

APPENDIX 6

A-6. TOMLINSON RUN

A-6.1 Watershed Description

Tomlinson Run is in the northern portion of the Upper Ohio North watershed, as shown in Figure A-6-1, and drains approximately 28.9 square miles (18,473 acres). Figure A-6-2 shows the land use distribution for the watershed. The dominant land use in the watershed is forest, which covers 60 percent of the watershed. Other important land use types include agriculture (38 percent) and urban/residential land (2 percent).

There are four impaired streams in the Tomlinson Run watershed. Figure A-6-3 shows the impaired segments and the pollutants for which each is impaired.

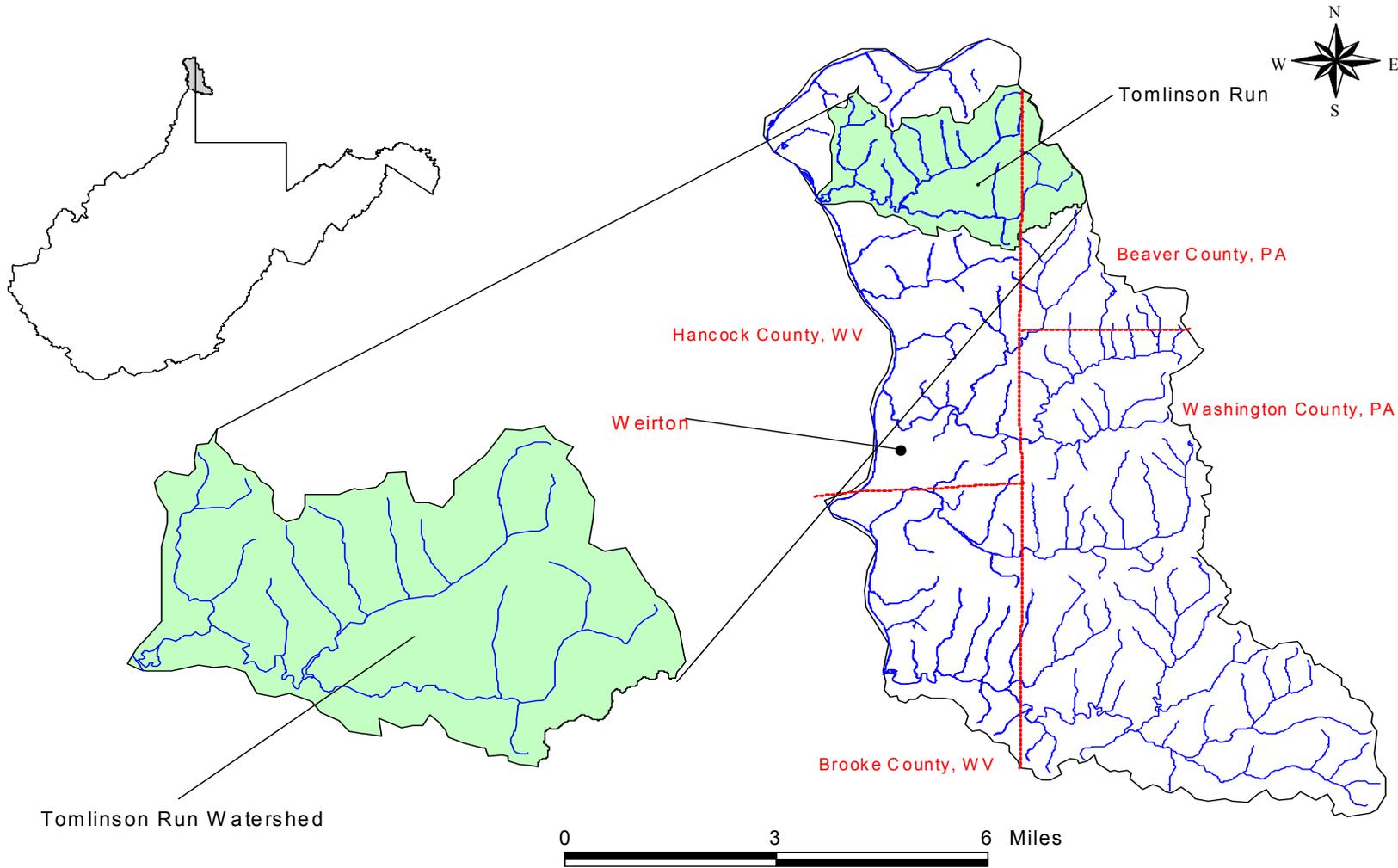


Figure A-6-1. Location of the Tomlinson Run watershed

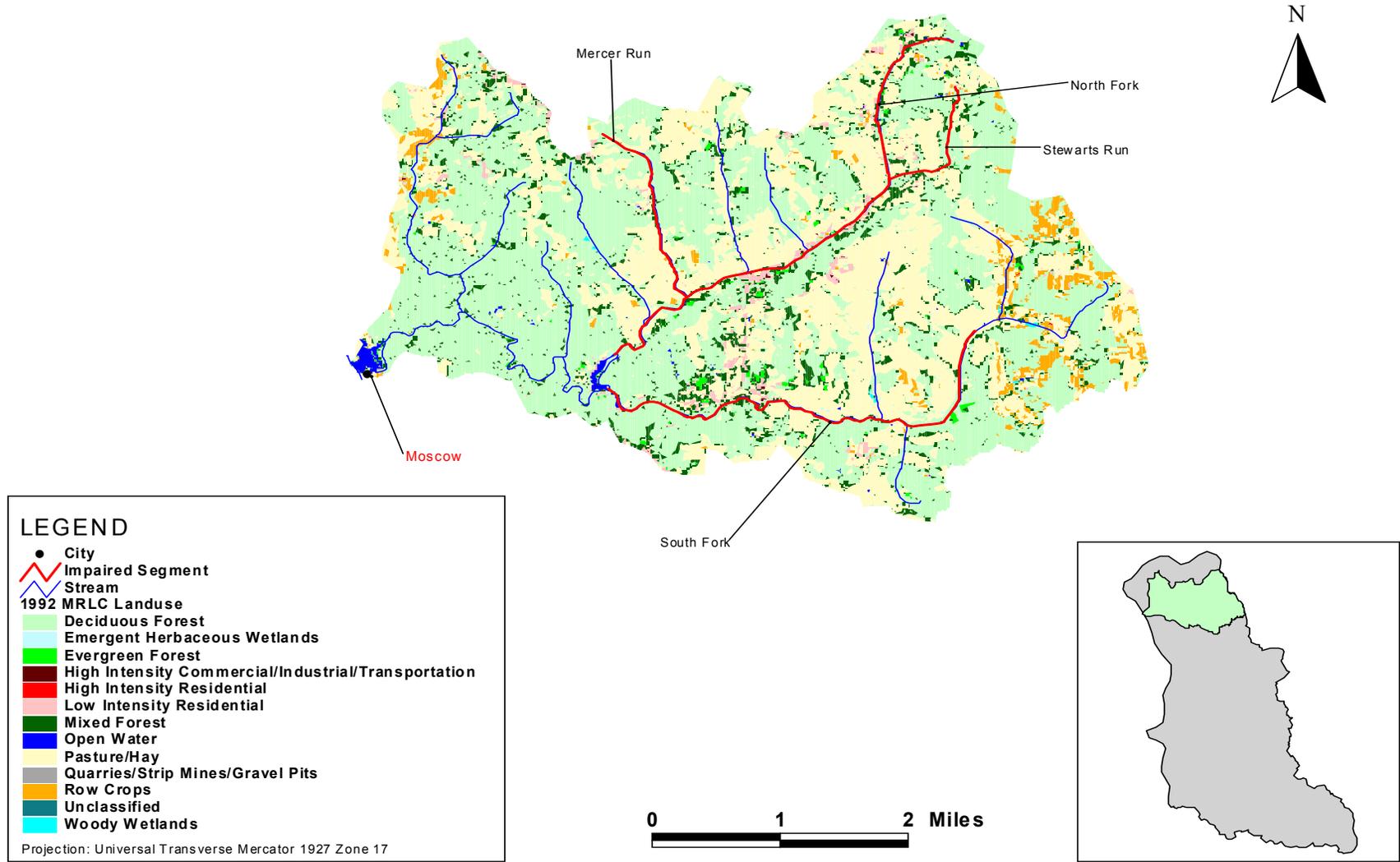
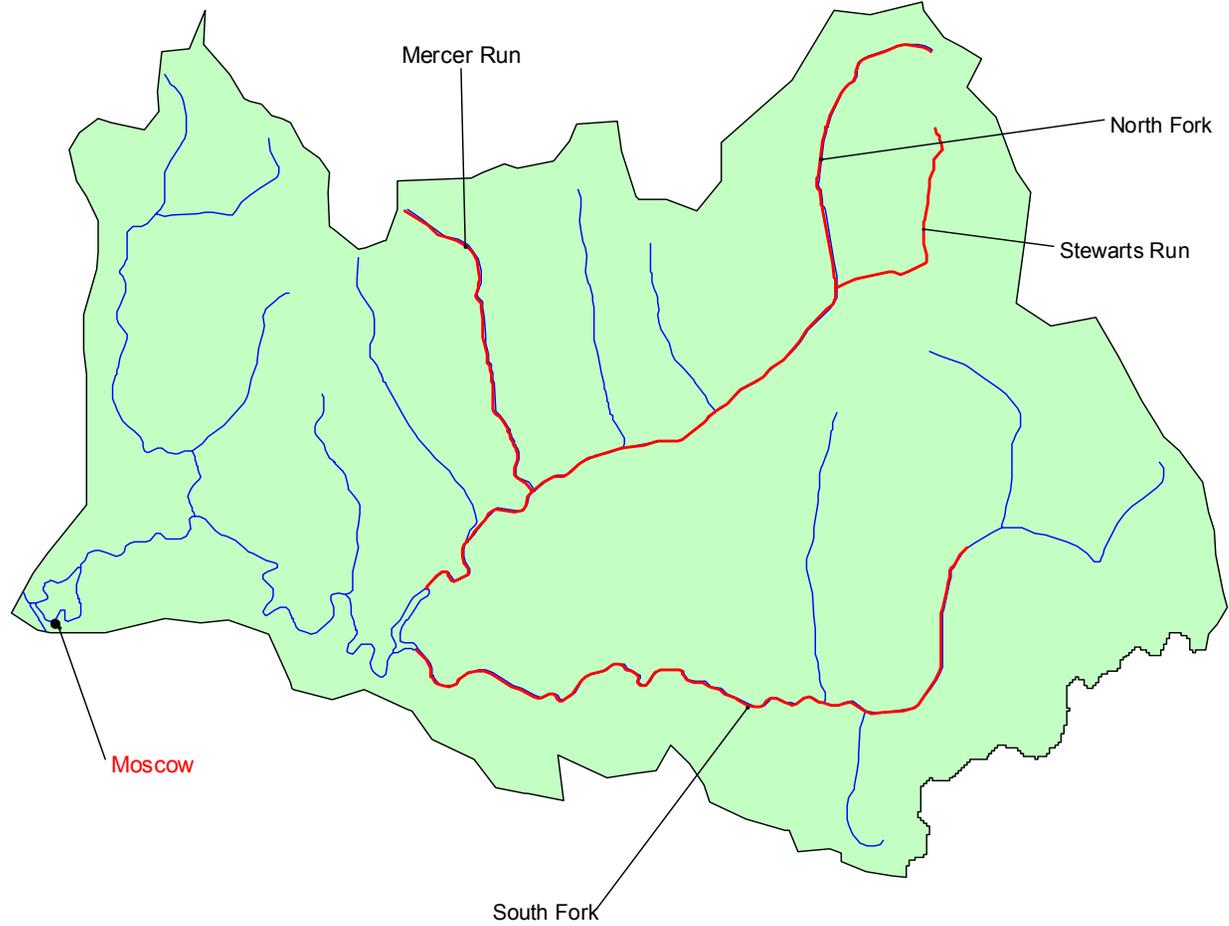


