APPENDIX B

B-1. PINEY CREEK

B-1.1 Watershed Information

Piney Creek is in the northwestern portion of the New River watershed and drains approximately 136 square miles as shown in Table B-1-1. The dominant landuse in the watershed is forest, which covers 68.4 percent of the watershed. Other significant landuse types include urban/residential (15.2 percent) and grassland (12.7 percent). All other individual land cover types together account for 3.7 percent of the total watershed area. There are ten impaired streams in the watershed, including Piney Creek, which are addressed in this total maximum daily load (TMDL) development effort. Figure B-1-1 shows the impaired segments and Table B-1-2 displays waterbody/impairment combinations for which TMDLs are developed.

Table B-1-1. Modeled landuse types in the Piney Creek watershed

Landuse Type	Area of Watershed		Percentage
	Acres	Square Miles	
Water	211.6	0.3	0.2%
Wetland	124.2	0.2	0.1%
Barren	366.3	0.6	0.4%
Forest	59,755.9	93.4	68.4%
Grassland	11,079.0	17.3	12.7%
Cropland	0.00	0.00	0.00%
Pasture	1,079.2	1.7	1.2%
Urban/Residential	13,267.8	20.7	15.2%
Mining	285.8	0.5	0.3%
AML	1,166.1	1.8	1.3%
Total Area	**87,335.9**	**136.5**	**100.00%**

Table B-1-2. Waterbodies and impairments for which TMDLs have been developed

TMDL Watershed	Code	Trout	Stream Name	Fe	Al	pH	Mn	FC	BIO
Piney Creek	WVKN-26	**T**	Piney Creek	**X**				**X**	
Piney Creek	WVKN-26-A	**T**	Batoff Creek	**X**	**X**	**X**			
Piney Creek	WVKN-26-E	**T**	Cranberry Creek	**X**				**X**	**X**
Piney Creek	WVKN-26-E-1		Little Whitestick Creek					**X**	
Piney Creek	WVKN-26-F	**T**	Beaver Creek	**X**				**X**	**X**
Piney Creek	WVKN-26-F-2		Little Beaver Creek					**X**	**X**
Piney Creek	WVKN-26-G		Whitestick Creek					**X**	**X**
Piney Creek	WVKN-26-K		Soak Creek					**X**	
Piney Creek	WVKN-26-N		Laurel Creek	**X**				**X**	
Piney Creek	WVKN-26-M		Bowyer Creek	**X**				**X**	

Note:
UNT = unnamed tributary.
FC indicates fecal coliform bacteria impairment
BIO indicates a biological impairment

Before establishing TMDLs, WVDEP performed monitoring in each of the impaired streams in the New River watershed to better characterize water quality and refine impairment listings. Monthly samples were taken at 25 stations (station locations can be viewed using the ArcExplorer project) throughout the Piney Creek watershed from July 1, 2004, through June 30, 2005. Monitoring suites at each site were determined based on past water quality data, field reconnaissance, and the use of statewide geographic information system (GIS) coverages to locate point and nonpoint sources that could cause stream impairments. Streams potentially impaired by metals and low pH were sampled monthly and analyzed for a suite of parameters including acidity, alkalinity, total iron, dissolved iron, total aluminum, dissolved aluminum, total suspended solids, pH, sulfate, and specific conductance. Monthly samples from streams potentially impaired by fecal coliform bacteria were analyzed for fecal coliform bacteria, pH, and specific conductance. In addition, benthic macroinvertebrate assessments were performed at specific locations on the biologically impaired streams during the pre-TMDL monitoring period. Instantaneous flow measurements were also taken at strategic locations during pre-TMDL monitoring.

