WATERSHED BASED PLAN FOR LITTLE TENMILE CREEK OF THE WEST FORK RIVER (HUC-8 #05020002)

PREPARED BY:
THE NATIONAL MINE LAND RECLAMATION CENTER
THROUGH A GRANT PROVIDED BY:
WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUNE 10, 2015

Table of Contents

List of Figures

List of Tables

List of Acronyms

AMD	acid mine drainage
AML	abandoned mine land
AMLIS	Abandoned Mine Lands Inventory System
AML&R [WVDEP]	Office of Abandoned Mine Lands & Reclamation
ANS's	Aquatic Nuisance Species
CAFO	Concentrated Animal Feeding Operations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	conversion factor
BMP	best management practice
DMR [WVDEP]	Division of Mining and Reclamation
DNR	West Virginia Division of Natural Resources
DWWM [WVDEP]	Division of Water and Waste Management
EPA	U.S. Environmental Protection Agency
ERIS	Environmental Resources Information System
FEMA	U.S. Federal Emergency Management Agency
FWS	U.S. Fish and Wildlife Service
GWF	Guardians of the West Fork Association
GIS	geographic information system
GPS	global positioning system
HUC	Hydrologic Unit Code
IBA	Important Birds Area
NGOs	Non-Government Organizations
NMLRC	National Mine Land Reclamation Center
NOAA-NCDC	National Oceanic and Atmospheric Administration, National Climatic Data Center
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source Program
NRCS	Natural Resources Conservation Service
OSM	U.S. Office of Surface Mining Reclamation and Enforcement
PAD	Problem Area Description
PIF	Partners in Flight
RBP	Rapid Bioassesment Protocol
RCRA	Resource Conservation and Recovery Act
SFHA	Special Flood Hazard Area
SMCRA	Surface Mining Control and Reclamation Act
SRF	Stream Restoration Fund
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UST	Underground Storage Tank
WAP [WVDEP]	Watershed Assessment Program
WVBAC	West Virginia Brownfield Assistance Center
WBP	Watershed Based Plan
WCAP	Watershed Cooperative Agreement Program
WVDEP	West Virginia Department of Environmental Protection
WVDOH	West Virginia Division of Highways
WVGES	West Virginia Geological and Economic Survey
WVSCI	West Virginia Stream Condition Index
WVU	West Virginia University

1 Executive Summary

1.1 Project Background

This document is a comprehensive watershed based plan (WBP) for Little Tenmile Creek, a tributary of the West Fork River located in Harrison County, West Virginia. This watershed based plan will encompass Little Tenmile Creek and its tributaries, as well as Jones Creek and the section of Tenmile Creek from its confluence with Little Tenmile Creek to the mouth of Tenmile Creek at the West Fork River. This project originated as a unique partnership between academia, state agencies, and a non-profit group. Funding was provided through a grant from the West Virginia Department of Environmental Protection's (WVDEP's) Division of Water and Waste Management (DWWM).

Development of the watershed based plan was initiated by the Guardians of the West Fork Watershed Association (GWF) in partnership with the National Mine Land Reclamation Center (NMLRC) and DWWM due to the nonpoint source pollution issues found within the watershed. Little Tenmile Creek, Jones Creek, and Tenmile Creek to its confluence with the West Fork, are a combined 43 mi^2 tributary of the West Fork River located in Harrison County, WV. This watershed is largely rural, with the two largest settlements of Lumberport and Wallace located near the confluence of Tenmile Creek and the West Fork River and near the headwaters of Little Tenmile Creek, respectively. Legacy issues associated with coal mining have led to sections of Little Tenmile Creek and Jones Creek being placed on the 303(d) list for impaired streams.

The original West Fork Total Maximum Daily Load (TMDL) (which covers Little Tenmile Creek and Jones Creek) was approved in 2002. In 2014, the West Fork River TMDL was updated by the WVDEP. No TMDL has been specifically created for the Little Tenmile Creek and Jones Creek watersheds. However, the updated West Fork River TMDL lists iron and fecal coliform as impairments in the Little Tenmile Creek/Jones Creek watersheds.

Throughout the watershed, the Pittsburgh coal seam has been mined extensively. The majority of the mining performed in the Little Tenmile Creek/Jones Creek watershed was underground mining, although some surface mining also occurred within the watershed. Water quality from underground mines in this coal seam may be either acidic or alkaline, depending on the local geology.

The Office of Surface Mining's (OSM's) Abandoned Mine Lands Inventory System (AMLIS) has identified 40 problem areas within the Little Tenmile Creek and Jones Creek watersheds. Of the 40 problem areas, 22 have been reclaimed. While water conveyance measures such as wet seals and limestone channels have been installed at these reclaimed areas, no water quality remediation measures have been taken. Little Tenmile and Jones Creek are still large contributors of metals and fecal coliform bacteria to the West Fork River due to a lack of installed water quality improvements.

1.2 Partnership Mission and Project Goals

The mission of the partnership formed for this project is to support the preservation and improvement of the ecological integrity of the West Fork River, its tributaries, and its watershed. The goals of this plan are to develop a set of recommendations to improve water quality and stream habitat, enable greater use of the creeks for recreation, and help stakeholders to implement the objectives of the West Fork River TMDL.

1.3 Project Overview

The creation of the watershed based plan for Little Tenmile/Jones Creek began in 2013 because water conveyance structures were constructed within some of the tributaries of Little Tenmile Creek, notably Bennett Run; however, water quality remained poor. The Little Tenmile Creek/Jones Creek watersheds provided an ideal environment for a watershed based plan because of the need for water quality improvement and the availability of partners to implement the plan. NMLRC, GWF, and the WVDEP developed and implemented a sampling plan for water and benthic macroinvertebrates and composed a plan to improve the watershed, including goals and objectives for measuring progress. NMLRC employees performed stream monitoring and provided assistance in developing management recommendations. Feasibility and performance of each recommended improvement were assessed by all project partners. This WBP summarizes the results of this partnership, and includes a prioritized implementation plan, estimated costs, and monitoring plan.

1.4 Existing Conditions

Little Tenmile Creek, Jones Creek, and Tenmile Creek to its confluence with the West Fork, are a combined 43 mi^2 tributary of the West Fork River located in Harrison County, WV. This watershed is largely rural with the two largest settlements of Lumberport and Wallace located near the confluence of Tenmile Creek with the West fork River and near the headwaters of Little Tenmile Creek, respectively. Chemical and macroinvertebrate sampling showed that water quality was negatively affected by mine drainage, in part due to the large amount of abandoned coal mines within the watershed. High concentrations of iron (and occasionally aluminum) from abandoned mines were found in several areas of the watershed. Some areas of the watershed are also heavily impacted by fecal coliform bacteria. Other nonpoint sources of pollution, such as sediment, may be masked due to the heavy acid mine drainage (AMD) contamination.

Mine drainage is a common problem in the coal-bearing regions of West Virginia. High pyrite content is often found in associated geological strata. Coal seams in north central West Virginia are particularly prone to either acid and alkaline mine drainage depending upon surrounding geology. Runoff from underground and surface mines may seriously impact water quality in this region. Little Tenmile Creek has multiple sources of mine drainage with high metal concentrations, and in a few cases, high acidity. Some sections

of the main stem and tributaries have significant deposits of iron and aluminum salts, which have likely reduced populations of fish and benthic macroinvertebrates. Little Tenmile Creek and Jones Creek were listed as impaired in WV 303(d) lists in 1996 and 1998. In 2014, the West Fork River TMDL was updated. Eighteen sections of Little Tenmile Creek, Jones Creek and lower Tenmile Creek were earmarked for reductions in iron and 12 sections required reductions in fecal coliform bacteria.

1.5 Improvement Plan and Analysis

A list of possible sites to be reclaimed was identified based on field and laboratory analyses. A total of 14 reclamation project sites is provided. Reclamation project sites will be reclaimed in the order of upstream to downstream as not to interfere with one another. The goal of each reclamation project is an 80% reduction in metal and acidity loads. Conceptual designs complete with cost information for each project is provided as an estimate of water quality treatment costs.

1.6 Quantitative Assessment and Results

Improved water quality in the West Fork River is the main goal to implementing this WBP. Performance will be assessed using WV state water quality standards as well as the 80% reduction benchmark mentioned previously. Identification and monitoring of benthic macroinvertebrate organisms throughout the watershed will provide an overall picture of aquatic life within the watershed. These metrics will provide the best quantitative measurement of project results.

1.7 Implementation, Projected Costs, and Funding

Implementation will require the aid of all stakeholders with interests in the Little Tenmile Creek/Jones Creek watersheds. Successful WBP implementation will require the cooperation of NPDES permit holders, state and federal agencies, academia, and Non-Government Organizations (NGOs). NMLRC and DWWM intend to lead implementation of this plan and offer technical and administrative assistance to watershed stakeholders. Numerous AMD abatement projects have been completed by NMLRC and stakeholders within the West Fork River watershed, notably on Lambert Run. Five mine drainage remediation projects have been constructed within Lambert Run. A sixth project is currently under construction. The completion of the sixth project will likely enable the removal of Lambert Run from the 303(d) list for pH and metals.

NMLRC plans to follow a similar plan in Bennett Run, which would be the first AMD abatement projects implemented within the Little Tenmile/Jones Creek watersheds. Seven project sites have been identified within Bennett Run and will be completed in order from upstream to downstream on the one mile stretch of impaired water. This implementation ensures that projects will not interfere with one another. Outside of Bennett Run, an additional seven AMD abatement projects have been identified throughout the watershed. They will be implemented in order of upstream to

downstream as they enter Little Tenmile Creek. Tables 13, 14, and 15 of this plan offer a list of projects, their order of implementation, and a projected cost per project. In sum, the estimated total capital cost to install AMD abatement projects within the watersheds is $1,260,679.

Acceptance of this plan will make the Little Tenmile Creek and Jones Creek watersheds eligible for Clean Water Act Section 319 funding; the most significant source of funding available for projects of this type in West Virginia. Additionally, grants specifically for mine drainage remediation projects on Abandoned Mine Lands (AMLs) are available through OSM's Watershed Cooperative Agreement Program (WCAP). Furthermore, the Stream Restoration Fund (SRF) has funds available for the restoration and remediation of streams in the state of WV which have been affected by coal mining or mine drainage. SRF funds can be used as matching funds for Clean Water Act Section 319 funds.

2 Introduction

2.1 Document Overview

A watershed based plan (WBP) is a document that describes all major environmental impacts within a watershed, and details possible remediation solutions for these impacts. WBPs are used in conjunction with TMDL plans to guide the remediation of environmental issues within a watershed. These plans are also written to aid in obtaining funding for construction of remediation projects.

A WBP covers all environmental aspects of a watershed. The first section of the plan is a description of the watershed, including such features as hydrology, climate, topography, geology, and vegetation among others. The watershed description also includes land use and demographic data.

The next section of the WBP refers to watershed conditions. These include water quality standards, available water quality data, and flow data. A pollutant assessment is also performed as part of the WBP. This assessment includes both point and nonpoint sources of pollution. Pollutant loads are then linked to water quality by establishing current water quality conditions and estimating future conditions.

The goals and objectives of the plan are then discussed with a specific focus on pollutant load reductions and management objectives. Current management strategies are detailed, along with plans for future pollutant management. Finally, the implementation program design is discussed. This section includes a: schedule of activities, milestones, and education of the watershed community. Water quality data is provided in appendices to this report.
This specific WBP is for the Little Tenmile Creek/Jones Creek watersheds, which are tributaries of the West Fork River, and are located in north-central West Virginia. In

2002, the final TMDL for the West Fork River was approved by EPA Region 3. The TMDL was updated in 2014. Interest in restoring the West Fork River has grown due to an active group of conservationists in the watershed (GWF); they provided the impetus for baseline water sampling detailed in this report to be accomplished. After approval of this watershed based plan, projects will be constructed to mitigate identified problem areas in the Little Tenmile/Jones Creek watersheds. In the 2014 West Fork River TMDL update, both Little Tenmile Creek and Jones Creek were listed as impaired by iron and fecal coliform bacteria. This watershed based plan will focus on these issues.

2.2 Watershed Management Plan Purpose and Process Used

The purpose of this plan is to document the existing characteristics and conditions within the Little Tenmile/Jones Creek watersheds, and identify problem areas for restoration. This was done by first compiling all existing water quality data. Some of these data sources included: WVDEP Watershed Assessment Program (WAP), WVDEP Abandoned Mine Lands (AML) program, and Guardians of the West Fork Watershed Association. Watershed characteristics were also compiled: GIS data such as aerial photography; digital elevation models; and topographic maps. From this data, it was determined that the most prevalent problem within the watershed is AMD and its impacts upon aquatic life. The NMLRC worked collaboratively with GWF to complete an intensive field survey of the watershed to verify the existing data and collect additional data. Three types of water quality samples were collected:

AMD: NMLRC collected water quality samples at several points on the main stems of Tenmile Creek, Little Tenmile Creek, and Jones Creek as well as the mouths of the major tributaries within the Little Tenmile/Jones Creek watersheds. Water quality samples were also grabbed on the West Fork River just below the discharge from Tenmile Creek and from mine portals emanating within the watershed. This baseline sampling showed that AMD was emanating from various inputs within the watershed. In all, 30 sites were located and sampled in accordance with EPA standard procedures.

Coliform: NMLRC collected total coliform samples at several points on the main stems of Tenmile Creek, Little Tenmile Creek, and Jones Creek as well as the mouths of the major tributaries within the Little Tenmile/Jones Creek watersheds. Samples were also grabbed on the West Fork River just below the discharge from Tenmile Creek. The baseline sampling showed that the sources of total coliform were distributed throughout the watershed. In all, 26 sites were located and sampled in accordance with EPA standard procedures.

Benthic Macroinvertebrate: Benthic macroinvertebrate samples were collected twice (October/November; 2013 and April; 2014) over the time period of one year. Samples were collected at many of the same points as the AMD samples. In all, nine sites were located and sampled in accordance with EPA standard procedures. Samples were then

scored by NMLRC researchers at the NMLRC laboratory. Scores were determined according to the Stream Condition Index for West Virginia Wadeable Streams (WVSCI).

2.2.1 Watershed Management Team

This watershed plan was prepared as a joint effort by the project team including:

- Jason Fillhart: Environmental Scientist, NMLRC;
- Ben Mack: Research Assistant, NMLRC;
- William Leonetti: Graduate Research Assistant;
- Chance Chapman: Graduate Research Assistant;
- John Eleyette: President, Guardians of the West Fork; and
- Lou Schmidt: Independent Consultant, Crystal Springs Consulting.

The project team also consulted with the WVDEP and local watershed residents.

2.2.2 Public Participation

Guardians of the West Fork Watershed is a volunteer 501(c)(3) organization dedicated to the preservation and improvement of the ecological integrity of the West Fork River, its tributaries, and its watershed. GWF will monitor and assist agencies in monitoring biological, physical, chemical, and cultural characteristics of the watershed to identify sources of degradation and suggest their elimination. It will publicize the status of the watershed and encourage education and recreational enjoyment of the watershed. It will seek membership and outside funding to support its activities.

This organization primarily examines watershed health in Marion, Harrison, and Lewis counties in north central West Virginia. Members work with local, state, and federal organizations to design and implement passive treatment systems to remediate local waters from decades of exposure to acid mine drainage from coal mining operations. The central goals of this organization are to:

1. Improve ecosystem health in the West Fork River watershed, and
2. Secure potable water resources for human uses.

3 Watershed Description

3.1 Physical and Natural Features

Little Tenmile Creek, Jones Creek, and Tenmile Creek to its confluence with the West Fork, is a combined 43 mi^2 watershed and is located entirely in Harrison County, WV. Tenmile Creek is a direct drain to the West Fork River on the eastern edge of Lumberport (Figure 1).

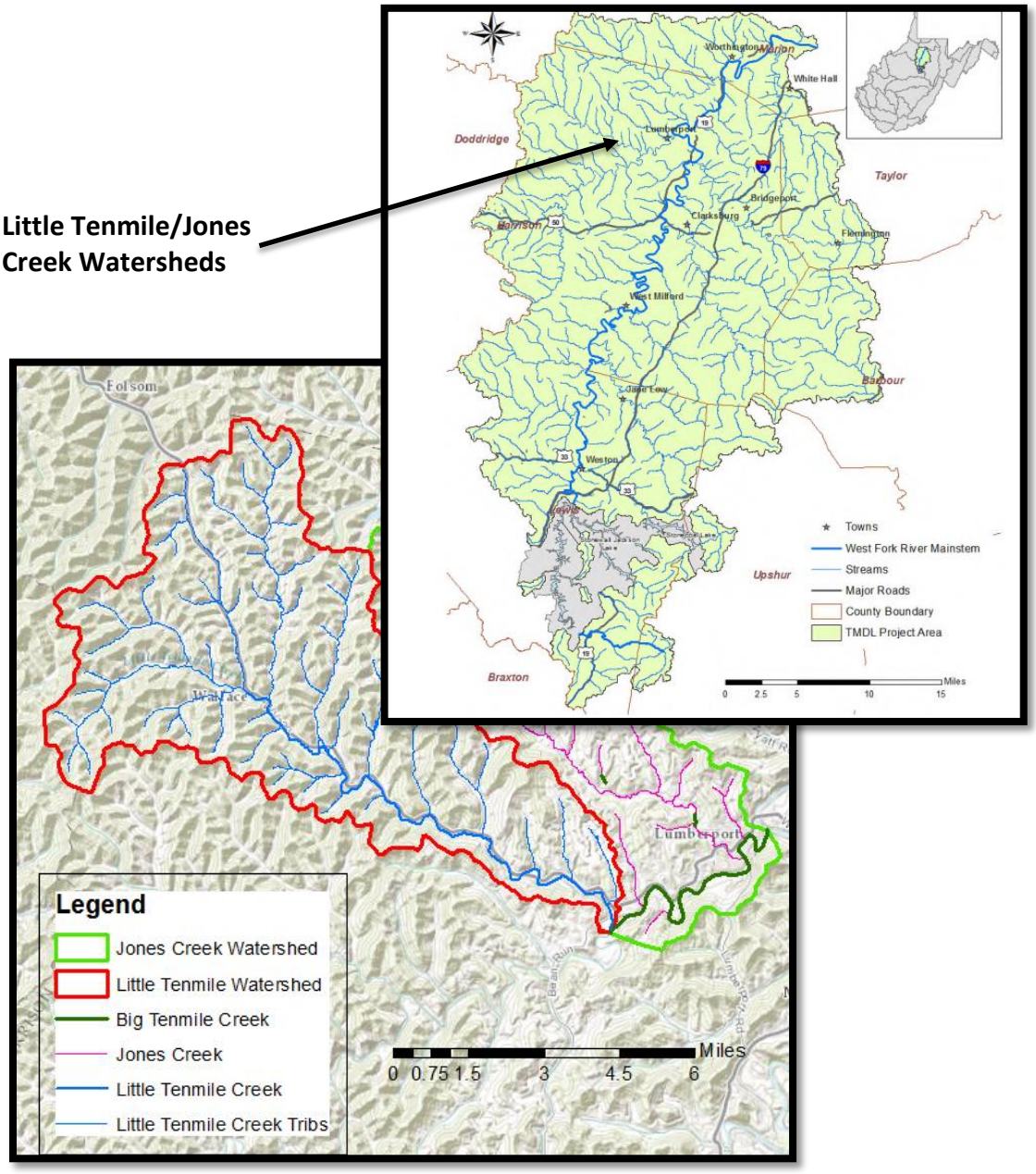

Figure 1: Map of the Little Tenmile/Jones Creek Watersheds.

3.1.1 Watershed Boundaries

Tenmile Creek is a direct drain into the West Fork River; the 8 digit Hydrologic Unit Code (HUC) for the West Fork is 05020002. Tenmile Creek (HUC 10 0502000205) is a fairly large subwatershed of the West Fork. Tenmile Creek is further subdivided into smaller subwatersheds, including Little Tenmile Creek (HUC 12 050200020503) and Jones Creek (HUC 12 050200020504). This plan covers all of Little Tenmile Creek, Jones Creek, and Tenmile Creek from the confluence with Little Tenmile Creek to its confluence with the West Fork River. Figure 1 is representative of the watershed boundaries for the Little Tenmile/Jones Creek watersheds. Little Tenmile is outlined in red and Jones Creek and part of Tenmile Creek is outlined in green (Figure 1).

3.1.2 Hydrology

Both Little Tenmile Creek and Jones Creek are ungauged, direct drains to Tenmile Creek; an ungauged, direct tributary to the West Fork River. Because it is ungauged, no continuous flow data, including base flow, storm flow, or flashiness, currently exist. However, stream flow was measured during the four sampling events that were performed by NMLRC. This data will be reviewed later in this report. The project team also talked to members of local communities within the watershed to determine hydrologic characteristics. No drastic changes in water quantity from current conditions were found to have existed as a result of these community interviews.

The mainstem of Little Tenmile Creek can be described as a moderately entrenched stream with low to moderate channel sinuosity. Sinuosity remains relatively consistent from the headwaters to the mouth. The upper region has a well-defined floodplain. The channel slope is fairly consistent throughout the run of the stream (approx. 0.3-1.2%). At the mouth, the slope is less than 0.5%. Frequently, this low gradient section of Little Tenmile Creek is back flooded by the mainstem of Tenmile Creek. This can be evidenced by the steep and highly eroded banks at the confluence of the Little Tenmile and Tenmile Creeks. The overall mean slope of Little Tenmile Creek is approx. 0.4% from the headwaters to its confluence with Tenmile Creek.

The mainstem of Jones Creek can also be described as a moderately entrenched stream with low to moderate channel sinuosity. Sinuosity increases from the headwaters to the mouth. The upper region has a well-defined floodplain. The channel slope is fairly consistent throughout the run of the stream (approx. 0.4-1.5%). At the mouth, the slope is less than 0.4%. Frequently, this low gradient section of Jones Creek is back flooded by the mainstem of Tenmile Creek. This can be confirmed by the steep and highly eroded banks near the confluence with Tenmile Creek. The overall slope of Jones Creek is approx. 0.5% from the headwaters to its confluence with Tenmile Creek.

Little Tenmile's creek bed is predominately cobbles and sediment (sand, silt and clay <2mm in diameter). However, as the stream approaches its confluence with Tenmile Creek, the creek bed is mostly sediment and fine pebbles. This is especially true at the mouth of the creek. There is very little visible bedrock exposed anywhere within the watershed. The bed of Jones Creek is predominately cobbles, coarse pebbles, and sediment. It differs from Little Tenmile in that more sediment occurs in the stream bed towards the headwaters than towards the mouth. This can be attributed to more intensive agricultural activities in the headwaters of the stream. Many of these farms lack riparian buffers to prevent erosion of sediment into the receiving stream. There is also very little visible bedrock exposed anywhere within the Jones Creek watershed.

The Little Tenmile/Jones Creek watersheds have similar physical characteristics. However, water chemistry varies significantly, specifically in the sub-tributary of Bennett

Run. Major impacts from legacy coal mining are found within this subwatershed. Bennett Run will be discussed in more detail later in this report.

There are no navigable waterways in the Little Tenmile/Jones Creek watersheds. However, one dam does exist on the mainstem of Jones Creek. The dam is located near the town of Lumberport and impounds water used to provide a drinking water supply for Lumberport. According to the West Virginia Division of Natural Resources (WVDNR), the impoundment is referred to as Lumberport Lake and is also used for fishing.

3.1.3 Climate and Precipitation

Typically, the weather in the north-central region of West Virginia has a strong seasonal pattern. Greater than half of the precipitation falls in the spring and summer months of April-September. The Little Tenmile/Jones Creek watersheds receive a mean precipitation of 45.6 inches per year. October is generally the driest month of the year (3.07 in.) and May is the wettest (4.8 in).

The average high temperature within the watershed is 63.3 degrees Fahrenheit (F) and the average low temperature is 41.2 degrees F. The overall average temperature in the general area around the watershed is 52.2 degrees F. (National Oceanic and Atmospheric Administration, 2010).

3.1.4 Surface Water Resources

Surface water resources within the 43 mi^2 Little Tenmile/Jones Creek watersheds consist of both the creeks and their tributaries. There are no natural lakes within the watershed. However, there are numerous man-made ponds that were used in the mining industry as settling ponds. Additionally, man-made ponds are present in the watershed as impoundments for agriculture. A reservoir/impoundment also exists in Lumberport and is used to supply the town with potable water. The reservoir acts as a dam to Jones Creek and is also used for recreational activities such as fishing.

Currently, the only surface water intake within the watershed is the reservoir for the town of Lumberport. According to a representative from the Lumberport Water Authority, their municipal water service extends roughly 0.7 to 2.1 miles depending on the direction. Approximately 1,580 people receive their potable water from the municipal facilities in Lumberport. Private groundwater wells are used in the more rural areas of the watershed.

3.1.5 Ground Water Resources

There are no documented springs within the watershed. However, undocumented springs may exist. There are also no groundwater intakes within the Little Tenmile/Jones Creek watersheds that serve a large population. However, a majority of the residents within the watershed rely on private groundwater wells for their drinking water.

Groundwater in the headwaters of the watershed is likely better quality than groundwater found in the lower reaches of the watershed due to major impacts from coal mining occurring just east of Dola in the Bennett Run subwatershed. It is likely that groundwater in this area of the watershed is contaminated due to historic mining and its associated legacy issues. Higher concentrations of metals and lower pH values may be found in this mining-impacted groundwater.

3.1.6 Flood Plains

With the exception of the extreme headwaters of Little Tenmile and Jones Creeks, these two creeks and many of their tributaries are in the estimated 100 year floodplain (Figure 2). The 100 year floodplain represents the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area (SFHA) is the area subject to flooding by the 1% annual chance flood; the SFHA is shaded in purple in Figure 2 below (FEMA Flood Map Service Center, 2014). Areas outside the purple shading are less prone to flooding and therefore outside of the SFHA. A few of the passive treatment systems mentioned later in this document would be installed close to the SFHA; therefore, flooding must be taken into consideration when choosing locations for these systems.