Figure A-6-2. Land use distribution in the Tomlinson Run watershed



Stream	Aluminum	Iron	Manganese	pH	Biological	Fecal Coliforms
South Fork					X	X
North Fork					X	X
Mercer Run					X	X
Stewarts Run						X

Figure A-6-3. Impaired waterbodies in the Tomlinson Run watershed

A-6.2 Pre-TMDL Monitoring

Before establishing Total Maximum Daily Loads (TMDLs), WVDEP conducted monitoring in each of the impaired streams in the Upper Ohio North watershed to characterize water quality and to refine impairment listings. Monthly samples were taken at 96 stations from July 1, 2001, to June 30, 2002. The locations of the pre-TMDL monitoring stations in the Tomlinson Run watershed are shown in Figure A-6-4. The parameters monitored 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 total iron, dissolved iron, total aluminum, dissolved aluminum, total manganese, total suspended solids, pH, sulfate, and specific conductance). Monthly samples from streams impaired by fecal coliform bacteria were analyzed for this parameter, pH, and specific conductance. Benthic macroinvertebrate assessments were performed at specific locations on the biologically impaired streams during the pre-TMDL monitoring period. Appropriate monitoring suites were selected for streams with multiple impairments. For example, if a stream was impaired by metals and fecal coliform bacteria, the samples were analyzed for total iron, dissolved iron, total aluminum, dissolved aluminum, total manganese, total suspended solids, pH, sulfate, specific conductance, and fecal coliform bacteria. When conditions allowed, instantaneous flow measurements were also taken at the pre-TMDL sampling locations.

