APPENDIX 7

A-7 HOMINY CREEK AND PANTHER CREEK

A-7.1 Watershed Information

Hominy Creek and Panther Creek are adjacent drainages in the middle of the Gauley River watershed. Hominy Creek drains approximately 100 square miles (64,014 acres), and Panther Creek drains approximately 16.5 square miles (10,584 acres), as shown in Figure A-7-1.

The dominant landuse in the Hominy Creek watershed is forest, which covers 86.0 percent of the watershed. Other important landuse types include grassland (10.7 percent) and barren land (1.7 percent). All other individual land cover types account for less than 2 percent of the total watershed area. This TMDL effort addresses four impaired streams in the Hominy Creek waterhed, including the mainstem of Hominy Creek from milepoint 17.2 upstream to its headwaters. WVDEP has identified this segment of Hominy Creek and the entire length of Brushy Meadow Creek as troutwaters.

The dominant landuse in the Panther Creek watershed is also forest, which covers 91.8 percent of the watershed. Other important landuse types include grassland (5.4 percent), urban/residential (1.4 percent), and mining land (1.0 percent). All other individual land cover types account for less than 1 percent of the total watershed area. The mainstem of Panther Creek has been determined by WVDEP to be a troutwater and is impaired pursuant to troutwater iron and aluminum water quality criteria. Two impaired tributaries of Panther Creek are also addressed in this TMDL development effort.

Figure A-7-2 shows the impaired segments of both watersheds 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 22 stations in the Hominy Creek watershed, and at 10 stations in the Panther Creek watershed (station locations can be viewed using the ArcExplorer project) from July 1, 2003, through June 30, 2004. 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.

