

### 3.9 PENNSYLVANIA RUN

#### 3.9.1 HISTORY, DEMOGRAPHIC AND COMMUNITY INFORMATION

The Pennsylvania Run watershed is approximately 7.0 square miles and located in the southern part of the County. It is bounded in the north and the west by the Pond Creek watershed and in the east by the Cedar Creek watershed. The Pennsylvania Run watershed is highlighted in yellow in Figure 98 to the right.

*Figure 98. Pennsylvania Run Watershed*



In 1990 (latest available census figures) the population of the Pennsylvania Run watershed reached 8,400. Table 82 illustrates the land use percentages.

**Table 82. Land Use Percentages (1992) - Pennsylvania Run**

<i>Total Imperviousness</i>	<i>Undeveloped</i>	<i>Commercial</i>	<i>Parks</i>	<i>Public</i>	<i>Industrial</i>	<i>Residential</i>
17.2	46.1	1.0	18.4	1.4	0.0	33.1

Co-permittees under the Municipal Separate Storm Sewer System (MS4) permit located within the watershed include Jefferson County and MSD. There are no other communities lying within the Pennsylvania Run watershed.

#### 3.9.2 HYDROLOGY AND FLOODING

There are approximately 15 miles of stream in the Pennsylvania Run watershed (see Figure 99). Pennsylvania Run is a tributary of Floyds Fork. The stream flows into Bullitt County where it empties into Floyds Fork. Approximately 17.2% of the 7.0 square mile watershed is impervious area.

*Figure 99. Typical Stream - Pennsylvania Run*



The Pennsylvania Run watershed has most recently experienced flooding in March 1997. There is approximately 0.4 square miles in Federal Emergency Man-

agement Administration’s (FEMA) 100-year floodplain. Within this area there are an estimated 224 structures. (See Exhibit 78 for the boundary of the 100-year floodplain.)

**3.9.2.1 Flood Prevention Measures**

There are two site detention basins that receive drainage credit. Pennsylvania Run includes McNeely Lake. (See Exhibit 78 for the location of this basin.) McNeely Lake is a multi-use recreational facility that also provides water quality and water quantity benefits to the watershed. The lake is located within McNeely Park.

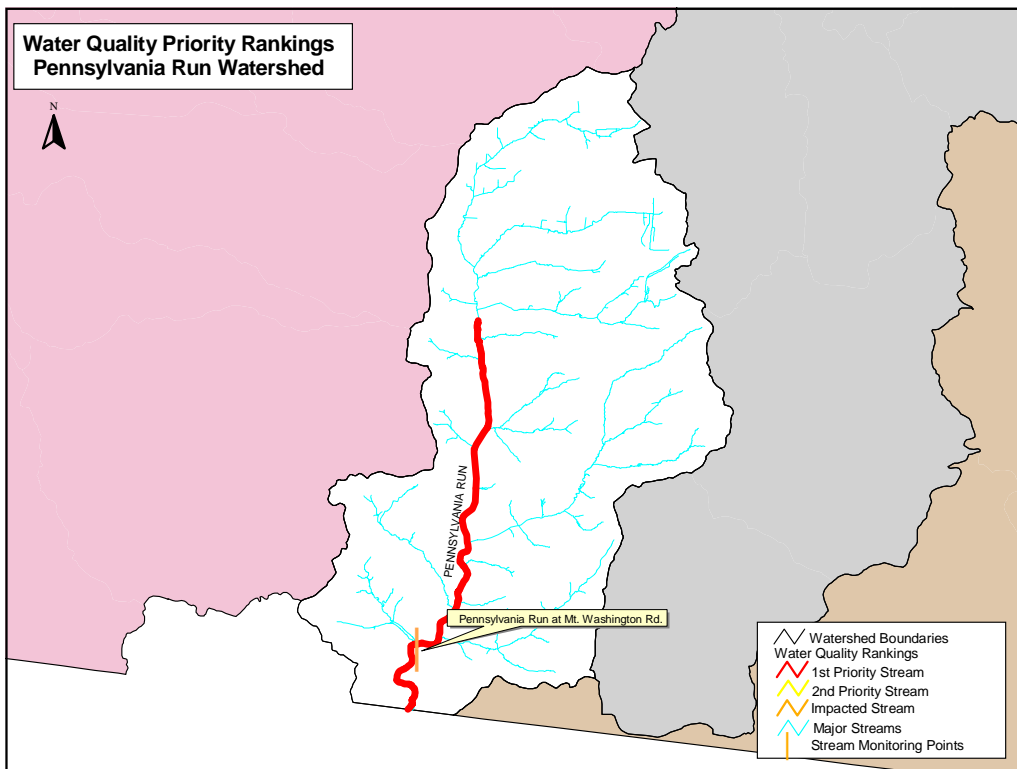
**3.9.3 STATUS OF WATER QUALITY**

Pennsylvania Run has approximately three miles of stream sections on the 1998 303(d) list for violations of the State Water Quality Standards (Table 83). The KDOW will develop Total Maximum Daily Loads (TMDL) for first priority streams within the next decade. Figure 100 shows the water quality priority rankings for the watershed. Impacted streams are based on MSD data for number of violations.

