months of June and July, and that the summer water temperatures may be a contributing factor in the low dissolved oxygen levels. The three samples from site 28-01 that measured below 4 mg/l were taken in June and July.

For sites 27-01, 28-01, and 28-02, fecal coliform counts in 2002 were in the “good” range for 13 percent, 31 percent, and 17 percent of the samples, respectively. Countywide, 17 percent of the samples collected in 2002 were in the “good” range. In the 2002 report, a fecal coliform count less than 200/100 ml (geometric mean) was considered “good” water quality and a count of 250,000/100 ml was indicative of a direct sewage discharge. Figure 1-2 shows the values for the geometric mean of fecal coliforms from 1993 to 2002. The geometric mean is used to measure the central tendency of the data.

The data collected for the *Annual Stream Water Quality Reports* indicated a higher concentration of fecal coliforms at the three sampling sites than the fecal coliform data collected for the *Occoquan Environmental Baseline Report*. Data from 1976 and 2002 are compared in Table 1-3.

Figure 1-2: Yearly Geometric Mean of Fecal Coliforms for Little Rocky Run and Johnny Moore Creek

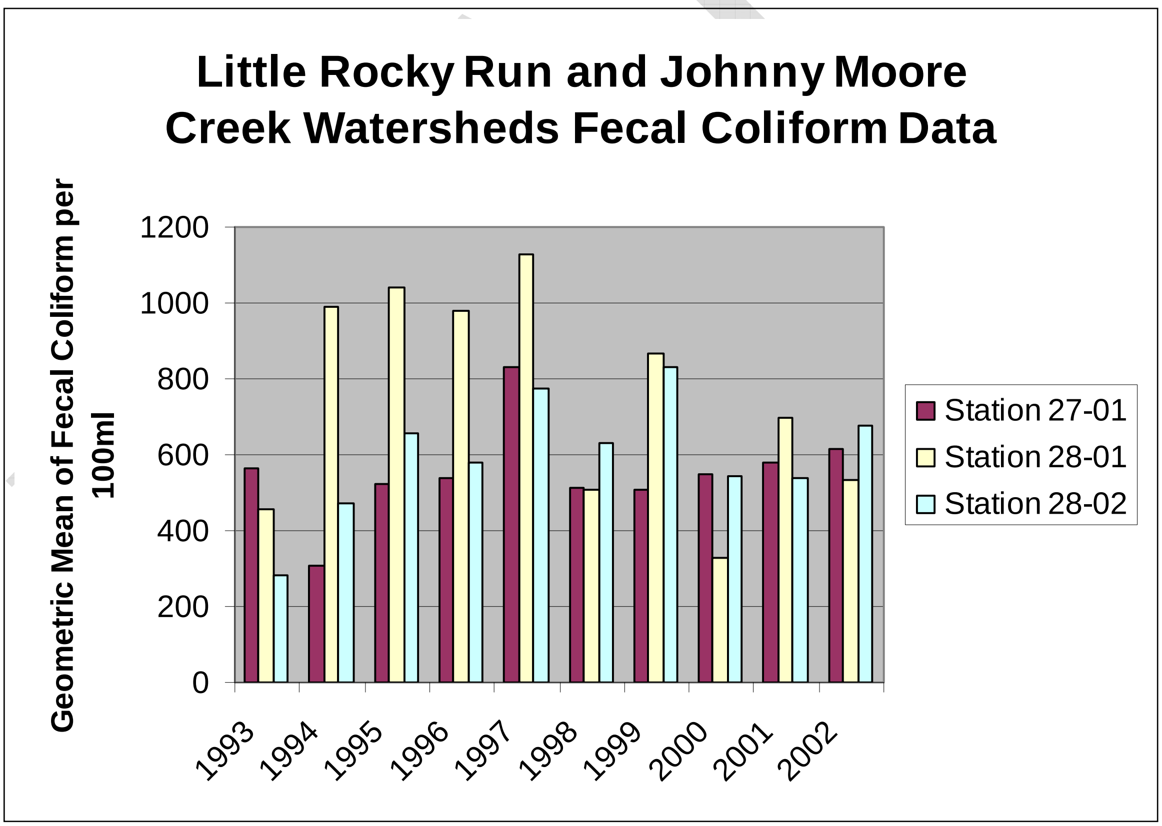


Table 1-3 Comparison of Fecal Coliform Levels – Occoquan Environmental Baseline Report and Stream Water Quality Reports