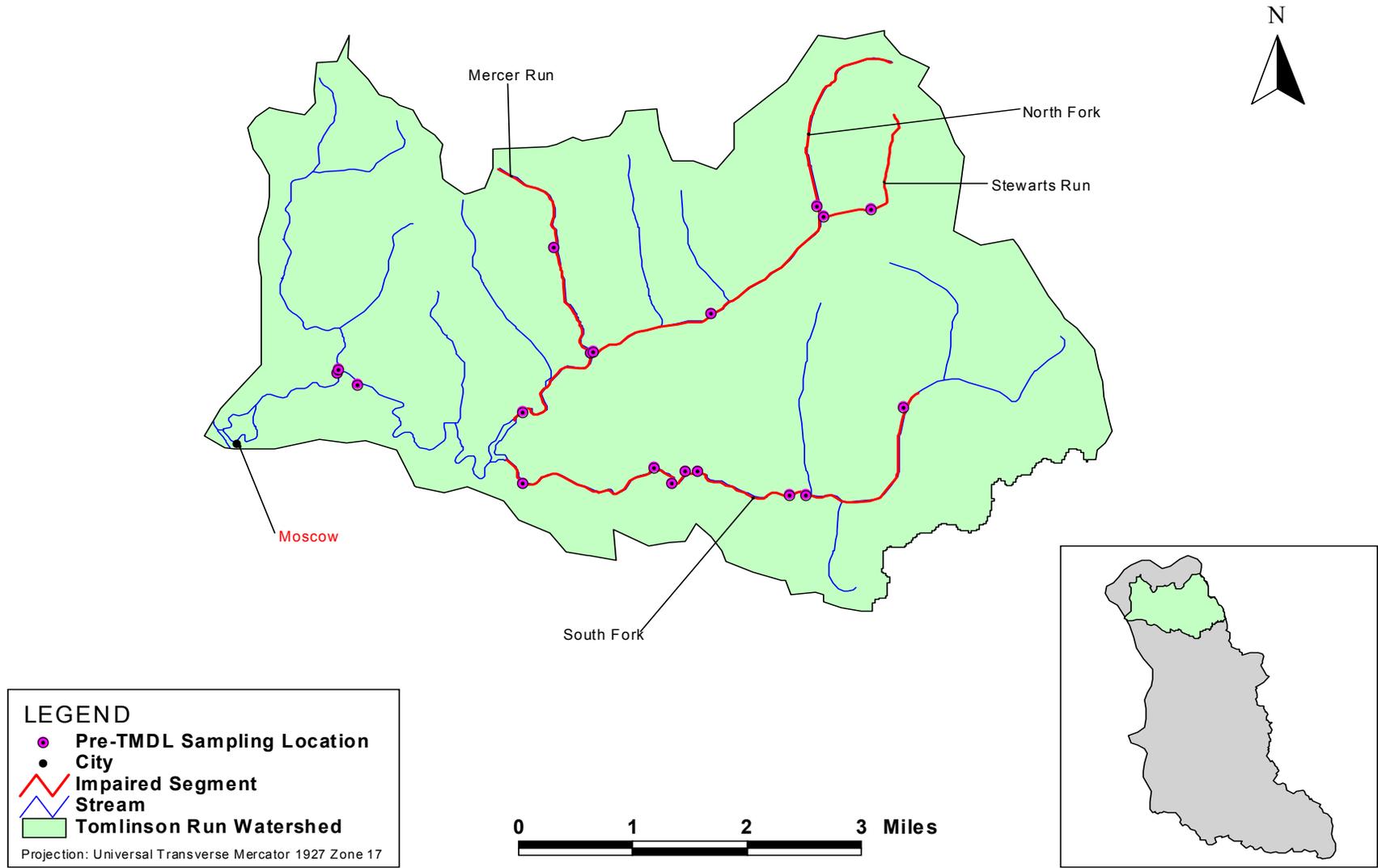


Figure A-6-4. Pre-TMDL monitoring stations in the Tomlinson Run watershed

A-6.3 Metals and pH Sources

No streams in the Tomlinson Run watershed have metals impairments or pH impairments addressed in this report.

A-6.4 Fecal Coliform Bacteria Sources

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

A-6.4.1 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 Tomlinson Run watershed there are five discharge permits.

A-6.4.2 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 Tomlinson Run 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 septic tank failure rates in this area to be 70 percent in the first 10 years (WV Bureau for Public Health 2003). An estimated 2,485 people live in unsewered areas of the Tomlinson Run watershed. Figure A-6-5 shows the unsewered population estimates 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 be a significant source, delivering bacteria present in litter and in the waste of pets and wildlife to the waterbody. Rural stormwater runoff can transport significant loads of bacteria to streams from livestock pastures, livestock and poultry feeding facilities, and manure storage and application.

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 WVDEP’s Division of Natural Resources. Although wildlife contributions of fecal coliform bacteria were considered in modeling, they were not found to be a significant source.

