APPENDIX 2

A-2. COAL RIVER

A-2.1 Watershed Information

This appendix deals with the impaired streams of the Coal River, exclusive of Clear Fork, Little Coal River, Marsh Fork, Pond Fork, and Spruce Fork watersheds. The area addressed by this appendix drains approximately 282.2 square miles (180,581 acres), as shown in Figure A-2-1. The dominant landuse in the watershed is forest, which covers 70.4 percent of the watershed. Other important landuse types include mining land (13.8 percent), urban/residential (3.3 percent), agriculture (2.3 percent) and harvested forest (2.1 percent). All other individual land cover types account for less than 8.1 percent of the total watershed area. There are 40 impaired streams, including the Coal River, in the watershed. Figure A-2-2 shows the impaired segments and the pollutants for which each is listed as impaired.

Before establishing Total Maximum Daily Loads (TMDLs), WVDEP performed monitoring in each of the impaired streams in the Coal River watershed to better characterize water quality and refine impairment listings. Monthly samples were taken at 106 stations (station locations can be viewed using the ArcExplorer project) throughout the Coal River watershed from July 1, 2002, through June 30, 2003. Monitoring suites at each site were determined based on the types of impairments observed in each stream. Streams 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, total selenium, total manganese, and specific conductance. Monthly samples from streams 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.

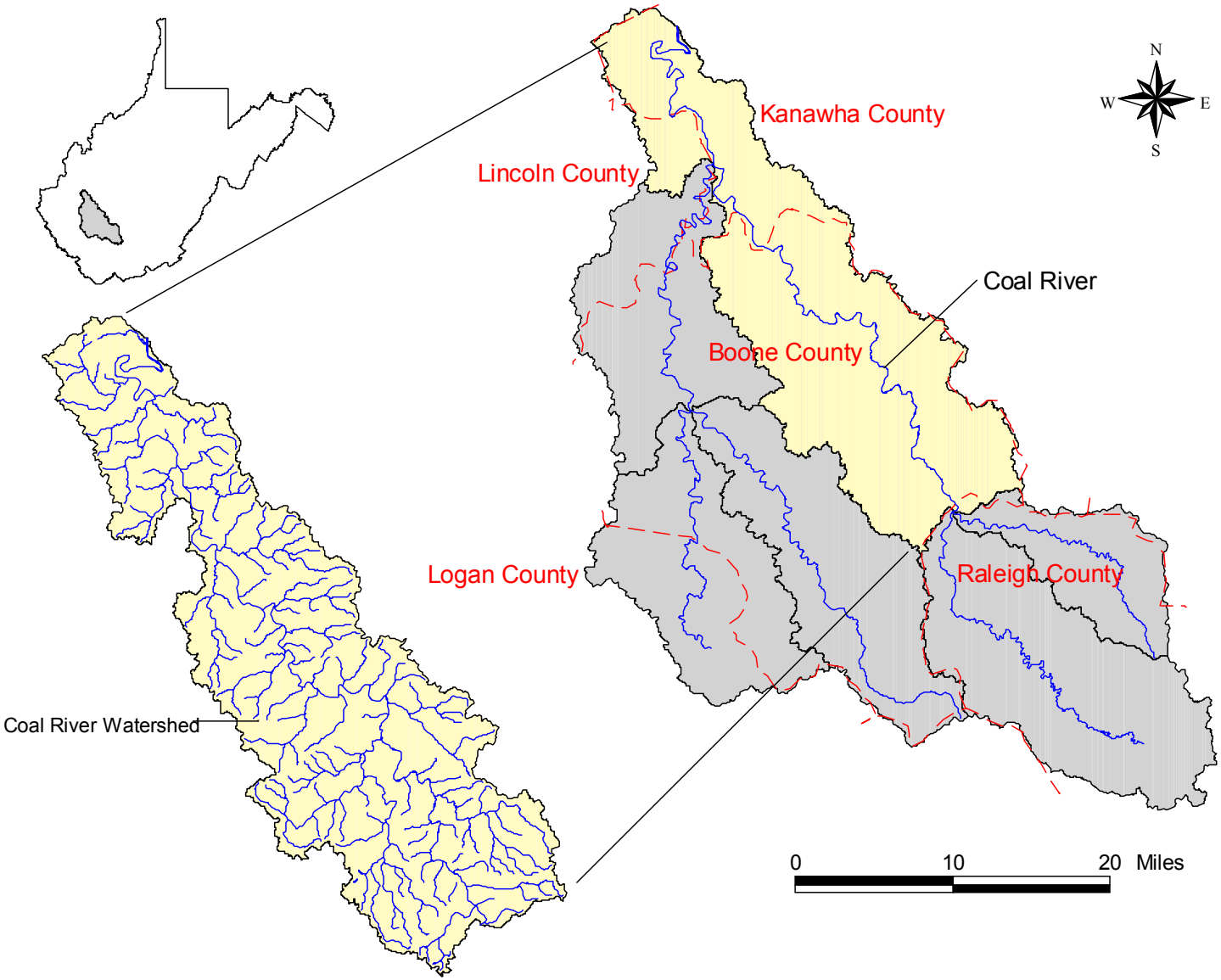
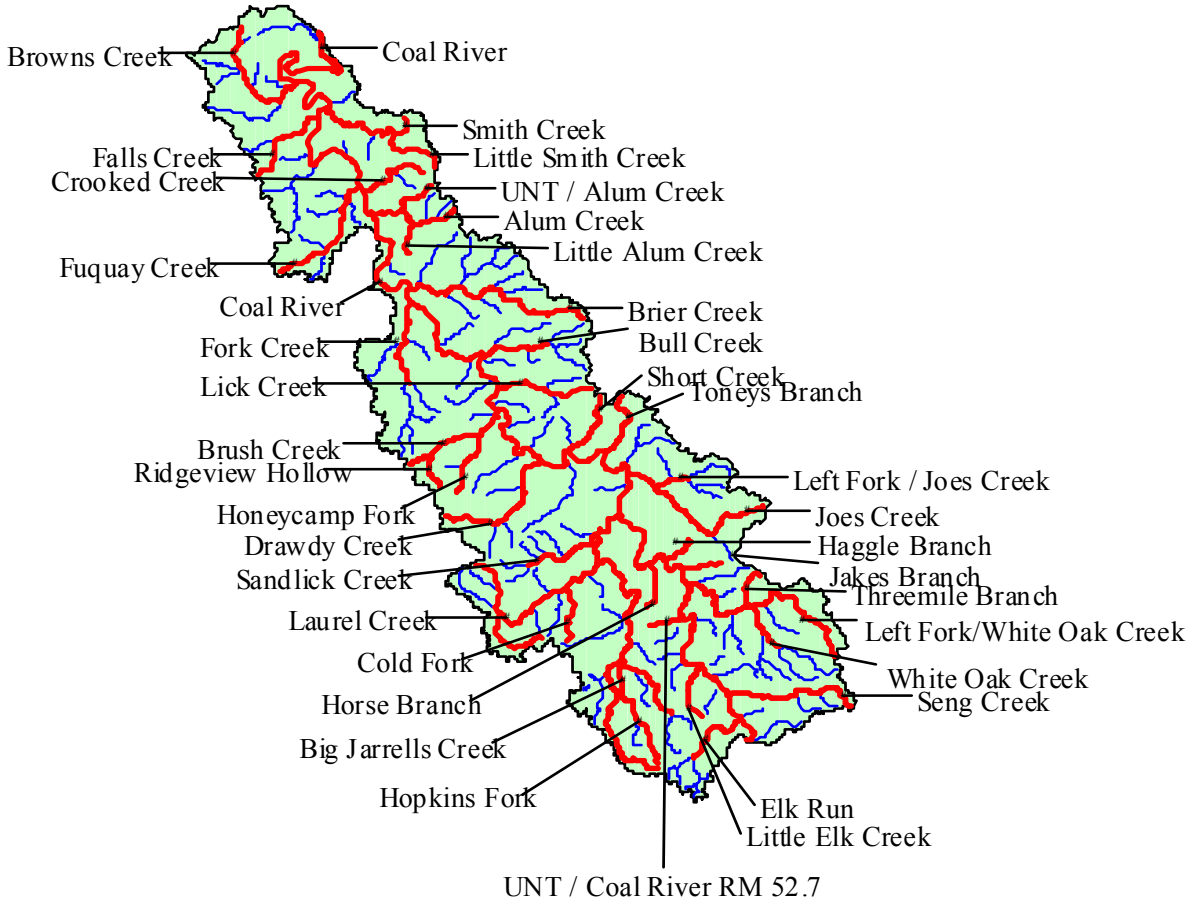