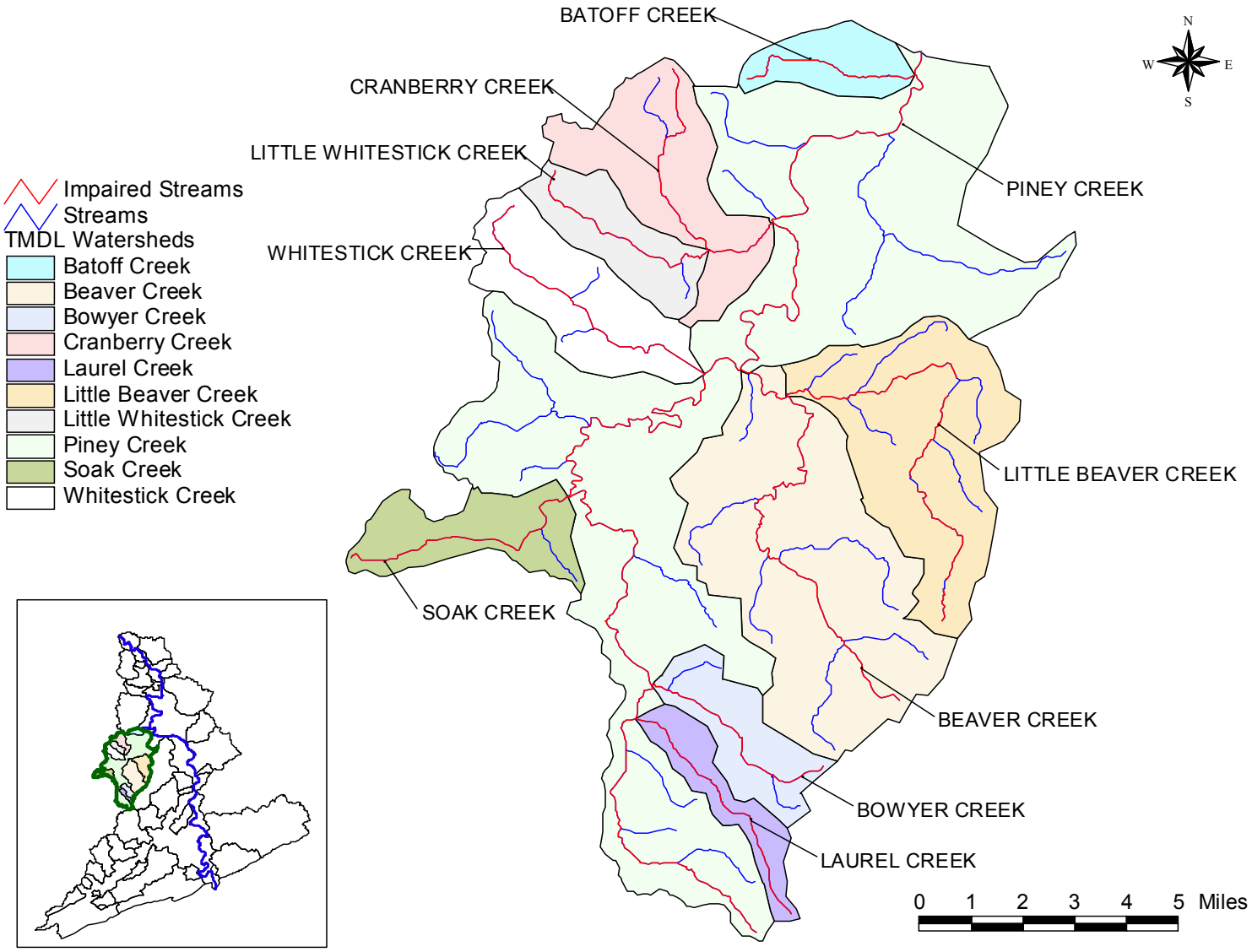

Figure B-1-1. Impaired waterbodies under TMDL development in the Piney Creek watershed

B-1.2 Metals and pH Sources

This section identifies and examines the potential sources of iron, aluminum and pH impairments in the Piney Creek watershed. Sources can be classified as point sources (specific sources subject to a permit) or nonpoint sources (diffuse sources). Mining and non-mining-related permitted discharges are potential metals and pH point sources. Potential metals and pH nonpoint sources include non-permitted sources such as abandoned or forfeited mine sites, and sediment producing land disturbance activities and streambank erosion. Controls of sediment-producing sources were determined necessary to meet water quality criteria for total iron during critical high-flow conditions.

Pollutant sources were identified using statewide GIS coverages of point and nonpoint sources, and through field reconnaissance. As part of the TMDL process, WVDEP documented pollution sources by describing the pollutant source in detail, collecting Global Positioning System data, and if necessary, collecting a water quality sample for laboratory analysis. WVDEP personnel recorded physical descriptions of the pollutant sources, such as the number of outfalls, the source of the outfalls, and the general condition of the stream in the vicinity of each outfall. These records were compiled and electronically plotted on maps using GIS software. This information was used in conjunction with other information to characterize pollutant sources.

Mining-related point and nonpoint sources are shown in Figure B-1-2, and specific details relative to these and other sources are discussed in the following sections.

B-1.2.1 Metals Point Source Inventory

As described in the TMDL Report, the National Pollutant Discharge Elimination System (NPDES) program, established under Clean Water Act Sections 318, 402, and 405, requires permits for the discharge of pollutants from point sources. Metals and pH point sources can be classified into two major categories: permitted non-mining point sources and permitted mining point sources.

In the Piney Creek watershed there are two mining-related NPDES permits with ten outlets. Because those NPDES permits contain effluent limitations and/or monitoring requirements, the regulated discharges were determined to be contributing point sources of iron and aluminum.

There are 34 sites in the watershed registered under the Multi-Sector Stormwater General Permit. That permit regulates stormwater associated with industrial activity (non-mining). All regulated outlets are subject to benchmark values for total iron and/or total suspended solids (TSS). Those general permit registrations were determined to be contributing point sources of iron. .

Permit and outlet information is provided in Appendix G of the Technical Report, which shows the name of each responsible party and the total number of outlets that discharge to the Piney Creek watershed. Appendix G of the Technical Report also contains specific data for each permitted outlet including effluent type, drainage area, pump capacity, and permit limits for each of the mining-related NPDES outlets. Industrial stormwater permits in Appendix G show the permit number, and the concentration limits for aluminum, iron and TSS.

Municipal Separate Storm Sewer Systems

Runoff from residential and urban areas can contribute excess sediment to waterbodies during storm events. Unmitigated impervious areas can also increase runoff volume and velocity and magnify instream erosion processes. Because of those factors, stormwater runoff from residential and urban lands is a source of iron.

USEPA's stormwater permitting regulations require public entities to obtain NPDES permit coverage for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in specified areas. The City of Beckley; the West Virginia Department of Transportation, Division of Highways (DOH); and the West Virginia Parkways, Economic Development and Tourism Authority (Parkways), are designated MS4 entities. Each entity will be registered under, and subject to, the requirements of General Permit Number WV0110625. Figure B-1-3 displays the MS4 areas of responsibility for each entity.

