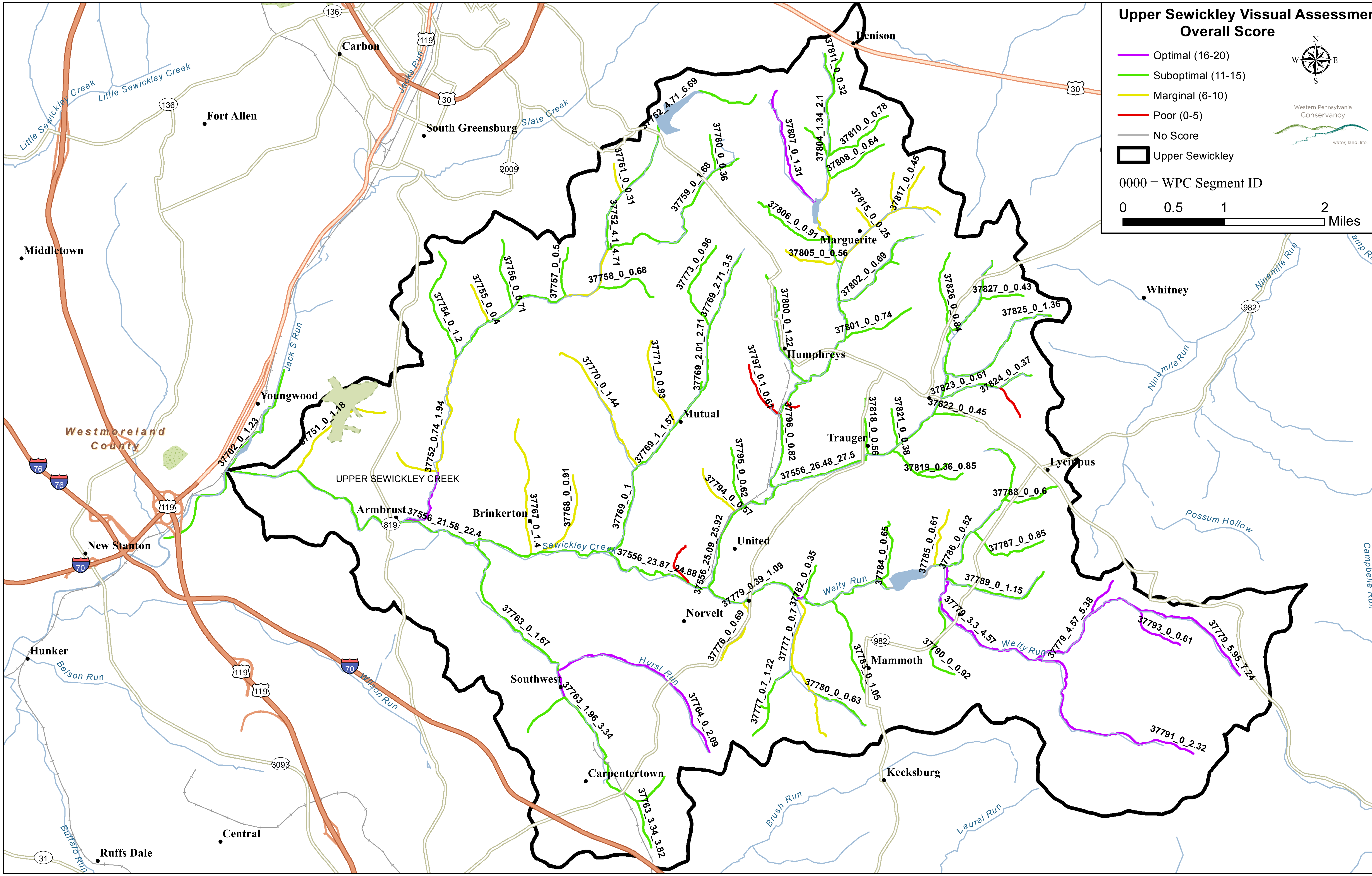
Upper Sewickley Sub-Watershed

Sewickley Creek Main Stem

The main stem of Sewickley Creek headwaters start above Pleasant Unity and generally flows through farm land and rural yards. Some segments flow through active pastures and cropland, while others flow through patchy forestland and mowed yards. Several old coal mining communities are located within the upper Sewickley Creek area and remnants of a time of weaker environmental regulations, such as mine spoil piles and inadequate sewage treatment, remain. An abandoned railroad bed crosses the waterway several times and follows the general meander of the stream from well above its confluence with Welty Run down to the town of Armbrust and beyond. As the main stem Sewickley flows from United to Armbrust, the stream gradient diminishes somewhat as it flows into flatter land and its speed slows down, creating a more sinuous channel with deeper, slower pools. Wetlands become more prevalent in this area. This is also the area where the first major impacts from AMD significantly impair the stream, near the small community of Brinkerton. Further downstream in the community of Youngwood the main stem meets Jacks Run, which defines the downstream extent of the upper Sewickley Creek as defined by this assessment.

Welty Run

The upper sections of Welty Run are fast flowing mountainous tributaries with significant gradient changes. They are primarily surrounded by forest and have healthy, continuous cover and shading. Once reaching Kecksburg Sportsmen's Road near Welty Town, the gradient lessens and land use becomes more residential with some agricultural and pasture land, but a vegetative cover is still maintained. There are several dams of various sizes along Welty Run, including the one that creates Mammoth Lake. Along with faulty septic problems and impacts associated with coal mining, erosion and sediment concerns are prevalent in the lower portion of the watershed. This portion of Welty Run also contains numerous farms. An old coke oven site is situated below Mammoth Lake along with an old rail line that parallels the stream until it meets Sewickley Creek in Norvelt. It is in the stretch of stream below Mammoth Lake that it was straightened and is now causing significant erosion. A large un-reclaimed boney pile is located along a tributary to Welty



Upper Sewickley Visual Assessment Overall Score
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
Upper Sewickley
0000 = WPC Segment ID
0 0.5 1 2 Miles
Western Pennsylvania Conservancy
UPPER SEWICKLEY CREEK
Westmoreland County
Denison
Carbon
Fort Allen
South Greensburg
Middletown
Youngwood
New Stanton
Armbrust
Brinkerton
Mutual
Humphreys
Marguerite
Trauger
Lycippus
Whitney
United
Norvelt
Mammoth
Southwest
Carpentertown
Kecksburg
Hunker
Central
Ruffs Dale
Sewickley Creek
Welty Run
Hurst Run
Little Sewickley Creek
Slate Creek
Jacks Run
Jack S Run
Ninemile Run
Possum Hollow
Campbelle Run
Brush Run
Laurel Run
Belson Run
Wilson Run
Buffalo Run

Run near the old mining community of Mammoth. Unnamed tributaries also drain to Welty Run from the former mining community of Calumet and United, and portions of Norvelt.

North Fork

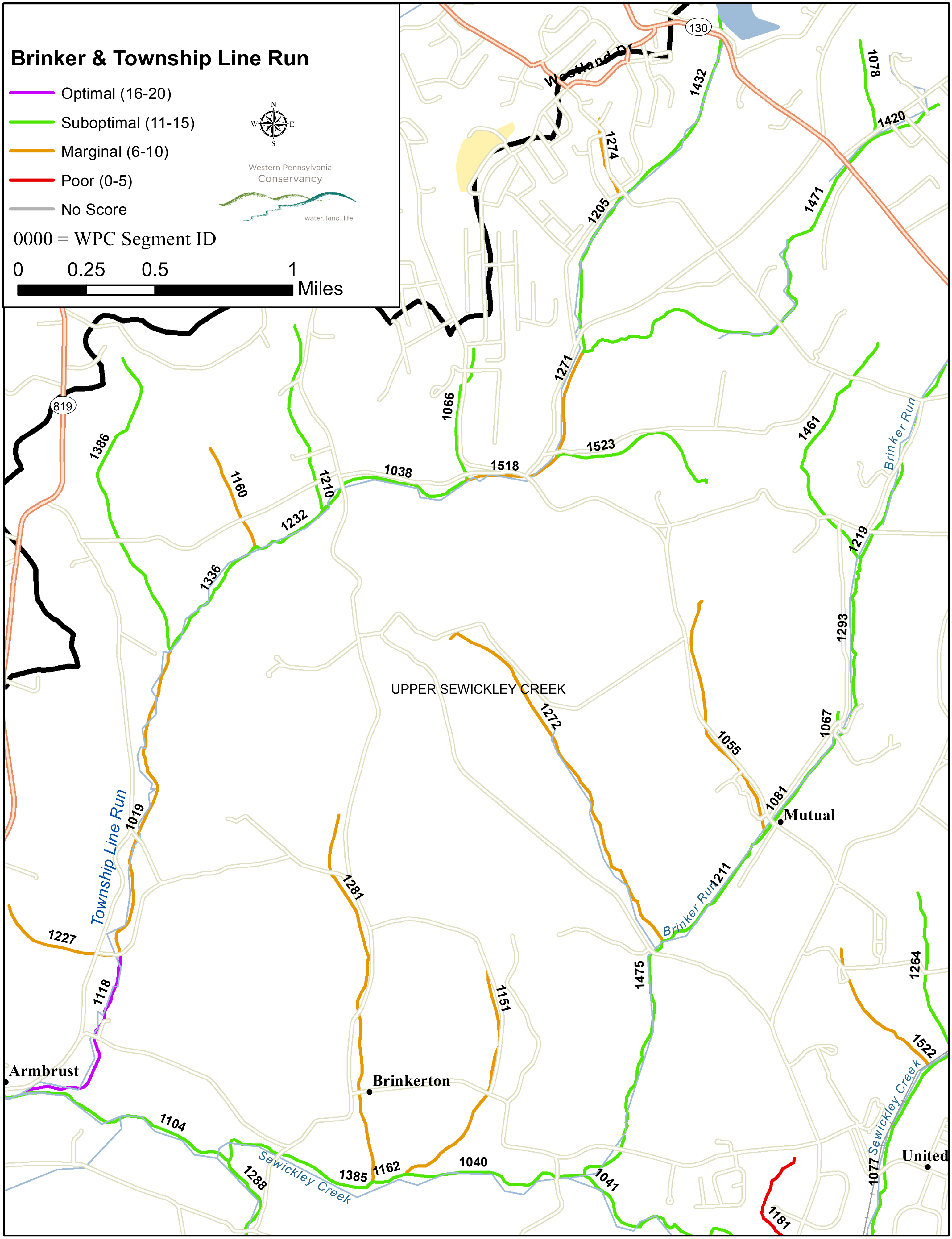
The North Fork tributary of Sewickley Creek joins with the main headwaters between the towns of Trauger and United. This stream has a variety of impacts, which range from active agricultural operations, expanding residential areas, and AMD impairments, and lead to a ranking in the sub-optimal to marginal categories. From the mouth, which is located within a naturally succeeding, over-grown pasture, the stream travels northward under an old railroad line and following several back roads before reaching active pasture and crop land. As it flows through the pasture, the stream is paralleled by a large wetland before reaching newly buffered property that has been enrolled in CREP. As the stream snakes its way through a healthy, well established buffer, it is joined by a tributary flowing out of Humphreys that is severely6 impacted by AMD. Additionally, just upstream of this juncture is the effluent of a local waste water treatment plant. As the North Fork continues up toward Marguerite, it is met with more active agriculture and pasture land as well as small clusters of rural communities with evidence of failing septic systems. The high gradient headwater tributaries flow down the hills from the expanding community of Denison where Route 30 allows for a quick commute into Greensburg or Latrobe. Significant erosion issues are evident along the section that was formerly part of the Marguerite reservoir. More AMD appears in the little tributaries above Marguerite as well. The majority of the stream has an open or semi-open canopy, however there are several fragmented portions of the tributary that are well buffered and have favorable aspects.

Brinker Run

Brinker Run joins with main stem Sewickley Creek just downstream from the town of United. Prior to its juncture with the main stem, the lowland area in which Brinker Run flows becomes a wetland which channels under a two lane road and an old railroad bed. Moving upstream, Brinker Run starts to pick up gradient and passes through a well forested buffer before entering property owned by the Greensburg Sportsmen Association. The tributaries that form Brinker Run surround the rural town of Mutual. Around Mutual, the streams flow through active farm land, past an old mining site, and several coke ovens. The majority of Brinker run has erosion and sedimentation issues which can be credited to the steep slopes of the headwaters as well as residential mowing. The stream is additionally affected by AMD with evidence of iron sediment from Mutual down.

Boyer Run

The multi-tributary system that makes up Boyer Run includes the stream segment known as Hurst Run which sits northwest of Norvelt and joins with Boyer Run in Hecla. The waters of Boyer Run above Hecla are in relatively good shape. Limited active farm land and spotty



Brinker & Township Line Run
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.25 0.5 1 Miles
Western Pennsylvania Conservancy
water, land, life.
N S E W
130
819
Westland Dr
UPPER SEWICKLEY CREEK
Township Line Run
Brinker Run
Sewickley Creek
Armbrust
Brinkerton
Mutual
United
1078
1420
1432
1274
1205
1471
1271
1066
1523
1518
1038
1210
1232
1160
1386
1336
1461
1219
1293
1067
1055
1081
1272
1211
1019
1227
1118
1281
1151
1475
1264
1522
1077
1104
1288
1385
1162
1040
1041
1181

residential areas are present, spread out along the banks. There are, however, significant amounts of knotweed present in the riparian zone and the stream is parallel and intersected by an old railroad line. Sedimentation issues start to arise as the stream flows out of Hecla toward the main stem of Sewickley Creek. In addition to soil sedimentation, the stream is impacted by two large AMD sites which add iron sediment.

Township Line Run

Township Line Run (TLR) is the last significant tributary system of the Upper Sewickley sub-watershed. It enters main stem Sewickley Creek before it is joined by Jacks Run to form the Middle Sewickley Creek sub-watershed. The headwater tributaries of TLR start in an expanding residential area with multiple culverts for driveways and main roads as well as mowed and manicured stream banks. The stream is also dammed to create the large Unity Reservoir. Active agriculture and pasture land also flank the stream in multiple areas before the stream travels into a well buffered area and then into a golf course. Beyond the golf course are more active agriculture and pasture lands and then the TLR passes through a nursery before entering the main stem. Sediment and erosion issues are prevalent throughout the tributary. Despite that, there are sections in good condition that even provide enough habitat for one of Pennsylvania's snake species of special concern, the *Regina septernvittata,* commonly known as a Queen Snake, as listed by the Pa. Fish and Boat Commission and the Natural Heritage Program.

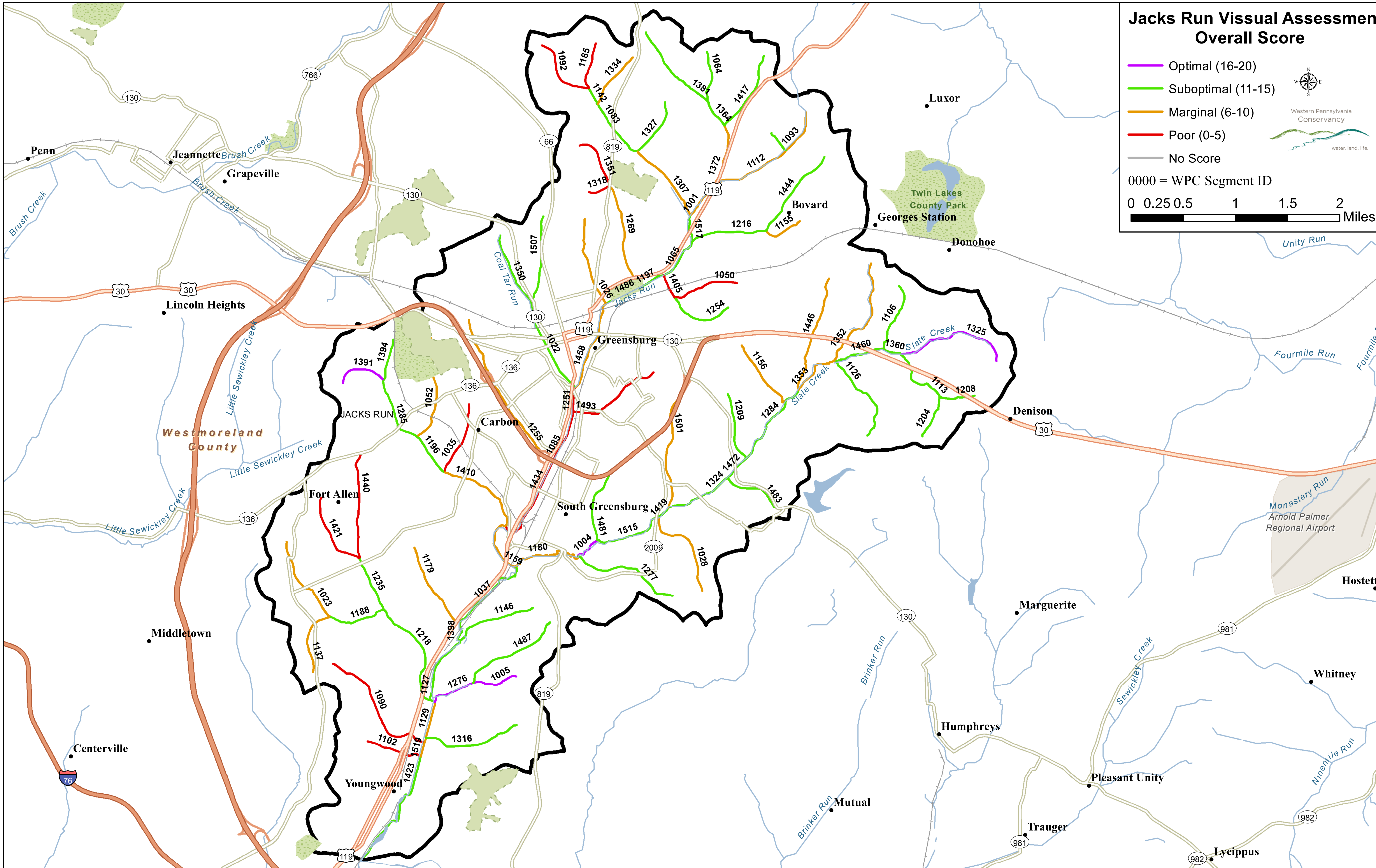
Jacks Run Sub-Watershed

Jacks Run

Jacks Run watershed is greatly affected by human impacts in addition to AMD. The headwaters of Jacks Run start northeast of Greensburg, converge in the heart of the city, and then flow in a southerly direction through Youngwood before joining with Sewickley Creek main stem. Many of the small headwater tributaries begin unrestricted in agriculture and forested land and end as continuously piped and culverted streams as they travel through residential and commercial areas. Channelization continues as Jacks Run grows in width and flows through the developed urban areas of Greensburg. This unnatural stream condition gets a slight reprieve after it leaves Greensburg. It is short lived, however, as channelization occurs again through the commercial area of Youngwood. It then flows through a large forested wetland area before joining Sewickley Creek.

Slate Creek

Slate Creek is the only named tributary system of the Jack's Run sub-watershed. It has many of the same human impact as Jacks Run does as well as serving as the drainage source for the Route 30 business district of Greensburg. This drainage includes acres of impervious parking


Jacks Run Visual Assessment Overall Score
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.25 0.5 1 1.5 2 Miles
Western Pennsylvania Conservancy
water, land, life.
Penn
Jeannette
Grapeville
Lincoln Heights
Westmoreland County
Luxor
Bovard
Georges Station
Donohoe
Twin Lakes County Park
Greensburg
Carbon
JACKS RUN
Fort Allen
South Greensburg
Denison
Middletown
Centerville
Youngwood
Marguerite
Hostetter
Whitney
Humphreys
Pleasant Unity
Mutual
Trauger
Lycippus
Arnold Palmer Regional Airport
Brush Creek
Little Sewickley Creek
Coal Tar Run
Jacks Run
Slate Creek
Unity Run
Fourmile Run
Monastery Run
Brinker Run
Sewickley Creek
Ninemile Run

areas for the Westmoreland Mall and surrounding businesses. Slate Creek also flows through a large residential area within Greensburg where the stream has been significantly impacted by urban runoff, channelization, culverts, and mowing.

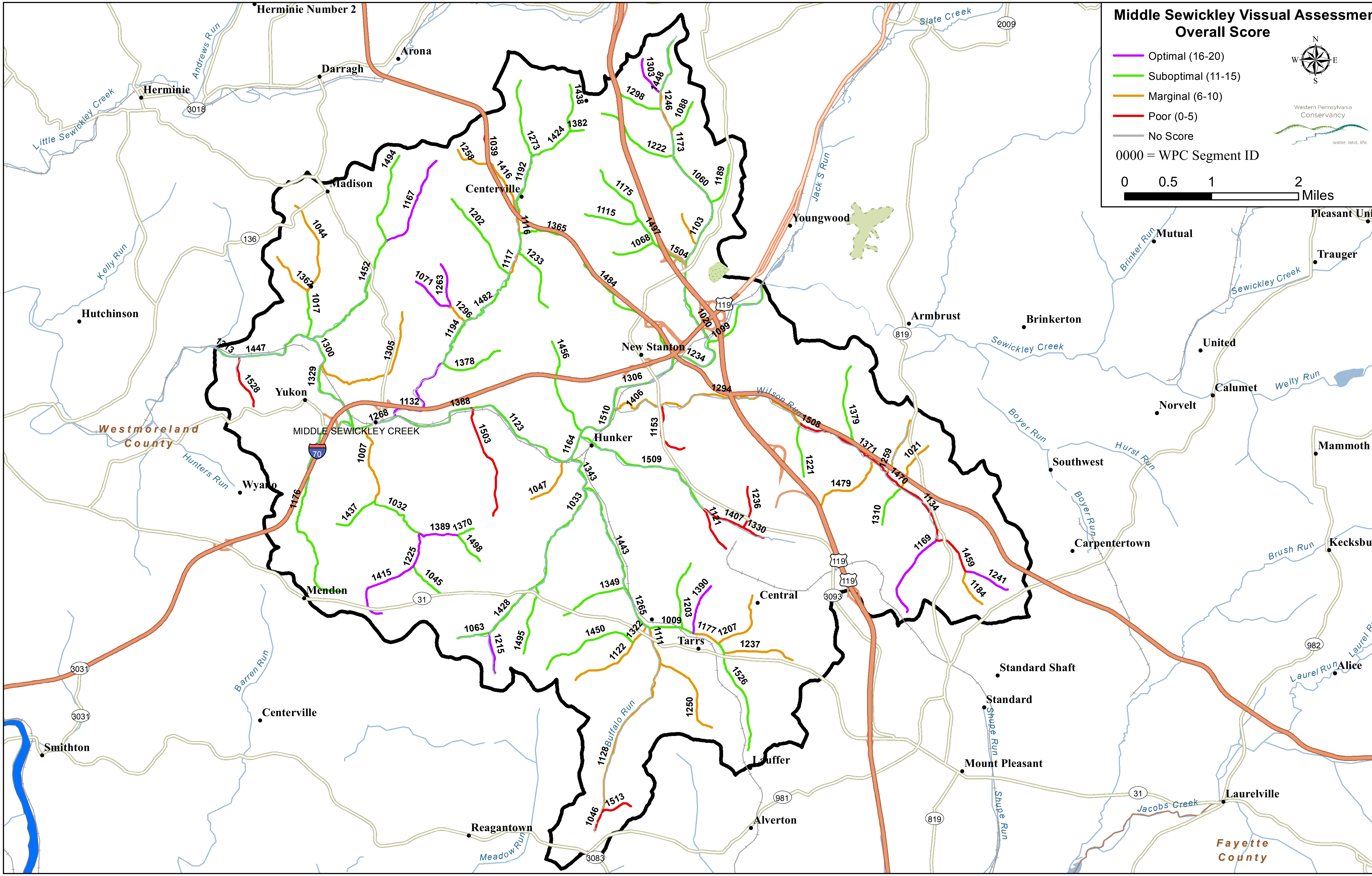
Middle Sewickley Sub-Watershed

Sewickley Creek Main Stem

The middle portion of the main stem of Sewickley Creek flows from the confluence of Jacks Run, just above New Stanton, down through Hunker, to just past Yukon. This portion of the stream has several larger named tributaries as well as nearly a dozen un-named tributaries (UNT) which range from small, single streams to larger, multi-tributary systems.

Downstream of Jacks Run, the first of these larger UNTs joining Sewickley Creek main stem runs in a southerly direction, draining the rolling valleys between Youngwood and New Stanton. The confluence of this tributary is just below the Route 66 and 119 interchange. For the most part, the tributaries of this system are well buffered and in fair condition. Route 66 cuts across the stream in multiple locations, leaving portions of the stream channeled under the highway or diverted into a new direction. There are rural homes dotted throughout the drainage and some active pastureland in addition to a large RV park and campground that maintains a very groomed and cleared riparian zone. A positive influence on the system is a number of wetlands that were installed as a result of the Route 66 interchange.

The next of the larger UNTs begins just north of Middletown Road between the Turnpike and Route 66 and flows in a southwesterly direction towards Waltz Mill. This tributary system travels through a variety of land uses. The headwaters are dotted with dozens of rural homes as well as patches of well forested buffers. They are also intersected several times by the Pennsylvania Turnpike. Making its way down the valley, the UNT is met with more homes and active pasture and cropland in addition to Pa. Game Commission Property. The stream flows through the grounds of Westinghouse before going under I-70 near Waltz Mill and into an excellent riparian zone. It then joins with main stem of Sewickley south of I70. Draining the land between these two large systems are two single-channel tributaries. The first is rather long and hugs the western edge of the PA Turnpike while collecting most of the drainage water from New Stanton. This stream has a mix of farm land, residential, and commercial properties which contain significant, impervious parking areas. The water quality in the upper part of the stream is in fair condition but drops dramatically as it nears New Stanton due to an old waste water drainage system which has been damaged and is draining directly into the stream. The next tributary downstream joins with main stem Sewickley Creek on the opposite bank from the town of Hunker, just up from the mouth of Belson Run. This is an intermittent stream with high, flashy flows due to drainage from I-70, which is causing sediment issues.



Middle Sewickley Vissual Assessment
Overall Score
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.5 1 2
Miles
N
W
E
S
Western Pennsylvania Conservancy
water, land, life.
MIDDLE SEWICKLEY CREEK
Westmoreland County
Fayette County
Herminie Number 2
Arona
Darragh
Herminie
Madison
Centerville
Youngwood
Hutchinson
Armbrust
Brinkerton
New Stanton
Yukon
Hunker
Wyano
Mendon
Central
Tarrs
Lauffer
Alverton
Reagantown
Smithton
Mount Pleasant
Standard
Standard Shaft
Southwest
Carpentertown
Norvelt
Calumet
United
Mutual
Trauger
Pleasant Unity
Mammoth
Kecksburg
Alice
Laurelville
Little Sewickley Creek
Andrews Run
Kelly Run
Hunters Run
Barren Run
Meadow Run
Buffalo Run
Jack S Run
Slate Creek
Sewickley Creek
Wilson Run
Boyer Run
Hurst Run
Brinker Run
Welty Run
Brush Run
Laurel Run
Shupe Run
Jacobs Creek

As main stem Sewickley bends around the town of Yukon, there are three UNT's draining from the north that join with it in close succession. When heading downstream, the first is a single-channel intermittent stream draining the valley that sits northwest of the Waltz Mill Westinghouse Plant. There is a KOA campground above Westinghouse with a pond called Tanglewood Lake built directly from the stream. During the dry seasons, the pond adds to the stream's periodic flow. Before the stream joins with the main stem it flows through a large brownfield area that shows signs of small AMD seeps and then through a little community that has the channel mowed or piped. The next tributary system is in fair condition with a few homes and a small amount of agriculture. Sediment issues are apparent at the confluence with Sewickley Creek where there are large sediment bars forming in the main channel. The third tributary system in the series drains the area below the community of Madison and flows northward through both Upper and Lower Whyel before joining Sewickley Creek. Above Upper Whyel, the stream flows past a large mining spoil pile where the water pH is very acidic. There is evidence around Upper Whyel of faulty septic systems as well as AMD issues.

Wilson Run

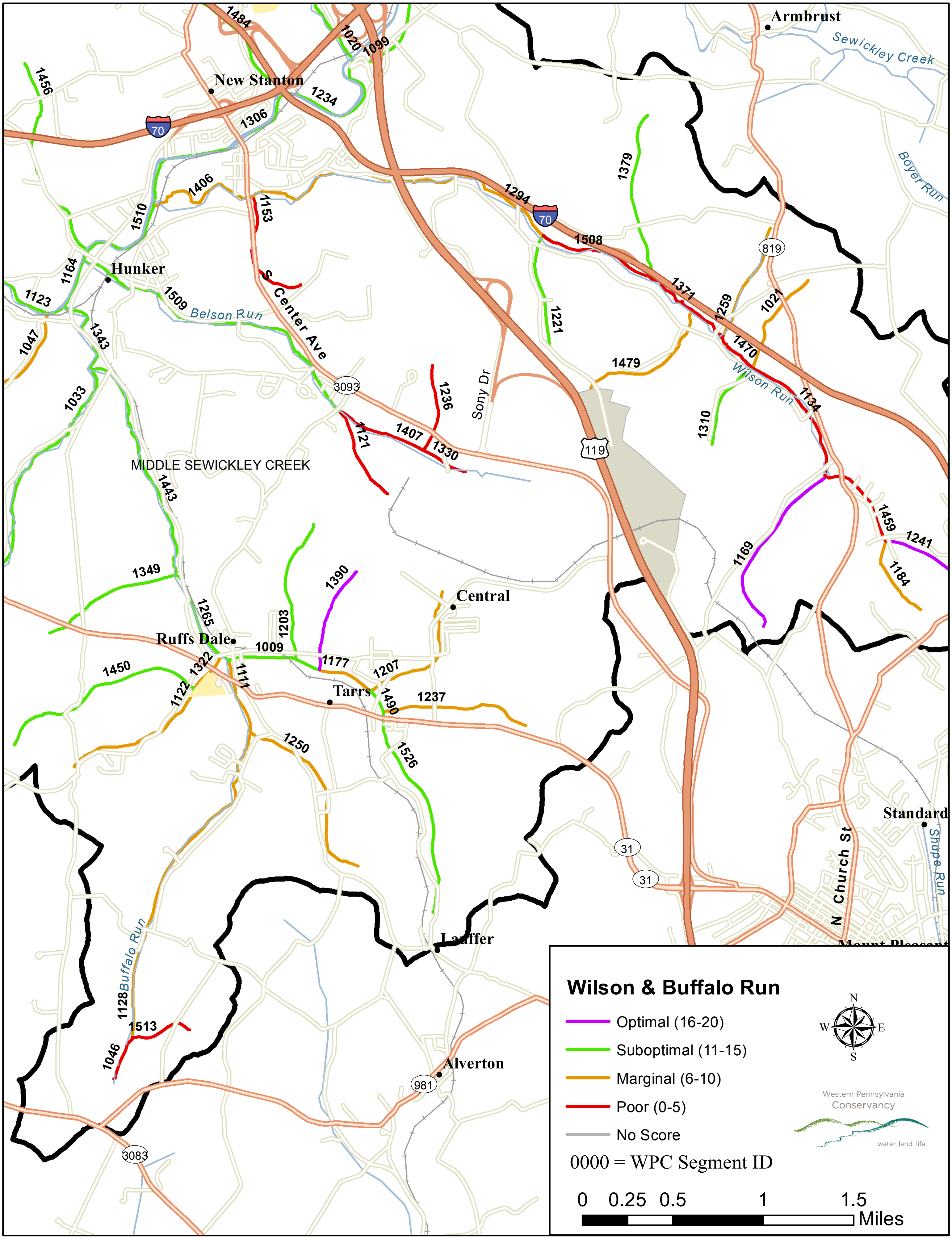
The headwaters for Wilson Run are found between the PA Turnpike and PA Route 981 near St. Johns Union Church. It parallels the Pennsylvania Turnpike for most of its length, crossing underneath Route 119 near New Stanton. The confluence with Sewickley Creek occurs just south of the town of New Stanton but north of the town of Hunker. Wilson Run has nine unnamed tributaries that empty into it before its confluence with Sewickley Creek. There two large AMD discharges that impair Wilson Run which enter the stream just south of the Turnpike. One of the discharges is being treated and can be seen as a large orange pond near the junction of Route 819 and the Turnpike. The other discharge enters the stream just downstream of the outflow of the treatment system and pollutes the stream with a large amount of iron being discharged. The length of Wilson Run passes through many residential areas and a few farms, but the majority of the reach runs through brushy, forested areas. Near its mouth, the stream passes near an industrial zone before entering Sewickley Creek.

Belson Run

Belson Run is a small but lengthy tributary system that starts below the Sony plant and swiftly flows down and through the town of Hunker. There are residential areas scattered along the entire reach but there are also portions of the stream that are well buffered. This stream is crossed and culverted many times for driveways and flows under an active railroad line.

Buffalo Run

Buffalo Run is a multiple tributary system that drains the hills surrounding Tarrs and Ruffs Dale. In addition to the sewage issues from the multiple rural communities in the area, Buffalo Run is affected by several different AMD sites that are high in both iron and aluminum



Wilson & Buffalo Run
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.25 0.5 1 1.5 Miles
N
S
E
W
Western Pennsylvania Conservancy
water, land, life.
Armbrust
New Stanton
Hunker
Ruffs Dale
Tarrs
Central
Lauffer
Alverton
Standard
Mount Pleasant
MIDDLE SEWICKLEY CREEK
Sewickley Creek
Boyer Run
Belson Run
Wilson Run
Buffalo Run
Shupe Run
S Center Ave
Sony Dr
N Church St
70
119
819
3093
31
981
3083
1484
1020
1099
1456
1234
1306
1406
1510
1153
1294
1508
1379
1371
1259
1021
1164
1123
1509
1047
1343
1221
1479
1470
1134
1310
1033
1236
1407
1121
1330
1443
1169
1459
1241
1184
1349
1390
1265
1203
1009
1177
1207
1450
1322
1111
1122
1490
1237
1250
1526
1128
1513
1046

and low in pH. Several farms are also located in the headwaters area, some which affect the stream. Thompson Run, part of the Buffalo Run system, joins the stream a short distance up from the mouth and is also affected by AMD.