Figure A-2-1. Location of the Coal River watershed.



Stream	Aluminum	Iron	pH	Selenium	Biological	Fecal Coliforms	Sediment
Coal River						X	
Browns Creek					X	X	X
Smith Creek					X	X	X
Little Smith Creek					X	X	
Falls Creek						X	
Fuquay Creek						X	
Crooked Creek					X	X	
Alum Creek						X	
UNT/Alum Creek RM 1.5						X	
Little Alum Creek						X	
Brier Creek						X	
Lick Creek					X	X	
Fork Creek		X					
Bull Creek		X					
Honeycamp Fork		X					
Brush Creek		X			X	X	X
Ridgeview Hollow		X			X	X	X
Drawdy Creek		X				X	
Short Creek						X	
Toneys Branch		X				X	
Joes Creek		X				X	
Left Fork/Joes Creek						X	
Laurel Creek	X	X				X	
Sandlick Creek		X			X	X	X
Hopkins Fork		X				X	
Big Jarrells Creek		X				X	
Logan Fork		X					
Cold Fork	X	X	X				
Little Laurel Creek		X					
Mudlick Fork		X					
Horse Branch	X	X	X				
Haggle Branch	X	X	X				
Jakes Branch		X					
White Oak Creek	X	X		X			
UNT/Coal River RM 52.7	X	X	X				
Threemile Branch	X	X	X				
Left Fork/White Oak Creek	X	X		X			
Little Elk Creek	X	X					
Seng Creek		X		X		X	
Elk Run		X					

Figure A-2-2. Waterbodies and impairments under TMDL development in the Coal River watershed.

A-2.2 Metals and pH Sources

This section identifies and examines the potential sources of aluminum, iron, selenium, and pH impairment in the Coal River watershed. Sources can be classified as point sources (specific sources subject to a permit) or non-point sources (diffuse sources). Mining- and non-mining-related permitted discharges are considered metals and pH point sources. Metals and pH non-point sources are diffuse, non-permitted sources such as abandoned or forfeited mine sites.

Pollutant sources were identified using statewide geographic information system (GIS) coverages of point and non-point 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. Significant metals sources in the watershed are shown in Figure A-2-3.

On the basis of scientific knowledge of sediment/metals interaction and knowledge of West Virginia's soils, it is reasonable to conclude that sediments contain high levels of aluminum and iron. Control of sediment-producing sources might be necessary to meet water quality criteria for dissolved aluminum and total iron during critical high-flow conditions. Although some of these sediment-producing sources are not shown in Figure A-2-3 (e.g., harvested forest areas, agriculture and unpaved roads), specific details relative to these sources are discussed in section A-2.2.2.

There are three streams in the Coal River watershed that are impaired for selenium: White Oak Creek, Left Fork/White Oak Creek and Seng Creek. Selenium is a naturally occurring element that is found in marine sedimentary rocks, coal and other fossil fuel deposits. In West Virginia, coals that contain the highest selenium concentrations are found in a region of south central West Virginia where the Allegheny and Upper Kanawha Formations of the Middle Pennsylvanian are mined (WVGES 2002). As stated in Section 4.3, sources of selenium impairment are limited to mining-related point sources.

A-2.2.1 Metals Point Source Inventory

As described in the main 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.