The stormwater discharges from MS4s are point sources for which the TMDLs prescribe wasteload allocations. Because the City of Beckley has formed a stormwater utility to comprehensively control stormwater within its jurisdiction and to facilitate implementation of the requirements of the MS4 general permit, the iron loading associated with precipitation and runoff from most land within the Beckley corporate boundary was aggregated to represent the City's baseline MS4 conditions. Corresponding wasteload allocations were prescribed under the same basis. Only the precipitation-induced loadings from the drainage areas associated with the DOH and Parkways MS4s that intersect Beckley were excluded from the City's baseline condition and wasteload allocation. The DOH and Parkways MS4 baseline conditions and wasteload allocations were based upon the drainage areas associated with the roads and MS4s for which they are responsible, as determined by information provided in their applications for registration under General NPDES Permit Number WV0110625. Under this approach, the iron loading associated with precipitation and runoff from approximately 14 percent of the land area of the Piney Creek watershed is subject to MS4 wasteload allocations. The iron loading associated with precipitation and runoff from the remaining 86 percent is addressed by load allocations for nonpoint sources.

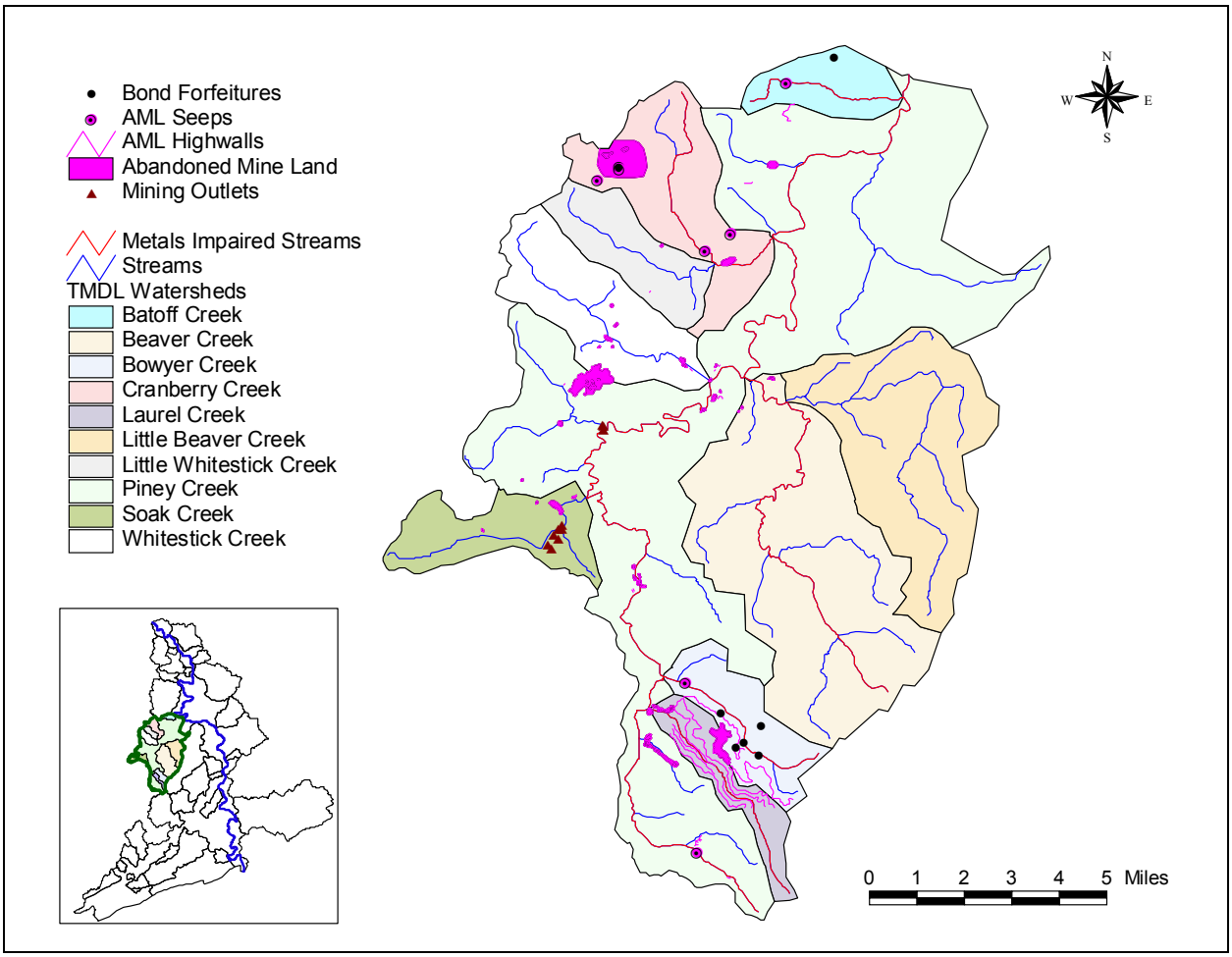

Figure B-1-2. Mining-related sources in the Piney Creek watershed

Construction Stormwater Permits

The discharges from construction activities that disturb more than one acre of land are legally defined as point sources and the sediment introduced from such discharges can contribute iron and aluminum. WVDEP issues a General NPDES Permit (permit WV0115924) to regulate stormwater discharges associated with construction activities with a land disturbance greater than one acre. These permits require that the site have properly installed best management practices (BMPs), such as silt fences, sediment traps, seeding / mulching, and riprap, to prevent or reduce erosion and sediment runoff. The BMPs will remain intact until the construction is complete and the site has been stabilized. Individual registration under the General Permit is usually limited to less than one year.