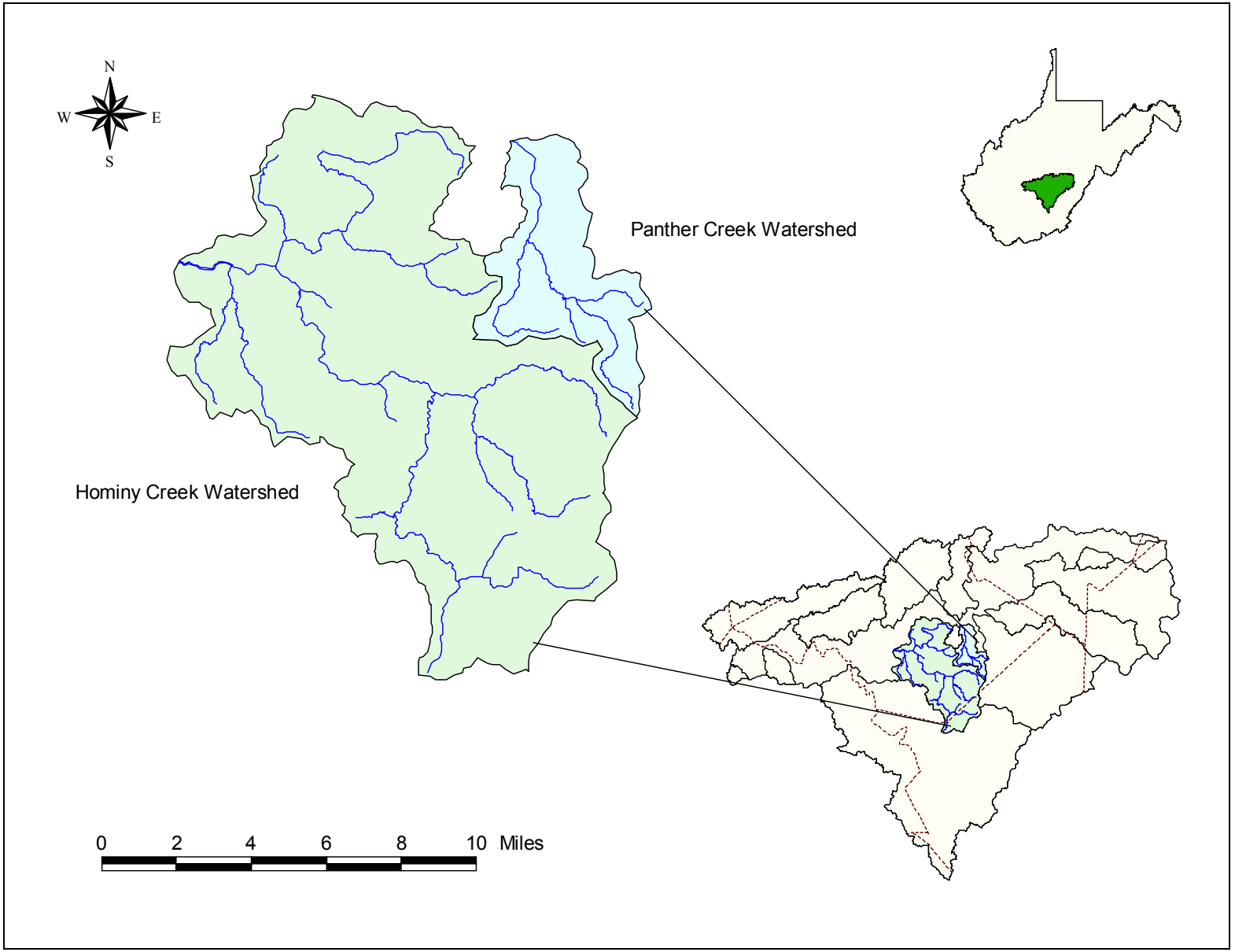
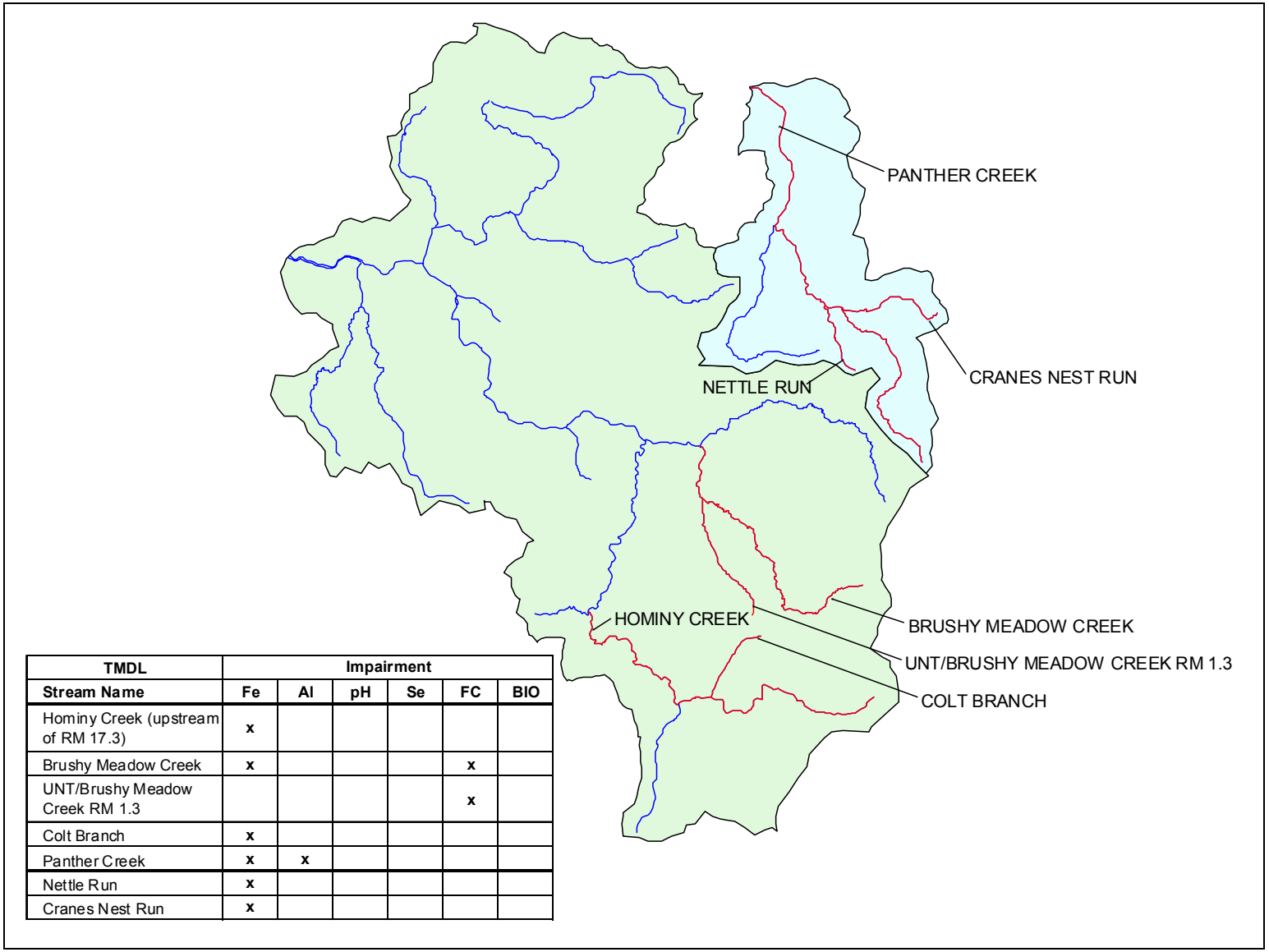