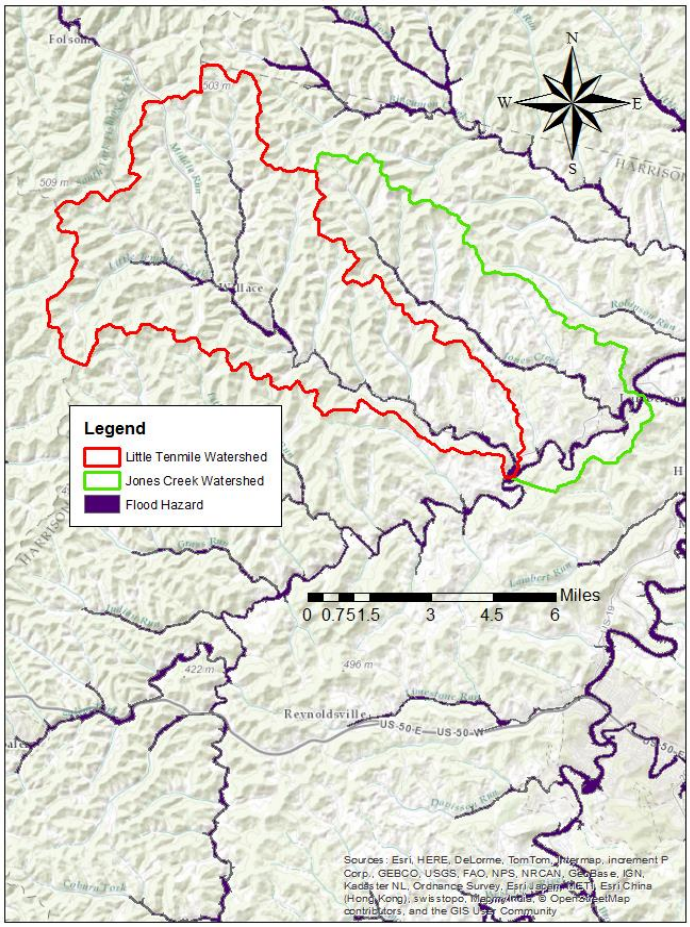

Figure 2: FEMA Flood Hazard Risk for Little Tenmile, Jones, and Tenmile Creeks. Areas shaded purple are the estimated 100 year flood plain.

3.1.7 Navigation Channels, Ports, and Harbors

There are no navigation channels, ports, or harbors within the Little Tenmile/Jones Creek watersheds.

3.1.8 Dams

A reservoir/dam exists in Lumberport and is used to supply the town with potable water. The reservoir acts as a dam to Jones Creek and is also used for recreational activities. There are no other know dams within the Little Tenmile/Jones Creek watersheds.

3.1.9 Topography/Elevation

Little Tenmile Creek originates at an elevation of approximately 1,095 ft. mean sea level (msl) and drops roughly 180 ft. to enter the Tenmile mainstem at an elevation of 915 ft. msl (Figure 3). Jones Creek originates at an elevation of nearly 1,069 ft. msl and drops approximately 169 ft. to enter the Tenmile mainstem at an elevation of 900 ft. msl (WV GIS Technical Center, 2005).

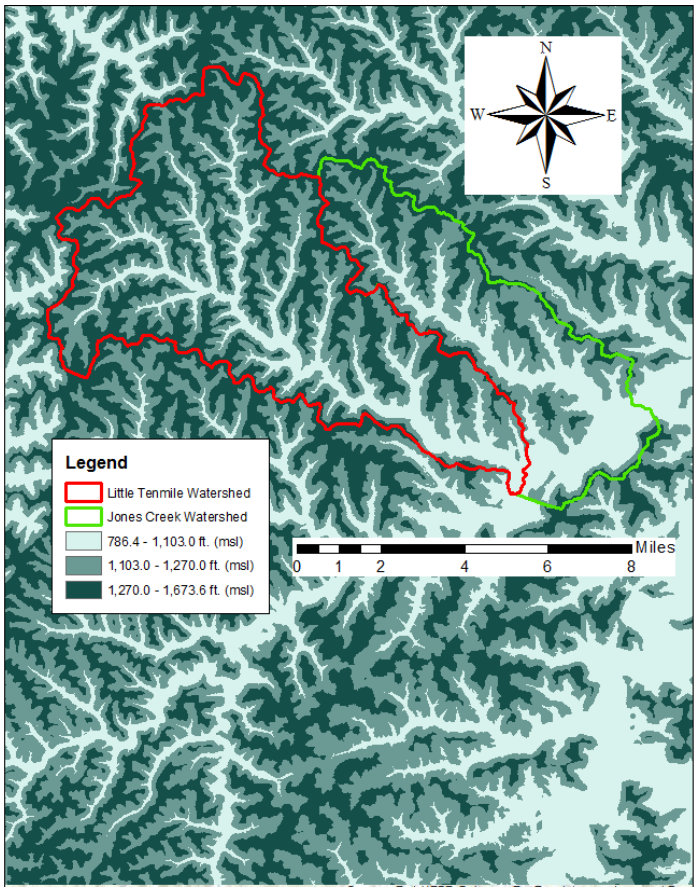

Figure 3: Digital Elevation Model of the Little Tenmile and Jones Creek watersheds. High elevations are shown in dark green and low elevations are shown in light green. Elevation values are given in feet.

3.1.10 Geology and Soils

The majority of the rocks that outcrop in West Virginia are Paleozoic or Paleozoic Transitional in age. In the Little Tenmile/Jones Creek watersheds, the rocks that outcrop all belong to two systems (Carboniferous and Devonian) and one period (Pennsylvanian). The majority of the outcrops are found in the Dunkard, Monongahela, and Conemaugh Series of the Upper Carboniferous system. These geological series also contain all of the coal seams found in the watershed. The rest of the Upper Carboniferous system consists of the Allegheny and Pottsville Series. The remainder of the geology consists of the Lower Carboniferous (3 Series) and Devonian (1 Series) systems. The oldest formation documented in the watershed is the Catskill Sandstone and the youngest formation is the Dunkard Series (Hennan and White, 1912).

Five coal seams are found within the Little Tenmile/Jones Creek watersheds. These are the Washington, Waynesburg, Uniontown, Redstone, and Pittsburgh coal seams. The Washington coal seam is found within the deeper depths of the Dunkard Series. This coal is one to two feet thick across the region and was typically not mined due to its lack of thickness (Hennan and White, 1912).

The Waynesburg coal seam is found at the top of the Monongahela Series. This coal seam is surrounded by sandstone and shale and does not often obtain minable thickness. In the area of Little Tenmile/Jones Creek, the Waynesburg seam is one to three feet thick (Hennan and White, 1912).

The Uniontown coal seam is found near the middle of the Monongahela Series. It is bracketed by a layer of slate and limestone. The Uniontown coal can be as thick as five feet and represents a minable resource in some areas of the watershed.

The Redstone coal seam is located above the Pittsburgh coal seam and is surrounded by layers of slate and limestone. The Redstone seam is only six to twelve inches thick in this region; therefore, it was exclusively surface mined within the watershed. This seam was mined in the eastern parts of the watershed near the West Fork River.

The Pittsburgh coal seam represents the most significant coal reserve in the watershed. This seam was heavily mined in this area and contributes to many of the mine drainage issues within the watershed. The Pittsburgh seam is found at the base of the Monongahela series and is surrounded by slate and sandstone layers. Pittsburgh seam thickness ranges from one to ten feet (Hennan and White, 1912).

Seventeen different soil types are represented in the Little Tenmile/Jones Creek watersheds (Table 1). Of these, the Gilpin-Upshur, Westmoreland, Gilpin, Strip Mines, Udifluvents/Fluvaquents, Clarksburg, and Monongahela soil families are the most prevalent. The majority of these soils are either a type of loam or a stony soil. The Strip Mines are the main exception to this trend, as they are mostly made up of udorthents and mudstone (Natural Resources Conservation Service, 2014). Figure 4 shows a general soil map for Harrison County. The Little Tenmile/Jones Creek watersheds are in the outlined area of the map.

Table 1: Soil types represented in the Little Tenmile/Jones Creek watersheds.

Soil Series	**Percent coverage in watershed (%)**
Gilpin-Upshur	46
Westmoreland	19.7
Gilpin	8.9
Strip Mines	6.1
Udifluvents and Fluvaquents	4.6
Clarksburg	3.6
Monongahela	2.1
Vandalia	1.5
Lindside	1
Water	0.7
9 other soil types	5.8

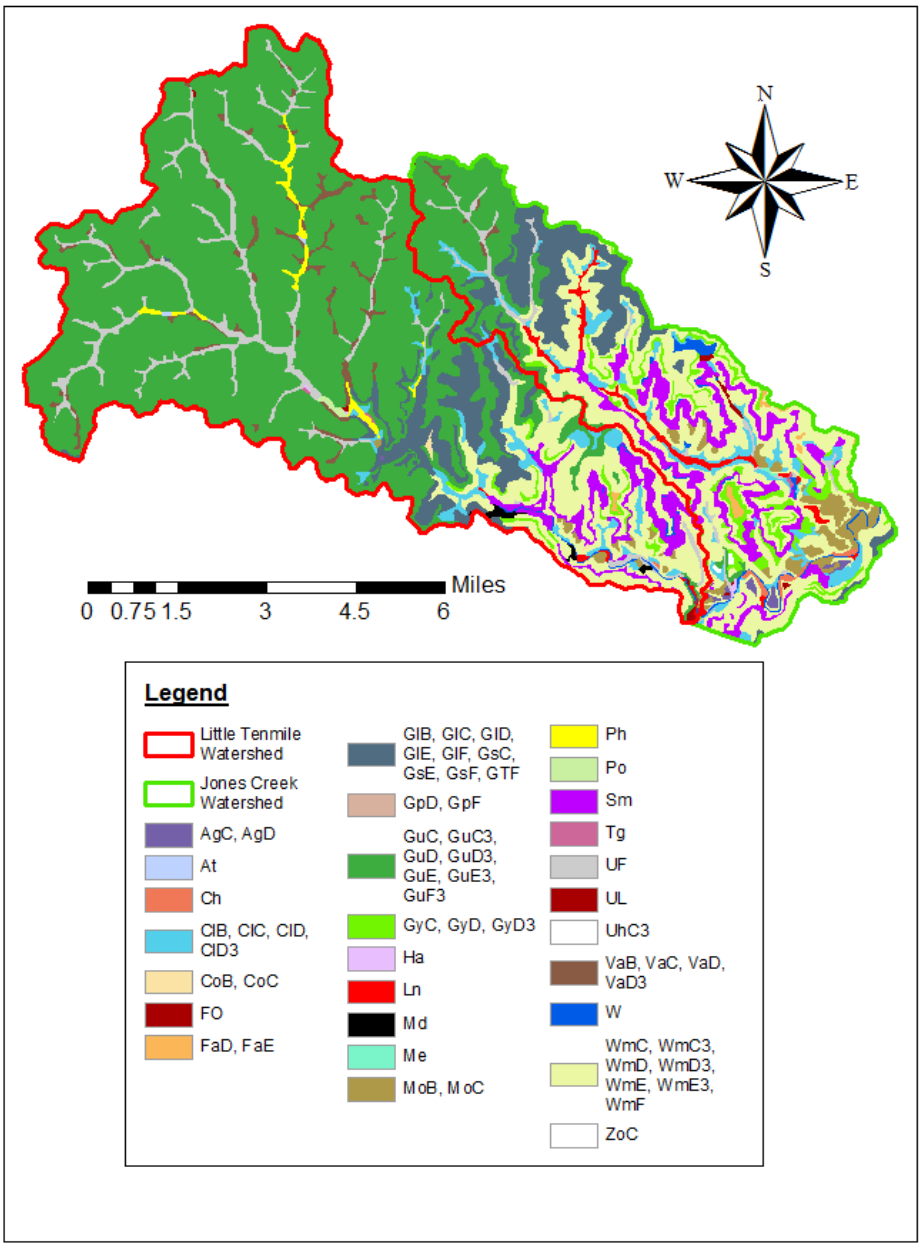

Figure 4: General soil map of the watersheds. Note the predominant Gilpin-Upshur soils in the headwaters of both Little Tenmile and Jones Creek.

3.1.11 Vegetation

The majority of the Little Tenmile/Jones Creek watersheds (82%) is deciduous forest (Table 2). Approximately 9% of the area is used for pasture and/or hay. Most of the remaining area of the watershed consists of open space, cultivated cropland, urban area, grassland/herbaceous, coniferous forest, and small areas of bare land. The bare land is likely from coal mining activities. (USGS Land Cover, 2001).

Table 2: Land use categories within the Little Tenmile/Jones Creek watersheds.

Land Use Type	% of total land use
Deciduous Forest	82%
Pasture/Hay	9%
Open Space	6%
Cultivated Crops	1%
Low Intensity Urban	0.70%
Barren Land	0.49%
Open Water	0.31%
Grassland/Herbaceous	0.24%
Mixed Forest	0.18%
Medium Intensity Urban	0.07%
Evergreen Forest	0.04%
TOTAL	100.00%

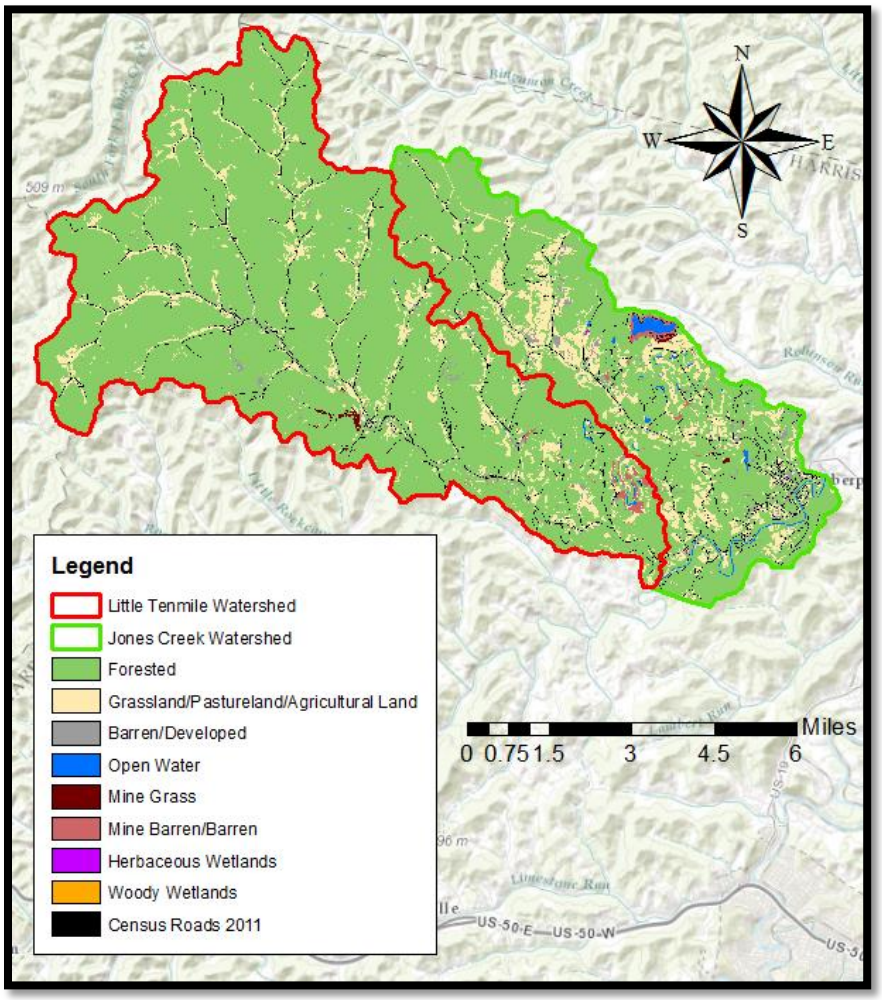

Figure 5: Land use map for the watersheds. Note that the predominant land use type is deciduous forest in the both Little Tenmile and Jones Creek watersheds.

3.1.12 Exotic/Invasive Species

Several non-native invasive species are found in West Virginia. These include: garlic mustard, Japanese honeysuckle, kudzu, purple loosestrife, mile-a-minute, Japanese knotweed, sachaline knotweed, spotted knapweed, barren brome, and tree of heaven. It is likely that many of these could be found in the Little Tenmile/Jones Creek watersheds. However, a detailed survey of invasive species within the Little Tenmile/Jones Creek watersheds has never been performed.

3.1.13 Wildlife

West Virginia is home to more than 57 species of amphibians and reptiles, 70 species of wild mammals, 178 species of fish, and nearly 300 species of birds (WVDNR, 2003a). Many of these species can be found in the Little Tenmile/Jones Creek watersheds. Some species of note within the watershed include: white-tailed deer, various species of fish, coyotes, black bears, and wild turkeys.

3.1.14 Protected Species

Eleven species of animals and four species of plants found in West Virginia are listed as endangered (WVDNR, 2003b). Of these endangered species, only the Indiana Bat, Virginia Big-Eared Bat, Clubshell Mussel, and Snuffbox Mussel are found in Harrison County (US Fish and Wildlife, 2013). The Indiana Bat and the Virginia Big-Eared Bat may be found in open, abandoned mines and caves within the Little Tenmile/Jones Creek watersheds. However, an extensive bat survey documenting their summer habitat, as well as hibernacula, has never been completed for Harrison County.

In addition, four species of animals and two species of plants are listed as threatened in West Virginia. Of these, none are found in Harrison County (WVDNR, 2003b). However, the Northern Long-Eared Bat is on the statewide “proposed” list as either threatened or endangered (US Fish and Wildlife, 2013).

3.1.15 Sensitive Areas

There is potential for two endangered bat species to be found in the Little Tenmile/Jones Creek watersheds. Both the Indiana bat and the Virginia Big-Eared bat could be found in abandoned mines or caves. Special care would need to be taken to ensure the survival of these species if they reside in a mine that required reclamation. A bat survey would be completed before mine reclamation would take place. A bat gate would be installed to allow the bats to enter and exit the mine if a bat population was found.

The Snuffbox Mussel has also been documented as occurring in the West Fork River (US Fish & Wildlife, 2013). Depending on their range in the West Fork and their

maneuverability within watersheds, the Little Tenmile/Jones Creek watersheds may someday accommodate these endangered mussels. Areas of the watershed may one day be deemed sensitive if they harbor this species.

3.1.16 Cultural Resources

No cultural resources are known to exist within the watersheds at this time.

3.2 Land Use and Land Cover

Land use and land cover data were obtained from the USGS Land Cover Analysis Tool. Data used in this report were based off of the 2001 revision of the National Land Cover Database. The primary land use in the Little Tenmile/Jones Creek watersheds is deciduous forest (Table 2). At the time of this study, less than 1.0% of the watershed is developed (Low and medium intensity urban areas).

3.2.1 Open Space

With the exception of the small towns of Wallace and Lumberport, the Little Tenmile/Jones Creek watersheds have remained almost entirely rural in nature. According to Table 2, roughly 6% of the watershed is open space. However, other areas such as stream corridors are counted as open space as well, even though they are in a separate category (open water). It is anticipated that the amount of open space in the watershed will remain relatively constant in the near future.

3.2.2 Wetlands

Two types of wetlands (emergent and forested/shrub wetlands) occur within the Little Tenmile Creek/Jones Creek watersheds. However, they make up less than 1% of the 43 mi^2 watershed. Of these wetlands, roughly 50% of them are emergent and 50% are forested/shrub wetlands (USFWS, Wetland Mapper, 2014).

3.2.3 Forested Areas

Roughly 82% of the land area within the Little Tenmile/Jones Creek watersheds is forested, with less than 1% of the forested area being evergreen forest. The deciduous forest is dominated by oak, maple, ash, and similar tree types. Forested areas are much less dense near the population centers of Wallace and Lumberport. The amount of farmland also increases nearer to the town of Lumberport and in the central portion of the Jones Creek watershed (Figure 6).

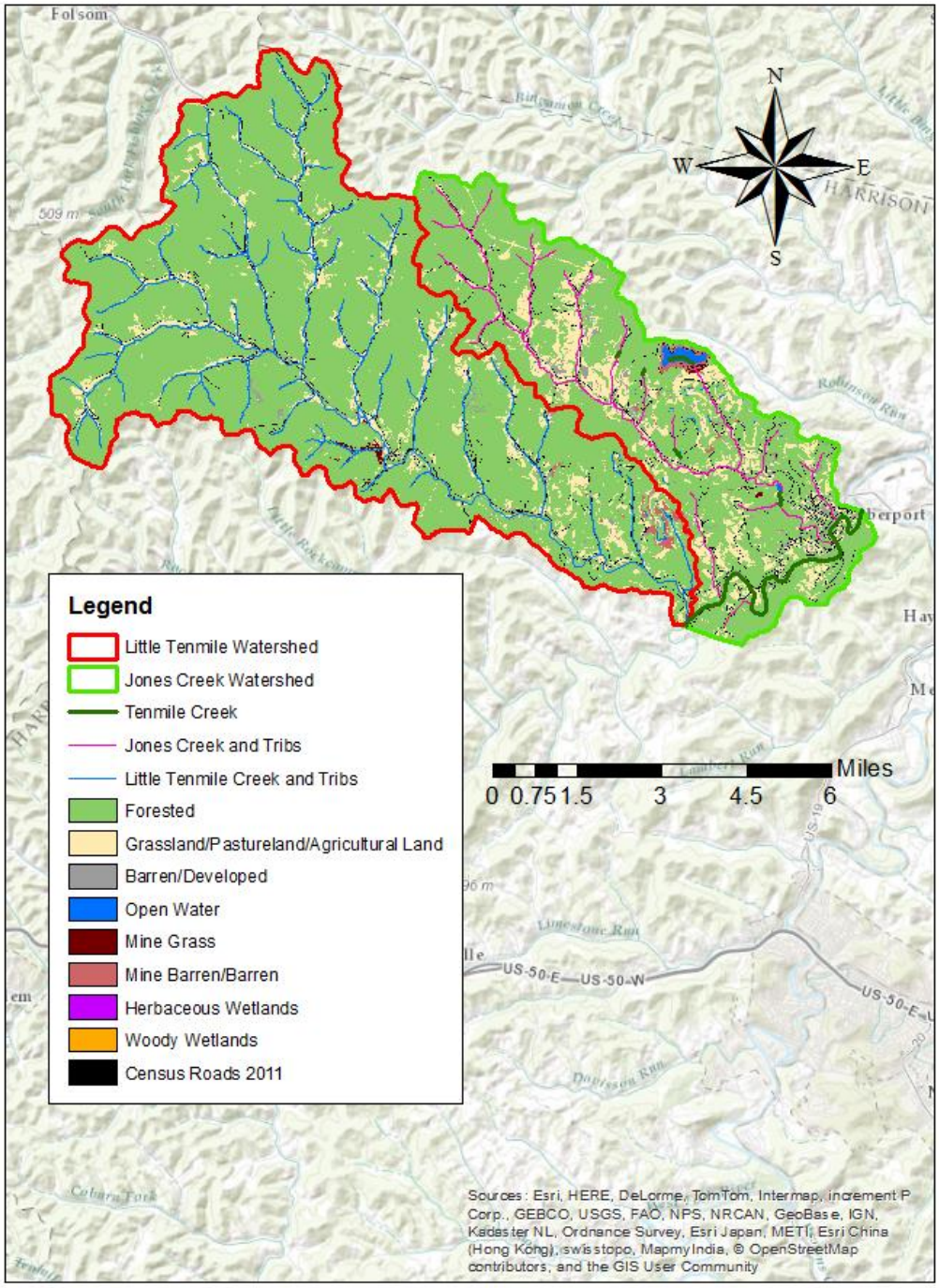

Figure 6: Land cover within the Little Tenmile/Jones Creek watersheds. The majority of the watershed is forested (green). However, some farming and pasture exist near Lumberport and in the central portion of the Jones Creek watershed. Grey areas signify barren/mined land.

3.2.4 Agricultural Lands

There are 778 farms in Harrison County at an average size of 150 acres (USDA, 2012). Most farms within the county are either cattle farms or forage area. The average value of a farm in Harrison County is approximately $318,696. It is unknown exactly how many of these farms are within the Little Tenmile/Jones Creek drainage. However, nearly 10% of the land within the watershed is either cultivated crops or hay/pasture land (Table 2). The majority of these farms are in the eastern part of the watershed near the town of Lumberport or in the central area of the Jones Creek watershed.

3.2.5 Mining

The Pittsburgh coal seam was mined extensively in Little Tenmile and Jones Creek. Underground mining was exclusively performed from Little Elk Creek to the mouth of Little Tenmile Creek (Figure 7). The Pittsburgh seam was also heavily mined throughout the majority of the Jones Creek watershed.

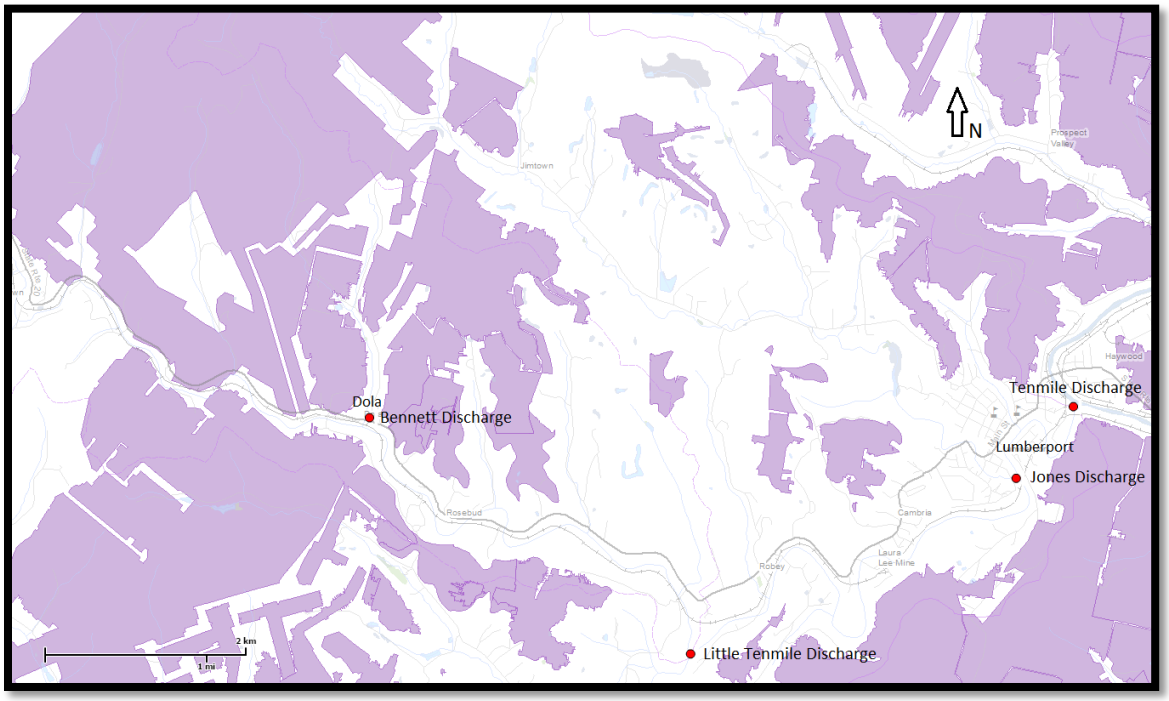

Figure 7: Underground mining within the Little Tenmile/Jones Creek watersheds. The extent of underground mining is in purple.