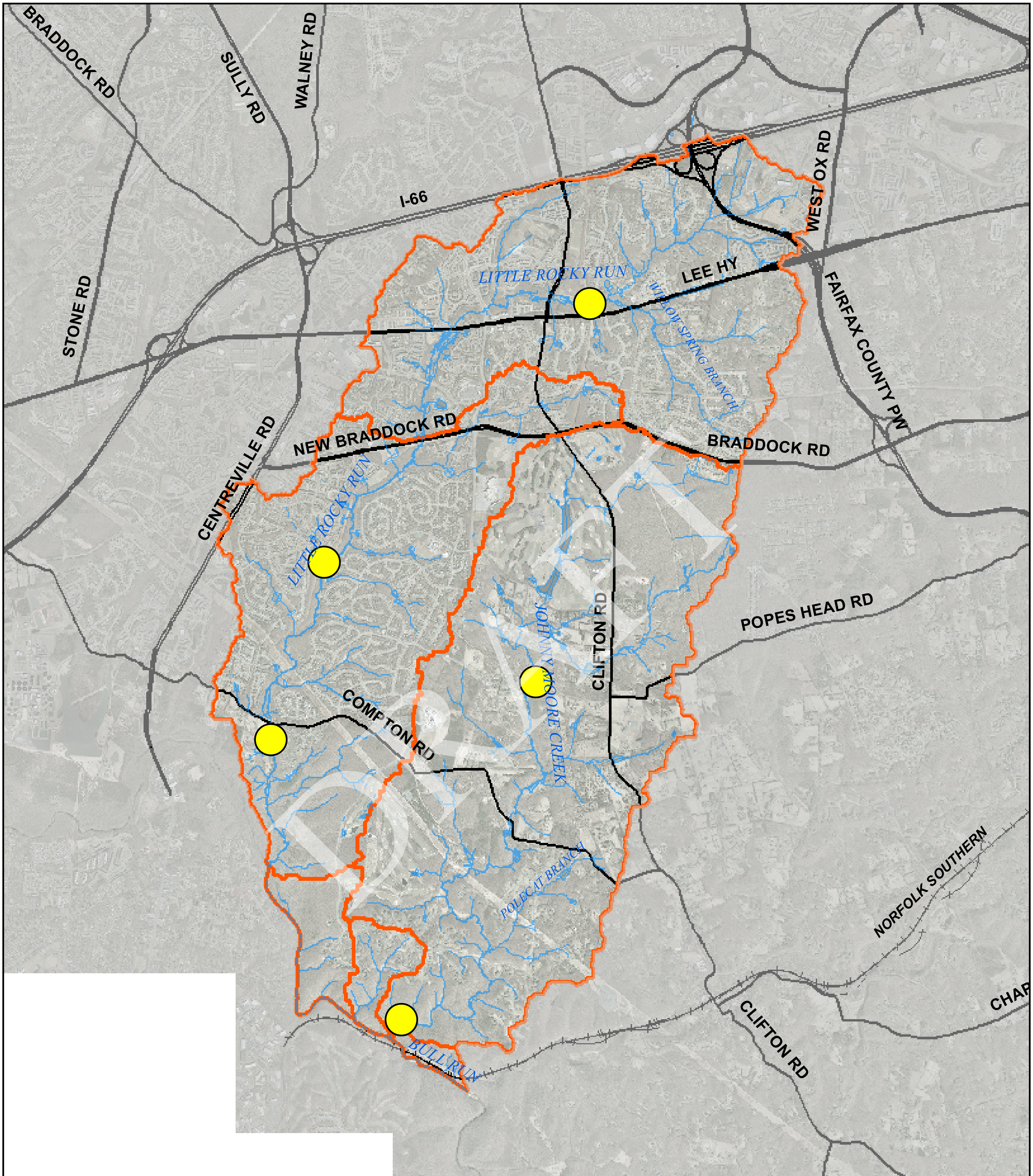
Sample Location	1976 Yearly Log Average Fecal Coliforms per 100 ml	2002 Geometric Mean Fecal Coliforms per 100 ml
Johnny Moore Creek at Compton Road (27-01)	33	615
Little Rocky Run at Lee Highway (28-01)	35	535
Little Rocky Run at Compton Road (28-02)	24	676

The stream water quality reports included analyses of sampling data that provide valuable information about the water quality in the Little Rocky Run and Johnny Moore Creek watersheds. These data will be used in conjunction with other County data to identify problem areas.

Fairfax County Stream Protection Strategy Baseline Study, 2001

The *Fairfax County Stream Protection Strategy (SPS) Baseline Study* evaluated the quality of streams throughout the County. The purpose of the SPS was to assess the continuing stream degradation within the ecosystem as evidenced by increasing stream channel erosion, loss of riparian buffers, decreased aquatic life, and poor water quality. The general objectives of the SPS program were to provide "recommendations for protection and restoration activities on a subwatershed basis, prioritization of areas for allocation of limited resources, establishment of a framework for long-term stream quality monitoring, and support for overall watershed management."

Little Rocky Run received "fair" composite site condition ratings in the upper and lower watershed, and a "good" rating in the central portion of the watershed. Johnny Moore Creek received "excellent" composite site condition ratings at both sites in the watershed. These ratings were based on the numeric scores of four components of stream/watershed conditions (environmental parameters): an index of biotic integrity; a general evaluation of watershed features, and a specific evaluation of 10 habitat quality parameters (habitat assessment); fish taxa richness (number of fish species); and percent imperviousness. Table 1-4 provides information regarding the macroinvertebrate and fish species and percent impervious surfaces at the five testing sites according to the *SPS Baseline Study Data Summary*. Faunal quality results at similar locations from the *Environmental Baseline Report* are also shown. Map 1-5 shows the location of the five SPS sampling sites.