Figure A-7-1. Location of the Hominy Creek and Panther Creek watersheds



TMDL	Impairment					
Stream Name	**Fe**	**Al**	**pH**	**Se**	**FC**	**BIO**
Hominy Creek (upstream of RM 17.3)	x					
Brushy Meadow Creek	x				x	
UNT/Brushy Meadow Creek RM 1.3					x	
Colt Branch	x					
Panther Creek	x	x				
Nettle Run	x					
Cranes Nest Run	x					

Figure A-7-2. Waterbodies and impairments under TMDL development in the Hominy Creek and Panther Creek watersheds

A-7.2 Metals and pH Sources

This section identifies and examines the potential sources of iron and aluminum impairment in the Hominy Creek and Panther Creek watersheds. 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. Metals and pH nonpoint sources are non-permitted sources such as abandoned or forfeited mine sites.

Pollutant sources were identified using statewide geographic information system (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. Significant metals sources in the watershed are shown in Figure A-7-3.

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 were determined to be necessary to meet water quality criteria for total iron during critical high-flow conditions. Although some of these sediment producing sources are not shown in Figure A-7-3 (e.g., agricultural areas and unpaved roads), specific details relative to these sources are discussed in Section A-7.2.2.

A-7.2.1 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 Hominy Creek and Panther Creek watersheds, all point sources of iron and aluminum 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 14 mining related NPDES outlets in the watersheds of impaired streams segments of the Hominy Creek watershed, and 8 mining related outlets in the Panther Creek 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 Hominy Creek and Panther Creek watersheds. 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. Because NPDES permits contain effluent limitations and/or monitoring requirements, the discharges from mining activities were determined to be contributing point sources of iron and aluminum.