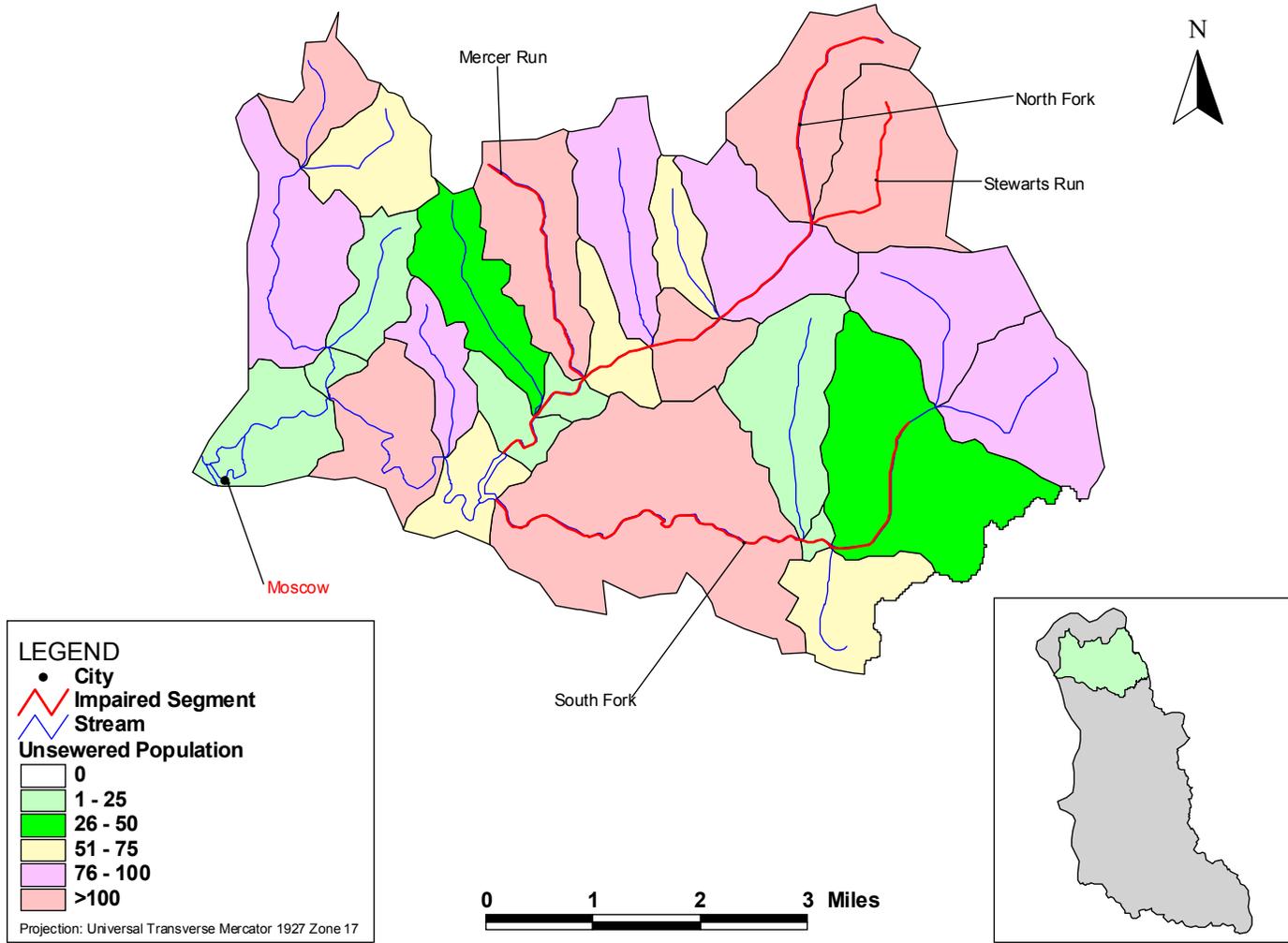


Figure A-6-5. Unsewered population in the Tomlinson Run watershed

A-6.5 Sources of Biological Impairment

A-6.5.1 Causative Stressors

The Tomlinson Run watershed has three biologically impaired streams for which TMDLs have been developed. These streams are identified in Table A-6-1 along with the primary stressors of the streams' benthic communities and the TMDLs required to address the cause of biological impairment. A stressor identification process was used to evaluate and identify the primary stressors of impaired benthic communities.

Table A-6-1. Primary stressors of biologically impaired streams in the Tomlinson Run watershed

Stream	Primary Stressors	TMDLs Required
South Fork	Organic enrichment Sedimentation	Fecal coliform bacteria Sediment
North Fork	Organic enrichment Sedimentation	Fecal coliform bacteria Sediment
Mercer Run	Organic enrichment Sedimentation	Fecal coliform bacteria Sediment

The fecal coliform bacteria TMDLs presented in Table A-6-3 are surrogates for the organic enrichment biological stressor. Please refer to section A-6.4 for source information.

A-6.5.2 Sediment Sources

Land Disturbance Activities

Land disturbance resulting from agriculture, forestry, oil and gas operations, and the construction and use of roads can contribute sediments to streams. The areas related to these activities and the number of sites in the Tomlinson Run watershed are discussed below.

Agriculture

Based on the Multi-Resolution Land Characteristics coverage, agricultural areas cover 6,899 acres (38 percent) of the Tomlinson Run watershed.

Forestry

Active logging operations are not present in the Tomlinson Run watershed.

Oil and Gas Wells

Active and inactive oil and gas operations are not present in the Tomlinson Run watershed.