Although there are no existing construction sites registered under the Construction Stormwater General Permit in Piney Creek, an area-based allocation for site registrations under the permit is provided for each Piney Creek subwatershed.

B-1.2.2 Metals Nonpoint Sources

In addition to point sources, nonpoint sources also contribute to metals-related water quality impairments in the Piney Creek watershed. Nonpoint sources are diffuse, non-permitted sources. Abandoned mine lands (AML) and facilities that were subject to the Surface Mining Control and Reclamation Act of 1977 and forfeited their bonds or abandoned operations can be a significant non-permitted source of metals. Non-mining land disturbance activities can also be a nonpoint source of metals, causing metals to enter waterbodies as a component of sediment. Examples of such land disturbance activities are agriculture, forestry, oil and gas wells, streambank erosion, and roads and urban and residential lands outside MS4 areas. The applicable land-disturbing activities in the Piney Creek watershed are discussed below.

Abandoned Mine Lands and Bond Forfeiture Sites

Based on the identification of a number of abandoned mining activities in the Piney Creek watershed, AMLs comprise approximately 1,166 acres and are a significant non-permitted source of metals and pH impairment in the watershed. WVDEP's Office of Abandoned Mine Lands identified the locations of AML in the Piney Creek watershed. In addition, source tracking efforts by WVDEP's Division of Water and Waste Management (DWWM) identified and characterized seven abandoned mine sources (AML seeps).

WVDEP's Division of Land Restoration, Office of Special Reclamation, provided bond forfeiture information and data. This information included the status of both land reclamation and water treatment activities. Seven bond forfeiture sites were modeled as metals sources in the Piney Creek watershed.

Land-Disturbance Activities

Land disturbance can increase sediment loading to impaired waters. The control of sediment-producing sources has been determined to be necessary to meet water quality criteria for total iron during high-flow conditions. Nonpoint sources of sediment include forestry operations, oil and gas operations, agriculture, stormwater from construction sites less than one acre, and stormwater from roads and urban and residential land in non-MS4 areas. Additionally, streambank erosion represents a significant sediment source throughout the watershed. Upland sediment nonpoint sources are summarized below.

During the pre-TMDL sampling period there were eight registered timber harvest sites in the Piney Creek watershed. The watershed also contains 67 active oil and gas wells, which, based on the survey by WVDEP's Office of Oil and Gas, are estimated to comprise 98 acres of disturbed area. The length and area of paved roads were calculated using the Census 2000 TIGER/Line files roads coverage for West Virginia. Information on unpaved roads from TIGER was supplemented by digitizing any unpaved roads shown on topographic maps that were not included in the TIGER shapefile. There are 23 miles of paved roads and 142 miles of unpaved roads in the Piney Creek watershed. Stormwater runoff from roads and residential and urban land uses in non-MS4 areas is a significant nonpoint source of sediment and iron throughout the watershed.

The sediment loadings from non-pasture grasslands and forested areas are not considered to be significant sediment or iron sources. Iron loadings from those landuses are categorized as "background" in the load allocations and are not reduced from existing conditions. Agricultural landuses (pasture and cropland) are not prevalent and are also included in the unreduced background loadings.

Streambank Erosion

Streambank erosion is a significant source of sediment and iron throughout the watershed. The base and allocated loads associated with bank erosion are included in both the MS4 wasteload allocations in subwatersheds or portions of subwatersheds where MS4 entities have areas of responsibility and as load allocations for the streambank erosion nonpoint source category in non-MS4 areas. The subdivision of the bank erosion component between point and nonpoint sources, and where applicable, between multiple MS4 entities is proportional to their respective drainage areas within each subwatershed.

B-1.3 Fecal Coliform Bacteria Sources

This section identifies and examines the potential sources of fecal coliform bacteria in the Piney Creek watershed. Sources can be classified as either point sources or nonpoint sources. Publicly and privately owned sewage treatment facilities are point sources of fecal coliform. Combined sewer overflows (CSOs) and discharges from municipal separate storm sewer systems (MS4s) are additional point sources that may contribute loadings of fecal coliform bacteria to receiving streams. Nonpoint sources of fecal coliform bacteria include failing or nonexistent on-site sewage disposal systems, stormwater runoff from pasture and cropland, direct deposition of wastes from livestock, and stormwater runoff from residential and urbanized areas that are not subject to MS4 permitting requirements.

B-1.3.1 Fecal Coliform Bacteria Point Sources

There are 21 permitted sewage treatment facilities with a total of 26 outlets discharging in the Piney Creek watershed.

Individual NPDES Permits

WVDEP issues individual NPDES permits to both publicly owned and privately owned wastewater treatment facilities. Publicly owned treatment works (POTWs) are relatively large facilities with extensive wastewater collection systems, whereas private facilities are usually used in smaller applications such as subdivisions and shopping centers. Five POTWs discharge treated effluent from seven outlets in the watershed. Two additional permits exist for privately owned sewage treatment facilities with discharges into Laurel Creek, and Griffith Branch. The treated effluents of individually permitted facilities are not significant sources of fecal coliform bacteria because they are permitted to discharge only at limits more stringent than water quality criteria.