**Table 83. 303(d) List of Waters for TMDL Development - Pennsylvania Run**

<i>Stream</i>	<i>Priority</i>	<i>Impaired Use</i>	<i>Pollutants of Concern</i>
Pennsylvania Run	First	Aquatic Life Swimmable	Metals Pathogens Organic Enrichment/Low DO

**Figure 100. Water Quality Priority Rankings - Pennsylvania Run Watershed**



**3.9.4 WATER QUALITY IMPACTS**

Basic statistics were calculated for water quality parameters. Table 84 lists summary statistics for dissolved oxygen (DO), fecal coliform, and several metals for the Pennsylvania Run site. These parameters are listed because each had violations of State Water Quality Standards. (See *The Synthesis Report* for statistics for the entire suite of parameters. See Appendix V for a summary of the statistics in *The Synthesis Report*.)

**Table 84. Basic Statistics for Water Quality Constituents - Pennsylvania Run**

	<i>DO</i> (mg/l)	<i>FC</i> (col/100ml)	<i>Cd</i> (mg/l)	<i>Cu</i> (mg/l)	<i>Zn</i> (mg/l)
<b>Pennsylvania Run at Mt. Washington Rd.</b>					
# of cases	81	81	29	29	29
Minimum	1.800	1.000	0.002	0.002	0.005
Median	7.600	253.000	0.002	0.005	0.024
Mean	7.589	3778.198	0.003	0.007	0.077
Maximum	12.600	80000.000	0.007	0.059	0.810
Standard Deviation	3.016	11337.630	0.002	0.010	0.152
Coefficient of Variation	0.40	3.00	0.62	1.55	1.96
% Data Below Detection	0.0	0.0	89.7	51.7	3.4

Dissolved Oxygen (DO), Fecal Coliform (FC), Cadmium (Cd), Copper (Cu), and Zinc (Zn).

Table 85 illustrates the potential exceedances of State Water Quality Standards in the watershed. DO violations were underestimated in the previous monitoring system. Please refer to Section 2.1.3.6 for a discussion of the new monitoring system and its ability to provide more accurate DO measurements.

**Table 85. Potential Exceedances of State Water Quality Standards\***

<i>Station</i>	<i>Fecal</i>				
	<i>DO</i>	<i>Coliform</i>	<i>Cd**</i>	<i>Cu</i>	<i>Zn</i>
Pennsylvania Run at Mt. Washington Rd	13.6	40.7	3.4	3.4	6.9

Dissolved Oxygen (DO), Fecal Coliform (FC), Cadmium (Cd), Copper (Cu), and Zinc (Zn).

\*Expressed as a percentage of total data collected in a nine year period.

\*\*The acute and chronic critical values for Cd are nearly six times lower than the detection limit.

**3.9.4.1 Point Source**

Table 86 summarizes MSD’s point source obligations and lists the number of private treatment plants.

**Table 86. Summary of MSD's Regulatory Obligations plus Private Treatment Plants - Pennsylvania Run**

<i>Sanitary Sewer Overflows</i>	<i>Combined Sewer Overflows</i>	<i>Storm Water Outfalls</i>	<i>General Permittees</i>	<i>Significant Industrial Users</i>	<i>Wastewater Treatment Plants</i>
Recurring: 1		Year Sampled: 1996			
Investigated: 1	0	Total: 135	0	0	MSD: 2
Eliminated: 3		Contaminated: 0			Private: 1

The watershed is served by separate sewer systems; therefore there are no combined sewer overflows (CSOs) in the watershed. This year, MSD has eliminated three recurring sanitary sewer overflows (SSOs) from the documented list in Pennsylvania Run watershed. The Pines Wastewater Treatment Plant, Apple Valley Wastewater Treatment Plant and Maple Grove #5 Wastewater Treatment Plant are all from the documented SSO list, ID. Nos. 29602, 31675, and UA0229-TP. These three wastewater treatment plants were eliminated by the McNeely Lake pump station project and were taken off-line in August 1999. In addition, there is one recurring SSO and one investigated SSO in Pennsylvania Run. (See Appendix IX for the SSO locations and for the fact sheets of new and eliminated SSOs. Also see Exhibit 79 for the location of SSOs.)