Lick Run

Lick Run is a long tributary that starts below the small town of Mendon off of Route 30 and flows in a northerly direction, parallel to and under Route 70 twice, before joining with main stem Sewickley Creek below Waltz Mill. The upper half of the stream is in great condition with good cover and a vegetated buffer. The lower portion shows evidence of erosion issues, intersects active pasture land, and has mowed residential yards. The poor condition of the lower half brings the overall rating of the stream to marginal.

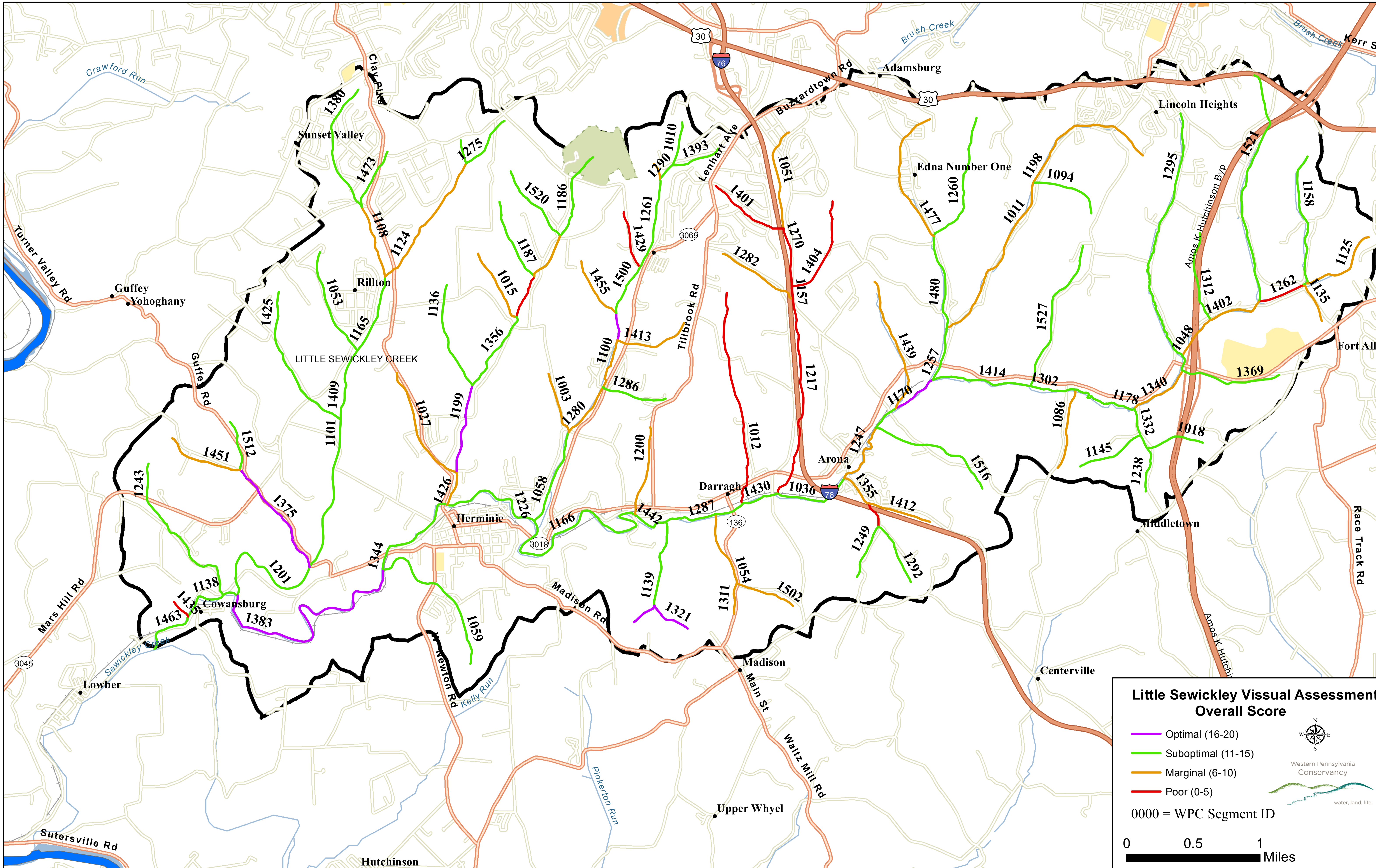
<u>Little Sewickley Sub-Watershed</u>

Little Sewickley Main Stem

Little Sewickley Creek drains the northwestern portion of the Sewickley Creek watershed with the headwaters starting just west of Route 66 and north of Hempfield High School. The stream follows a southwesterly path through the community of Arona and meanders around the town of Herminie before joining with main of stem Sewickley Creek just outside the town of Lowber. Agricultural land and rural homes as well as urban sprawl all contribute to the drainage of this sub-watershed. There is only one named tributary system of Little Sewickley. There are, however, over twenty fingers, both single streams and multi-tributary systems, that branch off of Little Sewickley.

Starting at the headwaters, these smaller tributaries are impacted by Route 66, Greensburg shopping plazas, and Hempfield township drainage through the installation of large stormwater retention basins, culverts, and channelized streambeds. The headwater streams have a significant gradient but quickly transition to flatter land which sets the conditions up for flash flooding events.

Main stem Sewickley Creek, as it flows from its underpass of Route 66 to Arona, parallels an old rail road grade. There are several tributary systems joining the main stem along this section from both the north and south. None of these systems appears to be contributing any pollution of great significance to the watershed. This section, although mostly undeveloped, contains a large amount of garbage (mostly tires) scattered both in the stream and along the banks. A significant tributary system paralleling the turnpike shows signs of human impacts through extensive channelization and stream bank modification.



Little Sewickley Vissual Assessment
Overall Score
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
0000 = WPC Segment ID
0
0.5
1
Miles
Western Pennsylvania Conservancy
water, land, life.
LITTLE SEWICKLEY CREEK
Sunset Valley
Rillton
Guffey
Yohoghany
Herminie
Cowansburg
Darragh
Arona
Adamsburg
Edna Number One
Lincoln Heights
Fort Allen
Middletown
Madison
Centerville
Upper Whyel
Hutchinson
Lowber
Crawford Run
Brush Creek
Kerr St
Clay Pike
Buzzardtown Rd
Lenhart Ave
Tillbrook Rd
Amos K Hutchinson Byp
Turner Valley Rd
Guffey Rd
Mars Hill Rd
Sewickley Creek
Sutersville Rd
Madison Rd
W Newton Rd
Kelly Run
Main St
Waltz Mill Rd
Pinkerton Run
Race Track Rd

From Herminie to the confluence with Sewickley, Little Sewickley is joined by a few single tributary systems and one large tributary system. The large system drains the expanding communities of Sunset Valley and Rillton.

Andrews Run

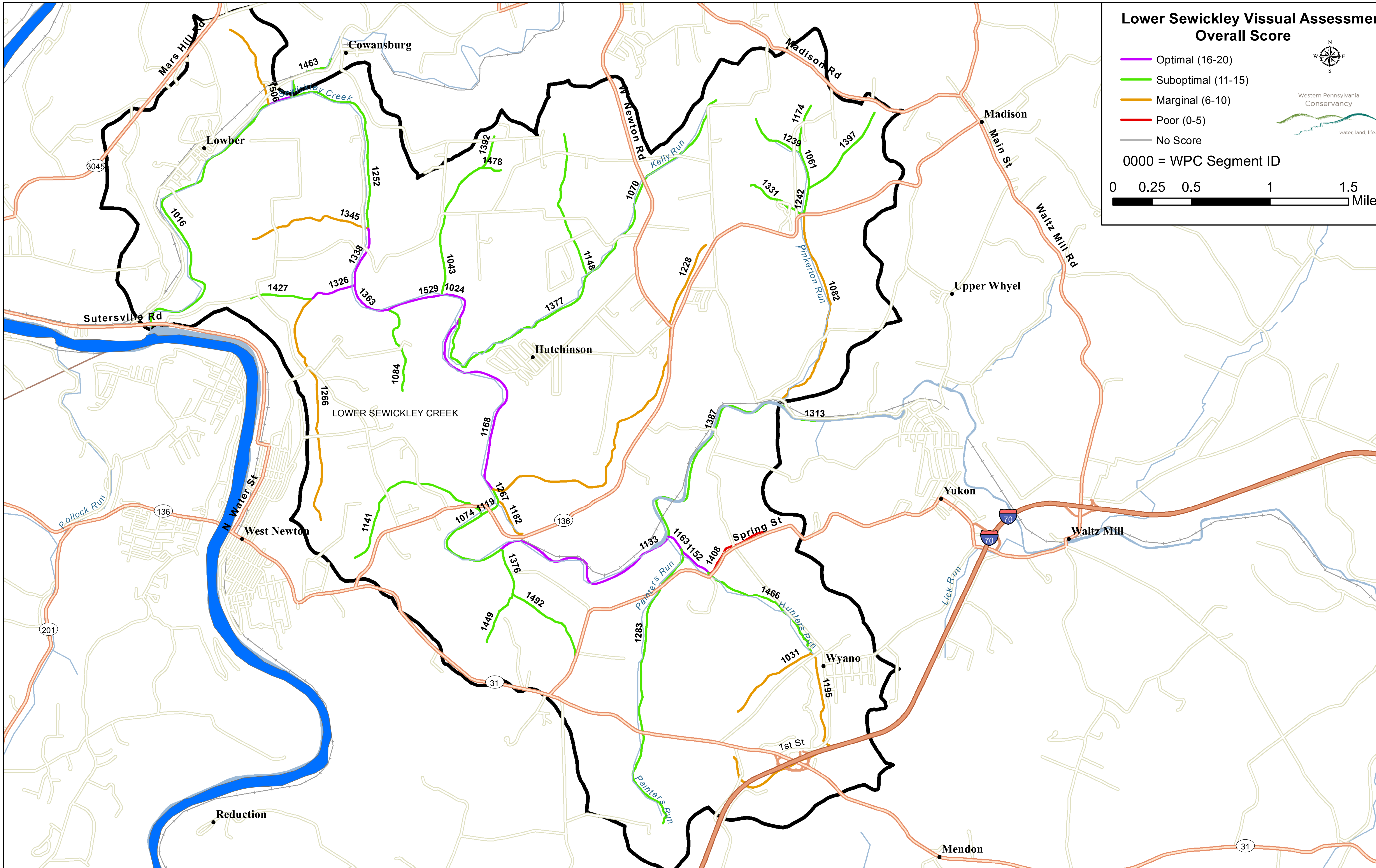
Andrews Run flows in a southerly direction and meets Sewickley Creek on the eastern side of Herminie. The tributary system drains the communities of Wendel, Edna No. 2, and Herminie No. 2, as well as the surrounding farm land. (The number 2 relates to the coal mines that were associated with these communities. Coal companies would sometimes designate a second mine and the company town associated with it as “No. 2”.). Small iron seeps, associated with the mining in the area, appear throughout the system, although nothing of great significance is present until the last 100 feet of the stream, where a significant AMD discharge can be seen. Bank stability, riparian zone vegetation, and width were consistently listed as weak elements of the system.

Lower Sewickley Sub-Watershed

Sewickley Creek Main Stem

The main stem of Sewickley snakes its way across the Lower Sewickley Creek sub-watershed, draining farm land around the communities of Hutchinson, Mill Grove, and Lowber. There are a handful of un-named tributaries along with several named tributaries in this sub-watershed. Most of the tributaries have a significant gradient change and are dotted with bedrock waterfalls. This sub-watershed has relatively little AMD in the upper portion; however there are multiple sources of AMD in the very last section of the watershed. A passive AMD treatment system has been installed above the town of Lowber to address the largest of these sources. There are also signs of natural gas drilling, including several Marcellus shale well sites, which use hydraulic fracturing to extract gas from the shale formation. A historic icon that crosses main stem Sewickley Creek between Pinkerton and Hunters Run in the top portion of the watershed is the Bells Mills covered bridge, built in 1850. The connectivity of the stream to its flood plain has been limited due to an old rail-line paralleling the main channel for more than half its length.

In the upper portions of the sub-watershed, Sewickley Creek main stem gently makes a gradient change and occasional bedrock formations can be seen.



Lower Sewickley Vissual Assessment
Overall Score
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.25 0.5 1 1.5 Miles
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Cowansburg
Lowber
Madison
Upper Whyel
Hutchinson
LOWER SEWICKLEY CREEK
West Newton
Yukon
Waltz Mill
Wyano
Reduction
Mendon
Mars Hill Rd
Sutersville Rd
W Newton Rd
Madison Rd
Main St
Waltz Mill Rd
N. Water St
Spring St
1st St
Kelly Run
Pinkerton Run
Painters Run
Hunters Run
Lick Run
Pollock Run
3045
136
201
31
70
1463
1506
1016
1345
1252
1392
1478
1043
1148
1070
1174
1239
1061
1397
1331
1242
1228
1082
1427
1326
1338
1363
1529
1024
1377
1084
1266
1168
1387
1313
1267
1182
1119
1074
1141
1133
1163
1152
1408
1376
1492
1449
1466
1283
1031
1195

Pinkerton Run

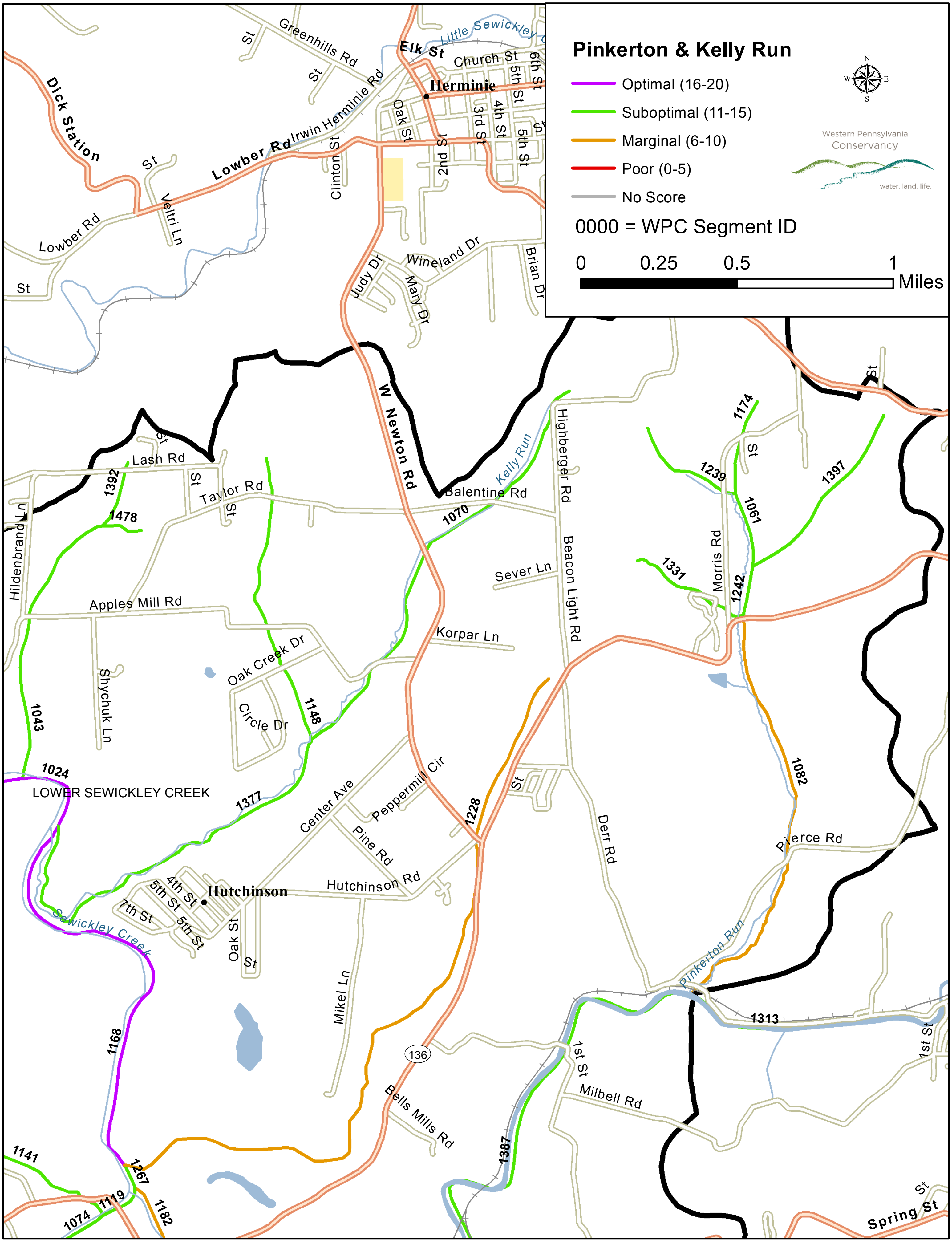
The Pinkerton Run Tributary system flows from the north and enters the main stem Sewickley at the top of the Lower Sewickley Sub-watershed. The headwaters of this system fan out in all directions around multiple farms. The land draining into the streams is a mix of forest and active crop land. For the most part, Pinkerton Run is well buffered but there is a section of the stream that flows through a heavily used animal concentration and feeding area.

Hunters Run

The Hunters Run tributary system drains the small community of Wyano. The headwaters start above the Interstate 70/ Route 31 interchange, which affects its flow pattern through multiple culverts and channel alteration. The tributaries also drain around a strip mining site although there does not appear to be any sign of AMD along the streams. Streams also flow through active pasture land. Panther's Run is a named single stream that drains the surrounding agricultural land before joining Hunters Run closer to its mouth.

Kellys Run

The headwater streams of Kellys Run are a pair of small, intermittent streams that start in cleared, active cropland then merge to flow through a well buffered valley. The lower portion of Kellys Run is well buffered with a bedrock bottom and waterfalls. Problems with the tributary include a fissure in the bedrock where the stream totally disappears and leaves an empty streambed for several hundred yards before re-emerging. Several old dams and a culvert for a rail line also are located on this tributary.



Pinkerton & Kelly Run
Optimal (16-20)
Suboptimal (11-15)
Marginal (6-10)
Poor (0-5)
No Score
0000 = WPC Segment ID
0 0.25 0.5 1 Miles
Western Pennsylvania Conservancy
water. land. life.
N
S
E
W
Herminie
Hutchinson
LOWER SEWICKLEY CREEK
Sewickley Creek
Little Sewickley
Kelly Run
Pinkerton Run
Greenhills Rd
Elk St
Church St
Dick Station
Lowber Rd
Irwin Herminie Rd
Oak St
Clinton St
2nd St
3rd St
4th St
5th St
6th St
Veltri Ln
Wineland Dr
Judy Dr
Mary Dr
Brian Dr
W Newton Rd
Lash Rd
Taylor Rd
Hildenbrand Ln
Apples Mill Rd
Shychuk Ln
Oak Creek Dr
Circle Dr
Balentine Rd
Highberger Rd
Beacon Light Rd
Sever Ln
Korpar Ln
Morris Rd
Center Ave
Peppermill Cir
Pine Rd
Hutchinson Rd
Derr Rd
Pierce Rd
Mikel Ln
Bells Mills Rd
1st St
Milbell Rd
Spring St
7th St
St
136
1392
1478
1043
1024
1148
1070
1377
1168
1228
1174
1239
1061
1397
1331
1242
1082
1313
1387
1141
1267
1119
1074
1182

HABITAT ASSESSMENT FIELD DATA SHEET – LOW GRADIENT STREAMS (FRONT)

STREAM NAME	**GIS ID #** __________	
SEGMENT ID	**STREAM CLASS**	
LAT ______________ **LONG** ______________	**RIVER BASIN** Sewickley Creek	
STORET # N/A	**AGENCY** Western Pennsylvania Conservancy	
INVESTIGATORS		
FORM COMPLETED BY	**DATE** ___________________ **TIME** _________ **AM PM**	**REASON FOR SURVEY** Sewickley Creek Visual Assessment

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/Available Cover	Greater than 70% (50% for low gradient streams) of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% (30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% (10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% (10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or submerged vegetation.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET – LOW GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) **Note: determine left or right side by facing downstream**	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) **Note: determine left or right side by facing downstream**	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score ________

HABITAT ASSESSMENT SCORE SHEET
LOW GRADIENT STREAM

STREAM NAME	**SEGMENT ID**	
GIS ID # __________	**STREAM CLASS**	
LAT _____________ **LONG** _____________	**RIVER BASIN** Sewickley Creek	
STOREТ # N/A	**AGENCY** Western Pennsylvania Conservancy	
INVESTIGATORS		
FORM COMPLETED BY	**DATE** ___________________ **TIME** __________ **AM PM**	**REASON FOR SURVEY** Sewickley Creek Visual Assessment

Habitat Parameter	Score	Explanation of Score Given *(Complete especially for poor rating)*	
1. Epifaunal Substrate /Available Cover			
2. Pool Substrate Characterization			
3. Pool Variability			
4. Sediment Deposition			
5. Channel Flow Status			
6. Channel Alteration			
7. Channel Sinuosity			
8. Bank Stability **(score each bank)** ***Note: determine left or right side by facing downstream***	**Total of LB & RB**	**(LB)**	
		(RB)	
9. Vegetative Protection **(score each bank)** ***Note: determine left or right side by facing downstream***	**Total of LB & RB**	**(LB)**	
		(RB)	
10. Riparian Vegetative Zone Width **(score each bank riparian zone)**	**Total of LB & RB**	**(LB)**	
		(RB)	
Total Score		**Add all scores and divide by the number of scores given.**	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME	**SEGMENT ID**	
GIS ID # __________	**STREAM CLASS**	
LAT ______________ **LONG** ______________	**RIVER BASIN** Sewickley Creek	
STORET # N/A	**AGENCY** Western Pennsylvania Conservancy	
INVESTIGATORS		
FORM COMPLETED BY	**DATE** ___________________ **TIME** __________ **AM PM**	**REASON FOR SURVEY** Sewickley Creek Visual Assessment

WEATHER CONDITIONS	**Now** ☐ storm (heavy rain) 25%] ☐ rain (steady rain) 50 %] ☐ showers (intermittent) 75% → ☐ % cloud cover (circle %) 100%] ☐ clear/sunny **Past 24 hours** ☐ ☐ [25% ☐ [50% ☐ ← 75% ☐ [100%	**Has there been a heavy rain in the last 7 days?** ☐ Yes ☐ No **Air Temperature** _____ °F **Other**________________________________
SITE LOCATION/MAP	**Draw a map of the site and indicate the areas sampled (or attach a photograph)**	
Suspected causes of observed problem(s): **Recommendation(s):**		
STREAM CHARACTERIZATION	**Stream Subsystem** ☐ Perennial ☐ Intermittent ☐ Tidal **Stream Origin** ☐ Glacial ☐ Spring-fed ☐ Non-glacial montane ☐ Mixture of origins ☐ Swamp and bog ☐ Other ________	**Stream Type** ☐ Coldwater ☐ Warmwater **Catchment Area** __________mi² *(Determined by GIS)*

WATERSHED FEATURES (with in 30 meter buffer)	**Predominant Surrounding Landuse** ☐ Forest ____% ☐ Field/Pasture ____% ☐ Agricultural ____% ☐ Open space (i.e., parks/golf courses) ____% ☐ Commercial/Industrial ____% ☐ Residential ____% (___ Rural or ___ Urban) ☐ Wetland ____% ☐ Other _______________ ____%	**Local Watershed NPS Pollution** ☐ No evidence ☐ Some potential sources ☐ Obvious sources **Local Watershed Erosion** ☐ None ☐ Minimal ☐ Moderate ☐ Heavy **Flood Damage Potential** ☐ High ☐ Medium ☐ Low ☐ None
RIPARIAN VEGETATION (18 meter buffer)	**Indicate the dominant type and record the dominant species present** ☐ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous	**Dominant species present:**______________________
INSTREAM FEATURES	**A) Estimated Reach Length** _______ft (GIS) **B) Estimated Stream Width** _______ft (Field Est.) **Sampling Reach Area** _______ft² (A * B) **Surface Velocity** ☐ Slow ☐ Moderate ☐ Fast **Canopy Cover** ☐ Open ☐ Mostly open ☐ Shaded ☐ Mostly shaded	**High Water Mark** _______ft **Proportion of Reach Represented by Stream Morphology Types** ☐ Riffle_______% ☐ Run_______% ☐ Pool_______% **Channelized** ☐ Yes ☐ No **Dam Present** ☐ Yes ☐ No **Culverts Present** ☐ Yes ☐ No
LARGE WOODY DEBRIS	☐ Significant ☐ Minimal ☐ None	
AQUATIC VEGETATION	**Indicate the dominant type and *record the dominant species present*** ☐ Rooted emergent *(Cattails, Horsetails)* ☐ Rooted submergent *(Pond weed, Coontail)* ☐ Rooted floating *(Lily Pads)* ☐ Free floating *(Duck weed, water hyacinth)* ☐ Floating Algae *(pond scum, filamentous)* ☐ Attached Algae *(resemble higher plants but without true roots)* ☐ None **dominant species present** __________________________________	**Portion of the reach with aquatic vegetation** _____%
WATER QUALITY **(During visual assessment use pH and conductivity meters to take reading.)**	**Specific Conductance** ________ **pH** ______________ (list range) **WQ Instrument Used** _______________ **Turbidity (if not measured)** ☐ Clear ☐ Slightly turbid ☐ Turbid ☐ Opaque ☐ Stained ☐ Other______ **Water Odors** ☐ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other___________	**Water Surface Oils** ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☐ None ☐ Other_________________________ **Overall Water Quality** ☐ Excellent ☐ Good ☐ Fair ☐ Poor **If a fair to poor ranking, what is the primary source of water quality impact?** ☐ Agriculture ☐ AMD ☐ Sewage ☐ Development
SEDIMENT/ SUBSTRATE **(Applicable only when investigator disturbs sediment in pool or other depositional area)**	☐ **Not Applicable** **Odors** ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ None ☐ Other________________________________ **Oils** ☐ Absent ☐ Slight ☐ Moderate ☐ Profuse	**Deposits** ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other_________________ **Looking at stones which are not deeply embedded, are the undersides black in color?** ☐ Yes ☐ No

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	**Diameter**	**% Composition in Sampling Reach**	**Substrate Type**	**Characteristic**	**% Composition in Sampling Area**
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")		Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")				
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

EPA Score Sheet Summaries

Parameters to be evaluated in sampling reach: (#'s 1-5)

1 EPIFAUNAL SUBSTRATE/AVAILABLE COVER

high and low gradient streams

Includes the relative quantity and variety of natural structures in the stream, such as cobble (riffles), large rocks, fallen trees, logs and branches, and undercut banks, available as refugia, feeding, or sites for spawning and nursery functions of aquatic macrofauna. A wide variety and/or abundance of submerged structures in the stream provides macroinvertebrates and fish with a large number of niches, thus increasing habitat diversity. As variety and abundance of cover decreases, habitat structure becomes monotonous, diversity decreases, and the potential for recovery following disturbance decreases. Riffles and runs are critical for maintaining a variety and abundance of insects in most high-gradient streams and serving as spawning and feeding refugia for certain fish. The extent and quality of the riffle is an important factor in the support of a healthy biological condition in high-gradient streams. Riffles and runs offer a diversity of habitat through variety of particle size, and, in many small high-gradient streams, will provide the most stable habitat. Snags and submerged logs are among the most productive habitat structure for macroinvertebrate colonization and fish refugia in low-gradient streams. However, "new fall" will not yet be suitable for colonization.

2a EMBEDDEDNESS

high gradient streams

Refers to the extent to which rocks (gravel, cobble, and boulders) and snags are covered or sunken into the silt, sand, or mud of the stream bottom. Generally, as rocks become embedded, the surface area available to macroinvertebrates and fish (shelter, spawning, and egg incubation) is decreased. Embeddedness is a result of large-scale sediment movement and deposition, and is a parameter evaluated in the riffles and runs of high-gradient streams. The rating of this parameter may be variable depending on where the observations are taken. To avoid confusion with sediment deposition (another habitat parameter), observations of embeddedness should be taken in the upstream and central portions of riffles and cobble substrate areas.

2b POOL SUBSTRATE CHARACTERIZATION

low gradient streams

Evaluates the type and condition of bottom substrates found in pools. Firmer sediment types (e.g., gravel, sand) and rooted aquatic plants support a wider variety of organisms than a pool substrate dominated by mud or bedrock and no plants. In addition, a stream that has a uniform substrate in its pools will support far fewer types of organisms than a stream that has a variety of substrate types.

3a VELOCITY/DEPTH COMBINATIONS

high gradient streams Patterns of velocity and depth are included for high-gradient streams under this parameter as an important feature of habitat diversity. The best streams in most high-gradient regions will have all 4 patterns present: (1) slow-deep, (2) slow-shallow, (3) fast-deep, and (4) fast-shallow. The general guidelines are 0.5 m depth to separate shallow from deep, and 0.3 m/sec to separate fast from slow. The occurrence of these 4 patterns relates to the stream's ability to provide and maintain a stable aquatic environment.

3b POOL VARIABILITY

low gradient streams Rates the overall mixture of pool types found in streams, according to size and depth. The 4 basic types of pools are large-shallow, large-deep, small-shallow, and small-deep. A stream with many pool types will support a wide variety of aquatic species. Rivers with low sinuosity (few bends) and monotonous pool characteristics do not have sufficient quantities and types of habitat to support a diverse aquatic community. General guidelines are any pool dimension (i.e., length, width, oblique) greater than half the cross-section of the stream for separating large from small and 1 m depth separating shallow and deep.

4 SEDIMENT DEPOSITION

high and low gradient streams Measures the amount of sediment that has accumulated in pools and the changes that have occurred to the stream bottom as a result of deposition. Deposition occurs from large-scale movement of sediment. Sediment deposition may cause the formation of islands, point bars (areas of increased deposition usually at the beginning of a meander that increase in size as the channel is diverted toward the outer bank) or shoals, or result in the filling of runs and pools. Usually deposition is evident in areas that are obstructed by natural or manmade debris and areas where the stream flow decreases, such as bends. High levels of sediment deposition are symptoms of an unstable and continually changing environment that becomes unsuitable for many organisms.

5 CHANNEL FLOW STATUS

high and low gradient streams The degree to which the channel is filled with water. The flow status will change as the channel enlarges (e.g., aggrading stream beds with actively widening channels) or as flow decreases as a result of dams and other obstructions, diversions for irrigation, or drought. When water does not cover much of the streambed, the amount of suitable substrate for aquatic organisms is limited. In high-gradient streams, riffles and cobble substrate are exposed; in low-gradient streams, the decrease in water level exposes logs and snags, thereby reducing the areas of good habitat. Channel flow is especially useful for interpreting biological condition under abnormal or lowered flow conditions. This parameter becomes important when more than one biological index period is used for surveys or the timing of sampling is inconsistent among sites or annual periodicity.

Parameters to be evaluated broader than sampling reach: (#'s 6-10)

6 CHANNEL ALTERATION

high and low gradient streams Is a measure of large-scale changes in the shape of the stream channel. Many streams in urban and agricultural areas have been straightened, deepened, or diverted into concrete channels, often for flood control or irrigation purposes. Such streams have far fewer natural habitats for fish, macroinvertebrates, and plants than do naturally meandering streams. Channel alteration is present when artificial embankments, riprap, and other forms of artificial bank stabilization or structures are present; when the stream is very straight for significant distances; when dams and bridges are present; and when other such changes have occurred. Scouring is often associated with channel alteration.

7a FREQUENCY OF RIFFLES (OR BENDS)

high gradient streams Is a way to measure the sequence of riffles and thus the heterogeneity occurring in a stream. Riffles are a source of high-quality habitat and diverse fauna, therefore, an increased frequency of occurrence greatly enhances the diversity of the stream community. For high gradient streams where distinct riffles are uncommon, a run/bend ratio can be used as a measure of meandering or sinuosity (see 7b). A high degree of sinuosity provides for diverse habitat and fauna, and the stream is better able to handle surges when the stream fluctuates as a result of storms. The absorption of this energy by bends protects the stream from excessive erosion and flooding and provides refugia for benthic invertebrates and fish during storm events. To gain an appreciation of this parameter in some streams, a longer segment or reach than that designated for sampling should be incorporated into the evaluation. In some situations, this parameter may be rated from viewing accurate topographical maps. The "sequencing" pattern of the stream morphology is important in rating this parameter. In headwaters, riffles are usually continuous and the presence of cascades or boulders provides a form of sinuosity and enhances the structure of the stream. A stable channel is one that does not exhibit progressive changes in slope, shape, or dimensions, although short-term variations may occur during floods (Gordon et al. 1992).

7b CHANNEL SINUOSITY

low gradient streams Evaluates the meandering or sinuosity of the stream. A high degree of sinuosity provides for diverse habitat and fauna, and the stream is better able to handle surges when the stream fluctuates as a result of storms. The absorption of this energy by bends protects the stream from excessive erosion and flooding and provides refugia for benthic invertebrates and fish during storm events. To gain an appreciation of this parameter in low gradient streams, a longer segment or reach than that designated for sampling may be incorporated into the evaluation. In some situations, this parameter may be rated from viewing accurate topographical maps. The "sequencing" pattern of the stream morphology is important in rating this parameter. In "oxbow" streams of coastal areas and deltas, meanders are highly exaggerated and transient. Natural conditions in these streams are shifting channels and bends, and alteration is usually in the form of flow regulation and diversion. A stable channel is one that does not exhibit progressive changes in slope, shape, or dimensions, although short-term variations may occur during floods (Gordon et al. 1992).