Surface mining in these watersheds occurred in the eastern part of Little Tenmile Creek (near Lumberport) and extracted the Redstone coal seam (Figure 8). The heaviest concentration of mining occurred from Little Elk Creek to the confluence of Little Tenmile and Tenmile Creeks, as well as from central Jones Creek to its confluence with Tenmile Creek. The sub-tributary of Bennett Run, which enters Little Tenmile Creek in the central part of the watershed, contributes the largest amount of mining pollution within the Little Tenmile/Jones Creek watersheds (WVGES, 2014).

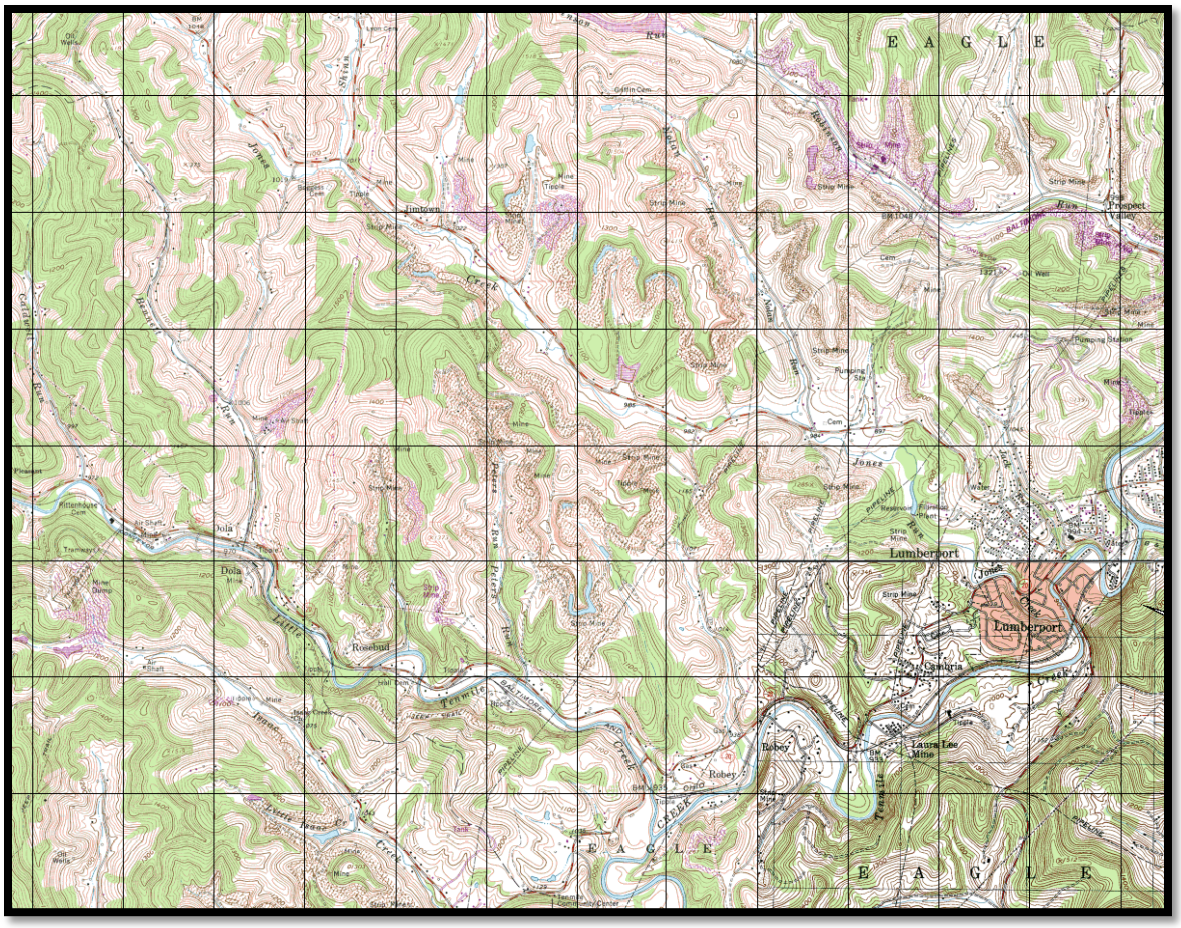

Figure 8: Strip mining within the Little Tenmile/Jones Creek watershed. Areas shaded purple and light red indicate strip mining activities.

3.2.6 Fisheries

There are no commercial fisheries within the Little Tenmile/Jones Creek watersheds.

3.2.7 Recreation

Little Tenmile and Jones Creek have legacy issues associated with coal mining and, in some cases, are affected by current agricultural practices. These environmental issues severely limit the recreational uses of these streams. The major recreational uses are contact recreation, such as wading and swimming, and fishing, mostly in Lumberport Lake. Mitigation of mining impacts and agricultural best management practices along and in Little Tenmile/Jones Creek may present further opportunities for recreation to the citizens of the watersheds.

3.2.8 Developed Areas

The Little Tenmile/Jones Creek watersheds are fairly undeveloped at this time. Figure 9 shows the amount of impervious (white areas) and pervious (black areas) surfaces

within the watershed. The greatest concentration of impervious surfaces is near the towns of Wallace and Lumberport, where there are some light and medium intensity urban areas. Some development has also occurred along the main road corridors in the watershed.

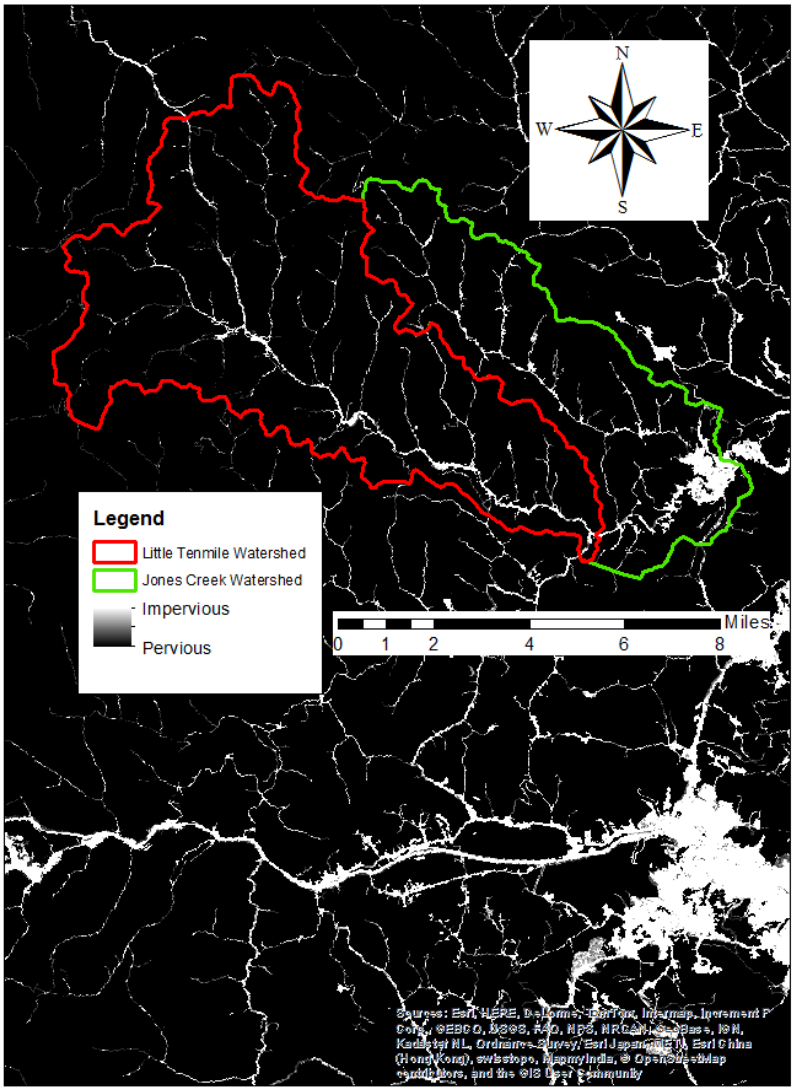

Figure 9: Map of impervious surfaces within the Little Tenmile/Jones Creek watersheds.

3.2.9 Transportation

There are no major transportation corridors within the watershed. The roads that carry the most traffic are two-lane roads with one lane going in each direction. The major transportation corridor within the watershed is West Virginia Route 20, connecting the towns of Wallace and Lumberport. The largest impact from transportation is likely salt and other similar compounds used for road de-icing in the winter. Impacts from road salt are likely smaller in the headwaters due to a lower population density than in other areas of the watersheds.

3.2.10 Political Boundaries

The majority of the land area within the Little Tenmile/Jones Creek watersheds is privately owned. There is no Federal or State owned land within the watershed. In the undeveloped parts of the watershed, much of the land is owned by farmers or land holding companies. Land holding companies often lease the land to groups of citizens for recreational purposes. Land around the towns of Wallace and Lumberport is mainly used for residential dwellings and is owned by private individuals.

3.2.10.1 Federal Lands

There is no federally-owned land within the Little Tenmile/Jones Creek watersheds.

3.2.10.2 State Lands

There is no state-owned land within the Little Tenmile/Jones Creek watersheds.

3.2.10.3 Tribal Lands

There are no tribal lands within the Little Tenmile/Jones Creek watersheds.

3.2.10.4 Local Lands

Land owned by local jurisdictions within the watershed is limited. The Town of Lumberport owns Lumberport Lake and a small amount of land circumventing the lake. The municipal park located near the confluence of Jones Creek and Tenmile Creek is also owned by the town.

3.2.11 Relevant Authorities

There are no federal, state, or tribal lands within the Little Tenmile/Jones Creek watersheds. The Lumberport Water Authority serves the surrounding area of Lumberport and the mayor and municipal board make decisions for both the water authority and park that are owned by the town.

3.2.12 Future Land Use Considerations

No future land use plan has been created for the Little Tenmile/Jones Creek watersheds. However, two future land uses are known. First, a new underground coal mine near Brown, WV will begin extracting coal in the next few years. This mine should not contribute to water quality problems in the watershed. However, it could affect future land use in the watershed by decreasing the amount of land available for other uses.

Harrison County also sits atop various layers of hydrocarbon producing shale. The Marcellus formation is the most notable of these strata. Land within the watershed boundaries is currently, and will continue to be, used for drilling pads, natural gas

pipelines, compressor stations, and other operations associated with the oil and gas industry. Water quality impacts from future gas drilling cannot currently be quantified. However, it is likely that water quality impacts will be seen within the watershed due to these activities. Similar to the new mine in Brown, gas well operations will decrease the amount of land available for other land uses within the watershed.

3.3 Demographic Characteristics

The US Census Bureau collects demographics data based on political boundaries, such as city limits and county lines. Little Tenmile/Jones Creek is completely within Harrison County. As such, the demographic data presented will be for Harrison County. All Census data were obtained from the US Census Bureau's website (US Census Bureau, 2010).

3.3.1 Population

In 1900, Harrison County had a population of 27,690. By 1910, the population had increased almost 43% to 48,381. Between 1910 and 2000, the population of Harrison County had increased roughly 30% to 68,652 people. The US Census Bureau estimated that by 2010, the population had increased to 69,099 with 96% of the population being white, 1.6% being black, 0.2% being Native American, and 0.5% being Asian (US Census Bureau, 2010).

3.3.2 Economics

The 2010 Census determined that there were 28,533 households in Harrison County, with 2.39 persons residing in each household. In 2010, the median household income in Harrison County was $41,799 which was slightly higher than the household median income for the state of West Virginia ($40,400). The per capita income in Harrison County was slightly lower than the average for the state of West Virginia ($22,321 vs. $22,482). Lastly, the percent of persons living below the poverty level was slightly higher in Harrison County than the rest of West Virginia (18.6% vs. 17.6%) (US Census Bureau, 2010).

3.3.3 Languages

The majority of citizens within Harrison County speak English as their primary language (97.7%). However, 2.3% of the county's residents speak a language other than English at home (US Census Bureau, 2010). It is likely that of this 2.3%, the majority of this group of people speak English as well. Since this is the case, outreach materials generated from this watershed based plan will be printed in English.

4 Watershed Conditions

4.1 Water Quality Standards

All streams within West Virginia are regulated by the WVDEP. Regulations concerning West Virginia water bodies are promulgated under Title 47, Series 2 of the West Virginia Department of Environmental Protection Water Resources code, entitled "Requirements Governing Water Quality Standards."

4.1.1 Designated and Desired Uses

According to the West Virginia Legislative Rules for the DEP, Office of Surface Water Quality, the Water Quality Standards Rule 47 CSR2 requires, at a minimum, all waters of the State of West Virginia be designated for the propagation and maintenance of fish and other aquatic life (Category B) and for water contact recreation (Category C). Category B waters include warm water fishery streams, trout waters, and wetlands. Category C includes swimming, fishing, water skiing, and certain types of pleasure boating such as sailing in very small craft and outboard motor boats. According to the state of West Virginia, Little Tenmile Creek does not have a listed designated use and therefore would fall under the general Category B and Category C. Jones Creek is designated as Category A (public water) use, as it is the source for Lumberport's potable water.

4.1.2 Numeric and Narrative Criteria

In the case of Little Tenmile/Jones Creek, numeric criteria have been used to establish if the stream is meeting water quality standards. Numeric criteria are preferred in this case because the source of pollution is known and it is possible that some pollutants found within the watershed could negatively affect human health. Table 3 illustrates numeric criteria for metal concentrations, pH, and fecal coliform within West Virginia streams.

Table 3: Numeric criteria for acute and chronic exposure to two different metals, pH, and fecal coliform bacteria.

Parameter	Use Designation				
	Aquatic Life				Human Health
	B1, B4		B2		
	Acute	Chronic	Acute	Chronic	Acute
*Dissolved Aluminum (ug/L) see below	750 x CF*	750 x CF*	750 x CF*	87 x CF*	

Iron (mg/L)		1.5		1.0	1.5
pH-No values below 6.0 or above 9.0. Higher values due to photosynthetic activity may be tolerated.	x	x	x	x	x
Fecal Coliform Bacteria (cfu/100mL)	The maximum allowable level of fecal coliform content for Primary Water Contact Recreation shall not exceed 200 colonies/100 ml as a monthly geometric mean based on not less than 5 samples per month; nor can it exceed 400 colony forming units/100 ml in more than ten percent of all samples taken during the month.				

* The aquatic life criteria for all metals listed in Appendix E, Table 2 shall be converted to a dissolved concentration by multiplying each numerical value or criterion equation from Appendix E, Table 1 by the appropriate conversion factor (CF) from Appendix E, Table 2. This above excerpt is directly from document *47CSR2 - Requirements governing Water Quality Standards* from the WVDEP website. The current conversion factor for both acute and chronic exposure for aquatic life is 1.000.

4.1.3 Antidegradation policies

The State of West Virginia's antidegradation policies can be found in the legislative rule for the Department of Environmental Protection Secretary's office (WVDEP, 2008). This rule divides the state waters into Tier 1, Tier 2, and Tier 3 waters. Due to impairment, both the Little Tenmile Creek and Jones Creek watersheds are Tier 1 watersheds. All waters of the state receive Tier 1 protection. Tier 1 protection states "existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected" (WVDEP, 2008). Tier 1 watersheds are waters of the state where the "water quality is not sufficient to support recreation and wildlife and the propagation and maintenance of fish and other aquatic life or where the water quality meets but does not exceed levels necessary to support recreation and wildlife and the propagation and maintenance of fish and other aquatic life" (WVDEP, 2008).

4.2 Available Monitoring/Resource Data

All available water quality data pertaining to the Little Tenmile/Jones Creek watersheds were collected for the making of this plan. Water quality data included both chemical and biological data and were collected from a variety of sources. Further descriptions of the data, including who collected it, monitoring station locations, and monitoring duration, will be described in greater detail in the following sections.

4.2.1 Water Quality Data

Acid Mine Drainage

The lower half (from Dola to the mouth near Lumberport) of the Little Tenmile Creek drainage is heavily impacted by AMD. The main stem of Little Tenmile, as well as Jones Creek, is on the 2002 303(d) list of Impaired Streams for metals. TMDLs for iron aluminum, and manganese were established for Little Tenmile Creek and Jones Creek as part of the West Fork River TMDL that was completed in 2002. pH was also listed as an impairment in the Little Tenmile Watershed. The West Fork River TMDL was redeveloped in 2013. In July 2014, the redeveloped West Fork River TMDL was approved. The 2014 TMDL only listed the Little Tenmile/Jones Creek watershed as being impaired by iron.

Water chemistry data has been collected by several different organizations and groups:

- WVDEP: The Watershed Assessment Program (WAP) group collected water chemistry data at three different points on the mainstem of Little Tenmile Creek from 2000 - 2011. Water chemistry data was also collected on eight tributaries of Little Tenmile Creek during this time period. WAP also collected data at four different point on the mainstem of Jones Creek and at one location on Nolan Run (tributary of Jones) from 2000 – 2011. These data can be found in Appendix A.
- WVDEP: Sample data was collected as part of the construction of the 2014 West Fork River TMDL (Appendix A). These data show that both Little Tenmile Creek and Jones Creek are impacted by high iron concentrations.
- NMLRC: Data was collected in 2013 and 2014 (Figure 10) by the NMLRC. Samples were taken quarterly for a one year period. NMLRC also collected samples on Bennett Run in 2011 and 2012. Sampling results and sample locations are given in Appendix A.

Bacteria

Fecal coliform samples were collected by the WVDEP WAP Group at the same time as their other water chemistry sampling. NMLRC also collected fecal coliform samples during two of their quarterly sample collections. These data can be found in Appendix A.

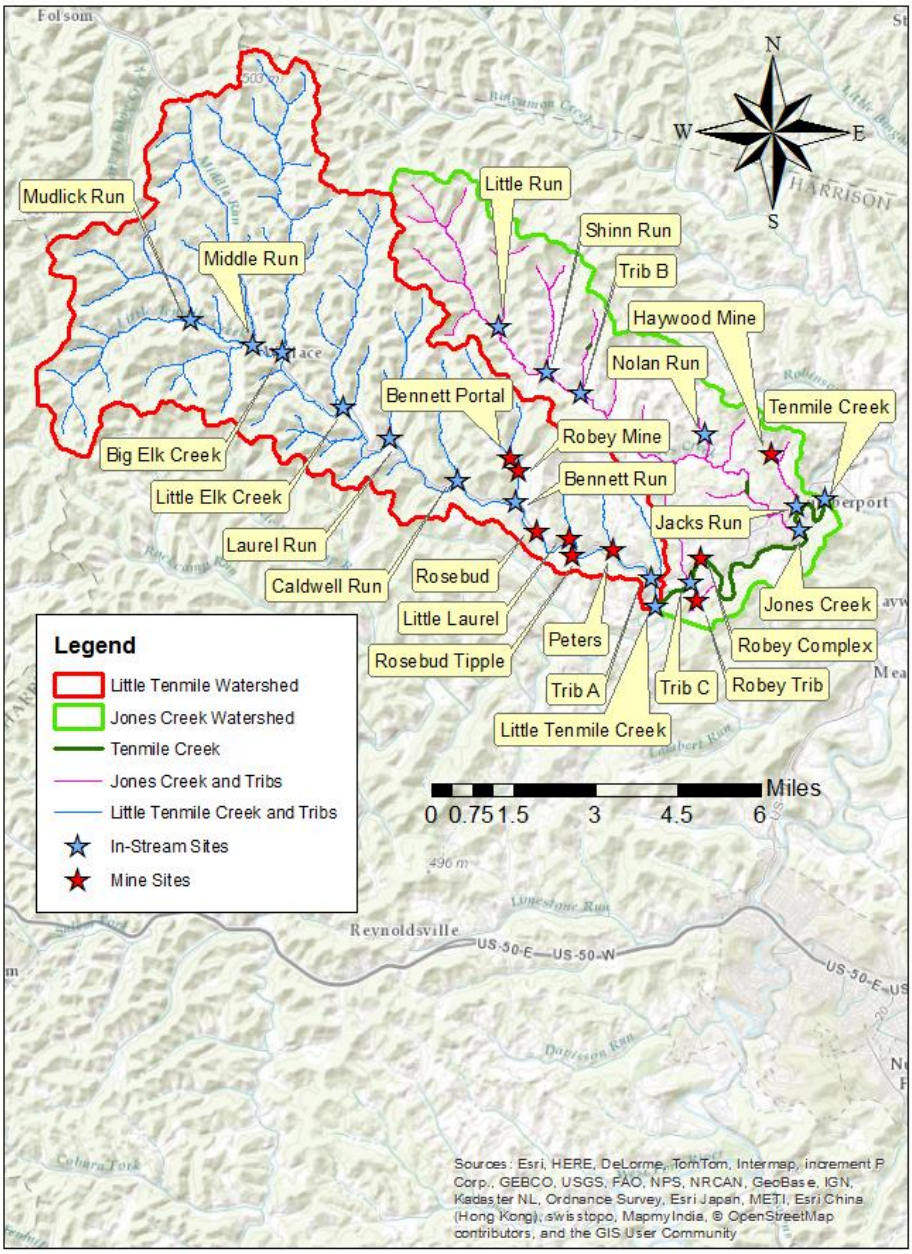

Figure 10: NMLRC sample collection locations.

4.2.1.2 Impaired Uses and/or Water Quality Threats

The entire length of the mainstem of Little Tenmile Creek and Jones Creek are on the Clean Water Act 303(d) list for high iron concentrations (and fecal coliform bacteria). The main source of Fe impairment is drainage from abandoned coal mines. The increased iron concentrations from these abandoned mines currently impair the designated use of these creeks. As Tier 1 streams, their designated use is contact recreation and the propagation and maintenance of fish and other aquatic life.

4.2.2. Flow Data

A greater amount of water chemistry data exists for Little Tenmile and Jones Creek than flow data. The NMLRC collected flow measurements during 2013-2014 at the same time as their water chemistry samples. Flow data were also collected during 2011-2012 water chemistry sampling for Bennett Run. These data are given in Appendix A.

4.2.3 Biological Data

Very little historical biological sampling was found for the Little Tenmile/Jones Creek watersheds. Benthic macroinvertebrate data was collected by NMLRC during two different time periods and by the WVDEP WAP group on various occasions. No formal fish surveys or vegetation data has been collected for this watershed.

4.2.3.1 Benthic Macroinvertebrates

- WVDEP: Benthic macroinvertebrate data were collected by the WAP group at the same time as their water chemistry samples. Benthic organisms were identified in both mainstems of Little Tenmile and Jones Creeks. Benthic data were also collected at various tributaries of these creeks. These data are given in Appendix A.
- NMLRC: Benthic macroinvertebrate samples were collected in 2013 and 2014 by the NMLRC. Samples were taken two times in a year (April and October) because this was deemed the best time of year to capture a representative stream macroinvertebrate population. Sampling results and sample locations are given in Appendix A. Benthic data was also collected at a limited amount of locations in the Little Tenmile watershed in 2011 and 2012.

4.2.3.2 Fish

No formal fish surveys have been completed on Little Tenmile or Jones Creek. However, informal surveys by the WVDNR have determined that there is a healthy smallmouth bass population in Tenmile Creek. Some of these bass may have migrated into Little Tenmile Creek. Lumberport Lake (on Jones Creek) was stocked from 1983-2005 with Muskellunge, Northern Pike, Channel Catfish, and Largemouth Bass. Although stocking was suspended due to excessive mud in the lake, some remnants of the stocked population may still exist.

4.2.3.3 Aquatic Nuisance Species

No data was found regarding Aquatic Nuisance Species (ANS's) within the Little Tenmile/Jones Creek watersheds. ANS's (also referred to as invasive aquatic species) common to West Virginia are Asian Carp, Didymo (Rock Snot), Snakehead Fish, and Zebra Mussels; however, according to the WVDNR website, some ANSs may exist within the watershed, but none have been formally documented (WVDNR, 2003c).

4.2.3.4 Migratory Patterns

No migratory bird pattern data specific to the Little Tenmile/Jones Creek watersheds was found. However, some data exists for the state of West Virginia. In West Virginia, 88 of 171 bird species migrate to the tropics (WVDNR, 2004). Initiatives such as the Partners in Flight (PIF) program and the Important Birds Area (IBA) program track bird populations and migratory paths. Seventeen IBAs can be found in West Virginia, including two that are rated as globally important (Audubon Society, 2011). None of these IBAs are within the Little Tenmile/Jones Creek watersheds or even within Harrison County.

4.2.4 Stream Survey Data

Stream survey data for the Little Tenmile/Jones Creek watersheds was collected by the WVDEP WAP group at the same time as their water chemistry samples were taken. The WAP group computed Rapid Bioassesment Protocol (RBP) scores for 21 different sites within the Little Tenmile/Jones Creek watersheds. These scores were calculated using multiple physical parameters of the stream. The complete description of this method can be found in the document "Rapid Bioassesment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition" (Barbour et al., 1999) or in the "WVDEP Watershed Assessment Branch 2014 Standard Operating Procedures" (WVDEP, 2014). The WAP data can be found in Appendix A.

5 Pollutant Source Assessment

5.1 Nonpoint Sources

There are multiple potential sources of pollution in the Little Tenmile/Jones Creek watersheds. These include sediment, nutrients, bacteria, and mining, among others. It is unlikely that either sediment or nutrients are significant sources of pollution because the watershed is mostly forested (thus soil loss is less of a problem). Fecal coliform bacteria are currently a problem in Little Tenmile/Jones Creek watersheds. This stems from poor farming/agricultural practices within the watersheds. Further fecal coliform impairment may exist, but is often masked in the presence of acid mine drainage. Of all sources of pollution, mining is the most significant impact to Little Tenmile and Jones Creek's water quality. The impacts of historic mining within the watershed are very easily observed.