To meet MS4 requirements for illicit connections, the Student Outfall Program concentrated their efforts in Pennsylvania Run watershed in 1996. There were 135 outfalls discovered. Of the 135 storm water outfalls, none were determined to be "contaminated." Storm water outfall information is included in Exhibit 80.

There are two MSD maintained wastewater treatment facilities in the Pennsylvania Run watershed. One is a small package plant and the other is the McNeely Lake Wastewater Treatment Plant (0.21 MGD). There is also one privately owned package plant. (See Exhibit 81 for the point source locations and Exhibit 82 for an overview of the watershed.)

There are no General Permittees and no Significant Industrial Users that are permitted through MSD's pretreatment program. There are no Kentucky Pollutant Discharge Elimination System (KPDES) permit holders in the Pennsylvania Run watershed other than MSD and private treatment plants.

#### **3.9.4.2 Non-Point Source**

Non-point source pollution is a problem in the Pennsylvania Run watershed. Nutrient levels are high in this area. Most of the nutrients originate from lawn chemicals, golf courses, small agriculture, septic tanks, and several package wastewater treatment plants. Heavy silt loads, from construction sites and agriculture, have produced degraded streams with dramatically reduced habitat.

Streams can be protected from development that is occurring in the Pennsylvania Run watershed through best management practices (BMPs) for erosion prevention and sediment control. Emphasis should be placed on protecting riparian vegetation. This vegetation creates a buffer for construction and moderates stream temperatures.

Other non-point sources in this watershed are herbicides, pesticides, and fertilizers. As part of the MS4 reapplication, pollution prevention plans will be required for co-permittee herbicide and pesticide applications.

Pollution prevention plans may include such items as:

- Application guidance
- Mixing and preparation guidance
- Guidance on proper disposal of used and/or waste materials
- Other environmental concerns.

In the 1999 data analysis effort (*The Synthesis Report*) loads were flow stratified. Low flow (point source) and high flow (non-point source/wet weather) loads indicated that impacts to the Pennsylvania Run watershed are evenly distributed between non-point source/wet weather and point source. Table 87 summarizes the loading for the constituents. Fecal coliforms frequently violated the State Water Quality Standard and were wet weather related. These findings indicate that the emphasis should be on wet weather impacts to the Pennsylvania Run watershed.

**Table 87. Sources of Loads for Point Source (P) and Wet Weather (W) - Pennsylvania Run**

<i>Station</i>	<i>TSS</i>	<i>BOD</i>	<i>NO<sub>3</sub></i>	<i>NH<sub>4</sub></i>	<i>TKN</i>	<i>TP</i>	<i>SRP</i>	<i>FC</i>	<i>Cu</i>	<i>Fe</i>	<i>Zn</i>
Pennsylvania Run at Mt. Washington Rd.	W	W	P	P	W	P	P	W	P	P	W

Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), Nitrate (NO<sub>3</sub>), Ammonia Nitrogen (NH<sub>4</sub>), Organic Nitrogen (TKN), Total Phosphorus (TP), Soluble Reactive Phosphorus (SRP), Fecal Coliform (FC), Copper (Cu), Iron (Fe), and Zinc (Zn).

**3.9.4.3 Habitat and Biological Quality**

This section is based on field observations for the Pennsylvania Run watershed. Riparian areas of the Pennsylvania Run watershed are frequently impacted by the removal of trees. In-stream temperatures are elevated and increased exposure to direct sunlight has caused a nuisance algae problem. Increased temperature and nuisance filamentous algae often contribute to lower DO levels. Heavy silt loads from construction sites and agriculture reduces habitat quality within the stream and when combined with lower DO reduce the biological diversity. Substrates are generally a combination of cobble, boulders and bed-rock. Some areas are degraded by considerable levels of sedimentation.

**3.9.5 TRACKING CHANGES IN WATER QUALITY**

**Trends in Water Quality**

One of the objectives of the 1999 data analysis was to examine how water quality (physical and chemical) has changed over the nine year period and to see if improvements in water quality could be detected in Jefferson County streams resulting from MSD’s activities. However, in the Pennsylvania Run watershed, these trends are flat. MSD anticipates that over the next decade, trends for those constituents directly related to SSOs and

storm water impacts will begin to decline as these programs move from planning to implementation.

### 3.9.5.1 Monitoring Activities

There were 29 monitoring sites that collected data from 1988 to 1998. One of these sites was located within the Pennsylvania Run watershed:

- Pennsylvania Run at Mt. Washington Road

There are 22 sites in the current monitoring program. This program uses the same site location as the previous monitoring program.

### 3.9.6 PROGRAM ACTIVITIES

Activities for the MS4, CSO, SSO, sanitary, and drainage programs are described in the following sections.