Overflows

Combined sewer overflows (CSOs) are outfalls from POTW sewer systems that carry untreated domestic waste and surface runoff. CSOs are permitted to discharge only during precipitation

events. Sanitary sewer overflows (SSOs) are unpermitted overflows that occur as a result of excess inflow and/or infiltration to POTW separate sanitary collection systems. Both types of overflows contain fecal coliform bacteria. SSOs have not been identified within the Piney Creek TMDL watershed. Outlet number 002 of NPDES Permit WV0023183 is a CSO for the City of Beckley's POTW collection system that discharges into Little Whitestick Creek. Overflows from this outlet are currently disinfected and the City intends to improve performance so as to achieve fecal coliform criteria (200 counts/100 mL) in the discharge. The wasteload allocation for outlet 002 is consistent with those intentions.

General Sewage Permits

General sewage permits are designed to cover like discharges from numerous individual owners and facilities throughout the state. General Permit WV0103110 regulates small, privately owned sewage treatment plants ("package plants") that have a design flow of less than 50,000 gallons per day (gpd). General Permit WV0107000 regulates home aeration units (HAUs). HAUs are small sewage treatment plants primarily used by individual residences where site considerations preclude typical septic tank and leach field installation. Both general permits contain fecal coliform effluent limitations identical to those in individual NPDES permits for sewage treatment facilities. Within the watersheds addressed by this report, nine facilities are registered under the "package plant" general permit and four are registered under the "HAU" general permit.

Municipal Separate Storm Sewer Systems

Runoff from residential and urbanized areas during storm events can be a significant fecal coliform source. USEPA's stormwater permitting regulations require public entities to obtain NPDES permit coverage for stormwater discharges from MS4s in specified areas. The City of Beckley, the West Virginia Department of Transportation, Division of Highways (DOH), and the West Virginia Parkways, Economic Development and Tourism Authority (Parkways) are designated MS4 entities. Each entity will be registered under, and subject to, the requirements of General Permit Number WV0110625. Figure B-1-3 displays the MS4 areas of responsibility for each entity.

The stormwater discharges from MS4s are point sources for which the TMDLs prescribe wasteload allocations. MS4 source representation was based upon precipitation and runoff from landuses determined from the modified GAP 2000 landuse data, the jurisdictional boundary of the City of Beckley, and the associated drainage areas for the DOH and Parkways MS4s. Because the City of Beckley has formed a stormwater utility to comprehensively control stormwater within its jurisdiction and to facilitate implementation of the requirements of the MS4 General Permit, the bacteria loadings associated with precipitation and runoff from most land within the Beckley corporate boundary were aggregated to represent the City's baseline MS4 condition and wasteload allocations. Only the precipitation-induced loadings from the drainage areas associated with the DOH and Parkways MS4s that intersect Beckley were excluded from the City's baseline condition and wasteload allocation. The DOH and Parkways MS4 baseline conditions and wasteload allocations were based upon the drainage areas associated with the roads and MS4s for which they are responsible, as determined by information provided in their application for registration under General NPDES Permit Number WV0110625.

Under this approach, the fecal coliform bacteria loading associated with precipitation and runoff from approximately 14 percent of the land area of the Piney Creek watershed is subject to MS4 wasteload allocations. The fecal coliform bacteria loading associated with precipitation and runoff from the remaining 86 percent is addressed by load allocations for nonpoint sources.

B-1.3.2 Fecal Coliform Bacteria Nonpoint Sources

Pollutant source tracking by WVDEP personnel identified scattered areas of high population density without access to public sewers in the Piney Creek watershed. Human sources of fecal coliform bacteria from these areas include sewage discharges from failing septic systems, and possible direct discharges of sewage from residences (straight pipes). WVDEP source tracking information yielded an estimate of 10,311 unsewered homes in the Piney Creek watershed. A septic system failure rate derived from geology and soil type was applied to the number of unsewered homes to calculate nonpoint source fecal coliform loading from failing septic systems. Figure B-1-4 shows the geographic distribution of estimated failing septic system nonpoint sources in the watershed. Failing septic systems and/or straight pipe discharges are a significant fecal coliform bacteria source in the Piney Creek watershed with pollutant reductions prescribed in 73 of the 84 subwatersheds.

Stormwater runoff from non-MS4 areas is another potential nonpoint source of fecal coliform bacteria. Runoff from residential areas can deliver the waste of pets and wildlife to the waterbody. In addition, rural stormwater runoff can transport significant loads of bacteria from livestock pastures, livestock and poultry feeding facilities, and manure storage and application. Given the small portion of total land area in the Piney Creek watershed that consists of agricultural areas, bacteria loadings in stormwater runoff from these areas were found to be problematic only in limited areas. The existing loadings from this nonpoint source category were reduced in only 3 of 84 Piney Creek subwatersheds. Similarly, stormwater runoff from non-MS4 residential areas is not generally significant, with pollutant reductions prescribed in only 14 of 84 Piney Creek subwatersheds.

A certain “natural background” contribution of fecal coliform bacteria can be attributed to deposition by wildlife in forest and grassland areas. Accumulation rates for fecal coliform bacteria in those areas were developed using reference numbers from past TMDLs, incorporating wildlife estimates obtained from the Division of Natural Resources. Although wildlife contributions of fecal coliform bacteria were considered in modeling, they were not found to be a significant source, and reductions were not prescribed.