8 BANK STABILITY (condition of banks)

high and low gradient streams Measures whether the stream banks are eroded (or have the potential for erosion). Steep banks are more likely to collapse and suffer from erosion than are gently sloping banks, and are therefore considered to be unstable. Signs of erosion include crumbling, unvegetated banks, exposed tree roots, and exposed soil. Eroded banks indicate a problem of sediment movement and deposition, and suggest a scarcity of cover and organic input to streams. Each bank is evaluated separately and the cumulative score (right and left) is used for this parameter.

9 BANK VEGETATIVE PROTECTION

high and low gradient streams Measures the amount of vegetative protection afforded to the stream bank and the near-stream portion of the riparian zone. The root systems of plants growing on stream banks help hold soil in place, thereby reducing the amount of erosion that is likely to occur. This parameter supplies information on the ability of the bank to resist erosion as well as some additional information on the uptake of nutrients by the plants, the control of instream scouring, and stream shading. Banks that have full, natural plant growth are better for fish and macroinvertebrates than are banks without vegetative protection or those shored up with concrete or riprap. This parameter is made more effective by defining the native vegetation for the region and stream type (i.e., shrubs, trees, etc.). In some regions, the introduction of exotics has virtually replaced all native vegetation. The value of exotic vegetation to the quality of the habitat structure and contribution to the stream ecosystem must be considered in this parameter. In areas of high grazing pressure from livestock or where residential and urban development activities disrupt the riparian zone, the growth of a natural plant community is impeded and can extend to the bank vegetative protection zone. Each bank is evaluated separately and the cumulative score (right and left) is used for this parameter.

10 RIPARIAN VEGETATIVE ZONE WIDTH

high and low gradient streams Measures the width of natural vegetation from the edge of the stream bank out through the riparian zone. The vegetative zone serves as a buffer to pollutants entering a stream from runoff, controls erosion, and provides habitat and nutrient input into the stream. A relatively undisturbed riparian zone supports a robust stream system; narrow riparian zones occur when roads, parking lots, fields, lawns, bare soil, rocks, or buildings are near the stream bank. Residential developments, urban centers, golf courses, and rangeland are the common causes of anthropogenic degradation of the riparian zone. Conversely, the presence of "old field" (i.e., a previously developed field not currently in use), paths, and walkways in an otherwise undisturbed riparian zone may be judged to be inconsequential to altering the riparian zone and may be given relatively high scores. For variable size streams, the specified width of a desirable riparian zone may also be variable and may be best determined by some multiple of stream width (e.g., 4 x wetted stream width). Each bank is evaluated separately and the cumulative score (right and left) is used for this parameter.

HABITAT ASSESSMENT FIELD DATA SHEET – HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	**GIS ID #** __________
SEGMENT ID	**STREAM CLASS**
LAT ______________ **LONG** ______________	**RIVER BASIN** Sewickley Creek
STORET # N/A	**AGENCY** Western Pennsylvania Conservancy
INVESTIGATORS	

FORM COMPLETED BY	**DATE** ___________________ **TIME** __________ **AM PM**	**REASON FOR SURVEY** Sewickley Creek Visual Assessment

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate & Available Cover	Greater than 70% (50% for low gradient streams) of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% (30-50% for low gradient streams) mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% (10-30% for low gradient streams) mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% (10% for low gradient streams) stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/ Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET – HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE ___	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) **Note: determine left or right side by facing downstream**	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) **Note: determine left or right side by facing downstream**	More than 90% of the streambank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score ________

HABITAT ASSESSMENT SCORE SHEET
HIGH GRADIENT STREAM

STREAM NAME	SEGMENT ID	
GIS ID # __________	STREAM CLASS	
LAT _____________ LONG _____________	RIVER BASIN Sewickley Creek	
STORET # N/A	AGENCY Western Pennsylvania Conservancy	
INVESTIGATORS		
FORM COMPLETED BY	DATE _________________ TIME _________ AM PM	REASON FOR SURVEY Sewickley Creek Visual Assessment

Habitat Parameter	Score	Explanation of Score Given *(Complete especially for poor rating)*	
1. Epifaunal Substrate /Available Cover			
2. Embeddedness			
3. Velocity/ Depth Regimes			
4. Sediment Deposition			
5. Channel Flow Status			
6. Channel Alteration			
7. Frequency of Riffles (or bends)			
8. Bank Stability **(score each bank)** ***Note: determine left or right side by facing downstream***	Total of LB & RB	**(LB)**	
		(RB)	
9. Vegetative Protection **(score each bank)** ***Note: determine left or right side by facing downstream***	Total of LB & RB	**(LB)**	
		(RB)	
10. Riparian Vegetative Zone Width **(score each bank riparian zone)**	Total of LB & RB	**(LB)**	
		(RB)	
Total Score		**Add all scores and divide by the number of scores given.**	

SHORT FIELD DATA SHEET

STREAM NAME (UNT name etc.)	**SEGMENT ID** (Which of the 5 Sub-Watersheds)
GIS ID # __________	**STREAM CLASS**
LAT ______________ **LONG** ______________	**RIVER BASIN** Sewickley Creek
STORET # N/A	**AGENCY** Western Pennsylvania Conservancy
INVESTIGATORS	

FORM COMPLETED BY	**DATE** ___________________ **TIME** __________ **AM PM**	**REASON FOR SURVEY** Sewickley Creek Visual Assessment

WEATHER CONDITIONS	**Now** ☐ storm (heavy rain) 25%] ☐ rain (steady rain) 50 %] ☐ showers (intermittent) 75% → ☐ % cloud cover (circle %) 100%] ☐ clear/sunny **Past 24 hours** ☐ ☐ [25% ☐ [50% ☐ ← 75% ☐ [100% **Has there been a heavy rain in the last 7 days?** ☐ Yes ☐ No **Air Temperature** _____ °F **Other**________________________________
STREAM SUMMARY	**Stream Width:** __________ **pH:** _________ **Description of erosion issues:** **Description of land use and riparian zone:** **Predominant Surrounding Landuse** ☐ Forest ____% ☐ Field/Pasture ____% ☐ Agricultural ____% ☐ Open space (i.e., parks/golf courses) ____% ☐ Commercial/Industrial ____% ☐ Residential ____% (___ Rural or ___ Urban) ☐ Wetland ____% ☐ Other _______________ ____% **Are the buffers: Good, Fair, Poor** **Canopy Cover:** ☐ Open ☐ Mostly open ☐ Shaded ☐ Mostly shaded **Record any additional notes about the stream:**
FIELD ESTIMATED SCORE	**Estimate the overall score of the stream:** **Optimal (Excellent) ~ Sub-Optimal (Good) ~ Marginal (Fair) ~ Poor** **20 19, 18, 17, 16 ~ 15, 14, 13, 12, 11 ~ 10, 9, 8, 7, 6 ~ 5, 4, 3, 2, 1**

IX. References

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GIS_ID_WPC	NAME	ATTAINUSE	PROBLEM1	USE_	SEGID_WPC	Length	StrmName	Inv	Date	Time	Sheet
1016	Sewickley Creek	N	Abandoned Mine Drainage/Metals:2002	Aquatic Life	37556_0_2.18	2.18	sewickley main	AT, TS	8/3/10	12:00 pm	No
1024	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_4.62_4.9	0.28	sewickley creek	RH, MK	4/21/10	12:40 PM	No
1031	Trib 37630 To Hunters Run	U	Unassessed		37630_0_0.62	0.62	UNT to hunters run	AT, TS, MK	7/2/10		Yes
1043	Trib 37618 To Sewickley Creek	U	Unassessed		37618_0_0.92	0.92	UNT sewickley main	AT, TS, MT	6/17/10	11:30 am	Yes
1061	Pinkerton Run	U	Unassessed		37631_1.55_1.8	0.25	UNT lower sewickley	TS, JR	6/23/10	10:30 am	Yes
1070	Kelly Run	U	Unassessed		37620_1.41_2.87	1.46	UNT lower sewickley	JR, CL, TS, AT	6/23/10	12:55 pm	Yes
1074	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_6.56_7.26	0.70	main stem lower sewickley	MK	4/14/10	2:00 PM	No
1082	Pinkerton Run	U	Unassessed		37631_0_1.4	1.40	unt to lower sewickley	MK, RH	4/9/10	3:20 AM	No
1084	Trib 37617 To Sewickley Creek	U	Unassessed		37617_0_0.61	0.61	UNT lower sewickley	TS, AT, MT	6/17/10	12:30 pm	Yes
1119	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_6.41_6.56	0.14	sewickley main	RH, MK	4/21/10		No
1133	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_7.26_8.6	1.34	main stem lower sewickley	MK	4/14/10	1:00 PM	No
1141	Trib 37624 To Sewickley Creek	U	Unassessed		37624_0_1.19	1.19	UNT to sewickley	AT, TS	6/18/2010	9.51 AM	Yes
1148	Trib 37621 To Kelly Run	U	Unassessed		37621_0_0.95	0.95	UNT to kelly run	TS, AT, CL, JR	6/23/10	12:55 AM	Yes
1152	Hunters Run	U	Unassessed		37627_0.12_0.35	0.23	Hunters Run	AT, TS	6/2/10	3:00 pm	Yes
1163	Hunters Run	U	Unassessed		37627_0_0.12	0.12	Hunters Run	AT, TS	6/2/2010	3:20 pm	Yes
1168	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_4.9_6.33	1.43	sewickley creek	RH, MK	4/21/10	11:41 AM	No
1174	Trib 37633 To Pinkerton Run	U	Unassessed		37633_0_0.31	0.31	UNT lower sewickley	TS, JR	6/23/10	11:00 am	Yes
1182	Trib 37623 To Sewickley Creek	U	Unassessed		37623_0_0.28	0.28	UNT lower sewickley	CL TS, AT, JR	6/23/10	1:30 pm	Yes
1195	Hunters Run	U	Unassessed		37627_1.24_2.72	1.48	hunters run	TS, AT, MK	7/2/10	10:00 am`	Yes
1228	Trib 37622 To Sewickley Creek	U	Unassessed		37622_0_2.52	2.52	UNT lower sewickley	AT, CL	6/23/10	11:07 am	No
1239	Pinkerton Run	U	Unassessed		37631_1.8_2.18	0.38	UNT lower sewickley	TS, JR	6/23/10	11:00 am	Yes
1242	Pinkerton Run	U	Unassessed		37631_1.4_1.55	0.15	UNT lower sewckley	TS, JR	6/23/10	10:30 am	Yes
1252	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_2.33_3.58	1.25	lower sewickley	AT, TS	4/2/10	10:48 AM	No
1266	Trib 37614 To Sewickley Creek	U	Unassessed		37614_0.3_1.81	1.51	UNT sewickley main	AT, TS, MT	6/17/10	2:00 pm	Yes
1267	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_6.33_6.41	0.08	main stem lower sewickley	RH, MK	4/21/10	12:07PM	No
1283	Painters Run	U	Unassessed		37628_0_1.94	1.94	painteres run	AT, TS, MK	7/2/10	1:00 pm	No
1313	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_10.07_10.4	0.33	main stem sewickley creek	RH, MK	4/9/10	2:20 PM	No
1326	Trib 37614 To Sewickley Creek	U	Unassessed		37614_0_0.3	0.30	UNT Sewickley main	AT, TS, MT	6/17/10	1:48 pm	Yes
1331		U	Unassessed		64935_0_0.41	0.41	UNT lower sewickley	TS, JR	6/23/10	10:30 am	Yes
1338	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_3.58_3.96	0.38	sewickley main	AT, TS	4/21/10	1:45 PM	No
1345	Trib 37613 To Sewickley Creek	U	Unassessed		37613_0_0.8	0.80	sewickley UNT	AT, TS	4/21/10	1:00 PM	Yes
1363	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_3.96_4.27	0.31	sewickley main	RH, MK	4/21/10	1:35 AM	No
1376	Trib 37625 To Sewickley Creek	U	Unassessed		37625_0_0.3	0.30	UNT sewickley main	AT, TS	6/ 18/10	11:40 am	Yes
1377	Kelly Run	U	Unassessed		37620_0_1.41	1.41	lower sewickley	MK, NP, MT	6/18/10	11:40	No
1387	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_8.6_10.07	1.47	Sweickley Main	MK	4/14/10	12:00 pm	No
1392	Trib 37618 To Sewickley Creek	U	Unassessed		37618_0.92_1.14	0.22	UNT sewickley main	AT, TS, MT	6/17/10	11:25 am	Yes
1397	Trib 37632 To Pinkerton Run	U	Unassessed		37632_0_0.65	0.65	UNT lower sewickley	TS, JR	6/23/10	10:30 am	Yes
1408	Trib 37629 To Hunters Run	U	Unassessed		37629_0_0.46	0.46	UNT to Hunters Run	AT, TS	6/2/2010	2:21 pm	Yes
1427	Trib 37615 Of Sewickley Creek	U	Unassessed		37615_0_0.39	0.39	UNT sewickley main	AT, TS, MT	6/17/10	1:50 PM	Yes
1449	Trib 37626 Of Sewickley Creek	U	Unassessed		37626_0_0.37	0.37	UNT sewickley main	AT, TS	6/18/10	11:22 am	Yes
1463	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_0_0.42	0.42	little sewickley main	AT, TS	4/21/10	11:55 AM	No
1466	Hunters Run	U	Unassessed		37627_0.35_1.24	0.89	hunters run	MK, AT, TS	7/2/10	11:00 am	No
1478	Trib 37619 Of Sewickley Creek	U	Unassessed		37619_0_0.13	0.13	UNT sewickley main	AT, TS, MT	6/17/10	11:30 am	Yes
1492	Trib 37625 To Sewickley Creek	U	Unassessed		37625_0.3_0.95	0.65	UNT sewickley main	AT, TS	6/18/10	11:00 am	Yes
1506	Trib 63941 To Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	63941_0_0.57	0.57	unt to little sewickley	AT, TS	8/3/10	9:45 am	Yes
1511	Sewickley Creek	N	Abandoned Mine Drainage/Metals:2002	Aquatic Life	37556_2.18_2.33	0.15	sewickley main	AT, TS	4/21/10	12:15 PM	No
1529	Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37556_4.27_4.62	0.35	sewickley creek	RH, MK	4/21/10	12:00 PM	No

GIS_ID_WPC	NAME	ATTAINUSE	PROBLEM1	USE_	SEGID_WPC	Length	StrmName	Inv	Date	Time	Sheet	WeatNow	Weat24hrs	Rain7days
1003	Trib 37576 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37576_0_0.48	0.48	UNT	RH, TS	3/31/10	1:43 PM	Yes	clear/sunny	clear/sunny	Yes
1010	Trib 37581 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37581_0.14_0.47	0.33	UNT little sewickley	CL, AT	5/13/10	9:35 AM	Yes	100% cloud cover	showers (intermittent)	Yes
1011	Trib 37599 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37599_0_1.35	1.35	UNT to Little Sewickley	AT, TS	11/18/2009	12:00 pm	No	clear/sunny	75% cloud cover	No
1012	Trib 37588 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37588_0_1.64	1.64	Little Sewickley	RH, TS	3/30/10	1:00 PM	Yes	clear/sunny	clear/sunny	No
1015	Trib 37572 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37572_0_0.57	0.57	UNT	TS, CL	5/26/10	11:30 a	Yes	clear/sunny	clear/sunny	No
1018	Trib 37606 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37606_0_0.44	0.44	Little Sewickley Main	MK, RH	11/10/09	11:20 p	Yes	100% cloud cover	75% cloud cover	No
1027	Trib 37570 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37570_0_0.93	0.93	UNT	JR, AT	5/26/2010	11:30 pm	Yes	clear/sunny	clear/sunny	No
1036	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_7.4_7.99	0.59	little sewickley	RH, MK	3/25/10	11:00 AM	No	100% cloud cover	100% cloud cover	No
1048	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_11.34_11.68	0.34	Little Sewickley Main	AT, TS	9/24/09	2:00 p	No	50% cloud cover	showers (intermittent)	Yes
1051	Trib 37589 To Little Sewickley Creek	N	Habitat Modification/Siltation:2004	Aquatic Life	37589_2.08_2.86	0.78	turnpike trib	AT, CR	3/25/10	3:00 PM	Yes	100% cloud cover	storm (heavy rain)	Yes
1053	Trib 37564 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37564_0_0.83	0.83	UNT little sewickley	TS, JR	6/4/10	11:05 am	Yes	100% cloud cover	showers (intermittent)	Yes
1054	Trib 37586 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37586_0_0.57	0.57	little sewickley	TS, RH	3/21/10	9:30 AM	Yes	clear/sunny	clear/sunny	Yes
1058	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_0_0.73	0.73	UNT little sewickley	AT, TS, CL, RH	5/13/10	1:40 PM	No	100% cloud cover	showers (intermittent)	Yes
1059	Trib 37568 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37568_0_1.23	1.23	UNT little sewickley	TS, JR	6/8/10	2:05 pm	No	25% cloud cover	25% cloud cover	Yes
1086	Trib 37603 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37603_0_0.62	0.62	UNT to Little Sewickley	MK, RH	11/10/09	2:00 p	Yes	100% cloud cover	75% cloud cover	No
1094	Trib 37600 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37600_0_0.56	0.56	UNT to Little Sewickley	AT, TS	11/18/09	10:45 a	Yes	100% cloud cover	100% cloud cover	No
1100	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_1.17_1.55	0.38	UNT	RH, TS	3/31/10	2:30	Yes	clear/sunny	clear/sunny	Yes
1101	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_1.05_2.22	1.17	UNT little sewickley	JR, TS	6/8/10	1:00 pm	No	25% cloud cover	25% cloud cover	Yes
1108	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_3.38_3.94	0.56	UNT little sewickley	TS, JR	6/8/10	10:45 am	No	25% cloud cover	25% cloud cover	Yes
1109	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_1.55_1.76	0.21	UNT little sewickley	AT, CL	5/13/10	12:20 PM	No	100% cloud cover	showers (intermittent)	Yes
1124	Trib 37565 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37565_0_1.08	1.08	UNT sewickley	TS, JR	6/8/10	11:45 am	No	25% cloud cover	25% cloud cover	Yes
1125	Trib 37610 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37610_0.39_1.03	0.64	Little Sewickley Main Headwaters	AT, TS	9/24/09	1:00 p	Yes	75% cloud cover	showers (intermittent)	Yes
1135	Trib 37611 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37611_0_0.32	0.32	UNT to Little Sewickley	AT, TS	9/24/09	11:20 a	Yes	100% cloud cover	showers (intermittent)	Yes
1136	Trib 37571 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37571_0_0.82	0.82	UNT	JR, AT	5/26/10	10:29 am	Yes	clear/sunny	clear/sunny	No
1138	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_0.42_0.79	0.37	little sewickley main	TS, AT, MT	6/17/10	9:55 AM	No	100% cloud cover	25% cloud cover	Yes
1139	Trib 37584 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37584_0_0.65	0.65	UNT little sewickley	TS, JR	6/4/10	12:00 pm	Yes	25% cloud cover	showers (intermittent)	Yes
1140	Trib 37585 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37585_0_0.2	0.20	UNT	TS, JR	6/4/2010	12:10	Yes	25% cloud cover	showers (intermittent)	Yes
1143	Trib 37610 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37610_0.35_0.39	0.04	Little Sewickley Main	RH, BN	9/24/09	12:55 p	Yes	75% cloud cover	storm (heavy rain)	Yes
1145	Trib 37605 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37605_0_0.53	0.53	UNT to Little Sewickley	AT, TS	11/10/09	10:45 a	Yes	100% cloud cover	100% cloud cover	No
1157	Trib 37589 To Little Sewickley Creek	N	Habitat Modification/Siltation:2004	Aquatic Life	37589_1.54_1.64	0.09	UNT little sewickley	AT, CR	3/25/10	2:30 pm	No	100% cloud cover	storm (heavy rain)	Yes
1158	Trib 37612 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37612_0_1.01	1.01	UNT to Little Sewickley	RH, BN	9/24/09	12:15 p	Yes	75% cloud cover	storm (heavy rain)	Yes
1165	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_2.77_3.38	0.61	UNT little sewickley		6/8/10	12:05 pm	No	25% cloud cover	25% cloud cover	Yes
1166	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_4.5_6.22	1.72	little sewickley creek main	AT, JR	5/21/10	10:35 AM	No	75% cloud cover	clear/sunny	Yes
1170	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_8.75_9.11	0.35	Little Sewickley Main	MK, RH	11/18/09	2:28 a	No	clear/sunny	100% cloud cover	No
1171	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_0.79_0.91	0.12	sewickley	TS, RH	5/21/10	1:50 PM	No	100% cloud cover	clear/sunny	Yes
1178	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_10.2_10.74	0.54	Little Sewickley Main	AT, TS	11/10/09	1:00 pm	No	100% cloud cover	100% cloud cover	No
1186	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_2.29_2.98	0.69	UNT	TS, CL	5/26/10	10:05 a	Yes	clear/sunny	clear/sunny	No
1187	Trib 37573 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37573_0_0.64	0.64	UNT	TS, CL	5/26/10	10:25 a	Yes	clear/sunny	clear/sunny	No
1198	Trib 37599 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37599_1.35_2.5	1.15	UNT to Little Sewickley	AT, TS	11/18/09	10:30 a	Yes	100% cloud cover	100% cloud cover	No
1199	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_0.26_0.94	0.68	UNT little sewickley	JR, AT	5/26/10	11:04 am	Yes	100% cloud cover	clear/sunny	No
1200	Trib 37583 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37583_0_0.69	0.69	Little Sewickley	RH, TS	3/31/10	11:50 AM	Yes	clear/sunny	clear/sunny	Yes
1201	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_0_1.05	1.05	UNT little sewickley	TS, JR	6/8/10	1:36 PM	No	25% cloud cover	25% cloud cover	Yes
1217	Trib 37589 To Little Sewickley Creek	N	Grazing Related Agric/Siltation:2004	Aquatic Life	37589_0_1.54	1.54	little sewickley	RH, MK	3/25/10	3:00 PM	No	clear/sunny	clear/sunny	No
1226	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_3.68_4.5	0.82	little sewickley	TS, RH	5/21/10	10:40 AM	No	clear/sunny	100% cloud cover	Yes
1231	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_2.85_2.97	0.12	UNT little Sewickley	TS, RH	5/12/10	10:05 am	Yes	100% cloud cover	showers (intermittent)	Yes
1238	Trib 37604 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37604_0.32_0.66	0.34	UNT to Little Sewickley	AT, TS	11/10/09	11:32 a	Yes	100% cloud cover	100% cloud cover	No
1243	Trib 37559 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37559_0_1.28	1.28	unt little sewickley	JR, TS	6/8/10		Yes	25% cloud cover	25% cloud cover	Yes
1247	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_7.99_8.53	0.53	little sewickley main	AT, CR	3/25/10	12:00 PM	No	100% cloud cover	showers (intermittent)	Yes
1249	Trib 37593 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37593_0.48_0.9	0.42	little sewickley	RH, TS	3/30/10	11:20 AM	Yes	clear/sunny	25% cloud cover	Yes
1253	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_11.22_11.34	0.11	Little Sewickley Main	AT, TS	9/24/09	2:22 p	No	50% cloud cover	showers (intermittent)	Yes
1257	Trib 37598 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37598_0_0.41	0.41	UNT to little sewickley	AT, TS	11/18/2009	2:22 pm	No	25% cloud cover	100% cloud cover	No
1260	Trib 37601 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37601_0_1.02	1.02	UNT to Little Sewickley	MK, RH	11/18/09	12:35 p	Yes	clear/sunny	100% cloud cover	No
1261	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_2.15_2.85	0.70	UNT little sewickley	TS, RH	5/13/10	10:58 am	No	100% cloud cover	showers (intermittent)	Yes
1262	Trib 37610 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37610_0_0.35	0.35	Little Sewickley Main	AT, TS	9/24/09	11:15 a	Yes	100% cloud cover	showers (intermittent)	Yes
1270	Trib 37589 To Little Sewickley Creek	N	Habitat Modification/Siltation:2004	Aquatic Life	37589_1.64_2.08	0.44	turnpike trib	AT, CR	3/25/10	2:30 PM	Yes	100% cloud cover	storm (heavy rain)	Yes
1275	Trib 37565 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37565_1.08_1.52	0.44	UNT little sewickley	TS, JR	6/8/10	11:30 am	Yes	25% cloud cover	25% cloud cover	Yes
1280	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_0.73_1.17	0.44	UNT little sewickley	RH, TS	3/31/10	2:03	Yes	clear/sunny	clear/sunny	Yes
1282	Trib 37590 Of Little Sewickley Creek	U	Unassessed		37590_0_0.64	0.64	unt. To turn pike trib	CR, AT	3/25/10	1:45 PM	Yes	75% cloud cover	storm (heavy rain)	Yes
1286	Trib 37577 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37577_0_0.49	0.49	UNT little sewickley	TS, RH	5/13/10	1:10 PM	Yes	100% cloud cover	showers (intermittent)	Yes
1286	Trib 37577 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37577_0_0.49	0.49	Main Stem mid sewickley	RH, MK	4/9/10	11:30	No	100% cloud cover	storm (heavy rain)	Yes
1287	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_6.5_6.89	0.39	Little Sewckley	RH, TS	3/30/10	3:20 AM	No	50% cloud cover	50% cloud cover	Yes
1290	Trib 37581 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37581_0_0.14	0.14	UNT little sewickley	TS, RH	5/12/10	10:05 AM	Yes	100% cloud cover	showers (intermittent)	Yes
1292	Trib 37595 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37595_0_0.49	0.49	little sewickley	RH, TS	3/30/10	10:50 AM	Yes	clear/sunny	25% cloud cover	Yes
1295	Trib 37608 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37608_0_1.99	1.99	Little Sewickley Main	MK, RH	11/10/09	10:43a	No	100% cloud cover	100% cloud cover	No
1302	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_9.86_10.2	0.34	Little Sewickley Main	AT, TS	11/10/09	1:53 p	No	100% cloud cover	100% cloud cover	No
1308	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_8.53_8.75	0.22	little sewickley	AT, CR	3/25/10	10:30 AM	No	100% cloud cover	100% cloud cover	Yes
1311	Trib 37587 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37587_0_0.23	0.23	little sewickley	TS, RH	3/31/10	9:25 AM	Yes	clear/sunny	clear/sunny	Yes
1312	Trib 37609 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37609_0_0.7	0.70	Little Sewickley UNT	RH, BN	9/24/09	2:25 p	Yes	75% cloud cover	storm (heavy rain)	Yes
1312	Trib 37609 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37609_0_0.7	0.70	UNT little sewickley	TS, JR	6/4/10	10:30 am	Yes	100% cloud cover	showers (intermittent)	Yes
1314	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_1.58_1.92	0.34	unt little sewickley	CL, TS	5/26/10	11:30 am	Yes	clear/sunny	clear/sunny	No
1315	Trib 37566 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37566_0_0.18	0.18	UNT little sewickley	TS, JR	6/8/10	10:32 am	Yes	25% cloud cover	25% cloud cover	Yes
1319	Trib 37604 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37604_0.2_0.32	0.12	UNT to Little Sewickley	AT, TS	11/10/09	11:11 a	Yes	100% cloud cover	100% cloud cover	No
1321	Trib 37584 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37584_0.65_0.97	0.32	UNT little sewickley	TS, JR	6/4/10	12:15 pm	Yes	25% cloud cover	showers (intermittent)	Yes
1332	Trib 37604 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37604_0_0.2	0.20	UNT to Little Sewickley	AT, TS	11/10/09	10:45 a	Yes	100% cloud cover	100% cloud cover	No
1340	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_10.74_11.22	0.48	Little Sewickley Main	AT, TS	11/10/2009	9:55 am	No	100% cloud cover	100% cloud cover	No
1344	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_2.89_3.68	0.79	little sewickley main	RH, TS	5/21/10	12:42	No	100% cloud cover	clear/sunny	Yes
1346	Trib 37593 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37593_0.28_0.48	0.20	little sewickley	TS, RH	3/30/10	10:25 AM	Yes	clear/sunny	25% cloud cover	Yes
1355	Trib 37593 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37593_0_0.28	0.28	little sewickley	TS, RH	3/30/10	9:30 AM	Yes	clear/sunny	25% cloud cover	Yes
1356	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_0.94_1.58	0.64	UNT	JR, AT	5/26/20	10:16 am	Yes	clear/sunny	clear/sunny	No

1369	Trib 37607 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37607_0_0.77	0.77	UNT Lower Sewickley	RH, BN	9/24/09	1:30 p	Yes	75% cloud cover	storm (heavy rain)	Yes	75	Perennial	Spring-fed	Warm water	60	10	0	0	0	70	10	0
1375	Trib 37561 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37561_0_0.94	0.94	UNT	TS, JR	6/4/2010	10:10 am	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		70	10	0	0	0	20	0	0
1380	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_3.94_4.96	1.02	UNT little sewickley	TS, JR	6/8/10	10:30 am	Yes	25% cloud cover	25% cloud cover	Yes	67	Perennial	Spring-fed		35	0	0	0	0	50	15	0
1383	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_0.91_2.89	1.98	Little sewickley main	AT, JR	5/21/10	1:50 PM	No	75% cloud cover	clear/sunny	Yes	70	Perennial	Spring-fed	Warm water	70	5	0	0	0	10	15	0
1393	Trib 37582 Of Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37582_0_0.38	0.38	UNT little sewickley	TS, RH	5/13/10	9:30 am	Yes	100% cloud cover	showers (intermittent)	Yes	60	Perennial	Spring-fed		40	0	0	0	0	60	0	0
1401	Trib 37592 Of Little Sewickley Creek	U	Unassessed		37592_0_0.62	0.62	unt to turnpike trib	AT, CR	3/25/10	2:00 PM	Yes	100% cloud cover	storm (heavy rain)	Yes	60	Perennial	Spring-fed		0	0	0	8	0	90	2	0
1402	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_11.68_12.11	0.43	Little Sewickley Main	RH, TS, AT, BN	9/24/09	9:26 a	Yes	100% cloud cover	storm (heavy rain)	Yes	65	Perennial	Spring-fed	Warm water	0	50	0	0	0	45	5	0
1402	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_11.68_12.11	0.43	Little Sewickley Main	RH, TS, AT, BN	9/24/09	9:26 am	Yes	100% cloud cover	storm (heavy rain)	Yes	65	Perennial	Spring-fed		0	50	0	0	0	45	5	0
1404	Trib 37591 Of Little Sewickley Creek	U	Unassessed		37591_0_0.8	0.80	unt to turnpike trib	CR, AT	3/25/10	2:30 PM	Yes	100% cloud cover	storm (heavy rain)	Yes	60	Perennial	Spring-fed		0	0	95	0	0	5	0	0
1409	Trib 37560 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37560_2.22_2.77	0.55	UNT little sewickley	TS, JR	6/8/10	12:15 pm	No	25% cloud cover	25% cloud cover	Yes	68	Perennial	Spring-fed	Coldwater	50	0	0	0	0	50	0	0
1412	Trib 37594 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37594_0_0.48	0.48	little sewickley	TS, RH	3/30/10	10:10 AM	Yes	clear/sunny	25% cloud cover	Yes	42	Perennial	Spring-fed		0	0	0	5	0	95	0	0
1413	Trib 37578 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37578_0_0.59	0.59	UNT little sewickley	TS, RH	5/13/10	11:35 am	Yes	100% cloud cover	showers (intermittent)	Yes	65	Perennial	Spring-fed		0	0	0	0	0	100	0	0
1414	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_9.11_9.86	0.75	Little Sewickley Main	AT, MK, TS, RH	11/10/2009	2:45 PM	No	100% cloud cover	100% cloud cover	No	55	Perennial	Spring-fed	Warm water	25	40	0	5	0	25	5	0
1418	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_6.89_7.12	0.23	little sewckley	RH, TS	3/30/10	2:40 PM	No	50% cloud cover	50% cloud cover	Yes	65	Perennial	Spring-fed	Coldwater	50	45	0	5	0	0	0	0
1425	Trib 37563 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37563_0_1.17	1.17	UNT	TS, JR	6/2/2010	10:50 am	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		30	30	10	0	0	30	0	0
1425	Trib 37563 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37563_0_1.17	1.17	UNT little sewickley	TS, JR	6/4/10	10:50 am	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		30	30	10	0	0	30	0	0
1426	Trib 37569 To Little Sewickley Creek	N	Abandoned Mine Drainage/Metals:2004	Aquatic Life	37569_0_0.26	0.26	UNT to little sewickley	TS, RH	5/21/10	11:55 AM	Yes	clear/sunny	100% cloud cover	Yes	75	Perennial	Spring-fed		0	0	0	5	0	95	0	0
1429	Trib 37580 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37580_0_0.44	0.44	UNT little sewickley	CL, AT	5/13/10	10:44 AM	Yes	100% cloud cover	showers (intermittent)	Yes	60	Perennial	Spring-fed		15	0	0	0	15	60	10	0
1430	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_7.12_7.4	0.28	Little Sewickley	RH, TS	3/30/10	12:37 PM	No	clear/sunny	50% cloud cover	Yes	50	Perennial	Spring-fed	Coldwater	0	0	0	0	0	0	0	0
1435	Trib 37558 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37558_0_0.16	0.16		AT, TS	4/21/10	12:00	Yes	75% cloud cover	clear/sunny	Yes	60	Perennial	Spring-fed		0	0	0	0	0	0	0	100
1439	Trib 37597 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37597_0_1.04	1.04	unt little sewickley	RH, MK	3/25/10	9:57 AM	Yes	75% cloud cover	clear/sunny	No	45	Perennial	Spring-fed		55	33	0	2	0	5	5	0
1442	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_6.22_6.5	0.28	Little Sewickley	RH, TS	3/31/10	12:50 PM	No	clear/sunny	clear/sunny	Yes	55	Perennial	Spring-fed	Coldwater	20	20	45	0	0	15	0	0
1451	Trib 37561 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37561_0.94_1.53	0.59	UNT	JR, TS	6/4/2010	10:22 am	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		75	0	0	15	0	10	0	0
1451	Trib 37561 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37561_0.94_1.53	0.59	UNT little sewickley	JR, TS	6/4/10	10:22am	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		75	0	0	15	0	10	0	0
1455	Trib 37579 To Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37579_0_0.49	0.49	UNT little sewickley	CL, AT	5/13/10	12:50 PM	Yes	100% cloud cover	showers (intermittent)	Yes	60	Perennial	Spring-fed		0	100	0	0	0	0	0	0
1463	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_0_0.42	0.42	little sewickley main	AT, TS	4/21/10	11:55 AM	No	25% cloud cover	clear/sunny	Yes	60	Perennial	Spring-fed	Warm water	35	0	50	0	0	10	0	5
1473	Trib 37567 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37567_0_0.47	0.47	UNT sewickley	TS, JR	6/8/10	10:35 am	Yes	25% cloud cover	25% cloud cover	Yes	68	Perennial	Spring-fed		10	0	0	0	0	40	50	0
1474	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_1.92_2.29	0.37	UNT	TS, CL,	5/26/10	11:30 a	Yes	clear/sunny	clear/sunny	No	80	Perennial	Spring-fed		50	0	0	0	0	15	35	0
1474	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_1.92_2.29	0.37	UNT little sewickley	TS, CL	5/26/10	10:30 am	Yes	clear/sunny	clear/sunny	No	80	Perennial	Spring-fed		60	10	10	0	0	20	0	0
1474	Trib 37569 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37569_1.92_2.29	0.37	UNT little sewickley	CL, TS	5/26/10	11:30 am	Yes	clear/sunny	clear/sunny	No	80	Perennial	Spring-fed		50	0	0	0	0	15	35	0
1477	Trib 37598 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37598_1.14_2.21	1.07	UNT to Little Sewickley	MK, RH	11/18/09	12:10 p	No	clear/sunny	100% cloud cover	No	58	Perennial	Spring-fed	Warm water	35	10	0	20	0	25	10	0
1480	Trib 37598 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37598_0.41_1.14	0.73	Little Sewickley Main	MK, RH	11/18/09	1:16 p	No	clear/sunny	100% cloud cover	No	58	Perennial	Spring-fed	Warm water	40	60	0	0	0	0	0	0
1500	Andrews Run	Y	Attaining/Attaining: .	Aquatic Life	37575_1.76_2.15	0.39	UNT little sewickley	AT, CL	5/13/10	12:40 PM	No	100% cloud cover	showers (intermittent)	Yes	60	Perennial	Spring-fed	Warm water	5	80	0	0	0	5	10	0
1502	Trib 37586 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37586_0.57_1.03	0.46	little sewickley	TS, RH	3/31/10	10:35 AM	No	clear/sunny	clear/sunny	Yes	50	Perennial	Spring-fed	Coldwater	75	0	0	0	0	15	10	0
1512	Trib 37562 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37562_0_0.39	0.39	UNT	TS, JR	6/4/2010	10:30 am	Yes	100% cloud cover	showers (intermittent)	Yes		Perennial	Spring-fed		50	30	10	0	0	10	0	0
1516	Trib 37596 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37596_0_0.99	0.99	unt to little sewickley main	AT, CR	3/25/10	11:10 AM	Yes	100% cloud cover	100% cloud cover	Yes	45	Perennial	Spring-fed		15	50	5	0	0	30	0	0
1520	Trib 37574 Of Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37574_0_0.63	0.63	UNT	TS, CL	5/26/10	10:10 am	Yes	clear/sunny	clear/sunny	No	80	Perennial	Spring-fed		50	0	0	0	0	50	0	0
1521	Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37557_12.11_13.92	1.81	UNT to Little Sewickley	AT, BN, RH, TS	9/24/09	10:26 a	Yes	100% cloud cover	showers (intermittent)	Yes	70	Perennial	Spring-fed	Warm water	10	50	0	0	0	40	0	0
1527	Trib 37602 To Little Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37602_0_1.18	1.18	UNT to Little Sewickley	MK, RH	11/10/09	1:07 p	No	100% cloud cover	75% cloud cover	No	60	Perennial	Spring-fed	Warm water	95	0	0	0	0	5	0	0