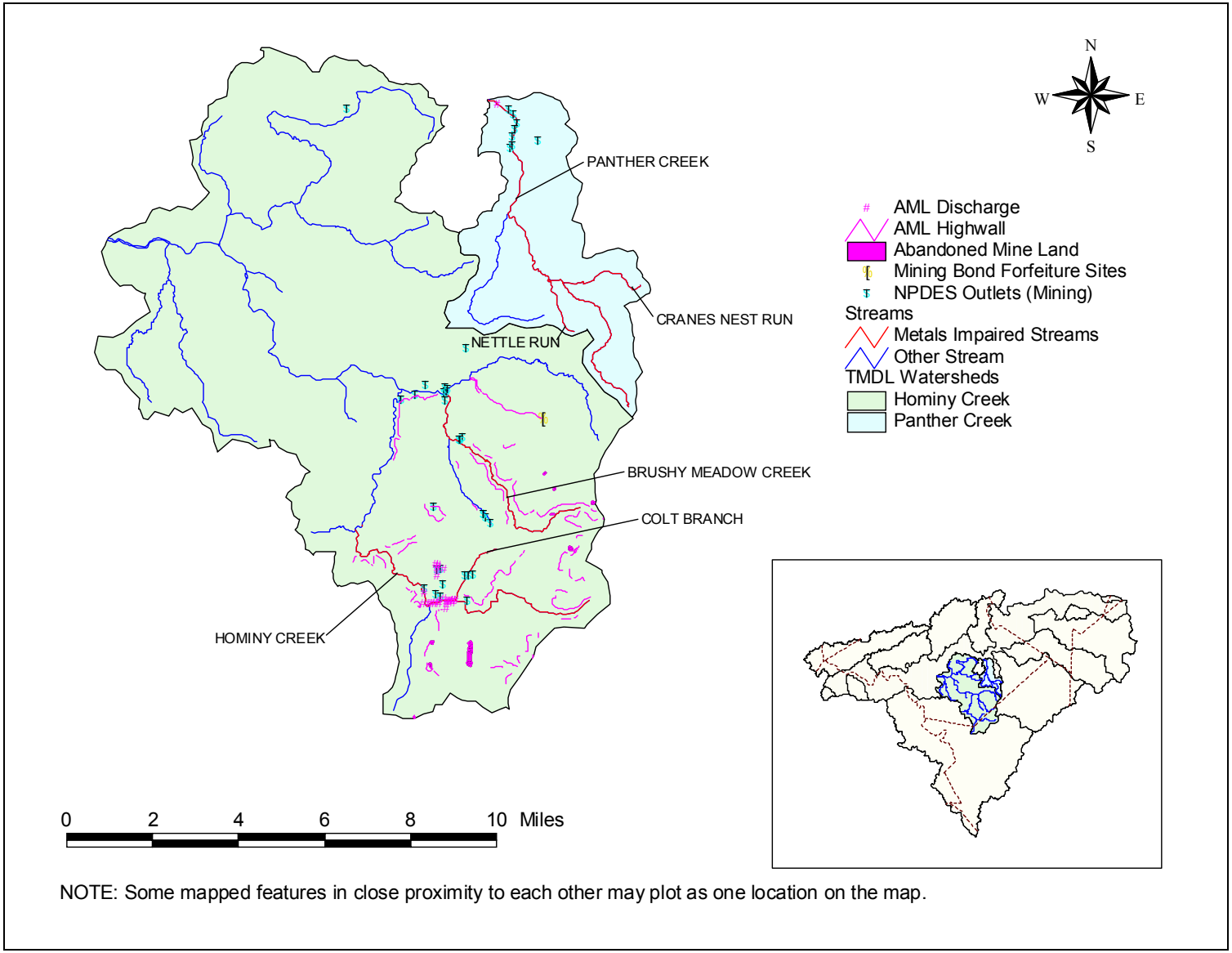


Figure A-7-3. Metals sources in the Hominy Creek and Panther Creek watersheds

A-7.2.2 Metals Nonpoint Source Inventory

In addition to point sources, nonpoint sources also contribute to metals-related water quality impairments in the Hominy Creek and Panther Creek watersheds. Nonpoint 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 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, and the construction and use of roads. The applicable land-disturbing activities in the Hominy Creek and Panther Creek watersheds are discussed below.

Abandoned Mine Lands and Bond Forfeiture Sites

Based on the identification of a number of abandoned mining activities in the Hominy Creek and Panther Creek watersheds, 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 Hominy Creek and Panther Creek watershed. In addition, source tracking efforts by WVDEP's Division of Water and Waste Management identified and characterized 18 abandoned mine sources (AML seeps) in the watersheds of impaired stream segments of the Hominy Creek watershed, and one source in the Panther Creek watershed.

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 is 1 bond forfeiture site that comprises approximately 14 acres in the Hominy Creek watershed, but this site is not within the watershed of the impaired streams for which TMDLs are being developed.