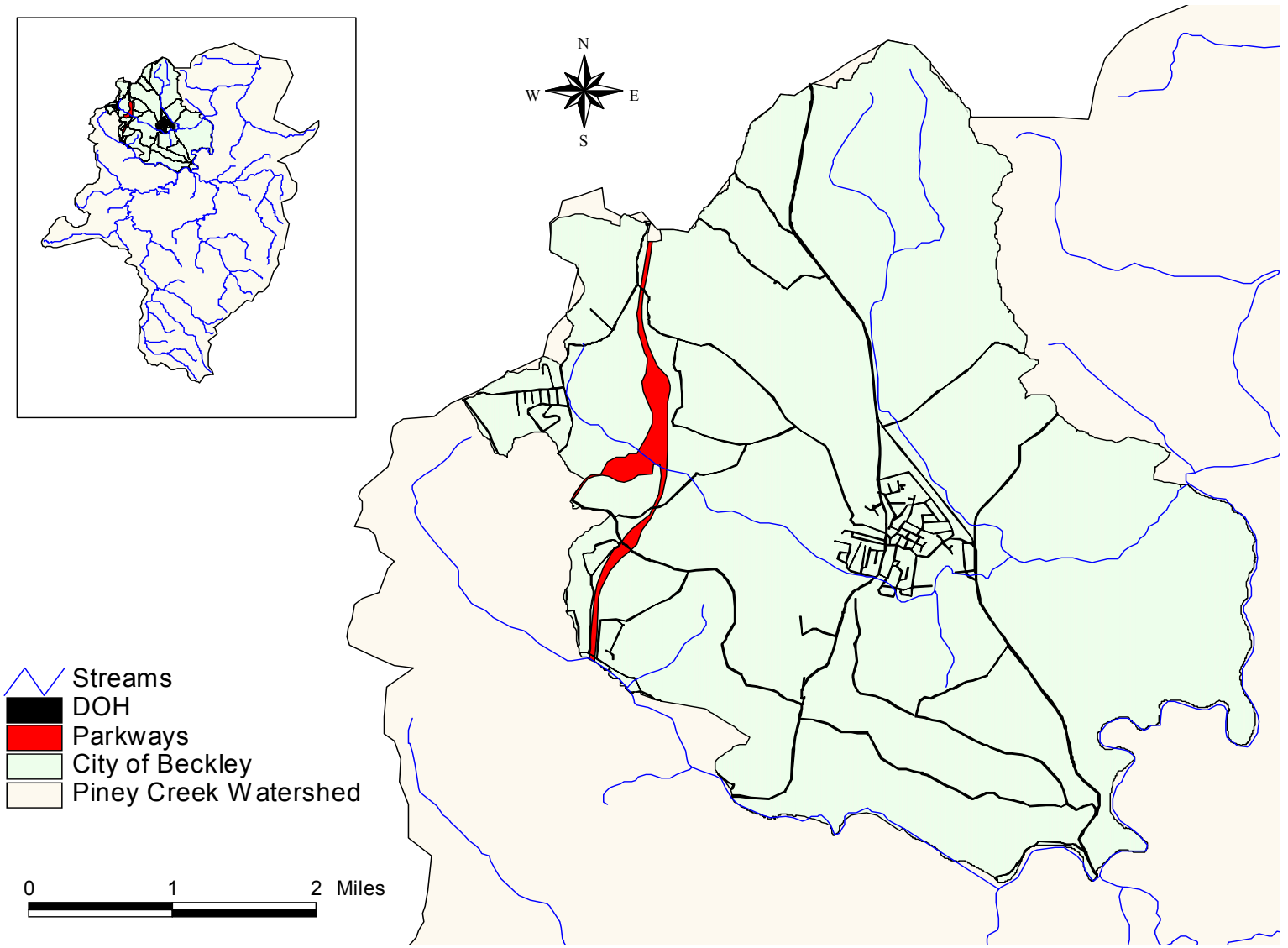

Figure B-1-3. Spatial distribution of MS4 and non-MS4 areas

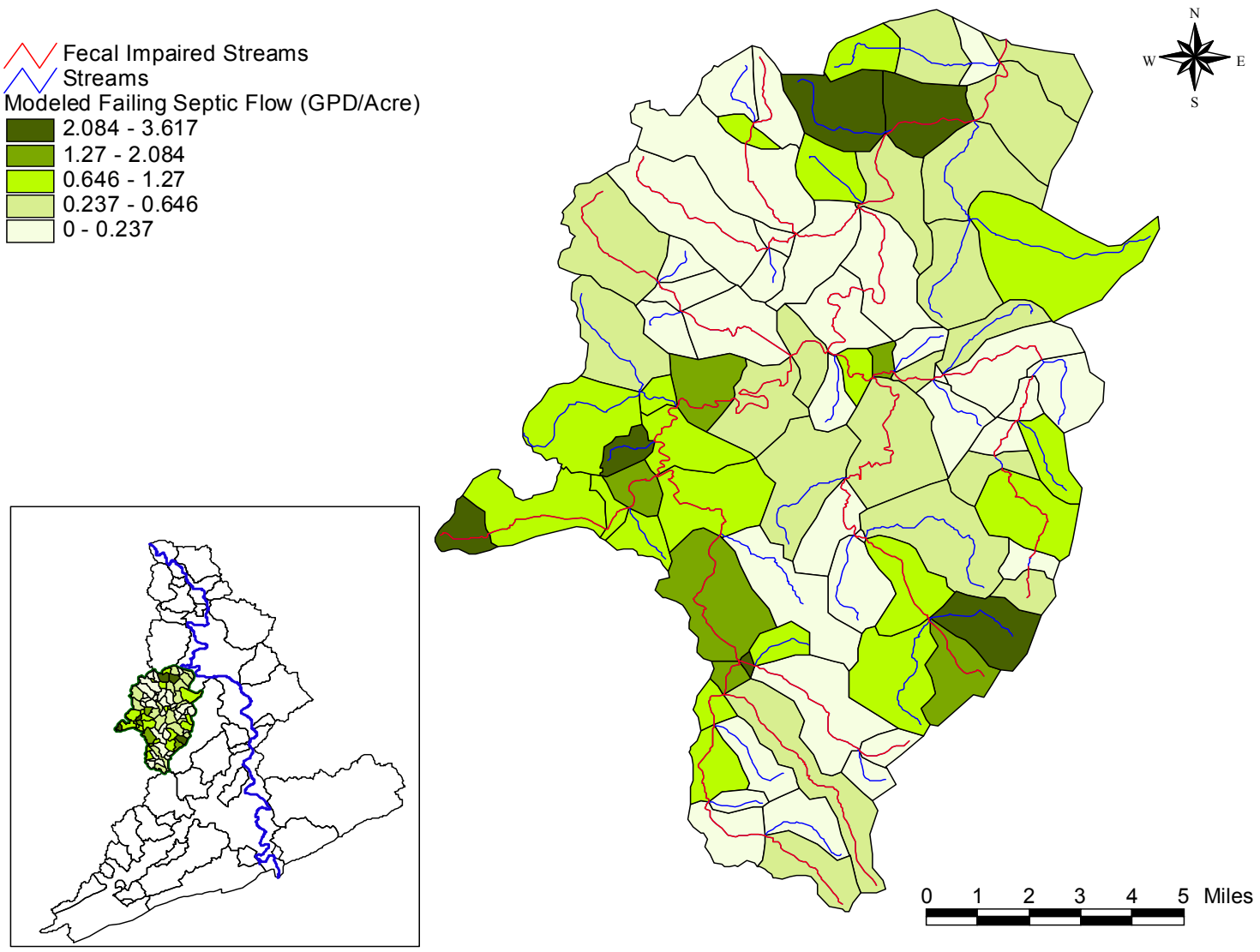

Figure B-1-4. Failing septic system flows in the Piney Creek watershed

B-1.4 Stressors of Biologically Impaired Streams

The Piney Creek watershed has four biologically impaired streams for which TMDLs have been developed. These streams are identified in Table B-1-3 along with the biological stressors of the streams' benthic communities and the TMDLs required to address these impairments. A stressor identification (SI) process was used to evaluate and identify the significant stressors of impaired benthic communities. The SI process is detailed in Section 4 of the TMDL Report with additional information provided in the Technical Report.

Where identified as the biological stressor, organic enrichment was linked to violations of the numeric criteria for fecal coliform bacteria. WVDEP determined that implementation of fecal coliform TMDLs would remove untreated sewage and animal waste, thereby reducing the organic and nutrient loading causing the biological impairment. Therefore, fecal coliform TMDLs will serve as a surrogate where organic enrichment was identified as a stressor. All streams where the SI process indicated sedimentation as a causative stressor also exhibited impairment pursuant to total iron water quality criteria. WVDEP determined that the sediment reductions that are necessary to ensure compliance with iron criteria exceed those necessary to resolve biological impairments. As such, the iron TMDL presented for Cranberry Creek is an appropriate surrogate for the necessary sediment TMDL.

Table B-1-3. Significant stressors of biologically impaired streams in the Piney Creek watershed

Stream	Code	Biological Stressors	TMDLs Required
Cranberry Creek	WVKN-26-E	Organic enrichment Sedimentation	Fecal coliform Iron