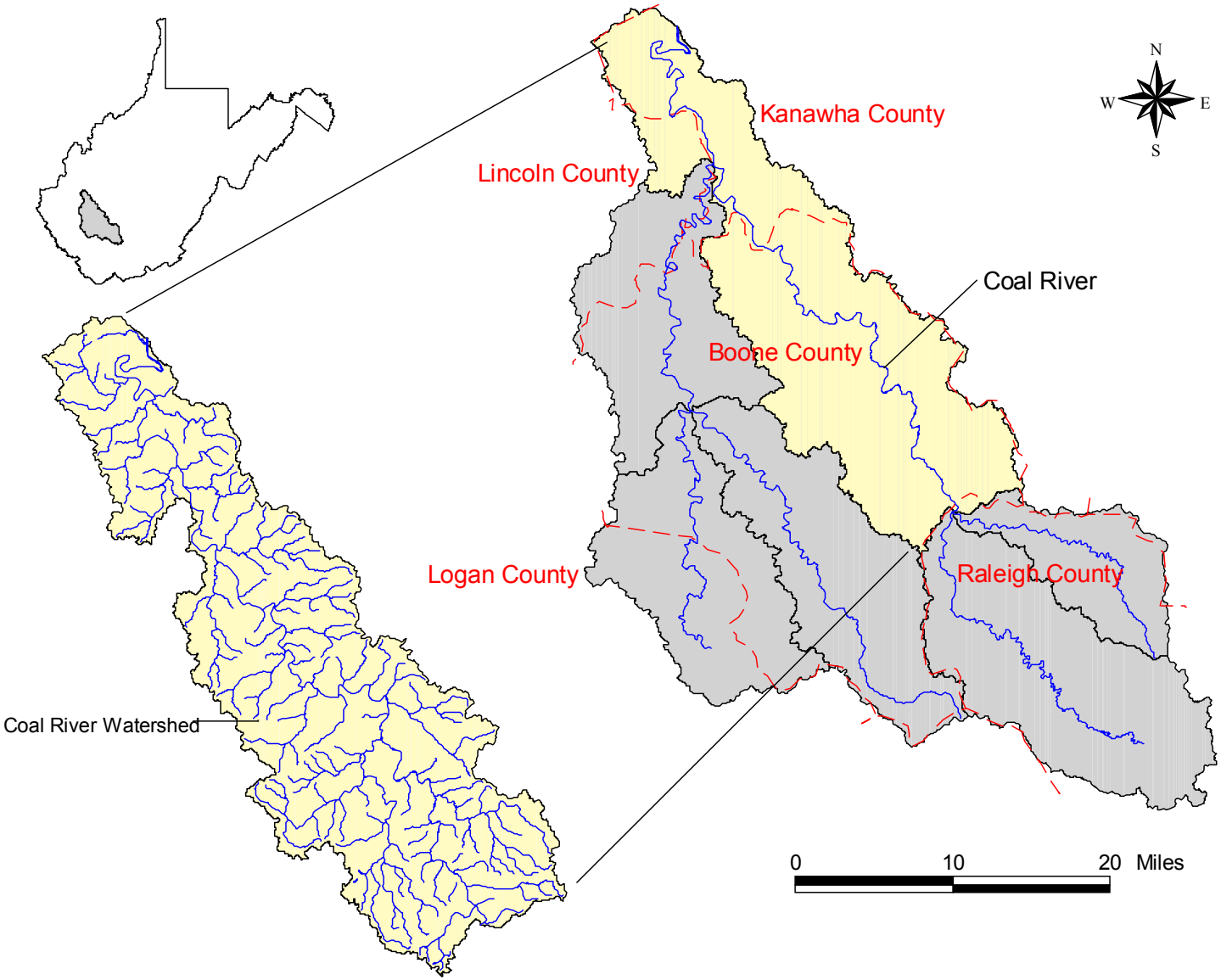
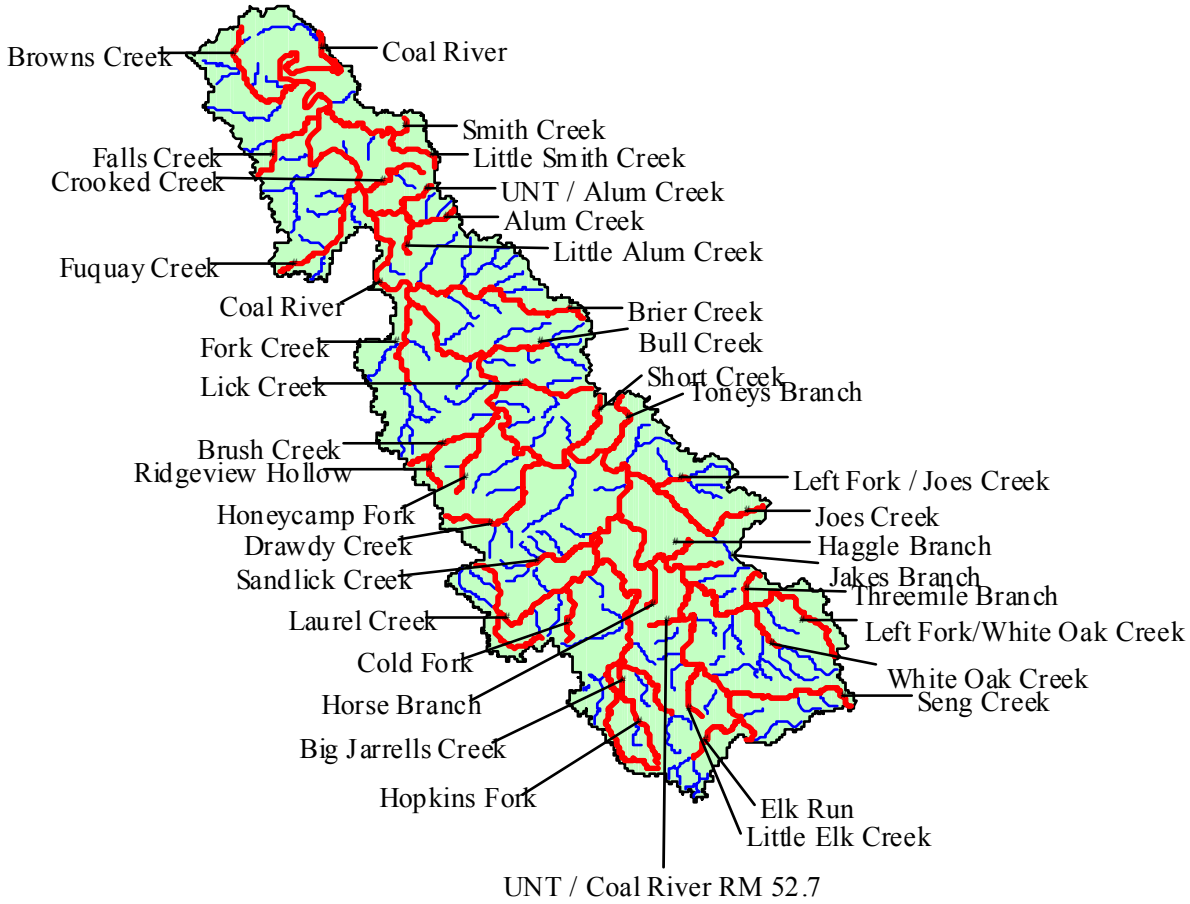
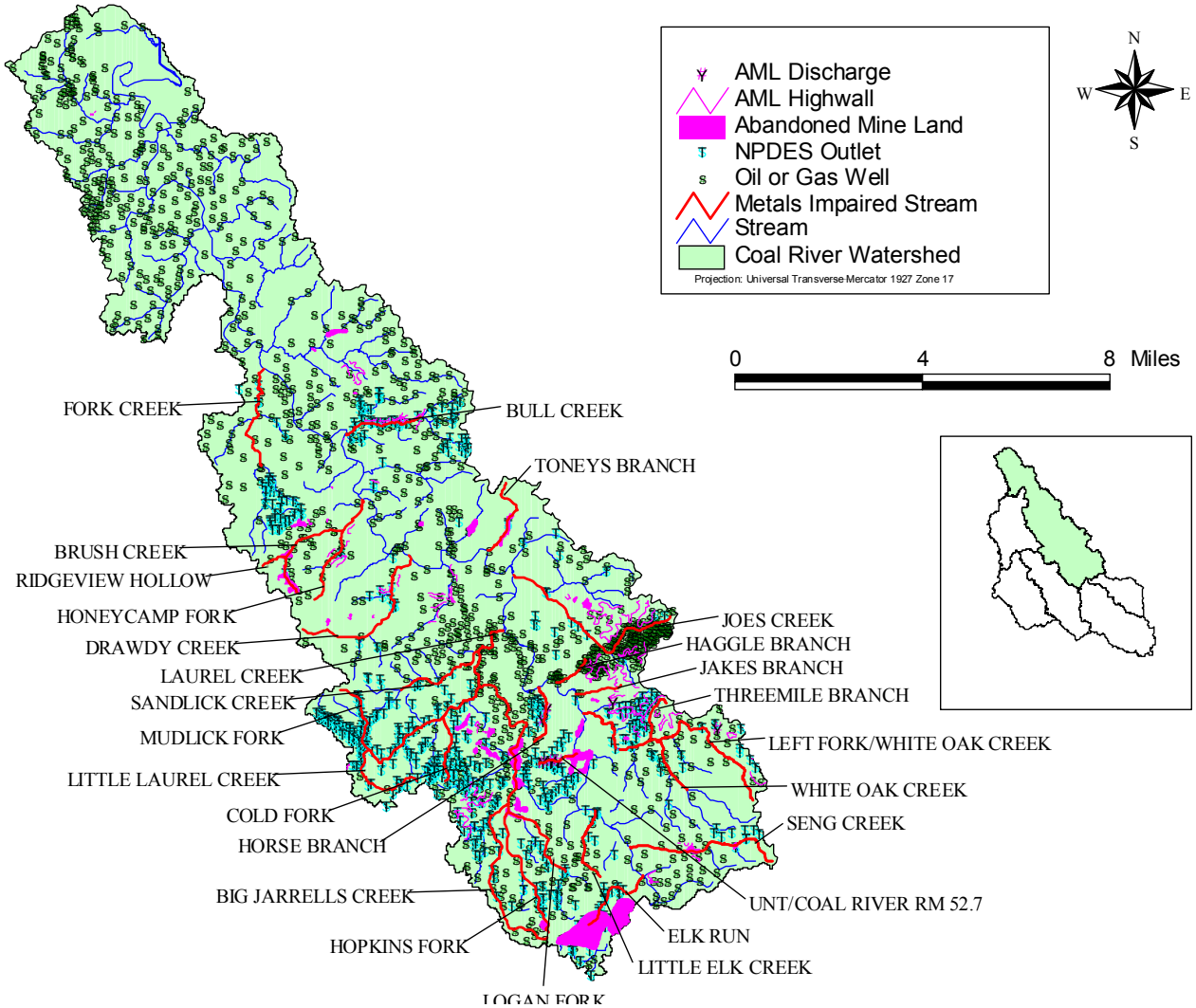