1369	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					7.9	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1375	Type of other landuse	Some potential sources	None	Low			4		Shaded	0	0	0	0	0	0					8.2	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1380	Type of other landuse	Some potential sources	None	Low			5		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1383	Type of other landuse	Obvious sources	Minimal	None	Trees	mixed hardwoods	50	Fast	Shaded	40	40	20	0	0	0	Significant	Floating Algae	brown green scum	5	8.1	Slightly Turbid	Normal/None	None	Good	AMD	N/A	15	10	50	10	5	10	0	0	0	0	16
1393	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0					7.9	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1401	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					7.9	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1402	Type of other landuse	Some potential sources	None	Low			4		Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1402	Type of other landuse	Some potential sources	None	Low			4		Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1404	Type of other landuse	Some potential sources	None	Low			3		Open	0	0	0	0	0	0					7.7	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1409	Type of other landuse	Some potential sources	Minimal	Medium	Trees	mixed	0	Moderate	Mostly Open	35	35	30	1	0	1	Minimal	Attached Algae	green brown		8.1	Clear	Normal/None	None	Fair	Development	N/A	0	5	25	25	20	25	0	0	0	0	10
1412	Type of other landuse	Some potential sources	None	Low			5		Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1413	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					7.7	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1414	Type of other landuse	Some potential sources	Moderate	Low	Shrubs	woody	18	Moderate	Mostly Shaded	40	20	40	0	0	0	Minimal	Attached Algae	Brown Scum	100	8.9	Clear	Normal/None	None	Fair	Unknown	N/A	5	5	30	30	25	10	0	0	0	0	16
1418	Type of other landuse	Some potential sources	Moderate	Low	Trees	hardwoods	18	Moderate	Mostly Shaded	40	35	25	1	0	1	Significant	Attached Algae	brown		8.1	Clear	Normal/None	None	Good		N/A	15	10	15	30	15	15	0	0	0	0	14
1425	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1425	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1426	Type of other landuse	Some potential sources	None	Low			5		Mostly Open	0	0	0	0	0	0					8.2	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1429	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					7.6	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1430	Type of other landuse	Some potential sources	Moderate	Medium	Trees	hardwoods	15	Moderate	Mostly Shaded	40	20	40	1	0	1	Minimal	Attached Algae	Green/Brown		8.0	Clear	Normal/None	None	Good		N/A	0	5	15	60	10	10	0	0	0	0	14
1435	Quarry	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					NA	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1439	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1442	Type of other landuse	Some potential sources	None	None	Grasses	non-native	20	Moderate	Mostly Open	40	30	30	1	0	0	Significant	Attached Algae	brown	40	8.1	Clear	Normal/None	None	Good	Agriculture	N/A	5	15	20	10	25	25	0	0	0	0	14
1451	Type of other landuse	Some potential sources	None	Low			0		Mostly Shaded	0	0	0	0	0	0					n/a	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1451	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0						Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1455	Type of other landuse	Some potential sources	None	Low			3		Open	0	0	0	0	0	0					8.0	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1463	Quarry	Some potential sources	Minimal	None	Trees	mixed decid	0	Moderate	Mostly Shaded	35	35	30	1	0	0	None	Attached Algae	brown green	80	8.3	Slightly Turbid	Normal/None	None	Fair	Sewage	N/A	5	10	50	15	5	15	0	0	0	0	16
1473	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					8.1	Clear	Normal/None	None	Fair		N/A	0	0	0	0	0	0	0	0	0	0	0
1474	Type of other landuse	Some potential sources	None	Low			0		Open	0	0	0	0	0	0					8.2	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1474	Type of other landuse	Some potential sources	None	Low			4		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None	Good		N/A	0	0	0	0	0	0	0	0	0	0	0
1474	Type of other landuse	Some potential sources	None	Low			4		Open	0	0	0	0	0	0					8.2	Clear	Normal/None	None	Poor		N/A	0	0	0	0	0	0	0	0	0	0	0
1477	Type of other landuse	Obvious sources	Minimal	Low	Trees		4	Moderate	Mostly Open	20	60	20	1	1	1	None	Attached Algae	brown	100	7.9	Opaque	Sewage	None	Fair	Sewage	N/A	0	0	15	20	20	40	5	0	0	0	6
1480	Type of other landuse	Some potential sources	Moderate	Low	Grasses		7	Moderate	Mostly Open	35	30	35	0	0	1	Minimal	Attached Algae	green	100	7.9	Turbid	Normal/None	None	Good		N/A	0	0	10	20	20	30	20	0	0	0	14
1500	Type of other landuse	Some potential sources	Minimal	None	Grasses		5	Moderate	Open	40	40	20	0	0	0	None	None			7.7	Clear	Normal/None	None	Good		N/A	0	0	5	40	10	45	0	0	0	13	0
1502	Type of other landuse	Obvious sources	Minimal	Low	Trees	hardwoods	3	Moderate	Mostly Shaded	40	30	30	0	0	1	Significant	Floating Algae	filamentous	10	2.5	Clear	Normal/None	None	Poor	AMD	N/A	0	0	0	20	40	40	0	0	0	0	8
1512	Type of other landuse	Some potential sources	None	Low			2		Mostly Open	0	0	0	0	0	0					8.2	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1516	Type of other landuse	Some potential sources	None	Low			4		Mostly Shaded	0	0	0	0	0	0					8.0	Clear	Normal/None	None	Good		N/A	0	0	0	0	0	0	0	0	0	0	0
1520	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1521	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					7.6-7.9	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0
1527	Type of other landuse	Some potential sources	Moderate	Low	Trees	hardwoods	5	Moderate	Mostly Shaded	0	0	0	0	0	1	Minimal	Attached Algae	green	60	7.7	Clear	Normal/None	None			N/A	5	0	50	35	5	5	0	0	0	0	13

1369		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		13.0	Suboptimal (11-15)	Culverts are fish barries, some erosion, possible channelization in future.	
1375		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	16		16.0	Optimal (16-20)	Forested area, follows road closely on left bank, but there is a buffer. A Few houses and fields on right bank but at a distance.	Some sediment, saw little fish and a frog.
1380		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	16		15.0	Suboptimal (11-15)	very residential area but stream has a nice forested/shrubby buffer at least 25 yards throughout culverted under road at bottom flows through wetland area small orange seeps with oily surface might be AMD lower pH jump, a bit embedded	
1383	lots of debris and stable habitat	16	0	riffles are pretty good	20	0	was very good	15	sediment shows up at lower quarter past AMD	16	some areas doesnÆt flow bank to bank	18	looks good rail trail may have made some changes	19	0	plenty of riffles	6	8	14	LB- rail trail weak at some point, RB- geology provides good banks	8	8	both - high banks lacked vegetation	9	8	17	both - great trees	16.7	Optimal (16-20)	3/4 section very little human activity huge wetland left side lower quarter old rail trail parallels left bank for majority of reach	AMD at lower section
1393		0	0		0	0		0		0		0		0	0		0	0	12		0	0		0	0	12		12.0	Suboptimal (11-15)	urban sprawl area, lots of residents stream follows road on right bank atdistance of 50-100 yards one yard mowed up to banks at beginning. Path moves near stream but not weed wacked on banks, somewhat of a forested buffer infact. Embedded some bank erosi	
1401		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	4		5.0	Poor (0-5)	major residential enroachment altered by turnpike at bottom, minimal erosion due to being culverted for 2/3 of its length, lots of debris, smells bad, old silt fences	
1402		0	0		0	0		0		0		0		0	0		0	0	10		0	0		0	0	10		11.0	Suboptimal (11-15)	Mostly mowed fields, looks like old (inactive) pasture land, high banks, few trees, erosion, tiny buffer. saw fish, mostly muddy bottom, needs trees. Spoke with residents along stream, Verna and Bob Kubicek- concerned about flooding. Identified recreatio	
1402		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		11.0	Marginal (6-10)	Mostly mowed fields, looks like old/inactive pasture land, high banks, few trees, erosion, tiny buffer. Fish, mostly mud bottom, needs trees. Fields belong to Eisman's- mowing. Crep potential.	Spoke with Verna and Bob Kubicek, flooding problems. Stream runs through back yard. Riprapped last nov. Dredging. Road built to school 2 years ago. Toll road drainage. Lowes and School drainage. See notes attached to data sheet. Sent pictures as well.
1404		0	0		0	0		0		0		0		0	0		0	0	12		0	0		0	0	12		3.0	Poor (0-5)	mostly active ag. Rotational corn/hay, minimal erosion due to open canopy, culverted at bottom, channel is totally grown in with grass water flowing over small ag. Trib	
1409	sediment affects habitat	13	0	good amount of fine sediment	17	0	all present	11	some new bars less sed then last section upstream	16	reaches both banks mostly	15	sewage pipe affects	15	0	not bad god riffles	8	7	15	left- forest and rip rap stabilizes banks right- erosion areas in yards	8	6	left- not bad effected by sewage line right- yards mowed	7	4	11	left- would be better if wasnÆt for sewage line right- yards and road close	13.7	Suboptimal (11-15)	Rillton seaides al along right bank left bank primarly forested sediment issues and embededness sewage line affects cover from left bank forest and riparian zone	
1412		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	4		7.0	Marginal (6-10)	lots of residential truck parking lot right beside turn pike, culverted underground stabalized with cobble riparian rip-rap by turn pike almost no riparian zone sedimentary. Embedded, ph higher likely due to sewage from houses.	
1413		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		10.0	Marginal (6-10)	residential area lots of yards moving to bank cultevated pipe enters stinky!, some trees along portions not many gas pipline follows newly dug ditch where pipe goes to creek then under	
1414	Good Cobble- some woody debris	14	0	Riffles still somewhat embedded	18	0	All four present	11	Sed bards present	13		15	old railroad bed/rail trail parallels stream, gas lines and trails cross	17	0		6	6	12	Slips on left, healing over. High walls on right.	8	8	one section of mowed field, mostly forest/field/trees	7	6	13	Good buffer - rail trail, res and commerical affects the stream somewhat.	14.0	Suboptimal (11-15)	Forested at first, then field/pasture. Lots of algae, can't find a reason for elevated pH levels, rail trail follows for entire stretch, road not far off- route 136. Gas line crosses stream and four wheeler trail adds to sed loading	
1418	lots of LWD newfall and good amiunt of existing LWD	9	0	embedded in riffles	15	0	lacking slow deep	7	some new bar formation	16	fills channel	15	old bridge at beginning	16	0	good amount of riffle	6	5	11	left - high banks right - high erosion potential during floods	6	7	left - not much plant growth right - covered by vegitation has erosion potential	3	5	8	left - field pasture with small stretch of trees for buffer right - sewage treatment plant yard trimmed within 10ft of ftream	13.0	Suboptimal (11-15)	erosion along this stretch field pasture on left bank and forested on rightsediment filled and embedded lots of newfall accumulated in areas of large sediment bars sewage treatment on right at beginning effluence = 7.5 ph	agriculture erosion by recent flood events
1425		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		12.0	Suboptimal (11-15)	Stream had a very low flow. Res & Forest at top, active fields/pasture w/ cows at bottom. Yards cut up to stream. Some ag.	
1425		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		12.0	Suboptimal (11-15)	stream had very low flow res. At top active field pasture with cows at bottom. Yards cut up to stream some ag	
1426		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		7.0	Marginal (6-10)	residential areas some commercial very channalized AMD discharge at bottom iron stainning sig. mowed yards/ roads close pH 6.8, shoring structures extensive old culvert bridge channelization	
1429		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	8		5.0	Poor (0-5)	UNT follows close to road, huge issue from road, also has minimal spoil at driveways, multiple AMD seeps both iron and Al, some swamy areas, stream intermitten, some shading from culverted pipe, lots of trash AMD localized.	
1430	new fall present	13	0	some embeddedmess obviovs at obstructions	17	0	all present	10	new bar formations deposites at obstructions	17	water fills channel	13	actice bridge at beginning and old bridge in middle	16	0	riffles frequent	4	4	8	left - patches of erosion at pasture edge for most of stretch, right - sections of steep high banks unstable	5	6	left - grass in pasture and fields cropped to streams edge, right - railbed effects steep banks with little vegitation	3	5	8	left - good at first then pasture for rest of reach, right - road at distance railroad bed follows for good portion residents and trucking besides	12.0	Suboptimal (11-15)	at beginning sig. trib enters from left does not change streams ph. Active pasture on most of left bank. Fence just outside of stream. Right bank follows roadwith some forest residential and industrial (trucking) inbetween road and stream. Trib #1012 ent	ag. Runoff road runoff, long stretch of active erosion and very high banks
1435		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	6		3.0	Poor (0-5)	little UNT bed is dry, seems to drain quarry when running	
1439		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	4		9.0	Marginal (6-10)	industrial, farmland, wetland, abandoned strip mine, gass wells, pond in upper section, a few homes, heavy drain cutting at upper end, excessive amounts of sediments. Slight iron staining, gas well (GPS point), old industrial ponds, collasped culvert at	
1442	new fall present	0	12	minor embeddedness	16	0	all present	9	some new deposition	17	minimal amount exposed	14	only at bridge at bottom of reach with riprap	16	0	riffles and bends present	5	5	10	(LB) some erosion (RB) same	4	3	(LB) ag fields up to bank for large portion of reach (RB) same	3	1	4	(LB) ag fields up to stream one section of good fopested hill side (RB) little to no riparian zone due to ag fields	11.9	Suboptimal (11-15)	boarder ag fields on right and left stream banks. Residentioal at bottom, forested hillside o left bank in middle. Some eroded areas and sedimend throughout	agriculture and lack of riparian buffer / make good buffers
1451		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		10.0	Marginal (6-10)	Dry Channel, water held in 2 ponds at nursey/compost site business thing. Would otherwise flow through forested/residential area.	
1451		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		10.0	Marginal (6-10)	dry channel water help in ponds at nursery compost site flows through forest and residential area	
1455		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		10.0	Marginal (6-10)	old pasture not in use anymore, no canopy cover present, natural flow allowed	
1463	just barely acceptable as optimal	11	0	some areas close to 50% surrounded in riffles	16	0	not a lot of fast deep	10	lots of sed bars	15	some areas channel not full	12	long stablized section of gabion baslats. 3 bridges	15	0	good riffles weak bends	7	7	14	LB - banks somewhat high, RB - stablized with gabion baslats	7	8	LB - good vegetation, RB - vegetated	2	7	9	LB - road huges for entire stretchfield on other side of road, RB - old rail line and quarry in distance at top	13.3	Suboptimal (11-15)	stream flows along road for entire section, quarry upland on rught bank, residential, bridge, and old train bridge cross plus another bridge, stablized by gabion baskets near road for a portion of reach	Quarry - water cloudy making main stem sewickley cloudy when it dumps in , cloudy even above source of cloudyness not in this section
1473		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		11.0	Suboptimal (11-15)	mowed yard at top then wetland area at bottom some small sections of forest. "al's Yard" some guy told us. Sediment	
1474		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		10.0	Marginal (6-10)	Forested at a distance, but cleared and newly planted with grasses and trees right along stream channel. Weird residence at bottom. Muck waist deep. Tall grasses. Very slow flowing. Silty grey anerobic muck. Turbid. Nearly inaccesible due to muck.	
1474		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	14		13.0	Suboptimal (11-15)	some active agriculture at forest good buffers though. Road at a distance on right bank	
1474		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	10		10.0	Marginal (6-10)	silty grey muck turbid nearly inaccessable, forested at distance but cleared and newly replanted along stream, tall grasses	
1477		5	0		12	0		8		10		12		12	0		7	7	14		7	7		4	4	8		10.0	Marginal (6-10)	Abandoned fish hatchery acts as a dam and fish barrier	
1480		11	0		14	0		13		15		13		15	0		5	5	10		4	4		4	4	8		12.0	Suboptimal (11-15)		
1500	due to lack of canopy and woody debris	13	0	slight build up in riffles	14	0	lacking pools	12	sediment bars build up on edges	16	no concetrated flow	17	may have been effected by previous pasture quad trail	17	0	straight in pasture area	8	8	16	slight erosion on both	9	9	grass growth on both	6	7	13	LB- some residential, buffer good but no canopy cover/ RB- buffer good no canopy	14.9	Suboptimal (11-15)	posted property was able to walk into top and bottom but not far, seems to be old pasture allowing to grow back (possibly mowed occasionally)	sediment issues from up stream / better buffers (road side catchers)
1502	ground LWD. But 0 cobble and boulder habitat	3	0	gravel particles almost entirely submerged	8	0	no deep portion sediment filled	3	pools absent due to seiment	12	water mostly filling channel	14	several old culverts at bottom	10	0	down hill	8	8	16	Left - only small areas of erosion Right - erosion healed	6	6	left - knotweed present at bottom right -multiflora present entire reach	9	8	17	left - nice forested area right - road and houses but at distance most of stretch	10.0	Marginal (6-10)	entire trib AMD, AMD seeps through old mine enterance at source slightly above stream headwaters on map largh amount of sediment follows road at a distance top neart gasswell. Large bony pile at bottom. Wetlands at bottom. Powerlines cross abandoned hou	AMD and sedimentation
1512		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		13.0	Suboptimal (11-15)	Lots of posted signs- one says "Wildlife Refuge" See pictures. Fields, Farmland, and Forested area. Culverted under road. Cows fenced out of stream.	Some Sed, likely from Ag
1516		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		13.0	Suboptimal (11-15)	heavy residential near top, little ag, couple gass wells, open and mowed at bottom. Even with mowing there are trees over stream giving shade, has some erosion and sediment issues	
1520		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		13.0	Suboptimal (11-15)	Newer Development and some forested area. Some mowing. Not terrible. Some culverts.	
1521		0	0		0	0		0		0		0		0	0		0	0			0	0		0	0	12		13.0	Suboptimal (11-15)	Some res, near road, multiple culverts, under Rt 66, altered at top by Rt 66, Big portion recreationally mowed, Lowe's drains to this unt, saw fish, many yards mowed to edge of stream, many driveway culverts	
1527		16	0		13	0		13		13		18		17	0		7	7	14		9	9		9	9	18		15.0	Suboptimal (11-15)		

GIS_ID_WPC	NAME	ATTAINUSE	PROBLEM1	SEGID_WPC	Length	StrmName	Inv	Date	Time	Sheet	WeatNow	Weat24hrs	Rain7days
1001	Jacks Run	U	Unassessed	37702_7.96_8.36	0.4	Jack's Run	AV, PR	7/8/09	11:30 a	Yes	clear/ sunny	clear/sunny	No
1002	Slate Creek	U	Unassessed	37714_3.52_3.69	0.2	Slate Run	GS, MH	6/23/09	10:45 a	Yes	clear/ sunny	25% cloud cover	Yes
1004	Slate Creek	U	Unassessed	37714_0.8_1.08	0.3	Slate Run Main	GS, MH	6/23/09	3:00 p	Yes	clear/ sunny	25% cloud cover	Yes
1005	Trib 37710 To Jacks Run	U	Unassessed	37710_0.44_0.88	0.4	UNT to Jack's Run	AT, MH	6/12/09	10:45 a	Yes	100% cloud cover	storm (heavy rain)	Yes
1014	Jacks Run	U	Unassessed	37702_1.77_1.82	0.1	Jack's Run Main	AT	12/01/09	2:00	Yes			
1022	Coal Tar Run	U	Unassessed	37734_0_0.96	1.0	Jack's Run	BP, MK	6/26/09	10:30 a	Yes	100% cloud cover	storm (heavy rain)	Yes
1023	Trib 37707 Of Jacks Run	U	Unassessed	37707_0.56_1.44	0.9	UNT to Jack's Run	MK, CB	6/12/09	2:30 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1026	Trib 37736 To Jacks Run	U	Unassessed	37736_0_0.87	0.9	Jack's Run UNT	AV, MK	6/25/09	3:30 p	Yes	clear/ sunny	clear/sunny	Yes
1028	Trib 37717 To Slate Creek	U	Unassessed	37717_0_0.95	1.0	Slate Run	MK, CB	6/19/09	11:45 a	Yes	75% cloud cover	showers (intermittent)	Yes
1035	Trib 37728 To Jacks Run	U	Unassessed	37728_0.88_1.6	0.7	UNT to Jack's Run	AT, MH, SG	6/19/09	9:40 a	No	100% cloud cover	storm (heavy rain)	Yes
1037	Jacks Run	U	Unassessed	37702_2.72_3.53	0.8	Jack's Run	AV, MK	6/25/09	10:20 a	No	clear/ sunny	clear/sunny	Yes
1050	Trib 37740 Of Jacks Run	U	Unassessed	37740_0_0.64	0.6	Jack's Run UNT	AT, CB, SG	6/23/09	1:45 p	Yes	clear/ sunny	clear/sunny	Yes
1052	Trib 37730 Of Jacks Run	U	Unassessed	37730_0_1.03	1.0	UNT to Jack's Run	AT, MH, SG	6/19/09	11:55 a	Yes	showers (intermittent)	rain (steady rain)	Yes
1064	Jacks Run	U	Unassessed	37702_9.26_9.75	0.5	Jack's Run	AT, CTIS	7/8/09	11:02 a	Yes	clear/ sunny	clear/sunny	Yes
1065	Jacks Run	U	Unassessed	37702_7.27_7.71	0.4	Jack's Run UNT	AT, CB	6/26/09	11:45 a	No	100% cloud cover	storm (heavy rain)	Yes
1083	Trib 37743 To Jacks Run	U	Unassessed	37743_0.82_1.43	0.6	Jack's Run	BP, MK	6/26/09	2:30 p	No	100% cloud cover	storm (heavy rain)	Yes
1083	Trib 37743 To Jacks Run	U	Unassessed	37743_0.82_1.43	0.6	Jack's Run	AV, PR	7/8/09	11:10 a	Yes	clear/ sunny	clear/sunny	No
1085	Jacks Run	U	Unassessed	37702_5.01_5.53	0.5	Jack's Run	AV, MK	6/25/09	2:40 p	No	clear/ sunny	clear/sunny	Yes
1089	Jacks Run	U	Unassessed	37702_1.37_1.41	0.0	Jack's Run	AV, AT	6/9/09	2:30 p	No	50% cloud cover	showers (intermittent)	Yes
1090	Trib 37704 To Jacks Run	U	Unassessed	37704_0_1.29	1.3	UNT to Jack's Run	MK, CB	6/12/09	2:45 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1092	Trib 37746 Of Jacks Run	U	Unassessed	37746_0_0.69	0.7	UNT to Jack's Run	BP, MK, AT	6/26/09	2:15 p	Yes	75% cloud cover	75% cloud cover	No
1093	Trib 37747 To Jacks Run	U	Unassessed	37747_0.78_1.23	0.5	Jack's Run	AT, CB	6/26/09	2:34 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1102	Trib 37703 To Jacks Run	U	Unassessed	37703_0_0.55	0.6	UNT to Jack's Run	AT	12/01/09	12:45	Yes			
1106	Trib 37725 To Slate Creek	U	Unassessed	37725_0_0.67	0.7	Slate Run	MK, CB	6/19/09	2:45 p	Yes	clear/ sunny	showers (intermittent)	Yes
1112	Trib 37747 To Jacks Run	U	Unassessed	37747_0_0.78	0.8	Jack's Run UNT	AT, CB	6/26/09	2:58 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1113	Trib 37726 To Slate Creek	U	Unassessed	37726_0_0.63	0.6	Slate Creek UNT	AV, PR	6/23/09	10:45 s	No	clear/ sunny	50% cloud cover	Yes
1126	Trib 37723 To Slate Creek	U	Unassessed	37723_0_0.92	0.9	Slate Creek UNT	AV, PR	6/23/09	11:20 a	No	clear/ sunny	50% cloud cover	Yes
1127	Jacks Run	U	Unassessed	37702_1.82_2.5	0.7	Jack's Run	AV, MK	6/25/09	11:00 a	No	clear/ sunny	clear/sunny	Yes
1129	Jacks Run	U	Unassessed	37702_1.41_1.77	0.4	Jack's Run	AV, AT	6/9/09	2:30 p	No	50% cloud cover	showers (intermittent)	Yes
1137	Trib 37708 Of Jacks Run	U	Unassessed	37708_0_0.66	0.7	UNT to Jack's Run	MK, Cb	6/12/09	2:30 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1142	Trib 37743 To Jacks Run	U	Unassessed	37743_1.43_1.62	0.2	Jack's Run	MK, BP	6/26/09	2:30 p	No	100% cloud cover	storm (heavy rain)	Yes
1146	Trib 37712 To Jacks Run	U	Unassessed	37712_0_0.81	0.8	UNT to Jack's Run	AT, MH	6/12/09	1:30 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1155	Trib 37742 Of Jacks Run	U	Unassessed	37742_0_0.4	0.4	Jack's Run UNT	AT, CB	6/26/09	1:30 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1156	Trib 37721 To Slate Creek	U	Unassessed	37721_0_0.72	0.7	UNT to Slate Creek	AT, MH, SG	6/19/09	2:05 p	Yes	25% cloud cover	rain (steady rain)	Yes
1159	Jacks Run	U	Unassessed	37702_3.53_4.1	0.6	Jack's Run	AV, PR	6/23/09	2:15 p	Yes	clear/ sunny	50% cloud cover	Yes
1179	Trib 37713 To Jacks Run	U	Unassessed	37713_0_0.87	0.9	UNT to Jack's Run	AT, MH	6/12/09	2:00 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1180	Slate Creek	U	Unassessed	37714_0_0.8	0.8	Slate Creek	AV, PR	6/23/09	2:40 p	No	clear/ sunny	50% cloud cover	Yes
1185	Trib 37743 To Jacks Run	U	Unassessed	37743_1.62_2.07	0.5	UNT to Jack's Run	BP, MK	6/26/09	2:00 p	Yes	75% cloud cover	75% cloud cover	No
1188	Trib 37707 Of Jacks Run	U	Unassessed	37707_0_0.56	0.6	Jack's Run	CB, MK	6.12.09	10:30 a	No	100% cloud cover	storm (heavy rain)	Yes
1196	Trib 37729 Of Jacks Run	U	Unassessed	37729_0_0.45	0.5	UNT to Jack's Run	AT, MH, SG	6/19/09	10:40 a	No	showers (intermittent)	storm (heavy rain)	Yes
1197	Jacks Run	U	Unassessed	37702_7.01_7.27	0.3	Jack's Run UNT	AT, CB	6/26/09	9:36 a	No	100% cloud cover	storm (heavy rain)	Yes
1204	Trib 37726 To Slate Creek	U	Unassessed	37726_0.63_1.06	0.4	Slate Creek UNT	AV, PR	6/23/09	9:40 a	Yes	clear/ sunny	50% cloud cover	Yes
1208	Trib 37727 Of Slate Creek	U	Unassessed	37727_0_0.35	0.4	Slate Creek UNT	AV, PR	6/23/09	10:00 a	Yes	clear/ sunny	50% cloud cover	Yes
1209	Trib 37720 To Slate Creek	U	Unassessed	37720_0_0.67	0.7	UNT to Slate Run	MH, AT, SG	6/19/09	2:40 p	Yes	25% cloud cover	storm (heavy rain)	Yes
1216	Trib 37741 To Jacks Run	U	Unassessed	37741_0_0.74	0.7	Jack's Run UNT	AT, CB	6/26/09	11:30 a	Yes	100% cloud cover	storm (heavy rain)	Yes
1218	Trib 37706 To Jacks Run	U	Unassessed	37706_0_1.1	1.1	Jack's Run	CB, MK	6/12/09	10 a	No	100% cloud cover	storm (heavy rain)	Yes
1235	Trib 37706 To Jacks Run	U	Unassessed	37706_1.1_1.65	0.6	UNT to Jack's Run	CB, MK	6/12/09	1:00 p	No	100% cloud cover	storm (heavy rain)	Yes
1248	Trib 37748 Of Jacks Run	U	Unassessed	37748_0_0.22	0.2	Jack's Run UNT	AT, CB	6/26/09	12:48 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1251	Jacks Run	U	Unassessed	37702_5.53_5.77	0.2	Jack's Run	AV, MK	6/25/09	2:40 p	No	clear/ sunny	clear/sunny	Yes
1254	Trib 37739 To Jacks Run	U	Unassessed	37739_0.24_0.89	0.7	Jack's Run UNT	AT, CB, SG	6/23/09	2:40 p	Yes	clear/ sunny	clear/sunny	Yes
1255	Zellers Run	U	Unassessed	37732_0_1.63	1.6	Zellers Run (trib to Jack's Run)	BP, MK	6/26/09	10:00 a	No	100% cloud cover	storm (heavy rain)	Yes
1269	Trib 37737 To Jacks Run	U	Unassessed	37737_0_1.07	1.1	Jack's Run UNT	AV, MK	6/25/09	3:45 p	Yes	clear/ sunny	clear/sunny	Yes
1276	Trib 37710 To Jacks Run	U	Unassessed	37710_0_0.44	0.4	UNT to Jack's Run	AT, MH	6/12/09	9:45 a	No	100% cloud cover	storm (heavy rain)	Yes
1277	Trib 37715 To Slate Creek	U	Unassessed	37715_0_1.08	1.1	Slate Run	MK, CB	6/19/09	11:10 a	No	100% cloud cover	rain (steady rain)	Yes
1284	Slate Creek	U	Unassessed	37714_2.81_3.52	0.7	Slate Run	GS, MH	6/23/09	11:30 a	No	clear/ sunny	25% cloud cover	Yes
1285	Trib 37729 Of Jacks Run	U	Unassessed	37729_0.45_1.12	0.7	UNT to Jack's Run	AT, MH, SG	6/19/09	11:25 a	No	showers (intermittent)	rain (steady rain)	Yes
1307	Trib 37743 To Jacks Run	U	Unassessed	37743_0_0.82	0.8	Jack's Run	BP, MK	6/26/09	1:00 p	No	75% cloud cover	75% cloud cover	No
1316	Trib 37705 To Jacks Run	U	Unassessed	37705_0_0.96	1.0	Jack's Run UNT	AT, AV	6/9/09	3:00 p	Yes	75% cloud cover	showers (intermittent)	Yes
1318	Trib 37738 Of Jacks Run	U	Unassessed	37738_0_0.21	0.2	UNT to Jack's Run	AV, MK (AT 12-01-09)	06/25/09	3:45	Yes	clear/ sunny	clear/sunny	
1324	Slate Creek	U	Unassessed	37714_1.9_2.56	0.7	Slate Run	GS, MH	6/23/09	2:00 p	No	clear/ sunny	25% cloud cover	Yes
1325	Slate Creek	U	Unassessed	37714_4.87_6	1.1	Slate Run	MK, CB	6/19/09	2:00 p	No	clear/ sunny	showers (intermittent)	Yes
1327	Trib 37744 Of Jacks Run	U	Unassessed	37744_0_0.57	0.6	Jack's Run	AV, PR	7/8/09	11:00 a	Yes	clear/ sunny	clear/sunny	No
1334	Trib 37745 Of Jacks Run	U	Unassessed	37745_0_0.57	0.6	Jack's Run	BP, MK	6/26/09	2:35 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1350	Coal Tar Run	U	Unassessed	37734_0.96_1.67	0.7	Jack's Run	MK, BP	6/26/09	11:30 a	Yes	100% cloud cover	storm (heavy rain)	Yes
1351	Trib 37737 To Jacks Run	U	Unassessed	37737_1.07_1.61	0.5	Jack's Run UNT	AV, MK	6/25/09	3:45 p	Yes	clear/ sunny	clear/sunny	Yes
1352	Trib 37724 To Slate Creek	U	Unassessed	37724_0_1.16	1.2	Slate Creek UNT	AT, CB, SG	6/23/09	10:30 a	Yes	clear/ sunny	clear/sunny	Yes
1353	Slate Creek	U	Unassessed	37714_3.69_4.16	0.5	Slate Run	GS, MH	6/23/09	10:15 a	No	clear/ sunny	25% cloud cover	Yes
1360	Slate Creek	U	Unassessed	37714_4.69_4.87	0.2	Slate Run	MK, CB	6/19/09	2:45 p	Yes	clear/ sunny	storm (heavy rain)	Yes
1364	Jacks Run	U	Unassessed	37702_8.96_9.26	0.3	Jack's Run	AT, CTIS	7/8/09	11:52 a	Yes	clear/ sunny	clear/sunny	Yes
1372	Jacks Run	U	Unassessed	37702_8.36_8.96	0.6	Jack's Run	AV, PR	7/8/09	11:45 a	Yes	clear/ sunny	clear/sunny	No
1381	Trib 37750 To Jacks Run	U	Unassessed	37750_0_0.91	0.9	Jack's Run UNT	AT, CTIS	7/8/09	10:15 a	Yes	clear/ sunny	clear/sunny	Yes
1391	Trib 37729 Of Jacks Run	U	Unassessed	37729_1.12_1.62	0.5	UNT to Jack's Run	AT, MH, SG	6/19/09	11:25 a	Yes	showers (intermittent)	rain (steady rain)	Yes
1394	Trib 37731 Of Jacks Run	U	Unassessed	37731_0_0.41	0.4	UNT to Jack's Run	AT, MH, SG	6/19/09	11:20 a	Yes	showers (intermittent)	rain (steady rain)	Yes
1398	Jacks Run	U	Unassessed	37702_2.5_2.72	0.2	Jack's Run	AV, MK	6.25.09	10:45 a	No	clear/ sunny	clear/sunny	Yes
1405	Trib 37739 To Jacks Run	U	Unassessed	37739_0_0.24	0.2	Jack's Ru UNT	AT, CB	6/26/09	10:30 a	Yes	100% cloud cover	storm (heavy rain)	Yes
1410	Trib 37728 To Jacks Run	U	Unassessed	37728_0_0.88	0.9	Jack's Run UNT	AT, MH	6/12/09	3:00 p	No	100% cloud cover	storm (heavy rain)	Yes
1417	Trib 37749 To Jacks Run	U	Unassessed	37749_0_0.79	0.8	Jack's Run	AT, CTIS	7/8/09	11:39 a	Yes	clear/ sunny	clear/sunny	Yes
1419	Slate Creek	U	Unassessed	37714_1.77_1.9	0.1	Slate Run	GS, MH	6/23/09	2:15 p	Yes	clear/ sunny	25% cloud cover	Yes
1421	Trib 37706 To Jacks Run	U	Unassessed	37706_1.65_2.42	0.8	UNT to Jack's Run	CB, MK	6/12/09	1:30 p	Yes	100% cloud cover	storm (heavy rain)	Yes
1423	Jacks Run	U	Unassessed	37702_0_1.23	1.2	Jack's Run Mouth	AT, AV	6/9/09	2:10 p	No	75% cloud cover	showers (intermittent)	Yes
1434	Jacks Run	U	Unassessed	37702_4.1_5.01	0.9	Jack's Run	AV, MK	6/25/09	2:25 p	No	clear/ sunny	clear/sunny	Yes
1440	Trib 37709 Of Jacks Run	U	Unassessed	37709_0_1.02	1.0	UNT to Jack's Run	CB, MK	6/12/09	2:00 p	Yes	100% cloud cover	storm (heavy rain)	Yes