Beaver Creek	WVKN-26-F	Organic enrichment	Fecal coliform
Little Beaver Creek	WVKN-26-F-2	Organic enrichment	Fecal coliform
Whitestick Creek	WVKN-26-G	Organic enrichment	Fecal coliform

B-1.5 TMDLs for the Piney Creek Watershed

B-1.5.1 TMDL Development

A top-down methodology was followed to develop these TMDLs and allocate loads to sources. Headwaters were analyzed first because they have a profound effect on downstream water quality. Loading contributions were reduced from applicable sources for these waterbodies, and TMDLs were developed. Refer to Section 8.5 of the TMDL Report for a detailed description of the allocation methodologies used in developing the pollutant-specific TMDLs.

The TMDLs for iron, aluminum, pH, fecal coliform bacteria, and biological impairments are shown in Tables B-1-4 through B-1-8. The TMDLs for iron are presented as average daily loads, in pounds per day. The TMDLs for fecal coliform bacteria are presented in number of colonies per day. The aluminum TMDL for Batoff Creek is presented as an average daily load of total aluminum that is necessary to attain dissolved aluminum water quality criteria. All TMDLs were developed to meet TMDL endpoints under a range of conditions observed throughout the year.

A surrogate approach was used to develop pH TMDLs. It was assumed that reductions in metals concentrations to TMDL endpoints would result in compliance with the pH water quality standard. To verify this assumption, the Dynamic Equilibrium In-stream Chemical Reactions model (DESC-R) that was applied in the Batoff Creek watershed was evaluated for an extended period under TMDL conditions—conditions where TMDL endpoints for metals were met. A median equilibrium pH was calculated based on the daily equilibrium pH output from DESC-R to confirm the acceptability of the surrogate approach.