#### 3.9.6.1 Planning

During fiscal year 1999, MSD began planning the project and studies that will be initiated during fiscal years 2000 through 2004. The following bulleted sections describe these projects and studies. See Exhibit 83 for the boundaries of the fiscal years 2000 through 2004 capital projects. (For further project description see Appendix X. For a listing of SSOs and associated projects see Appendix XI.)

#### MS4

- *Student Outfall Program*
- *Water Quality/Quantity Monitoring*
- *MS4 Storm Water Permit*
- *Water Quality/Regulatory Support Services*
- *Community Rating System (CRS)/FEMA/Floodplain Mapping General Services*
- *Plan Review Support General Services*
  
- Sanitary
  - *Floyds Fork Action Plan* - MSD ID No. 881500
  - *McNeely Lake PS, FM, INT and Odor Control* - MSD ID No. 933610
  - *Floyds Fork General Services* - MSD ID No. 992670, 992680, 992690, 992700, 992710
  
- Drainage
  - *Floyds Fork Watershed Drainage Imp.* - MSD ID No. 98303
  - *Glaser Road Area Drainage Imp.* - MSD ID No. 983040

**CSO**

- There are no combined sewers within this watershed.

**SSO**

- *McNeely Lake Infiltration and Inflow (I/I) Remediation (Phase II-IV)* - MSD ID No. 972100, 972110
- *Interceptor Inspection Program*

**3.9.6.2 Projects**

MSD has had several projects occur within the Pennsylvania Run watershed during fiscal year 1999. The following bulleted sections describe these projects. See Exhibit 84 for the project locations. (For additional information see Appendix X or the Wastewater and Operations Capital Sheet Binder. For a listing of SSOs and associated projects see Appendix XI.)

**MS4**

- *Water Quality/Quantity Monitoring* - See Section 2.1.3.6
- *MS4 Storm Water Permit* - See Section 2.1.3.7
- Sanitary
  - *McNeely Lake PS, FM, and Odor Control* - This project includes 1,150 LF of 20-inch force main and a new 2.8 MGD raw wastewater pumping station. MSD's Pennsylvania Run Pump Station and Old Maple Grove will be eliminated. Five neighborhood pumping stations will also be eliminated with the construction.
- Drainage
  - *Floyds Fork Watershed Drainage Improvement* - This plan consists of a series of neighborhood type drainage improvement projects.
  - *Glaser Road Area Drainage Improvement* - This project includes the construction of a detention basin and associated work. The project will reduce structural and property flooding.

**CSO**

- There are no combined sewers within this watershed.

## SSO

- *McNeely Lake Sanitary Sewer Evaluation Study (SSES)* - Field work and reporting was completed in fiscal year 1999. Results were used for the design of the McNeely Lake Rehab Phase I project.
- *McNeely Lake Rehab Phase I* - Design was completed for the installation of 644 chimney seals and 2709 linear feet of CIPP, including service laterals. Construction will be completed in fiscal year 2000.

### 3.9.6.3 Education

#### MS4 Education

- **MSD**  
MSD education activities are described in detail in Section 2.1.3.5. Activities specific to this watershed include:
  - The Floyds Fork Area Team formed a stakeholders group. MSD met with the stakeholders group on several occasions to discuss the Floyds Fork Subregional Wastewater Treatment Plant. The following groups participated:
    - Floyds Fork Environmental Association
    - Association of Chenoweth Run Environmentalists
    - Jeffersontown/Chenoweth Run Environmental Improvement Project Stakeholders Group
    - Apple Valley Neighborhood Association
    - MSD Countywide Stakeholders
    - Fern Creek Study Committee
    - Old Henry Road Study Group
    - Seaton Springs Association
    - Floyds Fork Wastewater Treatment Plant Erosion Control Group
- **Co-Permittee**  
Jefferson County is located in this watershed and their internet site is [www.jefferson.ky.us](http://www.jefferson.ky.us).

#### CSO Education

- There are no combined sewers within this watershed.

#### SSO Education

- There was no SSO education within this watershed.

**External Agencies**

Several organizations/agencies have participated in public education and outreach programs over the past year. The following organizations/agencies that have countywide programs are discussed in Section 2.1.3.8.

- Cornerstone 2020
- FEMA Community Rating System
- Health Department
- Home Builders Association of Louisville
- Jefferson County Waste Management District
- Kentucky Division of Forestry
- KY Fish and Wildlife
- Kentucky Waterways Alliance
- Louisville and Jefferson County Parks Department

The following organizations/agencies performed activities that are watershed specific.

- Natural Resource Conservation Service (NRCS)

In addition to the countywide activities discussed in Section 2.1.3.8, community members from the Pennsylvania Run watershed also participated in these NRCS activities:

- KY Agriculture Water Quality Act Farmer's Meeting
- Distribution of KY Agriculture Water Quality Producer Workbooks to Farmers
- Promotion of the United States Department of Agriculture National Buffer Initiative