Figure A-2-1. Location of the Coal River watershed.



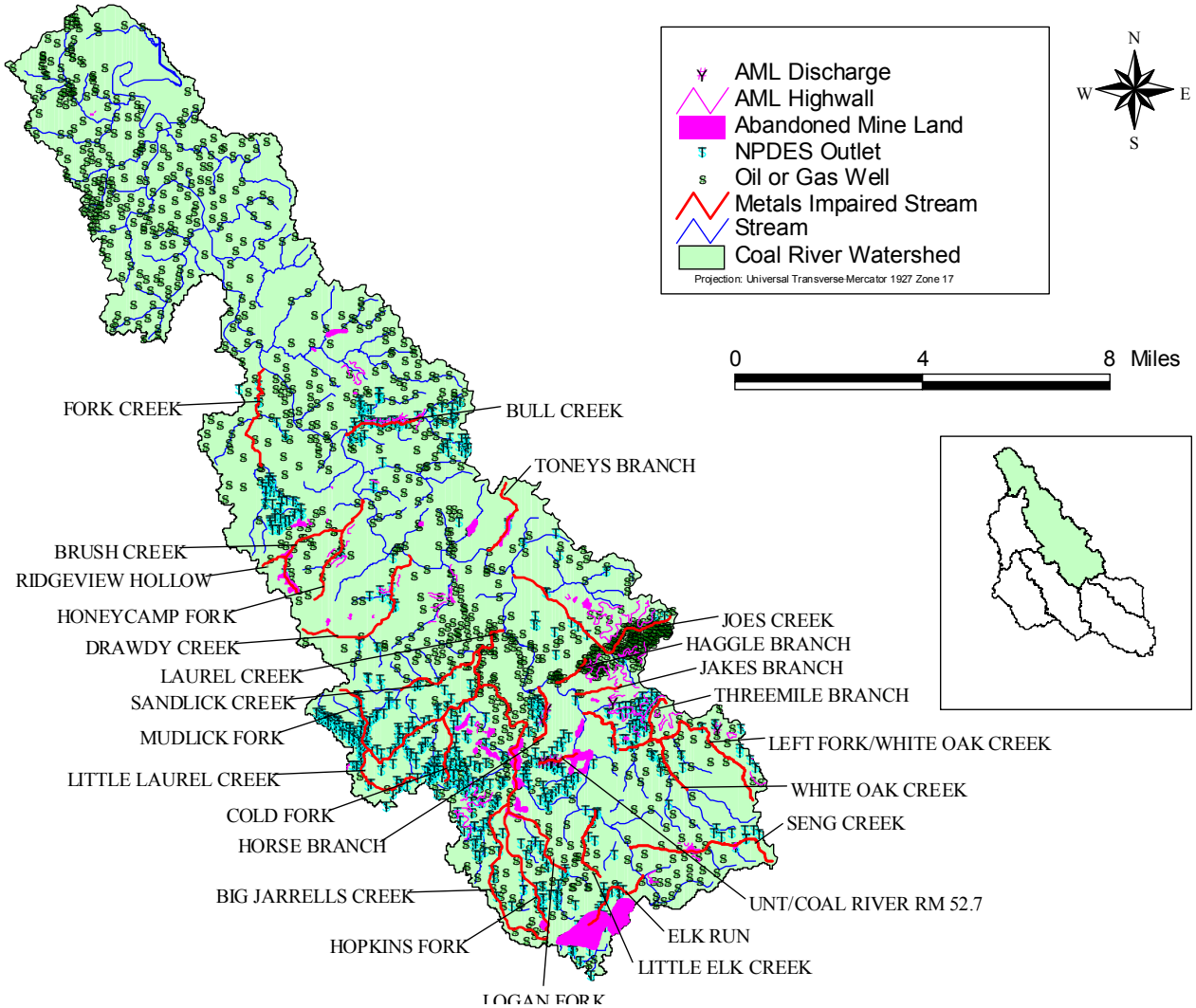
Stream	Aluminum	Iron	pH	Selenium	Biological	Fecal Coliforms	Sediment
Coal River						X	
Browns Creek					X	X	X
Smith Creek					X	X	X
Little Smith Creek					X	X	
Falls Creek						X	
Fuquay Creek						X	
Crooked Creek					X	X	
Alum Creek						X	
UNT/Alum Creek RM 1.5						X	
Little Alum Creek						X	
Brier Creek						X	
Lick Creek					X	X	
Fork Creek		X					
Bull Creek		X					
Honeycamp Fork		X					
Brush Creek		X			X	X	X
Ridgeview Hollow		X			X	X	X
Drawdy Creek		X				X	
Short Creek						X	
Toneys Branch		X				X	
Joes Creek		X				X	
Left Fork/Joes Creek						X	
Laurel Creek	X	X				X	
Sandlick Creek		X			X	X	X
Hopkins Fork		X				X	
Big Jarrells Creek		X				X	
Logan Fork		X					
Cold Fork	X	X	X				
Little Laurel Creek		X					
Mudlick Fork		X					
Horse Branch	X	X	X				
Haggle Branch	X	X	X				
Jakes Branch		X					
White Oak Creek	X	X		X			
UNT/Coal River RM 52.7	X	X	X				
Threemile Branch	X	X	X				
Left Fork/White Oak Creek	X	X		X			
Little Elk Creek	X	X					
Seng Creek		X		X		X	
Elk Run		X					