1444	Trib 37741 To Jacks Run	U	Unassessed	37741_0.74_1.66	0.9	Jack's Run	AT, CB	6/26/09	2:20 p	Yes	100% cloud cover	storm (heavy rain)	Yes	65	Perennial	Spring-fed		20	40	0	0	0	40	0	0	Type of other landuse	Some potential sources	None	Low			3		Shaded	0	0	0	0	0	0					DRY	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		11	Suboptimal (11-15)	lower 1/4 lots of mowed yards, upper 3/4 some homes, little pasture, overgrown fields, some forested, fair buffers- bad at bottom, good at top; trib is dry- but looks as though it gets high flows after storms	
1446	Trib 37722 To Slate Creek	U	Unassessed	37722_0_1.15	1.2	Slate Creek UNT	AT, CB, SG	6/23/09	11:50 a	Yes	clear/ sunny	clear/sunny	Yes	75	Perennial	Spring-fed		20	0	0	60	0	20	0	0	Type of other landuse	Some potential sources	None	Low			4		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		6	Marginal (6-10)	forest at top, commercial- middle(all culverted) to bottom, enters culvert under Burlington store, fair buffers- good at top, culverted at bottom	
1458	Jacks Run	U	Unassessed	37702_5.77_6.66	0.9	Jack's Run	AV, MK	6/25/09	2:50 p	No	clear/ sunny	clear/sunny	Yes	85	Perennial	Spring-fed	Warm water	0	0	0	50	0	50	0	0	Type of other landuse	Some potential sources	Minimal	Medium	Shrubs	knotweed	25	Moderate	Open	15	85	0	1	1	1	None	Attached Algae	green	100	8.3	Clear	Normal/None	None	Fair	Development	N/A	0	0	5	75	10	10	0	0	0	0	2		6	0		8	0		12		10		0	channelized and underground at football field	4	0	few	9	9	18	banks stable from concrete	2	2		2	2	4		7	Marginal (6-10)	still channelized, knotweed, few trees, res/industrial, underground by Offut Field	urban development
1460	Slate Creek	U	Unassessed	37714_4.2_4.69	0.5	Slate Run	GS, MH	6/23/09	9:45 a	No	clear/ sunny	25% cloud cover	Yes	65	Perennial	Spring-fed	Warm water	50	20	0	10	0	20	0	0	Type of other landuse	Some potential sources	Minimal	Medium			8-10	Moderate	Mostly Shaded	35	35	30	0	0	1	Minimal	None			8.1	Clear	Normal/None	None	Good		N/A	0	10	40	30	10	10	0	0	0	0	15		16	0		18	0		7	lots of sediment bars	11	has moments of each, majority has issues filling	14	culverts	18	0		8	8	16		7	8	some residental	7	7	14	few spots residental/commercial	13	Suboptimal (11-15)	located near Route 30, culverted, forest/residental, few drainage UNT's	sediment issues, road drainage
1472	Slate Creek	U	Unassessed	37714_2.56_2.81	0.3	Slate Creek	MH, GS	6/23/09	12:00 p	Yes	clear/ sunny	25% cloud cover	Yes	70	Perennial	Spring-fed		25	0	0	0	0	75	0	0	Type of other landuse	Some potential sources	None	Low			12		Mostly Shaded	0	0	0	0	0	0					7.8	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		13	Suboptimal (11-15)	active channelization, lots of res, no culverts, fair buffers	1472
1481	Trib 37716 To Slate Creek	U	Unassessed	37716_0_0.67	0.7	UNT to Slate Creek	AV, PR	6/19/09	10:00 A	Yes	100% cloud cover	50% cloud cover	Yes	70	Perennial	Spring-fed		40	0	0	0	0	40	20	0	Type of other landuse	Some potential sources	None	Low			5		Mostly Open	0	0	0	0	0	0					8.05	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		13	Suboptimal (11-15)	headwaters in residental, scrub/brush some forest, good cover and shading, ends in wetland, fari buffers, sediment moved from recent heavy rains	
1483	Trib 37719 To Slate Creek	U	Unassessed	37719_0_0.58	0.6	Slate Creek UNT	AV, PR	6/23/09	1:45 p	Yes	clear/ sunny	50% cloud cover	Yes	75	Perennial	Spring-fed		50	0	0	0	0	50	0	0	Type of other landuse	Some potential sources	None	High			3		Mostly Shaded	0	0	0	0	0	0					8.1	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		12	Suboptimal (11-15)	starts in forest, ends in res housing development. High flood damage potential at lower end. Fair buffers- forest good, res fair	
1486	Jacks Run	U	Unassessed	37702_6.66_7.01	0.4	Jack's Run	AV, MK	6/25/09	3:00 p	No	clear/ sunny	clear/sunny	Yes	85	Perennial	Spring-fed	Warm water	0	0	0	10	80	10	0	0	Type of other landuse	Some potential sources	Minimal	Medium	Shrubs	knotweed	15	Moderate	Mostly Open	25	40	35	1	1	1	None	Attached Algae	green		8.1	Slightly Turbid	Normal/None	None	Fair	Development	N/A	0	0	35	20	25	20	0	0	0	0	11		6	0		13	0		8		15		14	past alteration	10	0		8	8	16	some erosion in park	7	6		5	2	7	mowed up to bank (RB)	11	Suboptimal (11-15)	flows through Lynch Field Park, some shade, past habitat projects (SCWA), knotweed	development & mowing
1487	Trib 37711 Of Jacks Run	U	Unassessed	37711_0_1.01	1.0	UNT to Jack's Run	AT, MH	6/12/09	11:15 a	No	100% cloud cover	storm (heavy rain)	Yes	70	Perennial	Spring-fed	Warm water	50	25	0	0	0	25	0	0	Type of other landuse	Some potential sources	Moderate	None	Trees	mixed hardwoods	5	Moderate	Mostly Shaded	45	35	30	0	0	1	None	None			7.7	Slightly Turbid	Normal/None	None	Good		N/A	0	0	10	30	30	30	0	0	0	0	15	sediment issues from road	14	0		18	0		12	patchy sediment bars	14	doesn't fill entire channel in places	14	culverts	18	0		6	6	12	repaired road w. riprap	7	7	good vegetation for most, occasional mowed areas	7	3	10	road represents bank (RB)	14	Suboptimal (11-15)	culverts (several), several new homes built (middle of reach), road parallels almost entire section	sediment issues from rural roads and culverts
1493	Trib 37733 To Jacks Run	U	Unassessed	37733_0_0.94	0.9	Jack's Run UNT	AV, MK	6/25/09	3:15 p	Yes	clear/ sunny	clear/sunny	Yes	90	Perennial	Spring-fed		0	0	0	25	0	75	0	0	Type of other landuse	Some potential sources	None	Low			10		Open	0	0	0	1	1	1					8.0	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		3	Poor (0-5)	residential/some commercial, channelized near mouth w/ Jack's Run; channel flow status- heavy sediment & debris deposits in non-concrete channel (headwaters); stream barely flowing b/c debris; concrete channels & dam; mowed to bank in res areas; poor buff	
1501	Trib 37718 To Slate Creek	U	Unassessed	37718_0_1.11	1.1	Slate Run	MK, CB	6/19/09	12:00 p	Yes	50% cloud cover	showers (intermittent)	Yes	65	Perennial	Spring-fed		0	0	0	0	0	100	0	0	Type of other landuse	Some potential sources	None	Low			7		Mostly Shaded	0	0	0	0	0	1					7.6	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		7	Marginal (6-10)	heavily channelized, erosion issues, residental area, culverted- piped underground, poor buffers	
1507	Trib 37735 To Coal Tar Run	U	Unassessed	37735_0_0.83	0.8	Jack's Run	BP, MK	6/26/09	11:00 a	Yes	100% cloud cover	storm (heavy rain)	Yes	75	Perennial	Spring-fed		0	5	0	0	0	95	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					8.0	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		7	Suboptimal (11-15)	poor buffers, piped underground 1/4 mile	
1515	Slate Creek	U	Unassessed	37714_1.08_1.77	0.7	Slate Run	GS, MH	6/23/09	2:45 p	No	clear/ sunny	25% cloud cover	Yes	80	Perennial	Spring-fed	Warm water	40	0	0	60	0	0	0	0	Type of other landuse	Some potential sources	Moderate	Low	Grasses		17	Moderate	Mostly Shaded	30	30	40	0	0	0	Minimal	None			7.9	Slightly Turbid	Normal/None	None	Good		N/A	0	0	35	25	20	20	0	0	0	0	12	mostly groomed in upper	12	0		17	0		11	significant deposition	15		15	Pitt-Greensburg	17	0		8	8	16	some man-made	6	6	upper poor	6	6	12	see above	14	Suboptimal (11-15)	UPG campus, plus residental in upper section, lower section mostly forested, trimmed banks	development
1517	Jacks Run	U	Unassessed	37702_7.71_7.96	0.3	Jack's Run	AV, PR	7/8/09	11:20 a	Yes	clear/ sunny	clear/sunny	No	71	Perennial	Spring-fed		0	0	55	0	0	45	0	0	Type of other landuse	Some potential sources	None	Low			8		Mostly Shaded	0	0	0	0	0	0					8.18	Clear	Normal/None	None			N/A	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0		0	0	0		15	Suboptimal (11-15)	flows under Rt 119, some res/ag (corn), residences on one side, very short section, fair buffers	
1519	Jacks Run	U	Unassessed	37702_1.23_1.37	0.1	Jack's Run	AV, AT	6/9/09	2:30 p	No	50% cloud cover	showers (intermittent)	Yes	80	Perennial	Spring-fed	Warm water	0	0	0	75	25	0	0	0	Type of other landuse	Some potential sources	None	None	Shrubs	knotweed	20	Moderate	Open	10	90	0	1	0	0	None	Attached Algae	green fuzzy	50	7.2	Turbid	Normal/None	None	Poor	AMD	N/A	0	10	20	30	20	20	0	0	0	0	7	overhanging veg gives little cover	10	0	long, straight, shallow	5	0	dominated by run	15	sediment issues below this section	16		4	straight with roads on both sides	4	0	straight and run only	9	9	18	little potential for erosion	7	7	all covered, but by knotweed	1	1	2	roads on both sides	10	Marginal (6-10)	section from post office center and Firestone complex	AMD and channelization

GIS_ID_WPC	NAME	ATTAINUSE	PROBLEM1	USE_	SEGID_WPC	Length	StrmName	Inv	Date	Time	Sheet	WeatNow	Weat24hrs	Rain7days	AirTemp
1006	Trib 37797 Of Sewickley Creek	U	Unassessed		37797_0.1_0.61	0.51	Sewickley, North Fork	AV, AT, PR	04/17/09	10:45	Yes	clear/sunny	clear/sunny	Yes	55
1008	Boyer Run	U	Unassessed		37763_3.34_3.82	0.48	Boyer Run UNT	PR, MH	6/3/09	10:20 a	Yes	showers (intermittent)	75% cloud cover	Yes	60
1013	Trib 37796 To Sewickley Creek	U	Unassessed		37796_3.62_3.99	0.37	Sewickley (North Fork)	AT, CB	5/12/09	2:10 p	Yes	clear/sunny	75% cloud cover	Yes	65
1019	Township Line Run	U	Unassessed		37752_0.74_1.94	1.20	Sewickley (Upper)	AT, CB, GS, MH	6/2/09	2:00 P	Yes	75% cloud cover	50% cloud cover	Yes	60
1025	Trib 37786 To Welty Run	U	Unassessed		37786_0.52_0.96	0.44	Welty Unt	AV, AT, BP, MK	03/20/09	10:30	No	75% cloud cover	clear/sunny	No	35
1029	Trib 37827 To Sewickley Creek	U	Unassessed		37827_0_0.43	0.43	Sewickley (headwaters)	AV, BP, AT	3/31/09	9:00 a	Yes	clear/sunny	showers (intermittent)	Yes	35
1030	Trib 37796 To Sewickley Creek	U	Unassessed		37796_1.97_2.37	0.40	Sewickley, North Fork	AT, AV, PR	04/17/09	12:30	No	clear/sunny	clear/sunny	Yes	50
1034	Trib 37796 To Sewickley Creek	U	Unassessed		37796_0.82_0.96	0.14	North Fork	AT, AV, PR	04/17/09	10:15	Yes	clear/sunny	clear/sunny	Yes	50
1038	Township Line Run	U	Unassessed		37752_2.73_3.34	0.61	Sewickley (Upper)	GS, MH	6/2/09	1:00 p	Yes	75% cloud cover	50% cloud cover	Yes	60
1040	Sewickley Creek	U	Unassessed		37556_23.18_23.87	0.69	Sewickely Main	PR, CB, MH, AT	5/15/09	11:00 a	No	clear/sunny	showers (intermittent)	Yes	60
1041	Sewickley Creek	U	Unassessed		37556_23.87_24.88	1.01	Sewickley Main	PR, CB, AT, MH	5/15/09	10:10 a	No	clear/sunny	showers (intermittent)	Yes	60
1042	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_3.3_4.57	1.27	Welty	MK, AT, AV, BN	03/5/2009	9:30:00 AM	No	clear/sunny	clear/sunny	No	35
1049	Trib 37811 Of Sewickley Creek	U	Unassessed		37811_0_0.32	0.32	Sewickley (North Fork)	AT, CB	5/12/09	10:00 a	Yes	clear/sunny	50% cloud cover	Yes	50
1055	Trib 37771 To Brinker Run	U	Unassessed		37771_0_0.93	0.93	UNT to Brinker Run	AT, AV	5.29.09	10:30 a	Yes	rain (steady rain)	100% cloud cover	Yes	60
1056	Boyer Run	U	Unassessed		37763_1.67_1.96	0.29	Boyer Run	AT, CB	6/3/09	1:30 p	No	showers (intermittent)	50% cloud cover	Yes	65
1057	Trib 37778 Of Welty Run	U	Unassessed		37778_0.4_0.87	0.47	Upper Sewickley UNT	AV, CB, MH	7/23/09	3:30 p	Yes	50% cloud cover	showers (intermittent)	Yes	75
1062	Trib 37783 To Welty Run	U	Unassessed		37783_0_1.05	1.05	Welty UNT	AT, AV	6/9/09	9:30 A	Yes	100% cloud cover	showers (intermittent)	Yes	75
1066	Trib 37757 To Township Line Run	U	Unassessed		37757_0_0.5	0.50	UNT Township Line Run	AT, CB	6/2/09	12:30 p	Yes	75% cloud cover	clear/sunny	Yes	70
1067	Trib 37772 To Brinker Run	U	Unassessed		37772_0_0.09	0.09	UNT to Brinker Run	AT, AV	5/29/09	1;30 p	Yes	rain (steady rain)	100% cloud cover	Yes	60
1069	Trib 37796 To Sewickley Creek	U	Unassessed		37796_0.96_1.28	0.32	Sewickley, North Fork	AT, AV, PR	04/17/09	2:00	No	clear/sunny	clear/sunny	Yes	65
1072	Trib 37784 To Welty Run	U	Unassessed		37784_0_0.65	0.65	Welty Run	AT	03/13/09	2:15	Yes	clear/sunny	50% cloud cover	No	40
1073	Sewickley Creek	U	Unassessed		37556_26.02_26.48	0.46	Sewickley	AT, MH	5.13.09	10:30 a	No	50% cloud cover	clear/sunny	Yes	55
1075	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_4.57_5.38	0.81	Welty Run	AT, MK	02/17/2009	1:00	No	50% cloud cover	75% cloud cover	No	35
1077	Sewickley Creek	U	Unassessed		37556_25.09_25.92	0.83	Sewickely Main	AT, MH	5/13/09	12:30 p	No	clear/sunny	clear/sunny	Yes	60
1078	Trib 37760 Of Township Line Run	U	Unassessed		37760_0_0.36	0.36	Sewickley Upper	GS, MH	6/2/09	10:10 a	Yes	clear/sunny	showers (intermittent)	Yes	60
1079	Trib 37817 Of Sewickley Creek	U	Unassessed		37817_0_0.45	0.45	Sewickley (North Fork)	AT, CB	5/12/09	2:15 p	Yes	clear/sunny	75% cloud cover	Yes	65
1080	Trib 37796 To Sewickley Creek	U	Unassessed		37796_3.47_3.62	0.15	Sewickley (north fork)	AT, CB	5/12/09	2:10 p	Yes	clear/sunny	75% cloud cover	Yes	65
1081	Brinker Run	U	Unassessed		37769_1.57_2.01	0.44	Brinker Run	AT, AV	5/29/09	1:30 p	No	rain (steady rain)	100% cloud cover	Yes	60
1087	Trib 37804 Of Sewickley Creek	U	Unassessed		37804_0.32_0.81	0.49	Sewickley (North Fork)	AT, CB	5/12/09	1:15 p	No	clear/sunny	75% cloud cover	Yes	60
1091	Sewickley Creek	U	Unassessed		37556_28.75_29.2	0.44	Sewickley Headwaters	AT, BP, AV	03/31/09	9:50	No	clear/sunny	showers (intermittent)	Yes	40
1096	Trib 37777 To Welty Run	U	Unassessed		37777_0_0.7	0.70	UNT Welty Run	AT, TS	4/13/10	1:18 PM	Yes	100% cloud cover	75% cloud cover	No	50
1098	Trib 37819 To Sewickley Creek	U	Unassessed		37819_0_0.36	0.36	Sewickley Main UNT	AV, BP, AT	3/31/09	2:15 p	Yes	clear/sunny	showers (intermittent)	Yes	55
1099	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_18.34_19.41	1.07	Mid Sewickley Creek	RH, MK	4/1/10	9:30 AM	No	clear/sunny	clear/sunny	No	50
1104	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_21.58_22.4	0.82	Sewickely Main	AT, MH, AV	6/4/09	10:20 a	No	100% cloud cover	showers (intermittent)	Yes	60
1105	Trib 37766 To Boyer Run	U	Unassessed		37766_0_0.39	0.39	Boyer Run UNT	CB, AT	6/3/09	10:30 a	Yes	showers (intermittent)	50% cloud cover	Yes	70
1110	Sewickley Creek	U	Unassessed		37556_29.2_29.68	0.48	sewickley headwaters	AV, BP, AT	03/31/09	9:30	No	clear/sunny	showers (intermittent)	Yes	35
1114	Trib 37796 To Sewickley Creek	U	Unassessed		37796_2.37_2.76	0.39	Sewickley	AT, MH	5/13/09	9:00 a	No	clear/sunny	clear/sunny	Yes	55
1118	Township Line Run	U	Unassessed		37752_0_0.74	0.74	Township Line Run	AT, CB	6/2/09	2:00 p	No	75% cloud cover	clear/sunny	Yes	70
1120	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_0_0.39	0.39	Welty Run	AT, MK, BP, AV	03/20/09	1:30	No	75% cloud cover	clear/sunny	No	32
1130	Trib 37821 To Sewickley Creek	U	Unassessed		37821_0_0.38	0.38	Sewickley	AV, BP, AT	3/31/09	12:45 p	Yes	clear/sunny	showers (intermittent)	Yes	45
1131	Trib 37820 Of Sewickley Creek	U	Unassessed		37820_0_0.33	0.33	Sewickley Main UNT	AT, AV, BP	3/31/09	2:15 p	Yes	clear/sunny	showers (intermittent)	Yes	55
1144	Trib 37808 Of Sewickley Creek	U	Unassessed		37808_0_0.64	0.64	Sewickley (North Fork)	AT, CB	5/12/09	1:00 p	Yes	clear/sunny	75% cloud cover	Yes	60
1147	Trib 37802 Of Sewickley Creek	U	Unassessed		37802_0.69_1.09	0.40	Seiwckley (North Fork)	AT, CB	5/12/09	2:45 p	Yes	clear/sunny	75% cloud cover	Yes	65
1149	Sewickley Creek	U	Unassessed		37556_27.82_28.32	0.50	Sewickley Headwaters	AV, AT, BP	03/31/09	1:00	No	clear/sunny	showers (intermittent)	Yes	50
1150	Trib 37796 To Sewickley Creek	U	Unassessed		37796_0_0.82	0.82	Sewickley-North Fork	AT, AV, PR	04/17/09	10:30	No	clear/sunny	clear/sunny	Yes	50
1151	Trib 37768 To Sewickley Creek	U	Unassessed		37768_0_0.91	0.91	UNT Sewickley Main	AT, PR, CB, MH	5/15/09	11:40 a	Yes	clear/sunny	showers (intermittent)	Yes	65
1154	Trib 37777 To Welty Run	U	Unassessed		37777_1.22_1.56	0.34	Welty Run UNT	AV, AT	6/9/09	10:30 a	Yes	100% cloud cover	showers (intermittent)	Yes	75
1160	Trib 37755 To Township Line Run	U	Unassessed		37755_0_0.4	0.40	UNT to Township Line Run	AT, CB	6/2/09	1:00 p	Yes	75% cloud cover	clear/sunny		
1161	Trib 37824 Of Sewickley Creek	U	Unassessed		37824_0_0.37	0.37	Sewickley (headwaters)	AV, BP, AT	3/31/09	11:15 a	Yes	clear/sunny	showers (intermittent)	Yes	40
1162	Sewickley Creek	U	Unassessed		37556_23.05_23.18	0.12	Sewickley Main	AT, CB, PR, MH	5/15/09	11:30 a	No	clear/sunny	showers (intermittent)	Yes	65
1172	Trib 37803 Of Sewickley Creek	U	Unassessed		37803_0_0.09	0.09	Sewickley (North Fork)	AT, CB	5/12/09	2:45 p	Yes	clear/sunny	75% cloud cover	Yes	65
1181	Trib 37774 To Sewickley Creek	U	Unassessed		37774_0_0.48	0.48	Sewickley Main	AT, MH	5/15/09	11:00 a	Yes	clear/sunny	50% cloud cover	Yes	60
1183	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_5.95_7.24	1.29	Welty Run	AT, KH, BN	12/30/2008	12:30:00 PM	No	75% cloud cover	50% cloud cover	Yes	35
1191	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_2.11_2.26	0.15	Welty	AT, BN, MK, AV	03/5/2009	2:30:00 PM	No	clear/sunny	clear/sunny	No	35
1193	Sewickley Creek	U	Unassessed		37556_28.49_28.75	0.26	Sewickley headwaters	AV, BP, AT	03/31/09	11:40	No	clear/sunny	showers (intermittent)	Yes	40
1205	Township Line Run	U	Unassessed		37752_4.1_4.71	0.61	Township Line Run	AT, CB	6/2/09	11:20 a	No	75% cloud cover	clear/sunny	Yes	70
1206	Trib 37805 Of Sewickley Creek	U	Unassessed		37805_0_0.56	0.56	Sewickley (North Fork)	AT, AV, PR	4/17/09	2:00 p	No	clear/sunny	clear/sunny	No	65
1210	Trib 37756 To Township Line Run	U	Unassessed		37756_0_0.71	0.71	UNT to Township Line Run	AT, CB	6/2/09	12:45 p	Yes	75% cloud cover	clear/sunny	Yes	75
1211	Brinker Run	U	Unassessed		37769_1_1.57	0.57	Brinker Run	AT, AV	5/29.09	3:00 p	No	showers (intermittent)	100% cloud cover	Yes	60
1212	Trib 37790 To Welty Run	U	Unassessed		37790_0_0.92	0.92	Welty Run	AT, MK	03/13/09	2:52	No	clear/sunny	50% cloud cover	No	45
1213	Trib 37807 Of Sewickley Creek	U	Unassessed		37807_0_1.31	1.31	Sewickley (North Fork)	AT, CB (5/12); AT, MK (4/30)	4/30/09 & 5/12/09	11:00 a	No	50% cloud cover	50% cloud cover	Yes	60
1214	Trib 37826 To Sewickley Creek	U	Unassessed		37826_0_0.84	0.84	Sewickley (headwaters)	AV, BP, AT	3/31/09	9:50 a	Yes	clear/sunny	showers (intermittent)	Yes	35
1219	Brinker Run	U	Unassessed		37769_2.71_3.5	0.79	Brinker Run	AV, AT	5/29/09	11:00 A	Yes	rain (steady rain)	100% cloud cover	Yes	60
1220	Sewickley Creek	U	Unassessed		37556_28.32_28.49	0.16	Sewickley, headwaters	AV, BP, AT	03/31/09	11:40	No	clear/sunny	showers (intermittent)	Yes	40
1223	Sewickley Creek	U	Unassessed		37556_27.75_27.82	0.07	Sewickley Headwaters	AV, AT, BP	03/31/09	1:00	No	clear/sunny	showers (intermittent)	Yes	50
1224	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_3.01_3.3	0.29	Welty Run	AT, BN, MK, AV	03/5/2009	12:15	No	clear/sunny	clear/sunny	No	35
1227	Trib 37753 To Township Line Run	U	Unassessed		37753_0_0.48	0.48	Township Line Run	AT, CB	6/2/09	2:00 p	Yes	75% cloud cover	clear/sunny	Yes	75
1229	Trib 37792 To Welty Run	U	Unassessed		37792_0_0.4	0.40	Welty Run	AT, MK	02/17/2009	1:00	No	50% cloud cover	75% cloud cover	No	35
1232	Township Line Run	U	Unassessed		37752_2.43_2.73	0.30	Sewickley (Upper)	GS, MH	6/2/09	1:15 p	Yes	75% cloud cover	50% cloud cover	Yes	60
1240	Trib 37785 To Welty Run	U	Unassessed		37785_0_0.61	0.61	UNT to Welty Run	AT, AV, BN, MK	03/05/09	1:15	Yes	clear/sunny	clear/sunny	No	50
1244	Trib 37786 To Welty Run	U	Unassessed		37786_0_0.52	0.52	Welty Run UNT	AV, BP, MK, AT	03/20/09	11:00	No	75% cloud cover	clear/sunny	No	32
1256	Trib 37789 To Welty Run	U	Unassessed		37789_0_1.15	1.15	Welty Run	AT, BN, MK, AV	03/5/2009	12:00:00 PM	No	clear/sunny	clear/sunny	No	35
1264	Trib 37795 To Sewickley Creek	U	Unassessed		37795_0_0.62	0.62	Sewickley Main	AT, MH	5/13/09	11;20 a	Yes	50% cloud cover	clear/sunny	Yes	55
1271	Township Line Run	U	Unassessed		37752_3.69_4.1	0.41	Sewickley Upper	GS, MH	6/2/09	12:30 p	Yes	75% cloud cover	showers (intermittent)	Yes	60
1272	Trib 37770 To Brinker Run	U	Unassessed		37770_0_1.44	1.44	UNT to Brinker Run	AT, AV	5/29/09	9:45 a	No	rain (steady rain)	100% cloud cover	Yes	60
1274	Trib 37761 To Township Line Run	U	Unassessed		37761_0_0.31	0.31	UNT to Township Line Run	AT, CB	6/2/09	11:00 a	No	75% cloud cover	clear/sunny	Yes	70
1278	Sewickley Creek	U	Unassessed		37556_29.68_30.1	0.42	Sewickley (headwaters)	AV, BP, AT	3/31/09	9:00 a	Yes	clear/sunny	showers (intermittent)	Yes	35
1279	Hurst Run	U	Unassessed		37764_0_2.09	2.09	Hurst Run (Trib to Boyer)	PR, MH	6/3/09	12:40 p	No	100% cloud cover	50% cloud cover	Yes	60
1281	Trib 37767 To Sewickley Creek	U	Unassessed		37767_0_1.4	1.40	Sewickley Main	AT, CB, MH, PR	5/15/09	2:20 p	Yes	clear/sunny	showers (intermittent)	Yes	60
1288	Boyer Run	U	Unassessed		37763_0_1.67	1.67	Boyer Run	AT, AV, MH	6/4/09	1:00 p	No	100% cloud cover	showers (intermittent)	Yes	60
1289	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_2.9_3.01	0.11	Welty	AT, BN, MK, AV	03/5/2009	1	No	clear/sunny	clear/sunny	No	50
1291	Trib 37796 To Sewickley Creek	U	Unassessed		37796_2.76_3.21	0.45	Sewickley (North Fork)	AT, CB	5/12/09	2:15 p	No	clear/sunny	75% cloud cover	Yes	65
1293	Brinker Run	U	Unassessed		37769_2.01_2.71	0.70	Brinker Run	AT, AV	5/29/09	1:30 p	Yes	rain (steady rain)	100% cloud cover	Yes	60
1297	Trib 37815 Of Sewickley Creek	U	Unassessed		37815_0_0.25	0.25	Sewickley (North Fork)	AT, CB	5/12/09	2:30 p	Yes	clear/sunny	75% cloud cover	Yes	65
1299	Trib 37802 Of Sewickley Creek	U	Unassessed		37802_0_0.69	0.69	Sewickley (North Fork)	AT, CB	5/12/09	2:45 p	Yes	clear/sunny	75% cloud cover	Yes	65
1301	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_1.5_2.11	0.61	Welty Run	AT, MK, BP, AV	03/20/09	11:47	No	75% cloud cover	clear/sunny	No	32
1304	Sewickley Creek	U	Unassessed		37556_26.48_27.5	1.02	Sewickley main	AT, PR, AV	04/17/09	9:00	No	clear/sunny	clear/sunny	Yes	40
1309	Trib 37804 Of Sewickley Creek	U	Unassessed		37804_0.81_1.11	0.30	Sewickley (North Fork)	AT, CB	5/12/09	1:15 p	No	clear/sunny	75% cloud cover	Yes	60
1317	Trib 37781 Of Welty Run	U	Unassessed		37781_0_0.09	0.09	Welty Run UNT	AV, AT	6/9/09	10:30 a	Yes	100% cloud cover	showers (intermittent)	Yes	75
1320	Welty Run	N	Abandoned Mine Drainage/pH:1996	Aquatic Life	37779_0.39_1.09	0.70	Welty Run	AT, MK, BP, AV	03/20/09	1:30	No	75% cloud cover	clear/sunny	No	32