5.1.1 Mining

As previously noted, mining in the Little Tenmile/Jones Creek watersheds was predominately in the Pittsburgh coal seam, with some surface mining occurring in the Redstone coal seam. Most mining took place between 1910 and 1970. Some underground mining continued in the watershed after the 1977 Surface Mine Control

and Reclamation Act (SMCRA), notably the Compass #2 and #3 mines. There is also a new underground mine near Brown that will begin coal extraction within the next two years. The Office of Surface Mining Abandoned Mine Lands Inventory System (AMLIS) has identified 40 problem areas within the Little Tenmile Creek and Jones Creek watersheds (Figure 11). Of the 40 problem areas, 22 have been reclaimed. While water conveyance measures such as wet seals and limestone channels have been installed at these reclaimed problem areas, no water quality remediation measures have been taken.

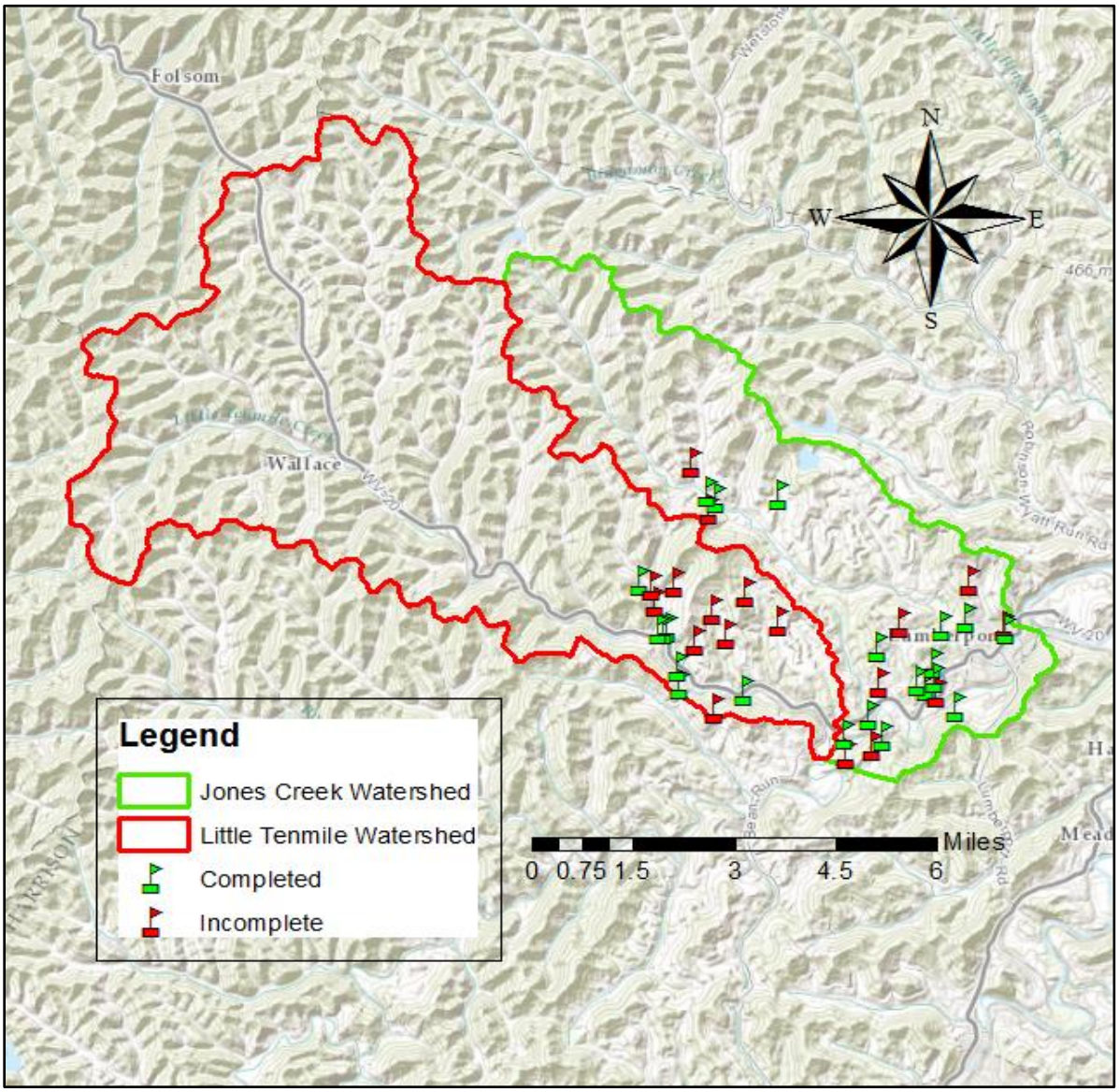

Figure 11: Map of Problem Area Descriptions (PAD) in the Little Tenmile/Jones Creek watersheds inventoried by the West Virginia Abandoned Mine Lands (AML) program. Green flags are completed projects and red flags are incomplete projects.

Little Tenmile remains a large contributor of acidity and metals and Jones Creek is a heavy contributor of metals to the West Fork River due to a lack of installed water quality improvements. NMLRC used AMLIS data to locate abandoned mine (PAD) sample sites within the Little Tenmile/Jones Creek watersheds. Nine sites were chosen for quarterly sampling (Figure 12). The full data set collected at each of these sites sampled by NMLRC is located in Appendix A. Table 4 contains the average data for each of the sites.

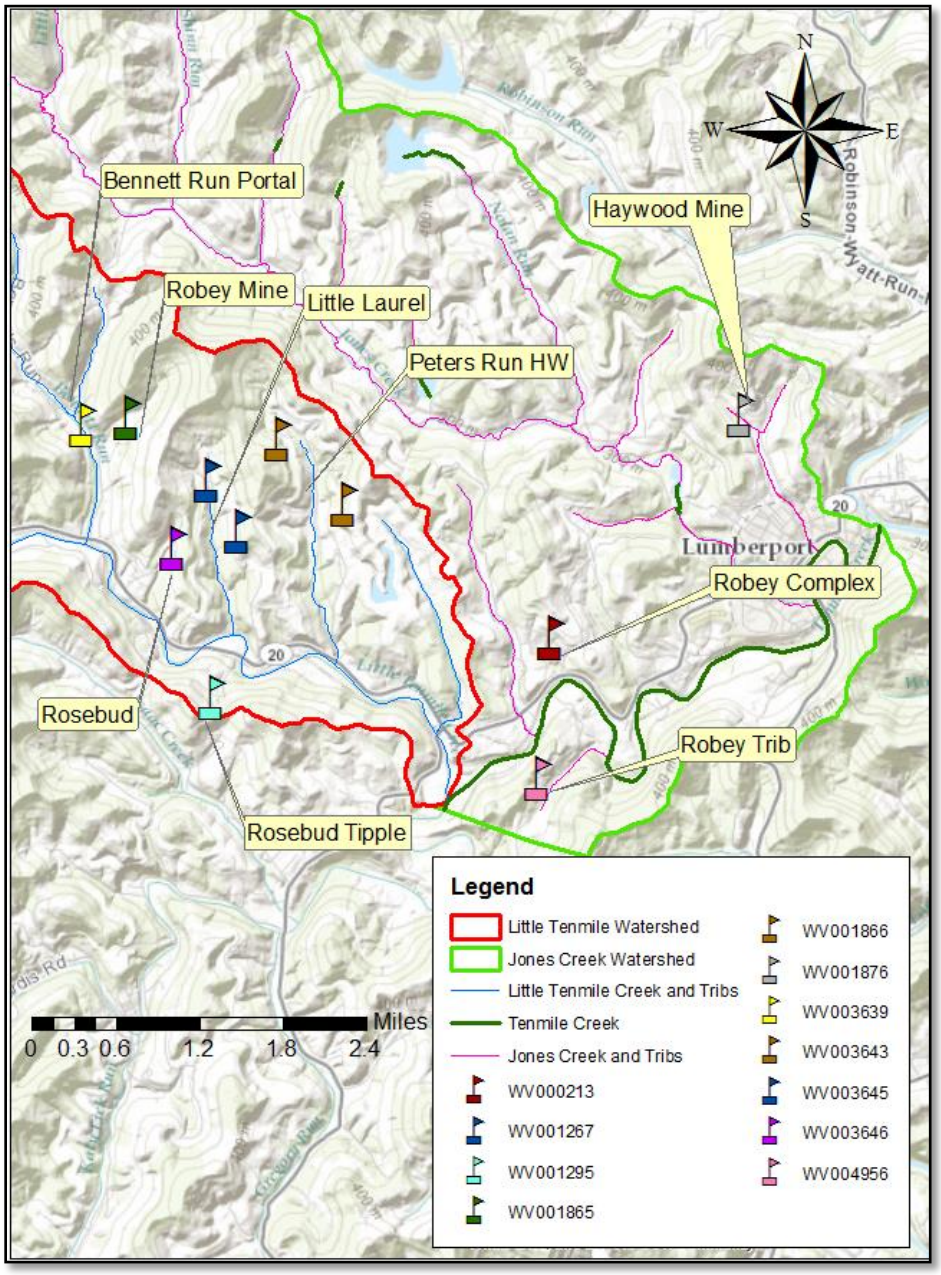

Figure 12: Map of Problem Area Descriptions (PAD) in the Little Tenmile/Jones Creek watersheds inventoried by the West Virginia Abandoned Mine Lands (AML) program and sampled by NMLRC. The PAD number is accompanying the flag that denotes the approximate sample location.

Table 4: Average water quality data for mine sample sites in the Little Tenmile/Jones Creek watershed. All metals are dissolved. *Asterisked rows indicate data from the Bennett Run sampling regimen conducted in 2011 and 2012. These sources emanate from the Robey Mine PAD but were sampled separately.

Site Name	*Flow (gal/min)*	EC uS/cm	pH*	Acd mg/L	Alk mg/L	SO4 mg/L	Fe mg/L	Al mg/L	Mn mg/L	Ca mg/L	Mg mg/L
Robey Mine	191	1,022	7.33	8.12	169.50	433.5	14.53	0.03	0.92	152.1	36.70
Bennett Portal	451	1,733	6.99	29.50	191.50	990.5	37.88	0.02	1.54	261.5	61.62
Rosebud	34	1,128	6.46	107.16	125.57	475.5	0.18	0.02	0.03	151.9	55.74
Little Laurel	97	1,144	7.40	0.50	187.73	464.9	0.10	0.03	0.04	173.0	60.41
Peters	270	1,075	7.87	0.50	200.65	396.6	0.07	0.03	0.03	152.8	53.88
Rosebud Tipple	14	861	8.06	0.50	210.14	263.3	0.04	0.01	0.04	119.7	40.16
Haywood Mine	86	1,068	7.02	0.50	84.19	496.4	3.38	0.04	0.64	163.3	44.69
Robey Trib	76	992	6.47	37.48	26.80	469.5	1.33	1.23	1.53	112.2	36.70
Robey Complex	151	1,193	7.49	0.50	164.81	499.4	0.07	0.03	0.21	161.1	69.60
Bennett Source 2*	5	1,739	7.62	18.85	206.15	1,058.3	3.61	0.01	5.45	333.8	76.47
Bennett Source 5*	37	1,424	7.04	57.45	114.69	824.1	49.94	0.02	0.86	220.1	57.04
Bennett Source 6*	20	1,406	6.80	41.20	67.61	879.8	46.84	0.02	0.92	212.8	53.21
Bennett Source 7*	39	1,077	7.84	9.22	222.35	567.0	3.96	0.01	0.30	165.4	48.25
Bennett Source 8*	39	1,061	7.55	15.62	220.45	438.1	4.04	0.01	1.29	174.6	43.38

Mining has heavily impacted the lower 3.5 miles of Little Tenmile Creek's mainstem and impaired roughly one mile of its tributaries. It has also affected 1.5 miles of Jones Creek. Table 5 details impaired stream miles, pollutant type, and pollutant sources for Bennett Run, Jones Creek, and the mainstem Little Tenmile itself.

Table 5: Description of mining impact on Little Tenmile and Jones Creek.

Sample point	Impacted stream miles	Pollutant type	Pollutant source
Mainstem Little Tenmile Creek	3.5	Fe	Abandoned mines throughout watershed
Bennett Run	0.7	Fe	2 abandoned mines
Jones Creek	1.5	Fe	1 abandoned mine

Robey Mine

The Robey Mine AMD source is the northern most mine drainage source flowing into Bennett Run. It is listed in the WVDEP AML database (PAD# WV-001865). This source is located in the direct vicinity of the village of Dola. Although the site has been reclaimed, mine drainage still emanates from various portals that had wet seals installed in them. Presently, (for the main Robey Mine flow) the water flows from the wet seals into grouted channels before it mixes and flows into Bennett Run. Average water quality values for this site can be seen in Table 4. Although slightly alkaline, this drainage contributes a heavy amount of iron as evidenced by the following pictures. Figures 13 and 14 are pictures of the grouted channel and Figure 15 shows a wet seal in the upper center portion of the photo.

Figure 13: Grouted Channel

Figure 14: Robey Mine AMD drainage entering Bennett Run.

Figure 15: Wet seals with mine drainage flowing on grouted channel at the Robey Mine sample site.

The following pictures are also from the Robey Mine PAD. These sources were sampled during the Bennett Run sampling regimen. These are denoted as Bennett Run Source numbers in Table 4 above. Bennett Run Source #2 (Figure 16) is the furthest source upstream emanating from the Robey Mine PAD; it has the lowest flow rate of the Bennett Run Sources.


Figure 16: Bennett Run Source #2 has wet seals and grouted channel. It is the furthest source upstream emanating from the Robey Mine PAD that flows into Bennett Run.

Figure 17: Bennett Run Source #5

Bennett Run Source #5 (Figure 17) and Source #6 (Figure 18) have wet seals and grouted channel. They are middle sources emanating from the Robey Mine PAD.

Figure 18: Bennett Run Source #6

Figure 19: Bennett Run Source #7.

Bennett Run Source #7 (Figure 19) and Source #8 (Figure 20) are the final two sources originating from the Robey Mine PAD that enter Bennett Run.

Figure 20: Bennett Run Source #8.

Bennett Run Portal

The Bennett Run Portal has three pipes emanating from wet seals adjacent to Bennett Run road. This is the upper most impact on Bennett Run and also the most significant contributor of mine drainage and heavy metals. It is listed in the WVDEP AML database (PAD# WV-003639). Average water chemistry can be found in Table 4. Figure 21 illustrates discharge from the wet seals. Note the freshwater mixing from upstream and the substantial AMD armoring as the mine water flows from the pipes.

Figure 21: Bennett Run Portal discharge.

Little Laurel

Little Laurel (PAD#'s WV-001267 and WV-003645) is located southeast of Dola. It drains directly into Little Tenmile Creek just downstream of where Bennett Run enters Little Tenmile Creek. Water samples indicate this source is mostly freshwater and does not contribute a significant amount of AMD to Little Tenmile Creek. Average water chemistry can be found in Table 4.

Sample location is denoted in Figure 10. Figure 22 is a picture of the Little Laurel sample location.

Figure 22: Little Laurel sample location (just before entering Little Tenmile Creek).

Rosebud

Rosebud (PAD# WV-003646) is located southeast of Dola. It directly drains into Little Tenmile Creek between Bennett Run and Little Laurel. Water samples indicate that this source is mostly freshwater and does not contribute a significant amount of AMD to Little Tenmile Creek. Average water chemistry can be found in Table 4. Sample location is indicated in Figure 10. Figure 23 is a picture of the Rosebud sample location.

Figure 23: Rosebud sampling location.

Peters

Peters (PAD#'s WV-003643 and WV-001866) is located southeast of Dola and directly drains into Little Tenmile Creek downstream of where Little Laurel enters Little Tenmile Creek. Water samples indicate that this source is mostly freshwater and does not contribute a significant amount of AMD to Little Tenmile Creek. Average water chemistry can be found in Table 4. Sample location is shown in Figure 10. Figure 24 is a picture of the Peters sample location.

Figure 24: Peters sample location.

Rosebud Tipple

Rosebud Tipple (PAD# WV-001295) is located southeast of Dola and directly drains into Little Tenmile Creek. It enters Little Tenmile Creek almost directly across the stream from Little Laurel. Water samples indicate this source is mostly freshwater and does not contribute a significant amount of AMD to Little Tenmile Creek. Average water chemistry can be found in Table 4. Sample location is indicated in Figure 10. Figure 25 is a picture of the Rosebud Tipple sample location.

Figure 25: Rosebud Tipple sample location.

Haywood Mine

Haywood Mine (PAD# WV-001876) is located just north of Lumberport and directly drains into Jones Creek. Water samples indicate this source is mine drainage and contributes a noteworthy amount of AMD to Jones Creek. Average water chemistry can be found in Table 4. Sample location is denoted in Figure 10. Figure 26 is a picture of the Haywood Mine sample location.

Figure 26: Haywood Mine sample location.

Robey Trib

Robey Trib (PAD#'s WV-003493, WV-001884 and WV-004956) is located southwest of Lumberport and directly drains into the mainstem of Tenmile Creek. Water samples indicate this source is mine drainage and contributes a noteworthy amount of AMD to Tenmile Creek. Average water chemistry can be found in Table 4. Sample location is indicated in Figure 10. Figure 27 is a picture of the Robey Trib sample location.

Figure 27: Robey Trib sample location.

Robey Complex

Robey Complex (PAD# WV-000213) is located southwest of Lumberport and directly drains into the mainstem of Tenmile Creek. Water samples indicate that this source is mostly freshwater and does not contribute a noteworthy amount of AMD to Tenmile Creek. Average water chemistry can be found in Table 4. Sample location is shown in Figure 10. Figure 28 is a picture of the Robey Complex sample location.

Figure 28: Robey Complex sample location.

5.1.2 Agriculture

Potential pollutants from agriculture may include nutrients, sediment, coliform bacteria, and pesticides. There is potential for these pollutants to impact the water quality of Little Tenmile and Jones Creeks because 10% of the watershed is either cultivated crops or hay/pasture land (Table 2). Mitigation of these pollutants is voluntary and is often performed by the landowner with financial assistance from state and federal government programs.

It is also possible that greater fecal coliform contamination is being masked by historic mining in the watersheds. Specific locations of the largest contributors of fecal coliform bacteria are currently unknown. However, since many of the tributaries, as well as the mainstems, of Little Tenmile and Jones Creek had TMDLs created for them in 2014, localized fecal coliform remediation projects will likely be installed in several areas around the watersheds. These projects will decrease the impact from fecal coliform bacteria on water quality.

5.1.2.1 Livestock

Watershed livestock statistics could not be found for Little Tenmile and Jones Creek. However, data are available for Harrison County. In order to estimate the amount of livestock in Little Tenmile and Jones Creeks, the total land area of the watershed (43 mi^2) was divided by the total land area of Harrison County (417 mi^2). By this estimation, the Little Tenmile/Jones Creek watersheds are approximately 10.3% of Harrison County. This percentage will be used to estimate all agricultural and livestock populations within the watershed.

Harrison County has a relatively large amount of agricultural activity compared to other counties in West Virginia (USDA, 2012). Table 6 details the estimated amount of livestock within Little Tenmile and Jones Creek by animal species. The amount of farms and number of animals estimated within Little Tenmile and Jones Creek imply that livestock are a likely source of nonpoint pollution in the watersheds. As with agricultural activities, mitigation of pollutants from livestock is voluntary and is often performed by the landowner with financial assistance from state and federal government programs.

Table 6: Estimated amount of livestock within the Little Tenmile/Jones Creek watersheds. Values less than 1 were rounded up to 1. "No Estimate" values were not calculated in the 2012 Census of Agriculture.

Animal type	Number of farms	Number of animals
Beef Cows	39	No Estimate
Dairy Cows	1	No Estimate
Hogs and Pigs	2	4
Sheep and Lambs	2	40
Chickens (Layers)	11	218
Chickens (Broilers)	1	No Estimate

5.1.2.2 Cropland

Possible water quality impacts from cropland could include nutrients, sediment, pesticides, and other chemicals. Similar to the amount of livestock in the watershed, the amount of cropland is unlikely to cause a significant degree of water quality impairment due to the small number of farms within the watershed. The exception is acreage used for forage crops. Localized water quality impacts could be seen dependent upon farm size and intensity of farming practices. Table 7 gives data for various crops in Little Tenmile and Jones Creek.

Table 7: Estimated amount of crops grown within the Little Tenmile and Jones Creek watersheds. Values less than 1 were rounded up to 1. "No Estimate" values were not calculated in the 2012 Census of Agriculture.

Crop	Number of farms	Number of acres
Corn	1	12
Wheat	No Estimate	No Estimate
Oats	No Estimate	No Estimate
Barley	No Estimate	No Estimate
Forage	59	2,241
Potatoes	1	1

5.1.2.3 Wildlife

No detailed statistics on wildlife within the Little Tenmile/Jones Creek watersheds were found. However, much of the wildlife found in other heavily forested parts of this area of West Virginia are likely found in the watershed. Mammals found in this area could include white-tailed deer, black bear, foxes, coyotes, skunks, moles, bats, and several types of rodents. Various bird species may also be found here, including cardinals, robins, hummingbirds, and many others. Reptiles and amphibians are also represented in the watershed, with several species of snakes, frogs, toads, etc. found within Little Tenmile/Jones Creek. Lastly, fish are likely found in many of the streams in the watershed.

Although Little Tenmile/Jones Creeks are heavily forested and the wildlife population is high, it is unlikely that wildlife is a significant pollutant to the watershed. Any bacterial or nutrient pollutants from wildlife within the watershed are likely overwhelmed by the mine drainage that exists within the watersheds. If bacterial contamination were found, it would more likely be due to human activities such as broken or nonexistent septic systems.

5.1.3 Septic Systems

The towns of Lumberport, Haywood, and Cambria are serviced by the Lumberport Area Public Service District. There is no city sewage system that serves the rest of the Little Tenmile/Jones Creek watersheds. Towns in the watershed use private sewage treatment systems or septic

systems. No reports on the exact number of septic systems within Little Tenmile and Jones Creeks could be found. However, the Little Tenmile/Jones Creek watersheds are very rural watersheds and it is likely that decentralized systems make up the majority of sewage treatment within the watershed. Statistics for the West Fork River show that there is a 3-24% failure rate for septic systems within the watershed (Tetra Tech, 2014). These failed systems could be a source of bacteria in Little Tenmile and Jones Creeks.

Fecal coliform samples were taken by the NMLRC at 26 locations (Sampling round 1) and 21 locations (Sampling round 2) in 2013 and 2014. Some fecal coliform samples were also collected by WVDEP WAP between 200-2011. Table 8 shows the average value of a selection of the samples taken as well as their locations. The complete data can be found in Appendix A.

Table 8: Locations and concentrations of a selection of Little Tenmile and Jones Creek fecal coliform samples.

Site description	Latitude	Longitude	Mean fecal coliform concentration (cfu/100 mL)
Little Tenmile mouth (NMLRC)	38 53 5.48	79 57 59.67	1767
Jones Creek mouth (NMLRC)	38 52 29.23	79 58 37.69	662
Jones Creek upstream (NMLRC)	38 52 29.23	79 58 37.69	1319
Tenmile Creek mouth (NMLRC)	38 55 10.29	79 55 44.67	850
Tenmile Creek downstream (NMLRC)	38 52 41.29	79 59 51.78	250
Jones Creek mouth (WAP)	38 52 29.23	79 58 37.69	1096
Little Tenmile mouth (WAP)	38 53 5.48	79 57 59.67	1559

The majority of the samples taken had concentrations above water quality standards. The rural nature of the watershed means that there are likely numerous potential sources of bacterial impairment due to untreated sewage from residences. The effects of raw sewage pollution may also be masked by mining impacts within the watershed.

5.1.4 Silviculture

The Little Tenmile/Jones Creek watershed is approximately 82% forested (Table 2). Because of this, there is potential for water quality impacts from silvicultural activities. Much of the watershed's forested areas are owned by land holding companies. Although occasional erosion was observed along some stream banks, there was no evidence of logging in these areas. It is unlikely that silviculture currently contributes much pollution to the Little Tenmile/Jones Creek watersheds.

5.1.5 Urban/Suburban Runoff

Approximately 1% of the watershed is categorized medium or light intensity urban area (Table 2). There are also multiple paved roads in the watershed. These are the largest sources of runoff within the watersheds. These areas are concentrated around the population centers of

Lumberport and Wallace. However, even areas within these two towns are mostly grass or soil instead of paved. There are no large parking lots or interstates to encourage large amounts of runoff. The greatest impact from runoff would come from road salt used for deicing in the winter. Although no sampling focusing on road salt was conducted, it is unlikely that deicing activities are a large contributor to nonpoint source pollution within the Little Tenmile/Jones Creek watersheds due to the relatively small amount of paved area.

5.1.6 Streambank Erosion

Streambank erosion may be a contributor to nonpoint pollution in some areas of the watershed (Figure 29). Most sample sites were forested with riparian buffers along stream edges. However, some sites, especially those found near confluences of larger streams in the Little Tenmile watershed, were eroded. There may also be localized areas of erosion on farmland, particularly if the stream has not been fenced off from livestock. However, none of these areas were observed during the data gathering for this plan.

Figure 29: Streambank erosion (red arrows) at the confluence of Jones Creek and Tenmile Creek.

5.1.7 Atmospheric Deposition

Potential sources of atmospheric deposition can include vehicle traffic, industrial facilities, and power plants, among others. The main sources of atmospheric deposition within the Little Tenmile/Jones Creek watersheds are vehicle traffic and the Harrison coal-fired power plant. Secondary deposition may also occur due to pollutants moving from other areas into the Little Tenmile/Jones Creek watersheds.

5.2 Point Sources

5.2.1 NPDES Permits

The following table lists the 15 NPDES permits found in the Little Tenmile/Jones Creek watersheds (Table 9).

Table 9: NPDES permits within the Little Tenmile/Jones Creek watersheds. MGD = Million Gallons/Day.