Land-Disturbing Activities

Based on the GAP 2000 landuse coverage, there are only 187 acres of row crop agriculture in the entire Hominy Creek watershed, and 15 acres of cropland in the Panther Creek watershed, representing a small fraction of the total watershed area. During the pre-TMDL sampling period there were 181 acres of active timber harvest in the Hominy Creek watershed, and 264 acres of active timber harvest in the Panther Creek watershed. Neither watershed has active oil or gas wells. 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 173.1 miles of paved roads and 162.2 miles of unpaved roads in the Hominy Creek watershed, and 27.9 miles of paved roads and 28.3 miles of unpaved roads in the Panther Creek watershed.

A-7.3 Fecal Coliform Bacteria Sources

Brushy Meadow Creek and an unnamed tributary of Brushy Meadow Creek are the only streams in the Hominy Creek watershed that are impaired pursuant to fecal coliform bacteria. No fecal

coliform impairments have been identified in the Panther Creek watershed. This section identifies and examines the potential sources of fecal coliform bacteria in the Brushy Meadow Creek drainage. Sources can be classified as either point sources or non-point sources. Potential point sources include effluent discharges of sewage treatment facilities and collection system overflows. Potential 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 urban areas.

A-7.3.1 Fecal Coliform Bacteria Point Sources

There are no point-source discharges of fecal coliform bacteria in the Brushy Meadow Creek drainage.

A-7.3.2 Nonpoint (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 Brushy Meadow Creek drainage. 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 102 unsewered homes in the drainage. 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 A-7-4 shows the geographic distribution of estimated failing septic system nonpoint sources in the watershed.

Stormwater runoff is another potential nonpoint 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. Fecal coliform bacteria reductions from agricultural landuses are prescribed in two subwatersheds where WVDEP source tracking identified moderate to high impact. Stormwater runoff from residential areas is a source of fecal coliform bacteria in the watershed and reduction is prescribed in one model subwatershed.

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, and WVDEP fecal coliform sampling in Shrewsbury Hollow in the Kanawha State Forest. 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