ID	Stream		Status	Segment	Length	Watershed	Assessors	Date	Time		Weather (current)	Weather (past)			Flow	Source	Temp.									Other landuse			
1328	Trib 37791 To Welty Run	U	Unassessed	37791_0_2.32	2.32	Welty Run	AT, MK	03/13/09	2:00	No	clear/sunny	50% cloud cover	No	40	Intermittent	Spring-fed	Coldwater	95	0	0	0	0	3	0	2	Old strip mines	Some potential sources	Moderate	Low
1335	Trib 37818 To Sewickley Creek	U	Unassessed	37818_0_0.56	0.56	Sewickley (headwaters)	AV, BP, AT	3/31/09	12:45 p	Yes	clear/sunny	showers (intermittent)	Yes	50	Perennial	Spring-fed	Coldwater	0	0	0	0	0	0	0	0	Type of other landuse	Some potential sources	None	Low
1336	Township Line Run	U	Unassessed	37752_1.94_2.43	0.49	Sewickley (Upper)	GS, MH	6/2/09	1:30 p	Yes	75% cloud cover	50% cloud cover	Yes	60	Perennial	Spring-fed	Warm water	0	0	0	100	0	0	0	0	Type of other landuse	Some potential sources	None	Low
1337	Trib 37825 To Sewickley Creek	U	Unassessed	37825_0_1.36	1.36	Sewickley Headwaters	AV, BA, AT	03/31/09	10:50	No	clear/sunny	showers (intermittent)	Yes	40	Perennial	Spring-fed	Coldwater	0	70	20	0	0	10	0	0	Type of other landuse	Some potential sources	Minimal	Low
1341	Trib 37798 Of Sewickley Creek	U	Unassessed	37798_0_0.05	0.05	Sewickley, North Fork	AV, AT, PR	04/17/09	10:45	Yes	clear/sunny	clear/sunny	Yes	55	Perennial	Spring-fed		0	0	99	0	0	1	0	0	Type of other landuse	Some potential sources	None	Low
1342	Trib 37801 Of Sewickley Creek	U	Unassessed	37801_0_0.74	0.74	Sewickley, North Fork UNT	AV, PR, AT	04/17/09	1:00	No	clear/sunny	clear/sunny	Yes	65	Perennial	Spring-fed		10	60	0	0	0	30	0	0	Type of other landuse	Some potential sources	Minimal	Low
1354	Trib 37777 To Welty Run	U	Unassessed	37777_0.7_1.22	0.52	Welty Run UNT	AT, AV	6/9/09	10:30 a	Yes	100% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed		15	0	0	0	85	0	0	0	Type of other landuse	Some potential sources	None	Low

ID	Riparian notes	Score	Rating	Comments	Other issues
1328		18.2	Optimal (16-20)		
1335		11.0	Suboptimal (11-15)	headwaters in ag field, turbid but no algae, some shrubs, field/pasture and some residential	
1336		15.0	Suboptimal (11-15)	completely surrounded by golf course; high grass protects stream, some wooded area with mixed hardwood; abundant cobble and above average cover- minimal erosion	
1337	lots of Ag fields active and over grown with some shrubs	12.8	Suboptimal (11-15)	Long section with ag all around it	
1341		5.0	Poor (0-5)	Sad little trib. Ag. field mowed to stream, no cover, completely exposed. Little UNT is a pond and then piped to trib.	
1342	overgrown shrubs, but no mature trees next to road	14.9	Suboptimal (11-15)		
1354		13.0	Suboptimal (11-15)	streams in golf course not overly mowed, buffers good for golf course, some shading; grasses and shrubs more than trees	
1357		13.0	Suboptimal (11-15)	flows through old nursery stock, decent veg cover, pond below	
1358		15.6	Suboptimal (11-15)	good buffer/good cover, developments above section, restoration project	
1361	lacking trees near top of reach	15.8	Suboptimal (11-15)	Run's next to naser's market, saw lots of fish. At very end of section waste water treatment plants dumps into stream just above where an AMD tribs enters stream.	
1366		12.8	Suboptimal (11-15)	Small segment just before Mammoth Park. Has some trees on both side but narrow zone. Ballfield close and road on other side.	
1367		10.0	Marginal (6-10)	pasture on one side, ag field on other; runs through wooded pasture (CREP-Zeglin farm) erosion issues, fair buffers	
1368	limited trees, heavy mowing	11.1	Suboptimal (11-15)	short section, mowed up to streambank	
1373		10.0	Marginal (6-10)	headwaters in golf course and residental housing plan, flows through Westmoreland Co. Comm. College- mowed up to streambank at college and golf course, riprap along golf course-stabilization; poor buffers	
1374	fence out of pasture and regrowing	13.0	Suboptimal (11-15)	section recently fenced from cows, just needs time to grow.	
1384		13.3	Suboptimal (11-15)		
1385		15.0	Suboptimal (11-15)	iron impact, would be great w/o AMD issues, small UNT entering pH 6.8	upstream AMD and sedimentation
1386		14.0	Suboptimal (11-15)	unplanted ag fields at top, overgown fields and then golf course, fair buffers- entire reach has buffers but not wide, great shrub cover, narrow riparian zone	
1395		15.0	Suboptimal (11-15)	similar to section 1049- some homes but good cover.	
1396	lots of clearing	10.3	Marginal (6-10)	evidence of clearing (mining), old coke oven residuals, parallels old RR bed	
1399		13.0	Suboptimal (11-15)	small ag portion near mouth, no fence with cows, fair buffers, mostly good minus pasture section	
1400		11.0	Suboptimal (11-15)	ag fields, wetland above	
1403	zone is there but narrow w. good trees and canopy	15.8	Suboptimal (11-15)	housing dev on most but not much direct mowing	
1420		13.0	Suboptimal (11-15)	mostly residental, a lot of groomed banks, minimal erosion issues (some gabian baskets), UNT pH 8.4, few sediment bars, very little cobble/mostly silt, culverts; fair buffers	
1422		18.9	Optimal (16-20)		
1423	lower reach better zone width, upper reach roads on both sides	11.4	Suboptimal (11-15)	2/3 stream normal channel, bike trail on both sides, upper 1/3 channelized (industrial park), road parallels stream, water has AMD iron staining and sediment issues	AMD
1431	Buffers are good. Forested and mostly protected.	15.0	Suboptimal (11-15)	Headwaters start in pasture of Friendship Farms, then go to a good forested buffer down to residents and horse farmette and ends in active beef pasture. Livestock have access to trib in lower portion, but not in headwaters.	
1432	part good buffer others affected by housing	14.9	Suboptimal (11-15)	community reservoir section, queen snake seen	lots of large developments
1433		12.0	Suboptimal (11-15)	fields, some ag, powerline mowed next to stream, some good cover areas, fair buffer	
1436		5.0	Poor (0-5)	stream has been "tiled"- no flow through ag fields, but ~5 ft wide above fields at culvert and good cover	
1441		12.0	Suboptimal (11-15)	yards mowed to stream edge- fair buffer	
1445	Buffers are Good. CREP buffer two years old and growing in well.	13.0	Suboptimal (11-15)	Trib flows through Ag land and active beef farm, but is newly protected by CREP. It's the Overly Farm sampled by WPC. Stream creates two large ponds by farmstead. Score should increase as buffer grows in.	
1453	residental and roads, nursery affect zone width	15.6	Suboptimal (11-15)	from Arbrust to College, AMD issues, rails to trails near stream, road next to stream	AMD
1454	LB - great trees and wide / RB - field beyond buffers from mining	17.8	Optimal (16-20)	had several wood ducks on section	some sediment issues most likely from pasture just up stream
1457		13.0	Suboptimal (11-15)	1457 and 1131 flow into 1098; originate from Wigle farm- CREP buffer with streambank fencing	
1461		12.0	Suboptimal (11-15)	headwaters in ag pasture/field, flows through more ag/pasture, trees buffering, narrow buffer following stream length	
1462		5.0	Poor (0-5)	Sad little trib. Ag. field mowed to stream, no cover, completely exposed	
1464		19.3	Optimal (16-20)		
1465		0.0	Marginal (6-10)	Residential area flows through housing, road right next to it, smells like sewage at mouth. Yucky looking, powerlines cross, several culverts, high banks. Sewage removal needs improved at bottom.	
1467	fence out of pasture and regrowing	13.0	Suboptimal (11-15)	section recently fenced from cows, just needs time to grow. This section was scored the same as section #1374 due to change of UNT #1206 entry point to North Fork.	
1468		13.1	Suboptimal (11-15)		
1469	big mowed fields and ag up to edge, road following stream, but good cover with trees	14.3	Suboptimal (11-15)	typical backyards/ag/industrial, good cover, little bit of mowing, most knotweed seen yet, some erosion and sediment issues	AMD
1471	mostly forested	14.3	Suboptimal (11-15)	culverts, pond in middle, beef farm in top of reach joined with wetlands, no streambank fencing on farm, 85% active riparian zone, minimal res	beef farm accompianed with mild bank erosion
1475	excellent except for roads	15.8	Suboptimal (11-15)	section ends in wetland before entering Sewickley (near Brinkerton), orange sediment staining from sections above	AMD issues
1476		0.0		Welty Run was damed to form Mammoth Lake. No score given for this section due to critera for lake being different that for streams	
1485	not wide, but trees present	14.2	Suboptimal (11-15)	section with high amout of knotweed, runs through res area, moderate velocity until bottom where it slows and has high sediment buildup	erosion, sediment issues
1488		12.0	Suboptimal (11-15)	pasture on left side, runs through forest for upper 3/4, good buffers, one culvert, sediment issues. Zeglin Farm, with streambank fencing on portion of reach.	
1489	LB good width, RB mowed up to stream edge	14.5	Suboptimal (11-15)		
1491	LB- railroad ed and mining area near stream bed/ Rb- power line and	11.2	Suboptimal (11-15)	straightened channel at top of section by farm landowner and dredged if permitted. Below straightened section huge sediment bars. Nice wetlands and vernal ponds all along right bank in riparian area. Right bank ripARIAN AREA HAS OLD RAIL BED AND MINE LAN	sediment issues from farm up stream
1496		14.3	Suboptimal (11-15)	This section is highly impacted by AMD. The souce is just below the 130 bridge by Humphreys, N40.25126 W79.47968. AMD is 2.8, stream above bride is 6.5.	
1505		5.0	Poor (0-5)	Pond in top of area where trib should be and them trib is tiled under fields to main stream.	
1514		8.0	Marginal (6-10)	rural, residental, forested, 1/3 stream culverted, poor buffers (culverts), AMD, UNT entering above houses	
1518		10.0	Marginal (6-10)	mostly trimmed, very little canopy cover, culverts, poor buffers	
1522		10.0	Marginal (6-10)	poor buffers, dry channel, ends in same wetlands as 1264, not flowing into mainstem	
1523		13.0	Suboptimal (11-15)	ag field, little forest, little residental, veg farm, headwaters has pond, trin dry after pond but flowing at mouth	
1524		11.0	Suboptimal (11-15)	cut lawns, overgrown fields, runs through residental area, small area in forest, fair buffers- half good, half mowed lawns	
1525	reclamation area/wetlands impact riparian zone	14.5	Suboptimal (11-15)	,	restoration debris, strip mine area

GIS_ID_WPC	NAME	ATTAINUSE	PROBLEM1	USE_	SEGID_WPC	Length	StrmName	Inv	Date	Time	Sheet	WeatNow	Weat24hrs	Rain7days	AirTemp	StrSubsys
1007	Trib 37643 To Sewickley Creek	U	Unassessed		37643_0_0.95	0.95	UNT to Middle Sewickley	AT, TS	09/22/09	2:30 p	Yes	50% cloud cover	showers (intermittent)	No	75	Perennial
1009	Trib 37670 To Buffalo Run	U	Unassessed		37670_0_0.37	0.37	Buffalo Run	BN, AT	8/13/09	1:10 p	No	75% cloud cover	25% cloud cover	Yes	72	Perennial
1017	Trib 37635 To Sewickley Creek	U	Unassessed		37635_0_0.56	0.56	Middle Sewickley UNT	RH, AT, TS	9/09/09	2:50 p	Yes	75% cloud cover	showers (intermittent)	Yes	72	Perennial
1020	Trib 37692 To Sewickley Creek	U	Unassessed		37692_0_0.98	0.98	Sewickley Middle UNT	AT, AV, CTIS	7/2/09	1:28 p	No	showers (intermittent)	50% cloud cover	Yes	68	Perennial
1021	Trib 37688 To Wilson Run	U	Unassessed		37688_0_0.6	0.60	Wilson Run UNT	AV, PR	8/06/09	1:08 p	Yes	clear/sunny	clear/sunny	Yes	75	Perennial
1032	Trib 37643 To Sewickley Creek	U	Unassessed		37643_0.95_1.68	0.73	UNT to Middle Sewickley	AT, TS	9/22/09	2:05 p	No	showers (intermittent)	showers (intermittent)	No	70	Perennial
1033	Trib 37663 To Buffalo Run	U	Unassessed		37663_0_1.36	1.36	Middle Sewickley UNT	PR, SG	8/07/09	12:15 p	No	clear/sunny	clear/sunny	Yes	75	Perennial
1039	Trib 37655 Of Sewickley Creek	U	Unassessed		37655_0.67_1.01	0.34	Middle Sewickley UNT	AV, CB	7/17/09	10:40 a	Yes	100% cloud cover	50% cloud cover	No	70	Perennial
1044	Trib 37637 Of Sewickley Creek	U	Unassessed		37637_0_1.13	1.13	UNT to Middle Sewickley	RH, AT, TS	9/09/09	2:12 p	Yes	75% cloud cover	showers (intermittent)	Yes	78	Perennial
1045	Trib 37645 Of Sewickley Creek	U	Unassessed		37645_0.39_0.86	0.47	UNT to Middle Sewickley	AT, TS	9/22/09	1:23 p	Yes	rain (steady rain)	showers (intermittent)	No	70	Perennial
1046	Buffalo Run	U	Unassessed		37662_4.75_5.01	0.26	Leighty Hollow	SG, GS	8/13/09	1:10 p	Yes	50% cloud cover	25% cloud cover	Yes	75	Perennial
1047	Trib 37661 To Sewickley Creek	U	Unassessed		37661_0_0.62	0.62	Wilson Run UNT	PR, SG	8/07/09	11:06 a	Yes	clear/sunny	clear/sunny	Yes	74	Perennial
1060	Trib 37692 To Sewickley Creek	U	Unassessed		37692_1.79_2.49	0.70	Rt 66 UNT	AV, PR (AT 12/01/09)	07/08/09	2:15	Yes	clear/sunny	clear/sunny	No	74	Perennial
1063	Trib 37665 Of Buffalo Run	U	Unassessed		37665_0_0.38	0.38	Middle Sewickley UNT	SG, PR	8/07/09	1:00 p	Yes	clear/sunny	clear/sunny	Yes	75	Perennial
1068	Trib 37694 Of Sewickley Creek	U	Unassessed		37694_0_0.5	0.50	Middle Sewickley	At, AV, CTIS	7/9/09	10:50 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial
1071	Trib 37650 Of Sewickley Creek	U	Unassessed		37650_0.24_0.76	0.52	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	11:16 a	Yes	75% cloud cover	storm (heavy rain)	Yes	75	Perennial
1076	Wilson Run	U	Unassessed		37681_3.56_3.79	0.23	Wilson Run UNT	PR, AV	8/06/09	10:35 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial
1088	Trib 37699 Of Sewickley Creek	U	Unassessed		37699_0_0.43	0.43	Sewickley Main UNT	AV, PR	7/8/09	1:55 p	Yes	clear/sunny	clear/sunny	No	75	Perennial
1095	Trib 37696 Of Sewickley Creek	U	Unassessed		37696_0_0.39	0.39	Middle Sewickley	AT, CTIS	7/8/09	2:18 p	Yes	25% cloud cover	clear/sunny	Yes	73	Perennial
1099	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_18.34_19.41	1.07	Sewickley Middle	AV, AT, CTIS	7/2/09	11:15 a	No	100% cloud cover	50% cloud cover	Yes	72	Perennial
1103	Trib 37692 To Sewickley Creek	U	Unassessed		37692_1.26_1.79	0.53	Middle Sewickley	AT, CTIS	7/8/09	2:01 p	Yes	25% cloud cover	clear/sunny	Yes	73	Perennial
1111	Buffalo Run	U	Unassessed		37662_2.41_2.84	0.43	Leighty Hollow	GS, SG	8/13/09	10:55 a	Yes	75% cloud cover	25% cloud cover	Yes	65	Perennial
1115	Trib 37695 Of Sewickley Creek	U	Unassessed		37695_0_0.65	0.65	Middle Sewickley	AV, AT, CTIS	7/9/09	11:30 a	Yes	clear/sunny	clear/sunny	Yes	78	Perennial
1116	Trib 37648 To Sewickley Creek	U	Unassessed		37648_3.24_3.49	0.25	Middle Sewickley UNT	AV, CB	7/17/09	12:20 p	Yes	100% cloud cover	rain (steady rain)	No	70	Perennial
1117	Trib 37648 To Sewickley Creek	U	Unassessed		37648_2.7_2.99	0.29	Middle Sewickley UNT	BP, PR	7/30/09	11:00 a	No	75% cloud cover	clear/sunny	Yes	75	Perennial
1121	Trib 37678 To Belson Run	U	Unassessed		37678_0_0.55	0.55	Belson Run UNT	CB, Mh	7/22/09	12:00 p	Yes	75% cloud cover	showers (intermittent)	Yes	75	Perennial
1122	Trib 37668 To Buffalo Run	U	Unassessed		37668_0.24_1.09	0.85	UNT to Buffalo Run	AT, GS	08/07/09	2:10	Yes	clear/sunny	clear/sunny	Yes	77	Perennial
1123	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_14.2_15.52	1.32	Mid Sewickley Creek	RH, MK	4/1/10	3:22 PM	No	clear/sunny	clear/sunny	No	60	Perennial
1128	Buffalo Run	U	Unassessed		37662_2.84_4.75	1.91	Leighty Hollow	GS, SG	8/13/09	12:45 p	No	50% cloud cover	25% cloud cover	Yes	75	Perennial
1132	Trib 37648 To Sewickley Creek	U	Unassessed		37648_0_1.13	1.13	Waltz Mill	AT, TS	9/03/09	11:15 a	No	clear/sunny	clear/sunny	No	70	Perennial
1153	Trib 37682 To Wilson Run	U	Unassessed		37682_0_0.7	0.70		SG, PR	8/07/09	10:15 a	Yes	clear/sunny	clear/sunny	Yes	72	Perennial
1164	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_15.63_15.9	0.27	Mid Sewickley Creek	RH, MK	4/1/10	3:30 PM	No	clear/sunny	clear/sunny	No	60	Perennial
1167	Trib 37640 Of Sewickley Creek	U	Unassessed		37640_0_1.19	1.19	Middle Sewickley UNT	RH, AT, TS	9/09/09	11:30 a	Yes	100% cloud cover	showers (intermittent)	Yes	65	Perennial
1169	Trib 37689 To Wilson Run	U	Unassessed		37689_0_1.05	1.05	Wilson Run UNT	AV, PR	8/06/09	10:26 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial
1173	Trib 37692 To Sewickley Creek	U	Unassessed		37692_2.49_2.78	0.29	Sewickley Main	AV, PR	7/8/09	2:00 p	Yes	clear/sunny	clear/sunny	No	75	Perennial
1175	Trib 37693 Of Sewickley Creek	U	Unassessed		37693_0.78_1.54	0.76	Middle Sewickley	AT, CTIS	7/8/09	2:57 p	Yes	25% cloud cover	clear/sunny	Yes	75	Perennial
1176	Lick Run	U	Unassessed		37642_0_2.73	2.73	Lick Run	RH, MK	9/22/09	2:30 p	No	75% cloud cover	showers (intermittent)	No	75	Perennial
1177	Trib 37670 To Buffalo Run	U	Unassessed		37670_0.52_0.83	0.31	Buffalo Run	AT, BN	8/13/2009	2:30 pm	No	25% cloud cover	25% cloud cover	Yes	75	Perennial
1184	Trib 37690 To Wilson Run	U	Unassessed		37690_0_0.47	0.47	Wilson Run UNT	AV, PR	8/06/09	10:05 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial
1189	Trib 37697 Of Sewickley Creek	U	Unassessed		37697_0_0.52	0.52	Middle Sewickley UNT	AT, AV, CTIS	7/2/09	2:25 p	Yes	showers (intermittent)	50% cloud cover	Yes	68	Perennial
1190	Sewickley Creek	U	Unassessed		37556_15.9_15.97	0.07	Mid Sewickley Creek	RH, MK	4/1/10	3:30 PM	No	clear/sunny	clear/sunny	No	60	Perennial
1192	Trib 37648 To Sewickley Creek	U	Unassessed		37648_3.49_4.18	0.69	Middle Sewickley	AV, CB	7/17/09	10:55 a	Yes	100% cloud cover	50% cloud cover	Yes	70	Perennial
1194	Trib 37648 To Sewickley Creek	U	Unassessed		37648_1.13_1.74	0.61	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	12:32 p	No	75% cloud cover	storm (heavy rain)	Yes	80	Perennial
1202	Trib 37652 Of Sewickley Creek	U	Unassessed		37652_0_1.12	1.12	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	10:11 a	Yes	75% cloud cover	storm (heavy rain)	Yes	75	Perennial
1203	Trib 37671 Of Buffalo Run	U	Unassessed		37671_0_0.8	0.80	Buffalo Run UNT	AT, BN	08/13/2009	1:15 pm	Yes	25% cloud cover	25% cloud cover	Yes	75	Perennial
1207	Trib 37673 Of Buffalo Run	U	Unassessed		37673_0_0.82	0.82	Buffalo Run UNT	AT, TS	6/2/2010	11:00 am	Yes	75% cloud cover	showers (intermittent)	Yes	81	Perennial
1215	Trib 37666 Of Buffalo Run	U	Unassessed		37666_0_0.47	0.47	Buffalo Run UNT	AT, BN	8/13/09	12:30 p	Yes	75% cloud cover	25% cloud cover	Yes	70	Perennial
1221	Trib 37683 To Wilson Run	U	Unassessed		37683_0_0.63	0.63	Wilson Run UNT	AV, PR	8/06/09	12:45 p	Yes	clear/sunny	clear/sunny	Yes	74	Perennial
1222	Trib 37698 Of Sewickley Creek	U	Unassessed		37698_0_1.03	1.03	Rt 66 UNT (MS)	AV, PR (AT 12/01/09)	07/08/09	2:05	Yes	clear/sunny	clear/sunny	No	75	Perennial
1225	Trib 37645 Of Sewickley Creek	U	Unassessed		37645_0_0.39	0.39	UNT to Middle Sewickley	AT, TS	9/22/09	1:11 p	No	rain (steady rain)	showers (intermittent)	No	70	Perennial
1233	Trib 37653 Of Sewickley Creek	U	Unassessed		37653_0_0.8	0.80	Middle Sewickley UNT	BP, PR	7/30/09	10:40 a	Yes	75% cloud cover	clear/sunny	Yes	75	Perennial
1234	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_17.58_18.34	0.76	Mid Sewickley Creek	RH, MK	4/1/10	11:40 AM	No	clear/sunny	clear/sunny	No	60	Perennial
1236	Trib 37679 To Belson Run	U	Unassessed		37679_0_0.49	0.49	Belson Run UNT	CB, MH	7/24/09	12:30 p	Yes	75% cloud cover	showers (intermittent)	Yes	75	Perennial
1237	Trib 37674 Of Buffalo Run	U	Unassessed		37674_0_0.84	0.84	Buffalo Run UNT	AT, TS	6/2/2010	11:50 am	Yes	75% cloud cover	showers (intermittent)	Yes	81	Perennial
1241	Wilson Run	U	Unassessed		37681_5.37_5.91	0.54	Wilson Run UNT	AV, PR	8/06/09	9:51 a	Yes	clear/sunny	clear/sunny	Yes	67	Perennial
1246	Trib 37692 To Sewickley Creek	U	Unassessed		37692_3.07_3.26	0.19	Middle Sewickley UNT	AV, PR	7/8/09	1:40 p	Yes	clear/sunny	clear/sunny	No	75	Perennial
1250	Trib 37675 To Buffalo Run	U	Unassessed		37675_0_1.08	1.08	Leighty Hollow UNT	GS, SG	8/13/09	11:16 a	Yes	75% cloud cover	25% cloud cover	Yes	65	Perennial
1258	Trib 37656 Of Sewickley Creek	U	Unassessed		37656_0_0.46	0.46	Middle Sewickley UNT	AV, CB	7/17/09	10:50 a	Yes	100% cloud cover	50% cloud cover	No	70	Perennial
1259	Trib 37686 To Wilson Run	U	Unassessed		37686_0_0.67	0.67	Wilson Run UNT	AV, PR	8/06/09	1:00 p	Yes	clear/sunny	clear/sunny	Yes	75	Perennial
1263	Trib 37651 Of Sewickley Creek	U	Unassessed		37651_0_0.52	0.52	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	11:20 a	Yes	75% cloud cover	storm (heavy rain)	Yes	75	Perennial
1265	Buffalo Run	U	Unassessed		37662_1.83_2.37	0.54	Buffalo Run	GS, SG	8/13/09	9:52 a	Yes	75% cloud cover	25% cloud cover	Yes	65	Perennial
1268	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_12.81_13.18	0.36	sewickley main	RH, MK	4/9/10	11:30 am	No	100% cloud cover	75% cloud cover	Yes	45	Perennial
1273	Trib 37648 To Sewickley Creek	U	Unassessed		37648_4.18_5.1	0.92	Middle Sewickley	AV, AT, CTIS	7/9/09	2:15 p	Yes	clear/sunny	clear/sunny	Yes	77	Intermittent
1294	Wilson Run	U	Unassessed		37681_0.7_2.58	1.88	Wilson Run	SG, PR	8/07/09		No	clear/sunny	clear/sunny	Yes	70	Perennial
1296	Trib 37650 Of Sewickley Creek	U	Unassessed		37650_0_0.24	0.24	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	11:12 a	Yes	75% cloud cover	storm (heavy rain)	Yes	75	Perennial
1298	Trib 37700 Of Sewickley Creek	U	Unassessed		37700_0_0.56	0.56	Middle Sewickley	AV, PR	7/8/09	1:45 p	No	clear/sunny	clear/sunny	No	75	Perennial
1300	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_11.38_11.73	0.35	sewickley main		AT, TS	4/9/10	11:03 AM	100% cloud cover	storm (heavy rain)	Yes	45	Perennial
1303	Trib 37701 Of Sewickley Creek	U	Unassessed		37701_0_0.47	0.47	Middle Sewickley	AV, PR	7/8/09	1:30 p	Yes	clear/sunny	clear/sunny	No	74	Perennial
1305	Trib 37641 To Sewickley Creek	U	Unassessed		37641_0_1.67	1.67	Middle Sewickley UNT	AT, TS	9/03/09	1:30 p	Yes	clear/sunny	clear/sunny	No	74	Perennial
1306	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_16.5_17.58	1.08	Mid Sewickley Creek	RH, MK	4/1/10	11:00 AM	No	clear/sunny	clear/sunny	No	60	Perennial
1310	Trib 37687 To Wilson Run	U	Unassessed		37687_0_0.51	0.51	Wilson Run	AV, PR	8/06/09	10:54 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial
1313	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_10.07_10.4	0.33	main stem sewickley creek	RH, MK	4/9/10	2:20 PM	No	100% cloud cover	75% cloud cover	Yes	45	Perennial
1322	Trib 37668 To Buffalo Run	U	Unassessed		37668_0_0.24	0.24	UNT Buffalo Run	AT, GS	8/07/09		Yes	clear/sunny	clear/sunny	Yes	77	Perennial
1323	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_15.52_15.63	0.11	Mid Sewickley Creek		4/1/10	3:40	No	clear/sunny	clear/sunny	No	60	Perennial
1329	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_11.73_12.63	0.90	sewickley main	AT, TS	4/9/10	10:41 AM	No	100% cloud cover	storm (heavy rain)	Yes	45	Perennial
1330	Belson Run	U	Unassessed		37677_2.31_2.58	0.27	Belson Run Unt	CB, Mh	7/22/09	12:30 p	Yes	75% cloud cover	showers (intermittent)	Yes	75	Perennial
1333	Trib 37648 To Sewickley Creek	U	Unassessed		37648_2.99_3.24	0.25	Middle Sewickley UNT	BP, PR	7/30/09	10:35 a	Yes	75% cloud cover	clear/sunny	Yes	75	Perennial
1339	Trib 37670 To Buffalo Run	U	Unassessed		37670_0.37_0.52	0.15	Buffalo Run	AT, BN	8/13/09	1:45 p	No	50% cloud cover	25% cloud cover	Yes	75	Perennial
1343	Buffalo Run	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37662_0_0.5	0.50	Buffalo Run	AT, GS	8/07/09	10:10 a	No	clear/sunny	clear/sunny	Yes	70	Perennial
1347	Trib 37692 To Sewickley Creek	U	Unassessed		37692_2.78_3.07	0.29	Sewickley Main	AV, PR	7/8/09	1:45	Yes	clear/sunny	clear/sunny	No	75	Perennial
1348	Trib 37692 To Sewickley Creek	U	Unassessed		37692_0.98_1.26	0.28	Middle Sewickley	AT, CTIS	7/8/09	2:24	Yes	25% cloud cover	clear/sunny	Yes	73	Perennial
1349	Trib 37667 To Buffalo Run	U	Unassessed		37667_0_0.79	0.79	UNT Buffalo Run	AT, GS	8/07/09	1:15 p	Yes	clear/sunny	clear/sunny	Yes	75	Perennial
1359	Buffalo Run	U	Unassessed		37662_2.37_2.41	0.04	Buffalo Run	GS, SG (AT 12/01/09)	08/13/09	11:00 AM	Yes	75% cloud cover	rain (steady rain)	Yes	65	Perennial
1362	Trib 37636 Of Sewickley Creek	U	Unassessed		37636_0_0.56	0.56	Middle Sewickley UNT	RH, AT, TS	9/09/09	12:28 p	Yes	100% cloud cover	showers (intermittent)	Yes	65	Perennial
1365	Trib 37654 Of Sewickley Creek	U	Unassessed		37654_0_0.62	0.62	Middle Sewickley UNT	BP, PR	7/30/09	10:30 a	No	75% cloud cover	clear/sunny	Yes	74	Perennial
1370	Trib 37647 Of Sewickley Creek	U	Unassessed		37647_0_0.21	0.21	UNT to Middle Sewickley	AT, TS	9/22/09	1:30 p	Yes	rain (steady rain)	showers (intermittent)	No	70	Perennial
1378	Trib 37649 Of Sewickley Creek	U	Unassessed		37649_0_0.76	0.76	Middle Sewickley UNT	BP, PR	7/30/09	12:00 p	No	75% cloud cover	clear/sunny	Yes	78	Perennial
1379	Trib 37684 To Wilson Run	U	Unassessed		37684_0_0.95	0.95	Wilson Run UNT	AV, PR	8/06/09	12:53 p	Yes	clear/sunny	clear/sunny	Yes	75	Perennial
1382	Trib 37658 Of Sewickley Creek	U	Unassessed		37658_0_0.14	0.14	Sewickely Middle	AT, AV, CTIS	7/9/09	2:45 p	Yes	clear/sunny	clear/sunny	Yes	80	Perennial
1388	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_13.18_14.2	1.02	main sewickley	RH, MK	4/9/10	10:40	No	100% cloud cover	storm (heavy rain)	Yes	45	Perennial
1389	Trib 37643 To Sewickley Creek	U	Unassessed		37643_1.68_2.13	0.45	UNT to Middle Sewickley	AT, TS	9/22/09	1:30 p	Yes	rain (steady rain)	showers (intermittent)	No	70	Perennial