Roads

The length and area of paved and unpaved roads were calculated using the Census 2000 TIGER/Line files road coverage for West Virginia. Table A-6-2 summarizes the length, area, and percentage of total watershed area for both paved and unpaved roads in the Tomlinson Run watershed.

Table A-6-2. Road miles by type in the Tomlinson Run watershed

Road Type	Road Distance (miles)	Road Area (acres)	Road Area as Percentage of Watershed
Total paved	74.93	150.55	0.81
Total unpaved	35.40	68.11	0.37

A-6.6 TMDLs for the Tomlinson Run Watershed

A-6.6.1 TMDL Development

TMDLs and source allocations were developed for impaired streams in the Tomlinson Run 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 in these waterbodies, and TMDLs were developed. Refer to section 7.4 of the main report for a detailed description of allocation methodologies used in the development of the pollutant-specific TMDLs. These TMDLs represent a successful scenario for which detailed load allocations were developed for specific nonpoint source categories in the West Virginia portion of the watershed. The loadings associated with the individual nonpoint source categories were aggregated and presented in this TMDL report as a gross load allocation for Pennsylvania. This TMDL report does not prescribe specific load or wasteload allocations for the contributing area of Pennsylvania. Instead, it allows Pennsylvania and its stakeholders to determine appropriate and necessary source reductions.

The TMDLs for fecal coliform bacteria and sediment are shown in Tables A-6-3 and A-6-4. The TMDLs for fecal coliform bacteria and sediment are presented as annual average loads, in terms of number of colonies per year and tons per year, respectively. They are presented as average annual loads because they were developed to meet TMDL endpoints under a range of conditions observed throughout the year.

Metals and/or fecal coliform pollutants can cause a biological impairment in a stream. In many instances, the biological impairment can be addressed by simply establishing TMDLs for various metals and fecal coliform. With the necessary TMDLs, the biological community will naturally respond to the more favorable conditions. In other situations, where sediment was identified as a primary stressor of the biological community, it was necessary to establish sediment TMDLs.

Sediment deposition can affect the biological community by smothering the habitat and organisms in the stream bottom, thereby creating a biological impairment. As discussed in section 6, a stressor identification process was used to evaluate and identify the primary stressors of impaired benthic communities. TMDLs were established for the responsible pollutants at the conclusion of the process. As a result, the TMDL process established a link between the impairment and benthic community stressor(s).

A-6.6.2 TMDL Tables: Fecal Coliform Bacteria

Table A-6-3. Fecal coliform bacteria TMDLs for the Tomlinson Run watershed

Major Watershed	Stream Code	Stream Name	Parameter	Load Allocation (counts/yr)	Wasteload Allocation (counts/yr)	Margin of Safety (counts/yr)	TMDL (counts/yr)	Pennsylvania Allocation (counts/yr)
TOMLINSON RUN	WVO-102-B	South Fork	Fecal coliform	5.09E+13	4.11E+10	2.68E+12	5.36E+13	3.71E+12
TOMLINSON RUN	WVO-102-C	North Fork	Fecal coliform	3.95E+13	1.79E+10	2.08E+12	4.16E+13	5.34E+12
TOMLINSON RUN	WVO-102-C-1	Mercer Run	Fecal coliform	4.51E+12	NA	2.38E+11	4.75E+12	NA
TOMLINSON RUN	WVO-102-C-6	Stewarts Run	Fecal coliform	5.01E+12	NA	2.64E+11	5.28E+12	1.63E+12

NA = not applicable.

A-6.6.3 TMDL Tables: Sediment

Table A-6-4. Sediment TMDLs for the Tomlinson Run watershed

Major Watershed	Stream Code	Stream Name	Parameter	Load Allocation (tons/yr)	Wasteload Allocation (tons/yr)	Margin of Safety (tons/yr)	TMDL (tons/yr)	Pennsylvania Allocation (tons/yr)
TOMLINSON RUN	WVO-102-B	South Fork	Sediment	399	1	21	421	14
TOMLINSON RUN	WVO-102-C	North Fork	Sediment	316	NA	17	333	141
TOMLINSON RUN	WVO-102-C-1	Mercer Run	Sediment	47	NA	2	49	0

NA = not applicable.