Figure A-2-2. Waterbodies and impairments under TMDL development in the Coal River watershed.



NOTE: Some mapped features in close proximity to each other may plot as one location on the map.

Figure A-2-3. Metals sources in the Coal River watershed.



NOTE: Some mapped features in close proximity to each other may plot as one location on the map.

Figure A-2-3. Metals sources in the Coal River watershed.

In the Coal River watershed, all NPDES permits for metals effluents are related to mining. WVDEP's HPU GIS coverage was used to determine the locations of the mining permits; the detailed permit information came from WVDEP's ERIS database system. There are 642 mining-related NPDES outlets in the Coal River watershed. The permits related to these outlets are listed in the Technical Report, which shows the name of each responsible party and the total number of outlets that discharge to the Coal River watershed. The Technical Report also contains specific data for each permitted outlet (including effluent type, drainage areas, and pump capacities) and permit limits for each of the mining-related NPDES outlets.

A-2.2.2 Metals Non-point Source Inventory

In addition to point sources, non-point sources also contribute to metals-related water quality impairments in the Coal River watershed. Non-point sources are diffuse, non-permitted sources. Abandoned mine lands 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 non-point 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, and the construction and use of roads. The applicable land-disturbing activities in the Coal River watershed are discussed below.

Abandoned Mine Lands and Bond Forfeiture Sites

Based on the identification of a number of abandoned mining activities in the Coal River watershed, abandoned mine lands 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 abandoned mine lands in the Coal River watershed. In addition, source-tracking efforts by WVDEP's Division of Water and Waste Management identified and characterized seven abandoned mine sources (discharges, seeps, portals, culverts, refuse piles, diversion ditches, and ponds).

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. There are no bond forfeiture sites in the Coal River watershed.

Land-Disturbing Activities

Based on the GAP 2000 landuse coverage, agricultural areas comprise 4,225 acres (2.3 percent) of the Coal River watershed. There are 23 active logging operations in the watershed. The disturbed areas associated with these operations are estimated to cover 3,874 acres (2.1 percent) of the total watershed area. The watershed contains 404 active oil and gas wells, which, based on the survey by WVDEP's Office of Oil and Gas, are estimated to comprise 558 acres (0.3 percent). 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 253.9 miles of paved roads and 1,186.6 miles of unpaved roads in the Coal River watershed.

A-2.3 Fecal Coliform Bacteria Sources

This section identifies and examines the potential sources of fecal coliform bacteria in the Coal River watershed. Sources can be classified as point sources (specific sources subject to a permit) or non-point sources (diffuse sources). Point sources of fecal coliform bacteria are classified by several different types of sewage permits and the point source discharges regulated in them. Non-point sources are diffuse, non-permitted sources.

A-2.3.1 Fecal Coliform Bacteria Point Sources

Permitted sources of fecal coliform bacteria that experience effluent overflows or that do not comply with permit limits can cause occasional high loadings of fecal coliform bacteria in receiving streams. In the Coal River watershed there are 209 discharge permits: 177 are for home aeration units and 30 are general sewage permits. Two Individual POTWs include those operated by Boone County PSD under NPDES Permit No.WV0035939 and Boone-Raleigh PSD under NPDES Permit No. WV0086525. In addition to the treated effluents of the POTW treatment plants, five Combined Sewer Overflows (CSOs) are associated with permit number WV0035939 and discharge into the Little Coal River, and one Sanitary Sewer Overflow (SSO) is associated with permit number WV0086525 and discharges into the Coal River.

The Outlet noted as 002 in permit WV0086525 is included in the Coal River TMDL and is allocated a 100 percent reduction in discharge of fecal coliform. The outlet is currently noted in Section C. Nineteen of the WVNPDES permit for identification purposes only and is not authorized to discharge. Any discharge that should occur is subject to the requirements of Appendix A.II of the permit entitled Operation and Maintenance Section 3. Bypass of the Permit.