Permit #	Site name	Latitude	Longitude	Permit type	Permit Notes	Permit expiration date
WVG990104	Rob's Wallace Mart	39.411123	-80.490278	Car Wash	0.0008 MGD avg. flow	1/1/2006
WVR105226	Wayne Kisling Highwall & Pond	39.386384	-80.424703	Storm Water Construction	5.5 disturbed acres	12/4/2012
WVR103668	Robey Mine Highwall & Refuse	39.386118	-80.417493	Storm Water Construction	15 disturbed acres	12/4/2012
WVG551347	Dola Dairy Mart	39.377295	-80.428136	Sewage	0.0006 MGD design flow	9/23/2015
WVR103667	Rosebud Bridge	39.366679	-80.405563	Storm Water Construction	1 disturbed acre	12/4/2012
WVR100152	Robey Arch Bridge	39.363626	-80.373634	Storm Water Construction	1.50 disturbed acres	12/4/2007
WVR101931	Jimtown Tipple	39.401838	-80.394920	Storm Water Construction	4.5 disturbed acres	12/4/2007
WVR105438	2011 Pipeline Replacement	39.398589	-80.418867	Storm Water Construction	1.17 disturbed acres	4/6/2011
WV0078328	Town of Lumberport Water Supply	39.378157	-80.360759	Individual	0.004 MGD average flow	12/2/1998
WVR104720	Robey Complex	39.374707	-80.370372	Storm Water Construction	4 disturbed acres	12/4/2012
WVR105322	Cambria Portals & Drainage	39.369266	-80.361360	Storm Water Construction	5.10 disturbed acres	12/4/2012
WVG550707	Kersak Mobile Home Park	39.371788	-80.356468	Sewage	0.0021 MGD design flow	12/23/1998
WVG640058	Town of Lumberport Water Plant	39.37866	-80.35191	Water Treatment Plant	0.0006 MGD average flow	7/18/2018
WVR105004	Lumberport Elementary School	39.376698	-80.348657	Storm Water Construction	3.68 disturbed acres	12/4/2012
*WV0024546	Town of Lumberport POTW	39.383306	-80.339694	Sewage Treatment Plant	0.16 MGD average flow	11/29/2014

* The Lumberport Sewage Treatment Plant is located outside of watersheds boundaries yet treats waste from inside the watersheds; therefore, it was added to the list above. The permit for the Lumberport POTW expired on November 11, 2014 but is listed as "permit continued" without an expiration date. Of the 15 permits listed in Table 9, only two within the watersheds boundaries are currently active. Neither the Dola Dairy Mart nor the Town of Lumberport Water Plant permits have had any violations in the last three years. No other information could be found on either new facilities coming online or expansion of existing facilities.

5.2.1.1 Phase I and II Stormwater Permits

No information could be found on Phase I and II stormwater permits for Little Tenmile or Jones Creeks. It is likely that no plan for stormwater exists for these watersheds due to a lack of urban area and a small scattered population. The watersheds also have relatively few impervious surfaces. All of these factors infer that stormwater is not a large contributor of pollutants to the Little Tenmile or Jones Creek watersheds.

5.2.1.2 CAFO Permits

No Concentrated Animal Feeding Operations (CAFO) permits were found within the Little Tenmile/Jones Creek watersheds.

5.3 Hazardous Waste

5.3.1 CERCLA Sites

No Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites exist within the Little Tenmile/Jones Creek watersheds.

5.3.2 RCRA

No Resource Conservation and Recovery Act (RCRA) sites exist within the Little Tenmile/Jones Creek watersheds.

5.3.3 Brownfields

No brownfield sites within the Little Tenmile and Jones Creek watersheds were found using the WV Brownfield Assistance Centers' (WVBAC) WV Brownfield Inventory. (WVBAC, 2014).

5.3.4 Underground Storage Tanks

The exact number of underground storage tanks (USTs) within the Little Tenmile/Jones Creek watersheds is unknown. There are several gas stations which have USTs. It is likely that the majority of USTs within the watershed are found at these gas stations.

5.4 Other Potential Pollutant Sources

There are no other major sources of pollutants in the Little Tenmile/Jones Creek watersheds.

6 Linkage of Pollutant Loads to Water Quality

6.1 Estimation of Pollutant Loads

6.1.1 Existing Conditions and Pollutant Load Estimates

As discussed previously, nine AMD sources have been located in the Little Tenmile/Jones Creek watersheds (with 14 total sample sites). The annual pollutant loadings (in tons per year) for these sites are shown in Table 10. All metal loadings are reported as dissolved.

Table 10: Pollutant loadings for nine abandoned mine sites in Little Tenmile and Jones Creeks.

Sample site	Acid load	Alkalinity load	SO4 load	Fe load	Al load	Mn load
	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr
Robey Mine	3.41	71.22	182.16	6.11	0.01	0.39
Bennett Portal	37.64	244.35	1263.88	37.58	0.03	1.97
Rosebud	8.02	9.39	35.57	0.01	0.001	0.002
Little Laurel	0.11	43.93	99.21	0.02	0.01	0.01
Peters	0.30	119.19	235.58	0.04	0.02	0.02
Rosebud Tipple	0.02	6.51	8.16	0.001	0.0003	0.001
Haywood Mine	0.09	15.91	93.82	0.64	0.01	0.12
Robey Trib	6.26	4.48	78.41	0.22	0.21	0.26
Robey Complex	0.17	54.72	165.8	0.02	0.01	0.07
Bennett Source 2	0.21	2.27	11.64	0.04	0.0001	0.06
Bennett Source 5	4.65	9.29	66.75	4.074	0.001	0.07
Bennett Source 6	1.81	2.97	38.71	2.06	0.001	0.04
Bennett Source 7	0.79	19.12	48.76	0.34	0.001	0.03
Bennett Source 8	1.34	18.96	37.68	0.35	0.001	0.11

Bacteria

Currently, Little Tenmile and Jones Creeks are on the 303(d) list for bacterial contamination. Bacteria sampling was performed by the WVDEP multiple times from 2000-2011 and by the NMLRC in 2013 and 2014. Bacteria concentrations from these sampling events can be found in Table 8. Fecal coliform loadings were not calculated because discharge readings were not taken on the same day as fecal coliform sampling. In order to determine the scope of the fecal coliform contamination within the watershed, water samples and discharge values would need to be collected on the same day. Site-specific remediation strategies could then be designed using the most current data. AMD sources within the watersheds will also need to be remediated, as it is likely that the AMD is masking bacterial contamination.

6.1.2 Future Conditions and Pollutant Load Estimates

NMLRC and GWF will construct passive treatment systems in the Little Tenmile and Jones Creek watersheds at each site listed in Table 10. Typical metal load reductions for passive treatment projects are 80% and are the expectation for the projects within the Little Tenmile/Jones Creek watersheds. Section 7.2 of this document outlines pollutant load estimates and target reductions for Jones Creek and Little Tenmile Creek.

For each proposed project the NMLRC and GWF will:

- create a conceptual design based on pollutant loads and calculations from the AMD Treat program;
- Submit proposals to the 319(H) program and other possible funding streams; and
- commence project implementation once funding has been secured.

The construction of the first project (Bennett Run Portal) is expected to take place in 2016 if funding is available and awarded to the NMLRC and GWF.

6.2 Identification of Critical Areas

Figure 12 illustrates the critical areas within the watershed that require NMLRC's immediate intervention. These areas were identified as critical during the NMLRC's sampling that occurred during 2011-2014. The majority of the mine drainage impacts in Little Tenmile/Jones Creek come from Bennett Run. NMLRC and GWF will begin remediating mine drainage at the most upstream mine site in Bennett Run and work downstream to the confluence of Bennett Run and Little Tenmile Creek. After the completion of projects within Bennett Run, treatment projects will be constructed at the most upstream mine sites within both Jones Creek and Little Tenmile Creek.

AMD remediation measures that may be used within Little Tenmile and Jones Creeks would include: limestone leach beds, limestone channels, wetlands, steel slag beds, and ponds. The priority for Bennett Run, Little Tenmile Creek, and Jones Creek is reduction of metal loads in order to remove Little Tenmile and Jones Creeks from the 303(d) list and to achieve compliance with the West Fork River TMDL. When properly designed and implemented, passive treatment has been found to be an excellent solution to mine drainage pollution.

7 Watershed Goals and Objectives

7.1 Management Objectives

The main goals of this WBP are to meet the watersheds designated use set forth by the WVDEP and reduce contaminant levels listed in the West Fork TMDL. West Virginia's designated use for the majority of the waters in the watersheds are the propagation and maintenance of fish and other aquatic life (Category B) and for water contact recreation (Category C). Jones Creek is

designated as Category A (public water) use, as it is the source for Lumberport's potable water. These goals will be accomplished by meeting the following objectives:

- AMD remediation;
- reduction of fecal coliform bacteria through various measures;
- increase available habitat for aquatic life; and
- employ strategies to ensure further sedimentation/erosion does not occur.

7.2 Load Reduction Targets

7.2.1 AMD

Metals: Achieve load reduction in iron concentrations in accordance with the West Fork River TMDL in order to achieve 100% compliance with West Virginia state water quality standards. The allocated loads, current loads, and target load reductions for iron (total) are shown in table 11.

Table 11: Baseline loads, allocated loads, and targeted load reductions for iron (total) from the West Fork River TMDL.

Stream	Baseline load (lbs/yr)	Allocated load (lbs/yr)	Reduction required (lbs/yr)
Little Tenmile Creek	233,545	67,003	166,542
Jones Creek	45,007	15,140	29,867

Table 12 below outlines the load reduction targets for dissolved iron for each project site and for both the Jones Creek and Little Tenmile Creek sub-watersheds. Total metals (including iron) were collected as per the West Fork TMDL by WVDEP. Samples collected by the NMLRC were field filtered (e.g. using an o.45 µm filter) for dissolved metals (including iron) analysis. Therefore, a direct comparison of the target load reduction cannot be entirely evaluated. However, while analyzing historical data the WVDEP and NMLRC dissolved metal data is analogous and thus rough comparisons can be drawn. In order to meet TMDL requirements the WVDEP requires load reductions of 71% and 67% total iron in Little Tenmile Creek and Jones Creek, respectively. Proposed site management strategies and BMP's designed by the NMLRC aim to remove 80% of the total AMD contaminates entering the aforementioned streams. Therefore, if BMP's are properly installed and maintained, allocated load reductions can be met and exceeded. Future pre- and post- construction samples will be analyzed for both total and dissolved metals to gain a more quantitative analysis of pollutant loadings for comparison to the TMDL.

Table 12: Baseline loads and load reduction targets for dissolved iron (Fe (d)) and proposed site BMP's to achieve target goals.

Parameter	Fe (d) load	Fe (d) load	Fe (d) load	Fe (d) load	Proposed BMP
Sample Site	tons/yr	pounds/yr	lb/yr 80% reduction (final loading)	lb/yr total reduction	
Robey Mine	6.11	13,442	2,688	10,754	Wetlands and OLC
Bennett Portal	37.58	82,676	16,535	66,141	Wetlands and OLC
Rosebud	0.01	22	4	18	Wetlands and OLC
Little Laurel	0.02	44	9	35	Wetlands and OLC
Peters	0.04	88	18	70	Wetlands and OLC
Rosebud Tipple	0.00	2	0	2	Wetlands and OLC
Haywood Mine	0.64	1,408	282	1,126	Wetlands and OLC
Robey Trib	0.22	484	97	387	Wetlands and OLC
Robey Complex	0.02	44	9	35	Wetlands and OLC
Bennett Source 2	0.04	88	18	70	Wetlands and OLC
Bennett Source 5	4.07	8,963	1,793	7,170	Wetlands and OLC
Bennett Source 6	2.06	4,532	906	3,626	Wetlands and OLC
Bennett Source 7	0.34	748	150	598	Wetlands and OLC
Bennett Source 8	0.35	770	154	616	Wetlands and OLC
Totals (all sites)	51.51	113,311	22,662	90,649	
Totals (Little 10Mile Sites)	50.87	111,903	21,980	89,523	
Totals (Jones Creek Sites)	0.64	1,408	282	1,126	

7.2.2 Fecal Coliform Bacteria

- The Little Tenmile Creek/Jones Creek watersheds are on the 2014 303(d) list for fecal coliform bacteria. Available data that was taken within the last 14 years shows some bacteriological impairment (Table 8). If fecal coliform bacteria do not meet state criterion, target reduction of 100% compliance will be used as the load reduction target. This will need to be re-evaluated after metal load reduction targets have been met, due to the tendency of AMD pollutants to mask fecal coliform contamination. The allocated loads, current loads, and target load reductions for fecal coliform bacteria are shown in Table 13.

Table 13: Baseline loads, allocated loads, and targeted load reductions for fecal coliform bacteria from the West Fork River TMDL.

Stream	Baseline load (lbs/yr)	Allocated load (lbs/yr)	Reduction required (lbs/yr)
Little Tenmile Creek	7.23E+13	5.94E+13	1.29E+13
Jones Creek	1.09E+14	2.18E+13	8.74E+13

7.2.3 Sediment and Habitat

There is no state criterion for sediment, and currently there is little to no water quality data existing for sediment. However, potential sediment pollution was modeled as part of the 2014 West Fork River TMDL. Sediment reductions required by the iron TMDLs were compared against reductions needed to achieve normalized sediment loads of an un-impacted reference stream. Reductions required in iron loads to attain water quality criteria exceeded needed sediment loading reduction in the reference stream (Tetra Tech, 2014). Implementation of the iron TMDLs will likely resolve any sediment pollution found in the Little Tenmile/Jones Creek watersheds. Implementation of iron TMDLs and a reduction in sediment will also increase available habitat for aquatic life. Pollution intolerant species such as the mayfly and caddisfly will have an increased rate of survival as pollutant loads decrease; furthermore, reductions in sediment will create more benthic habitat for all aquatic life.

8 Identification of Management Strategies

8.1 Existing Management Strategies

8.1.1 Structural Controls for Acid Mine Drainage

Two sites have existing management strategies for AMD in Little Tenmile Creek. The first is the Robey Mine site located in the Bennett Run sub-tributary. This site was reclaimed approximately 5 years ago. The reclamation consisted of nine wet seals that discharge water from multiple backfilled portals. There is also a grouted open limestone channel to convey and treat mine discharge on this site. Neither of these remediation methods is sufficient to treat the water emanating from this site.

The Bennett Run Portal also has an existing management strategy. Three portals were backfilled, each had a wet seal installed, and each discharges into grouted rip-rap channels. These remediation measures do not fully treat the acidic mine water discharging from this site.

8.1.2 Nonstructural Controls

There are no known nonstructural controls in the Little Tenmile/Jones Creek watersheds or their tributaries.

8.2 Additional Strategies Needed to Achieve Goals

8.2.1 Structural Controls for Acid Mine Drainage

The primary method of abatement of mine drainage in Little Tenmile and Jones Creeks will be passive treatment. Passive treatment in these watersheds will utilize combinations of passive treatment modules in succession to neutralize the mine drainage sources in the watershed. Precipitation of metals through the use of passive treatment will lower metal loads.

Almost all of the potential project sites in the Little Tenmile/Jones Creek watersheds are located in areas that are rural in nature. The terrain is agreeable to the use of passive treatment because there is a large amount of space available at each prospective project site to build treatment modules. The topography is also not very steep, which aids in the construction of treatment systems. However, it is possible that other treatment methods, such as active or in-situ treatment, may be employed due to unforeseen circumstances found at the potential project sites.

Some examples of passive treatment technologies include, but are not limited to:

1. *Open Limestone Channels* (OLCs) - Open limestone channels are modules that will be installed to convey the effluent through and to the treatment systems. In addition to conveyance, the OLCs will also help to neutralize acidity and precipitate metals. The OLCs are generally constructed with limestone sand and/or steel slag base, with rip- rap sized limestone above.
2. *Limestone Leach Beds* (LLB) – Limestone leach beds are another treatment module which utilizes limestone to neutralize acidity and precipitate metals. Leach beds are used in very low pH environments, are generally rectangular in shape, and designed for retention times of approximately 1.5 hours. The effluent enters the bed from the top and exits through a manifold system situated in the bottom of the bed.
3. *Steel Slag Leach Beds* (SSLB) – Steel slag leach beds are used in areas where there is a source of water that is relatively free of metals and a near neutral pH (generally surface flow) that can be mixed with mine water to generate excess alkalinity which in turn is used to neutralize the AMD.
4. *Anoxic Limestone Drain* (ALD) – ALDs consist of buried trenches of limestone which allow for neutralization of AMD without the presence of oxygen and without iron oxidation/precipitation. ALDs are used in situations where there is little to no dissolved oxygen and very little to no aluminum. Additionally, the iron in the effluent entering the bed should be ferrous (in a reduced state).
5. *Vertical Flow Reactors* (VFR) - Vertical flow reactors combine two passive technologies into one module. A VFR is constructed with a layer of organic material on top of a limestone bed. The effluent enters the bed from the top and flows down through the organic material where oxygen is removed and sulfates are reduced. The water then enters the limestone where neutralization occurs. The effluent leaves the reactor, at which point oxidation occurs and the metals precipitate from solution.

6. *Aerobic Wetlands* – Aerobic wetlands are utilized in passive treatment as more of a polishing feature where precipitates can be gathered and any metals still in solution can be collected. An aerobic wetland generally has an organic rich substrate that will produce a variety of wetland species. These wetlands can be used for both acidic and alkaline discharges.

8.2.1.1 Treatment Scenarios

Mine drainage sources are scattered throughout Little Tenmile and Jones Creek, with seven significant sources found within the Bennett Run tributary. The following conceptual designs are based on preliminary data that we have collected for the following proposed project locations and are subject to change as additional samples are collected. These systems will utilize combinations of passive treatment modules mentioned above in an effort to neutralize any acidity and precipitate metals. The goal of these projects is to achieve 80% acid load reduction.

The estimated costs for these projects were determined using the following formula: Acid load * cost of neutralization of 1 ton of acid load * expected life of treatment system. The acid load is determined by multiplying flow * acidity * 0.0022. The unit of acid load is tons of acid/year. The cost of neutralization of 1 ton of acid load had an assumed value of $125 and the expected life of the treatment system was 20 years for all sites. The cost of neutralization of 1 ton/year of acid load was determined to be $972 per ton in this case. This was calculated by the following: 64.82 Tons of acid/yr * 20 years = 1,296 total tons, **$1,260,679** total capital cost/1,296 tons =972$. This is roughly 8 times the assumed value; however, much of the water to be treated is net alkaline and the treatment scenarios focus on the removal of heavy metals rather than the neutralization of acid.

Bennett Portal - The Bennett Portal site, which is the most upstream mine discharge on Bennett Run, is a wet-sealed portal that discharges at stream level from three pipes and flows directly into Bennett Run. Although some reclamation work has been performed (open limestone channels, wet seals, and backfilling), the discharge is still heavily impacted by iron and requires further treatment. Due to a lack of space for passive treatment at the discharge point, the water will have to be pumped downstream. The pumped discharge will be piped into the first of two baffled wetland cells. Water will be discharged from this wetland into an open limestone channel (OLC), which will convey the water to the next wetland. Another OLC will then convey the water into Bennett Run. The estimated cost for engineering and construction of these modules would be $600,389. Currently, the Bennett Portal site adds 75,169 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 60,135 lbs/yr of iron. The implementation of a remediation project at the Bennett Portal site will help meet the load reduction goals listed in the West Fork River TMDL.

Bennett Source #2 - Bennett Source #2 is located approximately 500 ft downstream of the Bennett Portal. This source is a free-draining seep. Currently, it discharges alkaline, iron-laden water into a 50 ft long ditch, which drains directly to Bennett Run. The discharge will flow

straight into a wetland cell, which will be used to reduce the iron concentrations. An OLC will then convey the treated discharge into Bennett Run. The estimated cost for engineering and construction of these modules would be $82,976. Currently, the Bennett Source #2 site adds 79 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 63 lbs/yr of iron. The implementation of a remediation project at the Bennett Source 2 site will help meet the load reduction goals listed in the West Fork River TMDL.

Robey Mine – The Robey Mine site is located approximately 100 ft downstream of Bennett Source #2. It is a partially remediated source that continues to discharge alkaline, iron-laden water. Wet seals and grouted limestone channels were installed by the WVDEP to address safety issues. However, water quality has not yet been addressed. From the current wet seals, the water would discharge into a wetland. Baffles would be installed in the wetland in order to increase retention time of the water. The water would then be conveyed via an OLC to Bennett Run. The estimated cost for engineering and construction of these modules would be $98,833. Currently, the Robey Mine site adds 12,211 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 9,769 lbs/yr of iron. The implementation of a remediation project at the Robey Mine site will help meet the load reduction goals listed in the West Fork River TMDL.

Bennett Source #5 - Bennett Source #5 is located approximately 500 ft downstream of the Robey Mine. This source emanates from a wet seal and is piped under a road, down a hill, and into Bennett Run. This discharge will flow directly into a wetland cell, which will be used to reduce iron concentrations. An OLC will then convey the treated discharge into Bennett Run. The estimated cost for engineering and construction of these modules would be $51,262. Currently, the Bennett Source #5 site adds 8,130 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 6,504 lbs/yr of iron. The implementation of a remediation project at the Bennett Source 5 site will help meet the load reduction goals listed in the West Fork River TMDL.

Bennett Source #6 - Bennett Source #6 is located approximately 200 ft downstream of Bennett Source #5. This source emanates from a wet seal and is piped under a road, down a hill, and into Bennett Run. This discharge will flow directly into a wetland cell, which will be used to reduce iron concentrations. An OLC will then convey the treated discharge into Bennett Run. The estimated cost for engineering and construction of these modules would be $34,304. Currently, the Bennett Source #6 site adds 4,122 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 3,298 lbs/yr of iron. The implementation of a remediation project at the Bennett Source 6 site will help meet the load reduction goals listed in the West Fork River TMDL.

Bennett Source #7 - Bennett Source #7 is located approximately 600 ft downstream of Bennett Source #6. This source emanates from two wet seals, combines into a single channeled discharge, and is piped under a road and into Bennett Run. After the flow from the two wet seals combines and flows under the road, it will flow directly into a wetland cell. An OLC will then convey the treated discharge into Bennett Run. The estimated cost for engineering and

construction of these modules would be $12,938. Currently, the Bennett Source #7 site adds 680 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 544 lbs/yr of iron. The implementation of a remediation project at the Bennett Source #7 site will help meet the load reduction goals listed in the West Fork River TMDL.

Bennett Source #8 - Bennett Source #8 is located approximately 400 ft downstream of Bennett Source #5. This source emanates from a wet seal, flows through a grouted limestone channel, and is piped under a road and into Bennett Run. When it is treated, this discharge will flow directly into a wetland cell. An OLC will then convey the treated discharge into Bennett Run. The estimated cost for engineering and construction of these modules would be $34,238. Currently, the Bennett Source #8 site adds 693 lbs/yr of iron to Bennett Run. The remediation project described above will remove an estimated 554 lbs/yr of iron. The implementation of a remediation project at the Bennett Source #8 site will help meet the load reduction goals listed in the West Fork River TMDL.

Rosebud -Rosebud is located just southeast of Dola and is a direct drain to Little Tenmile Creek. An open mine portal discharges a moderate amount of alkaline, iron-laden water. Treatment for this site will include a wetland cell. Treated water will discharge into an OLC and then into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $5,064. Currently, the Rosebud site adds 27 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 22 lbs/yr of iron. The implementation of a remediation project at the Rosebud site will help meet the load reduction goals listed in the West Fork River TMDL.

Rosebud Tipple - The Rosebud Tipple site is located just southeast of Dola and is a direct drain to Little Tenmile Creek. A free-draining seep discharges a moderate amount of alkaline, iron-laden water. Treatment for this site will include a wetland cell. Treated water will discharge into an OLC and then into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $4,613. Currently, the Rosebud Tipple site adds 2 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 1 lb/yr of iron. The implementation of a remediation project at the Rosebud Tipple site will help meet the load reduction goals listed in the West Fork River TMDL.

Little Laurel -Little Laurel is located just southeast of Dola and is a direct drain to Little Tenmile Creek. Un-remediated highwalls and a mine drainage-impacted water body are located in the headwaters of this sub-tributary. Treatment for this site will include a wetland cell. Treated water will discharge into an OLC and then into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $5,975. Currently, the Little Laurel site adds 43 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 34 lb/yr of iron. The implementation of a remediation project at the Little Laurel site will help meet the load reduction goals listed in the West Fork River TMDL.

Peters - Peters is located just southeast of Dola and is a direct drain to Little Tenmile Creek. Un-remediated highwalls and a mine drainage-impacted water body are located in the headwaters of this sub-tributary. Treatment for this site will include a wetland cell. Treated water from the wetland will discharge into an OLC and then into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $7,883. Currently, the Peters site adds 83 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 66 lb/yr of iron. The implementation of a remediation project at the Peters site will help meet the load reduction goals listed in the West Fork River TMDL.

Robey Trib -The Robey Trib site is located southwest of Lumberport and is a direct drain to Little Tenmile Creek. A free-draining seep discharges a moderate amount of slightly acidic (pH = 6.4), iron-laden water. An OLC will gather and convey the mine water into a limestone bed. The water will then exit the limestone bed and proceed via OLC into a settling pond before being discharged via another OLC into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $250,302. Currently, the Robey Trib site adds 445 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 356 lbs/yr of iron. The implementation of a remediation project at the Robey Trib site will help meet the load reduction goals listed in the West Fork River TMDL.

Robey Complex - The Robey Complex site is located southwest of Lumberport and is a direct drain to Little Tenmile Creek. A free-draining seep discharges approximately 150 gpm of alkaline, iron-laden water. Treatment for this site will include a wetland cell. Treated water from the wetland will discharge into an OLC and then into Little Tenmile Creek. The estimated cost for engineering and construction of these modules would be $22,612. Currently, the Robey Complex site adds 47 lbs/yr of iron to Little Tenmile Creek. The remediation project described above will remove an estimated 37 lb/yr of iron. The implementation of a remediation project at the Robey Complex site will help meet the load reduction goals listed in the West Fork River TMDL.

Haywood Mine - The Haywood Mine site (PAD# WV-001876) is located just north of Lumberport and is a direct drain to Jones Creek. This site is the main contributor of iron to Jones Creek. A portal discharges slightly alkaline, iron-laden water. Treatment for this site will include a wetland cell. Treated water from the wetland will discharge into an OLC and then into Jones Creek. The estimated cost for engineering and construction of these modules would be $49,290. Currently, the Haywood Mine site adds 1,280 lbs/yr of iron to Jones Creek. The remediation project described above will remove an estimated 1,024 lb/yr of iron. The implementation of a remediation project at the Haywood Mine site will help meet the load reduction goals listed in the West Fork River TMDL.

In conclusion, these module designs and their costs were estimated using AMDTreat software from the Office of Surface Mining. The designs and costs were constructed using the most recent water quality data. However, these designs/costs are merely preliminary attempts to mitigate the AMD in the Little Tenmile and Jones Creek watersheds. As such, both the costs

and the designs could change before the commencement of project construction. For a map outlining the project locations please refer to Figure 30. Table 14 summarizes the project and cost for each of the treatment scenarios.