1390	Trib 37672 Of Buffalo Run	U	Unassessed		37672_0_0.6	0.60	Buffalo Run UNT	AT, BN	8/13/2009	1:30 pm	Yes	25% cloud cover	25% cloud cover	Yes	75	Perennial	Spring-fed	
1406	Wilson Run	U	Unassessed		37681_0_0.7	0.70	Wilson Run	PR, SG	8/07/09	10:35 a	Yes	clear/sunny	clear/sunny	Yes	74	Perennial	Spring-fed	
1407	Belson Run	U	Unassessed		37677_1.79_2.31	0.52	Belson Run UNT	MH, Cb	7/22/09	12:00 p	Yes	75% cloud cover	showers (intermittent)	Yes	75	Perennial	Spring-fed	
1411	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_11.3_11.38	0.08	sewickley main	AT, TS	4/9/10	11:45 AM	Yes	100% cloud cover	storm (heavy rain)	Yes	45	Perennial	Spring-fed	
1415	Trib 37646 Of Sewickley Creek	U	Unassessed		37646_0_1.02	1.02	UNT to Middle Sewickley	AT, TS	9/22/09	12:39 p	No	rain (steady rain)	showers (intermittent)	No	70	Perennial	Spring-fed	Warm water
1416	Trib 37655 Of Sewickley Creek	U	Unassessed		37655_0_0.67	0.67	Middle Sewickley UNT	AV, CB	7/17/09	11:22 a	Yes	100% cloud cover	50% cloud cover	No	70	Perennial	Spring-fed	
1424	Trib 37657 Of Sewickley Creek	U	Unassessed		37657_0_0.58	0.58	Sewickely Middle	AT, AV, CTIS	7/9/09	2:40 P	Yes	clear/sunny	clear/sunny	Yes	80	Perennial	Spring-fed	
1428	Trib 37663 To Buffalo Run	U	Unassessed		37663_1.36_2.14	0.78	Buffalo Run UNT	AT, BN	8/13/09	12:25 p	Yes	75% cloud cover	25% cloud cover	Yes	70	Perennial	Spring-fed	Warm water
1437	Trib 37644 Of Sewickley Creek	U	Unassessed		37644_0_0.56	0.56	UNT to Middle Sewickley	AT, TS	9/22/09	2:00 p	Yes	showers (intermittent)	showers (intermittent)	No	72	Perennial	Spring-fed	Warm water
1438	Trib 37657 Of Sewickley Creek	U	Unassessed		37657_0.58_1.15	0.57	Sewickley Middle	AT, AV, CTIS	7/9/09	2:50 p	Yes	clear/sunny	clear/sunny	Yes	80	Perennial	Spring-fed	
1443	Buffalo Run	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37662_0.5_1.83	1.33	Buffalo Run	AT, GS	8/07/09	12:15 p	No	clear/sunny	clear/sunny	Yes	75	Perennial	Spring-fed	Warm water
1447	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_10.4_11.3	0.90	sewickley main	AT, TS	4/9/10	2:42 PM	No	100% cloud cover	storm (heavy rain)	Yes	45	Perennial	Spring-fed	Warm water
1448	Trib 37692 To Sewickley Creek	U	Unassessed		37692_3.26_3.92	0.66	Middle Sewickley UNT	AV, PR	7/8/09	1:15 p	Yes	clear/sunny	clear/sunny	No	74	Perennial	Spring-fed	
1450	Trib 37669 Of Buffalo Run	U	Unassessed		37669_0_1.2	1.20	UNT to Buffalo Run	AT, GS	8/07/09	2:00 p	Yes	clear/sunny	clear/sunny	Yes	77	Perennial	Spring-fed	
1452	Trib 37638 To Sewickley Creek	U	Unassessed		37638_0_1.54	1.54	Middle Sewickley UNT	AT, TS	9/03/09	2:30 p	Yes	clear/sunny	clear/sunny	No	75	Perennial	Spring-fed	
1456	Trib 37680 To Sewickley Creek	U	Unassessed		37680_0_1.18	1.18	Middle Sewickley UNT	BP, PR	7/30/09	2:10 p	No	75% cloud cover	clear/sunny	Yes	78	Perennial	Spring-fed	Coldwater
1459	Wilson Run	U	Unassessed		37681_4.83_5.37	0.54	Wilson Run	AV, PR	8/06/09	10:10 a	Yes	clear/sunny	clear/sunny	Yes	70	Perennial	Spring-fed	
1470	Wilson Run	U	Unassessed		37681_3.79_4.04	0.25	Wilson Run UNT	AV, PR	8/06/09	11:00 a	Yes	clear/sunny	clear/sunny	Yes	71	Perennial	Spring-fed	
1479	Trib 37685 To Wilson Run	U	Unassessed		37685_0_0.95	0.95	Wilson Run	AV, PR	8/06/09		Yes	clear/sunny	clear/sunny	Yes	70	Perennial	Spring-fed	
1482	Trib 37648 To Sewickley Creek	U	Unassessed		37648_1.74_2.7	0.96	Middle Sewickley (Waltz Mill)	AV, AT	7/30/09	11:21 a	No	75% cloud cover	storm (heavy rain)	Yes	75	Perennial	Spring-fed	
1484	Trib 37691 To Sewickley Creek	Y	Attaining/Attaining: .	Aquatic Life	37691_0_1.58	1.58	Middle Sewickley UNT	AT, AV, CTIS	7/9/09	12:54 p	No	clear/sunny	clear/sunny	Yes	81	Perennial	Spring-fed	Warm water
1490	Trib 37670 To Buffalo Run	U	Unassessed		37670_0.83_0.97	0.14	Buffalo Run	AT, TS	6/2/2010	11:50 Am	Yes	75% cloud cover	showers (intermittent)	Yes	81	Perennial	Spring-fed	
1494	Trib 37639 Of Sewickley Creek	U	Unassessed		37639_0_1.1	1.10	Middle Sewickley UNT	RH, AT, TS	9/09/09	11:40 a	Yes	100% cloud cover	showers (intermittent)	Yes	65	Perennial	Spring-fed	
1495	Trib 37664 Of Buffalo Run	U	Unassessed		37664_0_0.83	0.83	Buffalo Run	GS, SG	8/13/09	11:15 a	Yes	75% cloud cover	25% cloud cover	Yes	70	Perennial	Spring-fed	Warm water
1497	Trib 37693 Of Sewickley Creek	U	Unassessed		37693_0.47_0.78	0.31	Middle Sewickley UNT	At, Av, CTIS	7/9/09	11:11 a	Yes	clear/sunny	clear/sunny	Yes	72	Perennial	Spring-fed	
1498	Trib 37643 To Sewickley Creek	U	Unassessed		37643_2.13_2.54	0.41	UNT to Middle Sewickley	AT, TS	9/22/09	1:30 p	Yes	rain (steady rain)	showers (intermittent)	No	70	Perennial	Spring-fed	Warm water
1499	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_12.63_12.81	0.18	sewickley main	AT, TS	4/9/10	9:45	No	100% cloud cover	storm (heavy rain)	Yes	45	Perennial	Spring-fed	Warm water
1503	Trib 37660 To Sewickley Creek	U	Unassessed		37660_0_1.36	1.36	UNT to Middle Sewickley	RH, MK	9/22/09	10:00 a	Yes	rain (steady rain)	showers (intermittent)	No	72	Perennial	Spring-fed	Warm water
1504	Trib 37693 Of Sewickley Creek	U	Unassessed		37693_0_0.47	0.47	Middle Sewickley	AT, AV, CTIS	7/9/09	10:30 a	Yes	clear/sunny	clear/sunny	Yes	71	Perennial	Spring-fed	
1509	Belson Run	U	Unassessed		37677_0_1.79	1.79	Belson Run	AV, AT, BP, PR	7/30/09	2:30 p	No	75% cloud cover	storm (heavy rain)	Yes	80	Perennial	Spring-fed	
1510	Sewickley Creek	N	Abandoned Mine Drainage/Metals:1996	Aquatic Life	37556_15.97_16.5	0.52	main stem sewickley	RH, MK	4/1/10	2:30 PM	No	clear/sunny	clear/sunny	No	60	Perennial	Spring-fed	Coldwater
1513	Trib 37676 To Buffalo Run	U	Unassessed		37676_0_0.35	0.35	Leighty Hollow	GS, SG	8/13/09	1:15 p	Yes	50% cloud cover	25% cloud cover	Yes	75	Perennial	Spring-fed	Warm water
1526	Trib 37670 To Buffalo Run	U	Unassessed		37670_0.97_2.18	1.21	Buf Middle Sewickley	GS, SG	8/13/09	2:10 p	Yes	25% cloud cover	25% cloud cover	Yes	80	Perennial	Spring-fed	
1528	Trib 37634 To Sewickley Creek	U	Unassessed		37634_0_0.63	0.63	unt to main sewickley	AT, TS	4/9/10	3:10 PM	Yes	100% cloud cover	storm (heavy rain)	Yes	50	Perennial	Spring-fed	

1390	75	0	5	0	0	10	0	10	gaswells	Some potential sources	None	Low			4			0	0	0	0	0	0					7.3	Clear	Normal/None	None			N/A
1406	0	0	0	65	0	35	0	0	Type of other landuse	Some potential sources	None	Low			8		Mostly Shaded	0	0	0	0	0	0		Attached Algae	Brown		8.04	Clear	Normal/None	None			N/A
1407	0	0	0	100	0	0	0	0	Type of other landuse	Some potential sources	None	Low			2		Mostly Open	0	0	0	0	0	0					8.3	Clear	Normal/None	None			N/A
1411	0	0	0	0	50	50	0	0	Type of other landuse	Some potential sources	None	Low			40			0	0	0	0	0	0					7.9	Clear	Normal/None	None	Good		N/A
1415	80	0	5	5	0	10	0	0	Type of other landuse	Some potential sources	Minimal	None	Trees	mix hard woods	8	Moderate	Mostly Shaded	40	40	20	0	0	1	Significant	None			6.1-7.4	Clear	Normal/None	None	Good	Sewage	N/A
1416	0	0	0	10	0	90	0	0	Type of other landuse	Some potential sources	None	Low			3		Open	0	0	0	0	0	1					8.1	Clear	Normal/None	None			N/A
1424	0	25	0	0	0	75	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	1					8.2	Clear	Normal/None	None			N/A
1428	50	30	0	10	0	10	0	0	Type of other landuse	Some potential sources	None	Low			4		Mostly Shaded	0	0	0	0	0	0					7.7	Clear	Normal/None	None			N/A
1437	85	15	0	0	0	0	0	0	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0					n/a	Clear	Normal/None	None			N/A
1438	65	20	0	0	0	15	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					8.2	Clear	Normal/None	None			N/A
1443	80	5	0	5	0	10	0	0	Type of other landuse	Obvious sources	Minimal	Medium	Trees	mixed hard wood	15	Moderate	Mostly Shaded	35	35	30	0	0	0	Minimal	Attached Algae	blue/green and red filimentars	30	6.9-7.1	Slightly Turbid	Other	Sheen	Poor	AMD	N/A
1447	35	0	0	10	0	35	0	20	mine refuse	Obvious sources	Minimal	Low	Trees	mix hard woods evergreens	35	Moderate	Mostly Shaded	35	35	30	1	0	0	Minimal	Attached Algae	brown green	80	7.9	Slightly Turbid	Normal/None	None	Good	AMD	N/A
1448	40	30	0	0	0	30	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	1					7.88	Clear	Normal/None	None			N/A
1450	20	20	40	0	0	20	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0					7.7-7.8	Clear	Normal/None	None			N/A
1452	25	50	0	0	0	25	0	0	Type of other landuse	Some potential sources	None	Low			5		Mostly Shaded	0	0	0	0	0	0					7.7-7.9	Clear	Normal/None	None			N/A
1456	40	55	0	0	0	5	0	0	Type of other landuse	Some potential sources	Minimal	Low	Trees		4	Slow	Mostly Shaded	40	40	20	1	0	1	Minimal				7.78-7.91	Clear	Normal/None	Slick	Fair	Development	N/A
1459	5	0	0	0	0	95	0	0	Type of other landuse	Some potential sources	None	Low			3		Open	0	0	0	1	0	1		Attached Algae	brown		8.1	Clear	Normal/None	None			N/A
1470	0	0	0	0	0	0	100	0	Type of other landuse	Some potential sources	None	Low			6		Open	0	0	0	0	0	0					6.4	Clear	Normal/None	None		AMD	N/A
1479	20	70	0	0	0	10	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	1					7.5	Clear	Normal/None	None			N/A
1482	5	25	20	0	0	45	5	0	Type of other landuse	Some potential sources	Minimal	Low	Shrubs	woody shrubs	10	Moderate	Mostly Shaded	35	40	25	0	0	1	Minimal	Rooted emergent	cattails		7.8	Turbid	Normal/None	None	Good		N/A
1484	0	20	15	50	0	15	0	0	Type of other landuse	Obvious sources	Moderate	Low	Herbaceous	mixture of trees, shrubs, grasses	4	Moderate	Mostly Open	40	40	20	1	0	1	None	Attached Algae	green filamentous	80	8.1-8.4	Slightly Turbid	Sewage	Other	Poor	Sewage	N/A
1490	5	0	0	0	0	95	0	0	Type of other landuse	Some potential sources	None	Low			5			0	0	0	0	0	0					3.5	Clear	Normal/None	None			N/A
1494	60	10	15	0	0	15	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					6.6-7.5	Clear	Normal/None	None			N/A
1495	40	20	0	10	0	30	0	0	Type of other landuse	Some potential sources	None	Low			4		Mostly Open	0	0	0	0	0	0					7.5	Clear	Normal/None	None			N/A
1497	0	80	0	0	0	20	0	0	Type of other landuse	Some potential sources	None	Low			4		Mostly Shaded	0	0	0	0	0	0					8.4	Clear	Normal/None	None			N/A
1498	75	20	0	0	0	5	0	0	Type of other landuse	Some potential sources	None	Low			2		Mostly Shaded	0	0	0	0	0	0					n/a	Clear	Normal/None	None			N/A
1499	50	0	0	0	0	50	0	0	Type of other landuse	Some potential sources	Moderate	Low	Trees	disd.	40	Moderate	Mostly Shaded	30	40	30	0	0	0	Significant	None		0	7.5	Turbid	Normal/None	None	Fair	AMD	N/A
1503	10	15	30	0	0	10	0	35	Surface mine	Some potential sources	None	Low			3		Mostly Shaded	0	0	0	0	0	0					4.3	Clear	Normal/None	None			N/A
1504	0	10	0	40	0	25	25	0	Type of other landuse	Some potential sources	None	Low			3-4		Mostly Shaded	0	0	0	0	0	1					8.3	Clear	Normal/None	None			N/A
1509	20	10	0	5	5	50	0	0	Type of other landuse	Some potential sources	Minimal	Low	Trees	mixed decid	12	Fast	Mostly Shaded	40	40	20	0	1	1	None	None			7.7-7.9	Slightly Turbid	Normal/None	None	Good		N/A
1510	40	0	0	60	0	0	0	0	Type of other landuse	Obvious sources	Minimal	Low	Trees	hardwoods	40	Moderate	Mostly Shaded	30	40	30	0	0	0	Minimal	Attached Algae	green	20	7.6	Turbid	Normal/None	None	Fair	AMD	N/A
1513	0	80	20	0	0	0	0	0	Type of other landuse	Some potential sources	None	Low			2		Open	0	0	0	0	0	0					7.7	Clear	Normal/None	None			N/A
1526	70	20	0	0	0	10	0	0	Type of other landuse	Some potential sources	None	Low			5		Mostly Shaded	0	0	0	0	0	0					3.28	Clear	Normal/None	None			N/A
1528	40	0	0	60	0	0	0	0	Type of other landuse	Some potential sources	None	Low			3		Mostly Open	0	0	0	0	0	0						Clear	Normal/None	None	Poor		N/A

1390	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1406	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1407	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1411	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1415	5	5	65	5	5	15	0	0	0	0	17	great habitat for most	16	0	some silt	18	0		15	some bar formation	14	low water levels due to no rain	15	couple culverts	18	0		9	8	17		8	8
1416	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1424	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1428	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1437	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1438	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1443	5	10	60	10	5	5	5	0	0	0	8	AMD	10	0	Iron in riffles	17	0		15	couple bars	16		14	few road bridge	18	0		7	8	15		8	8
1447	10	101	30	30	10	10	0	0	0	0	16	good cobble and debris	13	0	some sed in riffles	19	0	good variety	15	some sed not terrible	18	bank to bank	10	two bridges old mill channel, and long straight section by road	16	0	upper half good riffles, less in lower	7	6	13	LB- good banks lots of knotweed / RB- stabilized by road	7	7
1448	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1450	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1452	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1456	0	0	15	35	25	25	0	0	0	0	14	some types available	13	0	heavy in areas	12	0	few ponds	14	limited	18	clost to banks for majority	11	several culverts, long culvert under turnpike	11	0	very straight	7	6	13	steep hillside erosion at top (RB)	8	8
1459	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1470	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1479	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1482	0	0	0	0	0	0	0	0	0	0	15	mowing at top affects somewhat	15	0		18	0		16		17		15	bridge	17	0		7	7	14	some erosion	6	6
1484	0	10	40	20	20	10	0	0	0	0	12	sewage impact and highway sedimentation, but fish present	15	0	some sed issues	9	0	missing some regimes	13	island sediment deposition in areas after culverts	15	substrate evident more often than not-widening	9	highway stabilization issues, shoring, tiling and culverts	13	0	infrequent riffles, still present	7	7	14	stabilzed with rip rap and shoring, but issues after culverts	7	7
1490	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1494	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1495	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1497	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1498	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1499	0	5	25	20	20	20	0	0	0	0	14	lots of potential without the AMD sediment	10	0	AMD sed in riffles	18	0	look good and varied evenly	10	AMD deposition in pools	17	flowing good	16	road close to left bank	16	0	some riffles	3	5	8	LB-active erosion and high bank /RB- better protected by trees but still eroding	5	5
1503	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1504	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1509	0	10	60	10	10	10	0	0	0	0	17		17	0		18	0		17	fast moving	17		12	small dam, culverts, driveways	18	0		7	7	14	unstable in pasture areas	5	5
1510	0	10	60	15	5	5	5	15	0	0	15		15	0		16	0		13		17		15		14	0		7	7	14		7	7
1513	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1526	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0
1528	0	0	0	0	0	0	0	0	0	0	0		0	0		0	0		0		0		0		0	0		0	0	0		0	0

1390		0	0	16		16.0	Optimal (16-20)	Some res near mouth and main road culvert. A little active ag, a few gas wells and dirt roads. Upper 3/4 forested. Trees shade entire reach. Enters main buffalo run just east of Vincent lane, a private driveway. Nice little stream.	
1406		0	0	6		9.0	Marginal (6-10)	3 bridges, goes between super value distribution center, attached brown algae	
1407		0	0	4		2.0	Poor (0-5)	bottom 7/8 stream dry, parallels road, starts out of retention pond, culverted multiple times, runs beside Sony Technology center, poor buffers, ditch along road only water at very top	
1411		0	0	10		13.0	Suboptimal (11-15)	open space park/ball field and parking on LB. right bank is all residential. Mature trees but not very wide. Large sediment bar just past mouth UNT 1452	
1415		8	8	16		16.0	Optimal (16-20)	Headwaters by Yough Schools, top in bean field, at school-small wastewater treatment system w/ poor pH of 3.0, sediment from Ag and roads.	
1416		0	0	0		7.0	Marginal (6-10)	flows behind houses, mowed up to bank in most places, grass clippings and algae in stream, oily sheen , garbage and chunks of concrete in channel, some fish, multiple culverts, poor buffers	
1424		0	0	0		12.0	Suboptimal (11-15)	parallels road, some scattered residental, some mowing, many culverts, veg cover on banks, no buffer, some erosion	
1428		0	0	14		14.0	Suboptimal (11-15)	Excavation co, bus garage near bottom, rest runs through meadows, trees near some rural homes, buffer intact, runs near road at mouth, pasture land close to it.	
1437		0	0	0		12.0	Suboptimal (11-15)	Forest and field/pasture, has gaswell road culvert, teeny little stream, probably gets sediment from gaswell road.	
1438		0	0	8		13.0	Suboptimal (11-15)	starts in a pond, travels through overgown field, some res, dog warning signs (DiNardio), fair buffers	
1443	few yards mowed	7	7	14	road still close sometimes	14.0	Suboptimal (11-15)	section has large iron AMD discharge, above iron water seems to have aluminum issues, buffalo run rv park	AMD, Weir-able
1447	both- vegetation throughout knotweed	7	6	13	LB- lots of trees/ RB- road very close to stream	14.7	Suboptimal (11-15)	neat old mill on right bank. Shallow sections with slick bottom	large gob pile on both sides at start of section
1448		0	0	8		13.0	Suboptimal (11-15)	headwaters in ag field, goes through res/parallels road, 3 culverts, good shading past farm, mowed up to bank by houses	
1450		0	0	0		11.0	Suboptimal (11-15)	Active pasture near top with tree cover, active ag fields at bottom, past with tree, ag has buffer (grass), when forest, good looking	Active Ag
1452		0	0	12		14.0	Suboptimal (11-15)	Paralled by rural road, not affecting riparian zone, upper section stepper stream, lower meadow/wetland, saw fish.	
1456	good cover	6	6	12	field and roads buffer	13.4	Suboptimal (11-15)	6 culverts, 2 bridges, long culvert under turnpike, barbed wire stream fencing close to banks at upper end	
1459		0	0	6		5.0	Poor (0-5)	residential, heavily mowed, 10 culverts (under driveways,) some sections channelized with large stone and concrete, some forest below.	
1470		0	0	0		5.0	Poor (0-5)	wetland, AMD impact starts just above in section 1134	
1479		0	0	0		10.0	Marginal (6-10)	one culvert, no buffer in pasture, in forest in headwater cow pasture.	
1482	upper half some close mowed yards	5	5	10	some ag, mowing affect zone	14.0	Suboptimal (11-15)	upper section res mowing, overgown meadow/field at bottom, wetland pond near bottom, well-buffered lower half, UNT flowing into 40.22723 -79.64482; water too turbid to determine substrate compostition	
1484	vegetation throughout, not always native, not all categories represented	2	2	4	all impacts- ag, res, pasture, highways, culverts, mowing	11.4	Suboptimal (11-15)	culvert feeding into stream (40.22082 -79.60472) pH 8.1 iron deposition 8.4, foul odor and grey filamentous algae; 2nd site at broken public sewer (40.22305 -79.60590); last site (upstream at most) sediment issues from turnpike construction, limited buff	
1490		0	0	0		12.0	Suboptimal (11-15)	Residential area. Yards, but not mowed quite up to stream edge. Some small trees. Culverted under a road. Short section. Undeveloped right by stream. Sort of forested. Higher banks. Gravel/sed/garbage piles right next to road and stream. AMD coming from	
1494		0	0	12		14.0	Suboptimal (11-15)	Rural Res, some ag, crop fields at top, pastured area near bottom.	
1495		0	0	0		11.0	Suboptimal (11-15)	Excavation building at mouth, piped at bottom by excavation co, little bit of silt, good cobble.	
1497		0	0	0		11.0	Suboptimal (11-15)	active pasture for llamas and horses- not heavily grazed, fair buffers- vegetation in stream channel but not a wide buffer, saw lots of fish	
1498		0	0	12		15.0	Suboptimal (11-15)	Dry channel, score based on channel apperancesà downstream pH shows no issues, some res and ag and forest.	
1499	LB-has good trees on banks but some spots are bare/ RB-same	2	8	10	LB-road on top of stream bank/ RB-RR close but leaves a nice buffer	12.9	Suboptimal (11-15)	main stem has paved road hugging left bank, RR crosses but not on top of right bank	
1503		0	0	4		2.0	Poor (0-5)	Surface mining, farming and residential, erosion at outside bends in lower segment, channel is mostly concrete. Bedrock exposed. Bank stablized with tires. AMD treatment plant near mouth, untreated AMD discharge near mouth.	
1504		0	0	12		12.0	Suboptimal (11-15)	highway, wetland (mitigated), pasture/open field (reestablishing), good buffers- with the exception of double concrete culvert section (40.24501, -79.61095)	
1509	some yards mowed	6	6	12	small section of pasture, but even in yards shade trees	15.2	Suboptimal (11-15)	long section, fast flowing, flows into Sewickley mainstem in Hunker, foloows road for most part, good shading and forest	
1510		4	6	10	LB-industrial land use	14.3	Suboptimal (11-15)	lots of industry and businessin surrounding land	DAM - - FIX AMD
1513		0	0	4		4.0	Poor (0-5)	Large dairy operation, mostly pasture with no stream bank fencing.	
1526		0	0			14.0	Suboptimal (11-15)	Start of acid pond? (picture), GPS N:40.16109 W:79.58807 (other pictures of stream, too) Orange acidic water, acidic pond at headwater above possible AMD drainage site, acidic backwater in pond, non-weirable	
1528		0	0	0		0.0	Poor (0-5)	UNT is dry. Lower end forested, upper end has chemical waste plant. Review through ariel maps plant restricts access.	

Sample ID	SCWA ID	Sample Date	Flow GPM	pH Field	pH Lab	Cond. Umhos	Temp C	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Mang-anese mg/L	Alum-inum mg/L	Sulfate mg/L	Susp. Solids mg/L	TDS mg/L	Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day	Latitude	Longitude	Notes
DMP-WR1		7/5/2012	648	6.7	6.7	1090.0	20.4	176.0	-62.0	1.2	0.1	0.0	310.8	1.3	503.7	9.6	0.1	0.4	-482.9	1370.9			
DMP-WR1		9/4/2012		6.3	6.1	1254.0	14.4	140.0	-14.0	10.8	0.1	0.0	430.5	1.9	626.0	0.0	0.0	0.0	0.0	0.0			
DMP-WR1		10/9/2012	263	7.0	6.8	1270.0	10.9	204.0	-100.0	1.5	0.1	0.0	170.6	2.9	585.0	4.6	0.1	0.2	-315.6	643.8			
DMP-WR1		11/9/2012	1090	7.0	6.3	1250.0	10.2	196.0	-94.0	6.8	0.0	0.0	345.2	2.2	590.0	88.4	0.3	0.1	-1231.2	2567.2			
DMP-WR1		12/14/2012	1459	7.1	6.8	1190.0	9.6	200.0	-130.0	6.3	0.4	0.0	675.7	1.7	590.0	109.6	0.4	6.5	-2280.5	3508.4			
DMP-WR1		1/8/2013	1459	7.3	7.1	1200.0	9.1	228.0	-180.0	5.0	2.8	0.0	370.6	1.1	590.0	88.4	0.4	49.3	-3157.6	3999.6			Velocity: 1.05 ft/sec
DMP-WR1		2/6/2013	2060		6.7	1158.0		86.0	-72.0	11.8	1.0	0.1	402.1	1.7	573.0	290.9	2.2	23.5	-1782.8	2129.5			No chemical field data, use lab results.
DMP-WR1		3/12/2013	2319	7.0		1320.0	10.6									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1328**	**6.9**	**6.6**	**1216.5**		**175.7**	**-93.1**	**6.2**	**0.6**	**0.0**	**386.5**	**1.8**	**579.7**	**98.6**	**0.4**	**9.9**	**-1487.1**	**2805.5**			
DMP-WR2		7/5/2012	648	6.3	6.4	1340.0	13.8	150.0	-70.0	19.5	0.9	0.1	412.1	1.8	617.5	151.5	0.9	6.7	-545.2	1168.3			No flow discharge piped underground
DMP-WR2		9/4/2012	143	6.7	6.6	1127.0	19.6	202.0	-108.0	6.5	0.0	0.0	322.5	2.1	582.0	11.1	0.0	0.1	-185.6	347.2			
DMP-WR2		10/9/2012	263	6.5	6.0	1360.0	12.9	146.0	-50.0	25.4	0.0	0.0	170.8	5.2	607.0	80.2	0.0	0.1	-158.1	461.5			Chemical data only, no flow data
DMP-WR2		11/9/2012	1090	6.4	6.0	1320.0	13.1	132.0	-50.0	2.5	0.0	0.0	351.3	2.4	612.0	33.1	0.3	0.1	-655.1	1729.4			Chemical data only, no flow data
DMP-WR2		12/14/2012	1459	6.2	6.2	1260.0	12.8	138.0	-20.0	24.8	0.6	0.3	402.2	1.1	608.0	434.0	4.4	11.0	-350.7	2420.1			
DMP-WR2		1/8/2013	1459	6.1	6.4	1240.0	13.0	128.0	-84.0	23.8	0.8	0.2	452.5	1.1	606.0	416.5	4.2	14.6	-1473.1	2244.8			
DMP-WR2		2/6/2013	2060		5.9	1991.0		116.0	-62.0	21.3	0.9	0.2	450.7	1.2	575.0	526.2	5.7	22.8	-1535.2	2872.3			No chemical field data, use lab results.
DMP-WR2		3/12/2013	2320	6.1		1450.0	12.2									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1180**	**6.3**	**6.2**	**1386.0**	**13.9**	**144.6**	**-63.4**	**17.7**	**0.5**	**0.1**	**366.0**	**2.1**	**601.1**	**250.4**	**1.8**	**6.7**	**-899.8**	**2051.0**			
DMP-SOB1		7/5/2012	5	3.0	4.0	1850.0	17.2	0.0	344.0	26.8	8.3	2.3	867.9	2.6	801.2	1.6	0.1	0.5	20.7	0.0			
DMP-SOB1		9/4/2012	3	2.7	4.2	1657.0	17.9	0.0	280.0	18.6	8.8	2.1	660.8	2.6	840.0	0.7	0.1	0.3	10.9	0.0			
DMP-SOB1		10/9/2012	3	2.6	2.7	1830.0	14.8	0.0	330.0	32.7	9.9	1.2	368.7	5.6	885.0	1.2	0.0	0.4	12.6	0.0			
DMP-SOB1		11/9/2012	30	2.7	4.0	1650.0	11.2	0.0	382.0	46.5	0.8	0.2	775.6	3.1	793.0	16.8	0.1	0.3	137.7	0.0			Flow data gathered manually
DMP-SOB1		12/14/2012	72	3.9	4.4	1120.0	9.6	0.0	204.0	14.1	3.7	0.5	402.3	3.6	550.0	12.2	0.4	3.2	176.5	0.0			
DMP-SOB1		1/8/2013	17	2.9	4.0	1050.0		0.0	154.0	13.3	5.0	0.4	480.6	3.4	536.0	2.7	0.1	1.0	31.7	0.0			
DMP-SOB1		2/6/2013	20		3.8	830.0		0.0	91.0	11.6	4.1	0.6	375.8	2.7	414.0	2.8	0.1	1.0	21.9	0.0			No chemical field data, use lab results.
DMP-SOB1		3/12/2013		2.7		1030.0	7.6									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**22**	**2.9**	**3.9**	**1377.1**	**13.1**	**0.0**	**255.0**	**23.3**	**5.8**	**1.1**	**561.7**	**3.4**	**688.5**	**6.0**	**0.3**	**1.5**	**65.9**	**0.0**			
DMP-SOB2		7/5/2012	140	4.3	4.3	1980.0	12.7	0.0	284.0	84.9	6.7	1.9	703.5	2.4	909.0	142.9	3.2	11.2	477.9	0.0			
DMP-SOB2		9/4/2012	143	4.2	4.6	1977.0	12.8	2.0	278.0	70.6	10.9	1.7	735.7	3.6	1032.0	121.3	2.9	18.8	477.8	3.4			
DMP-SOB2		10/10/2012	93	4.2	4.0	2000.0	12.5	0.0	334.0	109.5	12.8	3.5	506.8	6.9	1107.0	122.2	3.9	14.2	372.6	0.0			
DMP-SOB2		11/9/2012	274	4.2	4.4	2010.0	12.8	0.0	370.0	82.5	0.1	0.1	1250.5	2.6	1108.0	271.3	0.3	0.2	1216.9	0.0			
DMP-SOB2		12/14/2012	169	4.2	4.3	1970.0	12.5	0.0	348.0	115.7	13.5	2.8	1200.9	4.7	1142.0	234.8	5.6	27.4	706.4	0.0			
DMP-SOB2		1/8/2013	315	3.3	4.0	2200.0	12.3	0.0	442.0	110.1	10.3	3.7	1272.5	6.6	1190.0	417.5	14.0	39.2	1675.8	0.0			
DMP-SOB2		2/6/2013	410		3.7	2038.0		0.0	314.0	66.7	7.7	2.9	1305.6	3.8	1015.0	328.8	14.1	38.0	1547.5	0.0			No chemical field data, use lab results.
DMP-SOB2		3/12/2013		3.1		2020.0	12.2									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**221**	**3.9**	**4.2**	**2024.4**	**12.5**	**0.3**	**338.6**	**91.4**	**8.9**	**2.4**	**996.5**	**4.4**	**1071.9**	**242.4**	**6.2**	**23.5**	**897.5**	**0.8**			
DMP-SOB3		7/5/2012	177	6.3	6.5	990.0	12.5	158.0	152.0	9.5	2.4	0.7	310.5	1.0	456.0	20.3	1.5	5.1	323.4	336.2			
DMP-SOB3		9/4/2012	127	6.6	6.5	928.0	12.7	156.0	-98.0	6.9	1.0	0.2	48.7	465.0	461.0	10.5	0.2	1.5	-149.6	238.1			
DMP-SOB3		10/10/2012	149	6.5	6.4	940.0	12.5	110.0	-48.0	5.8	0.9	0.0	151.7	2.6	470.0	10.4	0.1	1.6	-86.1	197.2			
DMP-SOB3		11/9/2012	122	6.6	6.4	920.0	12.9	174.0	-60.0	0.8	0.0	0.0	275.7	1.9	452.0	1.1	0.0	0.0	-88.3	256.1			
DMP-SOB3		12/14/2012	110	6.5	6.9	910.0	12.4	164.0	-36.0	16.3	0.9	0.1	204.4	2.1	436.0	21.5	0.1	1.1	-47.5	216.2			
DMP-SOB3		1/8/2013	271	6.3	6.8	920.0	12.5	160.0	-146.0	8.0	0.9	0.0	261.2	1.0	460.0	26.1	0.1	3.0	-475.4	521.0			
DMP-SOB3		2/6/2013	307		6.5	847.0		192.0	-88.0	11.4	1.1	0.1	847.5	1.6	422.0	42.0	0.4	3.9	-324.7	708.5			No chemical field data, use lab results.
DMP-SOB3		3/12/2013		6.5		1120.0	11.9									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**180**	**6.5**	**6.6**	**946.9**	**12.5**	**159.1**	**-46.3**	**8.4**	**1.0**	**0.2**	**300.0**	**67.9**	**451.0**	**18.2**	**0.3**	**22.0**	**-100.4**	**345.2**			
DMP-BUF1		7/5/2012	250	6.3	6.5	2100.0	12.8	150.0	10.0	71.5	5.3	2.4	702.8	2.6	955.0	214.9	7.2	15.8	30.1	450.8			
DMP-BUF1		9/4/2012	1032	6.5	5.9	1927.0	13.2	72.0	28.0	11.6	6.0	0.9	465.7	3.1	960.0	143.8	10.7	74.1	347.3	893.1			
DMP-BUF1		10/9/2012	563	6.4	6.3	2010.0	12.8	34.0	12.0	77.6	9.8	0.9	350.8	3.9	952.0	524.7	5.9	66.1	81.1	229.9			
DMP-BUF1		11/9/2012	329	5.8	5.8	1810.0	13.1	92.0	110.0	78.5	0.5	0.0	850.5	3.7	890.0	310.1	0.2	2.0	434.5	363.4			
DMP-BUF1		12/14/2012	329	6.4	5.5	1900.0	12.5	22.0	60.0	77.6	9.6	0.8	342.5	6.4	908.0	306.4	3.2	37.8	237.0	86.9			
DMP-BUF1		1/8/2013	290	6.5	4.8	1352.0		4.0	54.0	46.3	1.4	0.1	720.5	2.1	358.0	161.5	0.2	4.8	188.3	13.9			
DMP-BUF1		2/6/2013	294		4.4	1427.0		0.0	82.0	70.1	2.2	0.9	803.7	2.3	710.0	247.8	3.1	7.6	289.8	0.0			No chemical field data, use lab results.
DMP-BUF1		3/12/2013		5.9		1930.0	11.7									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**441**	**6.3**	**5.6**	**1807.0**	**12.7**	**53.4**	**50.9**	**61.9**	**4.9**	**0.8**	**605.2**	**3.4**	**819.0**	**327.9**	**4.5**	**26.2**	**269.5**	**283.1**			