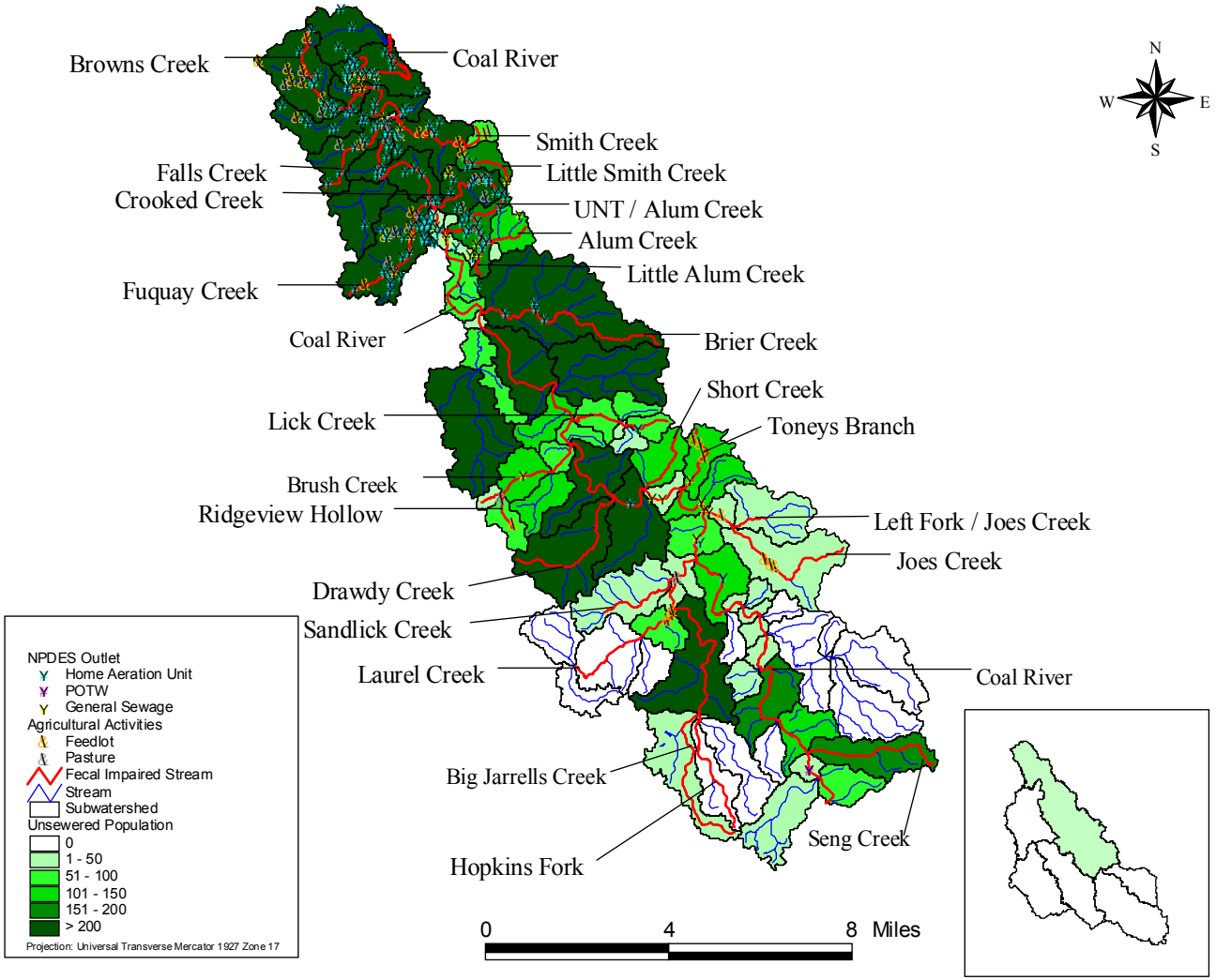
USEPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from municipal separate storm sewer systems (MS4s). There is one designated MS4 municipality, the City of Saint Albans, in the Coal River watershed. Saint Albans' MS4 has discharges in the Coal River watershed, and the city has filed a Notice of Intent for MS4 permit issuance. The area within the corporate limits is assumed to be subject to MS4 stormwater permitting.

A-2.3.2 Non-point (Non-permitted) Fecal Coliform Bacteria Sources

Pollutant source-tracking by WVDEP personnel identified scattered areas of high population density without access to public sewers in the Coal River 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). The West Virginia Bureau for Public Health estimates the septic tank failure rate in this area to be 70 percent in the first 10 years after installation (WV Bureau for Public Health 2003). An analysis of census data from the 1990 Census combined with WVDEP source-tracking information yielded an estimate of 13,156

people living in the unsewered homes in the Coal River watershed. Figure A-2-4 shows the estimated distribution of the unsewered population in the watershed.

Stormwater runoff is another potential non-point source of fecal coliform bacteria in both residential/urban and rural areas. 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 Coal River watershed that consists of agricultural areas, stormwater runoff from these areas is not considered a significant non-point source of fecal coliform bacteria. However, stormwater runoff from residential areas is a source of fecal coliform bacteria in the Coal River watershed.



NOTE: Some mapped features in close proximity to each other may plot as one location on the map.

Figure A-2-4. Fecal coliform sources in the Coal River watershed.

A certain "natural background" contribution of fecal coliform bacteria can be attributed to deposition by wildlife in forested areas. Accumulation rates for fecal coliform bacteria in forested 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.

A-2.4 Stressors of Biologically Impaired Streams

The Coal River watershed has eight biologically impaired streams for which TMDLs have been developed. These streams are identified in Table A-2-1 along with the biological stressors of the streams' benthic communities and the TMDLs required to address these impairments. A stressor identification process was used to evaluate and identify the primary stressors of impaired benthic communities. Refer to the main report for a detailed description of the stressor identification process. WVDEP is deferring biological TMDL development for the biological impairment in Seng Creek. The information available on the causative pollutants and associated impairment thresholds is insufficient to support TMDL development at this time.