8.2.1.2 Nonstructural Controls

There are no plans for implementation of nonstructural controls in the Little Tenmile/Jones Creek watersheds or their tributaries. This is because the mine drainage will be treated after it is discharged from the mines. For a control module to be nonstructural, mine drainage formation would have to be slowed down or stopped. The mine drainage in the Little Tenmile/Jones Creek watersheds will be treated after formation, which more appropriately fits the definition of a structural control.

8.2.2 Controls for Fecal Coliform Bacteria

"Point and nonpoint sources contribute to the fecal coliform bacteria impairments in the watersheds. Failing on-site systems, direct discharges of untreated sewage, and precipitation runoff from agricultural and residential areas are significant nonpoint sources of fecal coliform bacteria. Point sources of fecal coliform bacteria include the effluents of sewage treatment facilities, collection system overflows (CSOs) from publicly owned treatment works (POTWs), and stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s)" (Tetra Tech, 2014). The countless inputs of both point and nonpoint fecal coliform bacteria pollution generate an arduous task when considering proper controls.

Nonpoint sources of fecal coliform within the Little Tenmile/Jones Creek watersheds are innumerable. Failing residential septic systems and agricultural runoff are the prevalent contributors of fecal coliform within the watersheds. Furthermore, this problem may also be expounded in certain areas within the watersheds but is often masked by AMD pollution. The NMLRC will work with GWF to address fecal coliform bacteria impairments by:

- Applying for education and outreach funding to inform watershed residents about agricultural BMP's and on-site sewage treatment alternatives;
- Distributing literature to create awareness within the watersheds of governmental programs that provide monetary assistance for BMP's;
- Writing a supplement to the WBP focusing on bacterial contamination; and
- Re-assessing certain reaches of the watershed streams after AMD remediation measures have been installed.

This strategy will involve submitting an amendment to the WBP focusing directly on bacterial contamination outlining: controls needed; designs for these controls; project partners; possible funding streams; and cost estimates. The NMLRC anticipates the submission of a formal request to address bacterial contamination in the watersheds by the 2016 fiscal year. An in-depth approach focusing on certain stretches of sub-tributaries where high levels of bacterial contamination are found is obligatory to properly address this issue. Based on data previously

collected by the NMLRC and WVDEP WAP group, this approach will closely identify loadings and sources by conducting further sampling. Site specific BMP's that combat the effects of bacterial contamination will be implemented where needed throughout the watersheds.

AMD can mask bacteria yet wetlands often host beneficial bacteria for AMD remediation; therefore, these factors could skew bacterial colony numbers and loadings. In order to properly address bacteria in the watershed, re-assessment will be needed after passive treatment systems have been applied. After re-assessment, further site-specific remediation strategies will be designed using the most current data.

9 Implementation Program Design

9.1 Management Strategies

Mine drainage is currently the limiting factor for life in the Little Tenmile/Jones Creek watersheds. Therefore, reclamation will focus on mine drainage first. Once load reductions have been achieved to allow for the propagation and maintenance of fish and other aquatic life, fecal coliform bacteria will be re-assessed. Concurrent with the mine drainage reclamation, the WVDEP and the GWF will educate community members about mine drainage-related issues. Table 14 provides an overall view of management strategies for the Little Tenmile/Jones Creek watersheds. More details regarding the types of passive treatment for each project site are given in section 8.2.1.1 of this document. Project site locations are shown on Figure 12 in section 5.1.1 of this document. Total capital cost to implement the projected management strategies is an estimated **$1,260,679** (Table 14). These costs are based on current AMD treat modeling and will likely increase as the project timeline extends.

Table 14: Management strategies for the Little Tenmile/Jones Creek watersheds.

Site name	Responsible Party	Costs	Timeline	Interim Milestones	Progress Criteria	Info/Education	Monitoring
Bennett Portal	WVDEP/ NMLRC/ GWF	$600,389	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Bennett Source 2	WVDEP/ NMLRC/ GWF	$82,976	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Robey Mine	WVDEP/ NMLRC/ GWF	$98,833	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Bennett Source 5	WVDEP/ NMLRC/ GWF	$51,262	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Bennett Source 6	WVDEP/ NMLRC/ GWF	$34,304	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Bennett Source 7	WVDEP/ NMLRC/ GWF	$12,938	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Bennett Source 8	WVDEP/ NMLRC/ GWF	$34,238	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7

Rosebud	WVDEP/ NMLRC/ GWF	$5,064	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Rosebud Tipple	WVDEP/ NMLRC/ GWF	$4,613	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Little Laurel	WVDEP/ NMLRC/ GWF	$5,975	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Peters	WVDEP/ NMLRC/ GWF	$7,883	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Robey Trib	WVDEP/ NMLRC/ GWF	$250,302	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Robey Complex	WVDEP/ NMLRC/ GWF	$22,612	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7
Haywood Mine	WVDEP/ NMLRC/ GWF	$49,290	Section 9.2	Section 9.3	Section 9.4	Section 9.6	Section 9.7

9.2 Schedule of Activities

As described in the management strategy, the first reclamation activities taking place will be mine drainage remediation, as it is currently the limiting factor in Little Tenmile and Jones Creek. As remediation progresses, this should be re-evaluated in 2024. Once all mine drainage remediation is complete in 2023, Little Tenmile and Jones Creeks should be re-evaluated for impairment from other sources of pollution. Table 15 and 16 gives a timeline for completion of mine drainage remediation projects within the Little Tenmile/Jones Creek watersheds.

Table 15: Timeline for AMD remediation within the Bennett Run sub-tributary of Little Tenmile Creek.

Project	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Bennett Portal	Pre-const. sampling		Apply for 2016 grant	Construction		Post-construction sampling						
Bennett Source 2	Pre-const. sampling		Apply for 2016 grant	Construction		Post-construction sampling						
Robey Mine	Pre-const. sampling			Apply for 2017 grant	Construction		Post-construction sampling					
Bennett Source 5	Pre-const. sampling				Apply for 2018 grant	Construction		Post-construction sampling				
Bennett Source 6	Pre-const. sampling					Apply for 2019 grant	Construction		Post-construction sampling			
Bennett Source 7	Pre-const. sampling						Apply for 2020 grant	Construction		Post-construction sampling		

Bennett Source 8	Pre-const. sampling							Apply for 2021 grant	Construction		Post-construction sampling	
Education/Outreach	Education and Outreach about AMD related issues											

Table 16: Timeline for AMD remediation within the remainder of the Little Tenmile Creek and Jones Creek watersheds.

Project	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Rosebud	Pre-const. sampling		Apply for 2016 grant	Construction		Post-construction sampling						
Rosebud Tipple	Pre-const. sampling		Apply for 2016 grant	Construction		Post-construction sampling						
Little Laurel	Pre-const. sampling			Apply for 2017 grant	Construction		Post-construction sampling					
Peters	Pre-const. sampling				Apply for 2018 grant	Construction		Post-construction sampling				
Robey Trib	Pre-const. sampling					Apply for 2019 grant	Construction		Post-construction sampling			
Robey Complex	Pre-const. sampling						Apply for 2020 grant	Construction		Post-construction sampling		
Haywood	Pre-const. sampling							Apply for 2021 grant	Construction		Post-construction sampling	
Education/Outreach	Education and Outreach about AMD related issues											

9.3 Interim Milestones

Interim milestones will be met for the mine drainage-affected tributaries of Little Tenmile and Jones Creeks. These milestones include metal load reductions of 50-80% of the original load of the tributary. These load reductions are anticipated to occur within one year after project construction. As each project is completed, loading at the mouth of the impacted tributary will be determined and compared to the initial loading. This will determine the removal of mine drainage pollution in these tributaries, as well as the mainstem of Little Tenmile/Jones Creek, in a scientifically rigorous manner. Table 17 shows the initial loadings from all mine drainage sources for three major impacted tributaries, as well as the anticipated load reductions for iron.

Table 17: Initial iron loads (dissolved) and anticipated load reductions for three mine drainage-impacted streams within the Little Tenmile and Jones Creek watersheds. Note that the loadings for Little Tenmile include Bennett Run as it is a tributary to the Little Tenmile and the primary AMD contributor.

Subwatershed	Initial Fe (d) load lbs/yr	Expected Fe (d) Reduction lbs/yr
Little Tenmile	111,903	55,951-89,522
Jones Creek	1,408	704-1,126
Bennett Run	111,219	55,608-88,975

9.4 Indicators to Measure Progress

Multiple indicators will be used to track progress:

1. Water Quality - The most important water quality goal is to reduce metal loadings from AMD by 50-80%. Attainment of these load reductions will be assessed by periodic pre- and post-construction sampling at each project site, as well as at the confluence of the impacted tributaries and Little Tenmile or Jones Creeks. The sample taken at the confluence will help determine the effect on water quality of the mine drainage remediation projects. Sampling will be conducted during various times of the year in order to determine how pollutant loads change with large or small flow values.

2. Biological Diversity and Capacity - The biological integrity of Little Tenmile and Jones Creeks is an important indicator of potential habitat. Monitoring of benthic organisms within the stream will establish the potential for organisms to repopulate the entire watershed. Benthic monitoring will occur once per year at the mouths of the key impacted tributaries of both streams. Physical attributes of the stream will also be assessed during sampling times. Lastly, anecdotal evidence from watershed residents will help to further target sampling sites.

3. Public Support - Public support is important to the remediation of the Little Tenmile/Jones Creek watersheds. During the gathering of data for this plan, many citizens of the watershed observed the water sampling activities and by doing so, became more engaged in the welfare of the watershed. GWF hopes to capitalize on this interest by taking a leadership role in the garnering of public support for the Little Tenmile and Jones Creek watersheds.

9.5 Estimation of Costs and Technical Assistance Needed

9.5.1 Estimation of Costs

Costs of the mine drainage remediation projects are given in Table 14. Total capital cost to implement the projected management strategies is an estimated **$1,260,679**. These costs include all construction, engineering, and any other capital costs for each project. Each passive treatment system is designed to last 20 years without requiring maintenance. However, scope and complexity often dictate maintenance costs and issues within the 20 year design. The proposed passive systems in these watersheds are largely made up of wetlands and are fairly simple. Sludge build-up issues in the wetland cells and pipe clogging issues could arise and would be addressed on a per project basis. Cost factors for maintenance will largely rely on the price for sludge removal from wetland cells. Project performance will be closely monitored during post-construction sampling and beyond. If a maintenance issue does arise, it will be taken care of as soon as possible by the NMLRC and GWF.

9.5.1.1 Funding Sources

Section 319 funds
Clean Water Act Section 319 funds may be provided by USEPA to WVDEP to be used for reclamation of nonpoint-source pollution sources. This Watershed based Plan is being developed so that these funds in fiscal year 2016 and beyond can be allocated to the Little Tenmile and Jones Creek watersheds. WVDEP's Division of Water Resources sets priorities and administers the state Section 319 program.

Watershed Cooperative Agreement Program
Grants specifically for mine drainage remediation projects on Abandoned Mine Lands are available through OSM's Watershed Cooperative Agreement Program (WCAP). The WCAP is part of the Appalachian Clean Streams Initiative. Grants of up to $100,000 are awarded to not-for-profit organizations that have developed cooperative agreements with other entities to reclaim AML sites.

Stream Restoration Fund (SRF)
In 2010, the WV Code was updated to include the Stream Restoration Fund. This money is to be used for the restoration and remediation of streams in the state of WV which have been affected by coal mining or mine drainage. The funds in this account are replenished through mitigation monies and private sources. SRF funds can be used as matching funds for Clean Water Act Section 319 funds.

9.5.2 Technical Assistance

West Virginia Department of Environmental Protection
The Division of Water and Waste Management will provide technical assistance in the implementation of the WBP through the Nonpoint Source Program (NPS). The NPS Program is funded primarily by the Clean Water Act Section 319 Grants in order to:

- Educate the public and land users on nonpoint source issues;
- Support citizen-based watershed organizations;
- Support enforcement of nonpoint source water quality laws; and
- Restore impaired watersheds.

Another technical assistance program within the WVDEP is the WV Save Our Streams program. This is a volunteer monitoring program that trains West Virginia citizens of all ages how to monitor, as well as to become watchdogs over their local wadeable streams and rivers. This program has proven to be an invaluable asset in educating members of watershed groups as well as the general public.

West Virginia University
The primary organization housed within West Virginia University that provides technical assistance for watershed groups is the National Mine Land Reclamation Center. This organization can provide conceptual site designs for reclamation of AMD, as well as oversee the installation of the reclamation project, and monitor the pre- and post - construction water quality. The NMLRC also provides support to DEP in developing watershed plans and training for watershed organizations. NMLRC can draw upon the expertise of the numerous university colleges at WVU to address other types of nonpoint source pollutants as well.

Guardians of the West Fork
GWF will provide technical assistance by aiding in pre- and post-construction water quality monitoring. GWF will also offer support for education and outreach efforts throughout the West Fork River watershed.

9.6 Information/Education Component

A prominent part of the partnership between NMLRC, WVDEP, and GWF is to publicize the status of reclamation within the Little Tenmile and Jones Creek watersheds, and encourage education of environmental issues within these watersheds to a wide audience. The target audience of these education efforts will be any stakeholder within the watersheds, including, but not limited to, sportsmen, private citizens, and industry. The three partners involved in the reclamation of Little Tenmile and Jones Creeks will educate stakeholders and members of the community about mine drainage through:

- Websites of the respective partners;
- Public meetings; and
- Educational displays at regional and local festivals, conferences, and other public events.

In the future, the three partners may:

- Organize volunteer citizen monitoring within the watershed;
- Publicize results to the general public of reclamation projects as they are gathered; and

- Work with local schools and community members to educate citizens of the watersheds and surrounding area in water quality related issues.

The efficacy of information sharing will be evaluated by a survey given after each educational activity. Results of the survey will be used to improve educational materials and presentations to better share information with interested watershed stakeholders.

9.7 Monitoring Component

Monitoring is an essential component of a watershed based plan because it allows stakeholders to see what progress is being made and when goals are achieved. Monitoring will be a key component of each of the projects described in section 8.2.1.1 above. In general, at least one year of chemical monitoring (sampled once a month) will be conducted before and after the construction of the reclamation project at various points within the project site. Monitoring will also take place at the mouth of the completed project's tributary in order to quantify the effect of mine drainage treatment at each project site. Monitoring will include pre- and post-construction sampling for the 14 project sites, the mouth of each project tributary, and the mouth of Little Tenmile or Jones Creek, for a total of 16 sample points. This number and frequency of samples was deemed appropriate for a watershed this size because all mine drainage sources would be sampled several times and both initial metal loads and metal load reductions could be accurately calculated with this number of samples. A sampling regime of this size and frequency has also been previously used on other mine drainage remediation projects and has been found to effectively represent water quality conditions. All samples will be collected and analyzed using standard EPA protocols. Data collected from these samples will be stored at the NMLRC. Figure 30 indicates the location of the 14 project sampling points and the sampling point at the mouth of impacted tributaries.

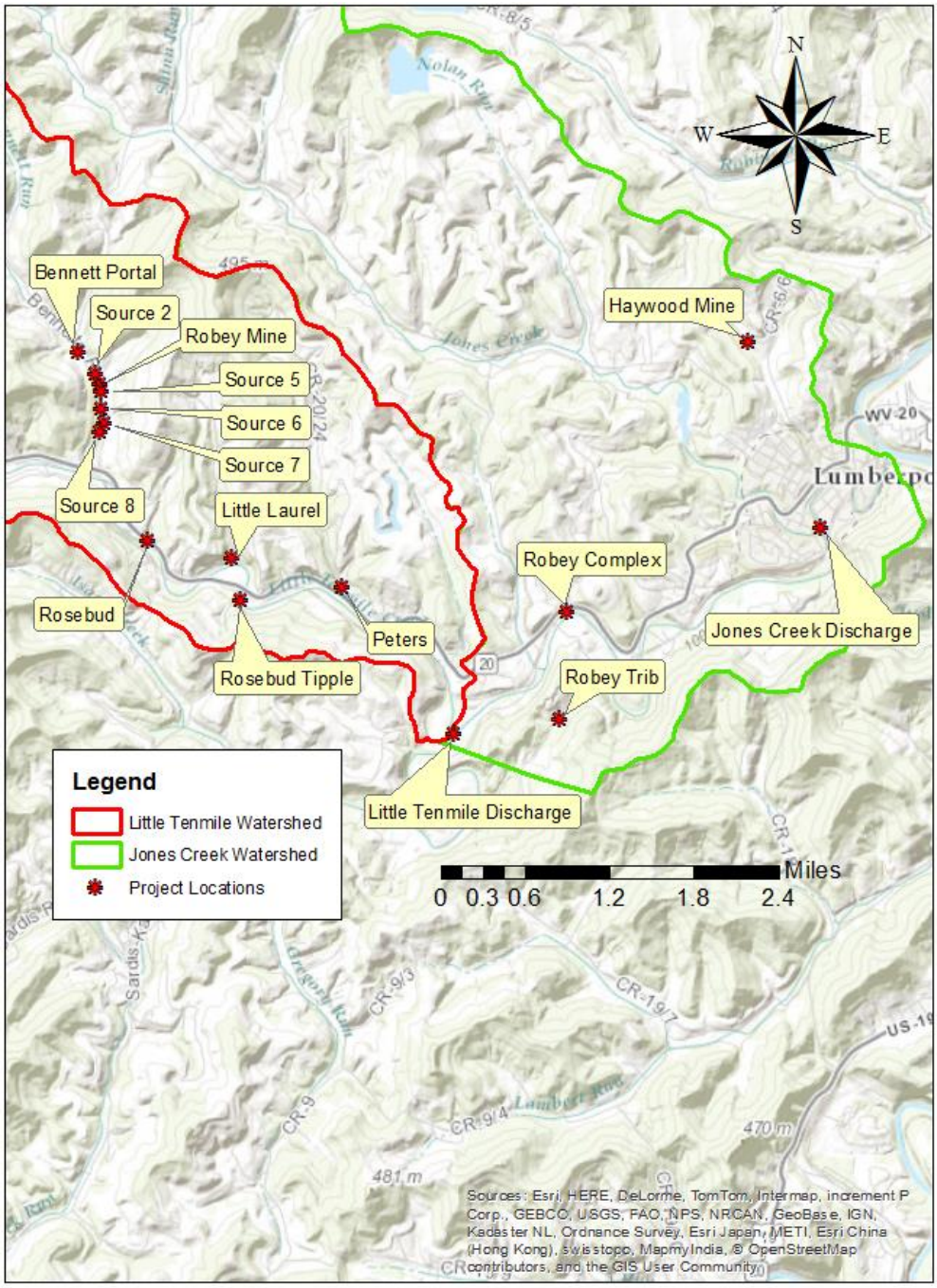

Figure 30: AMD project locations/sample points in the Little Tenmile/Jones Creek watersheds.

Chemical sampling will be the responsibility of the organization that is conducting the reclamation. In addition to localized, project-related monitoring, NMLRC will apply for further funding to complete monitoring surveys of other Little Tenmile/Jones Creek subwatersheds. These monitoring surveys will be targeted to areas where impacts on water quality have been noted during past sampling events. If more project sites are discovered due to increased sampling, NMLRC and/or GWF will apply for more project funds.

The above monitoring plan will effectively address the evaluation criteria in Section 8.2.1.1 of this plan by comparing existing monitoring data with data collected in the future. These data will be linked through the parameter of metal loads. Iron loads will be calculated for future samples and compared to previous samples to determine load reductions. Metal load reductions will also be used to establish the extent to which the West Fork River TMDL is being implemented. The data comparison will allow the WVDEP to determine the amount of progress made toward the ultimate goal of removing Little Tenmile and Jones Creeks from the WV 303(d) list of impacted streams. The progress toward these goals will be continually reassessed by the WVDEP as reclamation is completed.

9.8 Evaluation Framework

Three parts of this WBP will be assessed by the evaluation framework: inputs, outputs, and outcomes. Various strategies will be used to evaluate these sections of the plan.

9.8.1 Evaluation of Inputs

The two main inputs to this program are reclamation project funds and time spent on planning and implementation of projects. Project funds will be tracked by both the NMLRC and the WVDEP. Funds will be disbursed according to a pre-determined budget. The indicator used to measure the input of project funds will be a spreadsheet used to track project costs. This spreadsheet will be compared against the pre-determined budget to make sure that project funds are spent correctly and efficiently.

The time spent by various individuals and groups on reclamation projects will also is tracked. The hours that each individual/group will spend on a given project will be delineated during the budget process. Similar to the tracking of funds, a spreadsheet tracking these hours will be maintained for comparison against the budgeted amount of hours.

9.8.2 Evaluation of Outputs

The major outputs of this plan will be water quality data and completed reclamation projects. Water quality data will be collected before and after construction at each project site, as well as at the mouth of each project tributary (see Section 9.7 of this document). The indicator used to measure water quality is the number of samples collected. Samples will be tracked by date and site name to ensure accuracy of sampling. All this information, as well as water quality results, will be recorded on a spreadsheet and used to aid in future project design and implementation.

The second output will be completed reclamation projects. The indicator to evaluate these projects will be post-construction water sampling. When construction is complete, post-construction water sampling can commence. Post-construction water sampling will continue for at least one year after construction. Samples will be tracked to ensure the reclamation project is performing adequately.

9.8.3 Evaluation of Outcomes

The primary outcome related to this project will be a reduction in metal loads. Load reductions will be determined using post-construction data and comparing it to pre-construction data. The indicator of success in reducing metal loads will be a 50-80% reduction at the mouth of mine drainage-impacted tributaries. Ultimately, meeting the target load reductions will enable sub-tributaries to be removed from the 303(d) list of pollutant impacted streams; notably, Fe removal in the Bennett Run tributary of Little Tenmile Creek. In sum, sub-tributary load reductions will eventually serve to de-list both Jones Creek and Little Tenmile Creek main stems from the list of pollutant impacted streams.

A secondary outcome related to this project is the reduction of fecal coliform loads. It is likely that fecal coliform will be more closely addressed in a supplemental WBP and loads will be quantified. Therefore, proper load reductions cannot be put forth and observed at this time, yet success can be measured if colony counts are reduced when supplementary sampling occurs.

Increased aquatic life population is another outcome of this program. Indicators of success will be both scientific and anecdotal. Benthic macroinvertebrate populations will be monitored and quantified (particularly downstream of completed projects). These organisms will be the best biological indicators of the possible expansion of other aquatic life (i.e growth in fish population). The NMLRC will record any fish that are found and approximately where the fish were seen. Evidence of metal/acidity load reduction, fecal coliform reduction, and increased aquatic life will be documented in semi-annual project reports submitted to WVDEP.

References

1. Audubon Society. 2011. West Virginia's Important Bird Areas Program. http://netapp.audubon.org/iba/state/US-WV. Updated 2011. Accessed July 2014.

2. Barbour, M., Gerritsen, J., Snyder, B., and Stribling, J. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

3. FEMA (Federal Emergency Management Agency). 2014. Flood Map Service Center, 2014. https://msc.fema.gov/portal. Accessed June 2014.

4. Hennan, Ray V., and White, I. C. 1912. West Virginia Geological Survey: Doddridge and Harrision Counties. Wheeling News Litho Co., Wheeling WV. 712p.

5. NOAA (National Oceanic and Atmospheric Administration). 2010. NOAA Online Weather Data for Lumberport, WV. http://www.ncdc.noaa.gov/cdo-web/datatools. Accessed June 2014.

6. NRCS (Natural Resources Conservation Service). 2014. Web Soil Survey Data. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed August 2014.

7. Tetra Tech. 2014. Total Maximum Daily Loads for the West Fork River Watershed, West Virginia. http://www.dep.wv.gov/WWE/watershed/TMDL/grpe/Documents/West%20Fork%202%20-%202014%20docs/USEPA%20Approved_E2_Public_Report_2014.pdf. Accessed September 2014.

8. US Census Bureau. 2010. Harrison County, West Virginia. http://quickfacts.census.gov/qfd/states/54/54033.html. Updated November 2010. Accessed July 2014.

9. USDA (United States Department of Agriculture). 2012. 2012 Census of Agriculture. West Virginia State and County Data. http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/West_Virginia/. Accessed August 2014.

10. USFWS (United States Fish and Wildlife Service). 2013. Known and Potential Distribution of Federally Listed Endangered and Threatened Species and Proposed Species in West Virginia. http://www.fws.gov/westvirginiafieldoffice/PDF/Known%20and%20Potential%20Distribution%20of%20Federally_Oct%202013.pdf. Updated 2013. Accessed September 2014.

11. USFWS. 2014. Wetlands Mapper. http://www.fws.gov/wetlands/Data/Mapper.html. Updated 2014. Accessed August 2014.

12. USGS (United States Geologic Survey). 2001. Land Cover Analysis Tool. http://www.mrlc.gov/nlcd01_data.php. Accessed May 2014.

13. West Virginia GIS Technical Center. 2005. West Virginia Statewide Digital Elevation Models. http://seamless.usgs.gov. Accessed April 2014.

14. West Virginia GIS Technical Center. 2008. Statewide 100-year Floodplain Polygons for West Virginia. http://wvgis.wvu.edu/data/dataset.php?action=search&ID=128. Accessed June 2014.

15. WVBAC (West Virginia Brownfields Assistance Center). 2014. West Virginia Brownfields Inventory. http://wvbrownfields.org/wv-brownfields-inventory/. Accessed September 2014.

16. WVDEP (West Virginia Department of Environmental Protection). 2014. Watershed Assessment Branch 2014 Standard Operating Procedures. Division of Water and Waste Management, Watershed Assessment Branch, Charleston, WV.

17. WVDEP. 2002. Metals and pH TMDL's for the West Fork Watershed. http://www.dep.wv.gov/WWE/watershed/TMDL/grpe/Documents/West%20Fork/1966_West%20Fork%20draft%20TMDL%20appdxs.pdf. Accessed June 2014.

18. WVDEP. 2008. Antidegradation Implementation Procedures. WV 60CSR-05. WV Department of Environmental Protection, Secretary's Office. 13 pg.

19. WVDEP. 2014. REQUIREMENTS GOVERNING WATER QUALITY STANDARDS. http://www.dep.wv.gov/WWE/Programs/wqs/Documents/Rule%20Approved%20Letter%20and%20Rule%20Itself%202014/WVDEP_WQS_2014Tri-Review_FinalRule47CSR2_June_2014.pdf. Accessed August 2014.