Iron Allocations for Troutwaters

Piney Creek, Beaver Creek, Cranberry Creek and Batoff Creek are troutwaters that require total iron TMDLs. Implementation of the described methodology for troutwater iron TMDLs does not assure complete attainment of the chronic aquatic life protection criterion for iron. Non-attainment is predicted in response to extreme precipitation events or a series of significant storms that elevate instream TSS and iron concentrations. The magnitudes of the predicted exceedances under the initial allocation scenarios were not extreme, but exceedances were predicted much more often than the once per three year frequency prescribed by the criterion. Criterion attainment would require pollutant reductions from existing sources that are well beyond practical levels, coupled with significant reductions of undisturbed upland and streambank background loadings, and no construction stormwater allowances. Therefore, phased implementation of the TMDLs is proposed, under which the source allocations necessary to universally achieve the iron criterion for warmwater fisheries (1.5 mg/L, 4-day average, once per three years average exceedance frequency) are implemented concurrently with additional study of the situation. WVDEP has initiated planning of a special monitoring effort for minimally impacted and documented viable troutwaters upon which model refinements and/or alternative criterion decision-making may be based. For additional information and a detailed description of the iron allocations for troutwaters, please refer to the Section 8.5 of the main report.

B-1.6 TMDL Tables: Metals and pH

Table B-1-4. Iron TMDLs for the Piney Creek watershed

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	Margin of Safety (lbs/day)	TMDL (lbs/day)	Trout Water
Piney Creek	WVKN-26	Piney Creek	Iron	1024	409	75	1508	Yes
Piney Creek	WVKN-26-N	Laurel Creek	Iron	29	5	2	35	No
Piney Creek	WVKN-26-M	Bowyer Creek	Iron	45	7	3	54	No
Piney Creek	WVKN-26-F	Beaver Creek	Iron	238	31	14	282	Yes
Piney Creek	WVKN-26-E	Cranberry Creek	Iron	13	176	10	199	Yes
Piney Creek	WVKN-26-A	Batoff Creek	Iron	35	5	2	42	Yes

UNT = unnamed tributary, RM = river mile, NA = not applicable

Table B-1-5. Aluminum TMDLs for the Piney Creek watershed

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	Margin of Safety (lbs/day)	TMDL (lbs/day)	Trout Water
Piney Creek	WVKN-26-A	Batoff Creek	Aluminum	2	0	0.1	2	Yes

Table B-1-6. pH TMDLs for the Piney Creek watershed

Major Watershed	Stream Code	Stream Name	Parameter	pH* (Under TMDL conditions)
Piney Creek	WVKN-26-A	Batoff Creek	pH	7.87

UNT = unnamed tributary
*Predicted pH assumes that all metals (aluminum, iron) meet TMDL endpoints.

B-1.7 TMDL Tables: Fecal Coliform Bacteria

Table B-1-7. Fecal coliform bacteria TMDLs for the Piney Creek watershed

Major Watershed	Stream Code	Stream Name	Parameter	Load Allocation (counts/day)	Wasteload Allocation (counts/day)	Margin of Safety (counts/day)	TMDL (counts/day)
Piney Creek	WVKN-26	Piney Creek	Fecal coliform	7.52E+11	3.67E+11	5.89E+10	1.18E+12
Piney Creek	WVKN-26-F	Beaver Creek	Fecal coliform	2.22E+11	3.79E+07	1.17E+10	2.34E+11
Piney Creek	WVKN-26-F-2	Little Beaver Creek	Fecal coliform	7.11E+10	NA	3.74E+09	7.48E+10
Piney Creek	WVKN-26-M	Bowyer Creek	Fecal coliform	1.79E+10	NA	9.43E+08	1.89E+10
Piney Creek	WVKN-26-N	Laurel Creek	Fecal coliform	1.18E+10	2.42E+09	7.46E+08	1.49E+10
Piney Creek	WVKN-26-K	Soak Creek	Fecal coliform	4.50E+10	2.76E+09	2.51E+09	5.02E+10
Piney Creek	WVKN-26-G	Whitestick Creek	Fecal coliform	6.25E+10	4.44E+10	5.62E+09	1.12E+11
Piney Creek	WVKN-26-E	Cranberry Creek	Fecal coliform	4.00E+09	1.91E+11	1.02E+10	2.05E+11
Piney Creek	WVKN-26-E-1	Little Whitestick Creek	Fecal coliform	1.70E+09	7.84E+10	4.22E+09	8.43E+10

NA = not applicable; UNT = unnamed tributary.

"Scientific notation" is a method of writing or displaying numbers in terms of a decimal number between 1 and 10 multiplied by a power of 10. The scientific notation of 10,492, for example, is 1.0492×10^4.

B-1.8 TMDL Tables: Biological

Table B-1-8. Biological TMDLs for the Piney Creek watershed

Stream	Biological Stressor	Parameter	Load Allocation	Wasteload Allocation	Margin of Safety	TMDL	Units
Cranberry Creek	Organic enrichment	Fecal coliform	4.00E+09	1.91E+11	1.02E+10	2.05E+11	counts/day
	Sedimentation	Iron	13	176	10	199	lbs/day
Beaver Creek	Organic enrichment	Fecal coliform	2.22E+11	3.79E+07	1.17E+10	2.34E+11	counts/day
Little Beaver Creek	Organic enrichment	Fecal coliform	7.11E+10	NA	3.74E+09	7.48E+10	counts/day
Whitestick Creek	Organic enrichment	Fecal coliform	6.25E+10	4.44E+10	5.62E+09	1.12E+11	counts/day

NA = not applicable; UNT = unnamed tributary.

"Scientific notation" is a method of writing or displaying numbers in terms of a decimal number between 1 and 10 multiplied by a power of 10. The scientific notation of 10,492, for example, is 1.0492×10^4.