Table A-2-1. Primary stressors of biologically impaired streams in the Coal River watershed

Stream	Biological Stressors	TMDLs Required
Browns Creek	Organic enrichment Sedimentation	Fecal coliform Sediment
Smith Creek	Organic enrichment Sedimentation	Fecal coliform Sediment
Little Smith Creek	Organic enrichment	Fecal coliform
Crooked Creek	Organic enrichment	Fecal coliform
Lick Creek	Organic enrichment	Fecal coliform
Brush Creek	Organic enrichment Sedimentation	Fecal coliform Sediment
Ridgeview Hollow	Organic enrichment Sedimentation	Fecal coliform Sediment
Sandlick Creek	Organic enrichment Sedimentation	Fecal coliform Sediment

TMDLs for each specific biological stressor are shown in Table A-2-7. Sediment TMDLs are required only when the stressor identification process indicates that a sedimentation problem is impairing the biological community. Sediment TMDLs are presented for Browns Creek, Smith Creek, Brush Creek, Ridgeview Hollow, and Sandlick Creek. Refer to section A-2.2.2 for additional sediment source information.

A-2.5 TMDLs for the Coal River Watershed

A-2.5.1 TMDL Development

TMDLs and source allocations were developed for impaired streams in the Coal River watershed. 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 7.5 of the main report for a detailed description of the allocation methodologies used in developing the pollutant-specific TMDLs.

The TMDLs for iron, aluminum, selenium, pH, fecal coliform bacteria, and sediment are shown in Tables A-2-2 through A-2-7. The TMDLs for iron and aluminum are presented as annual average loads, in pounds per year. The TMDLs for sediment are presented in tonnes per year. The TMDLs for fecal coliform bacteria are presented in number of colonies per year. All TMDLs are presented as average annual loads because they were developed to meet TMDL endpoints under a range of conditions observed throughout the year.

Because the primary sources contributing to selenium impairments are the point sources at a low-flow 7Q10 condition of 0 cfs, the non-point source contributions of selenium were considered negligible. Therefore, the TMDLs were based on wasteload allocations assigned at water quality criteria for selenium (5.0 ug/L) at end-of-pipe for the surface mining point sources discharging upstream of the 7Q10 condition of 0 cfs. The selenium TMDLs for White Oak Creek, Left Fork/White Oak Creek, and Seng Creek are shown in Table A-2-4.

As stated in Section 7.4.1, 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) was run for an extended period under TMDL conditions—conditions in which TMDL endpoints for metals were met. A median equilibrium pH was calculated based on the daily equilibrium pH output from DESC-R. The results, shown in Table A-2-5, are the TMDLs for the pH-impaired streams in the watershed. Refer to the Technical Report for a detailed description of the pH modeling approach.

A-2.6 TMDL Tables: Metals and pH

Table A-2-2. Iron TMDLs for the Coal River watershed

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (lbs/yr)	Wasteload Allocation (lbs/yr)	Margin of Safety (lbs/yr)	TMDL (lbs/yr)
Coal River	WVKC-14	Fork Creek	Iron	9,543	9,930	1,025	20,498
Coal River	WVKC-16	Bull Creek	Iron	3,460	16,925	1,073	21,458
Coal River	WVKC-21	Brush Creek	Iron	13,843	1,105	787	15,735
Coal River	WVKC-21-A	Honeycamp Fork	Iron	2,224	242	130	2,596
Coal River	WVKC-21-C	Ridgeview Hollow	Iron	505	NA	27	532
Coal River	WVKC-24	Drawdy Creek	Iron	6,696	3,119	517	10,332
Coal River	WVKC-27	Toneys Branch	Iron	2,668	27	142	2,837
Coal River	WVKC-29	Joes Creek	Iron	11,176	8,394	1,030	20,600
Coal River	WVKC-31	Laurel Creek	Iron	39,870	92,856	6,986	139,711
Coal River	WVKC-31-A	Sandlick Creek	Iron	5,465	2,208	404	8,077
Coal River	WVKC-31-B	Hopkins Fork	Iron	20,842	52,971	3,885	77,697
Coal River	WVKC-31-B-2	Big Jarrells Creek	Iron	8,560	11,425	1,052	21,037
Coal River	WVKC-31-B-3	Logan Fork	Iron	3,935	4,076	422	8,433
Coal River	WVKC-31-C	Cold Fork	Iron	1,459	3,057	238	4,753
Coal River	WVKC-31-G	Little Laurel Creek	Iron	1,470	4,535	316	6,322
Coal River	WVKC-31-H	Mudlick Fork	Iron	128	13,977	742	14,847
Coal River	WVKC-32	Horse Branch	Iron	599	4,766	282	5,647
Coal River	WVKC-33	Haggle Branch	Iron	1,099	NA	58	1,157
Coal River	WVKC-34	Jakes Branch	Iron	1,295	NA	68	1,363
Coal River	WVKC-35	White Oak Creek	Iron	11,446	47,514	3,103	62,063
Coal River	WVKC-35.8	UNT/Coal River RM 52.7	Iron	1,194	4,822	317	6,333
Coal River	WVKC-35-D	Threemile Branch	Iron	687	922	85	1,693
Coal River	WVKC-35-E	Left Fork/White Oak Creek	Iron	2,421	21,427	1,255	25,103
Coal River	WVKC-39	Little Elk Creek	Iron	3,373	259	191	3,823
Coal River	WVKC-42	Seng Creek	Iron	3,508	11,192	774	15,474
Coal River	WVKC-43	Elk Run	Iron	5,125	7,172	647	12,945

NA = not applicable; UNT = unnamed tributary.

Table A-2-3. Aluminum TMDLs for the Coal River watershed

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (lbs/yr)	Wasteload Allocation (lbs/yr)	Margin of Safety (lbs/yr)	TMDL (lbs/yr)
Coal River	WVKC-31	Laurel Creek	Aluminum	15,135	32,180	2,490	49,805
Coal River	WVKC-31-C	Cold Fork	Aluminum	241	1,045	68	1,353
Coal River	WVKC-32	Horse Branch	Aluminum	110	574	36	720
Coal River	WVKC-33	Haggle Branch	Aluminum	131	NA	7	138
Coal River	WVKC-35	White Oak Creek	Aluminum	2,462	4,255	354	7,071
Coal River	WVKC-35.8	UNT/Coal River RM 52.7	Aluminum	138	887	54	1,079
Coal River	WVKC-35-D	Threemile Branch	Aluminum	104	88	10	201
Coal River	WVKC-35-E	Left Fork/White Oak Creek	Aluminum	655	1,693	124	2,471
Coal River	WVKC-39	Little Elk Creek	Aluminum	399	55	24	477

NA = not applicable; UNT = unnamed tributary.

Table A-2-4. Selenium TMDLs for the Coal River watershed

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (ug/L)	Wasteload Allocation (ug/L)	Margin of Safety (ug/L)	TMDL (ug/L)
Coal River	WVKC-35	White Oak Creek	Selenium	NA	5.0	Implicit	5.0
Coal River	WVKC-35-E	Left Fork/White Oak Creek	Selenium	NA	5.0	Implicit	5.0
Coal River	WVKC-42	Seng Creek	Selenium	NA	5.0	Implicit	5.0

NA = not applicable.