20. WVDNR (West Virginia Division of Natural Resources). 2003a. West Virginia Animals. http://www.wvdnr.gov/Wildlife/Animals.shtm. Updated 2003. Accessed July 2014.

21. WVDNR. 2003b. Rare, Threatened, and Endangered Species. http://www.wvdnr.gov/Wildlife/Endangered.shtm. Updated 2003. Accessed July 2014.

22. WVDNR. 2003c. Aquatic Invasive Species. http://www.wvdnr.gov/fishing/Invasive_Species.shtm. Accessed July 2014.

23. WVDNR. 2004. Neotropical Birds of West Virginia. Wildlife Resources Section, Wildlife Diversity Program. http://www.wvdnr.gov/publications/PDFFiles/neotropbirds.pdf. 15 p. Accessed June 2014.

24. WVGES (West Virginia Geologic and Economic Survey). 2014). Underground and Surface Coal Mines. http://www.wvgs.wvnet.edu/GIS/CBMP/all_mining.html. Accessed August 2014.

Appendix A - Data Inventory

WVDEP WAP Water Quality Data-Jones Creek Watershed

ANCODE	MILE_POINT	STREAM_NAME	DATE	PARAMETER	VALUE	DEFAULT_UNITS
WVMW-13-A	6.7	Jones Creek	6/15/10	Specific Conductance	247	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	6/15/10	Hot Acidity	1	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Alkalinity	107	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	PH	7.83	S.U.
WVMW-13-A-1	0	Nolan Run	6/15/10	Specific Conductance	968	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	6/15/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/10	Alkalinity	196	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/10	Hot Acidity	1	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/10	PH	7.75	S.U.
WVMW-13-A-1	0	Nolan Run	6/15/10	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Fe Dissolved	0.18	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Alkalinity	135	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Specific Conductance	313	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	7/20/10	PH	8.04	S.U.
WVMW-13-A-1	0	Nolan Run	7/21/10	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	7/21/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	7/21/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	7/21/10	Alkalinity	234	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	7/21/10	Specific Conductance	480	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	7/21/10	PH	7.94	S.U.
WVMW-13-A	6.7	Jones Creek	8/9/10	Alkalinity	141	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Fe Dissolved	0.22	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Specific Conductance	328	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	8/9/10	PH	7.8	S.U.
WVMW-13-A-1	0	Nolan Run	8/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	8/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	8/9/10	Alkalinity	218	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	8/9/10	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	8/9/10	PH	7.96	S.U.
WVMW-13-A-1	0	Nolan Run	8/9/10	Specific Conductance	1343	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	11/8/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Alkalinity	103	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Fe Dissolved	0.15	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Specific Conductance	131	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	11/8/10	PH	7.62	S.U.

WVMW-13-A-1	0	Nolan Run	11/8/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/8/10	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/8/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/8/10	Alkalinity	298	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/8/10	Specific Conductance	1666	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	11/8/10	PH	8.27	S.U.
WVMW-13-A	6.7	Jones Creek	11/18/10	PH	7.57	S.U.
WVMW-13-A	6.7	Jones Creek	11/18/10	Specific Conductance	240	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	11/18/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Fe Dissolved	0.09	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Alkalinity	84	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/18/10	PH	8.1	S.U.
WVMW-13-A-1	0	Nolan Run	11/18/10	Specific Conductance	1126	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	11/18/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/18/10	Alkalinity	218	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/18/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	11/18/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Lab Specific Conductance	249	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	12/9/10	Alkalinity	82	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Specific Conductance	221	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	12/9/10	PH	7.34	S.U.
WVMW-13-A-1	0	Nolan Run	12/14/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	12/14/10	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	12/14/10	Alkalinity	115	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	12/14/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	12/14/10	PH	7.72	S.U.
WVMW-13-A-1	0	Nolan Run	12/14/10	Specific Conductance	610	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	1/12/11	Specific Conductance	218	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	1/12/11	PH	7.82	S.U.
WVMW-13-A	6.7	Jones Creek	1/12/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Alkalinity	81	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	1/12/11	Specific Conductance	1182	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	1/12/11	PH	8.09	S.U.
WVMW-13-A-1	0	Nolan Run	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	1/12/11	Alkalinity	231	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	1/12/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	1/12/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Specific Conductance	167	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	2/8/11	PH	7.52	S.U.
WVMW-13-A	6.7	Jones Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Fe Dissolved	0.05	mg/L or ppm

WVMW-13-A	6.7	Jones Creek	2/8/11	Alkalinity	51	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	2/8/11	Specific Conductance	673	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	2/8/11	PH	7.84	S.U.
WVMW-13-A-1	0	Nolan Run	2/8/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	2/8/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	2/8/11	Alkalinity	134	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Specific Conductance	169	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	3/16/11	PH	7.75	S.U.
WVMW-13-A	6.7	Jones Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Alkalinity	57	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	3/16/11	Specific Conductance	864	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	3/16/11	PH	8.03	S.U.
WVMW-13-A-1	0	Nolan Run	3/16/11	Alkalinity	130	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	3/16/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Specific Conductance	110	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	4/19/11	PH	7.36	S.U.
WVMW-13-A	6.7	Jones Creek	4/19/11	Alkalinity	41	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	4/19/11	Specific Conductance	331	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	4/19/11	PH	7.45	S.U.
WVMW-13-A-1	0	Nolan Run	4/19/11	Alkalinity	75	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	4/19/11	Al Dissolved	2.13	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	4/19/11	Fe Dissolved	3.61	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	PH	7.78	S.U.
WVMW-13-A	6.7	Jones Creek	5/16/11	Alkalinity	66	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Specific Conductance	180	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	5/16/11	PH	8.02	S.U.
WVMW-13-A-1	0	Nolan Run	5/16/11	Alkalinity	147	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	5/16/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	5/16/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	5/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	5/16/11	Specific Conductance	964	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	6/15/11	PH	7.85	S.U.
WVMW-13-A	6.7	Jones Creek	6/15/11	Specific Conductance	330	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	6/15/11	Al Dissolved	0.04	mg/L or ppm

WVMW-13-A	6.7	Jones Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	Alkalinity	143	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	Fe Dissolved	0.12	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/11	PH	8.17	S.U.
WVMW-13-A-1	0	Nolan Run	6/15/11	Specific Conductance	1483	uS or umhos/cm
WVMW-13-A-1	0	Nolan Run	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A-1	0	Nolan Run	6/15/11	Alkalinity	262	mg/L or ppm

WVDEP WAP Water Quality Data-Little Tenmile Creek Watershed

ANCODE	MILE_POINT	STREAM_NAME	DATE	PARAMETER	VALUE	DEFAULT_UNITS
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Specific Conductance	476	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	PH	7.36	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Alkalinity	80	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Specific Conductance	142	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	PH	7.23	S.U.
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Alkalinity	34	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	1/12/11	Specific Conductance	1206	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	1/12/11	PH	8.18	S.U.
WVMW-13-B-1	0.1	Peters Run	1/12/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	1/12/11	Alkalinity	179	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	1/12/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Lab Specific Conductance	1110	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Specific Conductance	770	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	PH	7.58	S.U.
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Fe Dissolved	5.76	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Alkalinity	133	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Specific Conductance	180	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	PH	8.25	S.U.
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Alkalinity	64	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-5	0.2	Little Elk Creek	1/13/11	Specific Conductance	106	uS or umhos/cm
WVMW-13-B-5	0.2	Little Elk Creek	1/13/11	PH	7.43	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Specific Conductance	118	uS or umhos/cm

WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	PH	7.42	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Alkalinity	27	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Specific Conductance	128	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	PH	7.37	S.U.
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Alkalinity	33	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Fe Dissolved	0.1	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Specific Conductance	93	uS or umhos/cm
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	PH	7.44	S.U.
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Alkalinity	33	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Specific Conductance	208	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	PH	7.36	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Alkalinity	35	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Fe Dissolved	0.25	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Specific Conductance	78	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	PH	7.17	S.U.
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Alkalinity	18	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	2/9/11	Specific Conductance	984	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	2/9/11	PH	8.3	S.U.
WVMW-13-B-1	0.1	Peters Run	2/9/11	Alkalinity	149	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	2/9/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	2/9/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Specific Conductance	632	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	PH	7.67	S.U.
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Alkalinity	112	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Fe Dissolved	4.71	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Specific Conductance	132	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	PH	8.08	S.U.
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Alkalinity	40	mg/L or ppm

WVMW-13-B-5	0.2	Little Elk Creek	2/8/11	Specific Conductance	80	uS or umhos/cm
WVMW-13-B-5	0.2	Little Elk Creek	2/8/11	PH	7.15	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Specific Conductance	90	uS or umhos/cm
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	PH	7.09	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Alkalinity	17	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Specific Conductance	130	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	PH	7.11	S.U.
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Alkalinity	18	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Specific Conductance	86	uS or umhos/cm
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	PH	7.16	S.U.
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Alkalinity	17	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Specific Conductance	295	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	PH	7.58	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Alkalinity	54	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Fe Dissolved	0.15	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Lab Specific Conductance	78	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Alkalinity	13	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	3/16/11	Alkalinity	188	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	3/16/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	3/16/11	Specific Conductance	1054	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	3/16/11	PH	8.32	S.U.
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Fe Dissolved	1.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Alkalinity	61	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Lab Specific Conductance	278	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Al Dissolved	0.09	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Lab Specific Conductance	97	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Alkalinity	22	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Al Dissolved	0.03	mg/L or ppm

WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Alkalinity	22	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Lab Specific Conductance	97	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Al Dissolved	0.19	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Fe Dissolved	0.26	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Alkalinity	14	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Lab Specific Conductance	79	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Alkalinity	13	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Fe Dissolved	0.4	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Lab Specific Conductance	85	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Al Dissolved	0.3	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Fe Dissolved	0.34	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Al Dissolved	0.27	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Alkalinity	13	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Lab Specific Conductance	71	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Specific Conductance	137	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	PH	7.18	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Al Dissolved	0.09	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Fe Dissolved	0.23	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Alkalinity	29	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Specific Conductance	71	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	PH	6.83	S.U.
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Alkalinity	15	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	4/19/11	Specific Conductance	743	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	4/19/11	PH	8.04	S.U.
WVMW-13-B-1	0.1	Peters Run	4/19/11	Fe Dissolved	0.28	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	4/19/11	Al Dissolved	0.17	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	4/19/11	Alkalinity	151	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Specific Conductance	372	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	PH	7.33	S.U.
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Alkalinity	85	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Fe Dissolved	2.35	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Specific Conductance	93	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	PH	7.41	S.U.
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Al Dissolved	0.04	mg/L or ppm

WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Alkalinity	26	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-5	0.2	Little Elk Creek	4/13/11	Specific Conductance	64	uS or umhos/cm
WVMW-13-B-5	0.2	Little Elk Creek	4/13/11	PH	6.97	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Specific Conductance	66	uS or umhos/cm
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	PH	6.92	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Al Dissolved	0.06	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Alkalinity	14	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Fe Dissolved	0.09	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Specific Conductance	75	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	PH	6.93	S.U.
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Alkalinity	15	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Specific Conductance	70	uS or umhos/cm
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	PH	6.98	S.U.
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Alkalinity	15	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	PH	7.82	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Al Dissolved	0.14	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Fe Dissolved	0.3	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Alkalinity	84	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Specific Conductance	400	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Fe Dissolved	0.26	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Alkalinity	71	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	PH	7.78	S.U.
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Specific Conductance	217	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	5/18/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	5/18/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	5/18/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	5/18/11	Alkalinity	152	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	5/18/11	PH	8.15	S.U.
WVMW-13-B-1	0.1	Peters Run	5/18/11	Specific Conductance	759	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Fe Dissolved	3.12	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Alkalinity	141	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	PH	7.76	S.U.
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Specific Conductance	1300	uS or umhos/cm

WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Alkalinity	110	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	PH	8.3	S.U.
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Specific Conductance	272	uS or umhos/cm
WVMW-13-B-5	0.2	Little Elk Creek	6/9/11	PH	7.96	S.U.
WVMW-13-B-5	0.2	Little Elk Creek	6/9/11	Specific Conductance	152	uS or umhos/cm
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	PH	7.42	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Alkalinity	47	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Fe Dissolved	0.18	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Specific Conductance	159	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Alkalinity	23	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	PH	7.17	S.U.
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Specific Conductance	85	uS or umhos/cm
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Alkalinity	22	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	PH	7.12	S.U.
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Specific Conductance	88	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Specific Conductance	1220	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	PH	8.26	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Alkalinity	147	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Specific Conductance	168	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	PH	7.75	S.U.
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Fe Dissolved	0.21	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Alkalinity	63	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	6/24/11	Specific Conductance	1250	uS or umhos/cm
WVMW-13-B-1	0.1	Peters Run	6/24/11	PH	8.33	S.U.
WVMW-13-B-1	0.1	Peters Run	6/24/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	6/24/11	Alkalinity	207	mg/L or ppm
WVMW-13-B-1	0.1	Peters Run	6/24/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Specific Conductance	1850	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	PH	7.18	S.U.
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Al Dissolved	0.02	mg/L or ppm

WVMW-13-B-2	0.2	Bennett Run	6/24/11	Alkalinity	131	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Fe Dissolved	6.68	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Specific Conductance	263	uS or umhos/cm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	PH	8.12	S.U.
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Alkalinity	111	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-B-5	0.2	Little Elk Creek	6/24/11	PH	7.72	S.U.
WVMW-13-B-5	0.2	Little Elk Creek	6/24/11	Specific Conductance	144	uS or umhos/cm
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Specific Conductance	167	uS or umhos/cm
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	PH	7.5	S.U.
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Fe Dissolved	0.26	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Alkalinity	62	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	PH	8.83	S.U.
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Specific Conductance	262	uS or umhos/cm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Alkalinity	82	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Specific Conductance	232	uS or umhos/cm
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	PH	7.4	S.U.
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Alkalinity	81	mg/L or ppm

WVDEP WAP Fecal Coliform Data-Jones Creek Watershed

ANCODE	MILE_POINT	STREAM_NAME	DATE	PARAMETER	VALUE	DEFAULT_UNITS
WVMW-13-A	6.7	Jones Creek	6/15/10	Fecal Coliform	380	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	6/15/10	Fecal Coliform	230	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	7/20/10	Fecal Coliform	114	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	7/21/10	Fecal Coliform	500	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	8/9/10	Fecal Coliform	480	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	8/9/10	Fecal Coliform	200	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	11/8/10	Fecal Coliform	42	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	11/8/10	Fecal Coliform	46	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	11/18/10	Fecal Coliform	90	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	11/18/10	Fecal Coliform	48	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	12/9/10	Fecal Coliform	110	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	12/14/10	Fecal Coliform	327	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	1/12/11	Fecal Coliform	1100	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	1/12/11	Fecal Coliform	27	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	2/8/11	Fecal Coliform	164	Colonies/100 mL

WVMW-13-A-1	0	Nolan Run	2/8/11	Fecal Coliform	740	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	3/16/11	Fecal Coliform	660	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	3/16/11	Fecal Coliform	109	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	4/19/11	Fecal Coliform	16000	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	4/19/11	Fecal Coliform	35000	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	5/16/11	Fecal Coliform	520	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	5/16/11	Fecal Coliform	400	Colonies/100 mL
WVMW-13-A	6.7	Jones Creek	6/15/11	Fecal Coliform	12000	Colonies/100 mL
WVMW-13-A-1	0	Nolan Run	6/15/11	Fecal Coliform	780	Colonies/100 mL

WVDEP WAP Fecal Coliform Data-Little Tenmile Creek Watershed

ANCODE	MILE_POINT	STREAM_NAME	DATE	PARAMETER	VALUE	DEFAULT_UNITS
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Fecal Coliform	5	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Fecal Coliform	110	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	1/12/11	Fecal Coliform	64	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Fecal Coliform	2	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	1/13/11	Fecal Coliform	9	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	1/13/11	Fecal Coliform	218	Colonies/100 mL
WVMW-13-B-6	0.7	Big Elk Creek	1/13/11	Fecal Coliform	800	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	1/13/11	Fecal Coliform	10000	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	1/13/11	Fecal Coliform	500	Colonies/100 mL
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Fecal Coliform	40	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Fecal Coliform	640	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	2/9/11	Fecal Coliform	16	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Fecal Coliform	42	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	2/8/11	Fecal Coliform	20	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	2/8/11	Fecal Coliform	291	Colonies/100 mL
WVMW-13-B-6	0.7	Big Elk Creek	2/8/11	Fecal Coliform	291	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	2/8/11	Fecal Coliform	600	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	2/8/11	Fecal Coliform	7200	Colonies/100 mL
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Fecal Coliform	327	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Fecal Coliform	273	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	3/16/11	Fecal Coliform	82	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Fecal Coliform	500	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Fecal Coliform	230	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	3/9/11	Fecal Coliform	200	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	3/9/11	Fecal Coliform	636	Colonies/100 mL
WVMW-13-B-6	0.7	Big Elk Creek	3/9/11	Fecal Coliform	20000	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	3/9/11	Fecal Coliform	400	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	3/9/11	Fecal Coliform	360	Colonies/100 mL
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Fecal Coliform	700	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Fecal Coliform	460	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	4/19/11	Fecal Coliform	3000	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Fecal Coliform	200	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	4/13/11	Fecal Coliform	418	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	4/13/11	Fecal Coliform	800	Colonies/100 mL

WVMW-13-B-6	0.7	Big Elk Creek	4/13/11	Fecal Coliform	820	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	4/13/11	Fecal Coliform	309	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	4/13/11	Fecal Coliform	400	Colonies/100 mL
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Fecal Coliform	15000	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Fecal Coliform	236	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	5/18/11	Fecal Coliform	273	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Fecal Coliform	4	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/9/11	Fecal Coliform	90	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	6/9/11	Fecal Coliform	480	Colonies/100 mL
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	Fecal Coliform	500	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	5/18/11	Fecal Coliform	2600	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	5/18/11	Fecal Coliform	480	Colonies/100 mL
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Fecal Coliform	92	Colonies/100 mL
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Fecal Coliform	118	Colonies/100 mL
WVMW-13-B-1	0.1	Peters Run	6/24/11	Fecal Coliform	164	Colonies/100 mL
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Fecal Coliform	2	Colonies/100 mL
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	6/24/11	Fecal Coliform	31	Colonies/100 mL
WVMW-13-B-5	0.2	Little Elk Creek	6/24/11	Fecal Coliform	420	Colonies/100 mL
WVMW-13-B-6	0.7	Big Elk Creek	6/24/11	Fecal Coliform	840	Colonies/100 mL
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	Fecal Coliform	3400	Colonies/100 mL
WVMW-13-B-9	0.1	Mudlick Run	6/15/11	Fecal Coliform	327	Colonies/100 mL

WVDEP WAP Benthic Data-Little Tenmile and Jones Creek Watersheds

ANCODE	MILE POINT	STREAM NAME	DATE	WVSCI	NARRATIVE-WVSCI	GLIMPSS_CHIRO_FAMILY
WVMW-13-A	4.5	Jones Creek	6/15/05	46.48	Impaired-Slightly	30.44
WVMW-13-A	0.1	Jones Creek	8/1/00	60.86	Gray Zone	38.33
WVMW-13-A	3.7	Jones Creek	7/24/00	31.42	Impaired-Moderately	10.37
WVMW-13-A	0.1	Jones Creek	7/21/10	63.59	Gray Zone	43.38
WVMW-13-A	4.5	Jones Creek	7/20/10	60.75	Gray Zone	38.99
WVMW-13-A	6.7	Jones Creek	7/20/10	62.74	Gray Zone	49.18
WVMW-13-B-6	0.6	Big Elk Creek	5/17/04	52.07	Impaired-Slightly	25.51
WVMW-13-B-9	1	Mudlick Run	6/15/05	49.62	Impaired-Slightly	40.06
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	71.13	Unimpaired-Good	56.99

WVMW-13-B	0.3	Little Tenmile Creek	7/31/00	58.54	Impaired-Slightly	39.39
WVMW-13-B-1	0.1	Peters Run	7/31/00	49.99	Impaired-Slightly	17.88
WVMW-13-B-1.5	0.1	UNT/Little Tenmile Creek RM 1.91	8/1/00	59.25	Impaired-Slightly	46.63
WVMW-13-B-2	0.3	Bennett Run	7/24/00	42.11	Impaired-Moderately	17.44
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	8/1/00	61.46	Gray Zone	53.8
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	8/1/00	36.06	Impaired-Moderately	19.51
WVMW-13-B-9	0.1	Mudlick Run	8/1/00	52.78	Impaired-Slightly	28.22
WVMW-13-B-1	0.1	Peters Run	5/18/11	47.49	Impaired-Slightly	24.38
WVMW-13-B-1.5	0.1	UNT/Little Tenmile Creek RM 1.91	5/19/11	38.3	Impaired-Moderately	16.73
WVMW-13-B-5	0.2	Little Elk Creek	6/9/11	52.19	Impaired-Slightly	27.53
WVMW-13-B-6	0.7	Big Elk Creek	5/31/11	67.94	Gray Zone	40.14
WVMW-13-B-7	0.1	Middle Run/Little Tenmile Creek	6/15/11	31.27	Impaired-Moderately	6.65
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	66.16	Gray Zone	41.54
WVMW-13-B	9	Little Tenmile Creek	7/21/10	69.41	Unimpaired-Good	55.59
WVMW-13-B-2	0.2	Bennett Run	7/7/10	51.93	Impaired-Slightly	24.72
WVMW-13-B-4	0.05	Laurel Run/Little Tenmile Creek	7/28/10	72.67	Unimpaired-Good	62.85
WVMW-13-B-9	0.1	Mudlick Run	7/21/10	55.18	Impaired-Slightly	34.21

WVDEP WAP Stream Survey Data

STREAM	ANCODE	MP	DATE	TOTAL_RBP	RBP_NARRATIVE
UNT/Elk Creek RM 27.12	WVMW-21-T.4	0	6/2/11	119	Sub-Optimal
UNT/Tenmile Creek RM 22.53	WVMW-13-M.5	0	6/14/11	66	Marginal

Laurel Run/Little Tenmile Creek	WVMW-13-B-4	0.05	7/28/10	107	Marginal
Jack Run	WVMW-13-0.5A	0.1	7/6/10	113	Sub-Optimal
Gregory Run	WVMW-13-D	0.1	7/7/10	118	Sub-Optimal
Mudlick Run	WVMW-13-B-9	0.1	7/21/10	123	Sub-Optimal
Jones Creek	WVMW-13-A	0.1	7/21/10	127	Sub-Optimal
Cunningham Run	WVMW-7-D	0.1	9/1/10	93	Marginal
UNT/Tenmile Creek RM 10.82	WVMW-13-E.7	0.1	9/21/10	94	Marginal
Peters Run	WVMW-13-B-1	0.1	5/18/11	110	Sub-Optimal
UNT/Little Tenmile Creek RM 1.91	WVMW-13-B-1.5	0.1	5/19/11	120	Sub-Optimal
UNT/Elk Creek RM 27.87	WVMW-21-T.7	0.1	6/2/11	160	Optimal
Middle Run/Little Tenmile Creek	WVMW-13-B-7	0.1	6/15/11	101	Marginal
Bennett Run	WVMW-13-B-2	0.2	7/7/10	120	Sub-Optimal
Jack Run	WVMW-15-A	0.2	8/9/10	104	Marginal
Little Elk Creek	WVMW-13-B-5	0.2	6/9/11	100	Marginal
Little Tenmile Creek	WVMW-13-B	0.3	9/15/05	119	Sub-Optimal
Little Tenmile Creek	WVMW-13-B	0.3	7/7/10	113	Sub-Optimal
Jack Run	WVMW-17	0.3	7/21/10	133	Sub-Optimal
Jack Run	WVMW-17	0.3	6/22/11		
Elk Creek	WVMW-21	0.6	9/21/05	110	Sub-Optimal
Elk Creek	WVMW-21	0.6	7/29/10	109	Marginal
Mudlick Run	WVMW-9	0.7	8/30/10	134	Sub-Optimal
Big Elk Creek	WVMW-13-B-6	0.7	5/31/11	106	Marginal
Tenmile Creek	WVMW-13	0.8	9/21/05	122	Sub-Optimal
Tenmile Creek	WVMW-13	0.8	7/7/10	116	Sub-Optimal
Mudlick Run	WVMW-13-B-9	1	6/15/05	112	Sub-Optimal
Elk Creek	WVMW-21	3.7	9/21/05	115	Sub-Optimal
Jones Creek	WVMW-13-A	4.5	6/15/05	107	Marginal
Elk Creek	WVMW-21	4.5	9/21/05	126	Sub-Optimal
Jones Creek	WVMW-13-A	4.5	7/20/10	118	Sub-Optimal
Elk Creek	WVMW-21	6.3	5/1/06	123	Sub-Optimal
Jones Creek	WVMW-13-A	6.7	7/20/10	109	Marginal
Tenmile Creek	WVMW-13	7.3	7/6/10	112	Sub-Optimal

Tenmile Creek	WVMW-13	8.25	5/27/10	105	Marginal
Elk Creek	WVMW-21	8.39	9/20/05	139	Sub-Optimal
Elk Creek	WVMW-21	8.39	7/28/10	140	Sub-Optimal
Little Tenmile Creek	WVMW-13-B	9	7/21/10	131	Sub-Optimal
Tenmile Creek	WVMW-13	10.7	9/19/05	126	Sub-Optimal
Tenmile Creek	WVMW-13	10.7	8/10/10	138	Sub-Optimal
Elk Creek	WVMW-21	15.2	9/21/05	122	Sub-Optimal
Elk Creek	WVMW-21	15.2	7/28/10	121	Sub-Optimal
Tenmile Creek	WVMW-13	18	6/7/11	107	Marginal
Tenmile Creek	WVMW-13	18	5/2/13	100	Marginal
Tenmile Creek	WVMW-13	23.6	6/1/11	106	Marginal
Elk Creek	WVMW-21	28.2	7/28/10	141	Sub-Optimal