COUNTY OF FAIRFAX 1742 VIRGINIA

0 2,000 4,000 Feet

SPS Sampling Sites
Streams
Watershed Management Areas
Major Roads
Railroad

Map 1-5
Stream Protection Strategy
Sampling Sites

Little Rocky Run / Johnny Moore Creek Watersheds

Table 1-4 Macroinvertebrate Assessment and Fish Species

Stream Name and Location	Composite Site Condition Rating	Macro-invertebrate Assessment	Number of Fish Species	1978 Faunal Quality	2001 Percent Impervious Surfaces
Little Rocky Run upstream of Stringfellow Road	Fair	Poor	High	No data available	14.6
Little Rocky Run downstream of New Braddock Road (and Springstone Drive)	Good	Fair	High	Good	17.7
Little Rocky Run downstream of Compton Road	Fair	Poor	Moderate	Good to Very Good	19.1
Johnny Moore Creek downstream of Johnny Moore Lane	Excellent	Good	High	Fair to Good	2.6
Johnny Moore Creek upstream of the confluence with Bull Run	Excellent	Poor	High	Good to Very Good	2.4

The Little Rocky Run watershed differs from the Johnny Moore Creek watershed in terms of level of development. The Johnny Moore Creek watershed has a greater percentage of forested land and fields/pastures than the Little Rocky Run watershed. Little Rocky Run has a greater percentage of low intensity residential, high intensity residential, and commercial/ industrial development than Johnny Moore Creek. This is evident in the difference in percent imperviousness in the two watersheds. Johnny Moore Creek has a substantially lower percent imperviousness than Little Rocky Run.

Polluted stormwater runoff affects the number and diversity of macroinvertebrate and fish species. Twenty-one individual species of fish were found in each of the two watersheds, accounting for the high fish taxa richness. The generally poor rating for the benthic macro-invertebrate community for both watersheds was due to aquatic worms and/or midges (organisms generally considered tolerant of degraded conditions) dominating the community. The volunteer monitoring conducted by the Northern Virginia Soil and Water Conservation District indicated a generally healthy benthic community at four sites within the Johnny Moore Creek main stem. For the macroinvertebrate assessment, the number of unique species and the balance between pollution-tolerant and intolerant species were measured. The SPS rankings ranged between excellent, good, fair, poor, and very poor. A fair rating indicates a marked decrease in intolerant species and a shift to an unbalanced community; a poor rating indicates decreased diversity with intolerant species being rare or absent. For the number of unique fish species collected, the SPS ratings were high, moderate, low, or very low.

Sediment deposition and bank stability ratings negatively impacted overall habitat rankings. Specifically, active channel widening was identified on some reaches of Little Rocky Run, indicating bank instability. Little Rocky Run was considered a semi-degraded aquatic system with the potential for improvement. Sediment deposition and bank stability ratings also lowered overall habitat scores across the region; however, in-stream and riparian zone conditions were generally “good” throughout both watersheds (some exceptions being portions of Little Rocky Run with evidence of instability, often in the form of active channel widening). The Little Rocky Run and Johnny Moore Creek watersheds still contain some of the higher quality stream systems found within the Piedmont Upland Region in Fairfax County.

In the *SPS Baseline Study*, the central portion of Little Rocky Run watershed and all of Johnny Moore Creek watershed were classified as Watershed Protection Areas, with the goal of preserving biological integrity by taking active measures to identify and protect, as much as possible, the conditions responsible for the current high-quality rating of these streams. The upper portion of Little Rocky Run watershed was classified as a Watershed Restoration Area Level I, with the goal of reestablishing healthy biological communities by taking active measures to identify and remedy causes of stream degradation. The lower portion of Little Rocky Run watershed was classified as a Watershed Restoration Area Level II, with the goal of maintaining areas to prevent further degradation and implementing measures to improve water quality to comply with Chesapeake Bay initiatives, Total Maximum Daily Load (TMDL) regulations, and other water quality measures. It was also designated as an Assessment Priority Area, indicating a need to select sites and implement monitoring within that area. This reflects the uncertainty over the dramatic change in condition between monitoring sites along the system’s main stem. These designations were based on the composite biological ranking and estimated imperviousness (future development potential based on current zoning information). The Countywide representation in each of the management categories was as follows:

- Watershed Protection: 31.5 percent of the County
- Watershed Restoration Level I: 7.2 percent of the County
- Watershed Restoration Level II: 61.3 percent of the County

The entire Johnny Moore Creek watershed and a portion of the Little Rocky Run watershed are under the zoning ordinance of the Water Supply Protection Overlay District (WSPOD) to protect the quality of water draining directly into the Occoquan reservoir. The Centreville area within the Little Rocky Run watershed is exempt from the ordinance, a fact that explains the abrupt differences in land use and imperviousness between the two watersheds.

Based on the SPS goals of protecting and restoring stream quality within Fairfax County, a diverse management approach will be necessary. It will require active and ongoing stream