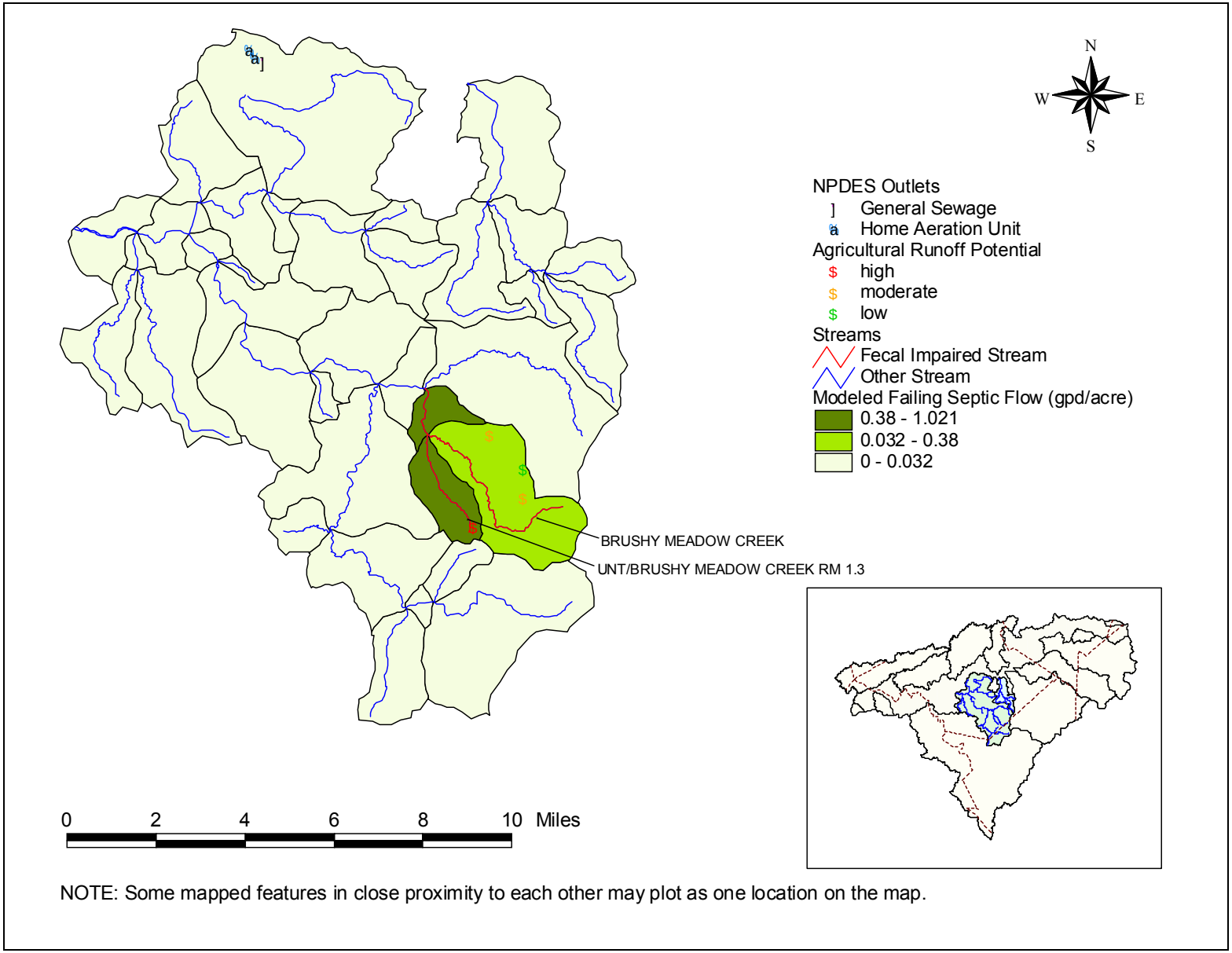


Figure A-7-4. Fecal coliform sources in the Hominy Creek watershed

A-7.4 TMDLs for the Hominy Creek and Panther Creek Watershed

A-7.4.1 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 the TMDL Report for a detailed description of the allocation methodologies used in developing the pollutant-specific TMDLs.

The TMDLs for iron, aluminum, and fecal coliform bacteria are shown in Tables A-7-2 through A-7-4. The TMDLs for iron and aluminum are presented as daily loads, in pounds per day. The TMDLs for fecal coliform bacteria are presented in number of colonies per day. All TMDLs were developed to meet TMDL endpoints under a range of conditions observed throughout the year.

A-7.5 TMDL Tables: Metals

Table A-7-2. Iron TMDLs for the Hominy Creek and Panther Creek watersheds

Major Watershed	Stream Code	Stream Name	Metal	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	Margin of Safety (lbs/day)	TMDL (lbs/day)
Hominy Creek	WVKG-24	Hominy Creek upstream of RM 17.3	Iron	31.5	5.4	1.9	38.8
Hominy Creek	WVKG-24-E-2	Brushy Meadow Creek	Iron	22.7	1.1	1.3	25.1
Hominy Creek	WVKG-24-I	Colt Branch	Iron	1.5	0.6	0.1	2.2
Panther Creek	WVKG-32	Panther Creek	Iron	91.4	4.8	5.1	101.3
Panther Creek	WVKG-32-I	Nettle Run	Iron	7.6	0.2	0.4	8.2
Panther Creek	WVKG-32-J	Cranes Nest Run	Iron	14.4	0.4	0.8	15.5

Table A-7-3. Aluminum TMDLs for the Panther 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)
Panther Creek	WVKG-32	Panther Creek	Aluminum	66.9	3.3	3.7	73.9

A-7.5 TMDL Tables: Fecal Coliform Bacteria

Table A-7-4. Fecal coliform bacteria TMDLs for the Hominy Creek and Panther Creek watersheds

Major Watershed	Stream Code	Stream Name	Parameter	Load Allocation (counts/day)	Wasteload Allocation (counts/day)	Margin of Safety (counts/day)	TMDL (counts/day)
Hominy Creek	WVKG-24-E-2	Brushy Meadow Creek	Fecal coliform	2.94E+10	NA	1.55E+09	3.09E+10
Hominy Creek	WVKG-24-E-2-B	UNT/Brushy Meadow Creek RM 1.3	Fecal coliform	7.56E+09	NA	3.98E+08	7.96E+09

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.