Selected WVDEP TMDL Water Chemistry Data

ANCODE	MILE_POINT	STREAM_NAME	SAMPLE_DATE	PARAMETER	VALUE	DEFAULT_UNITS
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	Specific Conductance	1476	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	PH	7.99	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	Alkalinity	164	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/15/05	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/05	Fe Dissolved	0.1	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/05	Specific Conductance	653	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	6/15/05	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/05	Alkalinity	165	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/05	PH	7.78	S.U.
WVMW-13-A	4.5	Jones Creek	6/15/05	Hot Acidity	1	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/10	Specific Conductance	676	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	6/15/10	Hot Acidity	1	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/10	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/10	PH	8.18	S.U.
WVMW-13-A	0.1	Jones Creek	6/15/10	Alkalinity	127	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/10	Specific Conductance	587	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	6/15/10	Alkalinity	145	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/10	PH	7.89	S.U.
WVMW-13-A	4.5	Jones Creek	6/15/10	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/10	Hot Acidity	1	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Specific Conductance	247	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	6/15/10	Hot Acidity	1	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Alkalinity	107	mg/L or ppm

WVMW-13-A	6.7	Jones Creek	6/15/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/10	PH	7.83	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	Specific Conductance	607	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	PH	8.07	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	Alkalinity	113	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/16/10	Hot Acidity	1	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/17/10	Specific Conductance	191	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	6/17/10	Alkalinity	60	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/17/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/17/10	Fe Dissolved	0.27	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/17/10	PH	7.37	S.U.
WVMW-13-B	9	Little Tenmile Creek	6/17/10	Hot Acidity	1	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/16/10	Specific Conductance	1322	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	6/16/10	Hot Acidity	1	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/16/10	Alkalinity	140	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/16/10	PH	7.58	S.U.
WVMW-13-B-2	0.2	Bennett Run	6/16/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/16/10	Fe Dissolved	0.95	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	7/21/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	7/21/10	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	7/21/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	7/21/10	Alkalinity	139	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	7/21/10	Specific Conductance	740	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	7/21/10	PH	8.2	S.U.
WVMW-13-A	4.5	Jones Creek	7/20/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	7/20/10	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	7/20/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	7/20/10	Alkalinity	188	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	7/20/10	Specific Conductance	785	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	7/20/10	PH	8.03	S.U.
WVMW-13-A	6.7	Jones Creek	7/20/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Fe Dissolved	0.18	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Alkalinity	135	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	7/20/10	Specific Conductance	313	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	7/20/10	PH	8.04	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	Specific Conductance	1136	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	Alkalinity	141	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	Fe Dissolved	0.02	mg/L or ppm

WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	7/7/10	PH	8.17	S.U.
WVMW-13-B	9	Little Tenmile Creek	7/21/10	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	7/21/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	7/21/10	Alkalinity	78	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	7/21/10	Fe Dissolved	0.22	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	7/21/10	Specific Conductance	232	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	7/21/10	PH	7.12	S.U.
WVMW-13-B-2	0.2	Bennett Run	7/7/10	Specific Conductance	1681	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	7/7/10	PH	7.42	S.U.
WVMW-13-B-2	0.2	Bennett Run	7/7/10	Alkalinity	137	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	7/7/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	7/7/10	Fe Dissolved	1.84	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	7/7/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	9/21/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	9/21/10	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	9/21/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	9/21/10	Alkalinity	146	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	9/21/10	Specific Conductance	1119	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	9/21/10	PH	7.99	S.U.
WVMW-13-A	4.5	Jones Creek	8/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	8/9/10	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	8/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	8/9/10	Alkalinity	204	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	8/9/10	PH	7.92	S.U.
WVMW-13-A	4.5	Jones Creek	8/9/10	Specific Conductance	918	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	8/9/10	Alkalinity	141	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Fe Dissolved	0.22	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	8/9/10	Specific Conductance	328	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	8/9/10	PH	7.8	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	Alkalinity	126	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	Specific Conductance	752	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	9/21/10	PH	8.01	S.U.
WVMW-13-B	9	Little Tenmile Creek	10/12/10	Alkalinity	76	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	10/12/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	10/12/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	10/12/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	10/12/10	Specific Conductance	258	uS or umhos/cm

WVMW-13-B	9	Little Tenmile Creek	10/12/10	PH	7.97	S.U.
WVMW-13-B-2	0.2	Bennett Run	10/11/10	Alkalinity	128	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	10/11/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	10/11/10	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	10/11/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	10/11/10	PH	7.74	S.U.
WVMW-13-B-2	0.2	Bennett Run	10/11/10	Specific Conductance	1665	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	10/26/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	10/26/10	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	10/26/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	10/26/10	Alkalinity	149	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	10/26/10	Specific Conductance	938	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	10/26/10	PH	7.93	S.U.
WVMW-13-A	4.5	Jones Creek	11/8/10	Alkalinity	153	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/8/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/8/10	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/8/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/8/10	Specific Conductance	516	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	11/8/10	PH	8.02	S.U.
WVMW-13-A	6.7	Jones Creek	11/8/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Alkalinity	103	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Fe Dissolved	0.15	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/8/10	Specific Conductance	131	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	11/8/10	PH	7.62	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	Fe Dissolved	0.09	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	Alkalinity	90	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	Specific Conductance	477	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	11/8/10	PH	8.1	S.U.
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Alkalinity	59	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Specific Conductance	212	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	PH	7.6	S.U.
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/9/10	Alkalinity	58	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/9/10	Fe Dissolved	0.02	mg/L or ppm

WVMW-13-B-2	0.2	Bennett Run	11/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/9/10	Alkalinity	127	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/9/10	Specific Conductance	1611	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	11/9/10	PH	7.88	S.U.
WVMW-13-A	0.1	Jones Creek	11/17/10	PH	8.25	S.U.
WVMW-13-A	0.1	Jones Creek	11/17/10	Specific Conductance	912	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	11/17/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Fe Dissolved	0.1	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Alkalinity	169	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	11/17/10	Alkalinity	162	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/18/10	PH	7.8	S.U.
WVMW-13-A	4.5	Jones Creek	11/18/10	Specific Conductance	440	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	11/18/10	Alkalinity	123	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/18/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/18/10	Fe Dissolved	0.09	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	11/18/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	PH	7.57	S.U.
WVMW-13-A	6.7	Jones Creek	11/18/10	Specific Conductance	240	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	11/18/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Fe Dissolved	0.09	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	11/18/10	Alkalinity	84	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	PH	8.03	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	Specific Conductance	497	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	Alkalinity	95	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	11/17/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/22/10	Specific Conductance	208	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	11/22/10	Alkalinity	58	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/22/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/22/10	Fe Dissolved	0.14	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	11/22/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/17/10	PH	7.54	S.U.
WVMW-13-B-2	0.2	Bennett Run	11/17/10	Specific Conductance	1042	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	11/17/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/17/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/17/10	Alkalinity	116	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	11/17/10	Fe Dissolved	0.14	mg/L or ppm

WVMW-13-A	0.1	Jones Creek	12/14/10	Alkalinity	76	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	12/14/10	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	12/14/10	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	12/14/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	12/14/10	PH	7.99	S.U.
WVMW-13-A	0.1	Jones Creek	12/14/10	Specific Conductance	379	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	12/9/10	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	12/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	12/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	12/9/10	Alkalinity	118	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	12/9/10	Specific Conductance	459	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	12/9/10	PH	7.43	S.U.
WVMW-13-A	6.7	Jones Creek	12/9/10	Alkalinity	82	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	12/9/10	Specific Conductance	221	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	12/9/10	PH	7.34	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	Alkalinity	29	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	Fe Dissolved	0.22	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	Al Dissolved	0.07	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	PH	6.83	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	12/13/10	Specific Conductance	163	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	12/14/10	Alkalinity	22	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	12/14/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	12/14/10	Fe Dissolved	0.13	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	12/14/10	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	12/14/10	PH	7.05	S.U.
WVMW-13-B	9	Little Tenmile Creek	12/14/10	Specific Conductance	109	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Alkalinity	98	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Fe Dissolved	2.1	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	PH	7.65	S.U.
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Specific Conductance	489	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Fe Dissolved	2.01	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	12/13/10	Alkalinity	100	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	1/12/11	Specific Conductance	422	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	1/12/11	PH	8.38	S.U.
WVMW-13-A	0.1	Jones Creek	1/12/11	Alkalinity	114	mg/L or ppm

WVMW-13-A	0.1	Jones Creek	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	1/12/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	1/12/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	1/12/11	Specific Conductance	427	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	1/12/11	PH	7.92	S.U.
WVMW-13-A	4.5	Jones Creek	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	1/12/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	1/12/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	1/12/11	Alkalinity	116	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Specific Conductance	218	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	1/12/11	PH	7.82	S.U.
WVMW-13-A	6.7	Jones Creek	1/12/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	1/12/11	Alkalinity	81	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Specific Conductance	476	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	PH	7.36	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Alkalinity	80	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Specific Conductance	142	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	PH	7.23	S.U.
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Alkalinity	34	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	1/13/11	Fe Dissolved	0.11	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Specific Conductance	770	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	PH	7.58	S.U.
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Fe Dissolved	5.76	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Alkalinity	133	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	1/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	2/9/11	Specific Conductance	449	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	2/9/11	PH	8.24	S.U.
WVMW-13-A	0.1	Jones Creek	2/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	2/9/11	Fe Dissolved	0.06	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	2/9/11	Alkalinity	88	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	2/8/11	Specific Conductance	283	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	2/8/11	PH	7.7	S.U.
WVMW-13-A	4.5	Jones Creek	2/8/11	Alkalinity	77	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	2/8/11	Hot Acidity	5	mg/L or ppm

WVMW-13-A	4.5	Jones Creek	2/8/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	2/8/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Specific Conductance	167	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	2/8/11	PH	7.52	S.U.
WVMW-13-A	6.7	Jones Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Alkalinity	51	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Specific Conductance	208	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	PH	7.36	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Alkalinity	35	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Fe Dissolved	0.25	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	2/9/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Specific Conductance	78	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	PH	7.17	S.U.
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	2/8/11	Alkalinity	18	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Specific Conductance	632	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	PH	7.67	S.U.
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Alkalinity	112	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	2/9/11	Fe Dissolved	4.71	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	3/16/11	Specific Conductance	527	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	3/16/11	PH	8.2	S.U.
WVMW-13-A	0.1	Jones Creek	3/16/11	Alkalinity	85	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	3/16/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	3/16/11	Specific Conductance	335	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	3/16/11	PH	7.83	S.U.
WVMW-13-A	4.5	Jones Creek	3/16/11	Fe Dissolved	0.04	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	3/16/11	Alkalinity	98	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Specific Conductance	169	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	3/16/11	PH	7.75	S.U.
WVMW-13-A	6.7	Jones Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Alkalinity	57	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm

WVMW-13-A	6.7	Jones Creek	3/16/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Specific Conductance	295	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	PH	7.58	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Alkalinity	54	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Fe Dissolved	0.15	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	3/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Alkalinity	13	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Fe Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	3/9/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Fe Dissolved	1.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Alkalinity	61	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	3/9/11	Al Dissolved	0.09	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	4/19/11	Specific Conductance	440	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	4/19/11	PH	7.86	S.U.
WVMW-13-A	0.1	Jones Creek	4/19/11	Al Dissolved	0.06	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	4/19/11	Fe Dissolved	0.1	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	4/19/11	Alkalinity	88	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	4/19/11	Specific Conductance	214	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	4/19/11	PH	7.62	S.U.
WVMW-13-A	4.5	Jones Creek	4/19/11	Alkalinity	62	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	4/19/11	Al Dissolved	3.93	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	4/19/11	Fe Dissolved	6.35	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Specific Conductance	110	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	4/19/11	PH	7.36	S.U.
WVMW-13-A	6.7	Jones Creek	4/19/11	Alkalinity	41	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	4/19/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Specific Conductance	137	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	PH	7.18	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Al Dissolved	0.09	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Fe Dissolved	0.23	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	4/13/11	Alkalinity	29	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Specific Conductance	71	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	PH	6.83	S.U.
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Alkalinity	15	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Hot Acidity	5	mg/L or ppm

WVMW-13-B	9	Little Tenmile Creek	4/13/11	Al Dissolved	0.05	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	4/13/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Specific Conductance	372	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	PH	7.33	S.U.
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Alkalinity	85	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	4/13/11	Fe Dissolved	2.35	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	5/16/11	PH	8.09	S.U.
WVMW-13-A	0.1	Jones Creek	5/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	5/16/11	Alkalinity	109	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	5/16/11	Fe Dissolved	0.13	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	5/16/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	5/16/11	Specific Conductance	535	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	5/16/11	PH	7.86	S.U.
WVMW-13-A	4.5	Jones Creek	5/16/11	Fe Dissolved	0.08	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	5/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	5/16/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	5/16/11	Alkalinity	98	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	5/16/11	Specific Conductance	365	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	5/16/11	PH	7.78	S.U.
WVMW-13-A	6.7	Jones Creek	5/16/11	Alkalinity	66	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Fe Dissolved	0.07	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Al Dissolved	0.03	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	5/16/11	Specific Conductance	180	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	PH	7.82	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Al Dissolved	0.14	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Fe Dissolved	0.3	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Alkalinity	84	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	5/17/11	Specific Conductance	400	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Fe Dissolved	0.26	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Alkalinity	71	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/9/11	PH	7.78	S.U.
WVMW-13-B	9	Little Tenmile Creek	6/9/11	Specific Conductance	217	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Fe Dissolved	3.12	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	Alkalinity	141	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/9/11	PH	7.76	S.U.

WVMW-13-B-2	0.2	Bennett Run	6/9/11	Specific Conductance	1300	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	6/15/11	PH	8.31	S.U.
WVMW-13-A	0.1	Jones Creek	6/15/11	Specific Conductance	1138	uS or umhos/cm
WVMW-13-A	0.1	Jones Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/11	Alkalinity	143	mg/L or ppm
WVMW-13-A	0.1	Jones Creek	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/11	Specific Conductance	1150	uS or umhos/cm
WVMW-13-A	4.5	Jones Creek	6/15/11	PH	7.98	S.U.
WVMW-13-A	4.5	Jones Creek	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/11	Fe Dissolved	0.03	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	4.5	Jones Creek	6/15/11	Alkalinity	219	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	PH	7.85	S.U.
WVMW-13-A	6.7	Jones Creek	6/15/11	Specific Conductance	330	uS or umhos/cm
WVMW-13-A	6.7	Jones Creek	6/15/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	Alkalinity	143	mg/L or ppm
WVMW-13-A	6.7	Jones Creek	6/15/11	Fe Dissolved	0.12	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Specific Conductance	1220	uS or umhos/cm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	PH	8.26	S.U.
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Alkalinity	147	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B	0.3	Little Tenmile Creek	6/15/11	Fe Dissolved	0.02	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Specific Conductance	168	uS or umhos/cm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	PH	7.75	S.U.
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Fe Dissolved	0.21	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Al Dissolved	0.04	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Alkalinity	63	mg/L or ppm
WVMW-13-B	9	Little Tenmile Creek	6/24/11	Hot Acidity	5	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Specific Conductance	1850	uS or umhos/cm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	PH	7.18	S.U.
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Al Dissolved	0.02	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Alkalinity	131	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Fe Dissolved	6.68	mg/L or ppm
WVMW-13-B-2	0.2	Bennett Run	6/24/11	Hot Acidity	5	mg/L or ppm

NMLRC Water Chemistry Data-In Stream Averages (Four Sample Collections)

Site	Location/AMLIS	*Flow (gal/min)*	EC uS/cm	pH*	Acd mg/L	Alk mg/L	SO4 mg/L	Fe mg/L	Al mg/L	Mn mg/L	Ca mg/L	Mg mg/L
Mudlick Run	Mouth	773	143	7.16	0.90	53.57	17.68	0.05	0.02	0.04	14.64	3.58
Mudlick Run	US	754	110	7.19	10.49	42.21	13.84	0.12	0.02	0.05	9.88	2.82
Middle Run	Mouth	943	148	7.19	0.69	49.70	17.00	0.07	0.02	0.03	13.07	3.19
Big Elk Creek	Mouth	1,828	134	7.28	0.70	48.93	16.90	0.08	0.03	0.05	11.23	3.02
Big Elk Creek	DS	412	119	7.30	0.50	41.29	14.20	0.08	0.01	0.03	9.66	1.93
Little Elk Creek	Mouth	490	116	7.95	1.30	42.95	14.55	0.16	0.02	0.06	9.44	2.79
Laurel Run	Mouth	609	197	7.30	0.50	83.52	21.50	0.04	0.02	0.04	18.51	4.72
Caldwell Run	Mouth	595	242	7.63	0.50	98.49	28.18	0.01	0.02	0.06	24.52	6.76
Caldwell Run	DS	8,228	220	7.44	0.50	75.71	31.30	0.03	0.02	0.05	20.93	5.66
Bennett Run	Mouth	1,000	928	6.33	163.15	111.07	358.10	1.76	0.02	0.27	107.58	27.09
Bennett Run	DS	14,893	482	6.77	13.59	57.79	150.50	0.53	0.05	0.11	39.31	9.54
Bennett Run	US	13,689	386	7.10	0.90	58.84	91.45	0.19	0.03	0.09	26.37	6.18
Trib A	Mouth	101	618	7.53	0.50	131.14	207.40	0.03	0.03	0.07	66.32	25.43
Little Run	Mouth	390	378	7.25	1.94	93.12	113.03	0.06	0.06	0.04	39.39	14.18
Little Run	US	1,026	181	7.23	1.92	71.04	24.83	0.05	0.05	0.07	15.34	4.25
Shinn Run	Mouth	442	267	6.89	0.50	105.11	32.58	0.04	0.05	0.08	26.12	7.18
Shinn Run	DS	1,012	219	7.34	0.50	85.99	25.40	0.06	0.01	0.08	19.78	5.73
Shinn Run	US	1,799	243	7.15	0.50	102.97	22.73	0.08	0.01	0.07	20.48	5.83
Trib B	Mouth	303	512	7.46	0.50	154.70	119.95	0.06	0.04	0.08	55.43	18.00
Nolan Run	Mouth	237	783	7.23	0.50	158.37	253.25	0.13	0.05	0.08	80.24	23.35
Little Tenmile Creek	Mouth	11,794	310	7.13	0.50	73.91	76.40	0.07	0.03	0.09	30.65	7.83
Little Tenmile Creek	DS		311	7.20	0.50	71.30	76.48	0.14	0.04	0.09	31.14	7.95
Trib C	Mouth	328	447	7.32	0.50	89.73	139.00	0.03	0.03	0.09	61.17	13.50
Trib C	DS		341	7.49	0.50	87.25	79.13	0.11	0.05	0.09	37.80	8.87
Trib C	US		333	7.35	0.50	84.99	82.65	0.08	0.05	0.08	35.58	8.42
Jones Creek	Mouth	5,540	541	7.63	0.50	124.24	149.63	0.02	0.02	0.05	63.17	18.53
Jones Creek	US		413	7.55	0.50	99.31	102.33	0.12	0.03	0.06	43.19	11.57
Jack Run	Mouth	222	856	7.33	0.50	108.24	340.50	0.01	0.02	0.09	110.85	29.43
Tenmile Creek (Discharge)	Mouth		365	7.46	0.50	84.41	82.53	0.08	0.02	0.06	40.45	9.92
Tenmile Creek (Discharge)	DS		542	7.53	0.50	92.42	158.00	0.03	0.02	0.08	60.20	17.05

NMLRC Water Chemistry Data-Mine Site Averages (Four Sample Collections)

Site Name	*Flow (gal/min)*	EC uS/cm	pH*	Acd mg/L	Alk mg/L	SO4 mg/L	Fe mg/L	Al mg/L	Mn mg/L	Ca mg/L	Mg mg/L
Robey Mine	191	973	7.08	0.50	174.70	387.00	15.78	0.03	0.46	137.44	37.06
Bennett Portal	644	1,642	6.78	0.50	203.13	720.50	42.96	0.02	0.65	237.83	51.93
Rosebud	34	1,128	6.46	107.16	125.57	475.50	0.18	0.02	0.03	151.86	55.74
Little Laurel	97	1,144	7.40	0.50	187.73	464.88	0.10	0.03	0.04	172.95	60.41
Peters	270	1,075	7.87	0.50	200.65	396.63	0.07	0.03	0.03	152.80	53.88
Rosebud Tipple	14	861	8.06	0.50	210.14	263.33	0.04	0.01	0.04	119.71	40.16
Haywood Mine	86	1,068	7.02	0.50	84.19	496.38	3.38	0.04	0.64	163.32	44.69
Robey Trib	76	992	6.47	37.48	26.80	469.50	1.33	1.23	1.53	112.17	36.70
Robey Complex	151	1,193	7.49	0.50	164.81	499.38	0.07	0.03	0.21	161.15	69.60

NMLRC Water Chemistry Data-Mine Site Averages (Bennett Run Sampling and WBP Sampling)

Site Name	*Flow (gal/min)*	EC uS/cm	pH*	Acd mg/L	Alk mg/L	SO4 mg/L	Fe mg/L	Al mg/L	Mn mg/L	Ca mg/L	Mg mg/L
Robey Mine	191	1,022	7.33	8.12	169.50	433.5	14.53	0.03	0.92	152.1	36.70
Bennett Portal	451	1,733	6.99	29.50	191.50	990.5	37.88	0.02	1.54	261.5	61.62
Rosebud	34	1,128	6.46	107.16	125.57	475.5	0.18	0.02	0.03	151.9	55.74
Little Laurel	97	1,144	7.40	0.50	187.73	464.9	0.10	0.03	0.04	173.0	60.41
Peters	270	1,075	7.87	0.50	200.65	396.6	0.07	0.03	0.03	152.8	53.88
Rosebud Tipple	14	861	8.06	0.50	210.14	263.3	0.04	0.01	0.04	119.7	40.16
Haywood Mine	86	1,068	7.02	0.50	84.19	496.4	3.38	0.04	0.64	163.3	44.69
Robey Trib	76	992	6.47	37.48	26.80	469.5	1.33	1.23	1.53	112.2	36.70
Robey Complex	151	1,193	7.49	0.50	164.81	499.4	0.07	0.03	0.21	161.1	69.60
Bennett Source 2*	5	1,739	7.62	18.85	206.15	1,058.3	3.61	0.01	5.45	333.8	76.47
Bennett Source 5*	37	1,424	7.04	57.45	114.69	824.1	49.94	0.02	0.86	220.1	57.04
Bennett Source 6*	20	1,406	6.80	41.20	67.61	879.8	46.84	0.02	0.92	212.8	53.21
Bennett Source 7*	39	1,077	7.84	9.22	222.35	567.0	3.96	0.01	0.30	165.4	48.25
Bennett Source 8*	39	1,061	7.55	15.62	220.45	438.1	4.04	0.01	1.29	174.6	43.38

NMLRC Benthic Data

WV330 (Tenmile Creek) Benthic Sampling Results

Sample Set 1

Collection Date	Site	WVSCI Scores		Integrity Rating
		Point Value	Percentage Value	
10/28/2013	Little Run US	14	46.7	Marginal
11/4/2013	Mudlick Run Mouth	12	40	Marginal
	Middle Run Mouth	12	40	Marginal
	Laurel Run Mouth	18	60	Marginal
	Nolan Run Mouth	12	40	Marginal
	Jones Creek Mouth	16	53.3	Marginal
11/11/2014	Bennett Run Mouth	10	33.3	Poor
	Little Tenmile Creek Mouth	12	40	Marginal

Sample Set 2

Collection Date	Site	WVSCI Scores		Integrity Rating
		Point Value	Percentage Value	
5/6/2014	Mudlick Run Mouth	8	26.7	Poor
	Middle Run Mouth	8	26.7	Poor
	Bennett Run Mouth	10	33.3	Poor
	Nolan Run mouth	16	53.3	Marginal
	Jones Creek Mouth	12	40	Marginal
5/14/2014	Laurel Run Mouth	20	66.7	Suboptimal
	Little Run US	18	60	Marginal
	Little Tenmile Creek Mouth	8	26.7	Poor

NMLRC Coliform Data

Sample Set	Date Sample Taken	Site	Location	*Coliform (CFU/100mL)*
1	10/17/2013	Mudlick Run	Mouth	>2000
1	10/17/2013	Mudlick Run	US	965
1	10/17/2013	Middle Run	Mouth	>2000
1	10/17/2013	Big Elk Creek	Mouth	287
1	10/17/2013	Big Elk Creek	DS	461
1	10/17/2013	Little Elk Creek	Mouth	1090
1	10/17/2013	Laurel Run	Mouth	47
1	10/17/2013	Caldwell Run	Mouth	>2000
1	10/17/2013	Caldwell Run	DS	>2000
1	10/17/2013	Bennett Run	Mouth	<2
1	10/17/2013	*Little Tenmile Creek*	Mouth	133
1	10/17/2013	*Little Tenmile Creek*	US	145
1	10/17/2013	*Jones Creek*	Mouth	544
1	10/17/2013	*Jones Creek*	US	397
1	10/30/2013	Little Run	Mouth	3500
1	10/30/2013	Little Run	US	8700
1	10/30/2013	Shinn Run	Mouth	1200
1	10/30/2013	Shinn Run	US	1100
1	10/30/2013	Shinn Run	DS	1250
1	10/30/2013	Trib B	Mouth	1250
1	10/30/2013	Nolan Run	Mouth	450
1	10/30/2013	Nolan Run	US	1500
1	10/30/2013	Trib C	Mouth	900
1	10/30/2013	Jacks Run	Mouth	60
1	10/30/2013	Tenmile Creek (Discharge)	Mouth	200
1	10/30/2013	Tenmile Creek (Discharge)	DS	250
2	5/14/2014	*Little Tenmile Creek*	Mouth	3400
2	5/14/2014	*Little Tenmile Creek*	DS	1600
2	5/14/2014	Little Run	Mouth	1700
2	5/19/2014	Mudlick Run	Mouth	1300
2	5/19/2014	Mudlick Run	US	4000
2	5/19/2014	Middle Run	Mouth	2500
2	5/19/2014	Big Elk Creek	Mouth	2300
2	5/19/2014	Big Elk Creek	DS	2700
2	5/19/2014	Little Elk Creek	Mouth	1000
2	5/19/2014	Laurel Run	Mouth	1400
2	5/19/2014	Caldwell Run	Mouth	1500
2	5/19/2014	Caldwell Run	DS	1800
2	5/19/2014	Bennett Run	Mouth	600
2	5/28/2014	*Jones Creek*	Mouth	780
2	5/28/2014	*Jones Creek*	US	2240
2	5/28/2014	Shinn Run	Mouth	1100
2	5/28/2014	Shinn Run	US	950
2	5/28/2014	Trib B	Mouth	1900
2	5/28/2014	Nolan Run	Mouth	1410
2	5/28/2014	Jacks Run	Mouth	660
2	5/28/2014	Tenmile Creek (Discharge)	Mouth	1500