Table A-2-5. pH TMDLs for the Coal River watershed

Major Watershed	Stream Code	Stream Name	Parameter	pH* (Under TMDL conditions)
Coal River	WVKC-31-C	Cold Fork	pH	7.48
Coal River	WVKC-32	Horse Branch	pH	8.22
Coal River	WVKC-33	Haggle Branch	pH	8.67
Coal River	WVKC-35.8	UNT/Coal River RM 52.7	pH	7.57
Coal River	WVKC-35-D	Threemile Branch	pH	8.76

UNT = unnamed tributary.

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

A-2.7 TMDL Tables: Fecal Coliform Bacteria

Table A-2-6. Fecal coliform bacteria TMDLs for the Coal River watershed

Major Watershed	Stream Code	Stream Name	Parameter	Load Allocation (counts/yr)	Wasteload Allocation (counts/yr)	Margin of Safety (counts/yr)	TMDL (counts/yr)
Coal River	WVKC	Coal River	Fecal coliform	7.92E+14	5.42E+12	4.20E+13	8.40E+14
Coal River	WVKC-11	Alum Creek	Fecal coliform	1.31E+13	5.78E+10	6.94E+11	1.39E+13
Coal River	WVKC-11-A	UNT/Alum Creek RM 1.6	Fecal coliform	1.71E+12	4.42E+09	9.00E+10	1.80E+12
Coal River	WVKC-11-B	Little Alum Creek	Fecal coliform	1.36E+12	2.93E+09	7.29E+10	1.46E+12
Coal River	WVKC-13	Brier Creek	Fecal coliform	5.49E+12	5.81E+09	2.90E+11	5.79E+12
Coal River	WVKC-19	Lick Creek	Fecal coliform	3.48E+12	1.66E+09	1.83E+11	3.67E+12
Coal River	WVKC-2	Browns Creek	Fecal coliform	1.33E+13	2.51E+11	7.15E+11	1.43E+13
Coal River	WVKC-21	Brush Creek	Fecal coliform	6.69E+12	4.15E+09	3.53E+11	7.05E+12
Coal River	WVKC-21-C	Ridgeview Hollow	Fecal coliform	6.54E+11	NA	3.44E+10	6.88E+11
Coal River	WVKC-24	Drawdy Creek	Fecal coliform	3.83E+12	NA	2.02E+11	4.03E+12
Coal River	WVKC-26	Short Creek	Fecal coliform	1.28E+12	NA	6.74E+10	1.35E+12
Coal River	WVKC-27	Toneys Branch	Fecal coliform	1.69E+12	2.77E+10	9.06E+10	1.81E+12
Coal River	WVKC-29	Joes Creek	Fecal coliform	6.19E+12	2.77E+10	3.27E+11	6.55E+12
Coal River	WVKC-29-A	Left Fork/Joes Creek	Fecal coliform	1.78E+12	NA	9.37E+10	1.87E+12
Coal River	WVKC-31	Laurel Creek	Fecal coliform	2.77E+13	NA	1.46E+12	2.92E+13
Coal River	WVKC-31-A	Sandlick Creek	Fecal coliform	4.04E+12	NA	2.12E+11	4.25E+12
Coal River	WVKC-31-B	Hopkins Fork	Fecal coliform	1.26E+13	NA	6.65E+11	1.33E+13
Coal River	WVKC-31-B-2	Big Jarrells Creek	Fecal coliform	3.70E+12	NA	1.95E+11	3.90E+12
Coal River	WVKC-4	Smith Creek	Fecal coliform	1.62E+13	7.38E+10	8.57E+11	1.71E+13
Coal River	WVKC-42	Seng Creek	Fecal coliform	2.97E+12	NA	1.56E+11	3.12E+12
Coal River	WVKC-4-C	Little Smith Creek	Fecal coliform	1.75E+12	3.26E+10	9.37E+10	1.87E+12
Coal River	WVKC-5	Falls Creek	Fecal coliform	4.51E+12	1.42E+11	2.45E+11	4.90E+12
Coal River	WVKC-8	Fuquay Creek	Fecal coliform	7.69E+12	9.04E+10	4.09E+11	8.19E+12
Coal River	WVKC-9	Crooked Creek	Fecal coliform	4.54E+12	2.46E+10	2.40E+11	4.81E+12

NA = not applicable.

A-2.8 TMDL Tables: Biological

Table A-2-7. Biological TMDLs for the Coal River watershed

Stream	Biological Stressor	Parameter	Load Allocation	Wasteload Allocation	Margin of Safety	TMDL	Units
Browns Creek KC-2	Organic enrichment	Fecal coliform	1.33E+13	2.51E+11	7.15E+11	1.43E+13	counts/yr
	Sedimentation	Sediment	1737.8	7.5	91.9	1837.2	tonnes/yr
Smith Creek KC-4	Organic enrichment	Fecal coliform	1.62E+13	7.38E+10	8.57E+11	1.71E+13	counts/yr
	Sedimentation	Sediment	1144.3	1.5	60.3	1206.1	tonnes/yr
Little Smith Creek KC-4-C	Organic enrichment	Fecal coliform	1.75E+12	3.26E+10	9.37E+10	1.87E+12	counts/yr
Crooked Creek KC-9	Organic enrichment	Fecal coliform	4.54E+12	2.46E+10	2.40E+11	4.81E+12	counts/yr
Lick Creek KC-19	Organic enrichment	Fecal coliform	3.48E+12	1.66E+09	1.83E+11	3.67E+12	counts/yr
Brush Creek KC-21	Organic enrichment	Fecal coliform	6.69E+12	4.15E+09	3.53E+11	7.05E+12	counts/yr
	Sedimentation	Sediment	1289.2	158.7	76.2	1524.1	tonnes/yr
Ridgeview Hollow KC-21-C	Organic enrichment	Fecal coliform	6.54E+11	NA	3.44E+10	6.88E+11	counts/yr
	Sedimentation	Sediment	88.0	NA	4.6	92.6	tonnes/yr
Sandlick Creek KC-31-A	Organic enrichment	Fecal coliform	4.04E+12	NA	2.12E+11	4.25E+12	counts/yr
	Sedimentation	Sediment	1036.3	328.2	71.8	1436.4	tonnes/yr