Sample ID	SCWA ID	Sample Date	Flow GPM	pH Field	pH Lab	Cond. Umhos	Temp C	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Mang-anese mg/L	Alum-inum mg/L	Sulfate mg/L	Susp. Solids mg/L	TDS mg/L	Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day	Latitude	Longitude	Notes
DMP-JR1		7/3/2012	847	5.9	5.2	1560.0	13.3	58.0	44.0	36.9	0.2	0.0	503.6	2.1	720.2	375.4	0.2	2.3	448.0	590.5			
DMP-JR1		9/4/2012	612	5.8	5.5	1419.0	13.4	38.0	68.0	10.5	1.4	0.1	990.6	2.3	703.0	76.9	0.6	10.1	500.2	279.5			
DMP-JR1		10/9/2012	724	5.9	5.7	1540.0	13.3	20.0	8.0	31.3	3.4	0.1	203.4	6.7	698.0	272.6	0.6	29.3	69.6	173.9			
DMP-JR1		11/9/2012	1399	6.0	5.7	1400.0	13.4	58.0	-24.0	28.3	0.0	0.0	284.7	2.5	682.0	475.0	0.3	0.2	-403.5	975.2			
DMP-JR1		12/14/2012	1550	6.0	5.7	1380.0	13.2	36.0	-4.0	27.8	1.2	0.1	375.5	1.9	671.0	517.1	1.3	23.1	-74.5	670.8			
DMP-JR1		1/8/2013	1702	5.9	5.9	1350.0	13.2	28.0	-10.0	29.3	1.4	0.1	604.3	2.0	675.0	598.4	1.2	28.0	-204.6	572.8			
DMP-JR1		2/6/2013	1702		5.5	1342.0		38.0	76.0	28.6	1.4	0.4	502.5	2.1	670.0	584.3	7.6	27.6	1554.8	777.4			No chemical field data, use lab results.
DMP-JR1		3/12/2013	1550	5.7		1680.0	12.7									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1261**	**5.9**	**5.6**	**1458.9**	**13.2**	**39.4**	**22.6**	**27.5**	**1.3**	**0.1**	**494.9**	**2.8**	**688.5**	**416.7**	**1.5**	**19.4**	**342.0**	**597.5**			
DMP-BR1		7/3/2012	1131	6.3	5.6	1240.0	13.3	130.0	14.0	38.6	2.0	0.1	453.3	1.5	560.3	524.8	1.5	26.9	190.3	1767.3			
DMP-BR1		9/4/2012	932	6.2	6.2	1189.0	13.2	130.0	-48.0	34.2	0.1	0.1	450.5	3.2	593.0	383.0	0.6	1.1	-537.7	1456.3			
DMP-BR1		10/9/2012	1304	6.3	6.1	1240.0	13.0	80.0	-14.0	19.0	4.9	0.6	190.5	1.7	542.0	297.2	8.8	76.3	-219.5	1254.1			
DMP-BR1		11/9/2012	2282	6.0	6.0	1200.0	13.0	136.0	34.0	23.8	0.0	0.0	350.6	2.2	550.0	651.4	0.5	0.3	932.6	3730.3			Flow on 30 in bypass: 1116.9 GPM. Flow on 46 in
DMP-BR1		12/14/2012	1870	6.2	6.1	1160.0	13.0	68.0	-24.0	18.5	1.0	0.5	412.5	1.7	536.0	416.4	11.7	21.8	-539.4	1528.2			Overflow: 971 GPM
DMP-BR1		1/8/2013	1131		6.2	1034.0		80.0	-36.0	37.8	1.2	0.7	410.8	2.7	512.0	513.2	9.9	16.4	-489.4	1087.6			
DMP-BR1		2/6/2013	1867		5.8	1036.0		44.0	-22.0	34.0	1.1	0.7	490.5	2.7	518.0	763.5	14.6	25.4	-493.7	987.4			No chemical field data, use lab results.
DMP-BR1		3/12/2013	527	6.1		1330.0	12.3									0.0	0.0	0.0	0.0	0.0			Overflow: 3038 GPM
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1380**	**6.2**	**6.0**	**1178.6**	**13.0**	**95.4**	**-13.7**	**29.4**	**1.5**	**0.4**	**394.1**	**2.2**	**544.5**	**487.8**	**6.3**	**24.3**	**-227.6**	**1583.5**			
																	0.00	**0.00**	**0.00**	**0.00**			
																	0.00	**0.00**	**0.00**	**0.00**			
BR1 Overflow		9/4/2012	0	6.3	5.6	1240.0	13.3	130.0	14.0	38.6	2.0	0.1	453.3	1126.0	560.3	0.0	0.0	0.0	0.0	0.0			overflow not flowing
BR1 Overflow		10/9/2012	0	6.2	6.2	1189.0	13.2	130.0	-48.0	34.2	0.1	0.1	450.5	3.2	593.0	0.0	0.0	0.0	0.0	0.0			overflow not flowing
BR1 Overflow		11/9/2012	1116	6.3	6.1	1240.0	13.0	80.0	-14.0	19.0	4.9	0.6	190.5	1.7	542.0	254.3	7.5	65.3	-187.8	1073.1			5 1/2" at 30"
BR1 Overflow		12/14/2012	1011	6.0	6.0	1200.0	13.0	136.0	34.0	23.8	0.0	0.0	350.6	2.2	550.0	288.6	0.2	0.1	413.2	1652.7			5" at 30"
BR1 Overflow		1/8/2013	1925	6.2	6.1	1160.0	13.0	68.0	-24.0	18.5	1.0	0.5	412.5	1.7	536.0	428.8	12.0	22.4	-555.3	1573.4			8"at 30"
BR1 Overflow		2/6/2013	3038		6.2	1034.0		80.0	-36.0	37.8	1.2	0.7	410.8	2.7	512.0	1378.5	26.7	44.2	-1314.6	2921.3			11"at 30"
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1182**	**6.2**	**6.0**	**1177.0**	**13.0**	**104.0**	**-12.3**	**28.6**	**1.5**	**0.3**	**378.0**	**189.6**	**548.9**	**406.7**	**4.7**	**21.6**	**-175.2**	**1477.2**			
DMP-BR1A		10/10/2012	1304		6.4			76.0	-16.0	12.3	0.1	0.0	220.6	3.2	550.0	192.0	0.3	1.1	-250.8	1191.2			Treatment system outlet-Flow as BR1
DMP-BR1A		11/9/2012	2281	6.6	6.3	1190.0	6.9	90.0	-10.0	27.8	0.0	0.0	507.3	3.1	544.0	760.8	0.5	0.3	-274.2	2467.6			flow data is the same as DMP-BR1
DMP-BR1A		12/14/2012	1869	6.6	7.0	1130.0	7.1	72.0	-26.0	22.3	1.2	0.6	350.7	2.9	545.0	499.9	14.2	26.5	-584.1	1617.5			
DMP-BR1A		1/8/2013	1131	6.6	6.9	1100.0	5.3	78.0	-28.0	22.3	1.1	0.5	426.2	2.7	523.0	302.5	6.3	15.0	-380.6	1060.4			
DMP-BR1A		2/6/2013	1867		6.5	1038.0		76.0	-42.0	21.5	1.2	0.4	475.0	2.0	513.0	482.5	9.9	26.9	-942.5	1705.5			No chemical field data, use lab results.
DMP-BR1A		3/12/2013		8.9		1240.0	8.9									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1690**	**7.2**	**6.6**	**1139.6**	**7.1**	**78.4**	**-24.4**	**21.2**	**0.7**	**0.3**	**396.0**	**2.8**	**535.0**	**430.8**	**6.4**	**14.5**	**-495.8**	**1593.0**			
DMP-BR2		7/3/2012	975	6.4	5.8	1240.0	15.2	210.0	-102.0	16.9	0.2	0.1	375.8	1.0	513.0	197.9	0.9	2.2	-1195.4	2461.1			
DMP-BR2		9/4/2012	1670	6.6	6.4	1156.0	13.6	210.0	-190.0	15.8	0.2	0.1	259.8	2.7	574.0	316.8	1.4	3.2	-3813.9	4215.4			
DMP-BR2		10/9/2012	1042	6.6	6.5	1250.0	12.2	216.0	-102.0	16.9	5.8	0.4	160.7	3.9	542.0	212.0	4.9	72.8	-1277.5	2705.4			
DMP-BR2		11/9/2012	925	6.6	6.0	1220.0	11.6	220.0	-70.0	18.1	0.0	0.0	335.5	2.9	548.0	200.8	0.2	0.1	-778.3	2446.1			
DMP-BR2		12/14/2012	1042	6.6	6.6	1170.0	12.1	230.0	-146.0	10.5	0.5	0.2	340.7	2.1	573.0	131.8	2.9	6.8	-1828.6	2880.7			
DMP-BR2		1/8/2013	1289	6.6	6.9	1510.0	13.3	216.0	-140.0	22.0	0.6	0.4	391.4	3.2	557.0	341.0	6.5	9.3	-2169.1	3346.7			
DMP-BR2		2/6/2013	1162		6.6	1103.0		206.0	-160.0	15.5	0.7	0.5	375.5	2.6	547.0	216.5	6.7	9.8	-2234.8	2877.3			
DMP-BR2		3/12/2013	1690	6.7		1360.0	11.7									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**1224**	**6.6**	**6.4**	**1251.1**	**12.8**	**215.4**	**-130.0**	**16.5**	**1.1**	**0.2**	**319.9**	**2.6**	**550.6**	**243.2**	**3.6**	**16.8**	**-1913.2**	**3170.5**			

Sample ID	SCWA ID	Sample Date	Flow GPM	pH Field	pH Lab	Cond. Umhos	Temp C	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Mang-anese mg/L	Alum-inum mg/L	Sulfate mg/L	Susp. Solids mg/L	TDS mg/L	Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day	Latitude	Longitude	Notes
DMP-BR3		7/3/2012		4.1	4.1	1550.0	13.2	0.0	116.0	35.5	2.4	0.3	726.8	1.8	672.0	0.0	0.0	0.0	0.0	0.0			No flow data
DMP-BR3		9/4/2012	506	5.2	5.0	1312.0	13.3	10.0	142.0	29.3	3.8	0.1	645.8	2.8	655.0	177.9	0.7	22.9	863.7	60.8			
DMP-BR3		10/9/2012	40	4.5	4.6	1390.0	13.1	4.0	-104.0	25.8	4.8	0.8	302.5	2.3	545.0	12.4	0.4	2.3	-50.0	1.9			Flow rate is an estimate
DMP-BR3		11/9/2012	100	3.9	4.3	1430.0	13.4	0.0	150.0	30.3	0.0	0.0	650.7	1.7	680.0	36.4	0.0	0.0	180.3	0.0			Flow rate is an estimate
DMP-BR3		12/14/2012		4.2	4.3	1400.0	13.3	0.0	118.0	33.8	1.9	0.4	675.8	2.3	803.0	0.0	0.0	0.0	0.0	0.0			
DMP-BR3		1/8/2013		6.1	4.0	1170.0	12.2	0.0	126.0	32.8	2.8	0.3	804.5	2.0	831.0	0.0	0.0	0.0	0.0	0.0			Add 20 GPM
DMP-BR3		2/6/2013			4.0	1520.0		0.0	236.0	24.8	2.9	0.8	950.8	2.5	759.0	0.0	0.0	0.0	0.0	0.0			No chemical field data, use lab results. No flow dat
DMP-BR3		3/12/2013		3.2		1870.0	12.3									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**215**	**4.5**	**4.3**	**1455.3**	**13.0**	**2.0**	**112.0**	**30.3**	**2.6**	**0.4**	**679.6**	**2.2**	**706.4**	**78.4**	**1.0**	**6.8**	**289.9**	**5.2**			
SMP-SC1		7/24/2012	107579	8.0	7.7	990.0	24.7	136.0	-98.0	17.8	0.0	0.0	178.4	1.6	471.0	22952.5	12.9	12.9	-126723.8	175861.5			
SMP-SC1		9/5/2012	26831	8.1	7.5	850.5	24.2	132.0	-92.0	0.9	0.0	0.0	190.1	2.0	420.0	274.1	0.6	3.2	-29670.8	42571.1			
SMP-SC1		10/10/2012	35519	8.2	8.1	1000.0	11.1	138.0	-60.0	0.1	0.0	0.0	226.7	1.0	460.0	34.2	4.3	4.3	-25616.4	58917.7			
SMP-SC1		11/9/2012	74867	8.1	7.4	800.0	7.8	126.0	-40.0	1.8	0.0	0.0	170.7	1.3	398.0	1592.8	18.0	9.0	-35996.0	113387.3			
SMP-SC1		12/14/2012	170178	7.6	7.2	620.0	3.4	106.0	-60.0	0.5	0.0	0.0	90.2	0.9	290.0	1104.6	20.5	20.5	-122732.3	216827.1			
SMP-SC1		1/8/2013	101948		7.2	910.0	17.0	116.0	-76.0	1.5	0.0	0.0	185.6	1.0	432.0	1825.9	12.3	12.3	-93131.5	142148.1			User error on pH. Use lab results.
SMP-SC1		2/6/2013	69578		6.9	1260.0	3.3	106.0	-56.0	2.3	0.3	0.0	165.5	1.4	645.0	1881.7	16.7	225.8	-46834.2	88650.5			pH meter broken. Use lab results.
SMP-SC1		3/12/2013	215222	8.0		990.0	8.3									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**100215**	**8.0**	**7.4**	**927.6**	**12.5**	**122.9**	**-68.9**	**3.5**	**0.0**	**0.0**	**172.5**	**1.3**	**445.1**	**4255.6**	**14.1**	**56.8**	**-82944.4**	**147992.1**			
SMP-SC3		7/24/2012	49266	7.5	7.0	970.0	22.8	108.0	-52.0	6.5	0.2	0.0	190.7	1.7	475.3	3866.9	23.7	124.4	-30793.2	63955.2	40.21344	-79.49319	
SMP-SC3		9/5/2012	23703	7.6	7.3	830.0	22.4	114.0	-54.0	1.0	0.0	0.0	239.8	1.9	412.0	270.7	0.6	5.7	-15385.1	32479.7			
SMP-SC3		10/10/2012	21762	7.5	7.4	930.0	11.7	110.0	-44.0	0.8	0.0	0.0	195.5	1.3	424.0	204.0	2.6	2.6	-11509.5	28773.7			
SMP-SC3		11/9/2012	46357	7.6	7.1	790.0	7.8	104.0	-40.0	3.1	0.0	0.0	168.3	1.0	374.0	1716.2	11.1	5.6	-22288.5	57950.1			
SMP-SC3		12/14/2012	103274	7.9	7.2	560.0	4.4	92.0	-68.0	1.5	0.0	0.0	80.2	1.2	260.0	1874.4	12.4	12.4	-84412.3	114204.9			
SMP-SC3		1/8/2013	63110	8.1	7.2	910.0	2.6	96.0	-58.0	1.4	0.0	0.0	170.3	1.1	406.0	1046.8	7.6	7.6	-43997.9	72824.1			
SMP-SC3		2/6/2013	45830		7.0	1366.0		86.0	-50.0	1.6	0.4	0.1	155.6	1.2	684.0	864.9	44.1	225.9	-27543.9	47375.5			No chemical field data, use lab results.
SMP-SC3		3/12/2013	187117	7.5		1160.0	8.1									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**67552**	**7.7**	**7.2**	**939.5**	**11.4**	**101.4**	**-52.3**	**2.3**	**0.1**	**0.0**	**171.5**	**1.4**	**433.6**	**1832.8**	**20.0**	**78.9**	**-42455.0**	**82358.0**			
SMP-SC4		7/3/2012		7.1	6.5	1060.0	20.3	136.0	-50.0	4.6	1.7	0.0	402.0	1.1	472.0	0.0	0.0	0.0	0.0	0.0			No flow data
SMP-SC4		7/24/2012	7568	7.2	6.8	930.0	20.3	142.0	-102.0	2.8	0.4	0.0	225.8	1.3	444.2	250.2	1.8	33.7	-9278.7	12917.4			
SMP-SC4		9/4/2012	8955	7.3	7.0	62.0	20.7	132.0	-110.0	4.3	0.1	0.0	170.5	1.8	310.0	460.7	0.2	10.8	-11840.3	14208.4			
SMP-SC4		10/9/2012	9687	7.5	7.1	810.0	10.9	150.0	-58.0	1.4	0.0	0.0	186.5	1.2	375.0	161.8	1.2	1.2	-6753.2	17465.1			
SMP-SC4		11/9/2012	24503	7.3	6.9	730.0	6.7	134.0	-84.0	0.5	0.4	0.0	189.7	1.9	340.0	156.1	5.9	120.8	-24740.2	39466.6			
SMP-SC4		12/14/2012	38054	7.5	7.1	540.0	5.9	110.0	-70.0	3.2	0.0	0.0	120.8	1.3	256.0	1472.8	4.6	4.6	-32018.4	50314.6			
SMP-SC4		1/8/2013	25121	7.5	7.1	730.0	4.5	116.0	-90.0	2.9	0.8	0.0	180.6	2.0	347.0	860.6	3.0	244.6	-27175.9	35026.7			
SMP-SC4		2/6/2013	34915		6.8	760.0		110.0	-64.0	3.8	0.6	0.0	97.5	1.9	378.0	1603.2	0.0	256.0	-26859.1	46164.0			No chemical field data, use lab results.
SMP-SC4		3/12/2013		7.3		630.0	7.6									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**21257**	**7.3**	**6.9**	**694.7**	**12.1**	**128.8**	**-78.5**	**2.9**	**0.5**	**0.0**	**196.7**	**1.6**	**365.3**	**748.3**	**3.3**	**129.4**	**-20057.9**	**32897.5**			
																				0.00			
SMP-SC5		7/3/2012		6.8	6.2	1100.0	19.6	130.0	-34.0	9.6	0.1	0.0	354.0	1.4	498.0	0.0	0.0	0.0	0.0	0.0			No flow data
SMP-SC5		7/24/2012	6619	7.0	6.7	1000.0	19.4	140.0	-76.0	2.8	2.3	0.0	265.7	0.9	470.6	218.8	2.4	182.2	-6046.6	11138.5			
SMP-SC5		9/5/2012	1553	7.2	7.0	708.0	18.8	164.0	-64.0	4.0	0.1	0.0	162.5	2.2	353.0	73.7	0.4	1.3	-1194.7	3061.4			
SMP-SC5		10/9/2012	7734	7.2	6.9	850.0	10.6	142.0	-50.0	3.2	0.0	0.0	188.3	2.1	394.0	296.5	0.9	0.9	-4648.0	13200.4			
SMP-SC5		11/9/2012	10950	7.2	7.2	740.0	7.0	118.0	-130.0	7.1	0.7	0.0	170.6	2.9	341.0	938.4	3.9	94.8	-17109.9	15530.6			
SMP-SC5		12/14/2012	27697	7.5	7.1	550.0	6.0	104.0	-42.0	4.3	0.0	0.0	135.6	1.1	258.0	1438.2	6.7	6.7	-13982.6	34623.5			
SMP-SC5		1/8/2013	17629	7.2	7.0	750.0	5.6	110.0	-25.0	6.2	0.0	0.0	240.3	2.1	351.0	1309.5	4.2	2.1	-5297.5	23309.1			
SMP-SC5		2/6/2013	23878		6.6	704.0		104.0	-60.0	7.3	0.4	0.0	195.4	1.8	350.0	2080.8	5.7	111.9	-17220.7	29849.2			No chemical field data, use lab results.
SMP-SC5		3/12/2013	52110	7.2		620.0	7.7									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**18521**	**7.2**	**6.8**	**780.2**	**11.8**	**126.5**	**-60.1**	**5.5**	**0.5**	**0.0**	**214.1**	**1.8**	**377.0**	**1233.9**	**4.7**	**101.6**	**-13385.3**	**28162.0**			
SMP-SC6		7/3/2012		8.0	7.1	730.0	22.3	160.0	-80.0	0.3	0.4	0.0	102.7	1.2	327.3	0.0	0.0	0.0	0.0	0.0			Meter broke. Disregard flow data in field notes.
SMP-SC6		7/24/2012	6028	7.9	7.2	720.0	22.4	178.0	-126.0	1.8	0.0	0.0	70.8	0.8	341.0	126.8	0.7	1.4	-9129.5	12897.3			
SMP-SC6		9/5/2012	5242	7.6	7.4	390.0	22.8	100.0	-78.0	0.6	0.0	0.0	26.0	1.6	194.0	37.2	0.1	0.6	-4914.7	6300.9			
SMP-SC6		10/9/2012	3447	7.8	7.5	560.0	10.3	154.0	-66.0	0.1	0.0	0.0	40.7	1.4	263.0	5.0	0.4	0.4	-2734.6	6380.7			
SMP-SC6		11/9/2012	9200	7.5	7.2	500.0	4.7	124.0	-34.0	0.8	0.0	0.0	45.2	1.0	227.0	82.9	2.2	1.1	-3759.9	13712.6			
SMP-SC6		12/14/2012	17598	7.8	7.5	410.0	6.1	108.0	-56.0	0.2	0.0	0.0	38.6	1.1	192.0	33.8	4.2	2.1	-11845.7	22845.3			
SMP-SC6		1/8/2013	8900	7.9	7.5	550.0	3.5	120.0	-82.0	1.2	0.0	0.0	58.3	1.2	263.0	124.1	2.1	1.1	-8772.5	12837.8			
SMP-SC6		2/6/2013	13030		7.5	560.0		102.0	-58.0	0.1	0.0	0.0	61.2	1.5	275.0	21.9	3.1	1.6	-9083.7	15974.8			No chemical field data, use lab results.
SMP-SC6		3/12/2013	36086	8.0		490.0	6.8									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**12441**	**7.8**	**7.4**	**545.6**	**12.4**	**130.8**	**-72.5**	**0.6**	**0.1**	**0.0**	**55.4**	**1.2**	**260.3**	**92.7**	**2.3**	**9.5**	**-10842.1**	**19553.1**			

Sample ID	SCWA ID	Sample Date	Flow GPM	pH Field	pH Lab	Cond. Umhos	Temp C	Alka-linity mg/L	Acidity mg/L	Iron mg/L	Mang-anese mg/L	Alum-inum mg/L	Sulfate mg/L	Susp. Solids mg/L	TDS mg/L	Fe Loading lbs/day	Al Loading lbs/day	Mn Loading lbs/day	Acidity Loading lbs/day	Alkalinity Loading lbs/day	Latitude	Longitude	Notes
SMP-BOYR1		7/3/2012		7.1	6.9	1040.0	17.0	188.0	-70.0	3.9	0.1	0.0	263.0	1.0	473.0	0.0	0.0	0.0	0.0	0.0			No flow data
SMP-BOYR1		7/24/2012	979	7.0	6.9	990.0	16.8	184.0	-94.0	5.0	0.1	0.0	233.1	1.0	470.2	59.2	0.1	1.4	-1106.0	2165.0			
SMP-BOYR1		9/5/2012	1100	6.9	6.9	752.0	21.0	152.0	-94.0	4.2	0.0	0.0	188.3	2.5	373.0	55.7	0.0	0.1	-1242.9	2009.7			Estimated
SMP-BOYR1		10/9/2012	1359	7.4	7.7	920.0	11.5	214.0	-116.0	1.8	0.0	0.0	197.8	1.8	435.0	29.2	0.2	0.2	-1894.9	3495.7			
SMP-BOYR1		11/9/2012	3317	7.2	7.3	840.0	7.9	166.0	-56.0	1.8	0.0	0.0	190.4	2.0	396.0	69.8	0.8	0.4	-2232.9	6619.1			
SMP-BOYR1		12/14/2012	3602	7.4	7.3	730.0	7.7	212.0	-114.0	0.1	0.5	0.0	125.5	1.0	350.0	5.6	1.3	19.5	-4935.9	9179.0			
SMP-BOYR1		1/8/2013	1849	7.4	7.4	840.0	6.4	206.0	-118.0	1.2	0.5	0.1	460.6	1.9	356.0	26.0	1.1	11.1	-2622.5	4578.3			
SMP-BOYR1		2/6/2013	2554		6.9	1056.0		198.0	-109.0	2.5	0.0	0.0	155.7	2.3	524.0	75.5	0.0	0.0	-3346.2	6078.4			No chemical field data, use lab results.
SMP-BOYR1		3/12/2013	4936	7.4		900.0	8.0									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**2462**	**7.2**	**7.2**	**896.4**	**12.0**	**190.0**	**-96.4**	**2.6**	**0.2**	**0.0**	**226.8**	**1.7**	**422.2**	**75.7**	**0.5**	**4.5**	**-2852.1**	**5622.8**			
SMP-WR1		7/24/2012	2643	7.8	7.1	930.0	20.4	114.0	-82.0	4.0	0.0	0.0	254.5	1.1	440.3	127.4	0.3	1.0	-2605.0	3621.7			
SMP-WR1		9/4/2012	1148	7.9	6.8	1118.0	20.8	154.0	-120.0	0.9	0.0	0.0	376.7	2.4	556.0	11.7	0.0	0.1	-1655.9	2125.0			
SMP-WR1		10/9/2012	1875	8.1	7.8	1130.0	11.7	160.0	-58.0	0.7	0.0	0.0	275.8	1.4	537.0	14.6	0.2	0.5	-1307.0	3605.6			
SMP-WR1		11/9/2012	4133	7.9	7.3	980.0	8.4	164.0	-108.0	1.0	0.2	0.0	261.3	1.9	475.0	51.2	2.0	9.4	-5365.1	8147.0			
SMP-WR1		12/14/2012	6837	7.8	7.4	760.0	6.5	138.0	-94.0	1.0	2.1	0.1	160.2	1.0	368.0	78.9	4.1	172.6	-7724.5	11340.3			
SMP-WR1		1/8/2013	4803	7.8	7.5	990.0	4.5	148.0	-122.0	6.4	0.5	0.3	258.2	1.7	433.0	370.0	19.6	30.0	-7042.6	8543.5			
SMP-WR1		2/6/2013	4304		7.1	1390.0		138.0	-74.0	2.9	0.0	0.0	245.5	1.7	694.0	152.1	2.1	0.0	-3828.6	7139.8			No chemical field data, use lab results.
SMP-WR1		3/12/2013	10809	7.7		1330.0	7.9									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**4569**	**7.9**	**7.3**	**1078.5**	**11.5**	**145.1**	**-94.0**	**2.4**	**0.4**	**0.1**	**261.7**	**1.6**	**500.5**	**132.2**	**3.9**	**22.5**	**-5162.3**	**7970.9**			
SMP-BUF1		7/24/2012	1760	7.3	6.6	1040.0	21.1	36.0	8.0	11.9	1.4	0.8	273.7	2.1	483.7	252.2	16.9	30.0	169.2	761.6			
SMP-BUF1		9/4/2012	449	7.5	6.7	1113.0	21.8	48.0	50.0	5.4	1.3	0.1	424.7	2.1	551.0	29.1	0.4	7.1	269.8	259.1			
SMP-BUF1		10/9/2012	1359	7.2	7.0	870.0	12.4	52.0	-16.0	6.4	1.1	0.0	385.6	1.1	412.0	104.4	0.5	17.5	-261.4	849.5			
SMP-BUF1		11/9/2012	2614	7.0	7.0	620.0	7.9	40.0	36.0	0.0	0.2	0.0	210.3	2.1	295.0	0.3	0.6	6.0	1131.1	1256.8			
SMP-BUF1		12/14/2012	6169	6.4	7.5	490.0	5.2	40.0	-16.0	4.8	3.2	0.4	125.4	1.4	229.0	352.2	28.9	238.0	-1186.4	2965.9			
SMP-BUF1		1/8/2013	4250	6.6	6.6	690.0	2.0	36.0	20.0	8.8	0.9	0.8	221.8	2.1	315.0	447.0	39.3	47.5	1021.8	1839.2			
SMP-BUF1		2/6/2013	4852		6.6	703.0		26.0	-16.0	5.5	0.7	0.6	220.5	1.6	352.0	317.8	35.6	40.2	-933.1	1516.3			No chemical field data, use lab results.
SMP-BUF1		3/12/2013	9493	7.5		670.0	6.9									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**3868**	**7.1**	**6.9**	**774.5**	**11.0**	**39.7**	**9.4**	**6.1**	**1.3**	**0.4**	**266.0**	**1.8**	**376.8**	**283.4**	**17.9**	**58.6**	**438.4**	**1846.6**			
SMP-LS1		7/24/2012	15282	8.0	6.9	840.0	23.1	168.0	-120.0	2.1	0.0	0.0	139.7	1.6	383.0	391.3	1.8	1.8	-22042.8	30859.9			
SMP-LS1		9/4/2012	3596	7.8	7.7	1040.0	22.8	192.0	-144.0	0.9	0.0	0.0	250.7	2.2	519.0	38.9	0.1	0.4	-6224.1	8298.8			
SMP-LS1		10/10/2012	3854	8.0	7.9	1080.0	10.7	202.0	-102.0	0.7	0.0	0.0	205.3	0.9	517.0	31.5	0.5	0.5	-4725.3	9357.9			
SMP-LS1		11/9/2012	11911	8.0	7.5	800.0	7.7	160.0	-78.0	1.6	0.0	0.0	135.5	1.7	393.0	224.8	2.9	1.4	-11167.4	22907.4			
SMP-LS1		12/14/2012	30111	8.0	7.5	630.0	3.1	136.0	-96.0	1.1	0.4	0.0	80.8	1.0	292.0	390.9	10.9	152.0	-34745.9	49223.4			
SMP-LS1		1/8/2013	13784	8.5	7.6	960.0	0.6	152.0	-80.0	0.7	0.5	0.0	185.3	1.2	430.0	107.7	1.7	86.2	-13254.3	25183.2			
SMP-LS1		2/6/2013	11777		7.5	1245.0	3.2	136.0	-94.0	1.6	0.2	0.0	145.5	1.7	620.0	229.3	1.4	28.3	-13307.0	19252.6			pH meter broken, use lab results.
SMP-LS1		3/12/2013	50403	7.9		1030.0	7.8									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**17590**	**8.0**	**7.5**	**953.1**	**9.9**	**163.7**	**-102.0**	**1.2**	**0.2**	**0.0**	**163.3**	**1.5**	**450.6**	**260.7**	**2.8**	**35.6**	**-21565.8**	**34614.0**			
SMP-JR1		7/3/2012		6.6	5.8	1390.0	22.3	60.0	2.0	15.2	0.6	0.1	356.0	1.1	642.0	0.0	0.0	0.0	0.0	0.0			No flow data
SMP-JR1		7/24/2012	7791	7.1	6.8	840.0	22.5	90.0	-40.0	4.8	0.0	0.0	125.3	0.9	318.0	447.6	2.8	3.7	-3745.9	8428.3			
SMP-JR1		9/5/2012	2977	6.7	6.5	1047.0	20.4	90.0	8.0	9.5	0.6	0.1	250.5	3.1	512.0	338.9	2.1	22.5	286.3	3220.5			
SMP-JR1		10/9/2012	2367	7.0	6.7	1310.0	13.3	94.0	-36.0	12.0	0.5	0.0	276.5	5.4	615.0	340.6	0.3	13.9	-1024.3	2674.6			
SMP-JR1		11/9/2012	6000	7.0	6.6	1120.0	9.5	120.0	-16.0	8.5	1.7	0.1	260.4	2.5	551.0	615.9	4.3	120.4	-1153.9	8654.4			
SMP-JR1		12/14/2012	7588	7.4	6.5	960.0	8.6	132.0	-62.0	5.0	1.1	0.0	182.3	2.4	478.0	457.8	3.6	100.3	-5654.7	12038.9			
SMP-JR1		1/8/2013	5875	7.2	7.1	1250.0		119.0	-50.0	5.5	2.1	0.1	285.5	2.4	637.0	384.9	5.6	150.4	-3531.0	8403.8			
SMP-JR1		2/6/2013	5566		6.5	2428.0		120.0	-54.0	4.7	0.5	0.2	275.6	2.7	1212.0	311.8	10.7	36.1	-3613.1	8029.0			No chemical field data, use lab results.
SMP-JR1		3/12/2013	14363	7.2		1690.0	8.3									0.0	0.0	0.0	0.0	0.0			
																0.0	0.0	0.0	0.0	0.0			
Average			**6566**	**7.0**	**6.6**	**1337.2**	**15.0**	**103.1**	**-31.0**	**8.1**	**0.9**	**0.1**	**251.5**	**2.5**	**620.6**	**642.2**	**5.2**	**70.6**	**-2446.6**	**8138.9**			